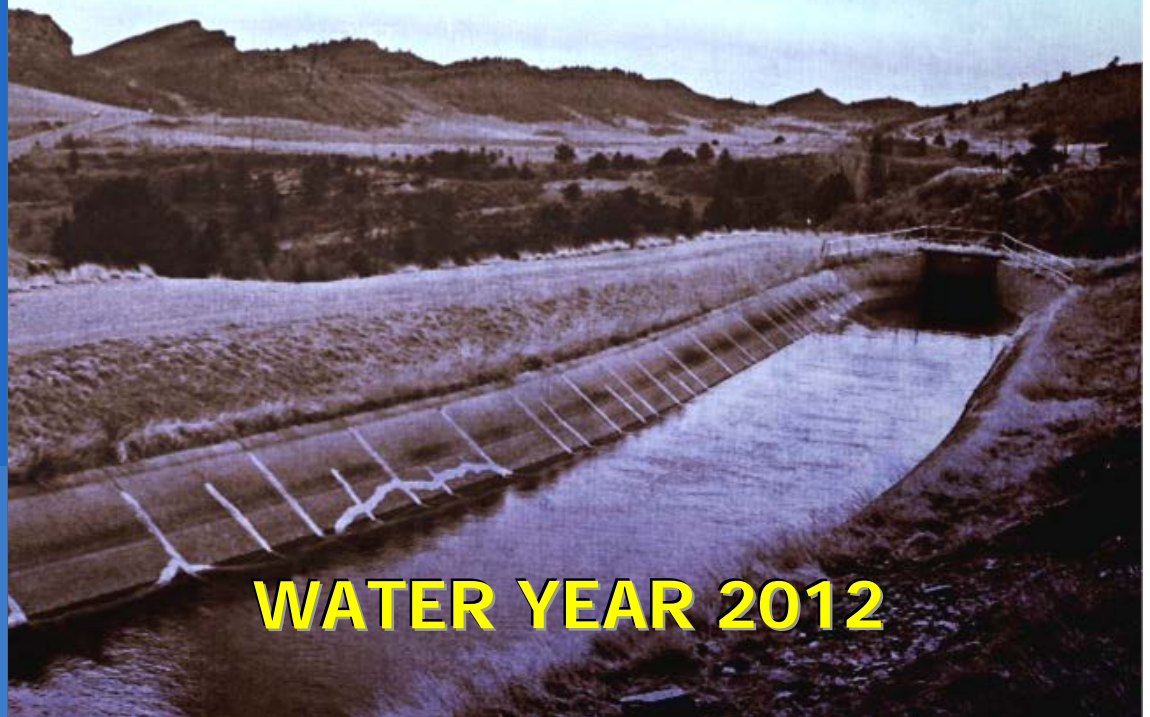




STREAM FLOW DATA for COLORADO



Computed by the
Hydrographic
Branch

Edited by
Thomas Ley

WATER YEAR 2012



Executive Director Mike King
Department of Natural Resources



Governor John Hickenlooper
State of Colorado



Director / State Engineer Dick Wolfe
Division of Water Resources

STATEWIDE HYDROGRAPHIC STAFF

Scott Cuthbertson, Deputy State Engineer-Public Safety

Thomas Ley, Chief, Hydrographic and Satellite Monitoring Branch

DENVER

David Hutchens

GREELEY

Russell Stroud
M. L. Cuning
Patrick Tyler
Bob Erosky
Mike Wild
Devin Ridnour
Tony Arnett
Matt Rusch

PUEBLO

Bill Tyner
Joseph Talbott
Charlie DiDomenico
Cheston Hart
Anthony Gutierrez
Steve Anselmo
Garrett Markus

ALAMOSA

Scott Veneman
Stan Ditmars
Lee Conner
Jesse Jaminet
Andrea Taillacq

MONTROSE

Jerry Thrush
Phil DeArcos

GLENWOOD SPRINGS

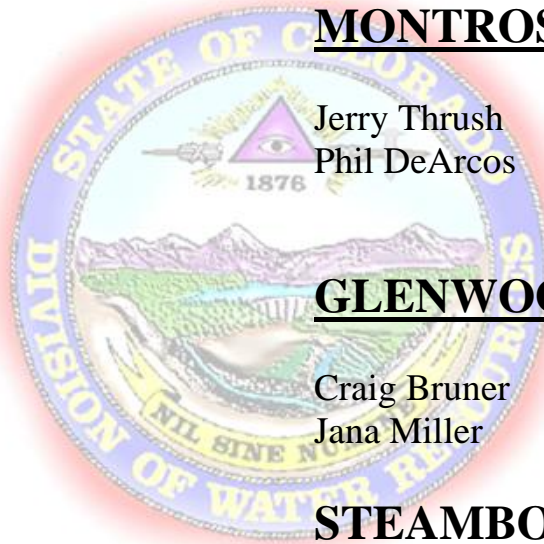
Craig Bruner
Jana Miller

STEAMBOAT SPRINGS

Dan Meyer
Dana Miller

DURANGO

Brian Boughton
Brian Leavesley



PLATTE RIVER BASIN
SOUTH PLATTE RIVER BELOW ANTERO RESERVOIR
Water Year 2012

Location.-- Lat. N38° 59' 37.96", Long. W105° 56' 40.31" (NAD83). Gage is located on the left side of a 10-ft Cipoletti Weir directly below Antero Reservoir.

Drainage Area and Period of Record.-- 191 sqmi (USGS Colorado StreamStats utility). ; Daily values are available from the DWR from October 1, 1975 to present.

Equipment.-- Sutron 56-0540-400-DTR shaft encoder connected to a Sutron SatLink 2 satellite Data Collection Platform (DCP) with an independent standalone Sutron SDR-0001-1 Stage Discharge Recorder (SDR) in a concrete shelter over a 48 inch concrete stilling well at a 10 ft. sharp-crested stainless steel Cipoletti weir centered in a rectangular concrete wall within a concrete trapezoidal canal section. The well is connected to channel by two 4-inch intakes located at the same elevation. An electric tape gage located on a equipment shelf is the primary reference. There are no supplemental gage provisions. Gage is operated in cooperation of the Denver Water Board (DWB) and the Colorado Division of Water Resources (DWR). Facilities are owned and maintained by DWB.

Hydrologic Conditions.-- Controlled release from Antero Reservoir. Antero Reservoir captures water from approximately 191 sq mi of lands of varying topography and vegetation types.

Gage-Height Record.-- The primary record is 15-minute satellite data with 15-minute logged DCP data and 5-minute logged SDR data as back up. Regular visits ensure that the blade of the Cipoletti weir remained clean. No corrections were necessary after cleaning. Instrument calibration was maintained by seventeen visits made to the gage. The daily averages of primary record agreed with daily averages of the SDR record within 0.02 ft. The large intakes (4 inch) transmit gage height (GH) fluctuation seen in the weir pool at higher stages (>1.50 ft.). The record is complete and reliable. Missing values on October 26, 2011 (14:45 to 16:30) and August 20, 2012 (18:45 to 23:30) when the DCP did not transmit were filled using backup data from DCP log without loss of accuracy. The shelter and stilling well are heated in winter months to keep the well open.

Datum Corrections.-- Levels were run to the ETG on August 11, 2010 using R.M. 1 as base. The ETG index elevation was found to be 0.02 ft lower than the established elevation. No correction was made.

Rating.-- The control is a 10 ft. sharp-crested stainless steel Cipoletti weir centered in a rectangular concrete wall within a concrete trapezoidal canal section. Flows can exceed the confines of the Cipoletti weir at which point the control becomes compound with the concrete walls functioning as a broad crested weir. Initially the weir employed a theoretic rating based on compound weirs. However, this proved inaccurate and a new rating, MOD10FTCIP was developed using the Cipoletti rating to a stage of 3.16 ft and discharge of 192 cfs. Above 3.16 ft. the rating is defined to 316 cfs by measurements made in 2002 and 2003. This rating was utilized for WY 2012. By agreement with DWB, when flows are confined to the Cipoletti portion of the rating, the rating is applied directly to the gage height record to compute flow. The accuracy of the Cipoletti portion of the weir is thought (by Denver) to be more accurate than conventional measurements made in a natural channel. However, once above GH's of about 3.16 ft, the rating is based on a few measurements with only fair accuracy due to surging GH conditions. Currently there is no suitable location to measure higher flows. The measurement bridge over the stilling pool in not usable due to eddies and extreme turbulence in the pool during high releases. No discharge measurements were made this year. The peak discharge of 40.4 cfs occurred at 11:15 on September 22, 2012 at a gage height of 1.13 ft. with a shift of 0.00 ft. The peak discharge event was short in duration and created by reservoir caretakers flushing the outlet works conduits.

Discharge.-- Shifts could be caused by moss growth and approach velocities. By agreement with the DWB, the rating was applied directly to gage heights. Flow is controlled by low head slide gates which are prone to blockage by debris, causing spikes in flow until the material breaks free or is flushed out by caretaker opening the gate. All flows for WY2012 were contained within the Cipoletti portion of the compound weir. For flows above the Cipoletti, some combinations of gate operation and outlet size choice produce highly turbulent flow conditions which are very difficult to rate (i.e., measurement GH's with high degree of uncertainty/variability and lack of suitable measurement section/conditions).

Special Computations.-- The MOD10FTCIP rating was renamed to PLAANTCO01 to match rating nomenclature standards in CoHMS. PLAANTCO01 was used for the record.

Remarks.-- The record is rated as fair due to lack of confirming measurements. The record will be rated fair until confirming discharge measurements can be made throughout the range of flows experienced. An Acoustic Doppler Current Profiler (ADCP) measurement was attempted on August 2, 2012 however was unsuccessful due to the low velocities and lack of turbidity in the water at the time. Station maintained and record developed by Mike Wild.

Recommendations.-- Due to limitations and or issues associated with performing conventional current meter measurements at this site, investigation and evaluation of the weir's rating by use of an Acoustic Doppler Current Profiler (ADCP) should be continued. However, site condition suitability for ADCP use has not been evaluated at higher flows, and excessive air entrainment introduced by the baffle structure located in the weir pool may preclude ADCP use. Alternatively, use of an in situ Acoustic Doppler Velocity Meter (ADVM) should be evaluated.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

SOUTH PLATTE RIVER BELOW ANTERO RESERVOIR

RATING TABLE-- PLAANTCO01 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

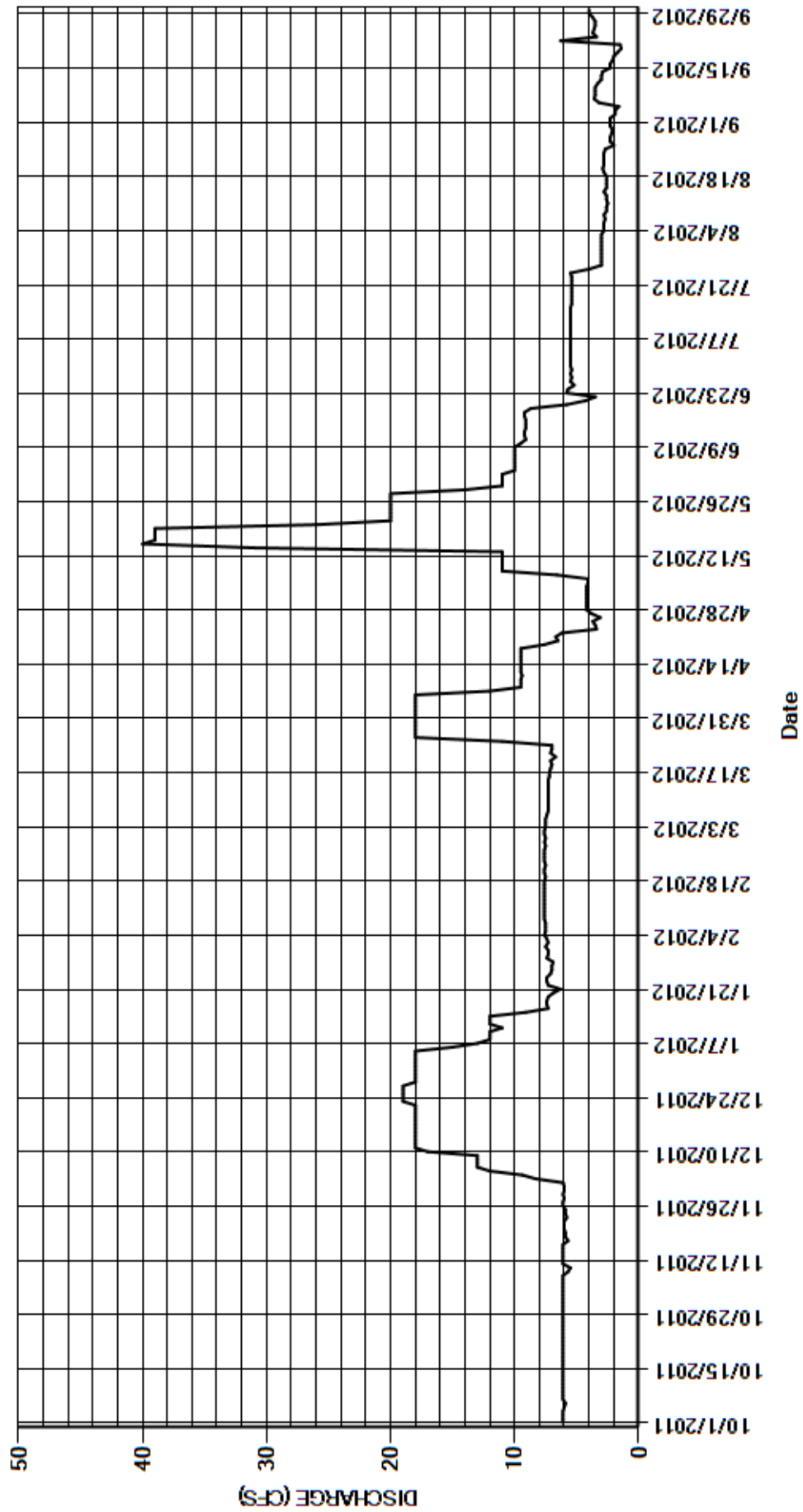
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.1	6.1	6.0	18	7.5	7.6	18	4.2	11	5.5	3.0	2.3
2	6.1	6.1	6.1	18	7.3	7.6	18	4.2	11	5.5	3.0	2.3
3	6.1	6.1	8.3	18	7.4	7.5	18	4.2	10	5.5	3.0	1.9
4	6.1	6.1	9.4	18	7.6	7.5	18	4.2	10	5.5	2.8	1.9
5	6.0	6.1	12	18	7.5	7.5	18	4.1	10	5.5	2.8	1.6
6	5.9	6.1	13	15	7.5	7.4	18	4.1	10	5.5	2.8	3.2
7	6.1	6.1	13	13	7.5	7.3	12	6.6	10	5.5	2.7	3.6
8	6.1	6.1	13	12	7.6	7.3	9.5	11	10	5.5	2.8	3.5
9	6.1	5.7	13	12	7.6	7.3	9.5	11	10	5.5	2.6	3.5
10	6.1	5.5	17	12	7.6	7.3	9.5	11	9.5	5.5	2.6	3.5
11	6.1	6.1	18	11	7.6	7.3	9.4	11	9.1	5.5	2.5	3.3
12	6.1	6.1	18	12	7.6	7.3	9.5	11	9.2	5.5	2.6	3.0
13	6.1	6.1	18	12	7.6	7.3	9.5	11	9.2	5.5	2.6	3.0
14	6.1	6.1	18	12	7.6	7.3	9.5	31	9.1	5.5	2.8	2.9
15	6.1	6.1	18	9.1	7.6	7.3	9.5	40	9.1	5.5	2.6	2.3
16	6.1	6.1	18	7.3	7.6	7.2	9.5	39	9.1	5.4	2.6	2.3
17	6.1	5.7	18	7.4	7.6	7.2	9.5	39	9.2	5.4	2.6	2.1
18	6.1	5.9	18	7.4	7.6	7.1	9.5	39	9.2	5.4	2.6	2.0
19	6.1	5.9	18	7.3	7.5	7.0	7.6	39	8.7	5.4	2.8	1.7
20	6.1	6.0	18	6.9	7.6	7.1	6.5	26	5.8	5.4	2.9	1.4
21	6.1	6.0	18	6.3	7.6	6.7	6.7	20	4.3	5.4	2.8	1.5
22	6.1	6.0	18	7.3	7.5	7.1	6.2	20	3.5	5.4	2.8	6.3
23	6.1	5.8	19	7.4	7.6	7.0	3.4	20	5.8	5.4	2.8	3.4
24	6.1	5.9	19	7.4	7.6	7.0	3.5	20	5.7	5.5	2.8	3.7
25	6.1	5.9	19	7.1	7.6	11	3.7	20	5.2	4.0	2.7	3.6
26	6.1	6.1	19	7.0	7.6	18	3.1	20	5.5	3.0	2.0	3.5
27	6.1	6.1	19	7.0	7.5	18	3.8	20	5.4	3.0	2.3	3.5
28	6.1	6.0	18	6.9	7.6	18	4.2	20	5.5	3.0	2.3	3.7
29	6.1	6.1	18	7.4	7.5	18	4.2	14	5.4	3.0	2.2	4.0
30	6.1	6.0	18	7.3	---	18	4.2	11	5.5	3.0	2.1	4.0
31	6.1	---	18	7.3	---	18	---	11	---	3.0	2.3	---
TOTAL	188.8	180.0	493.8	324.8	219.1	293.2	281.5	546.6	241.0	153.2	81.8	88.5
MEAN	6.09	6.00	15.9	10.5	7.56	9.46	9.38	17.6	8.03	4.94	2.64	2.95
AC-FT	374	357	979	644	435	582	558	1080	478	304	162	176
MAX	6.1	6.1	19	18	7.6	18	18	40	11	5.5	3.0	6.3
MIN	5.9	5.5	6.0	6.3	7.3	6.7	3.1	4.1	3.5	3.0	2.0	1.4

CAL YR	2011	TOTAL	10015.9	MEAN	27.4	MAX	154	MIN	1.8	AC-FT	19870
WTR YR	2012	TOTAL	3092.3	MEAN	8.45	MAX	40	MIN	1.4	AC-FT	6130

MAX DISCH: 40.4 CFS AT 11:15 ON SEP 22,2012 GH 1.13 FT SHIFT 0 FT
 MAX GH: 1.13 FT AT 11:15 ON SEP 22,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

SOUTHPLATTE RIVER BELOW ANTERO RESERVOIR
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06694920 SOUTH PLATTE RIVER ABOVE SPINNEY RESERVOIR

Water Year 2012

Location.-- Lat. N38° 59' 48.59", Long. W105° 40' 50.48" (NAD83). Gage is located on the left side of a 25-ft. Parshall Flume 0.7 mi above Spinney Reservoir and 6.5 miles SE of Hartsel, CO in Park County, CO.

Drainage Area and Period of Record.-- 668 sq. mi. (From USGS StreamStats utility). ; Daily values are available from the DWR from October 1, 1982 to present.

Equipment.-- Digital incremental Sutron 56-0540-400-DTR shaft encoder connected to a Sutron SatLink 2 Data Collection Platform (DCP) and a stand-alone Sutron SDR-0001-1 data logger in a 6-ft. by 8-ft. wooden shelter overtop a 3-ft. by 5-ft. concrete stilling well at a 25-ft. Parshall Flume. An electric tape gage placed on the instrument shelf serves as the primary reference with a supplemental staff gage on the right wing wall of the flume at the Ha location. Elevation of gage is 8,700 ft. (from topographic map). The gage and satellite monitoring equipment are owned and maintained by the City of Aurora. Aurora operates the gage seasonally. Colorado Division of Water Resources (DWR) operates the gage for record purposes and is paid by Aurora to provide real time data.

Hydrologic Conditions.-- Regulated and unregulated flows from areas of varying topography and vegetative type. Flows can be affected by operations at Antero and Montgomery Reservoirs and irrigation diversions upstream of the gage.

Gage-Height Record.-- The primary record is 15 minute telemetered data with 15-minute logged DCP and SDR data as backup. The record is complete and reliable, except as follows: October 29 through November 4, 2011 when the stage-discharge relationship was affected by ice; and November 4, 2011 and April 4, 2012 which are partial day records corresponding to shut-down and start-up of the gage. Missing values on April 4, April 5, 2012 from 02:00 to 04:45 were filled in with data from the DCP log without loss of accuracy. Instrument calibration was supported by thirty-one visits gage. One shaft encoder correction of - 0.01 ft. was made this year and was applied to the record as defined by observations made to the gage.

Datum Corrections.-- Levels were run on October 13, 2011 using the flume's crest as a base. The base reference was found to be set accurately. Reference Marks (RM) Nos. 1 and 2 were established on this date.

Rating.-- The control is a 25-foot Parshall Flume. STD25FTPF, a standard Parshall Flume rating was continued in use of all of WY2012. High flows have been observed to by-pass the flume by leaving the channel and crossing the access road. This is believed to occur at gage heights greater than 4.00 ft. and at flows in the 1000 cfs range. The rating is well defined to 572 cfs by measurements made since 2001. Wading measurements are made downstream of the foot bridge (measurement section width 30.5 ft.) while section rod and cable measurements are made on upstream side (measurement section width 32.1 ft.). Bridge is indexed on both sides to obtain accurate section widths. Fourteen measurements (Nos. 315 - 329) were made during the water year ranging in discharge from 20.7 to 95.0 cfs covering the range in flow experienced this year well. The peak flow of 153 cfs occurred at 18:30 on July 8, 2012 at a gage height of 1.34 ft. with a shift of 0.01 ft. exceeding the high flow measurement (No. 322) made June 7, 2012 by 58 cfs and 0.35 ft. of stage respectively. The peak on July 8, 2012 was caused by a brief rain event.

Discharge.-- Shifts can be caused by algal growth in the flume and by deposition and scour of bed materials above the flume. Stage dependent shifting was used for all periods of open water. Variable shift table PLASPICOVST11-1 was continued from WY11 until the gage was shut down for winter on November 4, 2011. PLASPICOVST11 is defined by twelve measurements (Nos. 302-311, 315 and 316) made during the periods of use. Variable shift table PLASPICOVST12-A was applied from April 4, 2012 to October 10, 2012 and is defined by fourteen measurements (Nos. 318-331) made during the period of use. All measurements were give full weight except for Nos. 319-321, 325 and 329 which were discounted up to 3.4% to smooth the stage-shift distribution.

Special Computations.-- Ice affected days were estimated from adjacent good record with respect to temperature trends recorded at the PLAHARCO gage and Spinney Mountain Reservoir accounting figures. Discharge for the winter period (November 4, 2011 through April 3, 2012) was taken from Aurora's Spinney Mountain Reservoir accounting. These figures are based on reservoir elevation readings, and tend to show step-wise changes. DWR cannot confirm accuracy of daily accounting. City of Aurora's accounting for April 2, 3, 2012 was adjusted to better represent the transition from winter estimated data to real time data.

Remarks.-- The record is good, except for days of ice effect, partial day record and winter estimates, which are estimated and poor. The peak was caused by a rain event occurring on July 8, 2012. Rain gage readings from the Spinney Mountain Reservoir operations office coincide with the elevated flows at PLASPICO. This area can receive intense precipitation events with short duration. Station maintained and record developed by Mike Wild.

Recommendations.-- Levels need to be run in the 2013 Water Year to verify establishment of RM 1 and RM 2.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06694920 SOUTH PLATTE RIVER ABOVE SPINNEY RESERVOIR

RATING TABLE.-- STD25FTPF USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

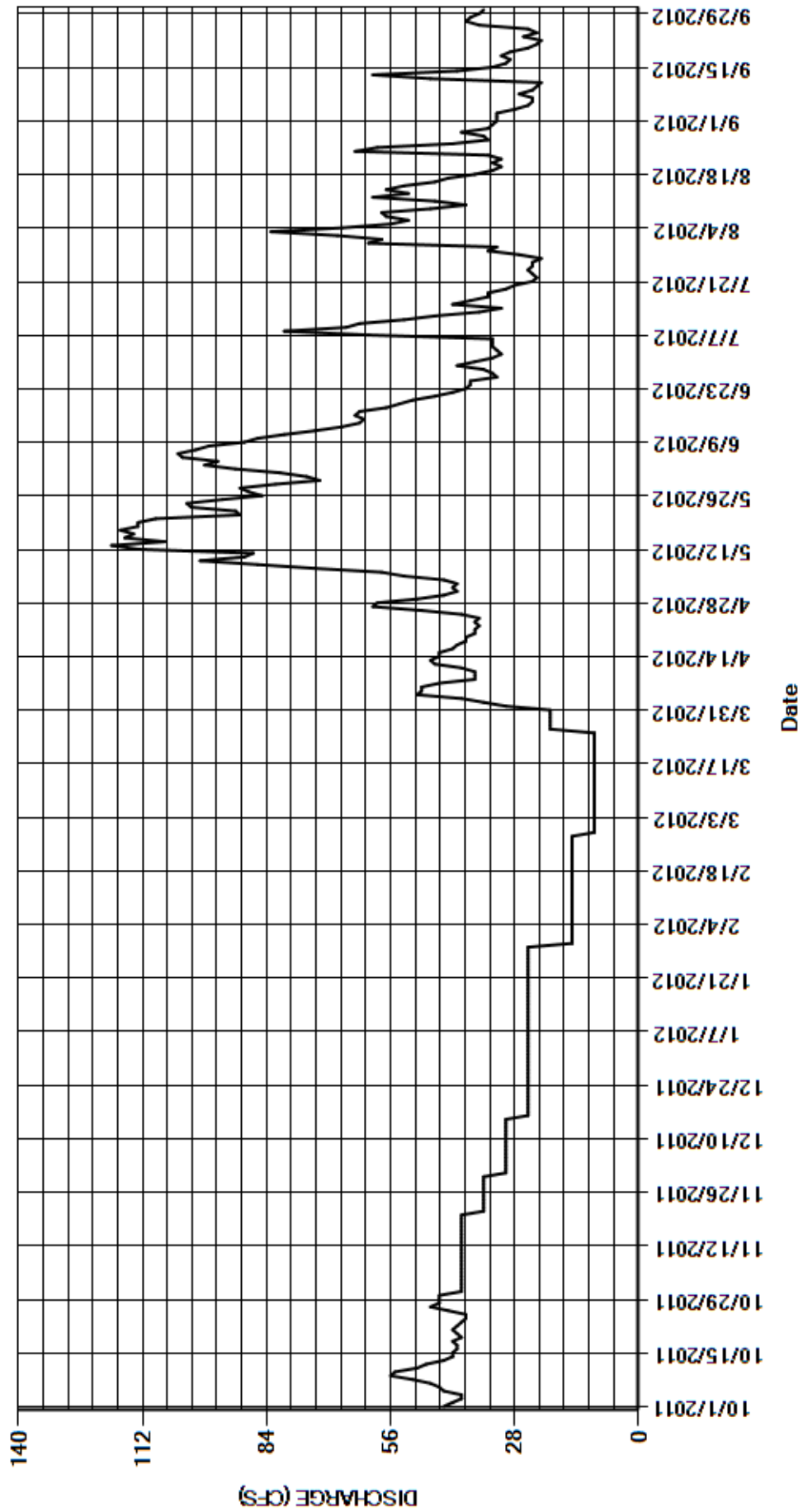
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	44	e40	e30	e25	e15	e10	e30	41	81	33	58	32
2	42	e40	e30	e25	e15	e10	e35	42	91	31	68	32
3	40	e40	e30	e25	e15	e10	e40	41	98	32	83	32
4	40	e40	e30	e25	e15	e10	e50	44	95	33	67	28
5	44	e40	e30	e25	e15	e10	49	53	103	33	56	25
6	45	e40	e30	e25	e15	e10	49	58	104	33	52	24
7	47	e40	e30	e25	e15	e10	45	73	100	61	57	24
8	51	e40	e30	e25	e15	e10	37	86	97	80	58	27
9	56	e40	e30	e25	e15	e10	37	99	89	66	47	24
10	55	e40	e30	e25	e15	e10	37	89	86	63	39	23
11	50	e40	e30	e25	e15	e10	40	87	80	53	46	22
12	48	e40	e30	e25	e15	e10	46	113	73	46	60	47
13	44	e40	e30	e25	e15	e10	47	119	67	36	52	60
14	42	e40	e30	e25	e15	e10	45	107	63	31	57	41
15	42	e40	e30	e25	e15	e10	45	116	62	42	53	33
16	41	e40	e25	e25	e15	e10	42	114	64	38	46	30
17	41	e40	e25	e25	e15	e10	41	117	63	34	43	29
18	42	e40	e25	e25	e15	e10	39	113	57	34	37	31
19	40	e40	e25	e25	e15	e10	39	113	54	30	33	29
20	41	e40	e25	e25	e15	e10	37	109	51	28	31	25
21	42	e35	e25	e25	e15	e10	37	90	46	24	33	23
22	41	e35	e25	e25	e15	e10	36	91	42	23	31	22
23	40	e35	e25	e25	e15	e10	37	101	39	24	34	26
24	39	e35	e25	e25	e15	e10	36	102	38	25	64	23
25	39	e35	e25	e25	e15	e10	40	94	38	24	59	25
26	43	e35	e25	e25	e15	e20	49	85	32	24	42	36
27	47	e35	e25	e25	e15	e20	60	88	33	22	34	39
28	45	e35	e25	e25	e10	e20	59	90	35	27	35	38
29	e45	e35	e25	e25	e10	e20	50	82	41	34	40	36
30	e45	e35	e25	e15	---	e20	44	72	37	32	34	35
31	e40	---	e25	e15	---	e20	---	75	---	61	33	---
TOTAL	1361	1150	850	755	425	370	1278	2704	1959	1157	1482	921
MEAN	43.9	38.3	27.4	24.4	14.7	11.9	42.6	87.2	65.3	37.3	47.8	30.7
AC-FT	2700	2280	1690	1500	843	734	2530	5360	3890	2290	2940	1830
MAX	56	40	30	25	15	20	60	119	104	80	83	60
MIN	39	35	25	15	10	10	30	41	32	22	31	22

CAL YR	2011	TOTAL	39541	MEAN	108	MAX	598	MIN	10	AC-FT	78430
WTR YR	2012	TOTAL	14412	MEAN	39.4	MAX	119	MIN	10	AC-FT	28590

MAX DISCH: 153 CFS AT 18:30 ON JUL 08,2012 GH 1.34 FT SHIFT 0.01 FT
 MAX GH: 1.34 FT AT 18:30 ON JUL 08,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06694920 SOUTH PLATTE RIVER ABOVE SPINNEY RESERVOIR
 WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06695000 SOUTH PLATTE RIVER ABOVE ELEVENMILE RESERVOIR

Water Year 2012

Location.-- Lat. N. 38°58'4.2"; Long. W105°24'53.5" (NAD83). Gage is located on the left side of a 25 ft. Parshall flume 2.2 miles downstream from the Spinney Mountain Reservoir Dam or 190 ft. east of where the South Platte River crosses County Road 59 and 9.1 miles southeast of the town of Hartzel in Park County, CO. The gage is also 2.5 mi. upstream from the high water line of Elevenmile Canyon Reservoir, at elevation 8,561 ft.

Drainage Area and Period of Record.-- 884 mi² (USGS Colorado StreamStats utility). ; Daily values are available from June 1939 to present.

Equipment.-- Digital incremental Sutron 56-0540-400-DTR shaft encoder, air temperature sensor and tipping bucket rain gage connected to a Sutron SatLink2 Data Collection Platform (DCP) and a standalone Sutron Stage Discharge Recorder (SDR) in a wooden shelter overtop a concrete Ha / Hb stilling well at a 25-foot Parshall Flume. An electric tape gage placed on the instrument shelf is the primary reference with a supplemental staff gage located on the right wing wall of the flume at the Ha location. Gage ownership is unknown. The Colorado Division of Water Resources reconstructed the gage shelter in 2011 and owns all instrumentation. The gage is located on City of Aurora property and has markers suggesting the structure was constructed by the Denver Water Board.

Hydrologic Conditions.-- Controlled release. The gage is approximately two miles below Spinney Mountain Reservoir and flows are controlled by Spinney operations. A small unregulated drainage is intercepted by the river between Spinney and the gage which at times can contribute significant flow during localized events. The record is generally flat showing stepwise changes. At extreme release rates (1,000+ cfs) water can enter a bypass channel and bypass the flume. This was last observed in 1995.

Gage-Height Record.-- The primary record is 15-minute telemetered encoder data with 15-minute logged DCP and SDR data as backup. The record is complete and reliable, except for: November 17-18, 20-30; December 4-6, 9, 11, 16-17, 20-27, 2011; January 3, 9, 12 and February 2, 4-10, 15-17, 19-21, 24, 26-27, 2012 when the gage had varying degrees of ice affect. Missing values on December 20, 2011 and January 3, 2012 were interpolated from adjacent record with out loss of accuracy. Instrument calibration was maintained by 31 visits to the gage. Three instrument calibration corrections ranging from +0.01 to -0.01 ft. were applied to the record as defined by observations made to the gage. Due to the gage's proximity to Spinney Mountain Reservoir, ice accumulation is generally not an issue. However, when winter releases are below 100 cfs ice can affect the gage in two ways: ice jams upstream of the gage can cause a drop in flow followed by surges as the ice dam lets loose or overtops, and by accumulation of ice on the flume walls above the normal stage level. This can be evident on the hydrograph as spikes in flow, however the daily values will remain equal to releases from Spinney Reservoir. Generally these operate in conjunction with each other and can compound the degree of ice affect. Algal growth in the flume can affect the flume's performance. Moderate to heavy algal growth was noted throughout the year. Measurements Nos. 899-903 were made under moderate to heavy algal growth conditions. Flume entry for cleaning purposes was prohibitory during this period due to stage.

Datum Corrections.-- Levels were run on October 13, 2011 using RM 3 as base. No correction to the base reference was required nor made.

Rating.-- The control is a 25-foot Parshall flume. Movement of cobble, gravel and silt and development of a sand bar above the flume as well as vegetal growth in the flume cause shifts. A standard 25-foot Parshall flume rating, STD25FTPF, was continued in use for all of WY2012. Eighteen discharge measurements (Nos. 890-907) were made this year, ranging in discharge from 39.6 to 249 cfs. Measurements made this year cover the range in stage experienced this year well. The peak flow of 256 cfs occurred at 16:30 on July 12, 2012 at a gage-height of 1.82 ft. with a shift of +0.04 ft. exceeding the high flow measurement (No. 904) made July 17, 2012 by 7 cfs and 0.03 ft of stage respectively.

Discharge.-- Shifting control method was applied for all periods of open water. Measurements made this year showed unadjusted shifts varying between -0.05 and 0.06 ft. Stage dependent shifting using variable shift table PLAHARCOVST11-A was applied from August 29 through October 3, 2011. It is defined by eleven measurements made during the period of use. Variable shift table PLAHARCOVST12-A was applied from October 3, 2011 through April 26, 2012. It is defined by nine measurements (Nos. 890-898) made during the period of use. Variable shift table PLAHARCOVST12-B was applied from July 5 through November 20, 2012. It is defined by eight measurements (Nos. 903-910) made during the period of use. Shifts outside the above periods were applied by time as defined by measurements. All measurements were given full weight except for Nos. No 890, 894, 896, 903 and 905-907, which were discounted up to ±3.50% to smooth shift distributions.

Special Computations.-- Discharge for ice affected periods were estimated from adjacent good record with respect given to Spinney Mountain Reservoir operating reports. A mass balance spreadsheet is used to identify ice affected days.

Remarks.-- The record is good, except for periods of ice effect which are estimated and fair. Station maintained and record developed by Mike Wild.

Recommendations.-- An additional reference point should be established the next time levels are run. Variable shift tables developed over the last several years show consistent patterns. Also, the existing rating has a maximum gage height of 6 ft. whereas the flume walls are 8 ft. in height. Either a custom rating or rating extension should be considered.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06695000 SOUTH PLATTE RIVER ABOVE ELEVENMILE RESERVOIR

RATING TABLE-- STD25FTPF USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

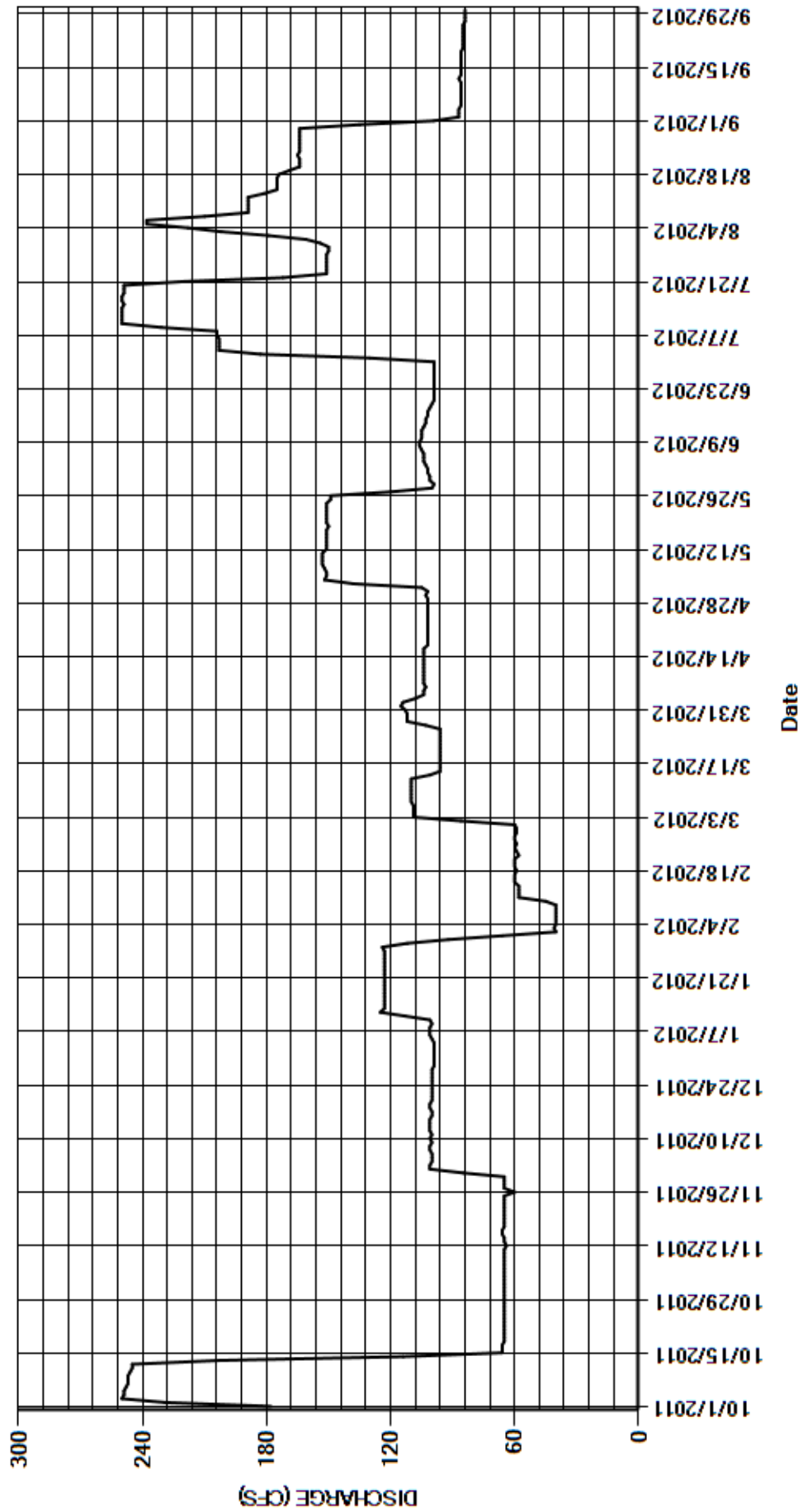
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	178	65	85	99	66	60	115	102	102	130	161	99
2	229	65	101	99	e40	86	114	105	102	183	179	87
3	250	65	101	99	41	109	108	138	103	203	202	87
4	249	65	e100	99	e40	109	104	152	104	203	218	87
5	249	65	e100	100	e40	109	104	151	104	203	238	86
6	248	65	e100	101	e40	109	103	151	104	203	238	86
7	247	65	101	101	e40	110	104	152	105	204	210	86
8	247	65	101	101	e40	110	104	153	106	204	189	86
9	247	65	e100	e100	e40	110	104	153	106	231	189	86
10	246	65	101	101	e45	110	104	153	105	250	189	86
11	245	65	e100	113	58	110	104	153	105	250	189	86
12	245	64	101	e125	58	110	104	151	105	250	189	87
13	203	65	101	123	58	110	104	151	104	250	181	86
14	114	65	101	123	58	101	104	151	103	250	175	86
15	66	66	101	123	e60	96	104	151	103	249	175	86
16	66	66	e100	123	e60	96	104	151	102	250	175	86
17	66	e65	e100	123	e60	96	102	151	102	250	175	86
18	65	e65	101	123	59	96	102	150	101	249	174	86
19	65	65	101	123	e60	96	102	151	100	249	169	86
20	65	e65	100	123	e60	96	102	151	99	249	164	85
21	65	e65	e100	123	e60	96	102	151	99	220	164	85
22	65	e65	e100	123	58	96	102	151	99	172	164	85
23	65	e65	e100	123	59	96	102	151	99	151	165	85
24	65	e65	e100	123	e60	96	102	151	99	151	164	85
25	65	e65	e100	123	59	96	102	149	99	151	164	85
26	65	e60	e100	123	e60	96	102	149	99	151	164	85
27	65	e65	e100	123	e60	103	102	120	99	151	164	84
28	65	e65	100	123	59	112	102	100	99	151	164	84
29	65	e65	99	124	59	112	102	99	99	150	164	84
30	65	e65	99	112	---	112	103	101	99	150	164	84
31	65	---	99	92	---	113	---	101	---	154	135	---
TOTAL	4305	1946	3093	3534	1557	3157	3117	4344	3055	6262	5555	2582
MEAN	139	64.9	99.8	114	53.7	102	104	140	102	202	179	86.1
AC-FT	8540	3860	6130	7010	3090	6260	6180	8620	6060	12420	11020	5120
MAX	250	66	101	125	66	113	115	153	106	250	238	99
MIN	65	60	85	92	40	60	102	99	99	130	135	84

CAL YR	2011	TOTAL	52696	MEAN	144	MAX	570	MIN	45	AC-FT	104500
WTR YR	2012	TOTAL	42507	MEAN	116	MAX	250	MIN	40	AC-FT	84310

MAX DISCH: 256 CFS AT 16:30 ON JUL 12,2012 GH 1.82 FT SHIFT 0.04 FT
 MAX GH: 1.82 FT AT 16:30 ON JUL 12,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06695000 SOUTH PLATTE RIVER ABOVE ELEVENMILE RESERVOIR
 WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06696000 SOUTH PLATTE RIVER NEAR LAKE GEORGE

Water Year 2012

Location.-- 38°54'19.59"N 105°28'24.07"W Referenced from Google Earth (WGS 84) Park County, Hydrologic Unit 10190001, on left bank 700 ft downstream from Elevenmile Canyon Reservoir and 8.05 mi southwest of town of Lake George.

Drainage Area and Period of Record.-- 963 mi²; October 1, 1929 to present

Equipment.-- Digital incremental Sutron 56-0540-400-DTR shaft encoder connected to a Sutron SatLink 2 Data Collection Platform (DCP) and a stand-alone Sutron SDR-0001-1 Stage Discharge Recorder (SDR) in a concrete shelter at a 15-foot concrete Parshall Flume. A 10-foot rectangular bypass channel is located adjacent to the Parshall Flume on the right side. The bypass channel can become active at a gage-height of 3.40 ft. but is normally kept closed by stop logs. An adjustable reference point and metal drop tape serve as the primary reference with a supplemental staff gage located on the right side of the flume at the Ha location. The gage is owned and operated by Denver Water in cooperation with the Colorado Division of Water Resources.

Hydrologic Conditions.-- Semi-controlled release. Eleven Mile Reservoir (97,780 AF) is immediately upstream from the gage, regulating flows. Eleven Mile Reservoir also has a spillway which can be active for extended periods of time. When the spillway is active abrupt gage-height changes are experienced at this gage due to wave action over the spillway. Spinney Mountain Reservoir (53,651 AF) and Antero Reservoir (22,300 AF) are located upstream of Eleven Mile Reservoir and can operationally affect hydrologic conditions at this gage. Discharge changes can occur in a stepwise fashion as releases are made from the outlet works to control water temperature for fish habitat.

Gage-Height Record.-- The primary record is 15-minute satellite data with 15-minute logged data (DCP) and SDR data as backup. The shelter and stilling well are heated in winter months and ice accumulation is generally not an issue. The record is complete and reliable except for December 25 and 26, 2011 when the stilling well is suspected to have froze. Missing telemetered values occurring on October 1 through 3, 2011 and February 15, 2012 were filled in with SDR data without loss of accuracy. Instrument calibration was maintained by 20 visits made to the gage. One correction of -0.01 ft was applied as defined by visits made to the gage. Algal growth in the flume can affect the flume's performance. Algal growth was cleaned from the flume on November 22, 2011 and resulted in a cleaning correction of -0.03 ft. Shift change due to the cleaning was defined by discharge measurements made before and after the cleaning.

Datum Corrections.-- Levels were run on August 8, 2010 using RM4 as a base. The RP was found to be 0.004 ft low. No corrections were necessary.

Rating.-- Flow was confined to the Parshall Flume section all year. The control is a 15-foot Parshall Flume. STD15FTPF, a standard 15-foot Parshall Flume rating was continued in use for all of WY2012. Nineteen measurements (Nos. 1122-1140) were made during the year ranging in discharge from 52.0 to 234 cfs. Measurements made this year cover the range in stage with the exception of the lower mean daily flows on November 14-22, 2011, and the higher mean daily flows on July 14, 15, 17-20, 2012. The peak flow of 250 cfs occurred at 17:30 hours on July 15, 2012 at a gage-height of 2.48 ft. with a shift of +0.02 ft. exceeding the high flow measurement (No. 1137) by 16 cfs and 0.11 ft. of stage respectively.

Discharge.-- Shifts are caused by constricted approach conditions, and aquatic growth in the flume and approach. Shifting control method was used for the entire year. Shifts were distributed by time as defined by measurements from September 14 to November 22, 2011, May 23 to July 5 and August 1 through October 11, 2012. Stage dependent shifting using variable shift table PLAGEOCOVST12-1 was applied from November 22, 2011 to May 23 and July 5 to August 1, 2012. PLAGEOCOVST12-1 is defined by twelve measurements (Nos. 1125-1133 and 1136-1138) made during the periods of use. Measurements made this year showed unadjusted shifts varying from -0.03 to 0.02 ft. this year. All were given full weight except for Nos. 1125 and 1128 which were adjusted -2.44% and 2.11% respectively.

Special Computations.-- None.

Remarks.-- The record is rated good with exception of December 25 and 26, 2011 which is fair. Station maintained and record developed by Mike Wild.

Recommendations.-- Approach conditions cause velocities to be greater than 0.50 ft/s in the stilling pool immediately upstream of the flume. This could be abated if the stilling pool were cleared of accumulated cobble and gravel. An area of concrete spalling was noted following the 2011 water year. It appears to be confined to the lower vertical walls below the crest on the left edge water (LEW) side. The spalling did not affect the performance of the structure in the 2011 or 2012 water year but needs to be monitored and is most likely caused by mechanical weathering. Denver Water was made aware of the issue and the structure was inspected by Denver Water officials during the Dam inspection on August 1, 2012. Continue to monitor spalling on departure section of the Parshall flume.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06696000 SOUTH PLATTE RIVER NEAR LAKE GEORGE

RATING TABLE-- STD15FTPF USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

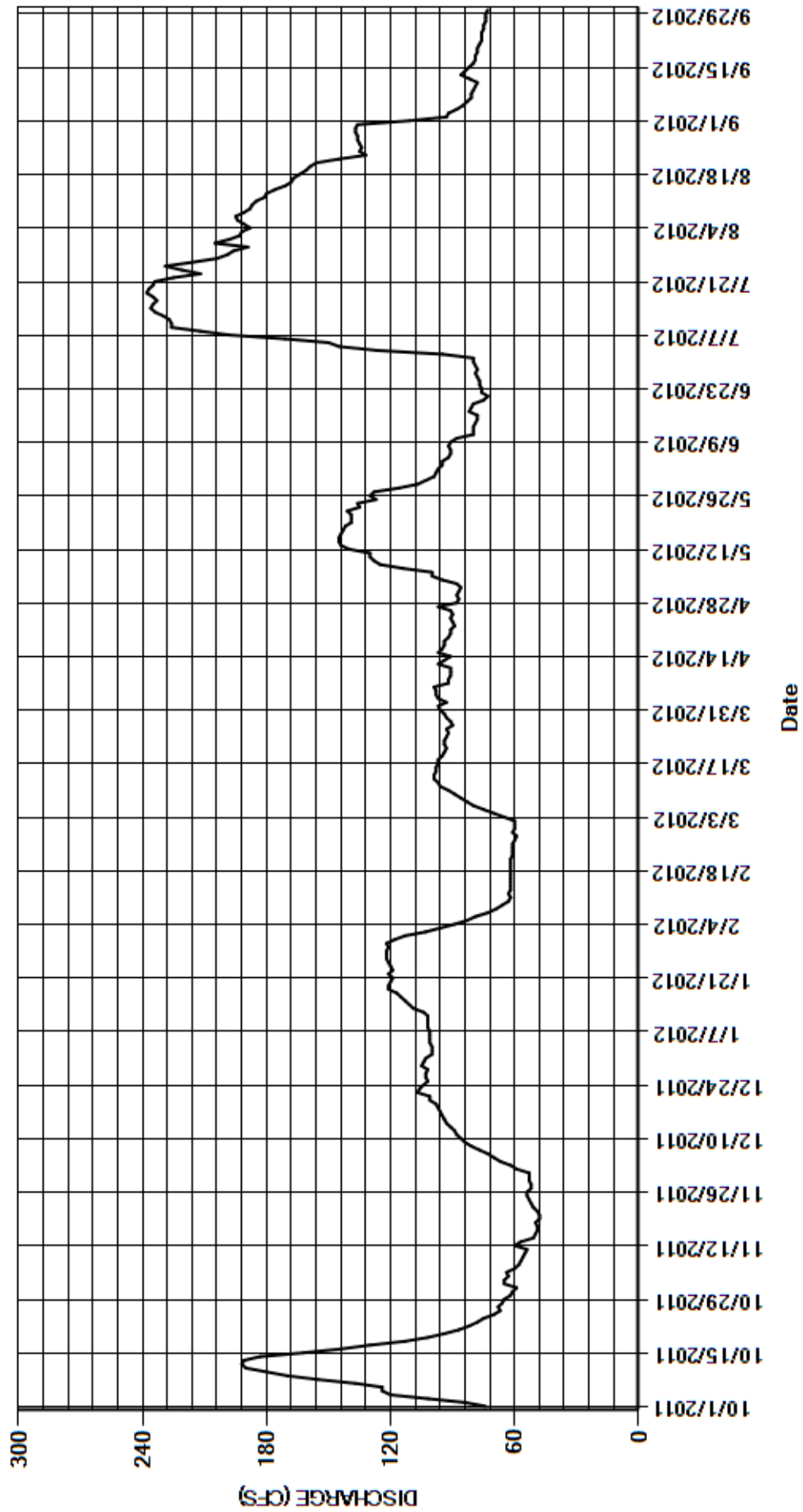
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	74	59	53	100	113	60	97	87	98	80	198	111
2	84	65	59	100	103	60	93	86	97	95	193	93
3	102	65	62	100	96	65	97	88	95	127	192	92
4	120	63	67	101	89	70	98	95	95	145	188	88
5	124	64	70	101	83	75	98	100	92	150	191	85
6	124	60	73	101	79	80	99	100	91	171	194	83
7	137	58	77	101	73	83	92	114	91	198	195	81
8	155	57	81	102	69	86	92	125	92	212	191	81
9	170	56	84	102	66	89	91	128	91	226	188	80
10	180	55	86	102	63	92	91	130	88	226	187	79
11	190	54	88	102	62	96	91	130	80	227	185	78
12	192	60	89	104	63	97	97	140	80	230	181	82
13	191	57	91	109	62	99	94	144	80	234	180	86
14	183	51	93	111	62	99	91	145	79	236	176	84
15	162	50	94	113	62	98	97	145	78	235	171	82
16	144	49	95	115	62	98	95	144	78	233	168	80
17	130	49	96	117	62	97	94	143	82	235	167	79
18	113	50	97	121	62	97	94	142	81	238	164	79
19	102	48	98	121	62	95	92	139	80	237	161	78
20	94	48	101	120	62	94	91	139	75	235	159	78
21	87	49	101	119	62	93	91	139	73	234	156	77
22	82	51	107	121	61	94	89	141	76	225	145	76
23	78	52	106	119	61	94	90	135	76	212	132	76
24	75	53	104	120	61	93	91	136	77	221	135	76
25	70	54	e102	121	61	92	90	127	77	229	134	75
26	67	54	e103	122	60	93	91	130	78	216	135	75
27	68	52	103	122	59	90	97	128	79	204	136	74
28	66	52	102	122	61	91	88	116	78	199	136	74
29	65	53	105	121	60	93	87	107	79	196	137	74
30	62	53	104	122	---	94	88	103	80	189	137	73
31	61	---	103	118	---	96	---	99	---	205	136	---
TOTAL	3552	1641	2794	3470	2001	2753	2786	3825	2496	6300	5148	2429
MEAN	115	54.7	90.1	112	69.0	88.8	92.9	123	83.2	203	166	81.0
AC-FT	7050	3250	5540	6880	3970	5460	5530	7590	4950	12500	10210	4820
MAX	192	65	107	122	113	99	99	145	98	238	198	111
MIN	61	48	53	100	59	60	87	86	73	80	132	73

CAL YR	2011	TOTAL	47827	MEAN	131	MAX	527	MIN	41	AC-FT	94860
WTR YR	2012	TOTAL	39195	MEAN	107	MAX	238	MIN	48	AC-FT	77740

MAX DISCH: 250 CFS AT 17:30 ON JUL 15,2012 GH 2.48 FT SHIFT 0.02 FT
 MAX GH: 2.48 FT AT 17:30 ON JUL 15,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06696000 SOUTH PLATTE RIVER NEAR LAKE GEORGE
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
TARRYALL CREEK BELOW TARRYALL RESERVOIR
Water Year 2012

Location.-- Lat. N39°13'18.1", Long. W105°36'09.1" (NAD83) Park County, CO. Gage is on the right edge water downstream of bridge on Park County Road 77 approximately 1000 ft. downstream from the Tarryall Reservoir dam and 15 miles southeast of Jefferson, CO.

Drainage Area and Period of Record.-- 355 sq. mi., from DWR Dam Safety Section database. ; The gage has been operated infrequently; records were kept from June 20, 1975 to September 30, 1980 and resumed in 2005. The Colorado Division of Water Resources (DWR) made the first known discharge measurement in August 1974. Satellite monitoring was installed in 2005. Daily values are available from June 20, 1975 through September 30, 1980 and from October 1, 2005 to present.

Equipment.-- Digital incremental Sutron SDR-0001-1 shaft encoder, temperature sensor and a tipping bucket rain gage connected to a Sutron SatLink2 Data Collection Platform (DCP) transmitting hourly in a 60-inch CMP structure overtop a 48-inch concrete stilling well located on the right side of the channel below a bridge on Park County Road 77 below Tarryall Reservoir. The stilling well is connected to channel via three 2-inch steel intakes with flushing provisions. An electric tape gage in the shelter is the primary reference with a supplemental staff gage located in the gage pool adjacent to the shelter. Gage is operated and equipment maintained by the Colorado Division of Water Resources (CDWR) under a cooperative agreement with the Colorado Division of Parks and Wildlife, the owner of Tarryall Reservoir.

Hydrologic Conditions.-- High mountain alluvial plateau mostly devoid of forest. Conditions remain stable with light residential development upstream. Discharge affected by irrigation diversions, return flows from irrigated areas. releases from Jefferson Lake, James Tingle Reservoir and releases from Tarryall Reservoir.

Gage-Height Record.-- The primary record is 15-minute satellite data with 15-minute logged DCP data and 5-minute logged SDR data as backup. The gage was taken offline for construction and realignment of the county road bridge upstream of the gage on October 1, 2011. Construction was completed and the gage was brought back online on November 17, 2011. Instrument calibration was supported by twenty-nine visits to the gage by CDWR personnel. Two instrument corrections of 0.01 and -0.01 ft. were made and applied to the record as defined by visits made to the gage. The record is complete and reliable except for: December 9-12, 2011 when the stage-discharge relation was affected by ice or freezing of the stilling well and March 23, 2012 which is a partial day record. There was some degree of backwater due to a downstream beaver dam from September 18, 2012 through the end of the water year. The gage is not operated in winter months. The gage was shut down due to ice on December 12, 2011 and was reactivated for the season on March 23, 2012. The period of record for the 2012 Water Year is November 17 through December 12, 2011 and March 23 through September 30, 2012.

Datum Corrections.-- Levels were run for the first time on the newly constructed gage on November 16, 2012. Construction and realignment of the bridge destroyed all markers used for the previous gage datum. The ETG datum was arbitrarily established on November 17, 2011. As such, levels run on November 16, 2012 used the ETG as base for establishment of reference marks 4, 5 and 6. The new control PZF was also determined on this date.

Rating.-- The control is a boulder cross-vane. TARTARCO04 was developed on July 26, 2012 in an expedited fashion to address some Safety of Dams concerns associated with Tarryall Reservoir that had come to the light in the days prior to development of the rating (contact the Safety of Dam's Engineer or the Water Commissioner for specific details). TARTARCO04 is defined by measurements from 3.59 to 41.4 cfs. The rating has been extrapolated approximately 400% above the high measurement (No. 164) for several reasons; current Safety of Dams event, known symmetry of the control and approach / departure channel and a relatively linear progression seen in the stage-discharge relation. Twenty-one discharge measurements (Nos. 156 - 176) were made this year ranging in discharge from 3.59 to 41.4 cfs covering the range in stage experienced this year well except for the higher daily flows of May 10 - 16, 2012. The peak flow of 70.2 cfs occurred at 00:45 on May 14, 2012 at a gage-height of 2.24 ft. with a shift of 0.01 ft. exceeded this year's high flow by 28.8 cfs and 0.27 ft. of stage.

Discharge.-- Shifting control method was used all year. This year, shifts were primarily caused by settling of the gage shelter and control structure. Other factors influencing the stage-discharge relation were fill and scour of materials through the gage pool, vegetal growth in the channel and backwater caused by beaver activity downstream of the gage. Stage dependent shifting was applied from November 17 through December 12, 2011 using variable shift table TARTARCOVST12A, defined by three measurements made during the period of use. From March 23 through October 11, 2012 shifts were applied by time as defined by measurements. Open water measurements showed unadjusted shifts varying between -0.10 and +0.04 ft. All measurements were given full weight except for Nos. 160, 161, 163, 166 - 168, 170 and 173 which were discounted up to ±4.49% to smooth shift distributions.

Special Computations.-- Discharge for the ice affected period was estimated from adjacent good record with consideration given to temperature trends and discharge measurements made during the period of ice affect. Discharge for partial day records was estimated from adjacent good record.

Remarks.-- The record is good with exception of: periods of ice affect and a frozen stilling well which are estimated and poor; partial day record which is estimated and poor; and periods of backwater caused by beaver activities downstream of the gage which are fair. The peak is also rated fair due to lack of definition in the rating and confirming in range measurements. This is a partial year record; the period of record for the 2012 Water Year is November 17 through December 12, 2011 and March 23 through September 30, 2012. Station maintained by Mike Wild, record developed by Division One Hydrographic Staff.

Recommendations.-- Levels need to be run in the 2013 Water Year to track movement of the shelter, control and newly established reference marks. Continued efforts to make discharge measurements through the entire range of flows experienced needs to be continued to better define the stage-discharge relation.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

TARRYALL CREEK BELOW TARRYALL RESERVOIR

RATING TABLE-- TARTARCO04 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

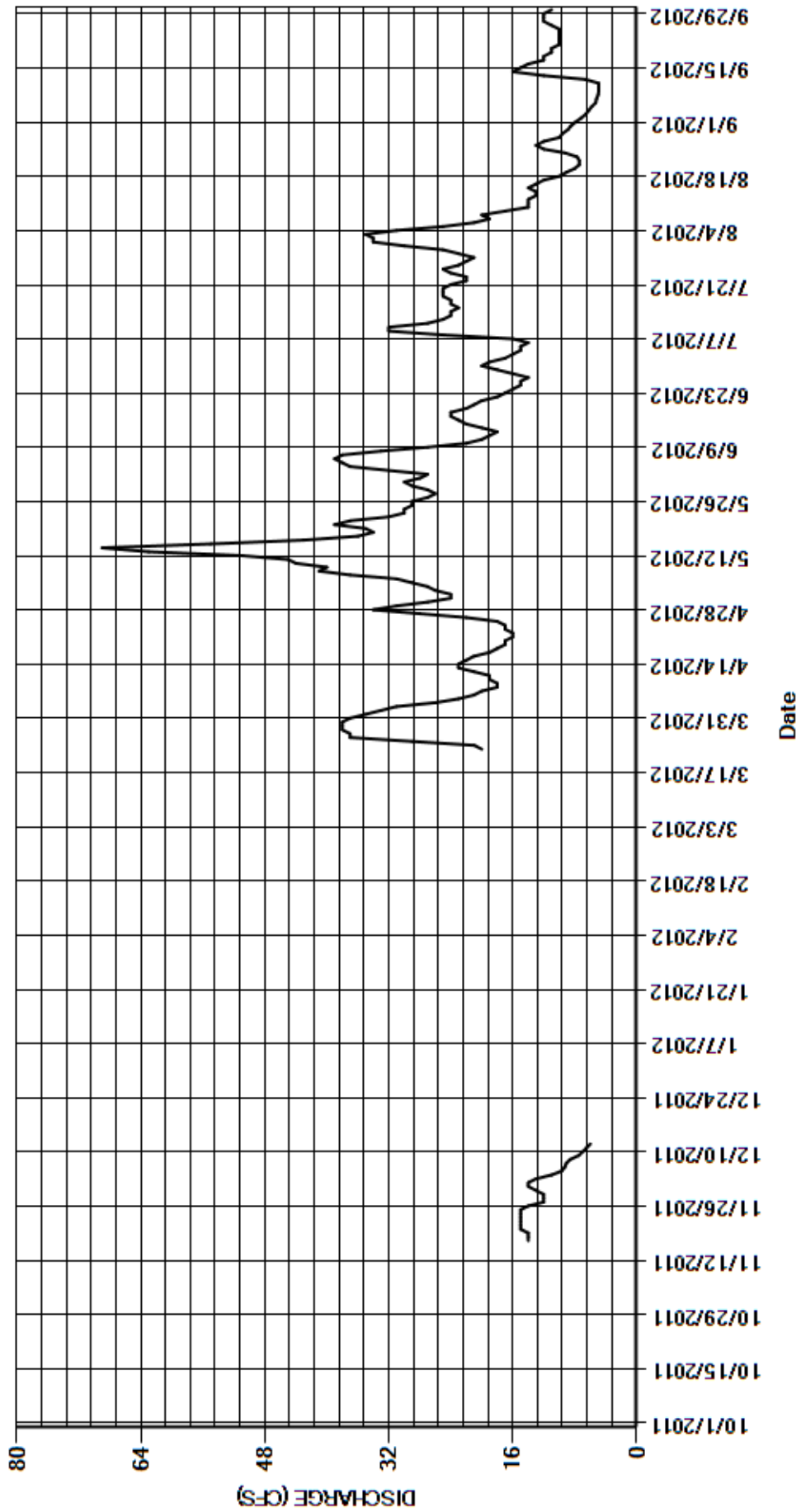
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	14	---	---	---	35	24	28	19	34	7.9
2	---	---	14	---	---	---	33	24	27	17	34	7.2
3	---	---	13	---	---	---	31	26	32	16	35	6.6
4	---	---	11	---	---	---	26	27	37	15	31	6.2
5	---	---	9.7	---	---	---	23	29	38	15	25	5.8
6	---	---	9.3	---	---	---	21	31	39	14	21	5.3
7	---	---	9.1	---	---	---	20	37	38	16	19	5.2
8	---	---	8.6	---	---	---	18	41	33	25	20	5.0
9	---	---	e7.5	---	---	---	18	40	27	32	17	4.9
10	---	---	e7.0	---	---	---	19	44	22	32	14	4.9
11	---	---	e6.5	---	---	---	19	45	20	27	14	4.9
12	---	---	e6.0	---	---	---	21	51	19	25	14	6.6
13	---	---	---	---	---	---	23	63	18	24	13	12
14	---	---	---	---	---	---	23	69	20	24	13	16
15	---	---	---	---	---	---	22	55	22	23	14	15
16	---	---	---	---	---	---	21	43	23	24	13	14
17	---	e14	---	---	---	---	19	36	24	24	12	12
18	---	14	---	---	---	---	18	34	24	25	10	12
19	---	14	---	---	---	---	17	35	22	25	9.1	11
20	---	15	---	---	---	---	17	39	21	25	8.0	11
21	---	15	---	---	---	---	16	37	20	24	7.4	10
22	---	15	---	---	---	---	16	32	18	22	7.4	10
23	---	15	---	---	---	e20	17	30	17	22	7.7	10
24	---	15	---	---	---	21	17	30	16	24	9.2	10
25	---	15	---	---	---	29	18	29	15	25	12	10
26	---	14	---	---	---	37	22	29	15	23	13	11
27	---	12	---	---	---	37	28	27	14	22	12	12
28	---	12	---	---	---	38	34	26	16	21	10	12
29	---	12	---	---	---	38	31	27	18	23	9.6	12
30	---	13	---	---	---	38	27	29	20	25	8.9	11
31	---	---	---	---	---	37	---	30	---	30	8.5	---
TOTAL	---	195	115.7	---	---	295	670	1119	703	708	475.8	281.5
MEAN	---	13.9	9.64	---	---	32.8	22.3	36.1	23.4	22.8	15.3	9.38
AC-FT	---	387	229	---	---	585	1330	2220	1390	1400	944	558
MAX	---	15	14	---	---	38	35	69	39	32	35	16
MIN	---	12	6.0	---	---	20	16	24	14	14	7.4	4.9

CAL YR	2011	TOTAL	17642.7	MEAN	81.3	MAX	274	MIN	6.0	AC-FT	34990 (PARTIAL YEAR RECORD)
WTR YR	2012	TOTAL	4563.0	MEAN	20.9	MAX	69	MIN	4.9	AC-FT	9050 (PARTIAL YEAR RECORD)

MAX DISCH: 70.2 CFS AT 00:45 ON MAY 14,2012 GH 2.24 FT SHIFT 0.01 FT
 MAX GH: 2.24 FT AT 00:45 ON MAY 14,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

TARRYALL CREEK BELOW TARRYALL RESERVOIR
 WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06701500 SOUTH PLATTE RIVER BELOW CHEESMAN RESERVOIR
Water Year 2012

Location.-- Lat. N39°12'33.58"; Long. W105°16'4.83" (NAD83) Jefferson County, Hydrologic Unit 10190002. Gage is located on the left side of a 30-ft. Parshall Flume, approximately 1,400-ft. downstream from the toe of Cheesman Dam and 3.8 miles SW of Deckers, CO.

Drainage Area and Period of Record.-- 1760 sq. mi. (USGS Colorado StreamStats utility). ; October 1, 1925 to present.

Equipment.-- Digital incremental Sutron SDR-0001-4 Data Logger connected to a Sutron SatLink2 Data Collection Platform (DCP) transmitting hourly in a rectangular concrete shelter and concrete stilling well at a 30-ft. Parshall Flume. An electric tape gage (ETG) in the shelter is the primary reference with no provisions for a supplemental reference. The stilling well is connected to the flume via one 2-in. intake without flushing equipment. Gage is owned and maintained by Denver Water and operated cooperatively with the Colorado Division of Water Resources.

Hydrologic Conditions.-- Regulated and unregulated flow. Cheesman Reservoir, an on-channel reservoir, regulates all flows at the gage unless the reservoir is spilling. Cheesman Reservoir is in the center of the 2002 Hayman burn area. The fire severely damaged the watershed. Denver Water Board has performed extensive erosion control in the area surrounding the reservoir.

Gage-Height Record.-- The primary record is 15-minute satellite data with 15-minute logged DCP data and 5-minute logged SDR data as backup. Instrument calibration was maintained by 19 visits made to the gage by DWR personnel. Two instrument corrections of -0.01 to +0.01 ft. were made this year and were applied to the record as defined by visits or events. The record is complete and reliable. Up to two unit values per day occurring on March 28, 2012, May 15, 2012 June 13, 2012 and September 14, 2012 during measurements or flume cleaning activities were deemed erroneous and manually adjusted from adjacent good record without loss of accuracy. Due to the flume's proximity to the dam, ice accumulation in the approach, flume and departing section is normally not an issue. Vegetal growth in the flume can affect the flume's performance. The flume was cleaned four times; October 31, 2011, November 28, 2011, March 28, 2012 and April 23, 2012 returning cleaning corrections from no change to -0.02 ft.

Datum Corrections.-- Levels were run November 16, 2012 using the flume crest as base. The ETG was found to be 0.02 ft. high with respect to the flume crest. The correction was applied to the record and the gage-heights of measurements from October 5, 2011 through November 19, 2012 (date when the correction was made).

Rating.-- The control for all stages is a 30-ft. Parshall Flume. PLACHECO11, developed in 1995 in an attempt to compensate for submergence of the flume at high stages, was continued this year. The rating is well defined except for the upper ranges (~1000 cfs) where submergence appears to cause a break in the slope of the curve. Shifts have been typically positive unless extensive vegetal growth is present. A new rating showing a more even distribution of shifts throughout the range of expected flow has been developed and is currently being evaluated. Twenty measurements (Nos. 265-284) were made this year, ranging in discharge from 44.2 to 333 cfs. Measurements made this year cover the range in stage experienced this year well except for higher daily flows of July 6, August 16-21 September 9-11, 2012. The peak flow of 698 cfs occurred at 12:00 on September 11, 2012 at a gage-height of 3.14 feet with a shift of +0.02 ft. exceeding the high flow Measurement (No. 281) made July 19, 2012 by 365 cfs and 1.22 ft. of stage respectively. The peak event was the result of flushing the valves of the Reservoir Outlet.

Discharge.-- Shifting control method was used all year. Shifts are caused by scour and fill of channel materials upstream of the flume and vegetal growth within the flume. Variable shift table PLACHECO11-4, defined by five measurements (Nos. 262-265 and Nos. 256 and 260) was applied from August 16 to October 5, 2011. Shifts were distributed by time with consideration given to change in stage from October 5, 2011 to January 25, 2012. Variable shift table PLACHECOVST12-E defined by four measurements (Nos. 271-274) was applied from January 25, 2012 to Measurement No. 274. Variable shift table PLACHECOVST12-F defined by seven measurements (Nos. 275-281) was applied from March 28, 2012 to July 19, 2012. Shifts were distributed by time as defined by measurements from July 19, 2012 to October 3, 2012. Open water measurements showed shifts varying between -0.01 and +0.09 ft. All were given full weight except for Nos. 265, 268, 271, 278, 279 and 282, which were discounted up to 4% to smooth shift distributions.

Special Computations.-- Generally if the flume is cleaned by a State Hydrographer, a measurement is made before and after the flume cleaning with shifts applied accordingly.

Remarks.-- The record is good, except for peak event September 11, 2012 which is fair due to lack of recent in range measurements made to the site. Station maintained by Mike Wild record developed by Mike Wild and Division One Hydrographic staff.

Recommendations.-- Continue to evaluate the efficacy of the new rating. Levels must be run in the 2013 Water Year to confirm the re-establishment of reference marks RM4, RM5, RM6 and the ETG.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06701500 SOUTH PLATTE RIVER BELOW CHEESMAN RESERVOIR

RATING TABLE-- PLACHECO11 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

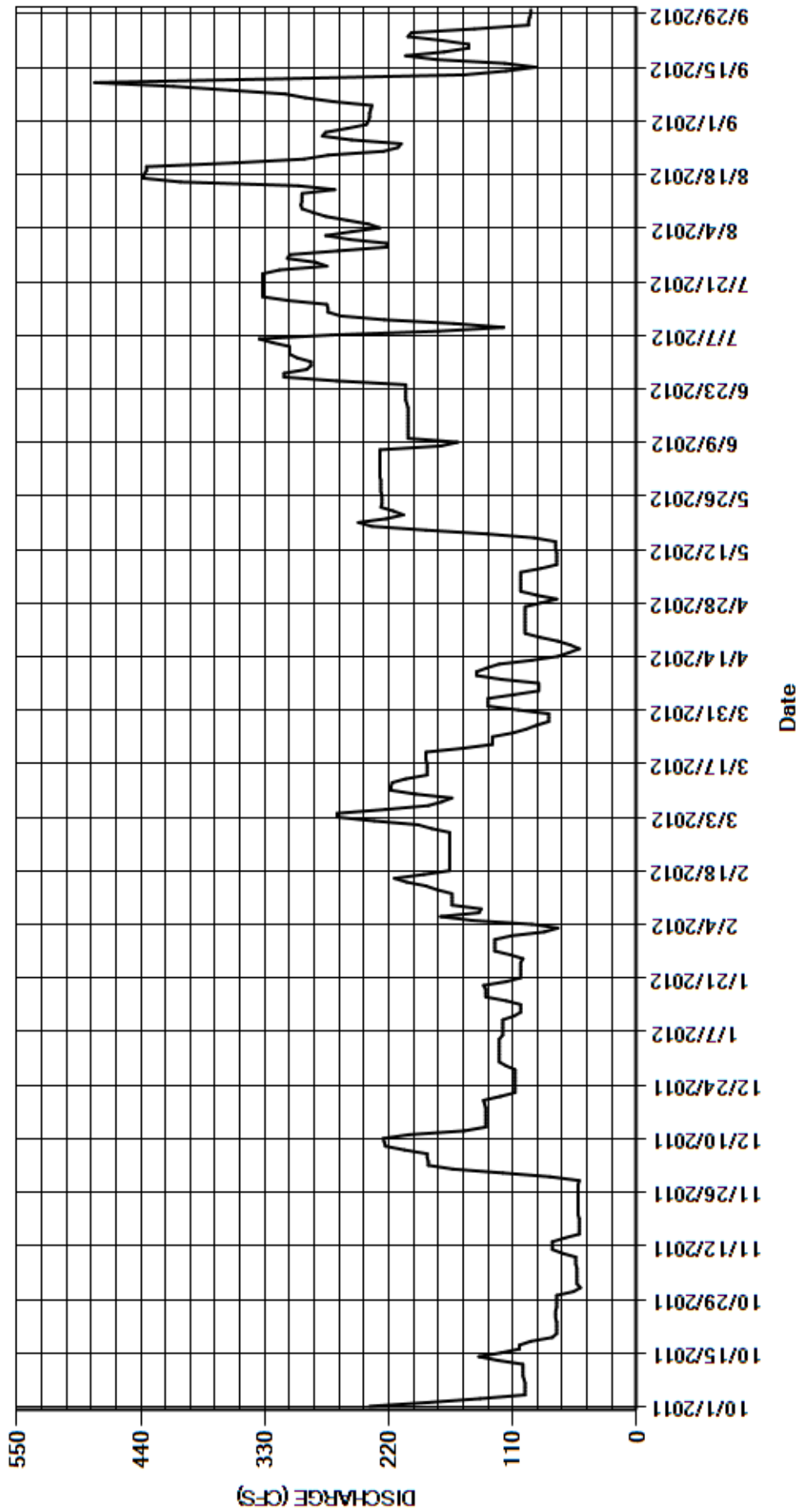
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	237	50	119	122	111	194	132	103	228	301	255	238
2	185	53	163	122	82	233	132	103	228	308	276	237
3	139	53	185	122	70	266	132	103	228	308	253	237
4	99	53	185	122	93	266	109	103	228	308	228	236
5	99	53	186	122	146	223	87	103	228	323	238	235
6	99	53	186	119	174	185	87	103	228	335	257	269
7	99	54	206	119	140	173	87	85	228	271	276	294
8	100	54	223	119	138	164	120	71	174	176	287	312
9	101	54	224	119	164	196	142	71	159	118	297	361
10	101	66	225	119	164	218	142	71	203	162	298	411
11	101	75	202	109	164	218	133	71	203	224	297	481
12	101	75	153	103	164	217	122	72	203	263	297	309
13	123	75	134	103	177	205	93	72	203	274	297	153
14	140	64	134	103	187	186	70	72	203	274	268	116
15	120	51	134	116	204	186	60	91	203	275	300	90
16	104	51	134	134	215	186	51	133	203	309	405	117
17	104	51	134	134	189	186	59	187	203	332	438	178
18	94	51	134	134	166	187	70	235	203	332	437	205
19	75	51	135	136	166	187	86	247	204	332	435	171
20	71	52	136	116	166	187	99	222	205	332	435	149
21	71	52	121	103	166	154	99	207	205	332	357	149
22	71	52	108	103	166	128	99	216	205	332	295	173
23	71	52	108	103	166	128	99	227	205	332	274	203
24	72	52	108	103	166	128	99	226	205	317	225	200
25	72	52	108	103	166	110	99	226	266	275	212	144
26	72	52	108	101	166	98	99	226	313	285	209	96
27	71	52	108	112	166	89	99	227	313	310	253	96
28	71	52	108	126	166	78	85	227	293	308	279	95
29	71	51	116	126	182	78	71	227	289	265	276	94
30	71	77	122	126	---	78	89	227	289	221	257	94
31	56	---	122	126	---	105	---	228	---	222	240	---
TOTAL	3061	1683	4569	3625	4590	5237	2951	4782	6748	8756	9151	6143
MEAN	98.7	56.1	147	117	158	169	98.4	154	225	282	295	205
AC-FT	6070	3340	9060	7190	9100	10390	5850	9490	13380	17370	18150	12180
MAX	237	77	225	136	215	266	142	247	313	335	438	481
MIN	56	50	108	101	70	78	51	71	159	118	209	90

CAL YR	2011	TOTAL	77450	MEAN	212	MAX	802	MIN	50	AC-FT	153600
WTR YR	2012	TOTAL	61296	MEAN	167	MAX	481	MIN	50	AC-FT	121600

MAX DISCH: 698 CFS AT 12:00 ON SEP 11,2012 GH 3.14 FT SHIFT 0.02 FT
 MAX GH: 3.14 FT AT 12:00 ON SEP 11,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06701500 SOUTHPLATTE RIVER BELOW CHEESMAN RESERVOIR
 WY2012 HYDROGRAPH



PLATTE RIVER BASIN
NORTH FORK SOUTH PLATTE RIVER AT GRANT

Water Year 2012

Location.-- Lat. N.39°27'28.7", Long. W.105°39'32.6" (WGS84) Park County, CO. Gage is located on the left side of the channel 1,350 ft. downstream from Geneva Creek and 1.0 miles downstream from the east portal of the Harold D. Roberts Tunnel or 0.25 miles southeast of the US 285 and County Road 62 intersection in Grant, CO.

Drainage Area and Period of Record.-- 127 mi²; (From topographic maps.); Daily values are available from the Colorado Division of Water Resources from October 1, 1990 to present.

Equipment.-- Digital incremental Sutron 56-0540-400-DTR shaft encoder connected to a Sutron SatLink 2 Data Collection Platform (DCP) and a graphic Stevens A type water stage recorder in a wooden shelter overtop a 36-inch concrete stilling well next to a concrete trapezoidal channel section and spillway. A metal drop tape and adjustable reference point serve as the base reference. There are no provisions for a supplemental reference. The gage is equipped with A/C power, heat lamps and heat tape to prevent freezing of the stilling well and intakes in winter months. The gage is owned and maintained by Denver Water in cooperation with the Colorado Division of Water Resources.

Hydrologic Conditions.-- Semi-controlled release. Gage is affected by natural stream flows from Kenosha Creek, Geneva Creek and discharges from the East Portal of the Roberts tunnel. Rapid changes in stage are caused by the regulation of Roberts Tunnel, 1 mile upstream. When Roberts Tunnel is operating in winter months, the gage is usually free of ice. Insufficient stilling due to rock and cobble build up at gage pool produces choppy water surfaces and fast velocities in the gage pool.

Gage-Height Record.-- The primary record is 15-minute satellite data with 15-minute logged DCP data and chart record as backup. Instrument calibration was supported by twenty visits made to the gage. One instrumentation correction of +0.02 ft. was made on March 14, 2012 which was applied to the record as defined by visits. The record is complete and reliable except for: December 1 through, March 12, when the stage-discharge relationship was affected by ice and March 13 through 17, 2012 when stilling well communication with the channel was impaired. One value at 1915 hrs on March 22, 2012 was corrected to adjacent values.

Datum Corrections.-- Levels were last run on November 1, 2012 using RM 4 as base. The base reference was within allowable tolerances.

Rating.-- The control for stages below 4.00 ft. is a broad crested weir with slightly raised edges. The overflow control has good getaway conditions and should not become submerged. Both banks are clear up to a stage of approximately 5.00 ft. Rating No. 12 (PLAGRACO12), in use since October 1, 2001 was continued this year. It is defined by measurements from 15.6 to 700 cfs. Fourteen discharge measurements (Nos. 1108-1121) were made during the year, ranging in discharge from 17.0 to 441 cfs covering the range in stage experienced this year well. The peak discharge of 490 cfs occurred at 0430 on July 7, 2012 at a gage-height of 1.71 ft. with a shift of -0.02 ft. It exceeded this year's high flow measurement (No. 1117) by 49 cfs and 0.07 ft. of stage.

Discharge.-- Shifts are caused by scour and fill of the weir pool and by the gradual erosion of the control. Open water measurements made this year showed unadjusted shifts varying between +0.04 and -0.05 ft. All measurements were given full weight except for Nos. 1115 and 1119 which were adjusted 2.17 and -4.15% respectively to smooth shift distributions. Shifting control method was used for all periods of open water. Shifts were applied to the record as follows: June 20 through October 31, 2011, stage dependent shifting using variable shift table PLAGRACOVST11-A, defined by six measurement made during the period of use; from October 31 through November 30, 2011 and March 17 to March 23, 2012 shifts were distributed by time as defined by measurements; from March 23 through June 26, 2012, stage dependent shifting using variable shift table PLAGRACOVST12-1, defined by six measurements (Nos. 1111-1116) made during the period of use; from June 26, 2012 through October 24, 2012 shifts were distributed by time as defined by measurements.

Special Computations.-- Discharge for periods of ice affect and periods of sluggish intakes were estimated from adjacent periods of good record, discharge measurements made at the gage and temperature trends recorded at the gage. A spreadsheet was used to compute the daily difference between the Grant gage and Roberts Tunnel. This difference represents the native flow in the North Fork without Roberts Tunnel.

Remarks.-- The record is good with exception of the ice affected period and the period of sluggish intakes which are estimated and poor. Station maintained by Tony Arnett, record developed by Tony Arnett and Division 1 staff.

Recommendations.-- The Roberts Tunnel and North Fork of the South Platte at Grant record should be worked on a monthly basis. A wire weight gage should be installed at this gage as there is a need for an outside reference to verify the primary reference.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

NORTH FORK SOUTH PLATTE RIVER AT GRANT

RATING TABLE-- PLAGRACO12 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

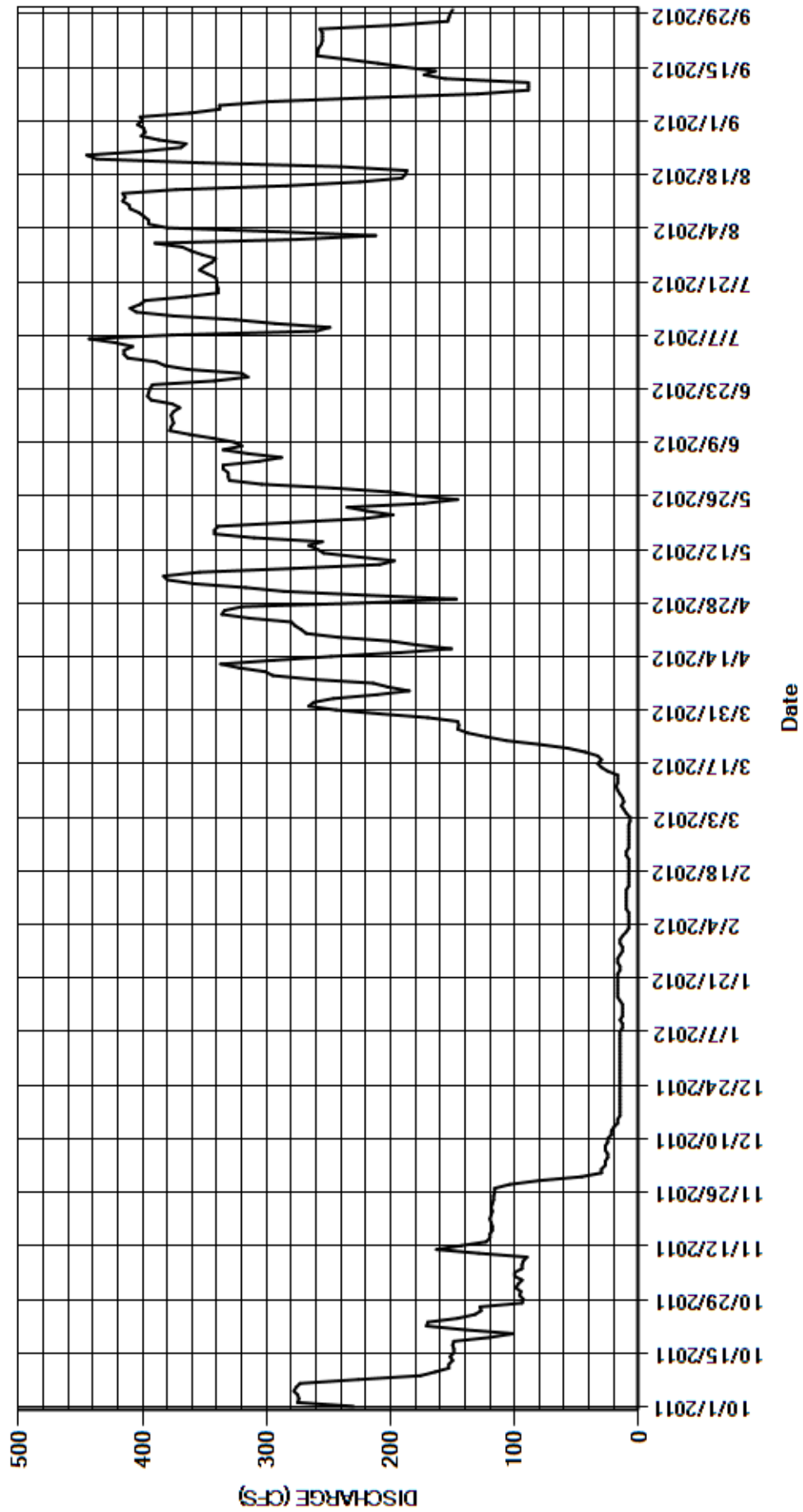
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	230	99	e30	e15	e13	e8.0	266	286	331	412	275	400
2	275	97	e30	e15	e10	e7.0	262	317	335	415	212	402
3	274	94	e27	e15	e8.0	e7.0	246	358	335	415	291	362
4	275	100	e27	e15	e8.0	e10	211	380	306	408	380	338
5	278	100	e25	e15	e8.0	e12	185	383	288	422	395	338
6	276	94	e25	e15	e8.0	e14	202	354	315	443	395	298
7	273	94	e27	e15	e8.0	e12	214	278	335	376	399	220
8	226	93	e27	e13	e10	e13	263	209	320	260	403	130
9	176	90	e25	e13	e10	e15	295	197	326	249	410	89
10	164	129	e25	e15	e10	e17	301	226	343	293	411	89
11	153	163	e22	e13	e10	e18	322	254	362	325	416	89
12	153	143	e22	e13	e10	e17	337	259	378	375	414	156
13	150	123	e20	e13	e10	e17	294	266	377	405	416	173
14	152	120	e17	e13	e8.0	e17	248	255	375	410	373	164
15	149	120	e17	e15	e8.0	e25	192	310	376	402	284	188
16	149	118	e15	e17	e8.0	e30	151	342	377	398	225	210
17	150	118	e15	e17	e8.0	e33	179	342	375	365	191	234
18	149	119	e15	e17	e8.0	30	200	339	370	339	188	259
19	120	120	e15	e17	e8.0	33	242	282	376	339	187	259
20	101	119	e15	e17	e8.0	43	268	222	393	340	240	258
21	140	118	e15	e17	e8.0	57	272	198	396	340	351	256
22	171	119	e15	e17	e10	80	277	219	395	341	437	255
23	170	118	e15	e15	e10	107	280	235	394	348	445	255
24	146	117	e15	e15	e8.0	123	314	173	392	354	400	255
25	132	117	e15	e17	e8.0	138	336	146	342	350	369	257
26	127	116	e15	e17	e8.0	146	334	179	315	344	365	196
27	128	116	e15	e15	e8.0	145	320	202	320	341	387	154
28	94	104	e15	e13	e8.0	146	220	246	363	352	401	153
29	93	80	e15	e13	e8.0	170	147	304	382	361	398	152
30	96	46	e15	e15	---	209	220	330	389	368	399	150
31	95	---	e15	e15	---	244	---	331	---	390	404	---
TOTAL	5265	3304	606	467	255.0	1943.0	7598	8422	10681	11280	10861	6739
MEAN	170	110	19.5	15.1	8.79	62.7	253	272	356	364	350	225
AC-FT	10440	6550	1200	926	506	3850	15070	16710	21190	22370	21540	13370
MAX	278	163	30	17	13	244	337	383	396	443	445	402
MIN	93	46	15	13	8.0	7.0	147	146	288	249	187	89

CAL YR	2011	TOTAL	62302.0	MEAN	171	MAX	607	MIN	15	AC-FT	123600
WTR YR	2012	TOTAL	67421.0	MEAN	184	MAX	445	MIN	7.0	AC-FT	133700

MAX DISCH: 490 CFS AT 04:30 ON JUL 07,2012 GH 1.71 FT SHIFT -0.02 FT
 MAX GH: 1.71 FT AT 04:30 ON JUL 07,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

NORTH FORK SOUTH PLATTE RIVER AT GRANT
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06707500 SOUTH PLATTE RIVER AT SOUTH PLATTE
Water Year 2012

Location.-- Lat. N.39° 24'31.85", Long. W105° 10'11.61" (NAD83), Jefferson County, CO Hydrologic Unit 10190002. Gage is located on the left bank of the South Platte River approximately 350 ft. downstream from the bridge on State Highway 75 and 500 ft. downstream from the confluence of the South and North forks of the South Platte River.

Drainage Area and Period of Record.-- 2,580 mi² (USGS Colorado StreamStats utility).; Daily values are available from the CDWR from: Jan 1, 1896 June 30, 1897; January 1, 1899 to May 31, 1900; June 1, 1901 to present.

Equipment.-- Digital incremental Sutron SDR-0001-1 shaft encoder, temperature sensor and tipping bucket rain gage connected to a Sutron SatLink2 Data Collection Platform (DCP) transmitting hourly in a concrete shelter overtop a 60-inch CMP well on the left bank. The primary gage is an electric tape gage (ETG) mounted on the equipment shelf with a supplemental cantilever wire weight gage (WWG) 20 feet downstream of the shelter. A cableway is just upstream of the shelter for measurement of flows that are too high to wade. The gage is on Denver Water property and has AC power. Satellite equipment is owned and maintained by the Colorado Division of Water Resources (CDWR). A Sutron 56-0540-400-DTR shaft encoder was removed and the gage was placed in the above configuration on August 1, 2012.

Hydrologic Conditions.-- The stream is heavily regulated by upstream reservoirs, diversions from and deliveries to the stream. Drainage area is mountainous with flows being principally controlled by releases from Cheesman Reservoir on the South Fork of the South Platte and transmountain deliveries made to the North Fork of the South Platte via Roberts Tunnel. A large portion of the drainage area is in areas having significant burn areas from the Hayman, Schoonover and Buffalo Creek fires as well as the North Fork fire occurring this year. Soil erosion from the older fires has been stabilizing and turbidity, though still present, was decreasing. Trees and other organic material migrate down river during heavy precipitation events.

Gage-Height Record.-- The primary record is 15-minute satellite data with logged 15-minute logged DCP data and 5-minute logged SDR data as backup. The record is complete and reliable except as follows: November 27 - 29, December 3 -12, 15-18 and December 20, 2011 through March 5, 2012 when the stage-discharge relation was affected by ice. Missing values on April 3, 14 and 15, 2012 were filled in with logged SDR data with no loss of accuracy. Instrument calibration was maintained by twenty visits made to the gage by CDWR staff. No instrument corrections were necessary nor made.

Datum Corrections.-- Levels were last run on December 5, 2012 using RM5 as base. The primary reference was found to be 0.06 ft. high with respect to RM5 and the supplemental WWG was found to be 0.13 ft. high. Inspection of previous levels runs to the gage found that this issue was present in 2006 and again in 2008 using different reference marks as base. The base reference was not corrected in either previous levels runs. The tape length of the primary reference and the WWG dial reading was adjusted at the time levels were run (December 5, 2012). The correction was applied to the gage-height record and the gage-heights of discharge measurements from October 5, 2011 through December 12, 2012 (date the gage was corrected).

Rating.-- The low stage control is a slight narrowing of the channel with a rock riffle below the gage. For moderate to high stages the channel and banks are the control. A constriction in the channel approximately 0.25 miles downstream will affect extremely high stages. Rating No. 16, in use since October 1, 2002 was continued this year. It is defined by measurements to 3350 cfs. Fifteen discharge measurements (Nos. 849-863) were made this year ranging in discharge from 213 to 695 cfs, covering the range in stage experienced this year well except for: the lower daily discharges of October 29 - November 1, 3 -10, 16-30, 2011, December 1-2, 5-6,13-19, 2011 January 3-12, 18-23, 27-28, 30, 2012 and February 7-8, 2012, and the higher daily discharges of July 5-7, 16-17, August 9-13 and 23, 2012. The peak discharge of 851 cfs occurred at 11:30 on July 7, 2012 at a gage-height of 3.72 ft. with a shift of 0.02 ft., exceeding this year's high flow measurement (No. 859), made on July 2, 2012 by 0.27 ft. of stage and 156 cfs.

Discharge.-- Shifts are primarily caused by the movement of sand and gravel through the measurement section. Winter ice conditions can cause dramatic changes to shifting patterns. Shifting control method was used all year. Shifts were applied as defined by measurements with consideration given to change in stage from September 19, 2011 to February 22, 2012 and from July 7, 2012 to October 3, 2012. Variable shift table PLASPLCOVST12-A, defined by Measurement Nos. 852-859, was applied from February 22, 2012 to the peak event of July 7, 2012. Open water measurements made this year showed unadjusted shifts varying between 0.02 ft. and 0.10 ft. all in the positive direction. All measurements were given full weight except for Nos. 856 and 857, which were adjusted -0.76 and 1.40% respectively to better fit the stage-shift distribution.

Special Computations.-- Periods of ice affect are identified by comparing computed record against Denver Water accounting for computed inflow to Strontia Springs Reservoir, approximately 2 miles downstream. A spreadsheet is also developed for the ice period displaying computed record, Strontia computed inflow, weather data, tributary inflows from Cheesman Reservoir and the North Fork of the South Platte at Grant. Ice periods are apparent when computed discharges are higher than Strontia inflow and out-of-line with trends from tributary gages. Generally the computed record will start to greatly exceed the Denver Water figures shortly after winter weather sets in. Most years the computed figures will remain high until sustained warm weather. When gage figures and Denver Water figures get close again, ice-affect is assumed to be over. The winter of 2011-2012 was warmer than usual which created shorter periods of ice affect.

Remarks.-- The record is good, except for periods of ice effect, which are estimated and poor. Station maintained by Mike Wild, record developed by Division One Hydrographic Staff.

Recommendations.-- Winter measurements and visits should continue to be made if possible in order to better determine ice affected days. Measurements should also continue to be made twice a month as conditions allow. Levels need to be run in the 2013 water year to monitor stability.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06707500 SOUTH PLATTE RIVER AT SOUTH PLATTE

RATING TABLE-- PLASPLCO16 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

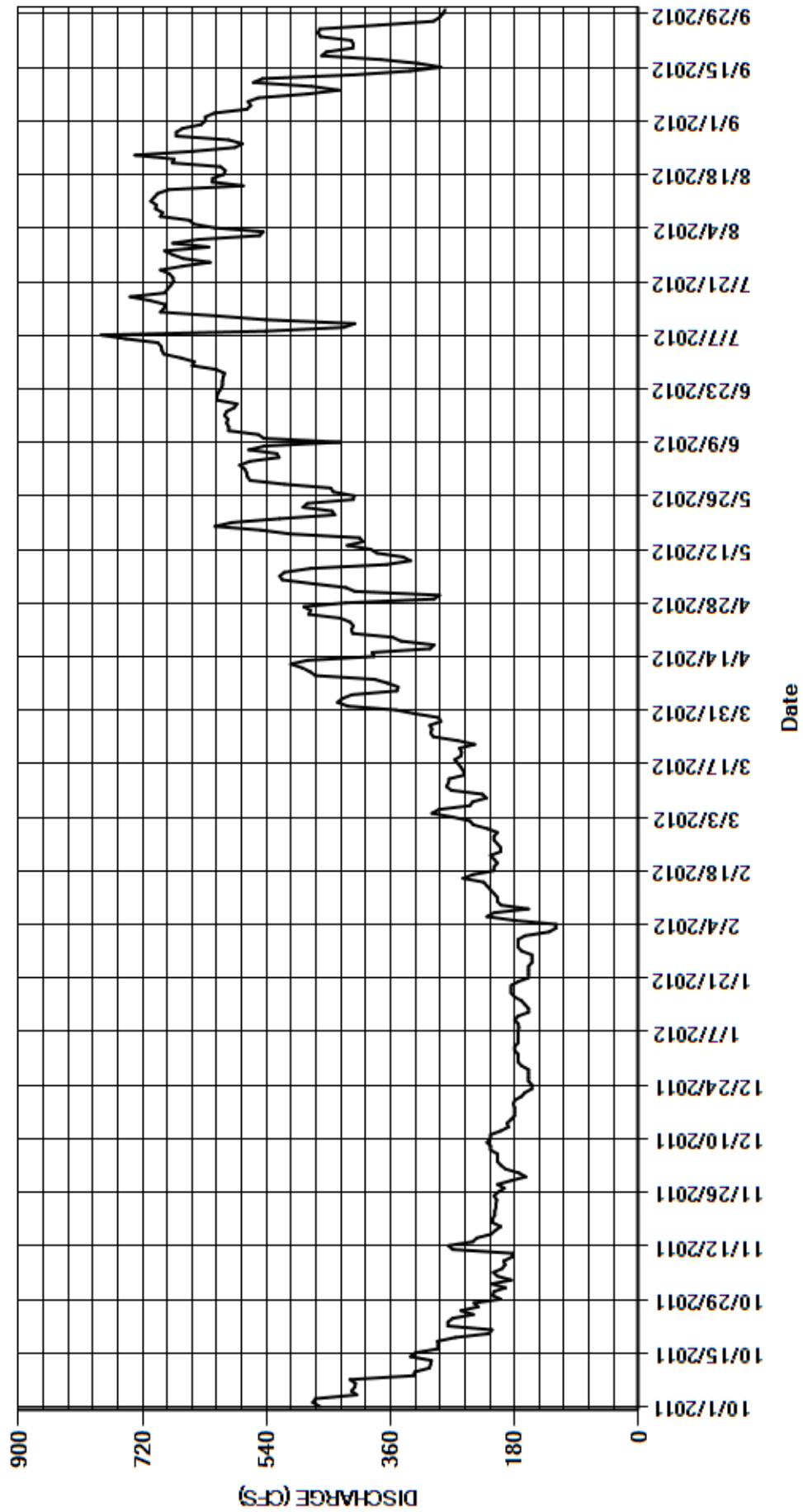
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	463	193	174	e175	e165	e240	422	412	569	664	638	629
2	473	214	193	e180	e130	e245	437	425	572	689	550	629
3	469	185	e200	e180	e120	e270	430	472	579	692	545	616
4	409	205	e205	e175	e120	e300	416	517	564	693	615	569
5	417	211	e205	e175	e180	e290	351	521	522	698	646	563
6	412	198	e205	e175	e220	245	349	514	525	744	652	567
7	411	194	e215	e175	e210	241	364	476	566	780	694	552
8	419	196	e215	e174	e160	221	383	366	543	542	691	481
9	327	184	e220	e175	e200	227	469	331	433	428	701	435
10	325	183	e215	e180	e205	272	477	342	544	412	700	475
11	304	270	e215	e175	e205	279	488	380	552	541	708	559
12	302	276	e200	e160	e210	276	505	389	595	612	703	546
13	301	241	189	e160	e215	275	480	423	595	694	698	413
14	331	235	191	e165	e220	253	384	400	598	689	682	332
15	324	214	e185	e170	e225	254	387	405	596	687	574	287
16	292	208	e180	e180	e255	258	303	506	601	709	619	320
17	291	200	e180	e185	e240	262	297	548	598	738	618	374
18	292	212	e180	e185	e210	267	345	615	587	688	602	460
19	266	212	182	e185	e210	258	357	590	583	684	600	453
20	217	209	e180	e175	e205	257	415	521	612	679	607	415
21	213	209	e170	e160	e210	260	417	441	612	675	677	414
22	277	207	e165	e160	e215	238	414	445	610	676	674	417
23	277	207	e155	e160	e200	263	419	487	606	681	731	462
24	270	206	e155	e160	e200	298	433	481	604	694	647	465
25	240	210	e160	e155	e205	302	479	414	604	662	586	463
26	258	204	e160	e155	e210	300	476	413	603	622	575	377
27	233	e195	e160	e155	e210	303	486	443	601	661	595	298
28	239	e205	e160	e170	e205	287	425	447	613	676	671	289
29	200	e185	e170	e175	e220	290	297	514	648	688	671	284
30	212	164	e175	e175	---	324	289	564	645	624	662	281
31	210	---	e175	e175	---	352	---	568	---	676	635	---
TOTAL	9674	6232	5734	5304	5780	8407	12194	14370	17480	20398	19967	13425
MEAN	312	208	185	171	199	271	406	464	583	658	644	448
AC-FT	19190	12360	11370	10520	11460	16680	24190	28500	34670	40460	39600	26630
MAX	473	276	220	185	255	352	505	615	648	780	731	629
MIN	200	164	155	155	120	221	289	331	433	412	545	281

CAL YR	2011	TOTAL	154834	MEAN	424	MAX	1350	MIN	155	AC-FT	307100
WTR YR	2012	TOTAL	138965	MEAN	380	MAX	780	MIN	120	AC-FT	275600

MAX DISCH: 851 CFS AT 11:30 ON JUL 07,2012 GH 3.72 FT SHIFT 0.02 FT
 MAX GH: 3.72 FT AT 11:30 ON JUL 07,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06707500 SOUTH PLATTE RIVER AT SOUTH PLATTE
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06707501 SOUTH PLATTE RIVER BELOW STRONTIA SPRINGS

Water Year 2012

Location.-- Lat. N39°26'8"; Long. W105°7'27.3" (NAD83) in Douglas County, CO. Gage is on the right bank approximately 1200 ft. downstream from Strontia Springs Reservoir and 9 mi. SSW from the Chatfeild Reservoir dam.

Drainage Area and Period of Record.-- 2596 sq. mi. (CDWR Dam Safety database).; The station was established when Strontia Springs dam was built. Daily values are available from CDWR from October 1, 1983 to present.

Equipment.-- A digital incremental Sutron Stage Discharge Recorder SDR-0001-1 connected to a Sutron SatLink2 Data Collection Platform (DCP) and a Steven's A-70 water-stage recorder in a 6 ft. by 6 ft. concrete shelter and stilling well set on bedrock in the channel. An adjustable reference point with graduated tape on the float drive of the recorder is the primary reference with an adjustable reference point and metal drop located below the floor of the shelter, accessible through a manhole and an outside staff gage as supplemental references. A cableway is located approximately 100 ft. below the shelter. The gage's instrumentation was updated to the above configuration on May 3, 2012. The gage is owned and maintained by Denver Water. Satellite equipment is owned and gage operations are done by CDWR.

Hydrologic Conditions.-- 2596 sq. mi. of drainage area heavily influenced by numerous diversions from and transbasin deliveries to the channel as well as several on-stream reservoirs. Flows will reflect extreme basin conditions when upstream reservoirs are either very low or completely full. The gage sits directly below Strontia Springs Reservoir which will regulate flows when not spilling. Ice effect is generally not seen due to the gages proximity to the dam. However, this year ice did affect the gage height during the coldest period of record.

Gage-Height Record.-- The primary record is 15-minute telemetered data with 15-minute logged DCP, 5-minute SDR data and chart record as backup. The record is complete and reliable except for December 12, 2011 when the inlets were sluggish and December 23, 2011, January 8,9,12,13,17,18 and February 5 and 8, 2012 when the stage-discharge relation was affected by ice. Three missing gage-height values were interpolated from adjacent record on May 3, 2012, due to upgrade of the instrumentation, without loss of accuracy. Likewise, two erroneous values on May 23, 2012, during stilling well work, were adjusted towards adjacent record without loss of accuracy. Instrument calibration was supported this year by twenty-two visits to the gage by CDWR staff. One instrument correction of +0.01 ft. was made on April 13, 2012 and applied to the record as defined by visits to the gage.

Datum Corrections.-- Levels were last run on November 16, 2012 using RM1 as base. The base reference was found within allowable tolerances. Prior to the September 2009 level run, it was believed that running levels on this gage was unnecessary because the stilling well and shelter are cast on bedrock and would thereby be more stable than surrounding features. Three additional reference marks were established on September 23, 2009.

Rating.-- The control is a boulder and cobble riffle approximately 50 ft. below the gage. The channel grade changes abruptly and significantly approximately 170 ft. below the gage. The riffle is considered the controlling feature for flows up to about 800 cfs. Above this point, the channel becomes the control. PLASTR004, dated March 19, 2008, is defined by measurements up to 1670 cfs and was continued in use for all of WY2012. Twenty-two discharge measurements (Nos. 502-523) were made this year ranging in discharge from 33.6 to 167 cfs covering the range in stage experience this year well except for the higher daily flows of: April 4-9, June 9, 30-July 13, 15-16, 19-August 2, 8-16 and August 22-23, 2012. The peak flow of 376 cfs occurred at 2300 July 7, 2012 at a gage-height of 4.17 ft. with a shift of +0.02 ft., exceeding this year's high flow Measurement (No. 517) made July 16, 2012 by 209 cfs and 0.61 ft. of stage.

Discharge.-- Shifting control method was used all year. Shifts at low flows are variable and generally caused by changes to the rock riffle and by vegetal growth in the channel. Shifting at moderate flows (GH 3.00-3.80) are caused by scour and fill in the control section below the gage. Shifting at high flow stages is influenced by downstream channel gradients and impedance factors. Shifts were applied by time as defined by measurements with consideration given to change in stage from: September 27, 2011 through January 24; February 29 through June 14 and September 19 through October 3, 2012. Stage dependent shifting using variable shift table PLASTR00VST12-B, defined by Measurement Nos. 507-509, was applied from January 24 through February 29, 2012. Variable shift table PLASTR00VST12-C, defined by Measurement Nos. 515-523, was applied from June 14 through September 19, 2012. Measurements made this year showed unadjusted shifts varying between -0.01 and +0.06 ft. All were given full weight except for Nos. 504, 505, 510, 511, 516, 518-520 and 524 which were adjusted up to 7.43% to smooth shift distributions.

Special Computations.-- Discharge for days of ice affect was done via straight-line interpolation of stage values from adjacent good record to estimate discharge. Strontia Springs Reservoir typically releases constant amounts for long periods of time and this helped to confirm the record. The Caretakers at Strontia Springs Dam rely heavily on the correlation of electrical output of their generators to flow values measured downstream.

Remarks.-- The record is good, except for December 12, 23, 2011, January 8-9, 12-13, 17-18 and February 5 and 8, 2012 which are fair due to some degree of ice effect. Station maintained by Tony Arnett and record developed by Division One Hydrographic staff.

Recommendations.-- The Strontia—Chatfield gages need to be measured with the highest possible accuracy, otherwise the shifts can cause bad water balances within the Waterton Canyon and Chatfield systems. These gages need to be operated by experienced personnel who are familiar with stage-shift relationships and the diversion flows that are balanced by gage figures. Frequent measurements at high flows are needed since the channel does change. Additional measurements are particularly desirable around 1000 cfs, as computed flows in this range sometimes do not balance well with downstream gages. The stilling well of this gage needs to be inspected periodically for excessive sediment accumulation as there seems to be an occasional sluggish reaction to gate changes of the Strontia Springs Dam. More frequent intake flushes also may be required to address the stilling well response to changes in water levels. A standard electric tape gage should be placed and used as the base reference.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06707501 SOUTH PLATTE RIVER BELOW STRONTIA SPRINGS

RATING TABLE-- PLASTRCO04 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

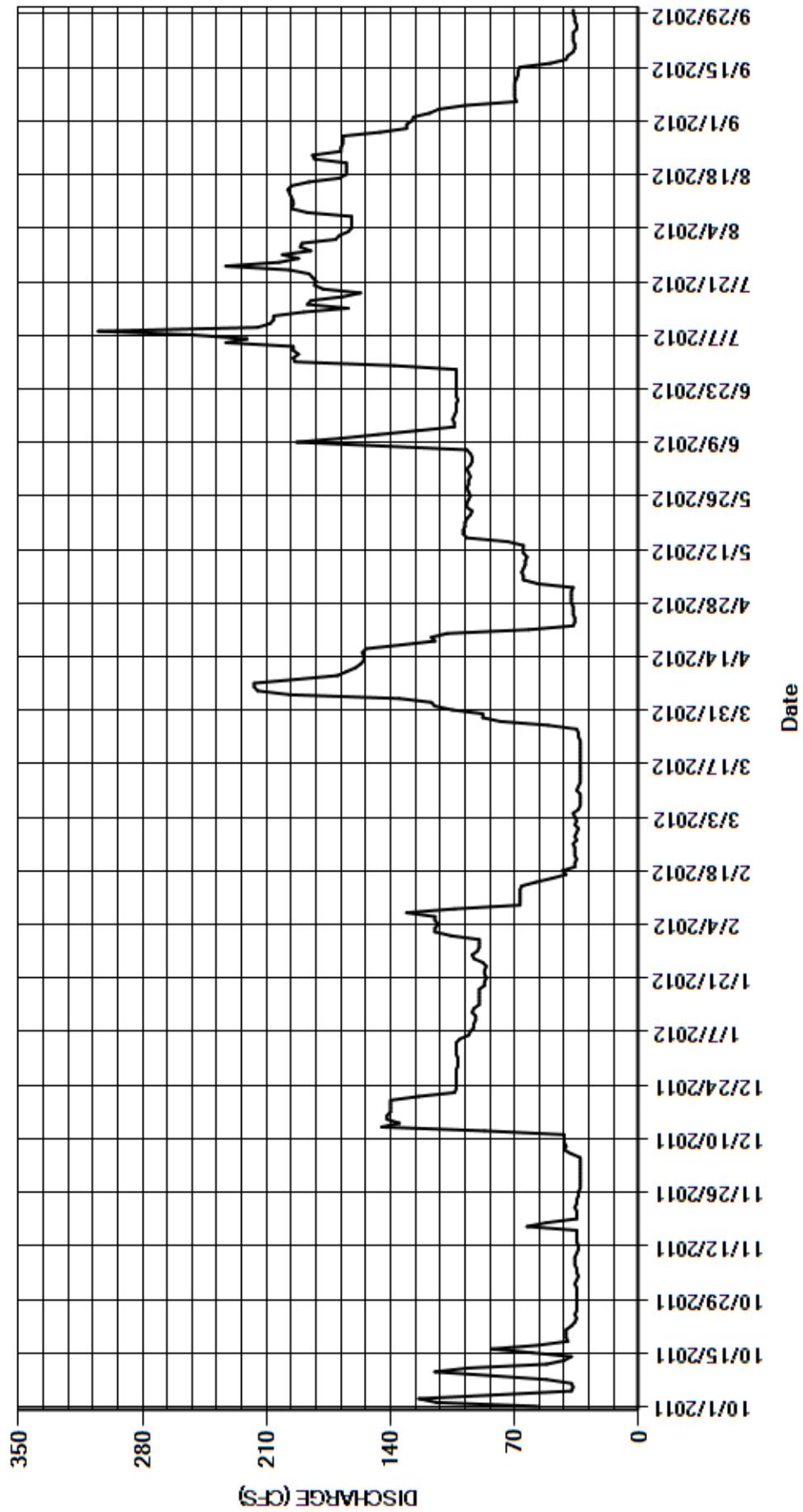
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	57	35	33	103	106	36	115	38	96	195	171	128
2	114	36	33	103	115	35	117	37	97	192	169	127
3	124	35	33	103	115	36	135	57	95	195	164	118
4	80	34	33	103	113	37	197	65	94	195	162	113
5	38	35	33	101	e115	34	215	65	94	233	162	98
6	37	35	38	96	115	33	217	66	95	221	162	69
7	38	36	42	95	131	33	217	65	97	251	162	70
8	52	36	41	e93	e104	33	193	64	145	305	187	70
9	83	36	42	e93	67	33	170	64	193	215	196	70
10	115	35	42	92	67	35	165	63	168	208	195	70
11	96	34	42	92	67	34	160	65	147	206	195	70
12	52	34	e87	e94	67	33	157	65	125	206	196	69
13	42	35	145	e93	67	33	155	65	104	189	197	68
14	38	35	135	90	66	33	155	74	104	164	198	68
15	60	35	142	90	58	33	156	97	105	187	196	67
16	83	35	142	90	49	33	154	99	104	185	186	50
17	56	63	140	e90	41	33	134	99	103	167	169	41
18	40	52	140	e90	43	33	115	98	103	157	165	40
19	41	35	140	87	36	33	117	98	103	178	165	37
20	41	35	140	87	36	33	108	97	102	183	165	36
21	41	35	124	86	35	33	62	95	103	182	165	36
22	38	36	104	87	36	33	37	94	103	184	183	37
23	36	35	e103	87	36	33	36	97	103	186	184	37
24	35	35	103	86	36	34	36	97	103	197	168	37
25	36	34	103	88	37	34	37	96	103	233	168	35
26	35	34	103	93	35	35	37	95	103	203	167	35
27	35	33	103	94	36	51	37	96	103	192	167	36
28	35	33	103	91	35	78	38	97	103	201	167	36
29	35	33	102	90	34	88	38	96	138	185	146	37
30	35	33	102	90	---	88	38	96	194	191	131	37
31	35	---	102	90	---	105	---	95	---	190	131	---
TOTAL	1683	1087	2775	2867	1898	1288	3548	2495	3430	6176	5339	1842
MEAN	54.3	36.2	89.5	92.5	65.4	41.5	118	80.5	114	199	172	61.4
AC-FT	3340	2160	5500	5690	3760	2550	7040	4950	6800	12250	10590	3650
MAX	124	63	145	103	131	105	217	99	194	305	198	128
MIN	35	33	33	86	34	33	36	37	94	157	131	35

CAL YR	2011	TOTAL	58808	MEAN	161	MAX	1160	MIN	31	AC-FT	116600
WTR YR	2012	TOTAL	34428	MEAN	94.1	MAX	305	MIN	33	AC-FT	68290

MAX DISCH: 376 CFS AT 23:00 ON JUL 07,2012 GH 4.17 FT SHIFT 0.02 FT
 MAX GH: 4.17 FT AT 23:00 ON JUL 07,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06707501 SOUTHPLATTER RIVER BELOW STRONTIA SPRINGS
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06708000 SOUTH PLATTE RIVER AT WATERTON

Water Year 2012

Location.-- Lat. 39°29'18", Long. 105°05'32", in NE¼ sec. 34, T.6 S., R.69 W., Jefferson County, Hydrologic Unit 10190002. Gage is on the left bank 168 ft. downstream from the bridge on State Highway 221, 0.4 mi. south of Waterton, CO, 4.7 mi. west of Louviers, CO and 6 mi upstream from Plum Creek.

Drainage Area and Period of Record.-- 2,620 mi² (USGS Colorado StreamStats utility).; Daily values are available from May 1, 1926 to present.

Equipment.-- Digital incremental Sutron SDR-0001-1 shaft encoder connected to a Sutron SatLink2 Data Collection Platform (DCP) in a 54-inch galvanized corrugated metal pipe shelter and stilling well. The gage is connected to the stream by two 2-inch inlets with flushing apparatuses. The primary reference is an electric tape gage with a supplemental cantilever style chain gage (largely not functional). The gage has power and is equipped with heat lamps to prevent the well from freezing. A bank operated cableway is located approximately 10-ft. upstream. Station is cooperatively operated by Denver Water.

Hydrologic Conditions.-- Stream-flows are heavily regulated by numerous diversions, deliveries and on-stream reservoirs above the gage. Flows at this gage are largely determined by operations occurring at Strontia Springs Reservoir and diversions within Waterton Canyon. Denver Water can divert water through Conduit 20, the Highline Canal and the Last Chance Ditch. The Last Chance diversion was rebuilt 2003 water year. In prior years Denver attempted to maintain a winter flow at Waterton of 30 cfs, but the use of the Last Chance diversion allows Denver's minimum stream flow at Waterton to drop to 15 cfs. This resulted in lower stream flows than have been historically seen at this gage. With the Last Chance ditch running, the FERC minimum stream flow is 15 cfs between September 16 and May 14, and 45 cfs between May 15 and September 15.

Gage-Height Record.-- The primary record is 15-minute satellite data with 15-minute logged DCP and SDR data as backup. The record is complete and reliable except for: December 3, 2011 through January 21; January 28, 29, February 4-19; February 23 through 27 and March 3, 2012 when either the stage-discharge relation was affected by ice or the stilling well and intakes were frozen. Instrument calibration was maintained by twenty-four visits to the gage. Six instrument corrections ranging from -0.02 to +0.02 ft. were made in the field this year. Corrections were applied to the record as defined by observations made to the gage. Two flush corrections of -0.01 ft. were made on November 19, 2012 and June 14, 2012 respectively. They were applied to the record by time from the time of the previous visit in both cases.

Datum Corrections.-- Levels were last run on November 16, 2012 using R.M. 8 as base. The gage was found to be reading accurately.

Rating.-- The control is a broad crested pipeline crossing approximately 35 feet below the gage. Rating PLAWATCO10, defined by measurements from 13 to 2000 cfs, was continued in use for the entire water year. Nineteen discharge measurements (Nos. 971-989) were made this year ranging in discharge from 16.5 to 59.4 cfs covering the range in stage experienced well, except for lower daily flows of January 29-31 and February 3, 2012 and the higher daily flows of October 2-4, 9-11, 16-17, 2011, and July 7-8, and 24-26, 2012. The peak flow of 306 cfs occurred at 14:30 on October 17, 2011 at a gage height of 1.40 ft with a shift of 0.00 ft. exceeding this year's high flow measurement (No. 987) made on August 30, by 247 cfs and 0.60 feet in stage.

Discharge.-- Shifting control method was for all periods of open water. Shifts are caused by scour and fill of the gage pool, vegetal growth and debris. Shifts were applied by time as defined by measurements with consideration given to change in stage. Open water measurements showed shifts varying between 0.03 and -0.01 ft. All were given full weight except for Nos. 971, 973, 983 and 989 which were discounted up to 5.68% to smooth shift distributions.

Special Computations.-- Discharge for periods of ice affect and frozen intakes was estimated from a mass balance spreadsheet accounting for releases made from Strontia Springs Reservoir (PLASTRCO) minus Denver Water provided diversion record for diversions within Waterton Canyon. The mass balance estimate was found to be about 5 cfs higher than periods of good record. This offset was incorporated into estimates. These spreadsheets should be used with caution on days of flow change, since Denver's accounting is based on 8am to 8am period rather than midnight to midnight figures.

Remarks.-- The record is good, except for periods of ice affect and frozen intakes, which are estimated and fair. The peak event is fair due to lack of confirming in range discharge measurements this year. Station maintained and record developed by Tony Arnett.

Recommendations.-- Visit notes, chart inspection, temperature data and Denver Water's Chatfield Check Sheet are used to determine ice effects and flow estimates. Without visit notes it is difficult to distinguish between ice effect at the gage and diurnal flow due to ice melting in the canyon. Also, ice affect can occur during a warm-up due to floating ice jamming on the control. Winter visits are critical and should be made on a regular basis. The channel and control should be cleared of ice during warm periods in the winter.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06708000 SOUTH PLATTE RIVER AT WATERTON

RATING TABLE.-- PLAWATCO10 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

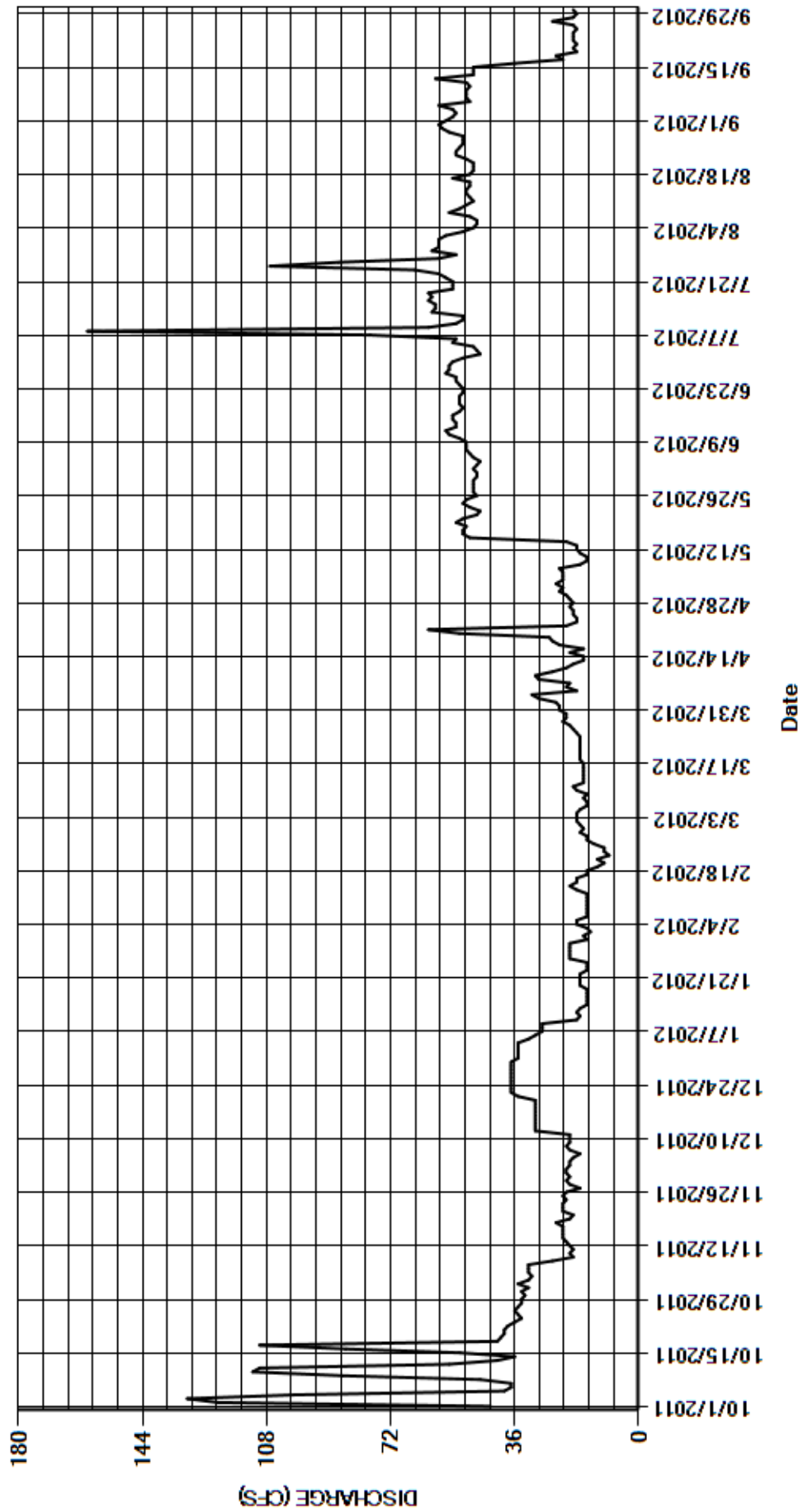
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	43	32	21	e35	16	17	23	23	47	51	58	56
2	122	35	21	e35	14	18	24	22	48	46	56	54
3	131	32	e20	e35	15	e18	29	24	47	47	51	53
4	100	31	e20	e35	e18	18	31	22	46	48	48	54
5	39	32	e19	e32	e18	17	18	22	48	54	47	58
6	37	32	e17	e30	e15	15	21	22	49	53	47	49
7	37	32	e20	e28	e15	15	20	23	50	78	49	50
8	46	25	e21	e28	e15	16	29	17	50	160	55	50
9	86	19	e20	e28	e15	15	30	15	50	61	52	50
10	112	20	e20	e18	e15	18	25	15	52	53	50	49
11	110	19	e20	e17	e15	19	21	17	55	51	48	50
12	55	20	e30	e18	e15	16	19	18	56	51	49	59
13	41	21	e30	e17	e18	16	16	18	53	60	50	48
14	36	22	e30	e15	e20	16	16	21	53	59	50	48
15	52	22	e30	e15	e18	16	20	49	54	59	49	48
16	85	22	e30	e15	e18	16	16	51	54	61	49	36
17	110	22	e30	e15	e15	16	23	51	52	60	54	22
18	41	24	e30	e15	e15	17	25	50	51	61	49	24
19	40	20	e30	e17	e12	17	26	53	52	54	48	18
20	39	19	e30	e17	10	17	52	51	52	54	48	19
21	39	22	e35	e17	12	17	61	47	52	54	48	18
22	38	22	e37	17	8.6	17	21	46	51	56	50	19
23	36	22	e37	15	e10	17	18	49	51	58	53	19
24	34	21	e37	15	e10	17	18	51	52	65	53	19
25	35	22	e37	15	e13	18	19	50	53	107	52	18
26	36	21	e37	20	e15	19	19	47	53	87	51	19
27	35	e17	e37	20	e15	20	20	48	56	58	51	25
28	34	20	e37	e20	17	22	19	48	55	53	51	19
29	34	21	e37	e20	16	21	20	48	55	60	55	18
30	33	20	e37	20	---	21	21	48	54	58	57	19
31	34	---	e35	15	---	23	---	47	---	58	58	---
TOTAL	1750	709	892	659	428.6	545	720	1113	1551	1935	1586	1088
MEAN	56.5	23.6	28.8	21.3	14.8	17.6	24.0	35.9	51.7	62.4	51.2	36.3
AC-FT	3470	1410	1770	1310	850	1080	1430	2210	3080	3840	3150	2160
MAX	131	35	37	35	20	23	61	53	56	160	58	59
MIN	33	17	17	15	8.6	15	16	15	46	46	47	18

CAL YR	2011	TOTAL	35253.0	MEAN	96.6	MAX	954	MIN	15	AC-FT	69920
WTR YR	2012	TOTAL	12976.6	MEAN	35.5	MAX	160	MIN	8.6	AC-FT	25740

MAX DISCH: 306 CFS AT 14:30 ON OCT 17,2011 GH 1.40 FT SHIFT 0 FT
 MAX GH: 1.40 FT AT 14:30 ON OCT 17,2011

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06708000 SOUTH PLATTE RIVER AT WATERTON
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
SOUTH PLATTE RIVER BELOW CHATFIELD RESERVOIR
Water Year 2012

Location.-- Lat. N39°33'45"; Long. W105°03'35" (NAD83) in Jefferson County, CO Hydrologic Unit 10190002. Gage is located on the left bank 815 ft. downstream from the outlet works of Chatfield Reservoir.

Drainage Area and Period of Record.-- 3018 sq. miles (from CDWR Dam Section database); First measurement made at gage was on June 3, 1975.

Equipment.-- Digital incremental Sutron 56-0540-400-DTR shaft encoder connected to a Sutron Satlink2 Data Collection Platform (DCP) and a Steven's A-70 water-stage recorder in a 6 ft. by 6 ft. concrete block shelter overtop a 60 in. concrete stilling well approximately 50 ft. upstream of a low head concrete dam. The well is connected to the channel via three 4 inch intakes equipped with flushing apparatuses. An electric tape gage placed on the instrument shelf is the primary reference with no provisions for an outside supplemental reference. A cableway is located approximately 30 ft. upstream from the gage. The gage is owned by the Army Corps of Engineers and maintained by the Colorado Division of Water Resources.

Hydrologic Conditions.-- Drainage area heavily regulated by diversions from and deliveries to the channel, including transbasin imports via Roberts Tunnel (ROBTUNCO) as well as several on-channel reservoirs upstream of the gage. All flows at the gage are regulated by Chatfield Reservoir, 815 ft. upstream. Releases from Chatfield Reservoir during flood events are regulated to limit the total flow at the Henderson gage (PLAHENCO) to about 5000 cfs. There are no minimum streamflow requirements below Chatfield Reservoir. Flows will periodically go to zero for short to prolonged periods.

Gage-Height Record.-- The primary record is 15-minute satellite data with 15-minute logged DCP data and chart record as backup. Twenty-four visits made to the gage by DWR personnel showed good agreement between the base reference and instrumentation. The record is complete and reliable. Due to the gage's proximity to the reservoir ice accumulation is generally not an issue. Algal growth in the gage pool can affect the gage's performance. Large algal plumes were not noted this year.

Datum Corrections.-- Levels were last run on September 23, 2009 using R.M. 1 as base. Levels showed the new elevation of the ETG to be 0.12 ft. higher at 20.090 ft. confirming levels run on July 26, 2006. No corrections were made as shifts are generally computing near zero. Further investigation needs to be done to determine if the gage datum should be changed.

Rating.-- The control is a massive low head sloped concrete dam approximately 50 feet below the gage in a deep stilling basin extending about 800ft. back to the reservoir outlet pipe. Measurement conditions near the gage are not good. The channel is very rocky and flow is deep and often extremely slow. The initial and subsequent ratings have incorporated a lot of scatter in the measurements. Variations in shifts at lower (wading) flows are probably more due to measurement error rather than conditions affecting the control. If enough measurements are made with the highest possible precision, it should be possible to develop a table that does not require shifts, or measurements at lower flows. In fact, shift variations at low flows have at times made administration of the release problematic. Rating PLACHACO03, well defined to about 2500 cfs, was continued in use for all of WY2012. Nine discharge measurements (Nos. 438- 446) were made during the year ranging in discharge from 12.6 to 125 cfs. Measurements and seven observations of no flow cover the range in stage experienced this year well. The peak flow of 161 cfs occurred at 1300 on August 2, 2012 at a gage-height of 2.09 ft. with a shift of -0.02 ft.; exceeding this year's high flow measurement (No. 446) made August 1, 2012 by 36 cfs and 0.19 ft. of stage.

Discharge.-- Shifting control method was used all year. Shifts are caused by algal growth in the stilling basin, accumulation of debris on the control and some ambiguity in the rating combined with some degree of measurement error. Shifts were prorated by time as defined by measurements for the entire water year. Open water measurements made this year showed shifts varying between -0.02 and +0.02 ft. All were given full weight except for No. 442 which was discounted -2.24% to smooth shift distributions.

Special Computations.-- Zero flow is determined operationally. The well retains a resident positive gage-height when releases are not being made. Small residuals draining through the control section were not considered. Observation made after releases were stopped quantified the resident residual gage-height of 0.37 ft. with no flow passing over the control. Thus, sustained gage-heights of 0.37 ft. and below occurring on part of the day or all day on the following days: October 1-3, 5-10, 14-31; November 1-30; December 1-31, 2011; January 1-4, 25-31; February 1, 2, 13-15; April 4-6, 16-20, 26, 27, 30; May 1, 2, 27-31; June 1-7; August 16-20, 28-31 and September 1-13, 2012 were considered zero.

Remarks.-- The record is good. Zero flow is determined operationally. Station maintained by Tony Arnett and record developed by Lee Cunning.

Recommendations.-- Cableway markings should be verified using a tagline at water level and a horizontal tape strung between the A-Frames. Vegetative growth in the stilling pool should be observed. Levels should be run in the 2013 Water Year to confirm elevations of the RM's and PZF, and reconcile any tape length problems.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

SOUTH PLATTE RIVER BELOW CHATFIELD RESERVOIR

RATING TABLE-- PLACHACO03 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

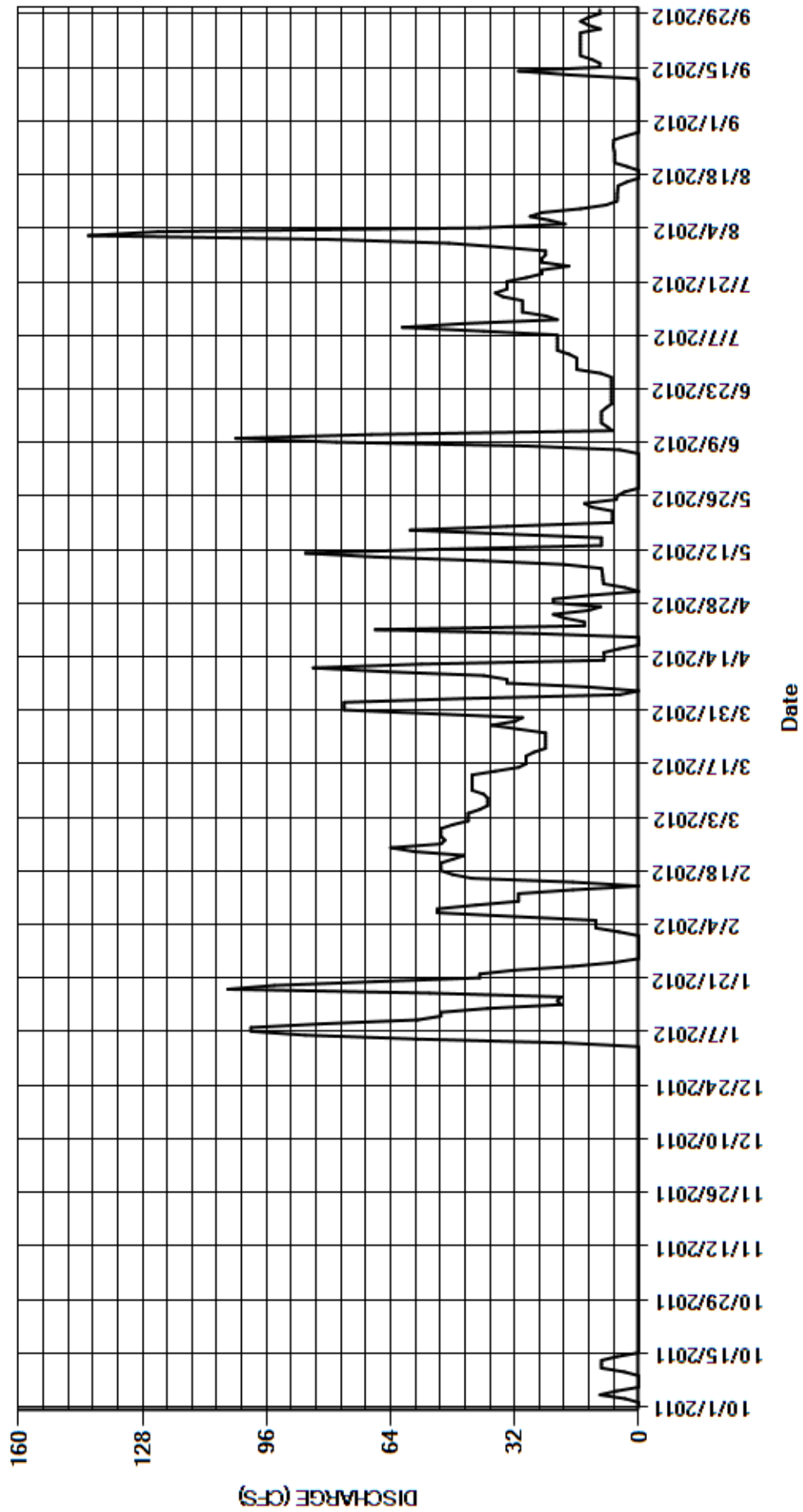
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	48	76	0.00	0.00	16	80	0.00
2	0.00	0.00	0.00	0.00	5.1	44	76	3.6	0.00	18	142	0.00
3	3.5	0.00	0.00	0.00	11	44	45	9.1	0.00	21	124	0.00
4	10	0.00	0.00	19	11	44	4.8	9.2	0.00	21	41	0.00
5	5.7	0.00	0.00	57	11	41	0.00	9.3	0.00	21	19	0.00
6	0.00	0.00	0.00	86	32	39	13	9.4	0.00	21	23	0.00
7	0.00	0.00	0.00	100	52	39	34	9.6	4.9	21	28	0.00
8	0.00	0.00	0.00	100	52	39	34	19	29	40	25	0.00
9	0.00	0.00	0.00	81	42	40	40	40	78	61	15	0.00
10	3.7	0.00	0.00	57	31	43	65	68	104	45	8.4	0.00
11	9.6	0.00	0.00	51	31	43	84	86	69	21	5.6	0.00
12	9.6	0.00	0.00	51	31	43	56	52	6.8	24	5.5	0.29
13	9.6	0.00	0.00	39	17	43	8.9	9.6	8.1	30	5.5	18
14	5.6	0.00	0.00	20	0.00	43	8.9	9.6	9.6	30	5.4	31
15	0.00	0.00	0.00	21	17	37	9.0	9.6	9.6	30	5.3	10
16	0.00	0.00	0.00	20	43	31	5.0	35	9.6	30	3.1	10
17	0.00	0.00	0.00	54	48	29	0.00	59	9.6	35	0.00	12
18	0.00	0.00	0.00	106	51	29	0.02	34	8.4	37	0.00	15
19	0.00	0.00	0.00	94	51	29	0.01	6.8	7.0	34	0.00	15
20	0.00	0.00	0.00	68	51	27	27	6.8	7.1	34	2.9	15
21	0.00	0.00	0.00	41	48	24	68	6.8	7.1	34	6.2	15
22	0.00	0.00	0.00	41	45	24	14	6.8	7.1	29	6.2	15
23	0.00	0.00	0.00	32	58	24	14	12	7.1	25	6.2	15
24	0.00	0.00	0.00	17	64	24	19	14	7.1	25	6.3	15
25	0.00	0.00	0.00	6.4	51	24	22	5.8	7.1	18	6.5	9.9
26	0.00	0.00	0.00	0.00	50	31	13	5.5	7.1	25	6.5	13
27	0.00	0.00	0.00	0.00	51	38	9.8	3.6	9.8	25	6.4	15
28	0.00	0.00	0.00	0.00	51	32	22	0.00	16	24	3.4	13
29	0.00	0.00	0.00	0.00	51	30	22	0.00	16	24	0.00	10
30	0.00	0.00	0.00	0.00	---	53	12	0.00	16	36	0.00	10
31	0.00	---	0.00	0.00	---	76	---	0.00	---	49	0.00	---
TOTAL	57.30	0.00	0.00	1161.40	1056.10	1155	802.43	540.10	461.10	904	586.40	257.19
MEAN	1.85	0.000	0.000	37.5	36.4	37.3	26.7	17.4	15.4	29.2	18.9	8.57
AC-FT	114	0	0	2300	2090	2290	1590	1070	915	1790	1160	510
MAX	10	0.00	0.00	106	64	76	84	86	104	61	142	31
MIN	0.00	0.00	0.00	0.00	0.00	24	0.00	0.00	0.00	16	0.00	0.00

CAL YR	2011	TOTAL	29325.30	MEAN	80.3	MAX	998	MIN	0.00	AC-FT	58170
WTR YR	2012	TOTAL	6981.02	MEAN	19.1	MAX	142	MIN	0.00	AC-FT	13850

MAX DISCH: 161 CFS AT 13:00 ON AUG 02,2012 GH 2.09 FT SHIFT -0.02 FT
 MAX GH: 2.09 FT AT 13:00 ON AUG 02,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

SOUTH PLATTE RIVER BELOW CHATFIELD RESERVOIR
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06710500 BEAR CREEK AT MORRISON
Water Year 2012

Location.-- Lat. N39° 39' 10.60"; Long. W 105° 11' 44.13" (NAD83) Jefferson County, Hydrologic Unit 10190002. Gage is on the left bank of the creek, 180 ft. upstream from bridge on State Highway 8 and 0.2 mi upstream from Mount Vernon Creek.

Drainage Area and Period of Record.-- 164 mi². ; Sporadic, incomplete data Sep. 1881 to Feb. 1902. Good data October 1919 to current year. Monthly data for some periods only. Some early years published as near Morrison, at Starbuck (Starbuck Heights, pre-1933), at Idledale.

Equipment.-- Digital incremental Sutron SDR-0001-1 Data Logger connected to a Sutron SatLink2 Data Collection Platform (DCP) in a 60-inch metal pipe shelter ovetop a 48-inch stilling well at a compound weir. A metal drop tape and adjustable reference point serve as the primary reference. A supplemental cantilever chain gage is present. A bank operated cableway is located upstream of the gage. The float for the encoder resides inside a cylinder tube containing Isopar (an anti-freezing agent). The back-up chart recorder float is in the well itself and prone to freezing. Chart recorder was removed in July, 2012.

Hydrologic Conditions.-- The Bear Creek drainage is a mix of mountains and urban landscape. It extends from the mountains near Mt. Evans down to the City of Morrison. In the summer of 2005, the Town of Morrison constructed a new bike path along the creek and past the gage. It does not seem to be affecting the gage or nearby creek banks in a negative manner.

Gage-Height Record.-- The primary record is 15-minute satellite monitoring data with DCP log and chart record as backup. The record is complete and reliable, except for: November 16, 17, 26, and 27, 2011; December 1, 2011 through March 3, 2012 when the stage-discharge relationship was affected by ice. Missing values on October 28-29, 2011, and June 23-25, 2012 were filled in with chart record without loss of accuracy. Missing data on July 17, 2012 was interpolated from adjacent record without loss of accuracy. Three instrument corrections ranging from -0.01 to +0.01 ft. were made in the field this year. Corrections were applied to the record as defined by observations made to the gage.

Datum Corrections.-- Levels were last run on November 1, 2012. No corrections were made.

Rating.-- The control is a compound weir consisting of a broad crested concrete wall with a six-foot sharp-crested Cipolletti notch (one-foot deep) for low flows. Rating No. 23 was developed from the standard Cipolletti for the first foot and from measurements made in 2003 above the first foot. The rating shows a break in slope around 6.00 ft as flow goes above the notch and out over the much wider section of the broad crested weir. Rating 23 is defined by measurements to 346 cfs, but it is not well defined around 6.00 ft where flow transitions from the notch to the concrete weir. Sixteen discharge measurements (Nos. 1022-1037), ranging in discharge from 5.09 to 43.8 cfs were made this year. The peak flow of 100 cfs occurred at 0030 on July 8, 2012 at a gage height of 6.69 ft with a shift of -0.01 ft. exceeding Measurement No.1032, made July 9, 2012 by 0.37 ft in stage and 56.2 cfs.

Discharge.-- Shifting control method was used all year. Shifts are caused by scour and fill in weir pool which can be accelerated by ice in winter months. Shifts generally have been negative at high and low stages and zero in the middle. Measurements show unadjusted shifts varying from -0.06 to 0.05 ft. Shifts were distributed by time with consideration of stage for the entire water year. Measurements 1022, 1029, 1030, 1031, 1034 and 1035 were adjusted up to ± 7% to smooth distributions.

Special Computations.-- Discharge for periods of ice affect were estimated from adjacent record with consideration given to measurements made during the affected period, temperature trends and observations made to the gage.

Remarks.-- The record is good, except for the periods of ice affect. Station maintained and record developed by Tony Arnett.

Recommendations.-- Frequent visits are necessary through the winter months and should be a priority to better estimate flows affected by ice. A new rating table may be necessary for higher flows (i.e. flows above 200 cfs). A series of measurements should be focused around gage heights where flow transitions out of the Cipolletti weir notch in order to better define the rating. Also, it would be a good idea to check the highway bridge for a MSL benchmark and tie the control BM back to sea level.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06710500 BEAR CREEK AT MORRISON

RATING TABLE-- BCRMORCO23 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

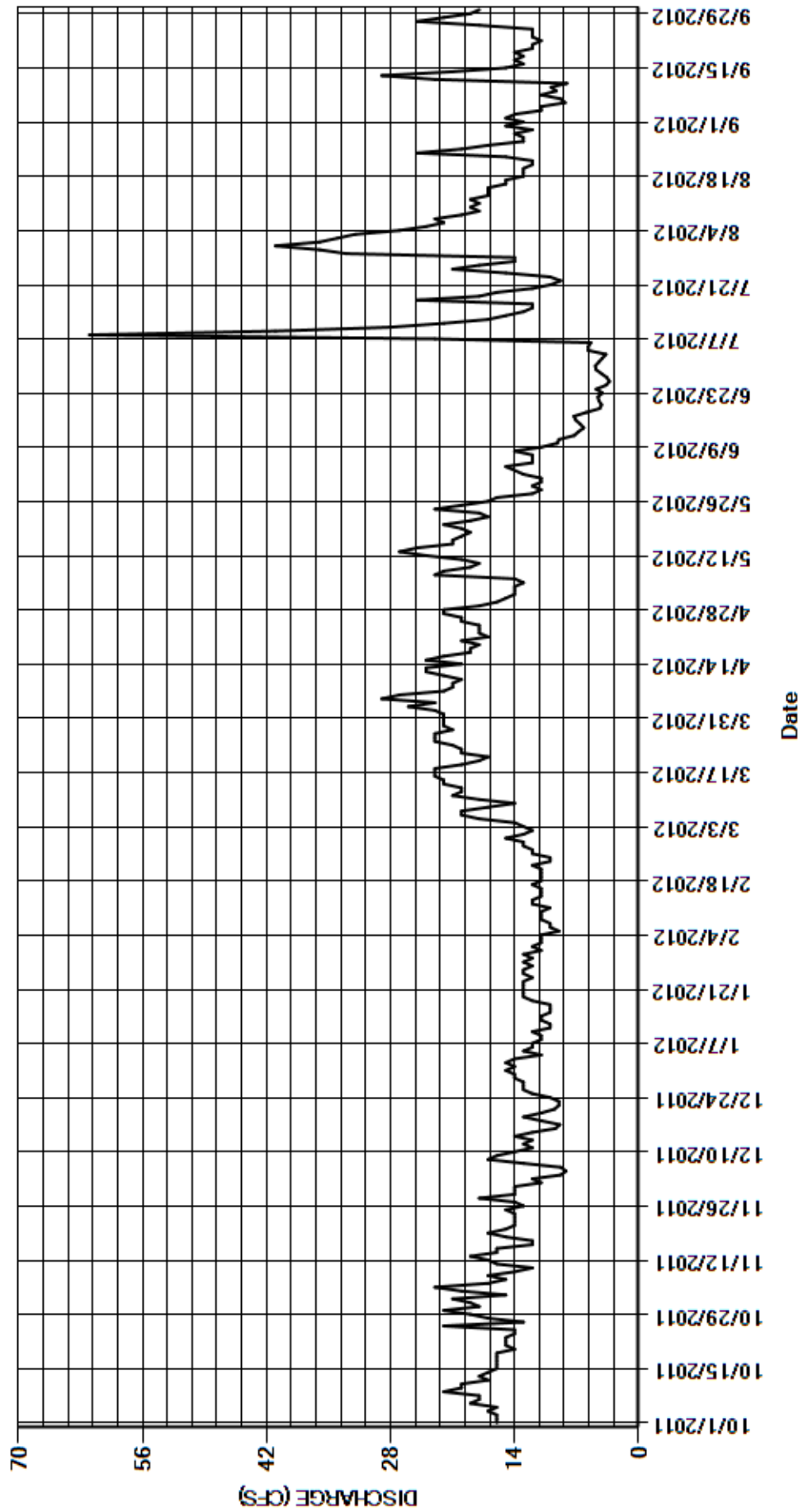
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16	19	e14	e14	12	e13	22	15	11	4.5	36	13
2	16	21	e11	e15	11	e12	23	14	13	4.1	34	15
3	16	15	e12	e14	e11	e13	26	14	14	3.7	32	14
4	17	20	e8.8	e11	e11	14	23	14	15	5.7	27	11
5	16	23	e8.2	e13	e9.0	18	29	13	12	5.7	24	11
6	19	17	e8.8	e12	e10	20	27	14	12	5.4	22	8.3
7	18	15	e13	e12	e10	20	22	23	12	23	23	8.8
8	18	17	e17	e11	e11	17	21	22	14	62	20	11
9	22	14	e16	e11	e11	14	21	19	11	41	18	9.3
10	20	12	e14	e12	e11	18	20	18	9.2	28	19	9.9
11	20	16	e12	e10	e10	21	22	20	9.0	22	18	8.1
12	17	17	e13	e10	e12	20	24	24	7.3	17	19	23
13	18	19	e12	e11	e12	20	24	27	6.8	15	17	29
14	17	16	14	e11	e11	22	20	25	6.2	13	17	21
15	16	16	12	e10	e11	22	24	21	6.6	12	17	15
16	16	e12	9.4	e10	e11	23	22	21	7.1	12	15	13
17	16	e12	8.9	e10	e12	23	19	20	7.3	25	15	14
18	16	15	11	e12	e11	23	19	19	5.9	18	13	13
19	16	17	13	13	e11	20	18	20	4.4	16	13	14
20	14	15	11	13	e11	18	20	22	4.2	12	13	12
21	15	14	9.5	13	e11	17	17	19	4.5	9.9	12	12
22	15	14	e9.0	13	e12	20	18	17	4.6	8.8	12	11
23	15	14	e9.0	13	e10	20	18	18	4.1	10	15	12
24	14	14	e10	12	e10	21	18	23	4.8	15	25	12
25	14	15	e12	13	e12	23	20	20	3.7	21	20	12
26	22	e13	e13	13	e12	23	20	17	3.3	18	17	18
27	13	e14	13	e12	e13	23	22	16	3.6	14	13	25
28	17	18	13	e13	e13	21	22	12	4.2	14	13	22
29	19	14	14	12	e15	22	18	11	4.8	33	14	19
30	22	14	14	13	---	22	16	12	4.9	36	12	18
31	18	---	e15	11	---	22	---	11	---	41	15	---
TOTAL	528	472	370.6	373	327.0	605	635	561	230.5	565.8	580	434.4
MEAN	17.0	15.7	12.0	12.0	11.3	19.5	21.2	18.1	7.68	18.3	18.7	14.5
AC-FT	1050	936	735	740	649	1200	1260	1110	457	1120	1150	862
MAX	22	23	17	15	15	23	29	27	15	62	36	29
MIN	13	12	8.2	10	9.0	12	16	11	3.3	3.7	12	8.1

CAL YR	2011	TOTAL	7715.0	MEAN	21.1	MAX	95	MIN	7.0	AC-FT	15300
WTR YR	2012	TOTAL	5682.3	MEAN	15.5	MAX	62	MIN	3.3	AC-FT	11270

MAX DISCH: 100 CFS AT 00:30 ON JUL 08,2012 GH 6.69 FT SHIFT -0.01 FT
 MAX GH: 6.85 FT AT 07:30 ON JAN 02,2012 (ice affected)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06710500 BEAR CREEK AT MORRISON
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06711500 BEAR CREEK AT SHERIDAN
Water Year 2012

Location.-- Lat. N39°39'8.3"; Long. W105°1'58.6" (NAD83) Arapahoe County, CO Hydrologic Unit 1019002. Gage is on the left bank downstream from the intersection of S. Lowell Blvd. and US HWY 285, 2.5 miles northwest of Marston Lake.

Drainage Area and Period of Record.-- 261 mi² (USGS Colorado StreamStats utility). ; Daily values are available from March 1, 1927 to present.

Equipment.-- Digital incremental Sutron SDR-0001-1 shaft encoder connected to a Sutron SatLink2 Data Collection Platform (DCP) in a 42-inch corrugated metal pipe shelter and stilling well at a concrete shrouded boulder and rubble control. The well is connected to a stream by two 2-inch intakes with flushing equipment. An adjustable reference point and metal drop tape is the primary reference with no provisions for a supplemental reference.

Hydrologic Conditions.-- Stream is heavily regulated upstream by numerous diversions and Bear Creek Lake, an on-stream reservoir 6-miles upstream from gage. Flow conditions are generally steady due to the regulation the reservoir; however, the area around the gage is urban. Hardened surfaces around the gage and recently introduced storm water culverts near the gage cause sharp peaks following rain events.

Gage-Height Record.-- The primary record is 15-minute telemetered data with 15-minute logged SDR and DCP data as backup. Instrument calibration was supported by twenty-one visits to the gage. One instrument correction of -0.01 ft. was made on July 26, 2012 and was applied to the record as defined by visits made to the gage. The gage is flushed often to prevent plugging of the inlets. No flush corrections were encountered this year due to frequent inlet flushes and low daily flows. Accumulation of debris on the control can affect the gage-height record. This year, several debris removal corrections of -0.08 ft. or less were made. Corrections due to debris were applied to the record as shift corrections. The record is complete and reliable except for: December 1, 5, 6, 22-23, 2011; January 12, 18, February 2-13 and 21-24, 2012 when the stage-discharge relation was affected by ice, March 21, 2012, missing gage-height were interpolated from adjacent record due to the GOES West satellite failure and July 6-8, 2012 when the gage-height record was erratic (probable debris on the control). Missing gage-height values on April 6, 2012 were interpolated from adjacent record without loss of accuracy.

Datum Corrections.-- Levels were last run on November 29, 2012 using RM6 as base. No correction was necessary to the base reference. Reference marks 7 and 8 were established at the time of levels.

Rating.-- The control for all stages is a concrete shrouded boulder and rubble pile approximately 10-ft. below the gage. Backwater conditions have never been observed. Rating BCRSHECO32, developed in 1998, was continued in use this year. The rating is defined by measurements up to 661 cfs but has been extrapolated to 3000 cfs to accommodate transient peaks. Flows above 1000 cfs need to be considered estimates and rated as poor without confirming measurements. Sixteen measurements (Nos. 1008-1023) were made this year ranging in discharge from 3.17 to 103 cfs, covering the range in stage experienced this year well with exception of the higher daily flow of June 7, 2012. The peak flow of 1440 cfs occurred at 0100 on June 7, 2012 at a gage-height of 5.93 ft. with a shift of -0.02 ft. The peak exceeded this year's high flow measurement (No. 1016) made on June 6, 2012 by 2.80 ft. of stage.

Discharge.-- Shifting control method was used all year. Shifts are caused by fill and scour of pool upstream of the control and materials passing over the control. Shifts were distributed by time as defined by measurements with some consideration given to change in stage. Open water measurements showed unadjusted shifts varying between -0.03 and +0.01 ft. All measurements were given full weight except for Nos. 1009, 1010, 1014, 1022 and 1023 which were discounted 4.76%, -5.69%, 3.57%, -6.79% and 4.07% respectively to smooth shift distributions.

Special Computations.-- Discharge for periods of ice affect were estimated from adjacent record with consideration given to temperature trends recorded at the BCRMORCO gage. Discharge for the period of erratic gage-height (probable backwater due to debris on the control) was estimated from adjacent record with consideration given to the releases made to the creek from Bear Creek Lake (BCROUTCO).

Remarks.-- The record is good with exception of periods of ice affect and erratic gage-height record which are estimated and poor. The peak is considered poor due to lack of definition in the rating and confirming in-range discharge measurements made. Station maintained by Tony Arnett, record developed by Division One Hydrographic Staff.

Recommendations.-- Continue visits every two weeks to ensure the control stays clear of debris, especially after rain events. If possible, extra visits should be made during extreme cold to break ice in the well. Light construction should be done to remove the catch points on the control to help with debris affecting gage height. Pictures should be taken of the interior of the gage since new equipment installation. The rating above 1000 cfs needs to be confirmed by slope-area or some other indirect method.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06711500 BEAR CREEK AT SHERIDAN

RATING TABLE-- BCRSHECO32 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

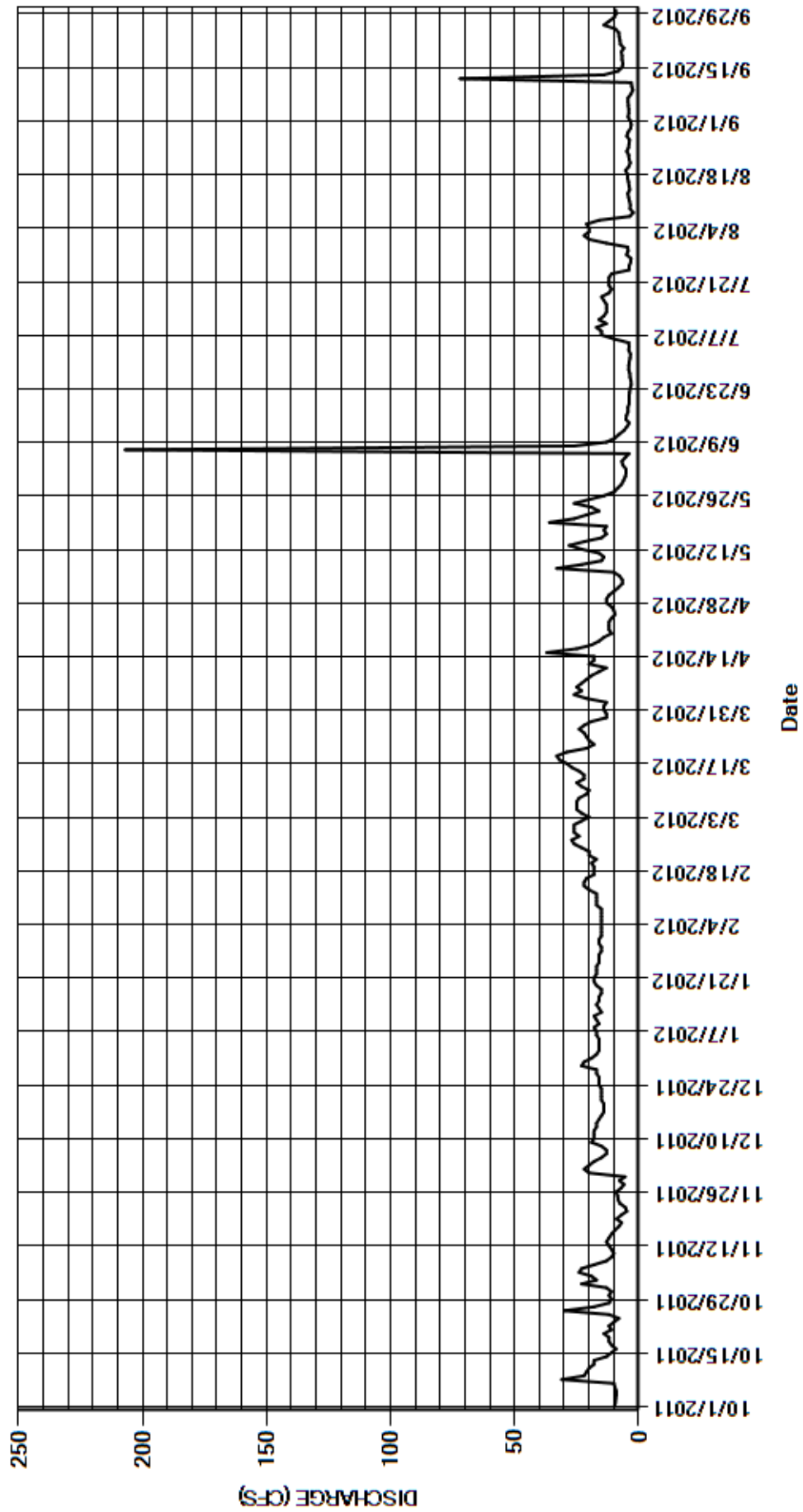
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9.8	13	e20	17	15	26	14	10	5.1	3.5	20	3.4
2	9.4	23	22	16	e15	23	13	8.2	5.2	3.3	22	4.3
3	9.3	17	20	16	e15	20	21	6.6	6.4	4.0	20	4.0
4	8.9	19	18	16	e15	23	26	6.6	6.8	3.9	20	4.0
5	9.0	24	e15	16	e15	25	23	7.7	5.4	4.0	21	4.2
6	9.6	23	e13	17	e15	25	25	10	3.9	e10	16	4.3
7	10	18	13	17	e15	25	23	33	207	e15	3.6	4.3
8	31	13	15	18	e15	24	21	23	26	e15	2.2	3.1
9	22	11	19	16	e17	21	19	15	13	17	3.5	2.4
10	21	10	18	17	e17	20	16	14	9.7	13	3.4	2.8
11	20	11	18	18	e17	23	13	16	8.0	16	3.7	3.0
12	18	12	18	e15	e17	25	20	23	6.0	14	4.1	72
13	18	13	17	16	e20	22	18	28	4.8	13	4.4	14
14	13	12	17	17	22	22	18	22	3.8	13	3.6	8.3
15	11	11	16	16	22	24	37	15	5.2	13	3.9	6.6
16	9.1	9.6	15	16	21	27	25	13	4.9	14	4.1	6.4
17	11	8.0	14	15	18	29	19	14	4.3	15	4.5	6.7
18	12	6.9	14	e15	18	32	16	13	4.4	12	4.5	6.7
19	12	8.9	14	17	18	33	14	36	3.9	11	5.3	7.0
20	14	7.0	15	18	19	29	11	26	3.9	12	4.0	6.0
21	11	4.8	15	18	e17	e21	12	21	3.9	12	3.4	7.4
22	12	5.4	e15	17	e20	18	12	16	3.7	12	3.9	7.5
23	10	7.5	e15	17	e20	20	12	19	3.5	11	4.0	7.9
24	8.0	8.3	16	17	e23	21	11	26	3.0	3.9	4.8	8.0
25	12	8.5	16	16	26	22	9.5	20	3.1	3.9	4.1	9.4
26	30	9.1	16	16	27	24	10	14	3.5	3.3	3.9	14
27	18	7.2	17	16	24	22	11	9.9	3.6	3.1	3.7	12
28	12	5.9	17	15	26	19	13	8.5	4.1	4.9	4.8	9.9
29	11	7.8	23	15	26	13	13	6.9	4.0	4.3	4.3	9.1
30	12	5.5	22	16	---	13	12	6.1	3.8	4.5	3.3	9.3
31	11	---	19	16	---	14	---	5.4	---	13	3.0	---
TOTAL	425.1	340.4	522	508	555	705	507.5	492.9	373.9	297.6	217.0	268.0
MEAN	13.7	11.3	16.8	16.4	19.1	22.7	16.9	15.9	12.5	9.60	7.00	8.93
AC-FT	843	675	1040	1010	1100	1400	1010	978	742	590	430	532
MAX	31	24	23	18	27	33	37	36	207	17	22	72
MIN	8.0	4.8	13	15	15	13	9.5	5.4	3.0	3.1	2.2	2.4

CAL YR	2011	TOTAL	6874.1	MEAN	18.8	MAX	160	MIN	1.7	AC-FT	13630
WTR YR	2012	TOTAL	5212.4	MEAN	14.2	MAX	207	MIN	2.2	AC-FT	10340

MAX DISCH: 1440 CFS AT 01:00 ON JUN 07,2012 GH 5.93 FT SHIFT -0.02 FT
 MAX GH: 5.93 FT AT 01:00 ON JUN 07,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06711500 BEAR CREEK AT SHERIDAN
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06714000 SOUTH PLATTE RIVER AT DENVER
Water Year 2012

Location.-- Lat. N39°45'34", Long. W105°0'14.42" (Spotted from Google Earth). Gage is located on the right bank at a grouted rock dam 110-ft. upstream from the 18th Street Bridge, 0.4 mi. downstream from the confluence with Cherry Creek and 1.75 miles NW of the Capitol Building in Denver, CO.

Drainage Area and Period of Record.-- 3860 sq. mi. (USGS Colorado StreamStats utility).; Daily values are available from July 1, 1895 to present.

Equipment.-- A digital incremental Sutron Stage Discharge Recorder (SDR) connected to a Sutron SatLink 2 Data Collection Platform (DCP) transmitting hourly and a Stevens A-35 water-stage recorder in a 6 ft. by 6 ft. precast concrete shelter overtop a 60 inch corrugated metal pipe stilling well at a grouted rock dam. The well is connected to the channel by three 2 inch inlets equipped with flush risers and valves. A potable water line is plumbed into the shelter for flushing the inlets. An electric tape gage located in the shelter is the primary reference with a cantilever style wire weight gage as a supplementary reference. The Urban Drainage and Flood Control District contracts OneRain Inc. and the USGS to operate early warning flood detection instrumentation and a water quality sampler respectively at the gage.

Hydrologic Conditions.-- 3860 sq. mi. of drainage area of varying topography. Gage is located approximately 0.4 miles downstream from the confluence of the South Platte River and Cherry Creek. The channel is heavily regulated upstream of the gage by numerous diversions, reservoirs and inflows to the system. Gage is subject to rapid changes in stage resulting from storm events in the Denver area from hardened surfaces draining to the river. The channel is principally composed of gravels and sand that are continually scouring and filling in the gage pool formed by the control, causing both positive and negative shifts. Directly across the channel from the gage, and above the control, is a spillback gate for the Farmers and Gardeners Ditch. The spillback chute to the river is very steep and flows are shallow, turbulent, air entrained, extremely fast and practically not measureable with Price meters. During routine operation of the ditch, this flow is often estimated at about 10 cfs. The ditch rider states that the head gate will draw about 35 cfs from the river and the ditch is decreed at 24 cfs. The remainder is spilled.

Gage-Height Record.-- The primary record is 15-minute satellite data with 15-minute logged DCP data and chart record as backup. The record is complete and reliable except for a nine hour period of time on October 17, 2011 when the roof was replaced and monitoring instrumentation was disconnected. Instrument calibration was maintained by twenty-five visits to the gage by DWR staff. One instrument correction of -0.01 ft. was applied to the record as defined by observations made to the gage.

Datum Corrections.-- Levels were run on October 13 and 17, 2011 prior to and after replacement of the shelter's roof panel and instrument shelf. Levels run on October 13, 2011, showed that the primary reference was 0.036 ft. high. It was not corrected in lieu of construction nor was it applied to the gage-heights of measurement or the gage-height record. Levels run on October 17, 2011 following replacement of the instrument shelf, established the primary reference at a new elevation of 19.786 ft. using RM 9 as base.

Rating.-- The control of all expected flows is a grouted rock dam approximately 50-ft. below the gage. Rating 34 (PLADENCO34), in use since October 1, 2008, was continued in use for all of WY2012. It is defined by measurements from 39.4 to 5340 cfs and has been extended to 12600 cfs using a peak flow on July 25, 1998 that was indirectly calculated using records from downstream gages. Twenty discharge measurements (Nos. 1023-1042) were made this year, ranging in discharge from 42.9 to 2390 cfs covering the range in stage experienced this year well. The peak flow of 4990 cfs occurred on at 0245 on June 07, 2012 at a gage-height of 8.02 ft. with a shift of -0.04 ft.; exceeding this year's high flow Measurement (No. 1041), made September 12, 2012 by 2600 cfs and 1.76 ft of stage. Peak events at this gage often occur as sharp, transitory rises in the evenings after thunderstorm events, defying measurement.

Discharge.-- Shifts are mainly caused by scour and fill of materials in the pool created by the control structure, vegetal growth and debris on the control. Shifting control method was used all year. Shifts were distributed as follows: September 28, 2011 through March 16, 2012, shifts were distributed by time as defined by measurements with consideration given to construction activities; March 16 through June 7, 2012, stage dependent shifting using variable shift table PLADENCOVST12-A, defined by measurement Nos. 1128-1033 made during the period of use and No. 1041 used to define the peak; June 7, 2012 through September 12, 2012, stage dependent shifting using variable shift table PLADENCOVST12-B, defined by measurement Nos. 1033-1041 made during the period of use; September 12 through 25, 2012, stage dependent shift using variable shift table PLADENCOVST12-C, defined by measurement Nos. 1041 and 1042, made during the period of use; September 25 through October 2, 2012, shifts were distributed by time as defined by measurements. Measurements made this year showed unadjusted shifts varying between -0.01 and 0.12 ft. All were given full weight except for Nos. 1028, 1030 and 1037 which were discounted 2.36, -1.53 and 7.75 percent respectively to smooth shift distributions.

Special Computations.-- Missing gage-height values on October 17, 2011 were interpolated from trends of adjacent record to help estimate the daily discharge.

Remarks.-- The record is good except for October 17, 2011, when the gage was under construction which is fair and the peak event of June 7, 2012, which is rated as poor due to lack of recent confirming measurements in the range of the peak event. Station maintained and record developed by Tony Arnett.

Recommendations.-- Continued efforts to measure peak events should be strived for. Measurements should be made shortly after events. Levels must be run in WY2013 to confirm establishment and stability of the primary reference.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06714000 SOUTH PLATTE RIVER AT DENVER

RATING TABLE-- PLADENCO34 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

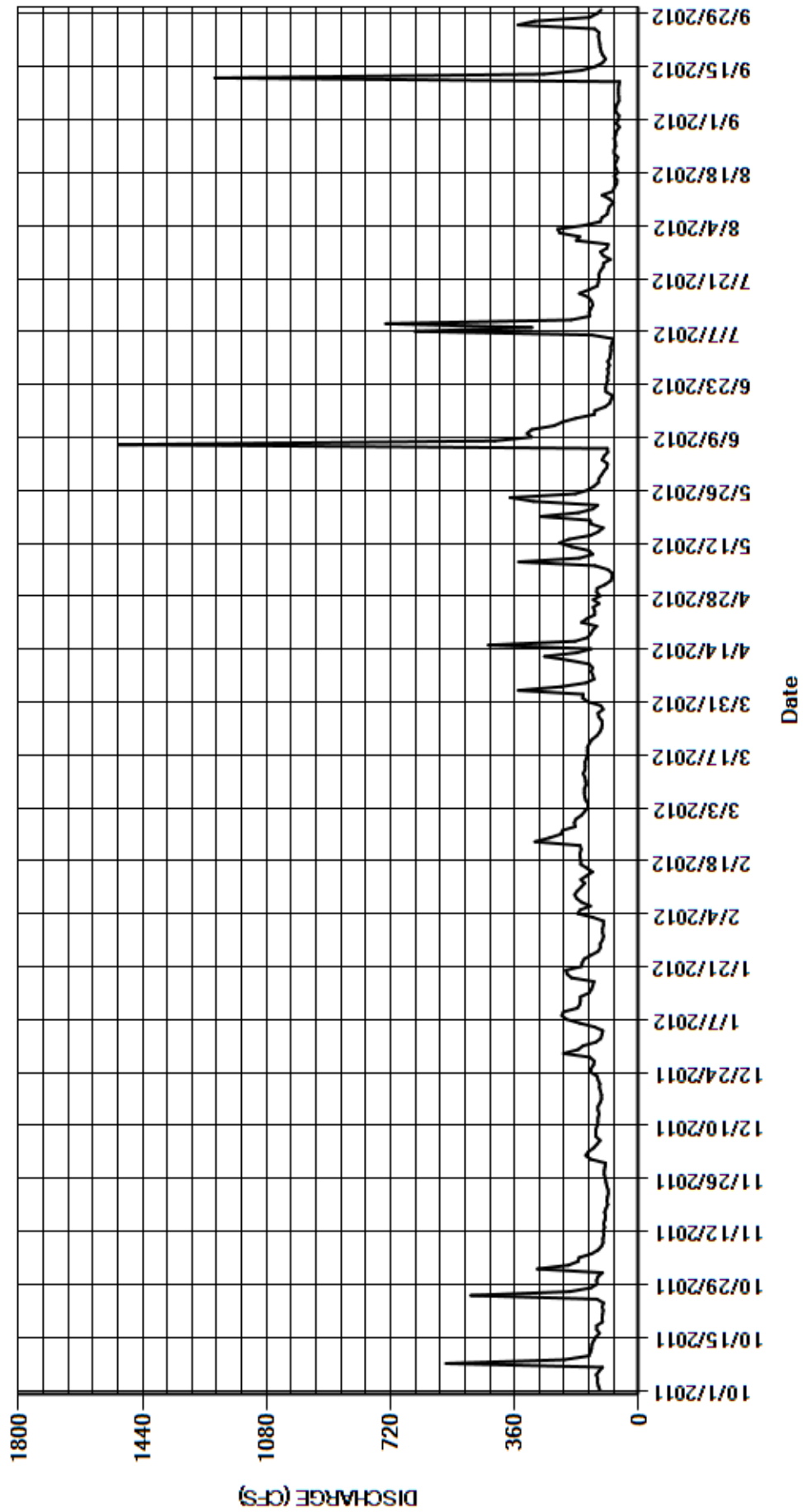
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	113	105	139	124	102	166	163	98	92	82	171	59
2	117	294	154	110	102	157	161	81	91	80	229	57
3	120	204	146	107	133	148	349	77	106	81	235	66
4	119	176	131	104	177	147	225	77	100	77	158	67
5	123	173	121	128	169	154	153	90	90	73	111	63
6	115	137	112	171	140	157	130	127	91	136	107	57
7	105	118	124	209	166	158	133	348	1510	649	91	58
8	559	108	124	223	180	158	138	172	418	310	89	59
9	217	103	124	218	186	153	134	133	311	734	85	59
10	145	104	120	178	178	154	144	145	324	196	73	58
11	140	101	118	171	167	156	204	195	310	142	85	55
12	137	103	118	169	157	161	273	230	246	144	106	1230
13	136	99	115	169	168	156	178	202	221	139	75	276
14	131	102	118	144	151	155	138	140	182	133	71	166
15	124	98	118	137	134	156	436	117	129	137	64	126
16	114	96	112	133	150	152	185	103	127	146	63	105
17	e122	99	108	130	168	148	148	137	98	172	71	96
18	122	95	108	195	168	149	139	141	84	144	61	104
19	105	90	111	208	170	149	133	286	80	120	65	109
20	106	92	114	211	170	143	122	175	76	117	70	112
21	105	91	113	166	167	136	166	133	95	115	64	113
22	103	88	118	164	170	122	150	119	96	116	61	115
23	106	89	121	158	301	113	128	305	94	111	71	117
24	102	93	139	138	259	108	128	373	90	103	71	115
25	121	95	138	118	226	106	132	184	91	102	67	128
26	487	97	131	111	221	107	115	148	88	82	68	350
27	200	100	129	112	184	116	132	130	90	103	71	302
28	139	100	142	105	187	118	112	117	85	111	67	143
29	121	98	218	102	182	103	122	116	90	92	64	121
30	122	96	176	105	---	110	121	108	83	89	56	109
31	118	---	162	105	---	147	---	101	---	181	65	---
TOTAL	4694	3444	4022	4623	5033	4363	4992	4908	5588	5017	2805	4595
MEAN	151	115	130	149	174	141	166	158	186	162	90.5	153
AC-FT	9310	6830	7980	9170	9980	8650	9900	9740	11080	9950	5560	9110
MAX	559	294	218	223	301	166	436	373	1510	734	235	1230
MIN	102	88	108	102	102	103	112	77	76	73	56	55

CAL YR	2011	TOTAL	89099	MEAN	244	MAX	2340	MIN	88	AC-FT	176700
WTR YR	2012	TOTAL	54084	MEAN	148	MAX	1510	MIN	55	AC-FT	107300

MAX DISCH: 4990 CFS AT 02:45 ON JUN 07,2012 GH 8.02 FT SHIFT -0.04 FT
 MAX GH: 8.02 FT AT 02:45 ON JUN 07,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06714000 SOUTH PLATTE RIVER AT DENVER
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06720000 CLEAR CREEK AT DERBY
Water Year 2012

Location.-- Lat 39°49'42", long 104°57'30", in SW¼SW¼ sec. 36, T.2 S., R.68 W., Adams County, Hydrologic Unit 10190004, on right bank 875 ft downstream from York Street bridge, 0.5 mi upstream from mouth, and 2.5 mi west of Derby.

Drainage Area and Period of Record.-- 575 mi². April-Nov. 1914.; 1927 to present

Equipment.-- Sutron Satlink II DCP with stage discharge recorder (SDR) in a 60 inch corrugated metal shelter and well, Primary reference is by electric tape gage (ETG) inside the shelter and well. There is no outside reference. An external temperature sensor is installed in the gage.

Hydrologic Conditions.-- Water is collected from the Clear Creek Drainage areas upstream and deposited ½ mile downstream into the South Platte River. Summer flows are affected by municipal and agricultural diversions upstream. In years of high snowpack, the runoff will exceed demand and much of the runoff will leave the basin past this gage. Gage also collects urban storm runoff and will see sharp peaks after rainstorms.

Gage-Height Record.-- The primary record is 15-minute data taken from satellite telemetry with the DCP and SDR logs as back-up. The record is complete and reliable, with little or no affect from ice this year. There were two days where the recorder failed to log values, however no more than two 15 minute values were ever missed in each instance. Missing values were filled in using adjacent good data on October 27 and December 29, 2011 with no loss in accuracy. One instrument calibration correction was also applied this year on May 9, 2012, back to point of gage agreement.

There were many periods this year where GH was affected by debris on the control. The following dates all had debris corrections that were all prorated by time from the debris correction back to point of clean control or assumed clean control: October 21, November 17, and December 20, 2011; April 6, May 9, and August 9, 2012. Corrections ranged from -0.02 ft to -0.04 ft.

Datum Corrections.-- Levels were last run to the ETG using BM 10 as base on August 25, 2011. No correction was necessary or made at that time.

Rating.-- The control is a rock dam formed by a pipeline crossing approximately 25 feet below the gage. Shifts are caused by changes in the channel geometry, accumulation of material on the control and possible ice affect. Rating No. 34 put in use on October 1, 1998 was only used to finish out WY2011. Rating No. 35 was put into use on October 5, 2011 and used for the remainder of the water year. It is well defined from 3.12 to 1810 cfs. Sixteen measurements (Nos. 999 - 1014) were made this year ranging from 3.12 to 629 cfs. They cover the range in discharge experienced this water year. The peak flow of 1320 cfs occurred at 19:00 on July 7, 2012 at a gage height of 3.25 ft with a shift of 0.00 ft. It exceeded measurement No. 1013 by 0.76 feet of stage and 691 cfs, respectively.

Discharge.-- Shifting control method was used for the record year. Shifts were distributed by time with consideration of stage. All measurements were given full weight except Nos. 1003 and 1007 which were adjusted up to 5% to better fit the distribution.

Special Computations.-- Ice affect has been an issue at the gage in past years, however this year, no ice affected days were identified. Debris corrections are also common at this gage and did have an impact this year. Debris corrections were applied in addition to shifts in all occasions. Every attempt was made to determine an obvious point where debris started to collect on the control. If no point is identified, the correction is prorated back to the last known point of a debris free control. For the WY 12 to WY 13 transition, the shift distribution from M1014 (-0.01) on 9/19/12 to M1015 (+0.01) on 11/13/12 was manually entered to match the fully computed distribution. A -0.01 ft shift was run from 1530 09/19/12 to 2245 10/07/12. Then a new distribution was started prorating from a 0.00 ft shift at 2300 10/07/12 to M 1015 at 1345 on 11/13/12.

Remarks.-- The record is rated good. The instantaneous peak flow for the year should be considered fair as it was more than twice the highest measurement. Station maintained and record developed by Patrick Tyler.

Recommendations.-- A new rating is needed. An obvious stage-discharge relationship is seen each year, with varying patterns. The control is stable but needs regular cleaning to remove branches and debris. More measurements need to be made at intermediate and higher flows, especially in late Spring/early Summer when the peak normally occurs.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06720000 CLEAR CREEK AT DERBY

RATING TABLE.-- CLEDERCO34 USED FROM 01-OCT-2011 TO 05-OCT-2011
 CLEDERCO35 USED FROM 05-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

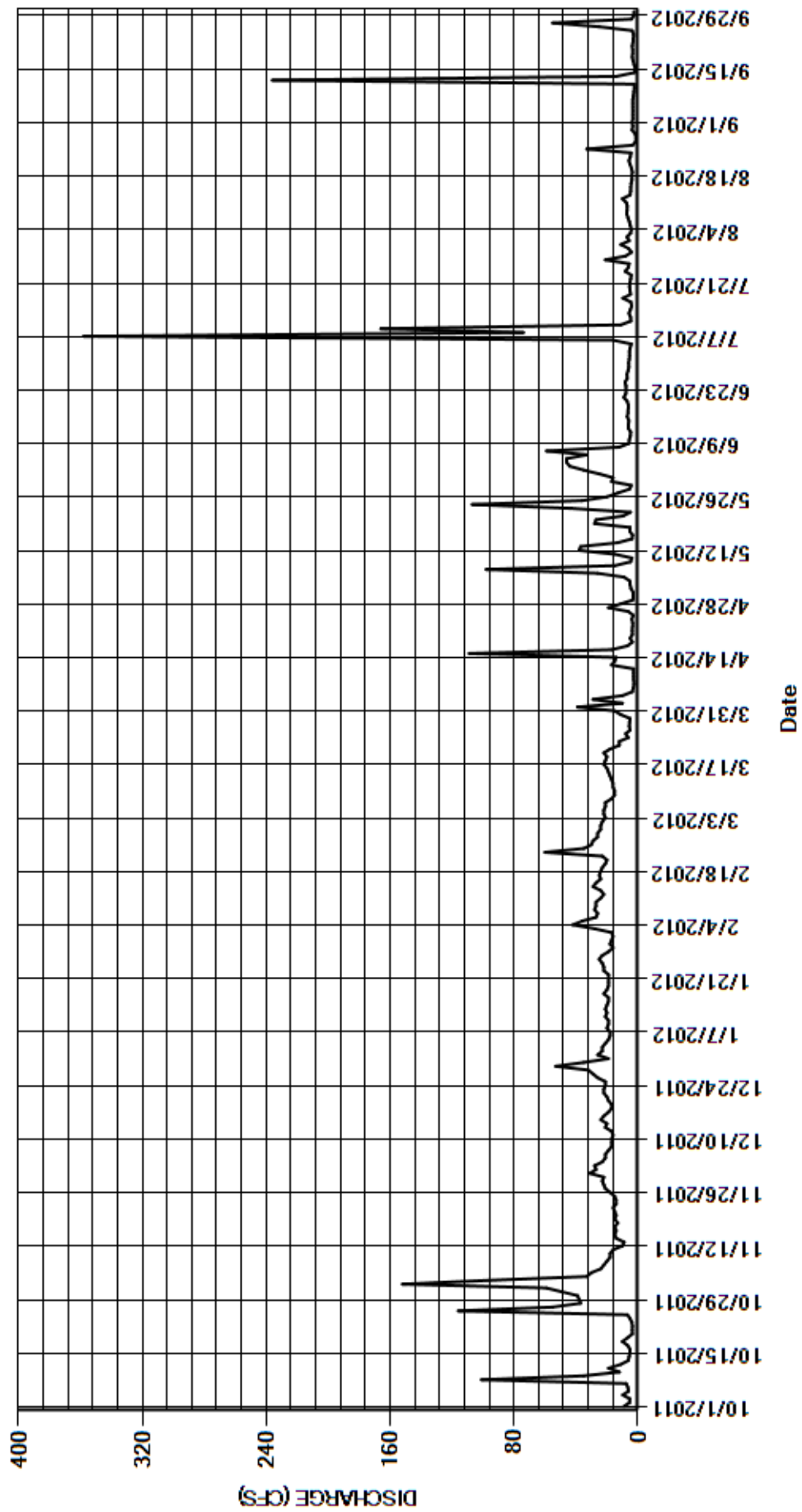
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9.1	59	31	26	16	24	39	3.0	25	5.6	5.6	3.8
2	5.4	152	27	23	17	23	10	4.5	35	5.4	7.1	3.2
3	5.2	96	28	23	28	21	29	5.0	44	5.5	4.7	3.3
4	9.8	33	23	21	42	22	9.8	5.3	46	5.0	4.2	3.2
5	6.1	30	21	19	36	22	3.6	9.0	46	4.2	4.9	3.3
6	6.5	24	21	18	27	21	3.0	26	33	16	5.5	3.3
7	7.6	22	19	18	26	21	2.5	98	59	358	6.4	3.3
8	101	20	17	20	28	17	2.7	15	12	74	7.2	2.9
9	35	18	17	19	27	15	2.7	4.7	5.8	166	7.0	2.6
10	12	18	17	19	27	15	2.8	3.9	5.6	11	6.8	2.3
11	19	16	16	21	24	16	2.7	15	4.8	4.5	7.5	2.4
12	11	10	17	20	22	16	17	38	4.7	4.7	10	236
13	6.3	8.9	21	21	24	17	15	37	6.3	5.8	5.0	14
14	5.7	14	20	20	29	18	14	13	6.1	4.8	4.7	2.3
15	5.1	15	24	19	27	19	109	3.8	5.9	4.0	4.6	1.6
16	5.2	14	22	19	24	20	17	3.4	6.9	4.6	4.4	2.4
17	6.7	15	19	22	25	22	6.8	5.3	6.4	9.7	3.8	3.1
18	10	13	17	20	24	21	3.6	5.0	6.3	4.7	3.9	3.6
19	6.6	15	17	19	23	20	5.0	28	6.2	5.1	3.6	3.4
20	3.5	14	19	19	21	22	3.5	27	6.9	5.4	4.2	3.4
21	3.7	15	20	19	20	18	3.7	9.5	9.1	5.1	5.1	3.6
22	3.5	16	22	19	23	12	3.5	4.8	7.8	4.7	5.8	3.2
23	3.9	14	22	22	60	12	3.4	43	7.7	4.2	4.9	3.0
24	5.1	14	21	22	35	6.2	3.9	107	7.7	8.2	4.4	2.8
25	6.8	15	21	23	30	7.9	3.0	36	8.3	6.2	33	3.7
26	116	18	26	25	29	5.0	6.2	20	6.8	5.7	3.4	25
27	55	21	29	23	26	5.6	19	13	7.1	21	1.4	55
28	37	22	32	19	26	5.4	11	5.5	6.4	8.0	1.2	4.1
29	38	23	53	16	24	5.0	3.3	4.2	5.8	4.1	1.8	2.5
30	39	22	35	18	---	11	3.1	17	6.0	6.1	3.8	2.5
31	49	---	19	17	---	15	---	16	---	11	3.3	---
TOTAL	633.8	786.9	713	629	790	495.1	358.8	625.9	444.6	788.3	179.2	408.8
MEAN	20.4	26.2	23.0	20.3	27.2	16.0	12.0	20.2	14.8	25.4	5.78	13.6
AC-FT	1260	1560	1410	1250	1570	982	712	1240	882	1560	355	811
MAX	116	152	53	26	60	24	109	107	59	358	33	236
MIN	3.5	8.9	16	16	16	5.0	2.5	3.0	4.7	4.0	1.2	1.6

CAL YR	2011	TOTAL	59296.0	MEAN	162	MAX	2110	MIN	3.4	AC-FT	117600
WTR YR	2012	TOTAL	6853.4	MEAN	18.7	MAX	358	MIN	1.2	AC-FT	13590

MAX DISCH: 1320 CFS AT 19:00 ON JUL 07,2012 GH 3.25 FT SHIFT 0 FT
 MAX GH: 3.25 FT AT 19:00 ON JUL 07,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06720000 CLEAR CREEK AT DERBY
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06720500 SOUTH PLATTE RIVER AT HENDERSON
Water Year 2012

Location.-- Lat. 39° 55'20.36", Long. 104°52'7.72"(NAD83), Adams County, CO Hydrologic Unit 1019003. Gage is located on the left bank 315 ft. upstream from the 124th Ave. bridge and 0.2 miles northwest of Henderson, CO. A new gage was established at this left bank location on April 9, 2010 at the same datum as the discontinued right bank gage described below and was run concurrently with the right bank gage from April 9, 2010 to May 17, 2011 (15:15). The right bank location was discontinued at 15:15 on May 17, 2011.

Drainage Area and Period of Record.-- 4,760 mi² (USGS Colorado StreamStats utility).; May 1, 1926 to present. Monthly data only prior to 1933. Periodic water quality data available starting in 1955.

Equipment.-- Sutron Constant Flow Bubbler (CFB) and tipping bucket rain gage with a SatLink2 DCP in a 6 ft. by 6 ft. concrete shelter. Two orifice lines are buried in conduit to the channel. A Sutron AccuBubble unit is connected to the other orifice line as backup. A cantilever type wire weight gage is suspended directly over the orifice lines serving as the primary reference.

Hydrologic Conditions.-- Flows are heavily regulated upstream by numerous transmountain diversions, storage reservoirs, diversions from and deliveries to the channel as well as return flows from irrigated areas. Diversions for irrigation are estimated at about 253,000 acres. Because of the heavy regulation upstream of the gage, a strong diurnal pattern from the metro effluent releases is present and is the main component of flows during low flow periods. Peak events typically are short transitory events steaming from storm events in the metro area combined with spring and summer snowmelt. The Army Corps of Engineers utilize this gage to regulate releases out of Chatfield and Cherry Creek Reservoirs to keep the flow at or below 5,000 cfs at the Henderson Gage.

Gage-Height Record.-- The primary record is 15-minute satellite data with 15-minute logged DCP and 5-minute logged CFB data as backup. The record is complete and reliable. Four unit values, occurring on March 8 and June 14, 2012 were interpolated from adjacent good record without loss of accuracy. Three erroneous unit values recorded on June 20, 21 and September 19, 2012 were interpolated from adjacent good record without loss of accuracy. Instrument calibration was maintained by forty-one visits to the gage. Fifteen instrument calibration corrections ranging from +0.16 to -0.18 ft. were required this year. The larger corrections occurring between April and July appear to be related to changing flow conditions. It is suspected that there may be an unknown transition from static head to dynamic head as experienced at the orifice face. Instrument corrections were applied to the record as defined by visits made to the gage. Plans are underway to move the orifice lines upstream to more favorable conditions.

Datum Corrections.-- Levels were run on January 26, 2012 and August 17, 2012 using RM10 as base. The cantilever gage was confirmed to be 0.028 ft low in January, as noted in previous level runs. The gage was corrected on January 26, 2012. The -0.03 ft correction was applied to the gage-heights of measurements as well as the record from October 1, 2011 through January 26, 2012. Levels run on August 17, 2012, confirmed that all adjustments were correct and stable.

Rating.-- The control is a grouted rock dam, constructed in 2002 as a grade control structure by the Urban Drainage and Flood Control District. The rock dam has a low flow notch in the right of center portion of the control, and will effectively regulate flow at all stages. In March of 2010, the UDFCD sloped and revetted the left bank to resolve some bank stabilization issues. Prior to construction of the dam, the control was a shifting sand and gravel channel, with high flows being influenced by the 124th Ave. bridge opening. The channel had been scouring during the entire history of the gage. The dam effectively raised the channel bed and PZF by about 2-ft. Rating PLAHENCO34, developed in the 2011 Water Year accounted for changes in pool dynamics from the right bank location to the left bank location as well as some degree of drawdown experienced at the right bank location. It is defined by measurements from 107 to 3600 cfs. Twenty-six discharge measurements (Nos. 610-635) were made this year ranging in discharge from 79 to 4340 cfs, covering the range in stage experienced this year well. The peak flow of 4410 cfs occurred at 1530 on September 12, 2012 at a gage-height of 8.31 ft. with a shift of 0.08 ft. The peak exceeded high flow Measurement No. 632 made the same day by 70 cfs and 0.04 ft. of stage.

Discharge.-- Shifting control method was used all year. Shifts are caused by fill and scour of the channel and pool above the control as well as some lack of definition in the new rating. From September 28, 2011 through May 29 and August 17 through October 16, 2012 shifts were distributed by time as defined by measurements with consideration given to change in stage. From May 29 through July 9, 2012 stage dependent shifting using variable shift table PLAHENCOVST12-A was applied. It is defined by six measurements (Nos. 621-626) made during the period of use. From July 9 through August 17, 2012 variable shift table PLAHENCOVST12-B was applied. It is defined by six measurements (Nos. 626-631) made during the period of use. Measurements made this year showed unadjusted shifts varying between -0.09 and +0.11 ft. All were given full weight except for Nos. 616, 618, 630, 633-636 which were discounted up to 4.77% to smooth shift distributions.

Special Computations.-- All measurements made this year were performed using half counts (20 second counts instead of 40 second counts). This method is employed to counteract the large and rapid changes in stage due to Denver-Metro Sewer releases and storm events. The measurement section changes occasionally to account for newly deposited or scoured sand. The best attempt is made to measure as close as possible to the gage as to not incur time lag in determining the measured gage-height. Many measurements have been adjusted for time lag as the gage-height changes rapidly. Use of weighted mean gage-height computations are necessary for large changes that occur during the measurement.

Remarks.-- The record is good except for: April 3 - 10, 2012 which is rated fair due to some degree of sensor instability and large calibration corrections encountered during the period. Station maintained by Division One Hydrographic staff, record developed by Patrick Tyler.

Recommendations.-- Measurements throughout the range in stage experienced are required to better define the rating. Photographs of the control at various high water stages would be helpful determining the transition to channel control. Photographs taken should be labeled with the date and gage-height. Steps are being taken to move the orifice line to a better flow regime to eliminate numerous gage-height corrections seen this year.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06720500 SOUTH PLATTE RIVER AT HENDERSON

RATING TABLE-- PLAHENCO34 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

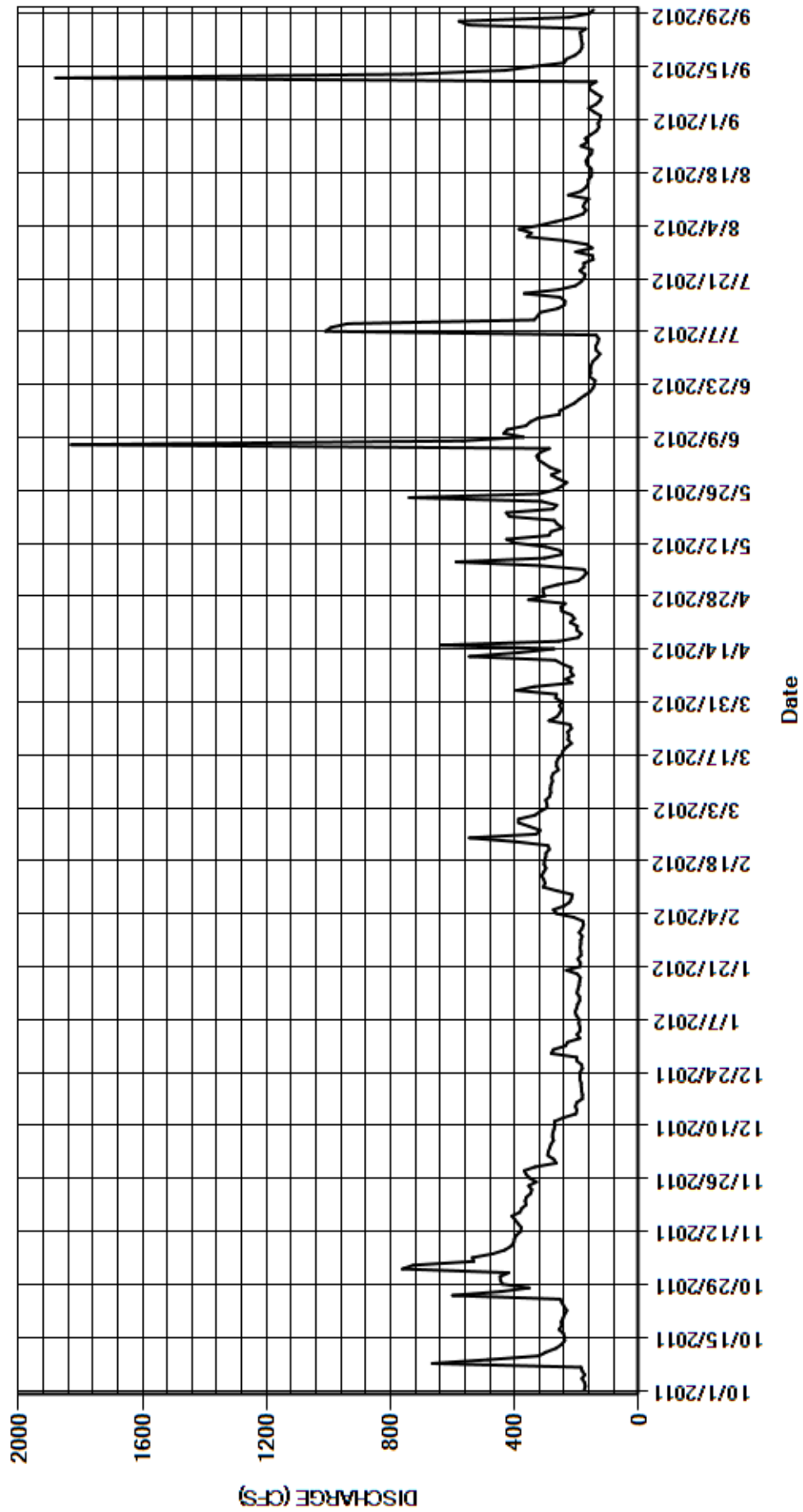
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	176	419	274	229	178	335	268	261	286	125	360	124
2	172	762	293	190	180	318	265	196	305	137	346	123
3	175	727	292	199	209	295	394	179	323	139	386	144
4	183	532	287	189	265	296	337	169	329	132	319	161
5	174	536	283	190	275	300	215	176	317	129	268	138
6	182	471	275	193	241	287	235	317	288	137	218	125
7	186	432	278	192	223	284	211	589	1830	1010	180	120
8	666	412	277	201	217	285	220	304	568	992	170	140
9	486	403	273	205	214	283	217	246	372	939	179	158
10	322	401	270	200	263	278	246	253	435	337	174	158
11	299	393	272	197	308	281	269	300	424	326	161	137
12	267	380	243	190	302	276	546	400	364	318	227	1880
13	249	379	203	191	306	259	387	426	350	261	186	733
14	239	389	199	199	313	265	273	289	326	239	171	430
15	239	399	204	196	306	265	637	283	256	238	163	341
16	243	409	200	192	299	260	258	244	254	254	163	240
17	257	383	182	191	305	248	195	263	230	369	153	233
18	248	377	181	188	304	244	185	272	207	258	152	205
19	250	363	184	198	300	233	200	417	192	205	153	190
20	244	366	185	233	299	217	198	427	175	187	166	183
21	239	362	185	189	288	228	221	276	157	176	170	182
22	232	348	189	188	293	226	207	264	147	173	164	185
23	240	345	190	196	396	229	217	313	142	190	152	186
24	247	355	189	186	546	217	248	740	141	176	151	189
25	253	330	182	187	331	222	251	323	159	177	186	171
26	600	351	184	189	317	289	237	272	155	147	165	549
27	445	363	199	187	352	264	355	249	156	149	172	579
28	353	369	200	187	387	255	303	232	153	203	154	225
29	440	334	282	182	387	248	308	260	148	150	136	160
30	446	266	275	192	---	256	308	282	135	169	128	146
31	447	---	236	183	---	246	---	254	---	243	131	---
TOTAL	9199	12356	7166	6029	8604	8189	8411	9476	9324	8685	6004	8535
MEAN	297	412	231	194	297	264	280	306	311	280	194	284
AC-FT	18250	24510	14210	11960	17070	16240	16680	18800	18490	17230	11910	16930
MAX	666	762	293	233	546	335	637	740	1830	1010	386	1880
MIN	172	266	181	182	178	217	185	169	135	125	128	120

CAL YR	2011	TOTAL	161151	MEAN	442	MAX	4510	MIN	131	AC-FT	319600
WTR YR	2012	TOTAL	101978	MEAN	279	MAX	1880	MIN	120	AC-FT	202300

MAX DISCH: 4410 CFS AT 15:30 ON SEP 12,2012 GH 8.31 FT SHIFT 0.08 FT
 MAX GH: 8.31 FT AT 15:30 ON SEP 12,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06720500 SOUTH PLATTE RIVER AT HENDERSON
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
MIDDLE SAINT VRAIN AT PEACEFUL VALLEY
Water Year 2012

Location.-- Lat. N40° 07' 47"; Long W105° 31' 07" (from topographic map), Boulder County, CO. 1-mile west of Peaceful Valley, CO, approximately 4.6-miles above the mouth of Cave Creek and just below the USFS Camp Dick Campground.

Drainage Area and Period of Record.-- 18.0 sq. mi. (USGS Colorado StreamStats utility). ; Daily values are available from the DWR from May 14, 1998 to present

Equipment.-- Digital incremental Sutron 56-0540-400-DTR shaft encoder and temperature sensor connected to a Sutron SatLink2 Data Collection Platform (DCP) and a graphic water-stage recorder in a 42-inch corrugated metal pipe shelter and well. The stilling well is connected to the channel via three 2-inch intakes, which are equipped with valves and flushing equipment. The primary reference is a metal drop tape and adjustable reference point. No supplemental reference is available.

Hydrologic Conditions.-- Uninhabited forested lands of varying topography. Gage is located in the Indian Peaks Wilderness Area of Roosevelt National Forest, at the Peaceful Valley / Camp Dick campground facilities. There are no known diversions occurring upstream of the gage. Marked diurnal flow patterns occur during peak snowmelt months. Due to heavy winter conditions and the remoteness of this gage, year-round operation of the gage is not possible.

Gage-Height Record.-- The primary record is 15-minute satellite data with 15-minute logged DCP data and chart record as backup. Instrument calibration was maintained by twelve visits to the gage this year. No instrument calibrations were needed nor made this Water Year. The record is complete and reliable except for: October 25 – Nov. 8, 2011, when the stage-discharge relation was affected by ice and November 9, 2011 and April 20, 2012, which are partial day records. No gage-height record is available for the winter period (November 10, 2011 through April 19, 2012).

Datum Corrections.-- Levels were last run to the inside gage on August 18, 2011 using Reference Mark (RM) 2 as base. The gage was found to be reading accurately. RM's 5 and 6 were established on this date to replace RM's 3 and 4 which were destroyed during control construction (November 6, 2010).

Rating.-- The control for low to moderate flows is a placed boulder cross-vane control approximately 30-ft. below the gage. The channel is straight for about 80-ft. above and below the gage. Shifts are caused by the movement of material across the gage pool. Vegetal growth and debris accumulation was not an issue this year. Rating MIDSTECO05, developed in the 2011 Water Year was used again this year. It is defined by measurements from 10.9 to 341 cfs. Twelve discharge measurements (Nos. 125 -136) were this year, ranging in discharge from 5.4 to 94.6 cfs covering the range in stage experienced this year except for: the peak flow event which was caused by a rain fall event. The peak flow of 172 cfs occurred at 5:45 on July 7, 2012 at a gage-height of 3.64 ft with a shift of -0.04 ft. The peak exceeded high flow Measurement No. 129 made June 5, 2012 by 75.4 cfs and 0.34 ft. of stage respectively.

Discharge.-- Shifting control method was used for all periods of open water. Shifts were applied by time as defined by measurements from October 1, 2012 through August 8, 2012. Stage dependent shifting using variable shift table MIDSTECO12-2 was applied from August 8 to November 6, 2012. MIDSTECOV12-2 is defined by seven measurements (Nos. 132-138) made during the period of application. Open water measurements showed shifts varying between -0.05 and +0.01 ft. All were given full weight except for No. 133 which was discounted by 4.46% to better fit the shift distribution.

Special Computations.-- Discharge for the ice affected periods was estimated from adjacent good record with consideration given to temperature trends. Partial day record discharges were estimated from adjacent good record and discharge measurements made prior to shutdown and startup respectively.

Remarks.-- The record is good except for: ice affected periods and partial day record which are estimated and poor. The peak flow is rated as fair due to the rapid rain event which created it and lack of measurements at this flow. This is a partial year record, no discharge record is kept in winter months. The period of record for the 2012 Water Year is October 1 through November 9, 2011 and April 20 through September 30, 2012. Station maintained and record developed by Patrick Tyler.

Recommendations.-- Efforts should be taken to better define the new rating at all stages. Levels need to be run in the 2013 Water Year to verify establishment of RM's 5 and 6. A cross-section across the control should also be shot to help identify breakpoints in the rating as well as the point of zero flow.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

MIDDLE SAINT VRAIN AT PEACEFUL VALLEY

RATING TABLE.-- MIDSTECO05 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

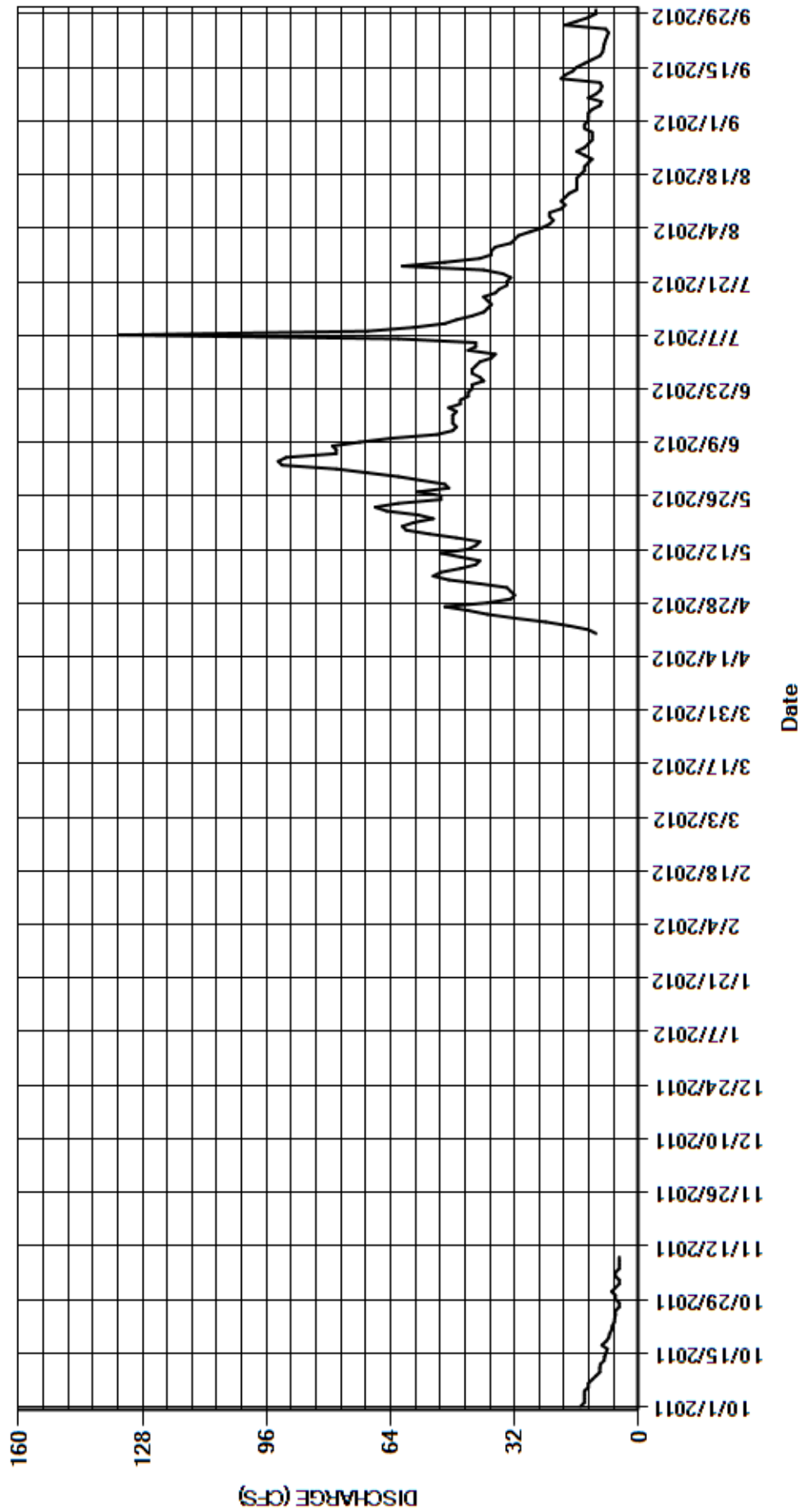
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15	e6.0	---	---	---	---	---	33	70	38	32	13
2	14	e5.0	---	---	---	---	---	34	78	37	31	13
3	14	e5.0	---	---	---	---	---	41	92	44	28	13
4	14	e6.0	---	---	---	---	---	49	93	42	25	12
5	14	e6.0	---	---	---	---	---	53	91	42	23	10
6	13	e5.0	---	---	---	---	---	51	78	62	22	9.6
7	13	e5.0	---	---	---	---	---	46	78	134	23	13
8	12	e5.0	---	---	---	---	---	42	79	70	23	11
9	11	e5.0	---	---	---	---	---	41	72	58	20	9.9
10	10	---	---	---	---	---	---	46	64	50	19	9.5
11	10	---	---	---	---	---	---	51	52	47	20	10
12	9.9	---	---	---	---	---	---	44	48	43	19	20
13	8.9	---	---	---	---	---	---	42	47	40	18	19
14	8.8	---	---	---	---	---	---	41	48	39	16	17
15	8.4	---	---	---	---	---	---	47	48	38	16	16
16	8.1	---	---	---	---	---	---	54	48	39	16	14
17	9.5	---	---	---	---	---	---	60	47	40	16	12
18	8.4	---	---	---	---	---	---	61	49	37	15	10
19	7.7	---	---	---	---	---	---	58	46	36	14	9.3
20	7.5	---	---	---	---	---	e11	53	46	34	14	9.1
21	7.0	---	---	---	---	---	13	57	44	34	13	8.9
22	6.8	---	---	---	---	---	18	65	44	33	12	8.6
23	6.3	---	---	---	---	---	24	68	43	35	14	8.2
24	6.2	---	---	---	---	---	32	62	43	40	16	7.8
25	e6.0	---	---	---	---	---	39	51	40	61	14	8.5
26	e6.0	---	---	---	---	---	44	51	41	50	13	19
27	e5.0	---	---	---	---	---	50	57	43	41	12	16
28	e5.0	---	---	---	---	---	39	49	43	38	12	13
29	e6.0	---	---	---	---	---	33	50	42	38	12	11
30	e6.0	---	---	---	---	---	32	56	41	37	14	11
31	e7.0	---	---	---	---	---	---	62	---	33	14	---
TOTAL	284.5	48.0	---	---	---	---	335	1575	1698	1410	556	362.4
MEAN	9.18	5.33	---	---	---	---	30.5	50.8	56.6	45.5	17.9	12.1
AC-FT	564	95	---	---	---	---	664	3120	3370	2800	1100	719
MAX	15	6.0	---	---	---	---	50	68	93	134	32	20
MIN	5.0	5.0	---	---	---	---	11	33	40	33	12	7.8

CAL YR	2011	TOTAL	17085.5	MEAN	101	MAX	354	MIN	5.0	AC-FT	33890 (PARTIAL YEAR RECORD)
WTR YR	2012	TOTAL	6268.9	MEAN	30.7	MAX	134	MIN	5.0	AC-FT	12430 (PARTIAL YEAR RECORD)

MAX DISCH: 172 CFS AT 05:45 ON JUL 07,2012 GH 3.64 FT SHIFT -0.04 FT
 MAX GH: 3.64 FT AT 05:45 ON JUL 07,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

MIDDLE SAINT VRAIN AT PEACEFUL VALLEY
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06722500 SOUTH SAINT VRAIN NEAR WARD
Water Year 2012

Location.-- Lat. 40°05'27", Long. 105°30'53" (NAD83) in Boulder County, 3.5 mi downstream of Brainard Lake and 1.25 miles north of Ward, Colorado.

Drainage Area and Period of Record.-- 14.4 mi².; Records are available from: 1925-27,28-31, 54-73, 1992 to present.

Equipment.-- Sutron 56-0450-400-DTR digital incremental shaft encoder connected to a Sutron SatLink2 Data Collection Platform (DCP) and a Steve's Type A graphic water-stage recorder in a 42-inch corrugated metal pipe shelter and well on the left side of the Saint Vrain Creek near Ward, CO. The primary reference is a metal drop tape and adjustable reference point (RP) located on the equipment shelf of the shelter. No other supplemental references are available.

Hydrologic Conditions.-- Drainage area is virtually uninhabited forested lands up to the Continental Divide, with no artificial diversions. This site is commonly used for watershed studies. The gage is approximately 3.5 miles downstream from Brainard Lake, a naturally occurring water body. Water passing this gage is diverted by the Lefthand Ditch Company into the Lefthand Creek basin about 1/3 mile downstream (LEFTHDCO). Normally the entire flow is diverted up to the point where it spills over the Lefthand diversion structure. Often, the two gages report similar, if not identical, discharges except during very high flow periods. However, the point when water bypasses LEFTHDCO is not well defined. Measurements made at this gage are sometimes also used for determination of flows at the Lefthand gage, when it is observed that 100% is being diverted.

Gage-Height Record.-- The primary record is 15-minute telemetered data with 15-minute logged DCP data and graphical chart record as backup. The record is complete and reliable except for October 24-November 3 when the stage-discharge relationship was affected by ice and November 4, 2011 and April 30, 2012 corresponding to shut down and startup of the stream gage. This is a partial year gage and no gage height record was obtained during the winter period, November 5, 2011 to April 29, 2012. At the end of WY 2011, parts of the control moved creating a hole with a resulting positive shift. On April 19, 2012, before opening the gage for the spring season, a small excavator was used to repair the control. Large cobble was placed back into a dam/riffle and heavily armored downstream. The work resulted in a slight rise in gage-heights resulting in negative shifting through the remainder of the year.

Datum Corrections.-- Levels were run on August 18, 2011 using RM No. 1 as base. The elevation of the RP was found to be 0.015 ft. high. No correction was made.

Rating.-- The control for low to moderate flow is a rock riffle composed of embedded river boulders approximately 30 feet downstream from the gage. The high water control is a sharp bend and gradient change in the stream channel approximately 50 feet downstream of the gaging station. The control is subject to shifting boulders moving into and out of the control area as well as material embedding and being released from the rock riffle. Rating No. 11 developed in water year 2007 was originally defined by measurements from 4.74 to 156 cfs. The rating was extended in 2010 to 510 cfs to include a 2009 measurement of 317 cfs. Thirteen discharge measurements (Nos. 224-236) were made this year ranging in discharge from 4.51 cfs to 98.1 cfs. They cover the range of stage experienced this water year, except for the higher mean daily flows on July 7 and 8, 2012. The peak discharge of 214 cfs occurred at 2230 on July 6, 2012 at a gage-height of 3.24 feet with a shift of -0.37 ft. exceeding this year's high flow Measurement No. 229 made on June 5, 2012 by 0.29 feet of stage.

Discharge.-- Shifting control method was used for all periods of open water. Moss growth and debris accumulation is generally not an issue at this gage; however fill and scour conditions as well as control movement does occur. Shifts were applied by time as defined by measurements from September 30, 2011 to winterization of the gage on November 4, 2011, April 30 through May 11 and September 27 through October 11, 2012. Stage dependent shifting using variable shift table SSVWARCOVST12-A was applied from May 11 up to the peak event of July 6, 2012. SSVWARCOVST12-A is defined by Measurements Nos. 227-230, made during the period of use. From the peak event to September 27, 2012 variable shift table SSVWARCOVST12-B was applied. It is defined by Measurements Nos. 231-236, made during the period of use. Open water measurements made this year showed unadjusted shift ranging from 0.03 to -0.37 ft. All measurements were given full weight except for Nos. 224, 226, 230, 235 and 236 which were adjusted up to ±7% to smooth shift distributions. This is a partial year gage and discharges are not estimated for the winter period, November 5, 2011 to April 29, 2012.

Special Computations.-- Discharge for periods of ice effect were estimated from adjacent record with consideration given to temperature trends and discharges recorded at the downstream station (LEFTHDCO).

Remarks.-- The record is good, except for periods of ice effect and partial day record which are estimated and poor. The peak is rated poor and the mean daily discharges on July 7 and 8, 2012 are also considered poor due to lack of confirming measurements in this flow range following rehabilitation of the control. Station maintained and record developed by Patrick Tyler.

Recommendations.-- Defining high flows remains a problem. High water measurements at or above 140 cfs cannot be waded. Crane measurements off the bridge at the gage are difficult and poor due to turbulence caused by a constriction at the bridge abutments, high velocities, and debris firmly lodged in the channel bed at the bridge section. Due to the remoteness of this gage, efforts to find a more suitable measurement location have been unsuccessful. Moreover, under high water conditions measurement at LEFTHDCO is not an option due to diversion practices and supercritical velocities encountered at the only available cabling location due to the LEFTHDCO structure lay out. Grooming the cabling section at this gage prior to high flow and shortening the inlets to avoid possible drawdown effects is suggested.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06722500 SOUTH SAINT VRAIN NEAR WARD

RATING TABLE-- SSVWARCO11 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

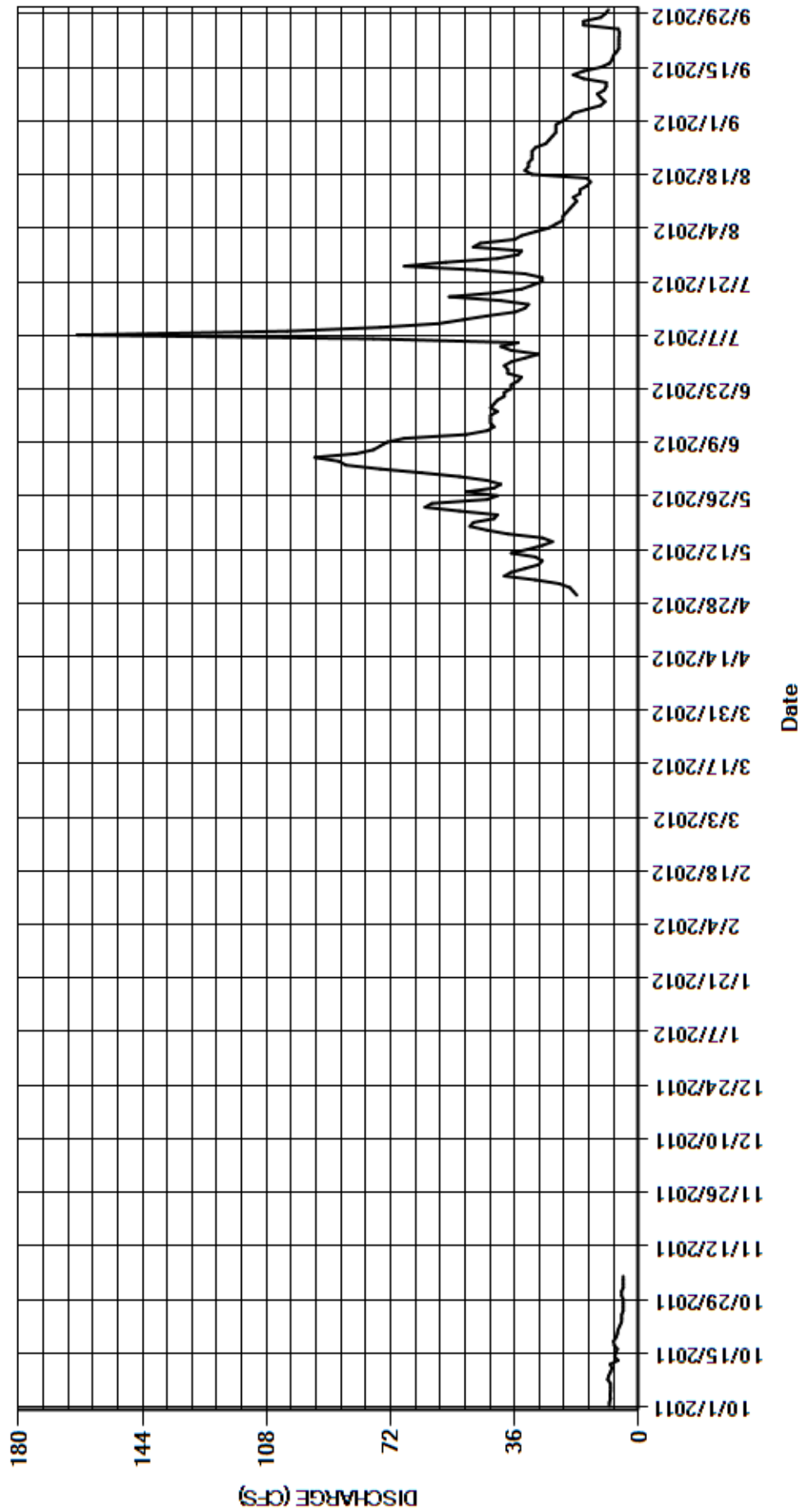
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.5	e4.5	---	---	---	---	---	19	63	33	36	22
2	8.5	e4.5	---	---	---	---	---	20	75	29	34	20
3	8.2	e4.5	---	---	---	---	---	23	85	37	30	19
4	8.3	e4.5	---	---	---	---	---	30	87	40	26	15
5	8.2	---	---	---	---	---	---	39	94	35	24	11
6	8.2	---	---	---	---	---	---	37	82	77	22	9.8
7	8.2	---	---	---	---	---	---	33	77	163	22	11
8	9.0	---	---	---	---	---	---	29	75	102	21	12
9	8.7	---	---	---	---	---	---	28	73	75	20	10
10	8.2	---	---	---	---	---	---	30	68	58	19	9.4
11	7.7	---	---	---	---	---	---	37	50	51	18	9.4
12	8.3	---	---	---	---	---	---	32	44	44	19	16
13	6.0	---	---	---	---	---	---	28	42	36	17	19
14	7.0	---	---	---	---	---	---	25	43	33	17	16
15	6.6	---	---	---	---	---	---	28	43	32	15	11
16	6.2	---	---	---	---	---	---	38	43	40	14	8.5
17	7.1	---	---	---	---	---	---	44	41	55	15	7.7
18	7.3	---	---	---	---	---	---	49	43	42	31	7.4
19	6.6	---	---	---	---	---	---	48	42	34	33	6.4
20	6.2	---	---	---	---	---	---	42	41	31	32	5.7
21	6.0	---	---	---	---	---	---	41	39	28	32	5.7
22	5.5	---	---	---	---	---	---	52	39	28	31	5.7
23	5.0	---	---	---	---	---	---	62	37	33	31	5.7
24	4.9	---	---	---	---	---	---	60	37	47	31	5.6
25	4.9	---	---	---	---	---	---	44	35	68	30	5.9
26	e4.5	---	---	---	---	---	---	41	34	56	27	16
27	e4.5	---	---	---	---	---	---	50	38	41	26	16
28	e4.5	---	---	---	---	---	---	42	38	35	25	11
29	e4.5	---	---	---	---	---	---	40	39	34	24	9.7
30	e5.0	---	---	---	---	---	e18	44	37	48	24	8.8
31	e5.0	---	---	---	---	---	---	52	---	46	24	---
TOTAL	207.3	18.0	---	---	---	---	18	1187	1584	1511	770	336.4
MEAN	6.69	4.50	---	---	---	---	18.0	38.3	52.8	48.7	24.8	11.2
AC-FT	411	36	---	---	---	---	36	2350	3140	3000	1530	667
MAX	9.0	4.5	---	---	---	---	18	62	94	163	36	22
MIN	4.5	4.5	---	---	---	---	18	19	34	28	14	5.6

CAL YR	2011	TOTAL	13785.6	MEAN	84.1	MAX	319	MIN	4.5	AC-FT	27340 (PARTIAL YEAR RECORD)
WTR YR	2012	TOTAL	5631.7	MEAN	29.8	MAX	163	MIN	4.5	AC-FT	11170 (PARTIAL YEAR RECORD)

MAX DISCH: 214 CFS AT 22:30 ON JUL 06,2012 GH 3.24 FT SHIFT -0.37 FT
 MAX GH: 3.24 FT AT 22:30 ON JUL 06,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06722500 SOUTH SAINT VRAIN NEAR WARD
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
LEFT HAND DIVERSION NEAR WARD

Water Year 2012

Location.-- Lat. 40°05'29", Long. 105°30'31" (NAD83) , In Boulder County, CO. The gage is located ½ mile downstream from gage on S. St. Vrain Creek off Highway 72.

Drainage Area and Period of Record.-- 14.4 sq mi. ; May 21, 1992 to present.

Equipment.-- Sutron 56-0540-400-DTR digital incremental shaft encoder connected to a Sutron SatLink 2 Data Collection Platform (DCP) and a Steven's Type A graphic water-stage recorder in a 36-inch corrugated metal pipe shelter ovetop a 42-inch concrete stilling well. The well is connected to the channel with two two-inch polyvinyl conduit (PVC) inlets, equipped with ball valves, street keys and flushing risers. The primary reference is a metal drop tape and adjustable reference point (RP) located on the equipment shelf of the shelter. No other supplemental references are available.

Hydrologic Conditions.-- Semi-regulated diversion point. Gage measures water diverted from the South Saint Vrain Creek into James Creek and thence to Lefthand Creek in the Boulder Creek watershed. Diversions usually encompass the entire flow of the South Saint Vrain Creek at this point. The drainage area listed for the upstream gage, South Saint Vrain Near Ward, CO (SSVWARCO). SSVWARCO is approximately 3.5 miles below Brainard Lake and approximately 0.4 miles above the Left Hand Diversion at South Saint Vrain Creek (LEFTHDCO) gage. The LEFTHDCO diversion structure is comprised of a concrete diversion dam, and a 10-foot wide radial gate with trash rack approximately 55-feet upstream from the control. The radial gate is operated in such a way that it is under pressure for a majority of the season creating a somewhat regulated diversion. Due to this operational regime, peaks and troughs encountered by the SSVWARCO gage can be somewhat attenuated at this gage. Some inflow is expected to occur between the SSVWARCO and LEFTHDCO gage during runoff and storm events which accounts for some computational differences.

Gage-Height Record.-- The primary record is 15-minute telemetered data with 15-minute logged DCP data and chart record as backup. The record is complete and reliable except for October 25 through November 4, 2011 when the stage-discharge relationship was affected by ice and November 5, 2011 and April 30, 2012 which are partial day records corresponding to winterization and startup of the gage. This is a partial year record. No record from November 5, 2011 through April 29, 2012. Instrument calibration was maintained by 13 visit to gage. One calibration correction of 0.01 ft. was applied to the record as defined by visits made to the gage.

Datum Corrections.-- Levels were last run on August 18, 2011 using RM2 as base. The base reference was found to be 0.022 ft. high. No correction was made in lieu of confirming levels. In the past levels have been run using RM #1 as a starting point. However, due to concrete deterioration, the Left Hand Ditch Company has been repairing portions of the wing walls and RM #1, has been disturbed and/or destroyed. The Point of zero flow (PZF) was last verified on September 24, 2005 and determined to occur at a gage-height of 0.86 feet.

Rating.-- The control is a broad crested concrete dam approximately 10 feet below the gage shelter. Rating No. 3 in use since October 2005 was continued this year. It was extended in 2010 to include Measurement 143, the highest measurement recorded at this gage. Flows above approximately 90 cfs cannot be measured at the gage, therefore high water measurements must be made upstream at SSVWARCO and applied to LEFTHDCO. Thirteen discharge measurements (Nos. 169-181) were made this year ranging in discharge from 4.51 to 98.1 cfs. They cover the range experienced for this water year except for the peak flow on July 7, 2012. Measurement Nos. 174 and 179 were both made at SSVWARCO due to high flow and lightning. Measurement Nos. 174 and 179 applied from SSVWARCO were done when LEFTHDCO was diverting the entire flow as confirmed by field observation. High flows, high enough to bypass the gage, continuing down the natural channel was not observed this water year. The peak flow of 322 cfs occurred at 03:45 on July 7, 2012 at a gage height of 2.61 ft with a shift of +0.05 ft., exceeding this year's high flow measurement (No. 174), made June 5, by 0.61 ft in stage.

Discharge.-- Shifting control method was used for all periods of open water. Moss and debris accumulation is generally not an issue at this gage; however, larger debris such as tree limbs can catch on the control. Larger cobble can also come to rest near the crest and erroneously raise the GH. Velocities are high past the gage and inlet drawdown has been speculated as a source of GH irregularity and consequent shifts. SSVWARCO and LEFTHDCO are in such close proximity to each other that discharges should be quite consistent. Shifts were applied by time as defined by measurements with consideration given to change in stage. Measurements made this year showed unadjusted shifts varying from 0.00 to 0.05 ft. All measurements were given full weight except for Nos. 173, 177, 178 and 181 which were adjusted up to ±6.14% to smooth shift distributions.

Special Computations.-- Discharge for periods of ice effect and partial day record were estimated from adjacent record, temperature trends and the upstream gage (SSVWARCO). A comparison spreadsheet has been prepared and is included in the record to confirm the flow relationships between the upstream and downstream gages. This is a partial year record. No record and discharge is not estiamted from November 5, 2011 through April 29, 2012. Diversion from the South Saint Vrain continues through the winter.

Remarks.-- The record is good, except for periods of ice effect and partial day record which are estimated and poor. The instantaneous peak and the high flow period of July 6-9, 2012 is poor due to lack of confirming discharge measurements made in the flow range and lack of confirmation from the upstream gage. Station maintained and record developed by Patrick Tyler.

Recommendations.-- High flow measurements are difficult and dangerous to perform at this gage as well as the SSVWARCO gage and are often poor. Due to the remoteness of these gages, other locations for performing high water measurements are not possible. If a bank operated cableway were installed at the SSVWARCO gage, some resolution of these issues may occur. That said, another measurement in the 200-300 cfs range would be very helpful in building a new rating. Such a measurement would need to incorporate observations about gate operation and GH reliability. A staff on the gate pool might help. Levels must be shot in the 2013 Water Year.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

LEFT HAND DIVERSION NEAR WARD

RATING TABLE.-- LEFTHDCO03 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

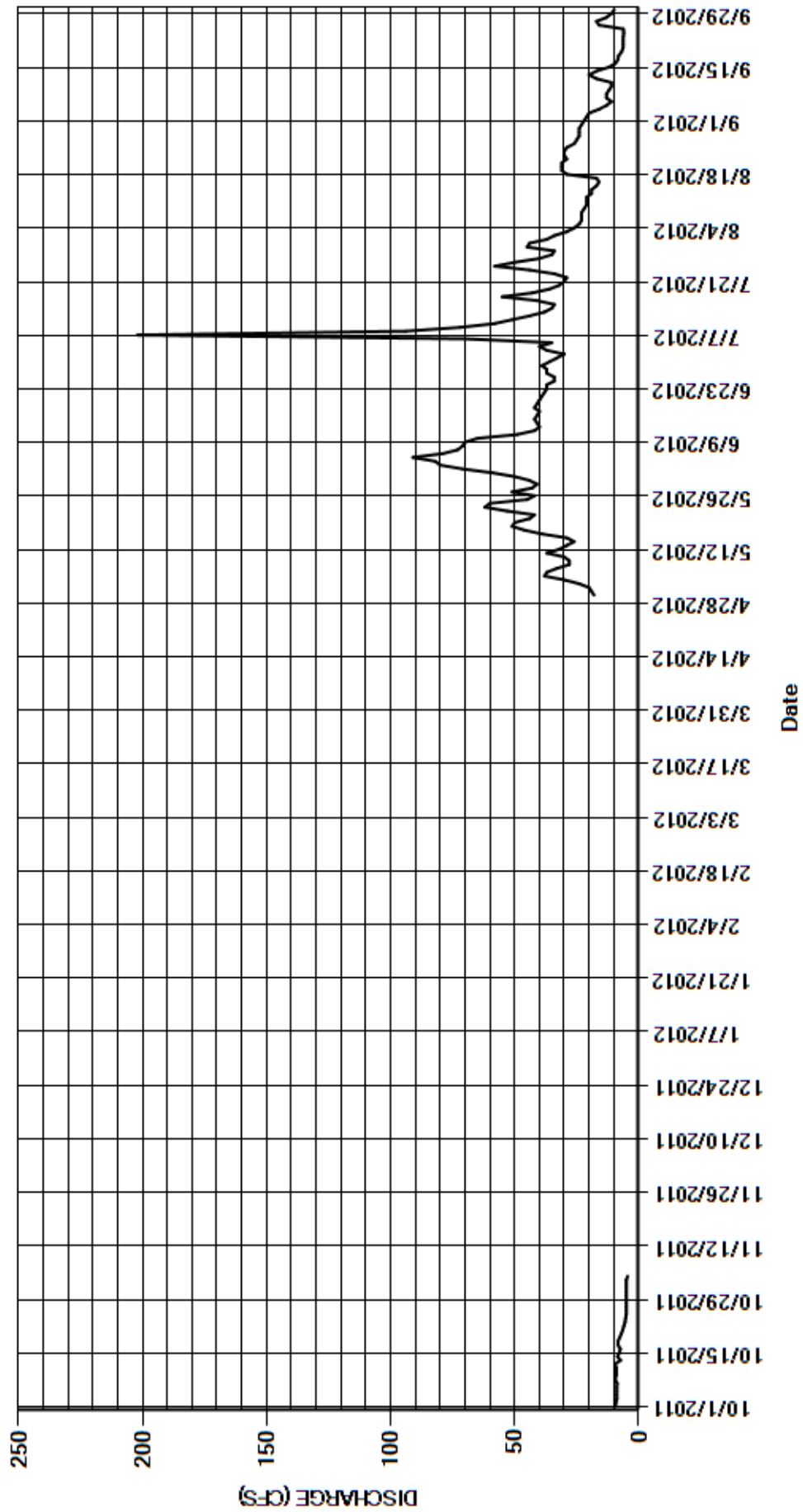
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9.3	e5.0	---	---	---	---	---	19	59	33	37	22
2	9.2	e5.0	---	---	---	---	---	20	71	30	34	21
3	8.8	e5.0	---	---	---	---	---	24	80	37	29	20
4	8.9	e4.5	---	---	---	---	---	30	82	40	26	16
5	8.8	---	---	---	---	---	---	38	91	35	24	13
6	8.8	---	---	---	---	---	---	37	79	70	23	11
7	8.7	---	---	---	---	---	---	33	73	202	23	13
8	9.5	---	---	---	---	---	---	28	71	94	23	13
9	9.1	---	---	---	---	---	---	28	70	72	22	12
10	8.9	---	---	---	---	---	---	30	65	58	21	11
11	8.9	---	---	---	---	---	---	37	49	51	21	11
12	9.7	---	---	---	---	---	---	32	42	44	21	17
13	7.3	---	---	---	---	---	---	29	40	38	19	20
14	8.5	---	---	---	---	---	---	26	41	35	19	17
15	7.8	---	---	---	---	---	---	29	42	34	17	12
16	7.4	---	---	---	---	---	---	39	41	41	16	9.4
17	8.3	---	---	---	---	---	---	46	40	55	17	8.4
18	8.4	---	---	---	---	---	---	51	42	43	29	8.1
19	7.6	---	---	---	---	---	---	50	41	36	31	6.9
20	7.0	---	---	---	---	---	---	44	40	32	31	6.3
21	6.4	---	---	---	---	---	---	42	39	30	31	6.3
22	6.0	---	---	---	---	---	---	53	38	29	29	6.3
23	5.5	---	---	---	---	---	---	62	37	34	30	6.2
24	5.3	---	---	---	---	---	---	60	37	44	30	6.0
25	e5.0	---	---	---	---	---	---	45	34	58	29	6.2
26	e5.0	---	---	---	---	---	---	42	34	50	26	16
27	e5.0	---	---	---	---	---	---	51	37	40	25	17
28	e5.0	---	---	---	---	---	---	43	37	35	24	13
29	e5.0	---	---	---	---	---	---	41	39	34	24	11
30	e5.0	---	---	---	---	---	e18	44	36	45	24	9.9
31	e5.0	---	---	---	---	---	---	50	---	44	23	---
TOTAL	229.1	19.5	---	---	---	---	18	1203	1527	1523	778	366.0
MEAN	7.39	4.88	---	---	---	---	18.0	38.8	50.9	49.1	25.1	12.2
AC-FT	454	39	---	---	---	---	36	2390	3030	3020	1540	726
MAX	9.7	5.0	---	---	---	---	18	62	91	202	37	22
MIN	5.0	4.5	---	---	---	---	18	19	34	29	16	6.0

CAL YR	2011	TOTAL	12105.1	MEAN	73.8	MAX	195	MIN	4.5	AC-FT	24010 (PARTIAL YEAR RECORD)
WTR YR	2012	TOTAL	5663.6	MEAN	30.0	MAX	202	MIN	4.5	AC-FT	11230 (PARTIAL YEAR RECORD)

MAX DISCH: 322 CFS AT 03:45 ON JUL 07,2012 GH 2.61 FT SHIFT 0.05 FT
 MAX GH: 2.61 FT AT 03:45 ON JUL 07,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

LEFT HAND DIVERSION NEAR WARD
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06724000 SAINT VRAIN CREEK AT LYONS, CO

Water Year 2012

Location.-- Lat. 40°13'13.27"; Long. 105°15'45.36" (NAD83), in Boulder County, CO, Hydrologic Unit 10190005. Gage is on the left bank 75 ft southwest of U.S. Highway 36 adjacent to State Highway 66 at southeast edge of Lyons, 400 ft upstream from St. Vrain Supply Canal, and 0.4 mi downstream from confluence of North and South St. Vrain Creeks.

Drainage Area and Period of Record.-- 216 mi² (USGS Colorado StreamStats utility).; Daily values are available from 1887 to Present. On March 23, 2003, the gage was moved approximately 0.2 mi upstream. In the new location, the gage is above the Supply Ditch diversion, whereas the old location was below this diversion.

Equipment.-- Sutron Stage Discharge Recorder (SDR-001), temperature sensor and a tipping bucket rain gage connected to a Sutron SatLink2 Data Collection Platform (DCP) in a 6-foot by 6-foot exposed aggregate precast concrete building overtop a 42 -inch precast concrete stilling well upstream of a low head concrete diversion dam. An Electric Tape Gage (ETG) located on the instrument shelf is the primary reference with a supplementary cantilever chain gage located 10 feet downstream of the shelter. The stilling well is connected to the channel via four 2-inch inlets, three of which are equipped with valves and flushing equipment. A bank operated cableway is located 15 ft downstream from the shelter. A secondary shaft encoder is installed on the instrument shelf of the shelter. This shaft encoder is used for the Highland Ditch Company's Supervisory Control and Data Acquisition (SCADA) system. This instrument is maintained by the Colorado Division of Water Resources (CDWR) and operated such that the instruments stage reading is set to the base gage stage plus or minus the last measured shift.

Hydrologic Conditions.-- Drainage area mainly comprised of forested and grassy areas with varying topography. Gage is located below the confluence of the south and north forks of the Saint Vrain and below most of Lyons Colorado. Beaver Creek and Button Rock Reservoirs are upstream of this gage as well as numerous other diversions of varying magnitude. This station is susceptible to rapid increases in stage due to storm runoff events from hardened surfaces within the Town of Lyons, CO.

Gage-Height Record.-- The primary record is 15-minute satellite data with 15-minute logged DCP and SDR data as backup. A Stevens A-35 Water Stage Recorder was removed when the SDR was installed on March 22, 2012 and is also available for partial year backup. Instrument calibration was maintained by nineteen visits to the gage this year. Three instrument corrections ranging from -0.01 to +0.02 ft. were made this year and were applied to the record as defined by visits to the gage. Accumulation of debris on the diversion dam was a common problem this year and is responsible for four corrections ranging from -0.02 to -0.04 ft. Debris removal corrections were applied to the record as shift corrections. The record is complete and reliable except for: November 2,3 and 6-9, December 2-11, 2011; January 27-31, February 1, 3, and 5-29, March 1-3 and 19-22, 2012 when the stage-discharge relation was affected by ice; December 12, 2011 through January 26, 2012 when the gage was winterized. Missing values on October 26, 2011 were filled in using chart backup without loss of accuracy.

Datum Corrections.-- Levels were last run to the inside gage on September 9, 2010 using R.M. No. 2 as base. The ETG elevation was found to be within the allowable limits.

Rating.-- The control for low to mid level stages is a low-head concrete diversion dam for the Supply Ditch approximately 570 feet below the gage. At higher stages the gage reverts to channel control; which, has not been fully defined since the gage relocation in 2003. The diversion dam and ditch check structure approximately 1000 feet below the gage can gather debris and cause backwater conditions at the gage under certain operational circumstances. Rating No. 26 in use since October 1, 2009 is defined by measurements from 13.6 to 1230 cfs. Seventeen discharge measurements (Nos. 617-633) were made this year ranging in discharge from 18.4 to 211 cfs covering the range in stage experienced this year well except for the higher daily flows of June 7-11 and July 7, 12-14, 2012. The peak discharge of 347 cfs occurred at 20:00 July 7, 2012 at a gage height of 2.42 ft. with a shift of -0.02 ft. exceeding this year's high flow measurement (No. 626) by 136 cfs and 0.34 ft. of stage.

Discharge.-- Shifting control method was use for all periods of open water. Shifts are caused by the fill and scour of the gage pool as well as debris accumulation on the low water control. Shifts were applied by time with consideration given to change in stage as defined by measurements and cleanings of the control structure. Open water measurements showed shifts varying between -0.06 ft and -0.02 ft. All were given full weight except for Nos. 624, 625, 631, and 633 which were discounted up to ± 4.65% to smooth distributions.

Special Computations.-- Discharge for ice affected periods as well as the winter period was estimated from adjacent record and discharge measurements made through the period with consideration given to logged temperature trends. Several gage-height values recorded during the course of clearing debris from the control were adjusted to smooth computed discharges during affected periods.

Remarks.-- The record is good except for periods of ice affect and winter record which are estimated and poor. The peak is rated good. Station maintained and record developed by Patrick Tyler.

Recommendations.-- Special care needs to be taken when performing Bank Operated Cableway (BOC) measurements. BOC measurements are often difficult to sound correctly and may introduce error into the measurement. Depths at the BOC are many times insufficient for two point (.2/.8) method incurring further error. Control and diversion check structure should be monitored for accumulated debris that may cause backwatering conditions. Levels need to run in the 2013 water year to monitor any subsequent settling of the new shelter. The addition of one to two additional reference marks is highly recommended.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06724000 SAINT VRAIN CREEK AT LYONS, CO

RATING TABLE.-- SVCLYOCO26 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

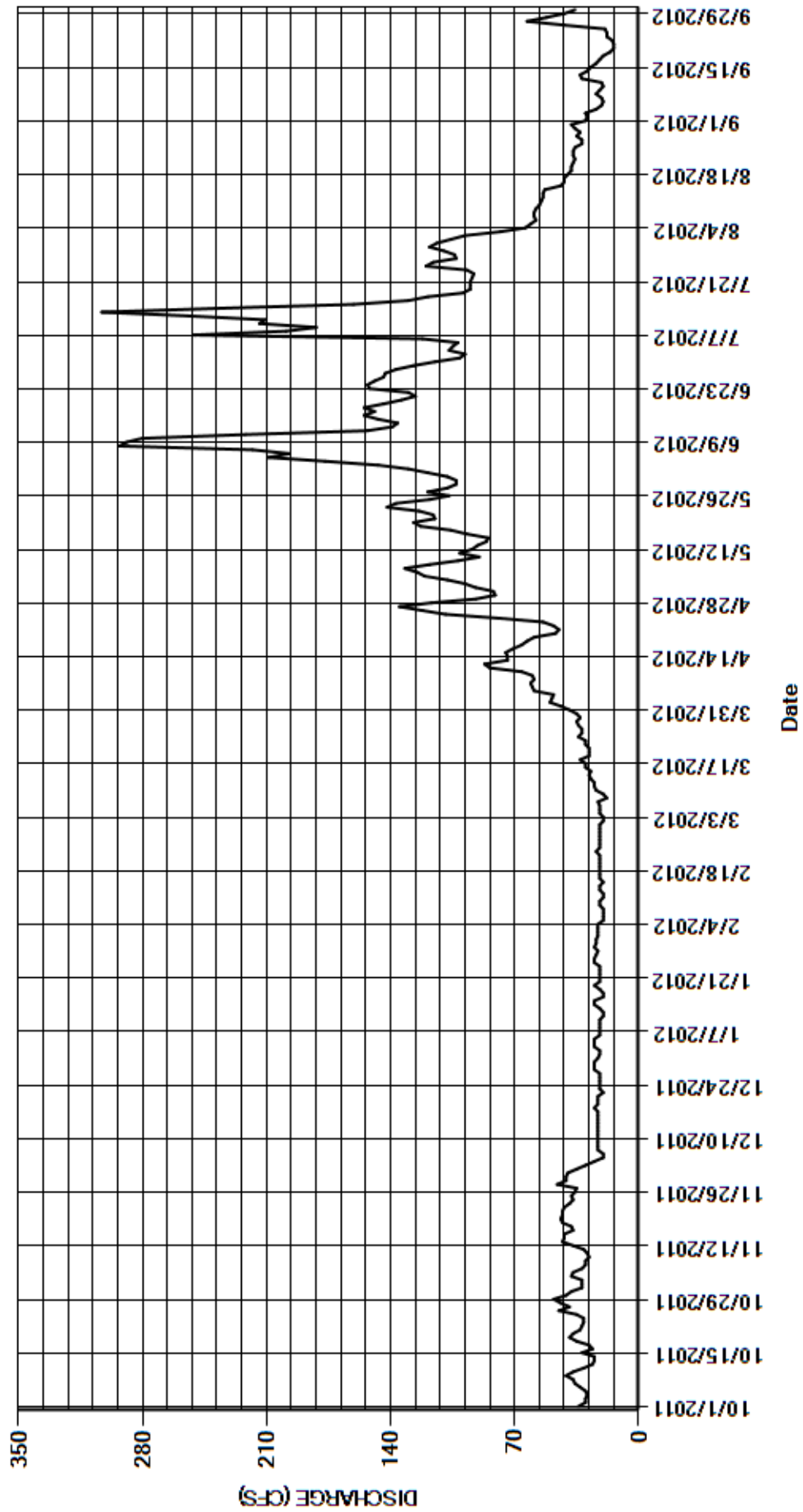
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	34	32	40	e22	e23	e22	44	82	119	101	106	30
2	30	e32	e35	e22	23	e20	50	92	130	98	98	29
3	30	e32	e30	e25	e23	e20	49	98	147	107	78	30
4	29	38	e25	e25	23	22	48	108	177	105	64	24
5	30	37	e20	e25	e20	22	59	121	209	102	61	21
6	33	e32	e20	e22	e20	22	60	125	197	122	58	20
7	36	e30	e23	e22	e20	23	61	132	218	251	59	21
8	37	e30	e23	e22	e20	18	59	118	293	199	59	24
9	41	e28	e23	e22	e22	20	60	102	289	182	58	22
10	37	29	e23	e22	e22	24	66	90	280	214	56	20
11	31	31	e23	e20	e20	25	84	101	222	211	55	21
12	26	37	e23	e20	e20	25	87	94	153	254	54	32
13	25	43	e23	e22	e22	27	74	91	139	303	54	33
14	25	42	e23	e25	e22	28	74	86	136	235	53	29
15	32	42	e23	e25	e20	27	75	85	147	161	44	27
16	26	37	e23	e20	e22	30	71	97	155	130	42	24
17	28	38	e23	e20	e22	30	66	106	149	119	42	22
18	35	43	e25	e22	e22	33	63	123	155	99	40	20
19	39	44	e23	e25	e22	e28	59	127	144	95	38	16
20	37	43	e23	e22	e22	e28	47	115	134	95	38	14
21	33	43	e23	e22	e22	e28	45	116	126	95	37	14
22	32	42	e20	e22	e22	e30	48	124	130	94	36	15
23	31	39	e22	e22	e24	30	54	142	152	93	37	18
24	31	37	e22	e22	e22	34	79	137	153	97	37	18
25	35	38	e22	e25	e22	32	109	118	149	120	36	19
26	45	36	e22	e25	e22	32	122	107	144	116	32	42
27	39	35	e22	e24	e22	34	135	119	143	103	32	63
28	44	46	e25	e23	e22	35	117	108	137	104	35	52
29	48	41	e25	e25	e22	33	92	103	127	110	33	42
30	41	41	e25	e24	---	35	81	103	115	118	36	36
31	38	---	e23	e24	---	39	---	108	---	114	38	---
TOTAL	1058	1118	745	708	630	856	2138	3378	4969	4347	1546	798
MEAN	34.1	37.3	24.0	22.8	21.7	27.6	71.3	109	166	140	49.9	26.6
AC-FT	2100	2220	1480	1400	1250	1700	4240	6700	9860	8620	3070	1580
MAX	48	46	40	25	24	39	135	142	293	303	106	63
MIN	25	28	20	20	20	18	44	82	115	93	32	14

CAL YR	2011	TOTAL	63005	MEAN	173	MAX	1050	MIN	15	AC-FT	125000
WTR YR	2012	TOTAL	22291	MEAN	60.9	MAX	303	MIN	14	AC-FT	44210

MAX DISCH: 347 CFS AT 20:00 ON JUL 07,2012 GH 2.42 FT SHIFT -0.02 FT
 MAX GH: 2.42 FT AT 20:00 ON JUL 07,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06724000 SAINT VRAIN CREEK AT LYONS, CO
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06727000 BOULDER CREEK NEAR ORODELL
Water Year 2012

Location.-- Lat. N.40°0'23.5"; Long. W.105°19'49.8" (NAD83) Boulder County, CO, Hydrologic Unit 10190005. Gage is on the left bank of Boulder Creek 0.3 miles downstream from the City of Boulder's Boulder Canyon Hydroelectric Facility and 1.1 miles upstream from Fourmile Creek, or 8.5 miles east of Barker Reservoir and 2.6 miles west of the Boulder Public Library which is adjacent to the Boulder Creek at Boulder, CO (BOCOBOCO) stream gage.

Drainage Area and Period of Record.-- 102 mi² (USGS Colorado StreamStats utility). ; Daily values are available from October 1, 1906 to November 30, 1915 and March 1, 1916 to present.

Equipment.-- Digital incremental Sutron 56-0540-400-DTR shaft encoder and a temperature sensor connected to a Sutron SatLink2 Data Collection Platform (DCP) and a standalone Sutron SDR-0001-1 in a 6-ft by 6-ft. precast concrete shelter sitting overtop a 54-inch corrugated metal pipe stilling well. The well is connected to the stream via three 2-inch intakes equipped with flushing provisions. An electric tape gage on the instrument shelf is the primary reference with a supplemental staff gage located on the opposite side of the channel, behind the shelter. The gage has AC power to keep the well and intakes open in winter months. OneRain Inc. operates and maintains a pressure transducer connected to an early warning radio under contract with the City of Boulder.

Hydrologic Conditions.-- Flows are regulated by operations of Barker Reservoir and diversions from Barker Reservoir. Water diverted for power generation at the Boulder Canyon Hydroelectric Facility is returned a few hundred feet above the gage. Hydroelectric operations can cause rapid changes in gage-height. Power generation activities in winter months help keep the channel at the gage open.

Gage-Height Record.-- The primary record is 15-minute satellite data with SDR and DCP log as backup. The record is complete and reliable, except for: November 16, 2011 thru March 16, 2012, when the stage-discharge relationship was affected by ice. Instrument calibration was supported by 19 visits to the gage this year. No equipment, debris or flush corrections were required this Water Year.

Datum Corrections.-- Levels were last run on August 17, 2011 using RM5 as base. The base reference was within allowable tolerances.

Rating.-- The control for low to mid level flows is a cobble and boulder riffle approximately 60 ft. below the gage. Channel control at higher stages. Rating BOCOROCO14, in use since October 1, 2004, is defined by measurement up to 757 cfs was continued all year. Sixteen discharge measurements (526 - 541) were made this year ranging in discharge from 7.56 to 174 cfs covering the range in stage experienced this year well except for the higher daily flows of July 7 - 9, 2012. The peak flow of 723 cfs occurred at 1800 July 7, 2012 at a gage-height of 3.44 ft. with a shift of 0.00 ft. The peak exceeded high flow Measurement No. 537 made July 8, 2012 by 549 cfs and 0.76 ft of stage.

Discharge.-- Shifting control method was used all year. Shifts are caused by fill and scour of materials through the gage pool and movement of the control at higher flows. Shifts were distributed time as defined by measurements unless otherwise stated. From March 5, 2013 to June 14, 2012 stage dependent shifting using variable shift table BOCOROCOVST12-A defined by measurement Nos. 531-535 and 537. From the peak event of July 7, 2012 to October 9, 2012 stage dependent shifting using variable shift table BOCOROCOVST12-B, defined by measurement Nos. 537-542. Open water measurements showed shifts varying between -0.15 and 0.00 ft. All were given full weight except for No. 535 which was discounted 1.45% to smooth the shift distribution. No. 539 was not used as it was not representative of other measurements made this year. The stage/shift relationship is evident and persistent at the gage, however this year's flows did not provide the measurements needed to define a new rating since the channel clean-out in water year 2010.

Special Computations.-- Discharges for the ice affected periods were estimated from adjacent good record, temperature trends and discharges recorded at the BOCOBOCO gage and the Water Commissioner's account of diversions away from the creek during the period. A mass balance spreadsheet is used for winter estimation. However, the Fourmile Creek gage (operated by the USGS) is only operated seasonally from April through September. Therefore, estimations at this gage might be slightly over-estimated.

Remarks.-- The record is good, except for the periods of ice affect which are estimated and poor. The peak flow on July 7, 2012 is also rated as poor due to lack of recent confirming measurements in range. Station maintained by Division One Hydrographic staff and record developed by Patrick Tyler.

Recommendations.-- There is some ambiguity in the upper and very low ends of the rating. High flow measurements made at the power plant have been questionable. A Bank Operated Cableway installation will be completed in the 2013 Water Year. Every effort should be made to get the highest range of flow measurements for the development of the new rating. Levels need to be run in the 2013 Water Year to monitor stability in the newly established reference marks.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06727000 BOULDER CREEK NEAR ORODELL

RATING TABLE-- BOCOROCO14 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

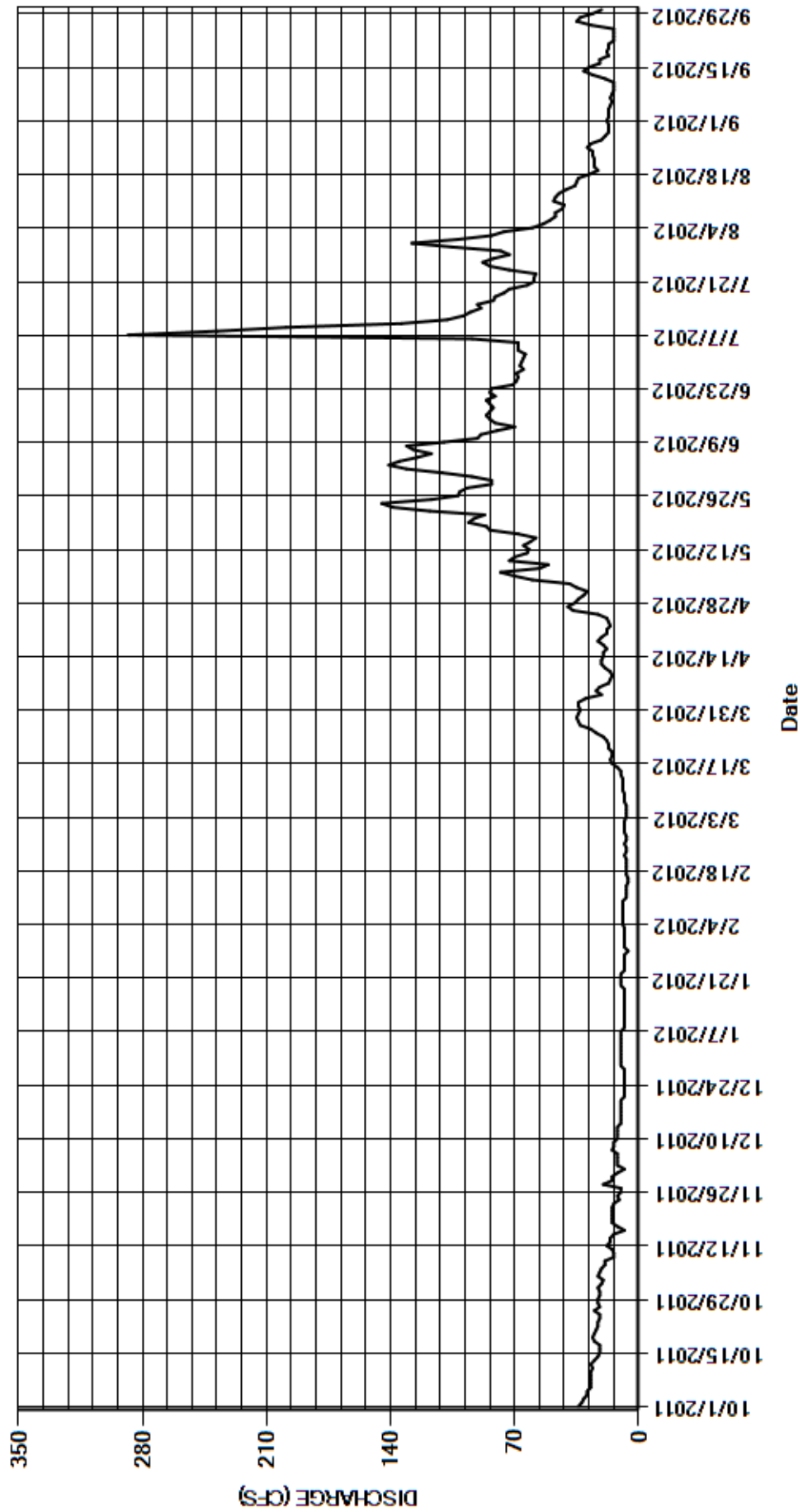
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	34	23	e12	e10	e8.0	e8.0	34	29	111	65	102	18
2	32	21	e8.0	e10	e8.0	e8.0	34	35	131	64	83	17
3	31	20	e12	e10	e8.0	e7.0	30	39	141	68	76	17
4	29	23	e12	e10	e9.0	e7.0	21	60	135	68	60	17
5	29	22	e12	e10	e9.0	e7.0	24	70	125	68	54	16
6	27	21	e12	e10	e9.0	e7.0	22	78	117	94	50	15
7	27	19	e15	e10	e9.0	e8.0	17	56	127	288	47	16
8	27	19	e14	e8.0	e9.0	e8.0	16	51	131	238	47	15
9	27	14	e14	e8.0	e9.0	e8.0	15	73	110	199	43	14
10	27	14	e12	e8.0	e9.0	e9.0	16	70	91	134	42	14
11	26	15	e12	e8.0	e7.0	e9.0	19	63	89	108	48	14
12	27	18	e12	e8.0	e7.0	e9.0	21	62	80	99	47	19
13	25	16	e12	e8.0	e7.0	e9.0	21	65	70	95	45	26
14	23	16	e10	e8.0	e7.0	e10	20	61	81	89	41	31
15	22	14	e10	e8.0	e6.0	e10	20	58	84	91	36	28
16	22	e8.0	e10	e8.0	e6.0	e12	18	68	86	82	35	22
17	22	e12	e10	e8.0	e7.0	15	20	84	84	81	34	22
18	25	e15	e10	e8.0	e7.0	16	23	86	82	76	28	17
19	26	e15	e10	e10	e7.0	15	21	96	84	73	23	18
20	25	e15	e10	e10	e7.0	15	18	93	86	63	25	17
21	24	e15	e8.0	e10	e7.0	17	18	87	81	59	25	17
22	23	e15	e8.0	e10	e8.0	17	16	118	84	59	25	14
23	23	e14	e8.0	e8.0	e7.0	18	17	139	83	58	26	14
24	22	e11	e8.0	e8.0	e7.0	20	18	145	71	73	26	14
25	22	e12	e8.0	e8.0	e8.0	24	23	117	69	84	29	14
26	25	e10	e8.0	e8.0	e7.0	27	37	102	68	88	27	27
27	22	e10	e8.0	e8.0	e7.0	33	40	101	69	82	21	35
28	23	e20	e8.0	e6.0	e8.0	34	36	97	65	73	19	33
29	23	e15	e10	e8.0	e8.0	35	34	83	67	78	17	26
30	22	e15	e10	e8.0	---	34	31	83	66	105	17	21
31	22	---	e10	e8.0	---	33	---	94	---	128	17	---
TOTAL	784	477.0	323.0	268.0	222.0	489.0	700	2463	2768	3030	1215	588
MEAN	25.3	15.9	10.4	8.65	7.66	15.8	23.3	79.5	92.3	97.7	39.2	19.6
AC-FT	1560	946	641	532	440	970	1390	4890	5490	6010	2410	1170
MAX	34	23	15	10	9.0	35	40	145	141	288	102	35
MIN	22	8.0	8.0	6.0	6.0	7.0	15	29	65	58	17	14

CAL YR	2011	TOTAL	41246.0	MEAN	113	MAX	813	MIN	7.0	AC-FT	81810
WTR YR	2012	TOTAL	13327.0	MEAN	36.4	MAX	288	MIN	6.0	AC-FT	26430

MAX DISCH: 723 CFS AT 18:00 ON JUL 07,2012 GH 3.44 FT SHIFT 0 FT
 MAX GH: 3.44 FT AT 18:00 ON JUL 07,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06727000 BOULDER CREEK NEAR ORODELL
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
BOULDER CREEK AT BOULDER, CO
Water Year 2012

Location.-- Lat N.40° 0' 52.63", Long. W.105° 16' 49.9" (WGS84), in Boulder County, CO. Gage is on the right bank in Central Park, 1 block west of the Broadway St. Bridge over Boulder Creek. Gage is located where the center line from 11th St. would cross Boulder Creek.

Drainage Area and Period of Record.-- 135 Sq. Mi. (USGS Colorado StreamStats utility). ; Daily values are available from CDWR from May 2004 to present

Equipment.-- Sutron Constant Flow Bubbler (CFB) unit connected to a Sutron SatLink 2 Data Collector Platform (DCP) transmitting hourly in a 3 ft. by 2.5 ft. by 1 ft. NEMA4 enclosure on the right bank of the channel in downtown Boulder, CO. A staff gage placed on the right side of the channel near the orifice line is the primary and only reference.

Hydrologic Conditions.-- Flows are regulated by storage in Barker Reservoir and by diversions below Barker Reservoir. Several inflows including North Boulder Creek and Four Mile Creek occur to the stream below Barker Reservoir. North Boulder Creek which converges with Middle Boulder Creek above the Boulder Creek at Orodell (BOCOROCO) streamgage and Four Mile Creek converges below BOCOROCO. The channel generally will stay open and free of ice during the winter months. However, during periods of sustained cold, ice may build up on the boulder control approximately 50 ft. downstream of the gage. This year's temperatures remained relatively warm with only a few periods of extreme cold. No ice affect was noted this year.

Gage-Height Record.-- The primary record is 15-minute telemetered data with 15-minute logged DCP and CFB data as backup. The record is complete and reliable except for periods of equipment failure and questionable instrument performance. The CFB unit had many equipment corrections as well as replacement of parts this year, which left periods of missing data during installation. From April 30 through September 30, 2012, the bubbler was unstable and unreliable requiring multiple instrument corrections of varying magnitude and direction. All corrections were prorated back to the point of last agreement with the base reference. Several corrections were handled with the equipment correction tool while others were fixed manually due to their short time frame. The bubbler's erratic behavior is attributed to the channel scouring and uncovering the orifice line and vandalism. It is suspected that the difference in pressure between when the line was buried in sand vs. just laying on the channel floor was enough to create a bouncing affect in data. Many steps were taken to fix the problems as can be seen by the corrections in the data. No natural debris corrections were applied to the gage this year. However, on August 27, 2011, a human placed cobble dam was created on top of the control in an attempt to deepen the stilling pool. The cobble was removed on August 30, 2012.

Datum Corrections.-- Levels were last run on December 21, 2012 using RM1 as base. No correction to the base reference was needed and all other reference marks were within tolerances.

Rating.-- Section control through the expected range of flows. The control could drown out at extreme stages. The control is a placed boulder cross vein approximately 50 ft. downstream from the gage. A second boulder cross vein grade control structure is located approximately 30 ft. further downstream. The channel is primarily composed of cobble, gravel and sands. Rating BOCOBOCO03, developed on May 24, 2005 was continued again this year. The rating was extended in 2010 and again in 2011 to accommodate higher flow rates seen in those years. However, there is little definition at these higher ranges. Seventeen discharge measurements (Nos. 154-170) were made this year ranging in discharge from 10.2 to 175 cfs. Measurements made this year covered the range in stage experienced well except for the lower daily flows through most of February and the first part of March, 2012 and the higher daily flows of July 7-9, 2012. The peak discharge of 595 cfs occurred at 1845 on July 7, 2012 at a gage height of 3.72 ft. with a shift of -0.03 ft. The peak exceeded this year's high flow measurement (No. 165) made July 8, 2012 by 1.33 ft. of stage.

Discharge.-- Shifts are caused by the fill and scour of the gage pool and accumulation of debris on the control. The control is composed of large boulders. The gaps between the boulders are susceptible to getting clogged. Cobble and leaf debris is continuously moving through the area causing shifts to fluctuate especially in fall months. Shifts were distributed by time as defined by measurements and events from September 30, 2011 through January 13, 2012 and August 7 through October 12, 2012. Stage dependent shifting using variable shift table BOCOBOCOVST12-A was used from January 13 through August 7, 2012. It is defined by eleven measurements (Nos. 156-166) made during the period of use. Open water measurement made this year showed unadjusted shifts varying between -0.03 and 0.04 ft. with the exception of No. 167 which had a unadjusted shift of -0.32 ft. attributable to the gage pool being elevated by rocks placed on top of the control. All measurements were given full weight except for Nos. 155, 156, 158-161, 163, 164 and 168 which were adjusted up to 6.85% to smooth shift distributions.

Special Computations.-- A spreadsheet is normally used to compare the upstream gage (BOCOROCO) with the downstream gage (BOCOBOCO). The spreadsheet is primarily used to estimate winter flows at BOCOROCO and to verify events at BOCOBOCO gage in summer months. For the period, April 30 through Sept 30, 2012, the spreadsheet was used to verify flows at BOCOBOCO from flows computed at the BOCOROCO site.

Remarks.-- Record is good, except for periods of bubbler malfunction/chatter, which are downgraded to fair due to lack of confidence in the data. The peak of July 7, 2012 is also downgraded to fair due to lack of confirming discharge measurements in this range this year. A mass balance spreadsheet was used to compare this gage with the upstream gage (BOCOROCO), and average daily flows look reasonable. However, between the two gages, there is one inflow, Four Mile Creek, and three active diversions which make precision difficult. Station maintained and record developed by Patrick Tyler.

Recommendations.-- A new rating should be developed using recent high water measurements. High water should be measured as often as possible to obtain better definition.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

BOULDER CREEK AT BOULDER, CO

RATING TABLE-- BOCOBOCO03 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

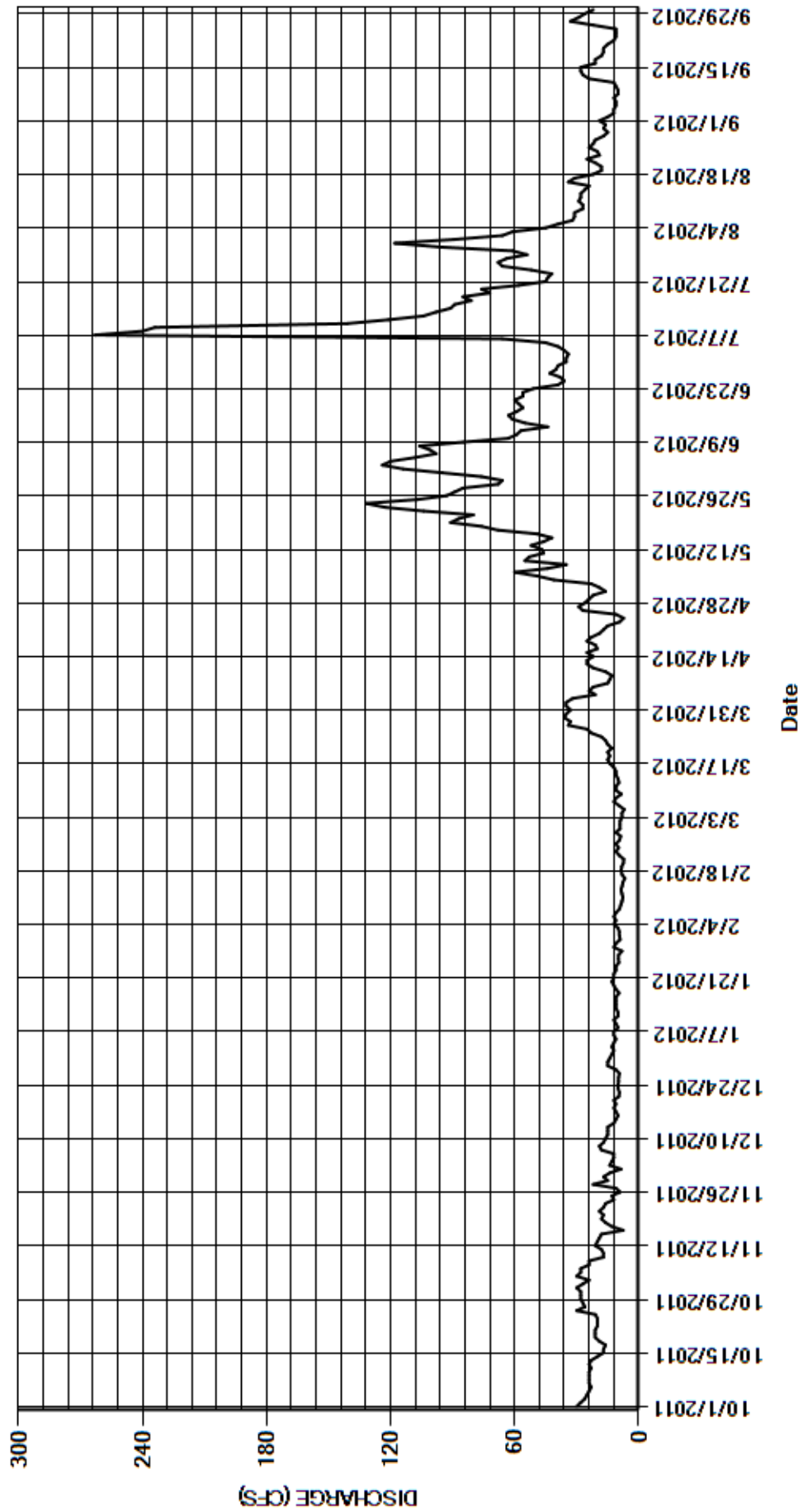
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	30	30	14	13	9.3	9.1	35	16	95	35	89	19
2	28	27	8.5	12	9.3	9.0	35	19	114	34	66	15
3	26	24	14	13	10	8.0	32	23	124	36	61	12
4	25	30	13	12	12	8.2	21	41	120	39	45	12
5	24	28	12	11	11	7.0	24	49	108	45	39	11
6	23	28	12	12	12	9.5	22	60	98	66	32	11
7	24	24	18	12	11	12	15	44	101	263	31	12
8	24	24	19	10	9.3	11	14	35	106	240	31	10
9	24	17	17	11	8.7	8.4	13	55	85	234	27	10
10	24	17	16	12	8.1	11	16	53	63	141	27	11
11	23	18	15	10	7.6	11	22	46	59	121	29	12
12	24	21	15	10	8.1	9.6	25	47	57	104	28	24
13	23	20	15	11	8.6	10	25	52	44	98	28	27
14	20	19	12	11	8.0	11	22	46	55	91	26	28
15	17	18	11	11	7.6	11	25	42	61	89	24	28
16	17	7.5	10	11	6.7	12	20	49	63	81	34	21
17	16	13	11	9.5	8.1	14	21	68	59	85	31	21
18	19	16	12	11	8.4	15	25	76	56	72	22	18
19	21	18	11	12	8.3	14	23	91	58	76	18	17
20	21	17	12	13	7.4	15	19	87	60	58	18	17
21	21	19	9.6	12	7.2	13	17	80	56	45	21	15
22	20	17	9.3	12	9.4	15	15	104	56	44	25	12
23	20	16	9.9	11	11	16	9.2	123	51	42	19	11
24	20	12	10	11	9.7	18	7.3	132	39	52	20	11
25	21	13	9.7	9.6	11	23	11	107	36	66	24	11
26	30	9.0	9.7	9.8	9.3	25	27	93	38	68	22	22
27	26	11	9.3	9.7	8.7	34	29	89	43	64	21	33
28	27	22	11	8.1	11	33	26	85	40	54	17	29
29	28	15	15	12	9.0	36	24	68	39	61	15	26
30	28	17	15	11	---	35	22	66	35	96	17	22
31	28	---	14	9.0	---	33	---	76	---	118	16	---
TOTAL	722	567.5	390.0	342.7	265.8	496.8	641.5	2022	2019	2718	923	528
MEAN	23.3	18.9	12.6	11.1	9.17	16.0	21.4	65.2	67.3	87.7	29.8	17.6
AC-FT	1430	1130	774	680	527	985	1270	4010	4000	5390	1830	1050
MAX	30	30	19	13	12	36	35	132	124	263	89	33
MIN	16	7.5	8.5	8.1	6.7	7.0	7.3	16	35	34	15	10

CAL YR	2011	TOTAL	40195.3	MEAN	110	MAX	839	MIN	7.3	AC-FT	79730
WTR YR	2012	TOTAL	11636.3	MEAN	31.8	MAX	263	MIN	6.7	AC-FT	23080

MAX DISCH: 595 CFS AT 18:45 ON JUL 07,2012 GH 3.72 FT SHIFT -0.03 FT
 MAX GH: 3.72 FT AT 18:45 ON JUL 07,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

BOULDER CREEK AT BOULDER, CO
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06729450 SOUTH BOULDER CREEK BELOW GROSS RESERVOIR

Water Year 2012

Location.-- Lat. N39° 56' 18.12", Long. W105° 20' 52.68" (NAD83). Gage is located on the right side of a 25-ft. Parshall Flume approximately 0.8 mi. downstream of Gross Dam in Boulder County, CO.

Drainage Area and Period of Record.-- 93.2 sqmi (USGS Colorado StreamStats utility) of east slope drainage area. Transmountain water delivered via Moffat Tunnel from tributaries of the Fraser River in the Colorado River Basin are routed through Gross Reservoir and will pass through this structure to terminal storage at other facilities.; Daily values are available from the DWR from October 1, 1967 to present.

Equipment.-- Digital incremental Sutron 8500 shaft encoder connected to a Sutron SatLink2 Data Collection Platform (DCP) transmitting hourly and a Stevens A-35 water stage recorder in a rectangular concrete shelter and Ha stilling well at a 25-ft. Parshall Flume. The primary reference is an electric tape gage with a supplemental staff gage located in the flume. A foot bridge crosses the flume above the Ha location and is used for measuring higher flows. Facilities are owned, operated and maintained by Denver Water.

Hydrologic Conditions.-- Controlled release from Gross Reservoir, with only partial control when the reservoir's spillway is in use. Water retained and released by Gross Reservoir includes transmountain water conveyed from the Fraser River Basin via the Moffat Tunnel Near Rollinsville, CO (MOFTUNCO) as well as waters native to South Boulder Creek. Water released from Gross Reservoir into South Boulder Creek can be diverted to Denver's treatment facilities about 3 miles downstream at the South Boulder Creek Diversion (BOSDELCO) structure.

Gage-Height Record.-- The primary record is 15-minute telemetered data with 15-minute logged DCP data and chart record as back up. The record is complete and reliable except for February 3, 27-29, and March 1-3, 9, 2012, when the stage-discharge relationship was affected by ice. Checks between the primary and backup records agreed within +/- 0.02 feet. Instrument calibration was supported by 14 visits made to the gage this year. One instrument correction of -0.01 ft was made on July 31, 2012 and applied to the record as defined by visit made to the gage.

Datum Corrections.-- Levels were last run on November 24, 2011 using the flume's crest as base. The ETG index elevation was found to be within allowable tolerances. R.M. 4 was established on this date.

Rating.-- The control is a 25 ft. Parshall Flume approximately 0.8 mi downstream of the Gross Reservoir outlet facilities. A standard 25 ft. Parshall flume rating (STD25FTPF) was continued in use this year. The flume is generally in good condition. However, the floor has some areas of increased roughness which cause velocity variations and promotes the establishment of algal growth. Shifts at lower stages are generally due to slower velocities through the flume. The stilling pool upstream of the flume is inadequate, and scour and deposition of materials above the flume will affect the flume's performance. A sand bar has developed just upstream of the flume on the left side of the channel and is further contributing to uneven approach velocities. Twelve measurements (Nos. 697- 708) were made this year ranging in discharge from 7.24 to 200 cfs. The peak flow of 334 cfs occurred at 1100 on June 20, 2011 at a gage height of 2.24 ft with a shift of -0.04 ft. The peak exceeded high flow Measurement No. 703 made May 1, 2012 by 0.61 ft. of stage.

Discharge.-- Historically, discharge measurements within ±5% of the rating were adjusted to the rating. However, this year shifts consistently fell further from the rating than what has typically been seen. Shifting control method was used all year. Shifts were distributed by time as defined by measurements from October 1 through December 29, 2011 and September 21 through October 1, 2012. Stage dependent shifting using variable shift table BOCBRGCOVST12-A was applied from December 29, 2011 through September 21, 2012. BOCBGRCOVST12-A is defined by eleven measurements (Nos. 678, 699-708). Ten of the measurements were made during the period of use and No. 678 was used to define a critical stage-shift point. Open water measurements made this year showed shifts varying between -0.04 and +0.01 ft. All were given full weight except for Nos. 698, 702 and 706 which were discounted 1.75%, 1.77% and 3.70% respectively.

Special Computations.-- Discharge for ice affected periods was estimated from adjacent periods of good record with respect to Denver Water accounting figures. This record is directly used to estimate winter flows at the South Boulder Creek At Eldorado Springs (BOCESLCO) gage.

Remarks.-- The record is good, except for ice affected days which are estimated and poor and periods when the average daily flow fell below 12 cfs which are considered fair. Station maintained by Patrick Tyler and Matt Rusch, and record developed by Matt Rusch.

Recommendations.-- Better documentation of Denver Water staff's daily visits to the gage is requested. Also, the operator should be consulted to find out if release was completely constant during any ice periods. If so, any ice record can be estimated without loss of accuracy using prior and subsequent discharges. The gravel bar developing upstream of the flume should be watched for further impact on the flume's performance. Removal and deepening of the stilling pool upstream of the flume is highly recommended. Levels need to be run again in the 2013 Water Year to confirm establishment of R.M. 4.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06729450 SOUTH BOULDER CREEK BELOW GROSS RESERVOIR

RATING TABLE-- STD25FTPF USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

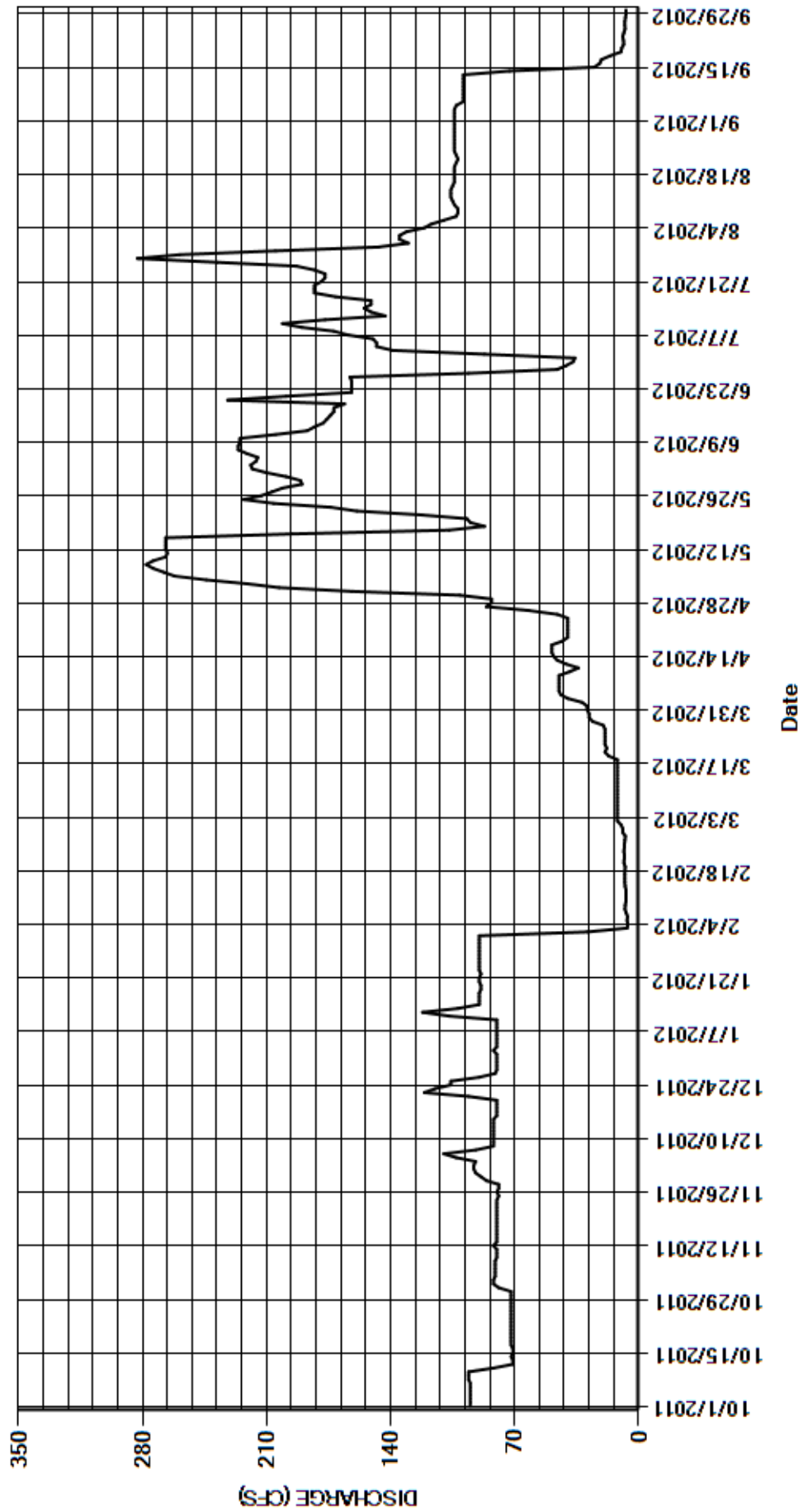
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	95	79	92	80	90	e10	29	162	210	36	135	104
2	95	82	93	82	29	e12	32	203	218	87	135	104
3	95	82	93	80	e6.5	e12	40	221	219	139	131	104
4	95	81	92	80	6.1	12	44	244	216	148	121	104
5	95	81	103	80	6.6	12	45	262	215	148	117	103
6	95	81	110	80	6.3	12	45	268	221	150	110	99
7	95	81	92	80	7.1	12	45	274	226	164	103	99
8	96	81	82	80	7.8	12	45	278	226	172	102	99
9	96	80	82	80	7.6	e12	45	274	225	190	102	99
10	96	80	82	80	7.2	12	39	267	225	201	104	99
11	82	80	82	107	7.2	12	34	266	205	177	105	99
12	71	82	82	122	7.2	12	41	267	187	143	106	99
13	71	80	82	102	7.2	12	46	267	183	151	106	99
14	72	80	82	90	7.7	12	48	267	178	155	106	73
15	71	80	82	90	7.8	12	49	267	176	151	105	25
16	71	80	80	90	7.8	12	49	196	174	151	104	22
17	72	80	80	90	7.8	12	49	107	172	171	104	21
18	72	80	80	89	7.8	12	43	87	172	183	104	16
19	72	80	80	89	7.6	17	40	95	166	183	104	10
20	72	80	80	90	8.3	19	40	97	232	183	104	9.6
21	72	80	96	90	8.2	18	40	123	199	179	103	8.4
22	72	80	121	89	8.0	19	40	159	162	177	102	8.6
23	72	80	115	90	8.4	19	40	174	162	177	103	9.0
24	72	80	106	90	8.1	19	40	206	162	183	104	8.4
25	72	79	106	90	8.0	19	46	223	162	193	104	7.7
26	72	80	90	90	7.8	19	62	213	163	238	104	7.8
27	72	79	81	90	e7.5	20	86	207	96	283	104	7.8
28	72	79	80	90	e9.0	26	83	201	46	259	104	7.5
29	72	86	80	90	e9.0	28	83	190	41	205	104	7.2
30	72	89	80	90	---	28	101	191	37	147	104	7.2
31	72	---	80	90	---	29	---	199	---	130	104	---
TOTAL	2471	2422	2766	2750	324.6	494	1469	6455	5276	5254	3348	1567.2
MEAN	79.7	80.7	89.2	88.7	11.2	15.9	49.0	208	176	169	108	52.2
AC-FT	4900	4800	5490	5450	644	980	2910	12800	10460	10420	6640	3110
MAX	96	89	121	122	90	29	101	278	232	283	135	104
MIN	71	79	80	80	6.1	10	29	87	37	36	102	7.2

CAL YR	2011	TOTAL	54513.9	MEAN	149	MAX	472	MIN	5.8	AC-FT	108100
WTR YR	2012	TOTAL	34596.8	MEAN	94.5	MAX	283	MIN	6.1	AC-FT	68620

MAX DISCH: 334 CFS AT 11:00 ON JUN 20,2012 GH 2.24 FT SHIFT -0.04 FT
 MAX GH: 2.24 FT AT 11:00 ON JUN 20,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06729450 SOUTH BOULDER CREEK BELOW GROSS RESERVOIR
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
SOUTH BOULDER CREEK DIVERSION NEAR ELDORADO SPRINGS

Water Year 2012

Location.-- Lat 39°55'58", long 105°18'29" (NAD 83), Boulder County. Gage is located on the right side of a 12 ft. Parshall flume at the entrance of the conduit connecting the South Boulder Creek Diversion to Ralston Reservoir.

Drainage Area and Period of Record.-- Controlled diversion, diverting water from South Boulder Creek to Ralston Reservoir.; Daily values are available from October 1, 1958 to September 30, 1961, and October 20, 1968 to present.

Equipment.-- Digital Incremental Sutron 56-0540-400-DTR shaft encoder connected to a Sutron SatLink2 Data Collection Platform (DCP) and a Stevens Type F weekly water-stage recorder in a timber shelter overtop a concrete stilling well at a 12 ft. Parshall flume. An electric tape gage located on the instrument shelf is the primary reference with supplemental outside staff. The facilities and water-stage recorder are owned, operated and maintained by Denver Water. Satellite monitoring equipment owned and gage operation is conducted by the Colorado Division of Water Resources.

Hydrologic Conditions.-- Controlled diversion. Diversion conveys water released from Gross Reservoir, about 3 miles upstream, to Ralston Reservoir for municipal uses. Water diverted through the diversion will include west slope water delivered to the So. Boulder Creek Basin via the Moffat Tunnel system. Accurate measurement at this gage is important to insure that the proper amount of water passes to the downstream users. As the gage is controlled at the diversion point as well as at Gross Reservoir flow patterns are stepwise. At times, a transitory peak can occur prior to a shut down as the canal is used to help drain the diversion pool.

Gage-Height Record.-- The primary record is 15-minute logged DCP data with telemetered data and chart record as backup. The record is complete and reliable. Zero flow is determined operationally in conjunction with Denver Water accounting spreadsheet. Residual gage-heights occurring during shut-down or startup of the canal were adjusted to zero. Instrument calibration was maintained by nine visits to the gage. Three instrument corrections ranging from -0.01 to +0.01 ft. were made this year. Instrument corrections were applied to the record as defined by visits made to the gage and operational events.

Datum Corrections.-- Levels were last run on March 16, 2012 using RM0 as base. The base reference (ETI) was found to be 0.016 ft. low. Although within allowable tolerances, a correction was made to tape length. The correction was not applied to the gage-heights of measurements nor was it applied to the record, but rather absorbed in the shifts. The supplemental reference was found to be 0.017 ft. low but was not corrected due to the mounting method used. RMs 3 and 4 were established on this date.

Rating.-- The control at all stages is a 12 ft. Parshall flume. A standard 12 ft. Parshall flume rating was continued this year. Positive shifts are often seen as there is little stilling provided upstream of the flume. A large timber is hung in the canal upstream of the flume to help dampen surging and dissipate energy. Vegetal growth in the flume will affect the magnitude of shifts and can become a large factor if the diversion runs for long periods of time. Five discharge measurements (Nos. 274-378) were made this year, ranging in discharge between 76.3 and 145 cfs. Discharge measurements made this year and two observations of no flow cover the range in stage experienced this year well with exception of May 3- 15, June 20 and July 26-29, 2012. The peak discharge of 273 cfs occurred at 12:00 on June 20, 2012 at a stage of 2.97 ft. using a stage distributed shift of +0.04 ft. exceeding this year's high measurement (No. 375) made May 1, 2012 by 0.98 ft. of stage and 128 cfs respectively.

Discharge.-- Shifting control method was used for all periods of record. Discharge was computed by direct application of the rating to the gage height record from October 1 through October 11, 2011. This shift application ignores the measurement made on October 6, 2012. This was done to provide continuity between the WY 2011 and WY 2012 records. From October 11, 2011 through the end of the water year shifts were distributed by stage using variable shift table BOCDELCOVST12-A. The variable shift table is defined by all measurements made this year and measurement No. 371 made in WY2011. Measurements made this year showed unadjusted shifts varying by stage from 0.02 to 0.04 ft. All measurements were given full weight except for No. 377 which was adjusted 0.90% to smooth the stage-shift distribution.

Special Computations.-- Zero flow is determined operationally in conjunction with Denver Water provided accounting. Residual gage-heights recorded after the diversion is shut off were adjusted to compute a zero discharge. Zero flow was determined to occur part of the day or the entire day on the following days: February 2-April 27, May 17-21, June 27-July 2 and September 14-October 1, 2012.

Remarks.-- The record is good. Station operated and maintained by Division One Hydrographic personnel; record developed by Matt Rusch.

Recommendations.-- Levels must be run in WY2013 to confirm establishment and stability of RMs 3 and 4; and to check on the adjustments made to the ETI gage and tape length in WY12.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

SOUTH BOULDER CREEK DIVERSION NEAR ELDORADO SPRINGS

RATING TABLE-- STD12FTPF USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

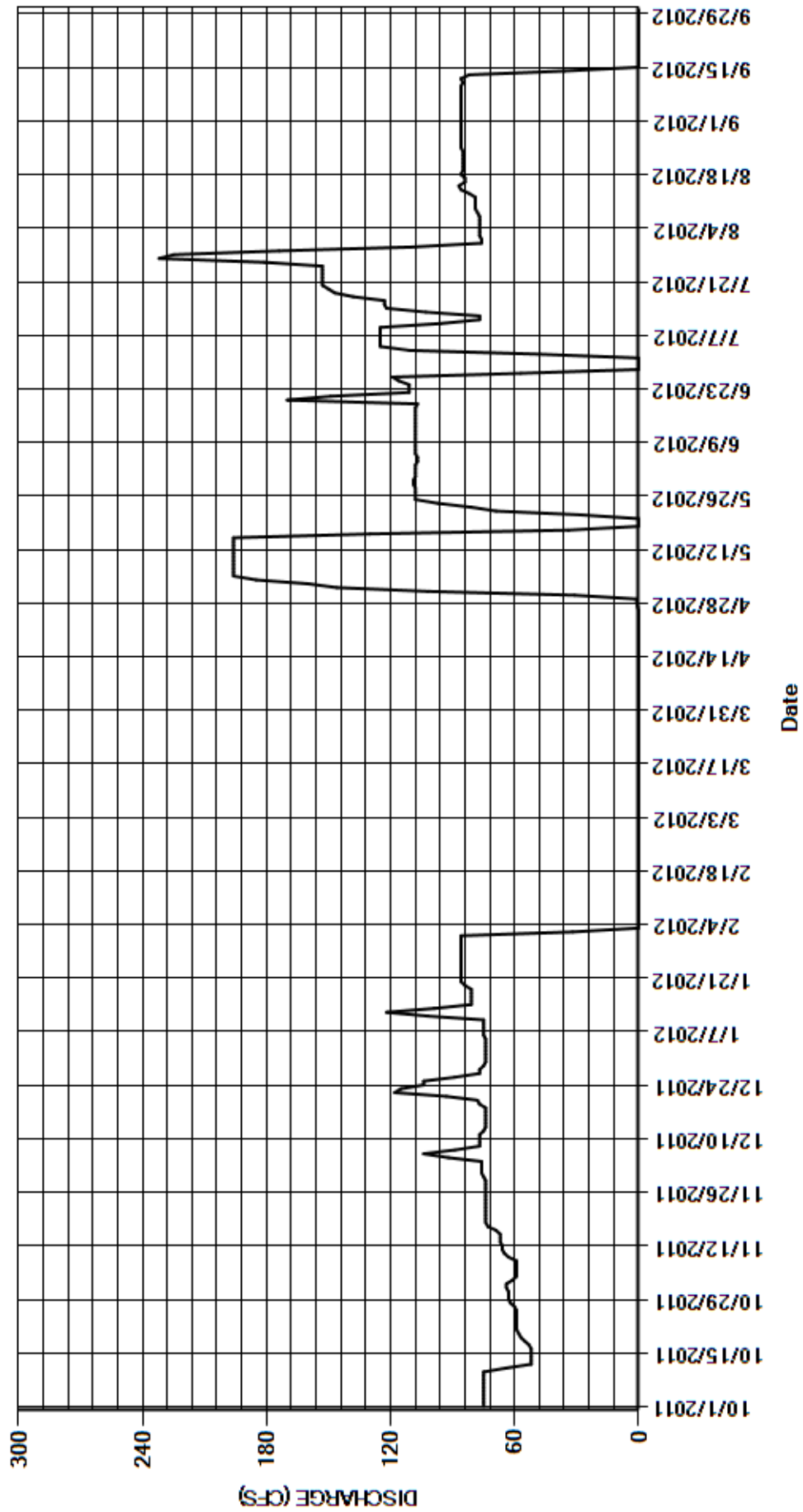
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	75	64	76	74	86	0.00	0.00	102	108	0.00	76	86
2	75	64	76	74	32	0.00	0.00	146	108	48	77	86
3	75	61	76	74	0.00	0.00	0.00	160	108	111	77	86
4	75	59	76	74	0.00	0.00	0.00	185	107	125	77	86
5	75	59	92	74	0.00	0.00	0.00	196	107	125	77	86
6	75	59	104	75	0.00	0.00	0.00	196	108	125	77	86
7	75	59	89	75	0.00	0.00	0.00	196	108	125	77	86
8	75	59	77	75	0.00	0.00	0.00	196	108	125	78	86
9	75	63	77	75	0.00	0.00	0.00	196	108	125	79	86
10	75	65	77	75	0.00	0.00	0.00	196	108	96	79	86
11	64	66	77	102	0.00	0.00	0.00	196	108	77	79	85
12	52	66	75	122	0.00	0.00	0.00	196	108	77	79	86
13	52	67	74	99	0.00	0.00	0.00	196	108	103	82	82
14	52	67	74	81	0.00	0.00	0.00	196	108	122	86	36
15	52	67	74	81	0.00	0.00	0.00	196	108	123	87	0.00
16	52	69	74	81	0.00	0.00	0.00	130	108	123	84	0.00
17	53	73	74	81	0.00	0.00	0.00	34	108	138	84	0.00
18	55	74	74	81	0.00	0.00	0.00	0.00	108	147	86	0.00
19	57	74	77	84	0.00	0.00	0.00	0.00	107	150	85	0.00
20	58	74	78	86	0.00	0.00	0.00	0.00	170	153	85	0.00
21	59	74	93	86	0.00	0.00	0.00	28	149	153	85	0.00
22	59	74	118	86	0.00	0.00	0.00	69	111	153	85	0.00
23	59	74	115	86	0.00	0.00	0.00	81	111	153	85	0.00
24	59	74	104	86	0.00	0.00	0.00	97	111	153	85	0.00
25	59	74	104	86	0.00	0.00	0.00	108	116	153	86	0.00
26	59	74	89	86	0.00	0.00	0.00	108	119	181	86	0.00
27	60	74	77	86	0.00	0.00	0.51	108	57	232	86	0.00
28	62	74	77	86	0.00	0.00	0.96	108	0.00	225	86	0.00
29	63	74	75	86	0.00	0.00	0.99	109	0.00	174	86	0.00
30	63	75	74	86	---	0.00	31	109	0.00	110	86	0.00
31	63	---	74	86	---	0.00	---	108	---	76	86	---
TOTAL	1962	2050	2571	2589	118.00	0.00	33.46	3946.00	2993.00	3981.00	2553	1149.00
MEAN	63.3	68.3	82.9	83.5	4.07	0.000	1.12	127	99.8	128	82.4	38.3
AC-FT	3890	4070	5100	5140	234	0	66	7830	5940	7900	5060	2280
MAX	75	75	118	122	86	0.00	31	196	170	232	87	86
MIN	52	59	74	74	0.00	0.00	0.00	0.00	0.00	0.00	76	0.00

CAL YR	2011	TOTAL	30429.83	MEAN	83.4	MAX	160	MIN	0.00	AC-FT	60360
WTR YR	2012	TOTAL	23945.46	MEAN	65.4	MAX	232	MIN	0.00	AC-FT	47500

MAX DISCH: 273 CFS AT 12:00 ON JUN 20,2012 GH 2.97 FT SHIFT 0.04 FT
 MAX GH: 2.97 FT AT 12:00 ON JUN 20,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

**SOUTH BOULDER CREEK DIVERSION NEAR EL DORADO SPRINGS
WY2012 HYDROGRAPH**



PLATTE RIVER BASIN
SOUTH BOULDER CREEK NEAR ELDORADO SPRINGS

Water Year 2012

Location.-- Lat. N39° 55' 58.52", Long. W105° 18' 18.91" (NAD83) in Boulder County, CO. Gage is located on the left side of a placed boulder cross-vane control structure 1.25 miles upstream from the previous gage location, 0.5 miles downstream from the South Boulder Creek Diversion Near Eldorado Springs, CO (BOSDELCO) stream gage or approximately 6 miles southwest of Boulder, CO and approximately 4 miles downstream of Gross Reservoir.

Drainage Area and Period of Record.-- 107 sq mi (USGS Colorado StreamStats utility). ; Daily record is available from 10/1/1896 to present.

Equipment.-- Sutron Constant Flow Bubbler (CFB) stage sensor and temperature sensor connected to a Sutron SatLink2 DCP in a 5 ft. by 5 ft. timber shelter at a placed boulder cross-vane control structure. A cantilever style chain gage located 15-ft. downstream of the shelter (overtop the CFB's orifice line) serves as the primary reference with no provision for a supplemental reference. A bank operated cableway is located 10 ft. downstream from the shelter.

Hydrologic Conditions.-- The drainage area is heavily forested terrain of varying topography. Stream is heavily regulated upstream of the gage since May 1, 1955. Moffat Tunnel, a transmountain diversion owned and operated by Denver Water intersects South Boulder Creek just after day lighting near Rollinsville, CO. Gross Reservoir (capacity 43,060 AF), an on-channel reservoir owned and operated by Denver Water intercepts and regulates all South Boulder Creek and tributary flows upstream of this gage. Releases made from Gross Reservoir (including spilled water) are recorded at the South Boulder Creek Below Gross Reservoir (BOCBGRCO) gage. Released water can then be subsequently diverted via the South Boulder Creek Diversion Near Eldorado Springs, CO (BOSDELCO) gage which routes water to Ralston Reservoir. The BOCBGRCO and BOSDELCO gages are both owned and operated by Denver Water. The channel is straight for approximately 200-ft. upstream and 300-ft. downstream of the gage. There is about 15 sq mi of drainage between Gross Reservoir and the gage. During conditions when there is low snow melting or storm runoff, significant flows can be seen at the gage when Gross release has been curtailed to minimum. The control will regulate flows at all anticipated stages.

Gage-Height Record.-- The primary record is 15-minute satellite data with 15-minute CFB log data as backup. The record is complete and reliable, except for January 17, 28 and February 2 through March 5, 2012 when the stage-discharge relation was affected by ice and March 16 when the control was being repaired. Instrument calibration was maintained by frequent visits to the gage by DWR staff. Two instrument calibration corrections of -0.01 ft and +0.01 ft were made and applied to the record as defined by visits made to the gage.

Datum Corrections.-- Levels were last run on December, 21, 2012 using RM 1 as base. The base reference was found to be within allowable tolerances. RM3 could not be located and is thought to have been buried during road construction sometime during the winter of 2011. Likewise, the boulder that RM4 is set into shifted stream-ward during road construction and was re-indexed after levels were last shot.

Rating.-- The control is a placed boulder cross-vane structure, established December 10, 2010. Rating BOCEL2CO01 subsequently renamed BOCELSCO24 was developed during the 2010 Water Year by correlating average day gage-height data recorded at the present gage location against average day discharge values computed at the old site during periods of stable flow when both gages were operating. BOCELSCO24 was used for the entire 2012 Water Year. Eighteen discharge measurements (Nos. 523-541) were made this year ranging in discharge from 6.60 to 121 cfs covering the range in stage experienced this year well. The peak flow of 135 cfs occurred at 1015 on June 10, 2012 at a gage-height of 2.93 ft. with a shift of -0.09 ft. It exceeded this year's high flow Measurement (No. 533) made June 8, 2012 by 0.07 ft. of stage.

Discharge.-- Shifting control method was use for all periods of open record. Shifts are caused by accumulation of debris and material above the control. Shifts were mainly applied by time as defined by measurements. Stage dependent shifting was used from March 16, 2012 through June 8, 2012 using variable shift table BOCELSCOVST12-1 defined by measurement Nos. 529-533 made during the period of use. From June 8 to September 28, 2012 stage dependent shifting using variable shift table BOCELSCOVST12-A was applied. It is defined by measurement Nos. 533- 539 and 541 made during the period of use. Measurement No. 540 was deemed unreliable and not used. Open water measurements showed unadjusted shifts varying between -0.09 and -0.03 ft. All were given full weight except for Nos. 531, 534 and 535 which were discounted 5.0, 3.49 and -5.62 percent, respectively.

Special Computations.-- Discharge during periods of backwater due to ice were estimated on a basis of mass balance calculations and discharge measurements made during the periods. Because the channel is heavily regulated upstream of this point, the record can be determined within fair accuracy by mass balancing the release from Gross Reservoir minus diversions via the South Boulder Creek Diversion. Reasonable consistency is seen before and after periods of good record validating this methodology. The construction to repair the control on March 16, 2012 caused a rise in gage-height and a pooling effect behind the equipment. The gage-height record has been adjusted during the period of construction and discharge has been corrected to calculate with consideration to the mass balance.

Remarks.-- The record is good, except for periods when the stage-discharge relation was affected by ice which is estimated and fair and March 16, 2012 which is downgraded to fair due to disturbances caused by the construction equipment. Station maintained and record developed by Division One Hydrographic staff.

Recommendations.-- The control was repaired March 16, 2012 and seems to be stable, but care should be taken to monitor its condition. A new rating should be considered in WY2013 as shifts consistently plot to the left of the current rating. Trimming the banks of willows will help with high water measurements, as they encroach on the section. Levels should be run again in the WY2013 to track stability of newly established reference marks.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

SOUTH BOULDER CREEK NEAR ELDORADO SPRINGS

RATING TABLE.-- BOCEL2CO01 USED FROM 01-OCT-2011 TO 06-OCT-2011
 BOCELSCO24 USED FROM 06-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

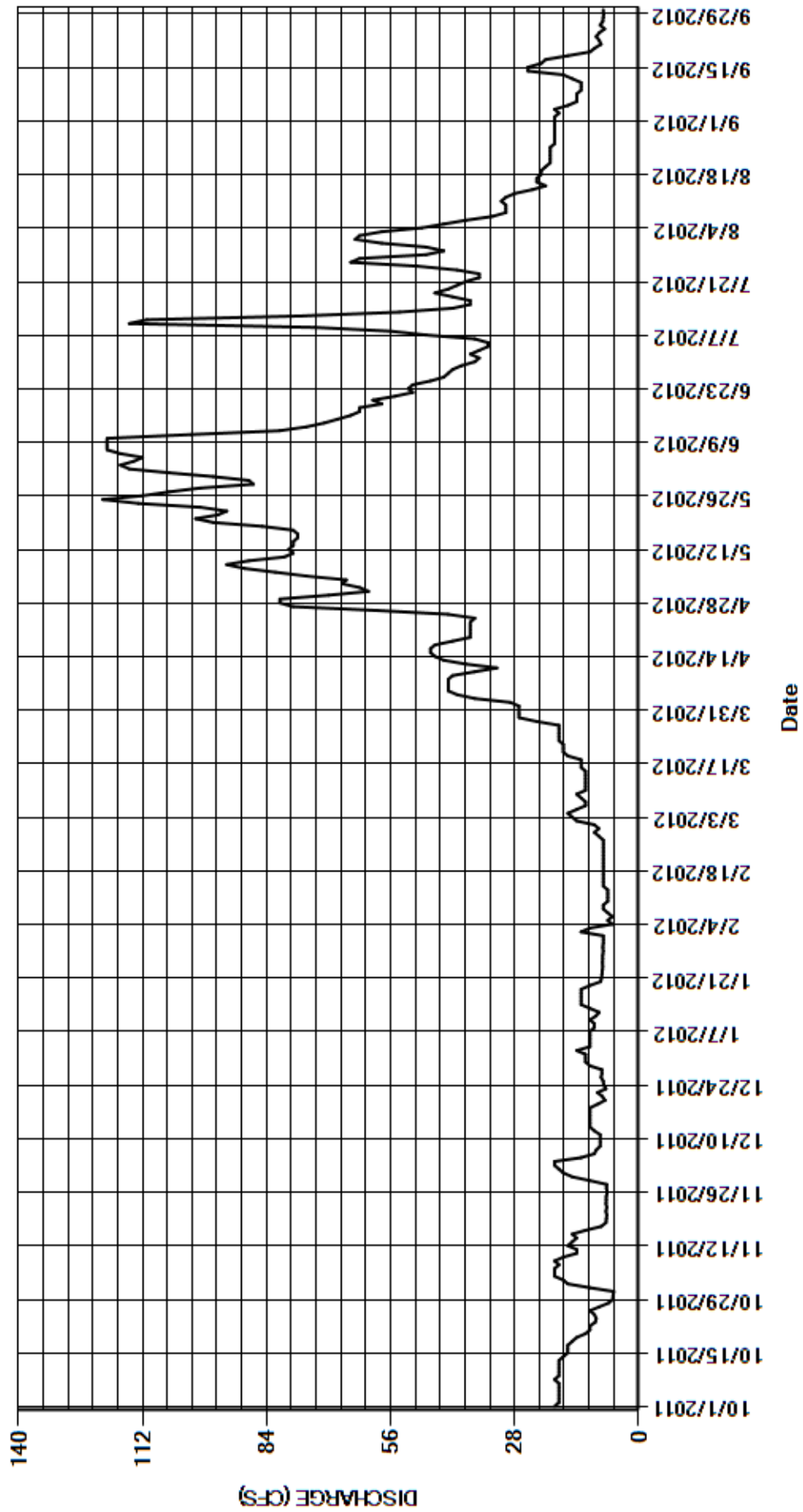
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	19	11	17	12	8.0	e10	27	61	106	36	64	19
2	18	16	18	14	e13	e14	29	63	115	38	63	19
3	18	17	19	11	e11	e15	37	67	117	36	58	18
4	18	19	19	11	e6.0	e16	41	66	114	34	49	19
5	18	19	13	11	e7.0	e14	43	75	112	34	44	16
6	18	19	10	11	e6.0	12	43	82	117	37	39	14
7	18	18	9.6	11	e7.0	12	43	89	120	48	33	14
8	19	19	8.7	10	e8.0	e13	43	93	120	56	30	14
9	18	17	8.7	10	e8.0	e14	42	88	120	73	30	13
10	18	14	8.7	11	e7.0	12	37	80	120	115	30	13
11	18	14	8.7	9.7	e7.0	12	32	78	101	111	31	13
12	18	16	10	8.9	e7.0	12	39	79	81	76	30	15
13	18	15	11	11	e7.0	12	44	78	75	54	28	17
14	17	14	11	13	e8.0	12	46	78	71	42	24	25
15	16	15	11	13	e8.0	12	47	77	68	38	21	25
16	16	12	11	13	e8.0	e13	47	77	65	38	23	22
17	16	8.5	11	e13	e8.0	13	46	78	63	42	23	21
18	15	7.4	11	13	e8.0	13	42	85	63	46	22	16
19	14	7.3	9.2	11	e8.0	16	38	96	58	43	22	11
20	12	7.2	7.6	8.6	e8.0	17	38	100	60	41	21	9.9
21	11	7.4	8.2	8.4	e8.0	17	38	95	55	39	20	8.5
22	11	7.2	9.3	8.3	e8.0	17	38	93	51	36	20	8.9
23	9.8	7.4	7.4	8.2	e8.0	18	38	99	52	36	20	9.6
24	9.6	7.3	7.9	8.1	e8.0	18	37	113	51	41	20	8.9
25	10	7.3	8.0	8.2	e8.0	18	43	121	47	50	20	7.7
26	11	7.1	8.5	8.1	e8.0	18	59	112	44	65	19	8.7
27	8.9	7.3	8.3	8.1	e9.0	18	78	106	43	63	19	8.1
28	6.8	7.2	8.3	e8.0	e10	23	81	99	42	48	19	8.0
29	5.8	11	11	8.1	e9.0	27	81	87	40	44	19	7.9
30	5.8	15	12	8.0	---	27	70	88	37	48	19	8.0
31	5.6	---	12	8.0	---	27	---	96	---	58	19	---
TOTAL	437.3	369.6	334.1	315.7	234.0	492	1367	2699	2328	1566	899	418.2
MEAN	14.1	12.3	10.8	10.2	8.07	15.9	45.6	87.1	77.6	50.5	29.0	13.9
AC-FT	867	733	663	626	464	976	2710	5350	4620	3110	1780	829
MAX	19	19	19	14	13	27	81	121	120	115	64	25
MIN	5.6	7.1	7.4	8.0	6.0	10	27	61	37	34	19	7.7

CAL YR	2011	TOTAL	24202.0	MEAN	66.3	MAX	392	MIN	5.0	AC-FT	48000
WTR YR	2012	TOTAL	11459.9	MEAN	31.3	MAX	121	MIN	5.6	AC-FT	22730

MAX DISCH: 135 CFS AT 10:15 ON JUL 10,2012 GH 2.93 FT SHIFT -0.09 FT
 MAX GH: 2.93 FT AT 10:15 ON JUL 10,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

**SOUTH BOULDER CREEK NEAR ELDORADO SPRINGS
WY2012 HYDROGRAPH**



PLATTE RIVER BASIN
06730300 COAL CREEK NEAR PLAINVIEW
Water Year 2012

Location.-- Lat. N.39°52'40", Long. W105°16'39" (NAD83). Gage is on the left bank of Coal Creek approximately 100 ft. upstream from a bridge on State Highway 72, 1.2 miles south of Plainview, CO or 6.5 miles southwest of the Gross Reservoir dam and 9 miles north of Golden, CO.

Drainage Area and Period of Record.-- 15.1 mi² (USGS Colorado StreamStats utility). ; 1959 to present.

Equipment.-- Digital incremental shaft encoder connected to a Sutron SatLink Data Collection Platform (DCP) and a graphic water-stage recorder in a 42-inch corrugated metal pipe shelter adjacent to a grouted boulder control. A metal drop table and adjustable reference point (RP) server as the base reference with a supplemental cantilever style chain gage. The control is constructed with a pipe through the control to allow for bucket measurement during low flow conditions. The pipe is plugged when measurement by bucket is not occurring.

Hydrologic Conditions.-- Drainage area consists mainly of forested mountainous terrain. The gage is located at the mouth of Coal Creek Canyon which has several small developments along the banks of Coal Creek. Gage is subject to rapid increases in stage resulting from rain events and runoff from hardened areas through the canyon. The channel is straight for approximately 100 feet upstream and approximately 100 feet downstream of the station. The stream is constrained to one channel at all stages. During high flows, small cobble and gravel migrate through the channel, causing approach condition changes.

Gage-Height Record.-- The primary record is 15-minute telemetered data with 15-minute logged DCP data and chart record as backup. The record is complete and reliable, except for: December 1-7, 15-25, 2011 and January 1 through March 8, 2012 when the stage-discharge relationship was affected by ice or the stilling well was frozen. Negative gage-height values are seen during periods of no flow, allowing the stilling well to drain. Once the channel is dry, the well will empty completely. These are real values that correspond to actual flow or dry conditions so values have not been zeroed out. Three 15 min values were missed on April 11, 2012 and filled from adjacent record without loss of accuracy. Two instrument calibration corrections were applied to the record as defined by visits made to the gage.

Datum Corrections.-- Levels were last run on September 1, 2011 using RM 4 as base. No correction was necessary at that time. RM's 1 and 5 did not close within allowable tolerances. Shot distance and shot obstruction were contributing factors.

Rating.-- The control is a rock and concrete dam eleven feet below the gage. Rating Number 10, developed in WY2010, was used the entire year. It is defined by measurements from 0.01 to 62 cfs. Seven measurements (Nos. 917 – 923) were made this water year ranging in discharge from 0.04 to 5.39 cfs. The peak discharge of 6.54 cfs occurred at 19:15 on April 4, 2012 at a gage height of 0.75 ft with a shift of -0.02 ft. exceeding this year's high measurement (No. 920) made on April 5, 2012 by 1.15 cfs and 0.05 ft. of stage respectively

Discharge.-- Shifting control method was used all year. Shifts are principally caused by the accumulation of material on the control or in the gage pool. Shifts were applied by time as defined by measurements. Open water measurements showed unadjusted shifts ranging from -0.02 to 0.02 feet. All measurements were given full weight.

Special Computations.-- Discharges for periods of ice effect and the frozen stilling were estimated from adjacent periods of good record with consideration of temperature trends and measurements made during the affected periods.

Remarks.-- The record is good except for December 1-7, 15-25, 2011 and January 1 through March 8, 2012 which are estimated and poor. Station maintained and record developed by Patrick Tyler.

Recommendations.-- High water measurements should be pursued, as most of the year's flow will occur during the peak event periods. Channel conditions should be noted with every visit, as this gage is susceptible to filling in with gravel and cobble. A cleanout is recommended every 3 to 5 years. Levels should be run again this coming water year. PZF on the control should be verified, and the MSL elevation from the temporary RM established by the 2008 pipeline contractor should be transferred to one of our RM's.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06730300 COAL CREEK NEAR PLAINVIEW

RATING TABLE-- COCREPCO10 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

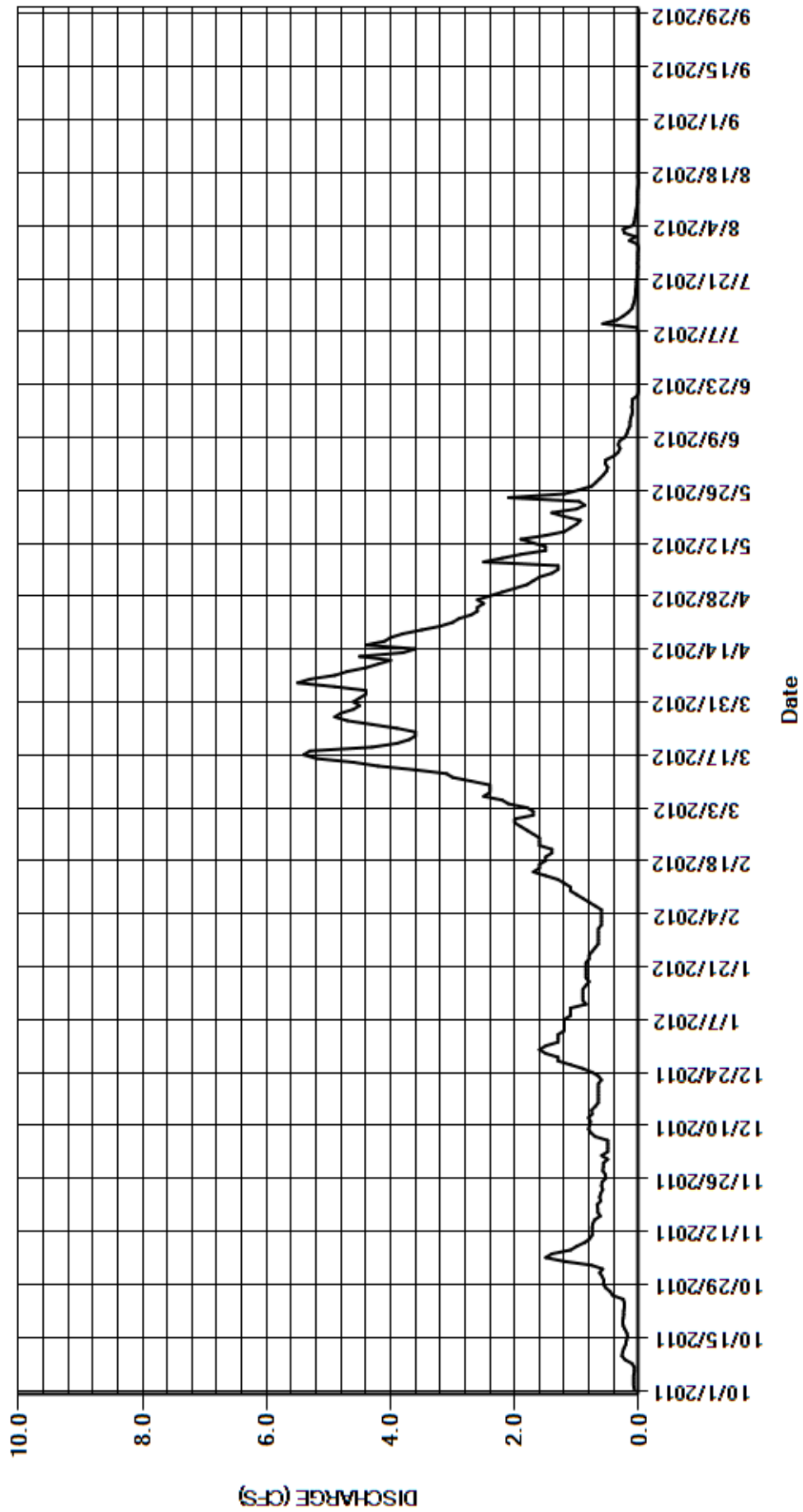
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.07	0.63	e0.50	e1.3	e0.60	e1.7	4.5	1.8	0.50	0.00	0.05	0.00
2	0.08	0.58	e0.60	e1.3	e0.60	e1.7	4.4	1.7	0.54	0.00	0.23	0.00
3	0.08	0.76	e0.50	e1.3	e0.60	e1.8	4.4	1.6	0.53	0.00	0.25	0.00
4	0.08	1.2	e0.50	e1.2	e0.60	e2.1	4.9	1.4	0.40	0.00	0.09	0.00
5	0.08	1.5	e0.50	e1.2	e0.60	e2.2	5.5	1.3	0.33	0.00	0.07	0.00
6	0.07	1.4	e0.50	e1.2	e0.70	e2.5	5.3	1.3	0.30	0.00	0.06	0.00
7	0.07	1.1	e0.70	e1.2	e0.80	e2.4	4.9	2.5	0.33	0.01	0.05	0.00
8	0.11	1.0	0.77	e1.1	e0.90	e2.4	4.7	2.2	0.31	0.03	0.04	0.00
9	0.22	0.87	0.81	e1.1	e1.0	2.4	4.4	1.9	0.22	0.58	0.03	0.00
10	0.27	0.79	0.79	e1.1	e1.1	2.7	4.2	1.5	0.19	0.35	0.02	0.00
11	0.26	0.75	0.78	e0.85	e1.1	3.0	4.0	1.5	0.17	0.25	0.02	0.00
12	0.24	0.75	0.81	e0.90	e1.2	3.1	4.5	1.7	0.14	0.17	0.02	0.00
13	0.21	0.75	0.75	e0.90	e1.3	3.6	3.8	1.9	0.14	0.11	0.02	0.00
14	0.20	0.74	0.76	e0.90	e1.5	4.2	3.6	1.5	0.13	0.09	0.01	0.00
15	0.18	0.71	e0.70	e0.90	e1.7	4.6	4.4	1.2	0.11	0.07	0.00	0.00
16	0.19	0.62	e0.65	e0.85	e1.6	5.2	4.1	1.1	0.10	0.06	0.00	0.00
17	0.22	0.66	e0.65	e0.80	e1.6	5.4	4.0	1.0	0.11	0.05	0.01	0.00
18	0.25	0.66	e0.65	e0.85	e1.5	5.3	3.8	0.94	0.10	0.05	0.00	0.00
19	0.26	0.67	e0.65	e0.85	e1.5	4.3	3.5	1.2	0.10	0.04	0.00	0.00
20	0.25	0.61	e0.65	e0.85	e1.4	3.9	3.2	1.4	0.02	0.04	0.00	0.00
21	0.24	0.63	e0.65	e0.85	e1.4	3.7	3.0	1.0	0.00	0.03	0.00	0.00
22	0.24	0.61	e0.60	e0.85	e1.6	3.6	2.9	0.87	0.00	0.02	0.00	0.00
23	0.23	0.58	e0.65	e0.80	e1.6	3.6	2.7	0.96	0.00	0.02	0.00	0.00
24	0.23	0.60	e0.75	e0.80	e1.6	3.9	2.6	2.1	0.00	0.01	0.00	0.00
25	0.25	0.59	e0.90	e0.75	e1.7	4.3	2.6	1.2	0.00	0.02	0.00	0.00
26	0.42	0.53	1.1	e0.70	e1.8	4.7	2.5	0.97	0.00	0.01	0.00	0.00
27	0.46	0.54	1.3	e0.65	e1.9	4.9	2.6	0.76	0.00	0.01	0.00	0.00
28	0.53	0.58	1.3	e0.65	e2.0	4.8	2.4	0.69	0.00	0.01	0.00	0.00
29	0.57	0.57	1.5	e0.65	e2.0	4.6	2.2	0.63	0.00	0.00	0.00	0.00
30	0.56	0.57	1.6	e0.65	---	4.5	2.0	0.57	0.00	0.02	0.00	0.00
31	0.59	---	1.5	e0.65	---	4.6	---	0.52	---	0.15	0.00	---
TOTAL	7.71	22.55	25.07	28.65	37.50	111.7	111.6	40.91	4.77	2.20	0.97	0.00
MEAN	0.25	0.75	0.81	0.92	1.29	3.60	3.72	1.32	0.16	0.071	0.031	0.000
AC-FT	15	45	50	57	74	222	221	81	9.5	4.4	1.9	0
MAX	0.59	1.5	1.6	1.3	2.0	5.4	5.5	2.5	0.54	0.58	0.25	0.00
MIN	0.07	0.53	0.50	0.65	0.60	1.7	2.0	0.52	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	741.49	MEAN	2.03	MAX	29	MIN	0.02	AC-FT	1470
WTR YR	2012	TOTAL	393.63	MEAN	1.08	MAX	5.5	MIN	0.00	AC-FT	781

MAX DISCH: 6.54 CFS AT 19:15 ON APR 04,2012 GH 0.75 FT SHIFT -0.02 FT
 MAX GH: 0.75 FT AT 19:15 ON APR 04,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06730300 COAL CREEK NEAR PLAINVIEW
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06731000 SAINT VRAIN CREEK AT MOUTH NEAR PLATTEVILLE, CO
Water Year 2012

Location.-- Lat. N40°15'28.88"; Long. W104°52'47.16' (NAD83), Hydrologic Unit 10190005, Weld County, CO. Gage is located on the right bank of the channel 125 ft. downstream of Weld County Road 19.5, 1.3 mi. from the confluence with the South Platte River, 1 mi. north of the Fort Saint Vrain power plant and 4 mi. northwest of Platteville, CO.

Drainage Area and Period of Record.-- 979 mi² (USGS Colorado StreamStats utility).; Daily values are available from February 24, 1927 to present.

Equipment.-- High data rate Sutron 8210 DCP and Sutron 8500 shaft encoder until November 3, 2010. From November 3, 2010 to March 14, 2012, digital incremental Sutron 56-0540-400-DTR shaft encoder connected to a Sutron SatLink2 Data Collection Platform (DCP). A Steven's Type A continuous graphic water-stage recorder was removed March 14, 2012 and equipment was upgraded to a digital incremental Sutron SDR-0001-1 shaft encoder connected to the Sutron SatLink2 DCP, transmitting hourly in a 54-inch metal pipe shelter. September 4, 2012 a Constant Flow Bubbler was also installed in the shelter.

Hydrologic Conditions.-- Gage is below the confluence of the Saint Vrain Creek and Boulder Creek. Flows are heavily regulated upstream by numerous diversions from and deliveries to the creek including transbasin delivers via the Colorado-Big Thompson (C-BT) project. Channel control at all stages, substrate is composed primarily of sands and clays and is subject to fill and scour. The upstream bridge affects flows at all stages and has fostered the development of a sand bar at the gage location.

Gage-Height Record.-- The primary record is 15-minute satellite data with 15-minute logged DCP data and a partial year of chart record as backup. Instrument calibration was maintained by twenty-four visits to the gage. Two instrument corrections ranging from -0.01 to +0.01 ft were required and applied to the record as defined by visits made to the gage. Two flush corrections ranging from -0.02 to +0.01 ft occurred this year. They were applied back to the last measurement prior to the flush correction. The record is complete and reliable except for: May, 2-4, 2012, June 7-8, 15, 19-28, 2012, August 28- September 7, 2012, when low stage values were affected by the SDR float beaching. These periods are estimated and rated fair to poor depending on the duration of affected gage-height. The Constant Flow Bubbler (CFB), installed September 4, 2012 was not used in determining the small period of estimated stage as it was not reliable in tracking stage in comparison to unaffected SDR stage values due to scouring and deposition of sand in the days after it was installed. Missing gage-height values occurring on July 1- 2, 2012, and September 4, 2012 at 13:45- 14:15 were filled in with logged DCP record without loss of accuracy. Missing gage-height values occurring on March 14, 2012, June 25, 2012, and September 4, 2012 at 14:00- 14:30 were interpolated without loss of accuracy.

Datum Corrections.-- Levels were run on August 25, 2011 using RM3 as base. The ETG index elevation was found to be 0.012 ft. low. No corrections were made to the index or the gage-heights of measurements.

Rating.-- Channel control at all stages. Rating SVCPLACO30, defined by measurements from 33 to 2180 cfs was continued this year. The channel has well defined banks. Primarily composed of sands, silts and clays; the channel is subject to considerable fill and scour. The bridge above the gage straightens flow and causes sand bars at the gage and downstream from the center pier. Nineteen discharge measurements (Nos. 981-999) were made during the year ranging in discharge from 62-833 cfs covering the range in stage well. Low daily flows not covered by this year's measurements occur on days in which the gage-height record is estimated due to the SDR float beaching (May 2-3, 2012, June 19-21, 24-28, 2012, and August 28-September 5, 2012). The peak flow of 1020 cfs occurred at 1530 July 8, 2012 at a gage height of 5.39 ft. with a shift of +0.18 ft. The peak exceeded high flow Measurement No. 993 made July 8, 2012 by 187 cfs and 0.57 ft. of stage.

Discharge.-- Shifting control method was used for all periods of open water. Shifts are caused by fill and scour of the channel and are typically event driven. The left bank across from the gage is continually being eroded by high flows. Shifts were prorated by time from the beginning of the WY up to Measurement 986 on Feb 14, 2012. Shifts were then distributed by stage using two variable shift tables (SVCPLACOVST12-C and SVCPLACOVST12-D) through the beginning of WY13, October 1, 2012, Measurement 1000. This year's measurements showed shifts varying from -0.02 to +0.45 ft. All were given full weight except for Nos. 985, 994, and 998 which were discounted up to ±2.24% to smooth shift distributions.

Special Computations.-- Discharge periods when the SDR float was beaching in the stilling well were estimated on a basis of adjacent good record.

Remarks.-- The record is good, except for the periods when the SDR float was beaching, these periods are estimated and rated fair or poor depending on duration. May 2- 4, 2012, August 28- September 6, 2012, and June 19- 28, 2012, are rated poor due to four or more hours of incorrect gage-height data caused by beaching of the float. June 8, 15, 2012, and September 7, 2012 are rated fair due to intermittent short periods of incorrect gage-height data caused by beaching of the float amounting to less than four hours per day. Station maintained by Patrick Tyler and record developed by Matt Rusch.

Recommendations.-- More measurements would be desirable especially at higher stages (above 3.00 feet of stage). The continuous growth of the sand-bar just below the bridge has detrimental affects to high-flow measurements. Steps should be taken to ensure trees do not become established on the sand-bar. Identify the high water controlling feature.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06731000 SAINT VRAIN CREEK AT MOUTH NEAR PLATTEVILLE, CO

RATING TABLE-- SVCPLACO030 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

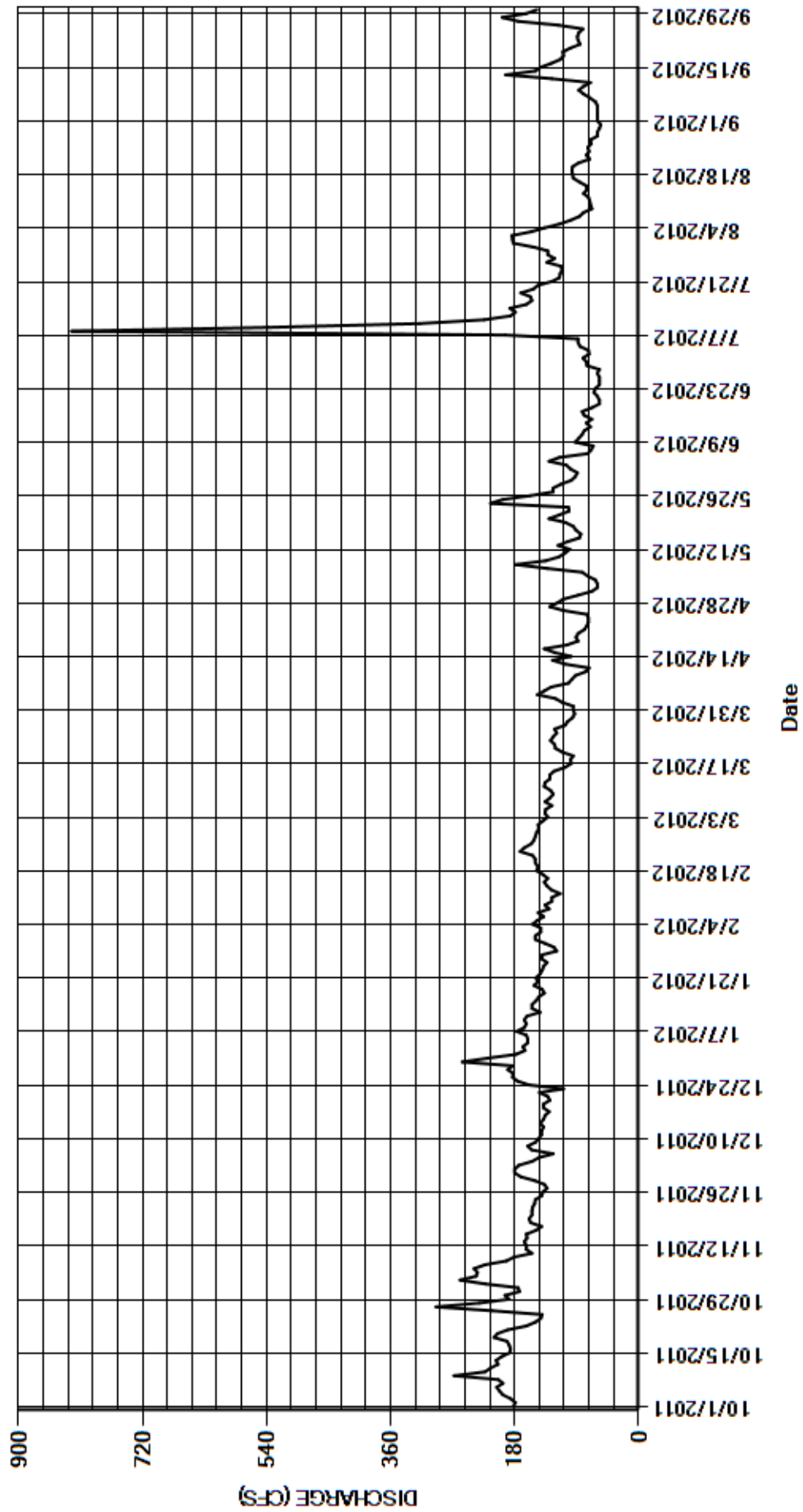
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	182	175	180	178	150	146	95	68	89	81	183	e60
2	179	223	180	165	142	139	111	e60	99	72	184	e60
3	186	259	174	168	142	132	121	e60	105	73	156	e60
4	197	236	155	161	154	136	147	e63	130	85	137	e60
5	202	234	145	161	147	135	137	74	115	88	115	e60
6	206	239	124	163	138	126	127	82	74	88	99	e63
7	197	223	155	177	146	136	102	133	69	194	86	71
8	204	192	161	166	130	129	97	178	66	823	80	80
9	268	181	150	163	136	124	92	135	92	538	68	87
10	223	155	145	166	126	128	77	116	87	318	70	80
11	215	163	141	162	126	137	72	107	82	224	71	70
12	204	163	141	143	114	136	107	100	79	186	73	126
13	207	166	138	155	127	129	125	117	70	179	80	193
14	199	162	143	155	133	129	98	103	76	187	75	150
15	187	163	138	149	137	123	122	86	68	163	76	142
16	186	149	136	145	132	107	137	84	79	155	86	127
17	188	141	130	137	139	98	104	91	82	157	95	114
18	191	157	138	140	148	99	88	95	68	171	96	109
19	210	159	138	152	146	95	91	106	e57	153	97	110
20	205	155	129	146	150	111	88	130	e57	146	96	99
21	190	155	132	149	150	121	79	115	e60	126	87	85
22	163	154	144	143	154	122	75	101	e65	115	71	88
23	150	151	109	140	172	128	73	102	e63	114	76	89
24	142	150	159	138	166	124	73	215	e57	111	72	87
25	140	141	176	133	156	119	75	197	e57	113	74	81
26	213	139	183	141	152	122	109	158	e57	133	69	117
27	294	133	182	140	150	107	129	124	e60	122	70	175
28	231	137	190	119	148	103	118	124	e57	132	e60	198
29	188	151	183	123	145	96	109	113	75	132	e60	164
30	194	171	256	136	---	93	88	98	76	153	e57	148
31	173	---	219	150	---	95	---	92	---	182	e55	---
TOTAL	6114	5177	4874	4664	4156	3725	3066	3427	2271	5514	2774	3153
MEAN	197	173	157	150	143	120	102	111	75.7	178	89.5	105
AC-FT	12130	10270	9670	9250	8240	7390	6080	6800	4500	10940	5500	6250
MAX	294	259	256	178	172	146	147	215	130	823	184	198
MIN	140	133	109	119	114	93	72	60	57	72	55	60

CAL YR	2011	TOTAL	108511	MEAN	297	MAX	1980	MIN	61	AC-FT	215200
WTR YR	2012	TOTAL	48915	MEAN	134	MAX	823	MIN	55	AC-FT	97020

MAX DISCH: 1020 CFS AT 15:30 ON JUL 08,2012 GH 5.39 FT SHIFT 0.01 FT
 MAX GH: 5.39 FT AT 15:30 ON JUL 08,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06731000 SAINT VRAIN CREEK AT MOUTH NEAR PLATTEVILLE, CO
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
WIND RIVER BYPASS
Water Year 2012

Location.--	Lat. N40° 19' 41.47", Long. W105° 34' 35.86" (NAD83). Gage is located on the left side of a 3-foot Cipolletti weir below the Alva B. Adams Tunnel East Portal afterbay approximately 4.9 mi. southwest of the Town of Estes Park Visitors Center.
Drainage Area and Period of Record.--	4.35 sq mi (USGS Colorado StreamStats utility). Drainage area consists of forested lands of varying topography within the boundaries of Rocky Mountain National Park; Daily data available from October 1, 2000 to present.
Equipment.--	Sutron SDR-0001-1 shaft encoder in a steel corrugated metal pipe (CMP) shelter and stilling well at a 3-foot Cipolletti weir. A metal drop tape and nonadjustable reference point serve as the primary reference; a supplemental staff gage is placed in the stilling pool adjacent to the shelter. A buried data line connects the shaft encoder to a Sutron SatLink2 data collection platform at the Alva B. Adam's Tunnel at East Portal (ADATUNCO) gage shelter. The gage is operated in cooperation with the United States Bureau of Reclamation (USBR) and the Colorado Division of Water Resources (CDWR) as a component of the Colorado Big Thompson (C-BT) system.
Hydrologic Conditions.--	Drainage area consists of forested lands of varying topography within the boundaries of Rocky Mountain Nation Park. A small diversion upstream of the WINDESCO gages diverts approximately 300 Acre Feet (AF) of domestic water a year. A gated pipeline below the WINDESCO gage can convey water undiminished under the Adam's Tunnel afterbay / Aspen Creek Siphon facility. The WINBYPCO gage sits below the terminus of this pipeline. However, when Wind River flows are in excess of 2 cfs, routinely from May to July, the excess may be skimmed into the Adam;s Tunnel afterbay and used for subsequent power generation purposes at the Mary's Lake and Estes power generation facilities. See the Special Computations section below for complete description. Adams Tunnel can also release water to the Wind River Below Adams Tunnel channel as required for maintenance or safety concerns. The ADATUNCO stilling basin is equipped with a head gate and spillway; which, when in use, places water upstream of the WINBYPCO control structure.
Gage-Height Record.--	No skimming operations in Water Year 2012. The record from the Wind River above Adams Tunnel (WINDESCO) gage was used all year. See the Special Computations section for further details.
Datum Corrections.--	Levels were last run on October 10, 2012 using the average weir crest (RM 0) as base. The inside gage was found to be reading 0.027 low and the supplemental staff gage was found to be 0.098 ft. low. Neither reference was adjusted. Levels are scheduled to be run again in the spring to verify the correction and to track further movement during winter months.
Rating.--	The control is a 3-foot Cipolletti weir. A standard 3-foot Cipolletti weir rating (STD03FTCIP) was continued in use for all of WY2012. One measurement (No. 17) was made during the year, at a discharge of 1.26 cfs. The peak flow of 3.19 cfs (computed from the WINDESCO gage) occurred at 1730 on July 7, 2012. It exceeded measurement No. 17 made on April 24, 2012 by 1.93 cfs. This year's measurement was not adjusted for the October 10, 2012 levels findings. See the Special Computations section for further details.
Discharge.--	See the Special Computations section for further details.
Special Computations.--	The Wind River Bypass gage (WINBYPCO) or Wind River below Adams Tunnel gage is used in the ADANETCO computation process to determine the amount of Wind River water that was "skimmed" into the C-BT system. This is done by subtracting the amount of water recorded at the Wind River Above Estes Park (WINDESCO) from the amount of water recorded at the WINBYPCO gage. The difference is then subtracted from the Alva B. Adam's Tunnel at East Portal (ADATUNCO) record is to determine the Alva B. Adam's Tunnel Net, ADANETCO flow of imported West Slope waters delivered during skimming periods. This computation is not performed when skimming is not occurring. Differences in discharge values between the WINDESCO and WINBYPCO records occurring outside the "skim" period are presumed to be due to either in part or in aggregate, slight drainage accruing to the stream from the ADATUNCO gage basin, or slight daily rounding differences and transit time allowances. No skimming of Wind River water occurred this year, therefore the WINBYPCO record is the WINDESCO record for all of Water Year 2012.
Remarks.--	The record is rated per the WINDESCO record; "This is a partial year record. Period of record for Water Year 2012 is October 1 to November 9, 2011 and April 24 to September 30, 2012. The record is good, except for periods of ice affected record and partial day records (October 26, 27, November 2-9, 2011 and April 24, 2012), which are estimated and poor and the leaky float period (April 25 - May 14, 2012) which is fair. Station was closed for winter for the periods; November 10, 2011 through April 22, 2012, no record was maintained. Station maintained by USBR and CDWR staff. Record developed by Russell V. Stroud."
Recommendations.--	Levels must be run in the spring to verify the October levels run as well as to monitor further frost heaving of the structure. Careful examination of skim balance should be made on real time basis. Photographs of the gage, control and channel should be taken to update the Station Description.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

WIND RIVER BYPASS

RATING TABLE.--

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

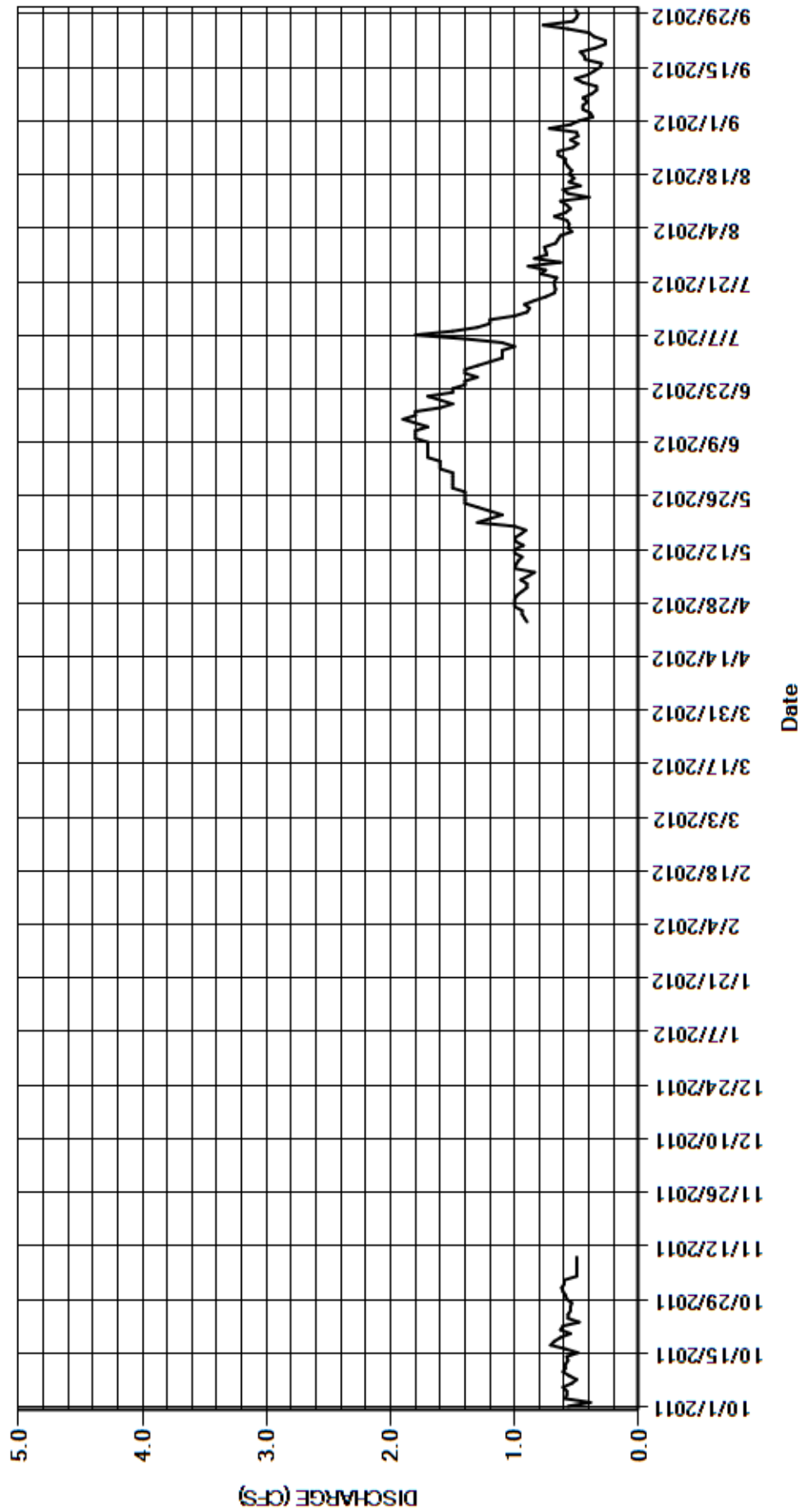
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.57	0.62	---	---	---	---	---	0.94	1.5	1.1	0.65	0.48
2	0.39	e0.60	---	---	---	---	---	0.90	1.6	1.1	0.63	0.37
3	0.59	e0.60	---	---	---	---	---	0.90	1.6	1.1	0.54	0.39
4	0.58	e0.50	---	---	---	---	---	0.95	1.6	1.0	0.57	0.45
5	0.58	e0.50	---	---	---	---	---	0.89	1.7	1.1	0.56	0.45
6	0.61	e0.50	---	---	---	---	---	0.84	1.7	1.4	0.58	0.41
7	0.54	e0.50	---	---	---	---	---	1.0	1.7	1.8	0.68	0.45
8	0.50	e0.50	---	---	---	---	---	0.99	1.7	1.5	0.59	0.38
9	0.56	e0.50	---	---	---	---	---	0.97	1.7	1.3	0.55	0.34
10	0.61	---	---	---	---	---	---	0.94	1.8	1.2	0.58	0.34
11	0.59	---	---	---	---	---	---	1.0	1.8	1.2	0.63	0.45
12	0.59	---	---	---	---	---	---	1.0	1.8	1.0	0.40	0.51
13	0.57	---	---	---	---	---	---	0.93	1.7	0.90	0.57	0.41
14	0.58	---	---	---	---	---	---	0.99	1.8	0.88	0.61	0.36
15	0.49	---	---	---	---	---	---	1.0	1.9	0.92	0.47	0.31
16	0.59	---	---	---	---	---	---	0.95	1.8	0.84	0.56	0.30
17	0.71	---	---	---	---	---	---	0.91	1.8	0.75	0.52	0.43
18	0.68	---	---	---	---	---	---	1.0	1.6	0.68	0.56	0.44
19	0.63	---	---	---	---	---	---	1.3	1.5	0.67	0.54	0.47
20	0.55	---	---	---	---	---	---	1.2	1.6	0.68	0.57	0.35
21	0.63	---	---	---	---	---	---	1.1	1.7	0.68	0.59	0.27
22	0.61	---	---	---	---	---	---	1.2	1.5	0.66	0.59	0.27
23	0.48	---	---	---	---	---	e0.90	1.3	1.5	0.79	0.65	0.36
24	0.57	---	---	---	---	---	0.92	1.4	1.4	0.75	0.65	0.40
25	0.57	---	---	---	---	---	0.94	1.4	1.4	0.89	0.53	0.57
26	e0.55	---	---	---	---	---	0.94	1.4	1.3	0.63	0.49	0.77
27	e0.55	---	---	---	---	---	1.0	1.4	1.4	0.84	0.55	0.53
28	0.54	---	---	---	---	---	1.0	1.5	1.4	0.74	0.49	0.50
29	0.58	---	---	---	---	---	1.0	1.5	1.3	0.75	0.50	0.49
30	0.59	---	---	---	---	---	0.98	1.5	1.2	0.76	0.72	0.51
31	0.61	---	---	---	---	---	---	1.5	---	0.67	0.55	---
TOTAL	17.79	4.82	---	---	---	---	7.68	34.80	48.0	29.28	17.67	12.76
MEAN	0.57	0.54	---	---	---	---	0.96	1.12	1.60	0.94	0.57	0.43
AC-FT	35	9.6	---	---	---	---	15	69	95	58	35	25
MAX	0.71	0.62	---	---	---	---	1.0	1.5	1.9	1.8	0.72	0.77
MIN	0.39	0.50	---	---	---	---	0.90	0.84	1.2	0.63	0.40	0.27

CAL YR	2011	TOTAL	313.52	MEAN	1.60	MAX	5.8	MIN	0.39	AC-FT	622 (PARTIAL YEAR RECORD)
WTR YR	2012	TOTAL	172.80	MEAN	0.86	MAX	1.9	MIN	0.27	AC-FT	343 (PARTIAL YEAR RECORD)

MAX DISCH: 3.19 CFS AT 17:30 ON JUL 07,2012 GH 0.35 FT SHIFT 0.01 FT (WINDESCO)
 MAX GH: 0.35 FT AT 17:30 ON JUL 07,2012 (WINDESCO)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

WIND RIVER BYPASS
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
WIND RIVER NEAR ESTES PARK

Water Year 2012

Location.-- Lat. N40° 19' 37", Long. W105° 34' 52" (NAD83). Gage is located on the left side of a 4-foot Parshall flume located upstream of the Alva B. Adam's tunnel afterbay; 1,330 ft. west of the ADATUNCO gage shelter and 5 mi. SW of the Town of Estes Park Visitors Center.

Drainage Area and Period of Record.-- 4.35 sqmi (from the USGS's Colorado StreamStats utility). Daily values are available from May 17, 1950 to present. ; October 1, 1950 to present.

Equipment.-- Sutron SDR-0001-4 shaft encoder connected to a satellite monitored Sutron SatLink2 data collection platform (DCP) in a 4-foot by 4-foot wooden shelter overtop a 36-inch corrugated metal pipe stilling well at a 4-foot steel Parshall flume. An electric tape gage (ETG) located on the instrument shelf is the primary reference and a supplemental staff gage is located at the flume's left Ha location. The station is maintained in cooperation with the United State Bureau of Reclamation (USBR) and the Colorado Division of Water Resources (CDWR) to determine east slope diversions in to the Colorado Big Thompson (C-BT) system from Wind River.

Hydrologic Conditions.-- Drainage area consisting of forested lands of varying topography within the boundaries of Rocky Mountain National Park. A small diversion is located upstream of the gage, diverting approximately 300 Acre Feet (AF) of domestic water a year. The gage is used to compute the amount of native East Slope (Wind River) water diverted or "skimmed" into the Colorado-Big Thompson system at Adams Tunnel for power generation purposes. See Special Computation section below for complete description. The USBR does not divert flow into the C-BT system if the native flow in Wind River is 2 cubic feet per second (cfs) or less. Skimming operations of Wind River did not occur this year as flows rarely were in excess of 2 cfs.

Gage-Height Record.-- The primary record is 15-minute satellite data with 15-minute logged DCP data and 5-minute logged SDR data as backup. Frequent visits by USBR and DWR personnel generally showed good agreement between the sensor and base gage. The record is complete and reliable except for the following periods: November 2 – 4, 2011 when the stage-discharge relationship was affected by ice; November 5-8, 2011 when the stilling well was frozen; and November 9, 2011 and April 23, 2012, which are partial day records corresponding to shutdown and startup days of the gage. Missing satellite values on July 24, 2012 sporadic singular missing values from August 3 through September 30, 2012 were filled in with DCP and SDR logged values respectively without loss of accuracy. This is a partial year record. The period of record for the 2012 water year is October 1 through November 9, 2011 and April 23 through September 30, 2012. The float was found to have a small pinhole leak on May 14, 2012. Instrument corrections made from April 23 through May 14, 2012 were applied to the record as defined by observations and corrections made to the gage.

Datum Corrections.-- Levels were last run on October 24, 2011 using the average flume crest (R.M.0) as base. The inside gage was found to be reading within allowable tolerances. The supplemental staff gage was not shot.

Rating.-- The control is a 4-foot metal Parshall flume. A standard 4-foot Parshall flume rating (STD04FTPF) was continued in used for all of WY2012. One discharge measurement (No. 132) was made during the year, at a discharge of 0.87 cfs. The peak flow of 3.19 cfs occurred at 17:30 on July 7, 2012 at a gage-height of 0.35 ft. with a shift of 0.01 ft.

Discharge.-- Shifting control method was used for all periods of record. Shifts were applied by time with consideration given to flume cleaning events. This year's measurement confirmed water year 2011 measurements showing shifts varying from 0.00 to 0.01 ft. This year's measurement was given full weight.

Special Computations.-- Discharges for November 2 – 9, 2011 and April 23, 2012 were estimated from adjacent good record. The WINDESCO gage is used in the ADANETCO computation process to determine the amount of Wind River water that was "skimmed" into the C-BT system. This is done by subtracting the amount of water recorded at the WINDESCO from the amount of water recorded at the Wind River Below Adams Tunnel (WINBYPCO) gage. The difference is then subtracted from the Alva B. Adam's Tunnel at East Portal (ADATUNCO) record and is used to determine the ADANETCO (Alva B. Adam's Tunnel New (West Slope)) delivery during skimming periods. This computation is not performed when skimming is not occurring. Differences in discharge values between the WINDESCO and WINBYPCO records occurring outside the "skim" period are presumed to be due to either in part or in aggregate, slight drainage accruing to the stream from the ADATUNCO gage basin, or slight daily rounding differences and transit time allowances. Skimming operations for power generation and appropriation purposes did not occur this water year as flows in Wind River were rarely in excess of the minimum skim threshold of 2 cfs.

Remarks.-- This is a partial year record. Period of record for Water Year 2012 is October 1 to November 9, 2011 and April 24 to September 30, 2012. The record is good, except for periods of ice affected record and partial day records, which are estimated and poor and the leaky float period which is fair. Station was closed for winter for the period; November 10, 2011 through April 22, 2012, no record was maintained. Station maintained by USBR and CDWR staff. Record developed by Russell V. Stroud.

Recommendations.-- More discharge measurements should be made as flows permit. ETG tape should be replaced as it has several splices in its medial section. Levels should be run again in conjunction to ETG tape replacement.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

WIND RIVER NEAR ESTES PARK

RATING TABLE-- STD04FTPF USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

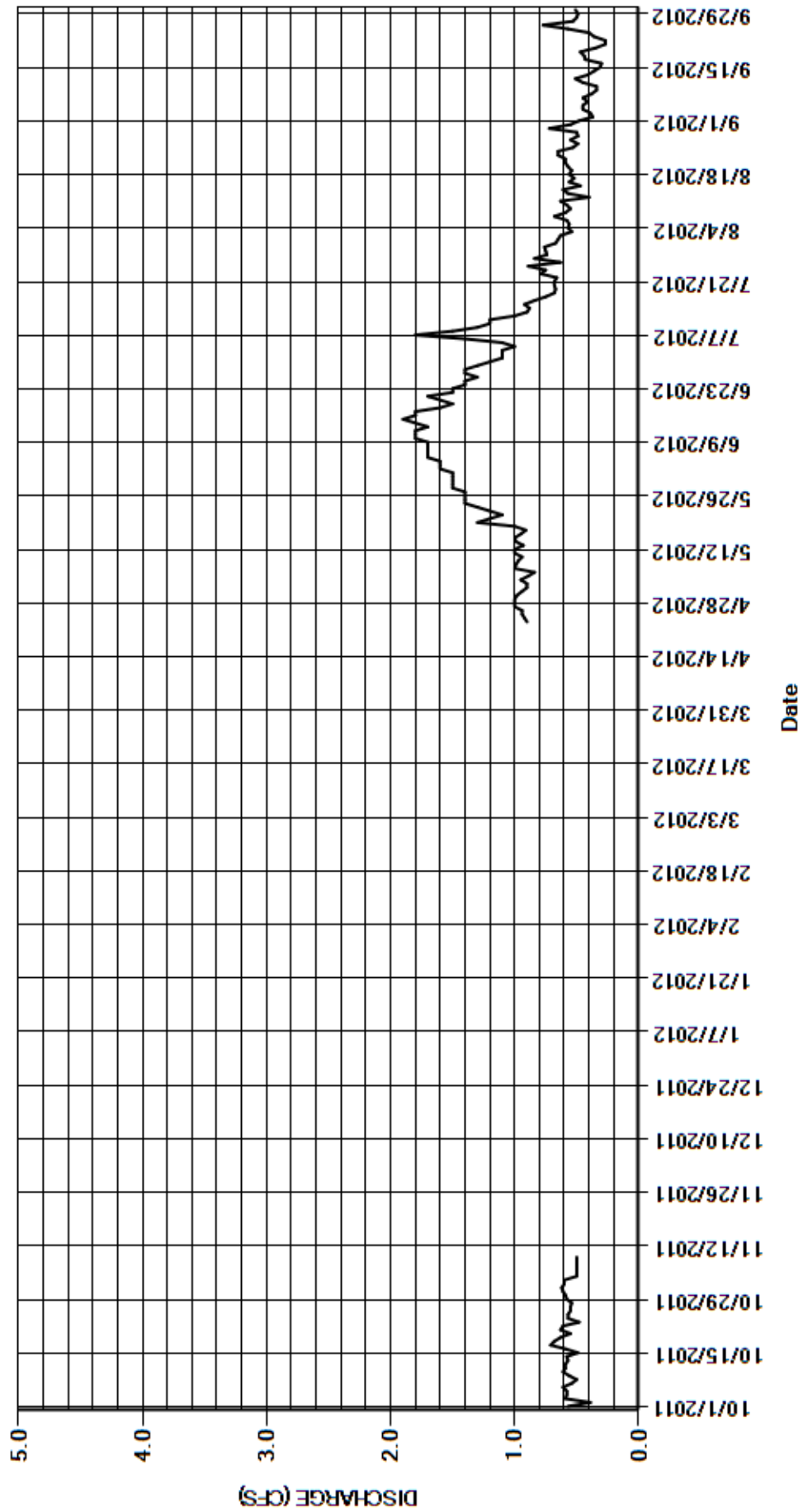
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.57	0.62	---	---	---	---	---	0.94	1.5	1.1	0.65	0.48
2	0.39	e0.60	---	---	---	---	---	0.90	1.6	1.1	0.63	0.37
3	0.59	e0.60	---	---	---	---	---	0.90	1.6	1.1	0.54	0.39
4	0.58	e0.50	---	---	---	---	---	0.95	1.6	1.0	0.57	0.45
5	0.58	e0.50	---	---	---	---	---	0.89	1.7	1.1	0.56	0.45
6	0.61	e0.50	---	---	---	---	---	0.84	1.7	1.4	0.58	0.41
7	0.54	e0.50	---	---	---	---	---	1.0	1.7	1.8	0.68	0.45
8	0.50	e0.50	---	---	---	---	---	0.99	1.7	1.5	0.59	0.38
9	0.56	e0.50	---	---	---	---	---	0.97	1.7	1.3	0.55	0.34
10	0.61	---	---	---	---	---	---	0.94	1.8	1.2	0.58	0.34
11	0.59	---	---	---	---	---	---	1.0	1.8	1.2	0.63	0.45
12	0.59	---	---	---	---	---	---	1.0	1.8	1.0	0.40	0.51
13	0.57	---	---	---	---	---	---	0.93	1.7	0.90	0.57	0.41
14	0.58	---	---	---	---	---	---	0.99	1.8	0.88	0.61	0.36
15	0.49	---	---	---	---	---	---	1.0	1.9	0.92	0.47	0.31
16	0.59	---	---	---	---	---	---	0.95	1.8	0.84	0.56	0.30
17	0.71	---	---	---	---	---	---	0.91	1.8	0.75	0.52	0.43
18	0.68	---	---	---	---	---	---	1.0	1.6	0.68	0.56	0.44
19	0.63	---	---	---	---	---	---	1.3	1.5	0.67	0.54	0.47
20	0.55	---	---	---	---	---	---	1.2	1.6	0.68	0.57	0.35
21	0.63	---	---	---	---	---	---	1.1	1.7	0.68	0.59	0.27
22	0.61	---	---	---	---	---	---	1.2	1.5	0.66	0.59	0.27
23	0.48	---	---	---	---	---	e0.90	1.3	1.5	0.79	0.65	0.36
24	0.57	---	---	---	---	---	0.92	1.4	1.4	0.75	0.65	0.40
25	0.57	---	---	---	---	---	0.94	1.4	1.4	0.89	0.53	0.57
26	e0.55	---	---	---	---	---	0.94	1.4	1.3	0.63	0.49	0.77
27	e0.55	---	---	---	---	---	1.0	1.4	1.4	0.84	0.55	0.53
28	0.54	---	---	---	---	---	1.0	1.5	1.4	0.74	0.49	0.50
29	0.58	---	---	---	---	---	1.0	1.5	1.3	0.75	0.50	0.49
30	0.59	---	---	---	---	---	0.98	1.5	1.2	0.76	0.72	0.51
31	0.61	---	---	---	---	---	---	1.5	---	0.67	0.55	---
TOTAL	17.79	4.82	---	---	---	---	7.68	34.80	48.0	29.28	17.67	12.76
MEAN	0.57	0.54	---	---	---	---	0.96	1.12	1.60	0.94	0.57	0.43
AC-FT	35	9.6	---	---	---	---	15	69	95	58	35	25
MAX	0.71	0.62	---	---	---	---	1.0	1.5	1.9	1.8	0.72	0.77
MIN	0.39	0.50	---	---	---	---	0.90	0.84	1.2	0.63	0.40	0.27

CAL YR	2011	TOTAL	944.76	MEAN	4.82	MAX	18	MIN	0.39	AC-FT	1870 (PARTIAL YEAR RECORD)
WTR YR	2012	TOTAL	172.80	MEAN	0.86	MAX	1.9	MIN	0.27	AC-FT	343 (PARTIAL YEAR RECORD)

MAX DISCH: 3.19 CFS AT 17:30 ON JUL 07,2012 GH 0.35 FT SHIFT 0.01 FT
 MAX GH: 0.35 FT AT 17:30 ON JUL 07,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

WIND RIVER NEAR ESTES PARK
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06733000 BIG THOMPSON RIVER ABOVE LAKE ESTES

Water Year 2012

Location.-- Lat. N.40°22'42", Long. W. 105°30'50" (NAD 83), Larimer County Hydrologic Unit 10190006. Gage is located on the right bank 630 ft. downstream from the Hwy 36 bridge and 2,400 ft. upstream from Lake Estes, adjacent to the Estes Park Visitor's Center. Gage is also know as Big Thompson River at Estes Park, CO

Drainage Area and Period of Record.-- 137 mi² (USGS Colorado StreamStats utility).; Daily values are available from October 1, 1946 to present.

Equipment.-- Digital incremental Surton SDR-0001-4 shaft encoder, tipping bucket rain gage and temperature sensor connected to a Sutron SatLink2 Data Collection Platform (DCP) in a four ft. by four ft. concrete shelter and stilling well at a 15-ft. Parshall flume with ogee crested overflow bays flanking the flume. The well is attached to the channel via one two-inch and three three-inch valved inlets. One inlet connects the well to the flume at its Ha location with the other three inlets connect the channel to the well at the shelter location. The primary reference is an electric tape gage located in the shelter with two supplemental outside staff gages; one at the Ha location of the flume and the other located on the stream-ward side of the shelter. The second staff is utilized when the upstream inlets are active. The gage is maintained in cooperation of the United States Bureau of Reclamation and the Colorado Division of Water Resources.

Hydrologic Conditions.-- Drainage area mainly comprised of forested lands of varying topography within Rocky Mountain National Park and the bulk of Estes Park, CO. There are no storage projects nor diversions of significant magnitude upstream of this site. The gage is susceptible to rapid increases in stage due to storm runoff events from hardened surfaces. Spring runoff displays strong diurnal characteristics associated with snowmelt, peaking early in the morning. On May 18, 2011 the flash boards over top the ogee crest overflow bays were removed to increase channel conveyance. The gage was switched to the upstream configuration on that date.

Gage-Height Record.-- The primary record is 15-minute satellite data with 15-minute logged DCP data as well as 5-minute logged SDR data as backup. The record is complete and reliable except for: December 2-3 when the stage-discharge relationship was affected by ice; December 4-14 when the stilling well was frozen; December 15, 2011 through March 25 when the gage was off for winter and March 26, 2012 which is a partial day record when the gage was turned on for the season. Missing stage values on May 19, 2012 were interpolated from adjacent record without loss of accuracy. Instrument calibration was maintained by frequent visits made to the gage by USBR and DWR staff. Two instrument corrections of +0.01 and -0.01 ft. were made made this year and were applied to the record as defined by observations made to the gage.

Datum Corrections.-- Levels were last run on October 20, 2010 to the ETG and Ha staff gage using the average flume crest (BM0) elevation of 0.00 feet as base. The tape length was increased 0.014 ft. at the time levels were run. The Ha staff gage was found at an elevation of 0.008 feet with respect to the average crest elevation. No adjustment could be made due to the anchoring method utilized.

Rating.-- The control is a 15-ft. Parshall flume with ogee crest overflow bays flanking the flume. Rating 10 (BTABESCO10), developed in the 2011 Water Year, was continued this year. It was developed following removal of the flashboards from the overflow bays on May 18, 2011 and stilling well inlet reorientation from the Ha inlet location to the upstream weir pool location. The rating was developed using a Std. 15 Parshall flume rating from 0.00 ft to approximately 2.43 ft. with a theoretical water surface drawdown curve from the stilling well to the Ha location in the flume; and a theoretical average weir flow for gage heights above 2.43 ft (using the Francis weir equation and the WES short crested weir equation) and Msmts. Nos. 640-647 made during Water Year 2011, ranging from 2.35 to 4.49 ft. of stage and 171 to 933 cfs, respectively. Seventeen discharge measurements (Nos. 654-670) were made this year ranging from 26.4 to 353 cfs covering the range in stage experienced well. The peak discharge of 393 cfs occurred at 01:45 on June 4, 2012 at a stage of 3.23 ft. using shift of 0.00 ft., exceeding this year's high measurement (No. 661) by 0.13 ft. of stage and 30 cfs respectively.

Discharge.-- Shifting control method was used for all periods of open water. Shifts were distributed by time as defined by measurements from August 29 to December 14, 2011. Stage dependent shifting using variable shift table BTABESCOVST12-A was applied from March 26 through October 1, 2012. BTABESCOVST12-A is defined by 15 measurements (Nos. 657-671) made during the period use. Open water measurements showed unadjusted shifts varying between 0.12 and -0.02 ft. All were given full weight except for Nos. 655, 657-659, 661, 664, 667, 669 and 670 which were discounted up to 4.8% to smooth shift distributions.

Special Computations.-- Discharge for periods of ice affect, frozen stilling well, winter operation and partial day records were taken from USBR computed inflow values with consideration to adjacent good record. The USBR computes the native inflow to Lake Estes based on gaged outflows (BTBLESCO and OLYTUNCO) correlating the net outflow to reservoir elevation changes at Lake Estes. The computed flow is the summation of all sources of unaccounted-for water into Lake Estes, including other ungaged tributaries and local runoff. Note: The USBR requested that no winter measurements be performed in the flume due to concerns of damaging the newly placed concrete. As such, no measurements were made during ice conditions.

Remarks.-- The record is good, except for period of ice affect, frozen stilling well and partial day record which are estimated and fair. Station maintained by USBR and DWR staff. Record developed by Russell V. Stroud.

Recommendations.-- Continued efforts to find a cooperative solution to issues introduced by Estes Park's erosion control device including placement of a gradient control/energy dissipation structure upstream of the flume; and correctly designed and placed bank stabilization/protection structures should be strived for. The new rating needs to be verified throughout the full range of flow.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06733000 BIG THOMPSON RIVER ABOVE LAKE ESTES

RATING TABLE.-- BTABESCO10 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

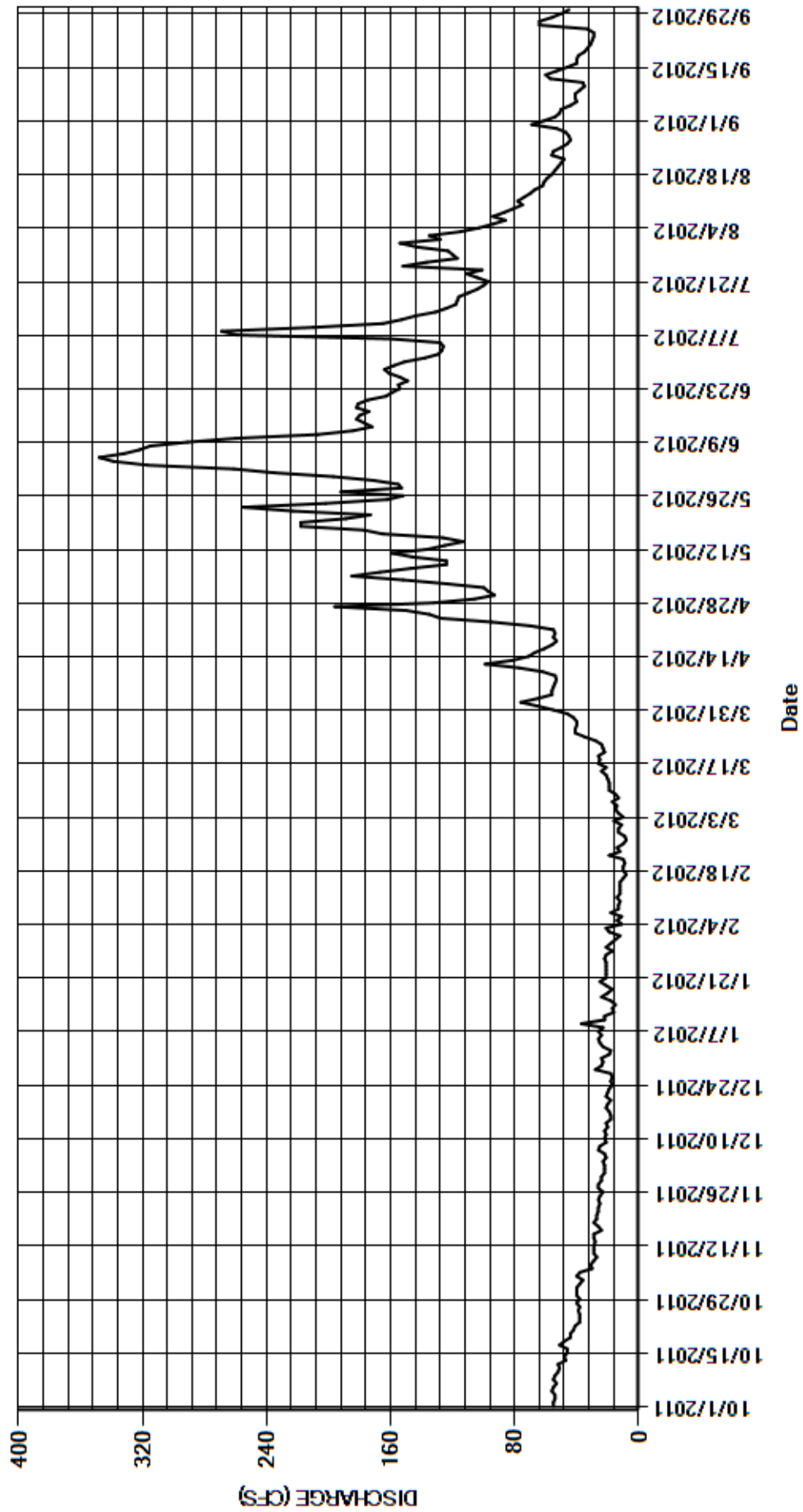
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	55	40	22	e19	e12	e11	65	97	235	138	128	61
2	55	38	e22	e18	e19	e16	76	100	261	129	135	54
3	54	36	e22	e23	e21	e10	65	124	317	127	115	51
4	54	40	e23	e25	e11	e13	56	152	339	126	103	50
5	56	38	e21	e26	e14	e15	56	185	348	128	94	44
6	55	30	e22	e24	e11	e14	55	167	332	160	86	40
7	53	31	e26	e26	e18	e17	54	147	322	259	94	41
8	55	29	e25	e23	e13	e13	53	124	315	269	87	41
9	54	27	e21	e37	e13	e15	54	124	291	210	81	38
10	52	29	e22	e22	e12	e19	62	146	260	165	75	35
11	51	29	e21	e22	e14	e19	77	159	207	153	78	36
12	52	29	e22	e16	e12	e19	99	136	184	144	74	57
13	47	28	e20	e17	e12	e20	81	125	172	131	70	60
14	48	29	e21	e15	e12	e21	71	113	177	124	67	53
15	46	29	e18	e18	e12	e24	67	126	182	118	62	46
16	46	24	e18	e24	e10	e21	61	165	180	117	61	40
17	51	26	e19	e20	e8.0	e26	56	177	174	116	59	40
18	48	29	e21	e17	e10	e25	53	218	182	110	56	39
19	44	27	e20	e21	e10	e26	55	218	181	104	54	35
20	44	27	e18	e25	e9.0	e22	54	189	175	100	52	33
21	42	26	e21	e21	e10	e23	55	173	163	97	50	31
22	41	26	e20	e21	e19	e24	70	223	159	104	48	30
23	38	25	e19	e21	e12	e28	95	255	154	111	56	29
24	38	26	e17	e21	e14	e35	128	202	155	101	55	29
25	38	25	e18	e21	e10	e41	135	162	149	152	50	33
26	39	23	e17	e22	e8.0	e41	150	152	154	137	46	64
27	38	26	e18	e21	e9.0	40	196	192	161	117	44	64
28	40	26	e28	e17	e13	40	132	153	164	120	45	56
29	38	24	e24	e21	e13	42	106	155	158	123	47	50
30	40	24	e23	e18	---	46	93	171	151	143	53	45
31	40	---	e24	e15	---	55	---	197	---	154	69	---
TOTAL	1452	866	653	657	361.0	781	2430	5027	6402	4287	2194	1325
MEAN	46.8	28.9	21.1	21.2	12.4	25.2	81.0	162	213	138	70.8	44.2
AC-FT	2880	1720	1300	1300	716	1550	4820	9970	12700	8500	4350	2630
MAX	56	40	28	37	21	55	196	255	348	269	135	64
MIN	38	23	17	15	8.0	10	53	97	149	97	44	29

CAL YR	2011	TOTAL	72106.0	MEAN	198	MAX	1280	MIN	10	AC-FT	143000
WTR YR	2012	TOTAL	26435.0	MEAN	72.2	MAX	348	MIN	8.0	AC-FT	52430

MAX DISCH: 393 CFS AT 01:45 ON JUN 04,2012 GH 3.23 FT SHIFT 0 FT
 MAX GH: 3.23 FT AT 01:45 ON JUN 04,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06733000 BIG THOMPSON RIVER ABOVE LAKE ESTES
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06734500 FISH CREEK NEAR ESTES PARK
Water Year 2012

Location.-- Lat. N40° 22' 06"; Long. W105° 29' 35" (NAD83). Gage is located on the right side of a 5-foot Parshall Flume 40 ft. off the Fish Creek road approximately 650 ft. upstream from the normal high water mark of Lake Estes 1.3 miles SE of the Town of Estes Park Visitors Center.

Drainage Area and Period of Record.-- 16.9 sq mi. (measured from topographic maps). ; Daily values are available from May 6, 1947 to September 30, 2012.

Equipment.-- Digital incremental Sutron 56-0540-400-DTR shaft encoder connected to a Sutron SatLink2 Data Collection Platform (DCP) transmitting hourly and a graphic water-stage recorder in a 4-ft. by 4-ft. concrete shelter and stilling well at a 5-ft. Parshall Flume. An electric tape gage located on the instrument shelf is the primary reference with a supplemental staff gage located on the left wing wall of the flume at the Ha location. Gage is owned by the United States Bureau of Reclamation (USBR) and operated by the Colorado Division of Water Resources (CDWR). USBR personnel do not visit nor maintain this station on a regular basis. Per agreement with the USBR, the satellite equipment was removed on October 1, 2012. The gage is considered discontinued from this point forward.

Hydrologic Conditions.-- Drainage area consisting of mainly grassed and forested lands with some developed areas adjacent to the channel. Flows measured by this gage enter Lake Estes immediately downstream from the gage. There are no diversions away from the channel upstream of gage.

Gage-Height Record.-- The primary record is 15-minute satellite data with 15-minute logged DCP data as backup. The gage was not visited regularly in the 2012 Water Year. The record is complete and reliable. This is a partial year record. The gage was not operated from November 28, 2011 through March 26, 2012.

Datum Corrections.-- Levels were last run on September 9, 2010 using RM0 (flume crest) as base. The electric tape gage was found to be reading 0.016 ft. high and the supplemental staff gage was found to be 0.008 low. No corrections were made to either references in lieu of confirming levels.

Rating.-- The control is a 5-foot concrete Parshall flume. Rating FISHESCO06, developed by the United States Geologic Survey in 1951 is based on a 5-foot Parshall rating below 3.50 feet of stage and was extended upwards to 7.40 feet on a basis of slope area determination to a stage of 7.32 feet, discharge 1480 cfs . FISHESCO06 was continued this year. No discharge measurements were made this year. However, measurements made in previous years do not indicate the presence of any permanent shift condition. The peak flow of 107 cfs occurred at 1815 on July 7, 2012 at a gage height of 2.87 feet with a shift of 0.00 feet.

Discharge.-- The rating was directly applied to the gage-height record to compute discharge.

Special Computations.-- None.

Remarks.-- Due to a lack of visits made to the gage this year as well as confirming discharge measurements the record is rated as fair. Station maintained and record developed by Colorado Division of Water Resources staff.

Recommendations.-- The USBR and CDWR have mutually agreed to discontinue this gage as it is thought that the gage no longer significantly benefits water administration nor C-BT operations within the East Slope portion of the C-BT project. Satellite instrumentation was removed at 1545 on October 1, 2012. No action has been nor is anticipated to remove the flume or the shelter. The gage could be reactivated with little effort in the future, if needed.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06734500 FISH CREEK NEAR ESTES PARK

RATING TABLE.-- FISHESCO06 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

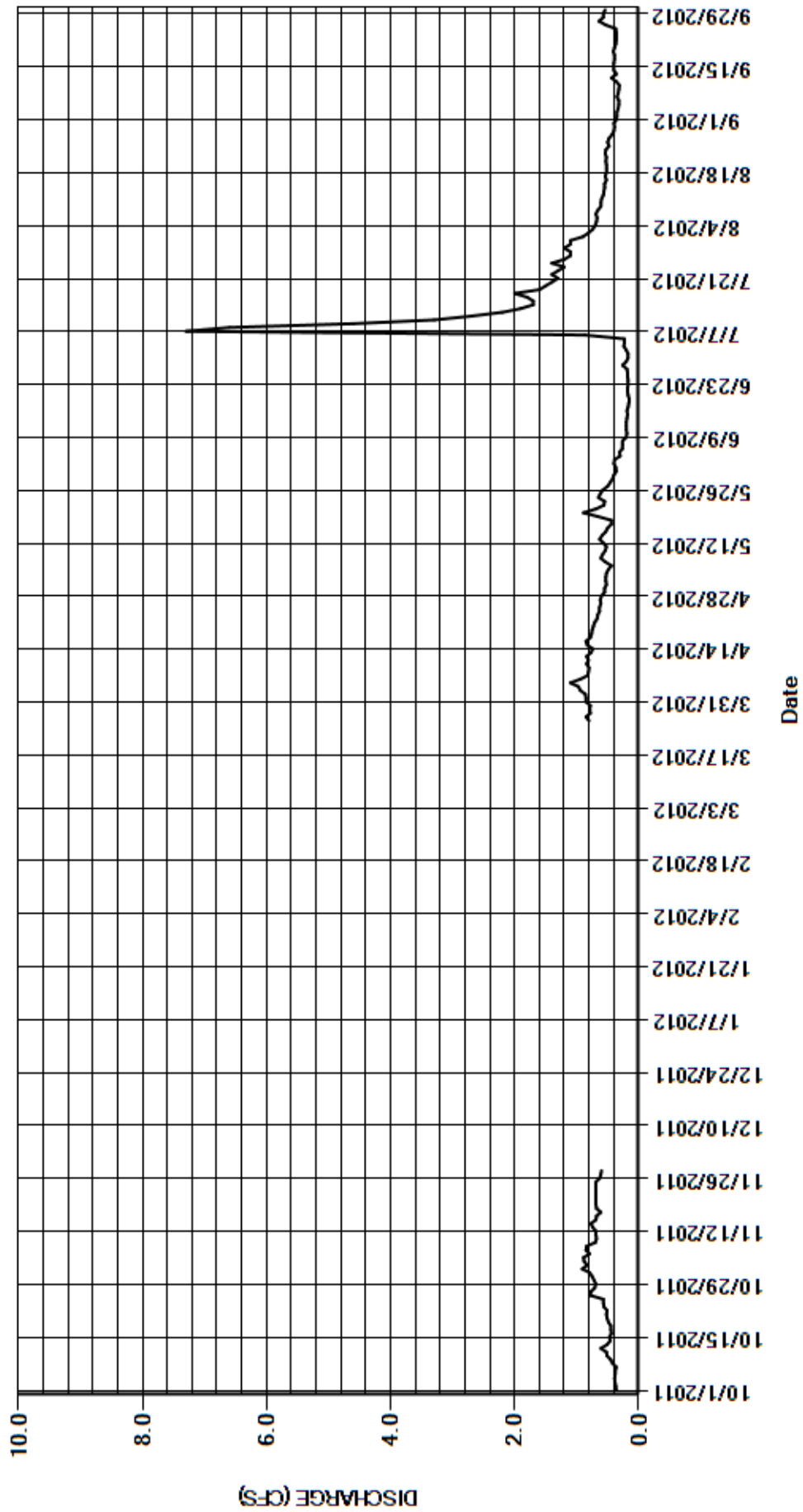
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.36	0.79	---	---	---	---	0.85	0.52	0.37	0.17	0.90	0.36
2	0.37	0.91	---	---	---	---	0.86	0.53	0.40	0.20	0.81	0.35
3	0.38	0.83	---	---	---	---	0.94	0.53	0.39	0.24	0.74	0.35
4	0.39	0.88	---	---	---	---	0.97	0.52	0.30	0.23	0.70	0.33
5	0.38	0.89	---	---	---	---	1.1	0.49	0.31	0.23	0.68	0.32
6	0.38	0.79	---	---	---	---	0.94	0.44	0.26	0.87	0.67	0.32
7	0.36	0.85	---	---	---	---	0.82	0.54	0.26	7.3	0.69	0.35
8	0.42	0.84	---	---	---	---	0.81	0.61	0.26	6.6	0.66	0.33
9	0.45	0.70	---	---	---	---	0.80	0.58	0.20	4.6	0.61	0.32
10	0.51	0.68	---	---	---	---	0.84	0.54	0.19	3.3	0.61	0.31
11	0.52	0.69	---	---	---	---	0.81	0.52	0.20	2.7	0.60	0.36
12	0.61	0.69	---	---	---	---	0.84	0.57	0.20	2.2	0.57	0.44
13	0.51	0.74	---	---	---	---	0.77	0.63	0.20	1.9	0.56	0.36
14	0.46	0.77	---	---	---	---	0.74	0.59	0.19	1.7	0.55	0.40
15	0.47	0.69	---	---	---	---	0.83	0.53	0.18	1.7	0.55	0.40
16	0.44	0.68	---	---	---	---	0.85	0.50	0.19	1.8	0.52	0.40
17	0.45	0.61	---	---	---	---	0.78	0.44	0.17	2.0	0.54	0.39
18	0.45	0.68	---	---	---	---	0.76	0.44	0.16	1.6	0.52	0.39
19	0.49	0.69	---	---	---	---	0.75	0.66	0.15	1.5	0.52	0.41
20	0.51	0.69	---	---	---	---	0.73	0.89	0.17	1.4	0.52	0.39
21	0.52	0.69	---	---	---	---	0.71	0.69	0.18	1.3	0.53	0.37
22	0.51	0.69	---	---	---	---	0.67	0.56	0.18	1.4	0.52	0.36
23	0.56	0.69	---	---	---	---	0.66	0.55	0.17	1.3	0.54	0.36
24	0.57	0.69	---	---	---	---	0.63	0.65	0.17	1.2	0.53	0.36
25	0.57	0.69	---	---	---	---	0.63	0.62	0.18	1.4	0.48	0.37
26	0.78	0.63	---	---	---	e0.80	0.61	0.58	0.18	1.2	0.50	0.53
27	0.77	0.61	---	---	---	0.85	0.62	0.50	0.19	1.1	0.48	0.64
28	0.71	e0.60	---	---	---	0.78	0.60	0.46	0.26	1.1	0.43	0.57
29	0.69	---	---	---	---	0.79	0.55	0.42	0.20	1.2	0.40	0.57
30	0.72	---	---	---	---	0.78	0.55	0.40	0.17	1.1	0.39	0.54
31	0.75	---	---	---	---	0.85	---	0.36	---	1.1	0.40	---
TOTAL	16.06	20.38	---	---	---	4.85	23.02	16.86	6.63	55.64	17.72	11.95
MEAN	0.52	0.73	---	---	---	0.81	0.77	0.54	0.22	1.79	0.57	0.40
AC-FT	32	40	---	---	---	9.6	46	33	13	110	35	24
MAX	0.78	0.91	---	---	---	0.85	1.1	0.89	0.40	7.3	0.90	0.64
MIN	0.36	0.60	---	---	---	0.78	0.55	0.36	0.15	0.17	0.39	0.31

CAL YR	2011	TOTAL	625.17	MEAN	2.50	MAX	21	MIN	0.32	AC-FT	1240 (PARTIAL YEAR RECORD)
WTR YR	2012	TOTAL	173.11	MEAN	0.70	MAX	7.3	MIN	0.15	AC-FT	343 (PARTIAL YEAR RECORD)

MAX DISCH: 107 CFS AT 18:15 ON JUL 07,2012 GH 2.87 FT SHIFT 0 FT
 MAX GH: 2.87 FT AT 18:15 ON JUL 07,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06734500 FISH CREEK NEAR ESTES PARK
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06735500 BIG THOMPSON RIVER BELOW LAKE ESTES
Water Year 2012

Location.-- Lat. N40° 22' 34.58"; Long. W105° 29' 7.80" (NAD83). Gage is located on the right side of a 15-ft. Parshall Flume with overflow bays flanking the flume, 620 ft. below Olympus Dam or 1.5 miles east of the Town of Estes Park Visitors Center.

Drainage Area and Period of Record.-- 155 sq mi. (USGS Colorado StreamStats utility). ; Daily values are available from July 1, 1930 to present.

Equipment.-- Digital incremental Sutron SDR-0001-4 shaft encoder connected to a Sutron SatLink 2 Data Collection Platform (DCP) transmitting hourly in a 4-ft by 4-ft. concrete shelter and stilling well at a 15-ft. Parshall Flume with overflow bays flanking the flume. The primary reference is an electric tape gage (ETG) in the shelter. There is currently no Ha staff. The well is attached to the flume via one valved inlet; and to the channel upstream of the flume and overflow bays via three valved inlets. When in overflow conditions the flume's inlet can be closed and the channel inlets opened. A supplementary (Non-Ha) staff gage, located above the flume, can be used during these periods. Stage readings will be higher than in the flume and would require a separate rating. The channel inlets have not been operated for record purposes since the early 1950's, before the installation of the overflow flash boards. Gage is owned by the United States Bureau of Reclamation (USBR) and maintained and operated cooperatively with the Colorado Division of Water Resources (CDWR). The SDR-0001-4 unit had to be replaced several times this year. It was replaced on October 19, 2011, July 16 and September 28, 2012 due to failed digital to analog converters (DAC). It is suspected that the DAC modules were failing due to excessive voltage being placed on the line between the sensor and the RTU. On September 28, 2012 a Design Analysis H-4191 was placed in the loop to help alleviate this issue.

Hydrologic Conditions.-- Controlled release from Olympus Dam.

Gage-Height Record.-- The primary record is 15-minute satellite data with 15-minute logged DCP and 5-minute SDR data as backup. The record is complete and reliable. Frequent visits by USBR and CDWR personnel showed good agreement between the sensor and the base gage. Two instrumentation corrections were made this Water Year, one of 0.01 ft. made on Oct. 24, 2011 due to disruption of flow caused by upstream construction activity and one of -0.01 ft. was applied to the record on July 16, 2012 and is attributable to miscalibration of the instrument following reinstallation of the SDR unit. Following reinstallation of the SDR unit on September 28, 2012, the instruments float was placed incorrectly in the reverse orientation; meaning, as the stage went up the instrument recorded lower stage values. The float reversal issue was corrected at 07:17 on October 1, 2012. Gage-height data for this period was developed using a spreadsheet which used the base stage set value and added or subtracted subsequent recorded values accordingly. Missing gage-height values occurring on October 19, 2011, May 19 and July 16, 2012 were interpolated from adjacent good record without loss of accuracy. Gage-heights can be affected by wading in the flume. Wade affected gage-heights were adjusted the following days without loss of accuracy: October 5, November 28, 2011, January 4, February 1, August 30 and September 17, 2012.

Datum Corrections.-- Levels were last run on February 27, 2008 using R.M.3 as base. The Base reference was found to be 0.01 low. The correction was made at the time levels were run.

Rating.-- The control is a 15-foot Parshall Flume with overflow bays flanking the flume. Rating BTBLESCO10, in use since October 1, 1997, was continued in use for all of Water Year 2012. The rating is a standard 15-foot Parshall Flume rating from 0.00 to 5.00 ft. of stage and custom above this point to account for water flowing over the overflow bays. A site visit on July 6, 2011 identified 5.32 ft. (as indicated on the Ha inlet operation) as being the exact stage at which the overflow bays become active. Because of the rarity of the overflow bays being active this portion of the rating is poorly defined. The rating has been confirmed by measurements from 6.8 to 1000 cfs. Eighteen discharge measurements (Nos. 224-241) were made this year ranging in discharge from 19.0 to 359 cfs, covering the range in stage experienced this year well, except for the higher daily flow of June 20, 2012. The peak flow of 510 cfs occurred at 00:30 on June 12, 2012 at a gage height of 3.92 ft. with a shift of -0.02 ft. It exceeded this year's high flow measurement (No. 233) made the same day by 151 cfs and 0.77 ft of stage respectively.

Discharge.-- Shifting control method was used all year. Shifts were principally caused by vegetal growth in the flume. Shifts were applied mainly by time as defined by measurements with consideration given to change in stage and cleaning of the flume. Open water measurements made this year showed shifts varying between -0.05 and +0.01 ft. All were given full weight except for Nos. 226, 235 and 239 which were discounted -4.43%, 0.29% and 2.17% respectively to smooth shift distributions.

Special Computations.-- A spreadsheet was used to develop the gage-height record from September 28 to October 1, 2012 when the instrument's float was placed in the reverse orientation.

Remarks.-- The record is good. Station maintained and record developed by Russell V. Stroud.

Recommendations.-- Levels must be run in the 2013 Water Year. Fabrication of the necessary brackets and fasteners to properly and securely mount the Ha staff should be undertaken prior to running of levels. Continued moderate to high flow measurement opportunities should be watched for and performed with the ADCP unit. Exercising the inlet valves should be done following the winter period.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06735500 BIG THOMPSON RIVER BELOW LAKE ESTES

RATING TABLE.-- BTBLESCO10 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

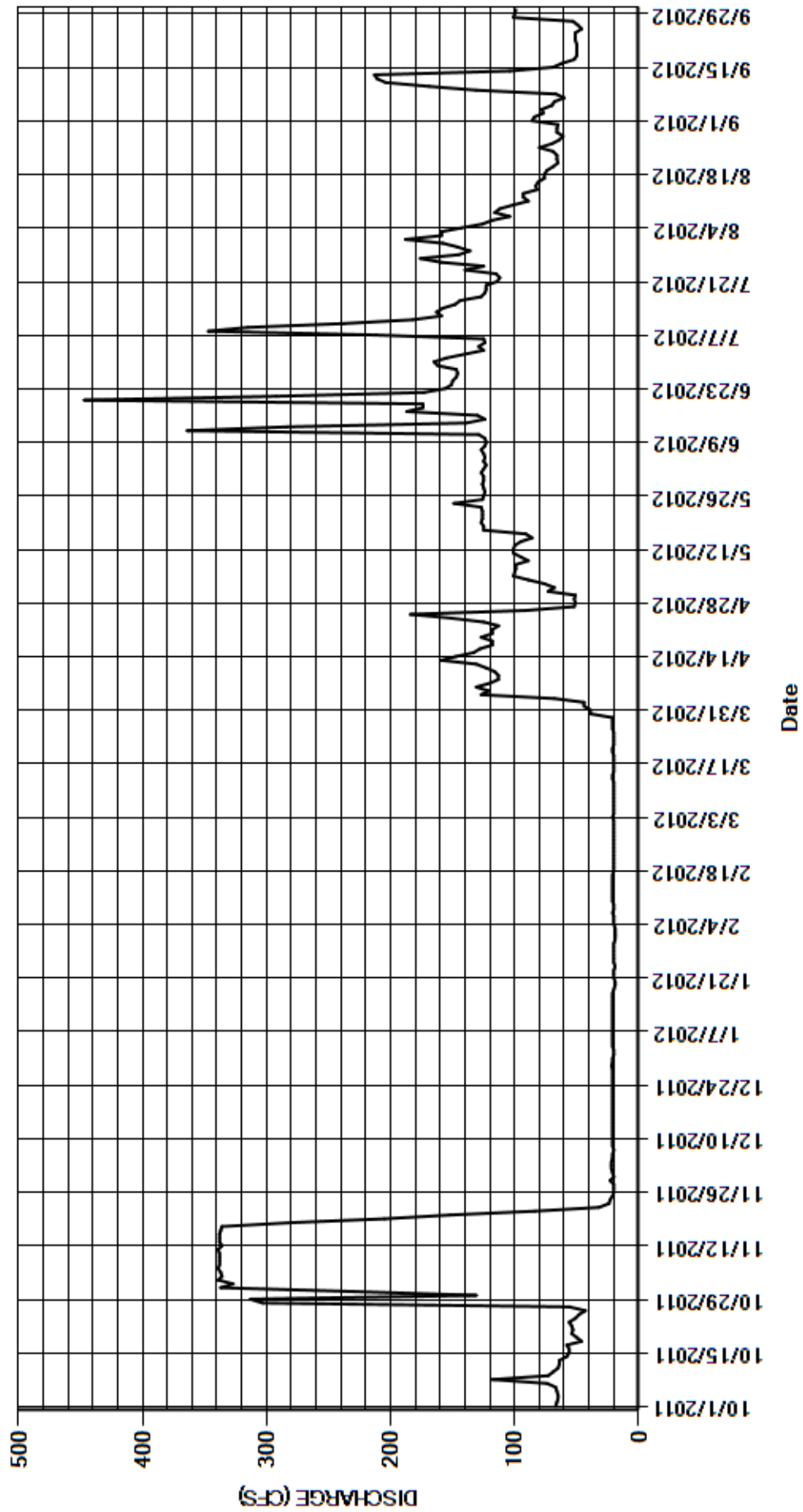
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	67	337	21	20	19	20	44	73	127	155	188	86
2	66	327	22	20	19	20	44	68	125	140	159	84
3	65	339	22	21	19	21	68	76	123	125	159	77
4	65	336	22	21	20	20	127	89	125	129	143	78
5	66	337	21	21	20	20	121	101	124	124	126	70
6	67	339	21	21	20	20	131	100	125	125	118	68
7	74	338	20	21	21	20	120	99	127	212	104	60
8	118	338	21	21	20	20	113	99	124	347	116	67
9	73	338	21	21	20	20	113	89	123	315	112	131
10	69	338	21	21	21	20	116	95	124	238	101	169
11	65	339	21	21	21	20	123	101	129	182	89	204
12	64	336	21	21	21	20	131	101	364	159	93	211
13	64	338	21	21	21	21	159	100	284	163	93	213
14	58	338	21	21	21	21	147	95	139	158	82	104
15	56	338	21	21	21	20	133	86	124	148	83	69
16	56	337	21	21	21	20	128	91	130	144	81	62
17	58	336	21	21	21	20	118	125	187	127	76	52
18	46	280	21	20	20	20	118	125	174	124	76	50
19	50	205	21	19	20	20	127	127	174	123	74	50
20	54	152	21	19	20	21	118	126	447	123	69	50
21	53	84	21	20	20	21	118	126	292	114	65	50
22	54	32	21	20	20	20	113	126	173	112	66	51
23	56	24	21	20	20	20	125	127	156	115	66	51
24	51	23	21	19	20	20	151	149	151	140	69	51
25	48	21	21	20	20	20	184	126	150	125	80	46
26	43	20	21	20	20	21	91	125	147	159	70	49
27	56	20	21	20	20	21	52	124	146	176	64	53
28	303	20	21	20	20	21	51	125	147	145	61	101
29	313	23	22	20	20	21	52	126	162	136	66	100
30	131	20	21	20	---	39	51	125	165	146	66	99
31	230	---	21	19	---	39	---	125	---	158	65	---
TOTAL	2639	6653	654	631	586	667	3287	3370	5088	4887	2880	2606
MEAN	85.1	222	21.1	20.4	20.2	21.5	110	109	170	158	92.9	86.9
AC-FT	5230	13200	1300	1250	1160	1320	6520	6680	10090	9690	5710	5170
MAX	313	339	22	21	21	39	184	149	447	347	188	213
MIN	43	20	20	19	19	20	44	68	123	112	61	46

CAL YR	2011	TOTAL	58357	MEAN	160	MAX	947	MIN	20	AC-FT	115800
WTR YR	2012	TOTAL	33948	MEAN	92.8	MAX	447	MIN	19	AC-FT	67340

MAX DISCH: 510 CFS AT 00:30 ON JUN 12,2012 GH 3.92 FT SHIFT -0.02 FT
 MAX GH: 3.92 FT AT 00:30 ON JUN 12,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06735500 BIG THOMPSON RIVER BELOW LAKE ESTES
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06734900 OLYMPUS TUNNEL (ESTES FOOTHILLS CANAL)

Water Year 2012

Location.--	Lat. N40° 22' 25.82", Long. W105° 28' 25.64" (NAD83). Gage is located on the right side of a tunnel at a covered rectangular concrete section 0.75 mi east of Olympus Dam or 2.20 mi east of the Town of Estes Park Visitors Center.
Drainage Area and Period of Record.--	Controlled release from Olympus Dam. Olympus Tunnel, a component of the Colorado-Big Thompson system conveys water from Olympus Dam (Lake Estes) to Pinewood Reservoir for subsequent diversion to other C-BT facilities. ; Daily values are available from the DWR from: April 1, 1953 to September 30, 1969; and October 1, 1979 to present.
Equipment.--	Digital incremental Sutron SDR-0001-4 shaft encoder connected to a Sutron SatLink2 Data Collection Platform (DCP) transmitting hourly in a 4-ft. by 4-ft. concrete shelter and stilling well at a rectangular concrete canal section. A SonTek Argonaut SW Acoustic Doppler Velocity Meter (ADVM) is placed in the center of the canal approximately 20-feet upstream from the shelter. An electric tape gage on the instrument bench serves as the primary reference with a supplemental staff gage located on the left wall at the canal's hatch opening. Gage is operated in cooperation of the Colorado Division of Water Resources (DWR) and the United States Bureau of Reclamation (USBR) as part of the Colorado-Big Thompson (C-BT) Project. Facilities are owned, operated and maintained by the USBR. The SonTek SW ADVM was removed on June 12, 2012. A SonTek IQ ADVM unit was placed in the tunnel at the same location on November 16, 2012.
Hydrologic Conditions.--	Controlled release from Olympus Dam. Upstream of the measurement location the tunnel is a circular concrete conduit at a lower elevation than the rectangular section. From here the canal transitions to a rectangular concrete section for approximately 100 ft. before returning to a circular concrete conduit and changing slope again. Because of these transitions and the absence of stilling areas in this reach, the channel does not present a typical velocity distribution. Starting this year, the 5-point measurement technique (Rantz et al, 1983) has been employed. The 5-point measurement returns lower calculated discharges than the 3-point and 2-point measurement techniques. These discharges tend to agree closer to USBR mass balance figures and generation figures taken from the Pole Hill power generation facility.
Gage-Height Record.--	The primary record is 15-minute logged DCP data with 5-minute logged SDR data as backup. The record is complete and reliable except for several hours on June 15, 2012 when the float got hung-up on obstructions in the stilling well during a rapid increase in stage. To resolve this issue a cylinder was added to the stilling well on June 26, 2012. However, after installation of the float cylinder the instrument's float was set in the reverse orientation. The instrument's rotational orientation again changed on June 27, 2012 by USBR staff. A spreadsheet was used to develop the gage-height record during the affected period. Instrument calibration was supported by 62 visits to the gage by CDWR and USBR staff. Three instrument corrections aside from corrections associated with the above events were made. Corrections made to the instrument ranged from -0.06 ft. to +0.01 ft. They were applied to the record as defined by observations made to the gage and corrections made to the instrument.
Datum Corrections.--	Levels were run to the ETI on October 10, 2012 using BM1 as base. The ETI was found to be reading 0.009 ft. low and the staff gage was found to be 0.017 ft. high. No correction was made to the ETI as it was within allowable tolerances. No correction was possible to the staff gage as the Bureau was moving a full tunnel at the time of levels. RM 2, the top of the north most bolt on the hatch cover bracket was also established on this date.
Rating.--	The control is a rectangular concrete canal section. Rating No. 7 in use since October 2005 was continued again this year. Rating No. 7 was created using Rating No. 6 (defined by measurements) up to about 4.30 feet of stage and 272 cfs. Above this point Rating No. 7 is not based on measurements, but instead is based on USBR estimates of flow released into Olympus Tunnel. These estimates assumed that the Adams Tunnel rating was computing discharge correctly. However since 2011, shifts have been applied to the Adams Tunnel structure refuting this assumption. Rating No. 7 still remains a temporary solution until more resolution of noted discrepancies can be fully documented. Olympus Tunnel does not present a typical velocity distribution, and as such conventional measurement techniques will mismeasure this structure. On March 27, 2008 a SonTek SW ADVM was installed in the center section of Olympus Tunnel approximately 20-feet upstream from the gage shelter. This ADVM was found inadequate in collection of velocities. A SonTek IQ ADVM was placed on November 16, 2012 and is currently being evaluated. Hopes are that a velocity-indexed rating can be developed and will help resolve issues associated with this gage. Nine discharge measurements (Nos. 469-477) were made this year ranging in discharge from 106 to 573 cfs covering most of the operational range of this structure. Measurements made this year and three observations of no flow cover the range in stage experienced this year well. The peak discharge of 640 cfs occurred at 20:30 on June 26, 2012 at a gage-height of 8.96 ft. with a shift of +0.21 ft. It exceeded the high flow measurement (No. 469) made May 4, 2012 by 67 cfs and 1.07 ft. of stage respectively.
Discharge.--	From October 1 through October 28, 2011 the rating was directly applied to the gage-height record for continuity with last year's record. From October 28, 2011 through October 3, 2012 stage dependent shifting using variable shift table OLYTUNCOVS_12-A was used. OLYTUNCOVS_12-A is defined by twelve measurements (Nos. 468 - 479) made during and adjacent to the period of application. Measurements made showed shifts varying from 0.00 ft. to +0.34 ft. Measurement Nos. 469, 470, 472, 473, 475, 477 and 478 were discounted up to 1.78 percent to smooth the stage-shift relationship.
Special Computations.--	Zero flow is determined operationally. Residual gage-heights of 0.16 ft and below have been recorded and observed when the tunnel has been dewatered. Zero flow was determined to have occurred on part of the day or the whole day on the following days: October 28 through December 28, 2011 and June 12 through 14, 2012. Gage-heights for the hours when the float's operation was impaired by obstructions in the well was estimated on a basis of the stage where the float stopped at and the stage that was observed when issue was resolved. A spreadsheet was developed to compute the gage-height record when the instrument's float was in the reverse orientation. Measurement No. 479 was compared to the power generation curve at the Pole Hill power generation facility. The 5-point discharge measurement compared well to generation rate recorded.

Remarks.-- The record from October 1 through October 28, 2012 is fair. The remainder of the record is good with exception of June 15, 2012 which is estimated and poor. Gage maintained and record developed by Russell V. Stroud.

Recommendations.-- Levels should be run again at the end of WY2013 to verify findings of the most recent levels. Although within allowable tolerances; if the base reference is found to be out of calibration again in the same direction and magnitude it should be corrected. Discharge measurements should be crosschecked with power generation figures. This method could also be used to better refine a future stage-discharge relationship or a velocity-indexed rating. Brief inspection of the OLYTUNCO05 rating showed better agreement with measurements made this year than rating No. 6 and No. 7. Rating No. 5's history and application should be further investigated. Reinstatement or refining of this rating may be applicable. Five point current meter measurements need to be continued and made at targeted stages for development of a velocity indexed rating. Every effort should be made to perform these measurements and develop the rating in an expeditious manner, requiring close coordination with USBR Water Scheduling staff.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06734900 OLYMPUS TUNNEL (ESTES FOOTHILLS CANAL)

RATING TABLE.-- OLYTUNCO07 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

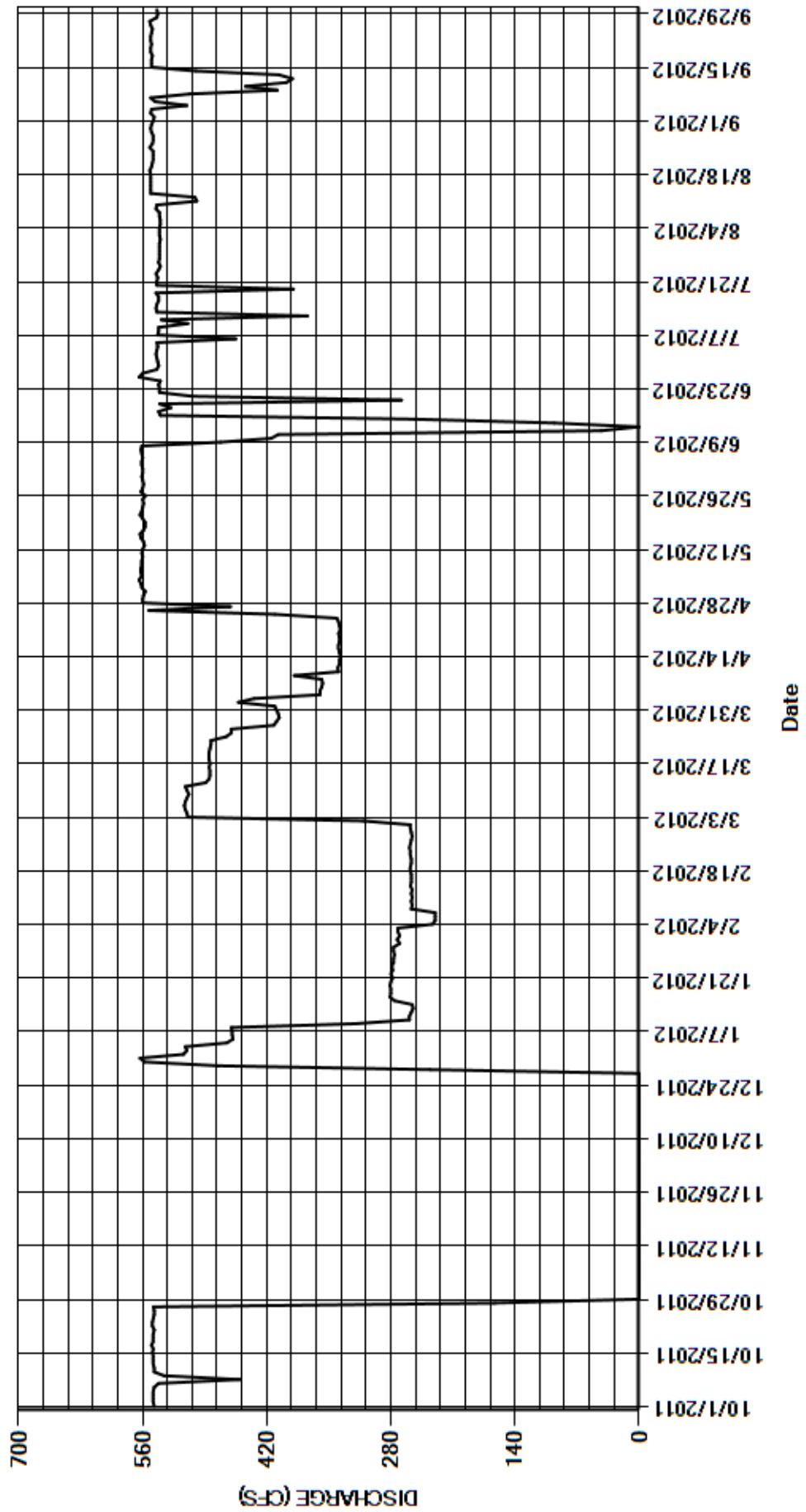
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	547	0.00	0.00	514	270	258	411	557	560	544	540	548
2	548	0.00	0.00	510	272	311	452	561	560	545	541	547
3	548	0.00	0.00	512	272	509	434	562	561	544	541	551
4	548	0.00	0.00	465	233	510	360	564	561	543	541	550
5	548	0.00	0.00	458	230	512	360	561	560	544	540	510
6	547	0.00	0.00	459	230	513	358	562	561	455	540	546
7	542	0.00	0.00	459	230	512	357	562	562	543	541	551
8	450	0.00	0.00	460	257	510	358	561	561	542	541	507
9	536	0.00	0.00	320	256	508	389	561	472	542	545	408
10	547	0.00	0.00	259	257	510	339	560	415	509	544	444
11	547	0.00	0.00	259	256	512	340	561	407	539	499	398
12	548	0.00	0.00	257	257	489	338	560	43	374	501	391
13	548	0.00	0.00	255	256	485	338	558	0.00	544	551	406
14	548	0.00	0.00	256	258	484	337	559	96	545	551	500
15	549	0.00	0.00	276	257	484	338	562	e253	544	551	550
16	548	0.00	0.00	281	257	485	339	563	540	542	551	550
17	550	0.00	0.00	280	257	484	339	559	542	542	551	550
18	548	0.00	0.00	280	258	485	338	557	528	545	551	549
19	548	0.00	0.00	281	258	485	338	557	541	390	552	551
20	548	0.00	0.00	280	257	485	339	560	268	544	550	551
21	547	0.00	0.00	278	257	484	337	563	504	544	549	550
22	549	0.00	0.00	280	258	483	338	561	541	543	548	551
23	549	0.00	0.00	278	258	483	339	560	541	545	548	551
24	548	0.00	0.00	279	259	466	341	559	542	542	548	550
25	547	0.00	0.00	277	258	460	411	560	540	540	552	549
26	547	0.00	0.00	277	257	460	553	557	564	542	549	551
27	548	0.00	0.00	276	256	412	461	562	560	541	548	552
28	163	0.00	236	277	257	409	560	560	544	541	548	544
29	0.00	0.00	475	277	258	406	560	559	542	541	550	543
30	0.00	0.00	558	270	---	407	559	560	543	541	551	544
31	0.00	---	563	273	---	409	---	561	---	541	550	---
TOTAL	14841.00	0.00	1832.00	10163	7396	14410	11661	17369	14012.00	16381	16863	15643
MEAN	479	0.000	59.1	328	255	465	389	560	467	528	544	521
AC-FT	29440	0	3630	20160	14670	28580	23130	34450	27790	32490	33450	31030
MAX	550	0.00	563	514	272	513	560	564	564	545	552	552
MIN	0.00	0.00	0.00	255	230	258	337	557	0.00	374	499	391

CAL YR	2011	TOTAL	148181.50	MEAN	406	MAX	563	MIN	0.00	AC-FT	293900
WTR YR	2012	TOTAL	140571.00	MEAN	384	MAX	564	MIN	0.00	AC-FT	278800

MAX DISCH: 640 CFS AT 20:30 ON JUN 26,2012 GH 8.96 FT SHIFT 0.21 FT
 MAX GH: 8.96 FT AT 20:30 ON JUN 26,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06734900 OLYMPUS TUNNEL (ESTES FOOTHILLS CANAL)
 WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06736000 NORTH FORK BIG THOMPSON RIVER AT DRAKE
Water Year 2012

Location.-- Lat. N40°25'59.77"; Long. W105°20' 23.04" (NAD83) Larimer County, CO. Gage is located on the right bank of channel approximately 400 ft. upstream from the confluence with the Big Thompson River in Drake, CO.

Drainage Area and Period of Record.-- 85.1 mi² (USGS Colorado StreamStats utility).; Daily values are available from May 14, 1947 to September 30, 1955 and October 1, 1978 to present.

Equipment.-- Digital incremental Sutron 8500 shaft encoder connected to a Sutron SatLink1 Data Collection Platform (DCP) transmitting hourly, and a graphical chart recorder in a 42-inch Corrugated Metal Pipe (CMP) shelter and stilling well. The stilling well is connected to the stream via two 2-inch inlets equipped with gate valves, street keys and a flushing tank (exterior). An Electric Tape Gage (ETG) located on the instrument shelf is the primary reference with a supplemental cantilever chain gage located 10-feet upstream of the shelter. An additional inlet was added on May 4, 2012. A flush riser was added but not plumbed into the existing flush tank. The graphic chart recorder was removed on October, 1, 2012.

Hydrologic Conditions.-- Drainage area consisting of mainly forested lands and canyons of varying topography. The town of Glen Haven, other residential properties and a state highway are built along the side of much of the north fork channel.

Gage-Height Record.-- The primary record is 15-minute satellite data with 15-minute logged DCP data and chart record as backup. Instrument calibration was supported by nineteen visits to the gage. Two instrument corrections of +0.01 ft. and -0.01 ft. were made and applied to the record as defined by visits made to the gage. The record is complete and reliable, except as follows: October 25-28, November 3-11, 16-17, 20-23, 25-27 and 29 through December 2, 2011 when the stage-discharge relation was affected by ice; December 3, 2011 through March 25, 2012 when the stilling well was frozen and March 26, 2012 which is a partial day record corresponding to reactivation of the gage for the season. Three flushing corrections of +0.02 ft., +0.01 ft. and +0.01 ft. were made this year. Flush corrections were applied to the record from the last stage inflection to the point of correction. Similarly, three debris removal corrections of -0.01 ft. occurred this year. Debris removal corrections were applied to the record as shifts.

Datum Corrections.-- Levels were last run on September 9, 2010 to verify RM establishment. No correction was required to the primary reference.

Rating.-- The control for low to moderate stages is a low head concrete dam located approximately 8-feet downstream of the shelter. The channel is the control at higher stages. There is little freeboard in this channel and the controlling feature for flood level stages has not been determined. Rating BTNFDRCO11, in use since October 1, 2002 was continued in use for all of WY2012. It is defined by measurements from the Point of Zero Flow (PZF) occurring at 3.41 ft. to 232 cfs. Fifteen discharge measurements (Nos. 361- 375) were made this year, ranging in discharge from 5.23 to 36.4 cfs covering the range in stage experienced this year well. The peak discharge of 50.9 cfs occurred at 23:00 on July 7, 2012 at a gage-height of 4.16 ft. with a shift of +0.01 ft. It exceeded this year's high flow Measurement (No. 369) by 14.5 cfs and 0.09 ft. of stage.

Discharge.-- Shifting control method was used for all periods of open water. Shifts are caused by accumulation of debris on the control, fill and scour of material in the gage pool and noted accelerated deterioration of the control. Shifts were distributed by time as defined by measurements. Open water measurements showed shifts varying between 0.01 and 0.03 ft., all in the positive direction. All were given full weight except for No. 370, a training measurement, which was discounted -5.16% to smooth the shift distribution and better match measurement No. 371 made concurrently. Measurement No. 372 was not used as the velocity probe was found to be loose partway through the measurement.

Special Computations.-- Discharge for ice affected periods and winter periods were estimated from adjacent good record, temperature trends and discharge measurements made during the winter period. Shifts for debris removal events were applied on a basis of the magnitude of the debris removal correction aggregated with the measurement shift made immediately following the debris removal.

Remarks.-- The record is good, except for periods of ice affect and no gage-height record, which are estimated and poor. Station operated and record developed by Russell V. Stroud.

Recommendations.-- Degradation of the control noted in previous years continues. Levels run on October 15, 2009 indicated the PZF elevation was 3.40 feet; whereas levels run on September 9, 2010 indicate that the PZF is now at 3.15 feet at a location where the control had failed. Although well defined, the control should be replaced. Plans have been developed to replace the control and shelter such that when funds come available immediate action can be taken. The new inlet will placed on May 4, 2012 helped resolve sluggish inlet issues seen in previous years. If inlet plugging continues, a Sutron Constant Flow Bubble (CFB) will be placed as an emergency solution. Installation of a bank operated cableway should be evaluated to help define the upper portion of the rating.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06736000 NORTH FORK BIG THOMPSON RIVER AT DRAKE

RATING TABLE.-- BTNFDRCO11 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

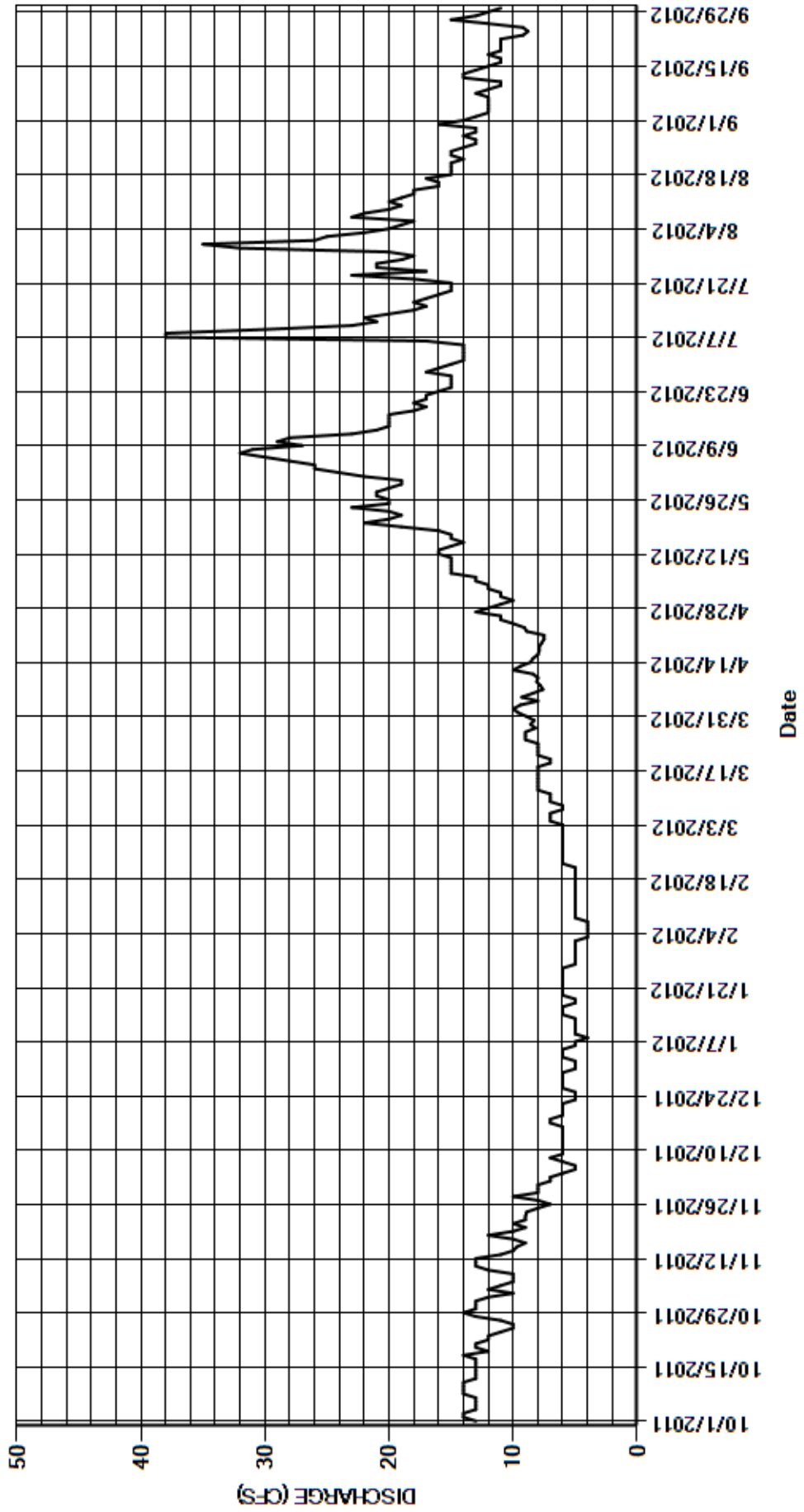
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13	13	e8.0	e5.0	e5.0	e6.0	9.6	11	22	14	26	14
2	14	12	e7.0	e5.0	e5.0	e6.0	10	11	24	14	25	13
3	14	e10	e7.0	e6.0	e4.0	e6.0	9.4	12	26	14	22	12
4	13	e12	e6.0	e6.0	e4.0	e7.0	8.0	12	26	14	20	12
5	13	e11	e5.0	e6.0	e4.0	e7.0	9.3	13	28	14	19	12
6	13	e10	e5.0	e5.0	e4.0	e7.0	8.4	13	30	17	18	12
7	13	e10	e6.0	e5.0	e4.0	e6.0	7.6	15	32	38	23	12
8	14	e10	e7.0	e4.0	e5.0	e6.0	7.8	15	31	38	22	13
9	14	e12	e6.0	e5.0	e5.0	e7.0	8.1	15	27	30	20	12
10	14	e13	e6.0	e5.0	e5.0	e7.0	8.0	15	29	23	19	11
11	14	e13	e6.0	e5.0	e5.0	e7.0	8.4	15	28	21	20	11
12	13	13	e6.0	e5.0	e5.0	e8.0	10	16	23	22	19	14
13	13	11	e6.0	e5.0	e5.0	e8.0	9.4	16	21	20	18	14
14	13	10	e6.0	e6.0	e5.0	e8.0	8.6	15	20	18	18	13
15	13	9.7	e6.0	e6.0	e5.0	e8.0	8.4	14	20	17	16	12
16	13	e9.0	e6.0	e6.0	e5.0	e8.0	8.0	15	20	18	16	11
17	13	e10	e7.0	e5.0	e5.0	e8.0	7.9	15	20	17	17	11
18	14	12	e7.0	e5.0	e5.0	e8.0	7.9	16	18	16	15	12
19	12	10	e6.0	e6.0	e5.0	e7.0	7.7	19	17	15	15	11
20	13	e9.0	e6.0	e6.0	e5.0	e7.0	7.5	22	18	15	15	11
21	13	e10	e6.0	e6.0	e5.0	e8.0	7.5	20	17	15	15	11
22	12	e9.0	e6.0	e6.0	e6.0	e8.0	8.9	19	17	18	14	11
23	12	e9.0	e5.0	e6.0	e6.0	e8.0	9.1	20	16	23	15	9.2
24	11	8.9	e5.0	e6.0	e6.0	e8.0	10	23	15	17	15	8.8
25	e10	e8.0	e5.0	e6.0	e6.0	e9.0	11	20	15	21	14	9.2
26	e10	e7.0	e6.0	e6.0	e6.0	e9.0	11	20	15	21	13	12
27	e11	e8.0	e6.0	e5.0	e6.0	9.0	13	21	15	19	13	15
28	e13	10	e6.0	e5.0	e6.0	8.2	12	21	17	18	14	13
29	14	e8.0	e6.0	e5.0	e6.0	8.6	11	20	16	20	13	12
30	13	e8.0	e6.0	e5.0	---	8.3	10	19	15	32	13	11
31	13	---	e5.0	e5.0	---	8.9	---	19	---	35	16	---
TOTAL	398	305.6	187.0	168.0	148.0	235.0	273.5	517	638	634	538	355.2
MEAN	12.8	10.2	6.03	5.42	5.10	7.58	9.12	16.7	21.3	20.5	17.4	11.8
AC-FT	789	606	371	333	294	466	542	1030	1270	1260	1070	705
MAX	14	13	8.0	6.0	6.0	9.0	13	23	32	38	26	15
MIN	10	7.0	5.0	4.0	4.0	6.0	7.5	11	15	14	13	8.8

CAL YR	2011	TOTAL	13657.4	MEAN	37.4	MAX	193	MIN	4.0	AC-FT	27090
WTR YR	2012	TOTAL	4397.3	MEAN	12.0	MAX	38	MIN	4.0	AC-FT	8720

MAX DISCH: 50.9 CFS AT 23:00 ON JUL 07,2012 GH 4.16 FT SHIFT 0.01 FT
 MAX GH: 4.16 FT AT 23:00 ON JUL 07,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06736000 NORTH FORK BIG THOMPSON RIVER AT DRAKE
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
DILLE TUNNEL NEAR DRAKE

Water Year 2012

Location.--	Lat. N40° 25' 6.16", Long. W105° 14' 36.10" (NAD83, Spotted from topographic map). Gage is located at the West portal of Dille Tunnel.
Drainage Area and Period of Record.--	Controlled diversion. ; Daily values are available from 1950 to present.
Equipment.--	Digital incremental Sutron SDR-0001-1 shaft encoder connected to a Sutron SatLink2 Data Collection Platform (DCP) transmitting hourly in a rectangular concrete shelter over top a concrete stilling well near an 8-ft. Parshall Flume. The gage is equipped with an electric tape gage located on the instrument shelf serving as the primary and only active reference. A staff gage is located at the flume's Ha location but cannot be observed when the flume is operational as the flume is located approximately 80-feet downstream in the tunnel. The gage is owned by the United States Bureau of Reclamation (USBR) and is operated cooperatively by the USBR, Northern Colorado Water Conservancy District (NCWCD) and the Colorado Division of Water Resources (CDWR) as a component of the C-BT project.
Hydrologic Conditions.--	Controlled diversion. Flow is regulated by a check structure and radial gate diverting water from the Big Thompson River to the Charles Hansen Feeder Canal several miles downstream. Waters delivered to the feeder canal can then be subsequently conveyed to terminal storage at Horsetooth Reservoir or used for power generation at the Big Thompson Power Plant (BTPMCCO) with subsequent delivery back to the Big Thompson River or directly returned to the river via the Charles Hansen Feeder Canal Wasteway (HFCWASCO) structure. A large stilling basin and energy dissipation devices are located downstream from the radial gate and upstream from the flume's converging section. Direct observation of the flume's performance is not possible.
Gage-Height Record.--	The primary record is 15-minute telemetered data with 15-minute logged DCP and SDR data as backup. Frequent visits by NCWCD and DWR personnel showed good agreement between the sensor and base gage. The record is complete and reliable. Instrument calibration was supported by approximately 200 visits made to the gage by NCWCD and DWR staff. Four instrument corrections ranging from +0.01 to -0.01 ft. were made. Only two of the corrections were applied to the record as the other corrections (both -0.004 ft.) were too insignificant to be seen in the gage-height record. The SDR's float does not completely go to zero when the tunnel is not in use but the forebay is still charged. Levels and flume inspection on October 9, 2007 and again on November 16, 2012 found the inlet invert approximately 0.09 feet above the flume floor and crest. This observation is consistent with notations of positive stage readings occurring at zero flow as well as previous years point of zero flow (PZF) stage assumptions. Note: Flume entry for cleaning or any other purpose is strictly prohibited without prior authorization and lock-out tag-out procedures as per USBR Hazardous Energy Control Program (HECP) policy (document on file).
Datum Corrections.--	Levels were run on October 9, 2007 using the flume's crest as base. The tape was replaced on October 18, 2007 and cut to the index elevation of 19.87 ft. Levels were run again on November 16, 2012 using the flume's crest as base. The base reference was found to be 0.006 ft. high. No corrections were made as the reference is within allowable tolerances.
Rating.--	Rating table STD08FTPFEEXP, implemented on October 1, 2007, was continued again this year. It is a standard 8-ft. Parshall Flume rating expanded formulaically to 5.35 feet of stage using a standard 8-ft. Parshall flume formula. In previous years, the gage had been directly measured infrequently due to considerable safety hazards. More recently, per USBR HEPC policies, the structure has not been measured or observed directly as the measurement structure cannot be entered when water is actively being diverted. Mass balance computations and indirect measurements (when conditions allow) are now used to track this structure's performance. Although no measurements were made this year, mass balance computations indicate reliable performance. This year's peak of 391 cfs occurred at 23:45 on June 20, 2012 at gage height of 4.75 ft. using a zero shift.
Discharge.--	Per agreement with the USBR, NCWCD and Water Commissioner the rating is directly applied to the gage-height record. Mass balance computations made periodically throughout the year showed reliable performance.
Special Computations.--	Zero flow is determined operationally with consideration given to operational constraints and observations made to the gage by NCWCD personnel. Zero flow was determined to occur part of the day of the entire day on the following days: October 14-31, November 21, 2011 through April 4, April 26 through May 17, September 7-10, 14 and September 25 through October 10, 2012. Operations at the Big Thompson River Below Lake Estes (BTBLESCO) and mass balance computations on the Charles Hansen Feeder Canal confirm zero flow operation.
Remarks.--	The record is good. Flow at this station is intermittent; dependent on river flows, C-BT water orders, and other regulations. Station maintained and record developed by Russell V. Stroud. Discharge measurements are not made in the flume or tunnel for safety reasons. Measurement opportunities are limited at the tunnel's east portal due to backwater from Hansen Feeder Canal. Performing measurements upstream of the tunnel diversion is not possible due to swift water conditions and excessive depth issues. Likewise, cable and Acoustic Doppler Current Profiler measurements are not possible at or near the DILTUNCO diversion. Mass balance computations and indirect measurements (when conditions allow) are used to track this structure's performance.
Recommendations.--	Mass balance computations should be continued to monitor the gage's performance. Measurement opportunities similar to those seen in November 2010 should be watched and planned for.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

DILLE TUNNEL NEAR DRAKE

RATING TABLE-- STD08FTPFEXP USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

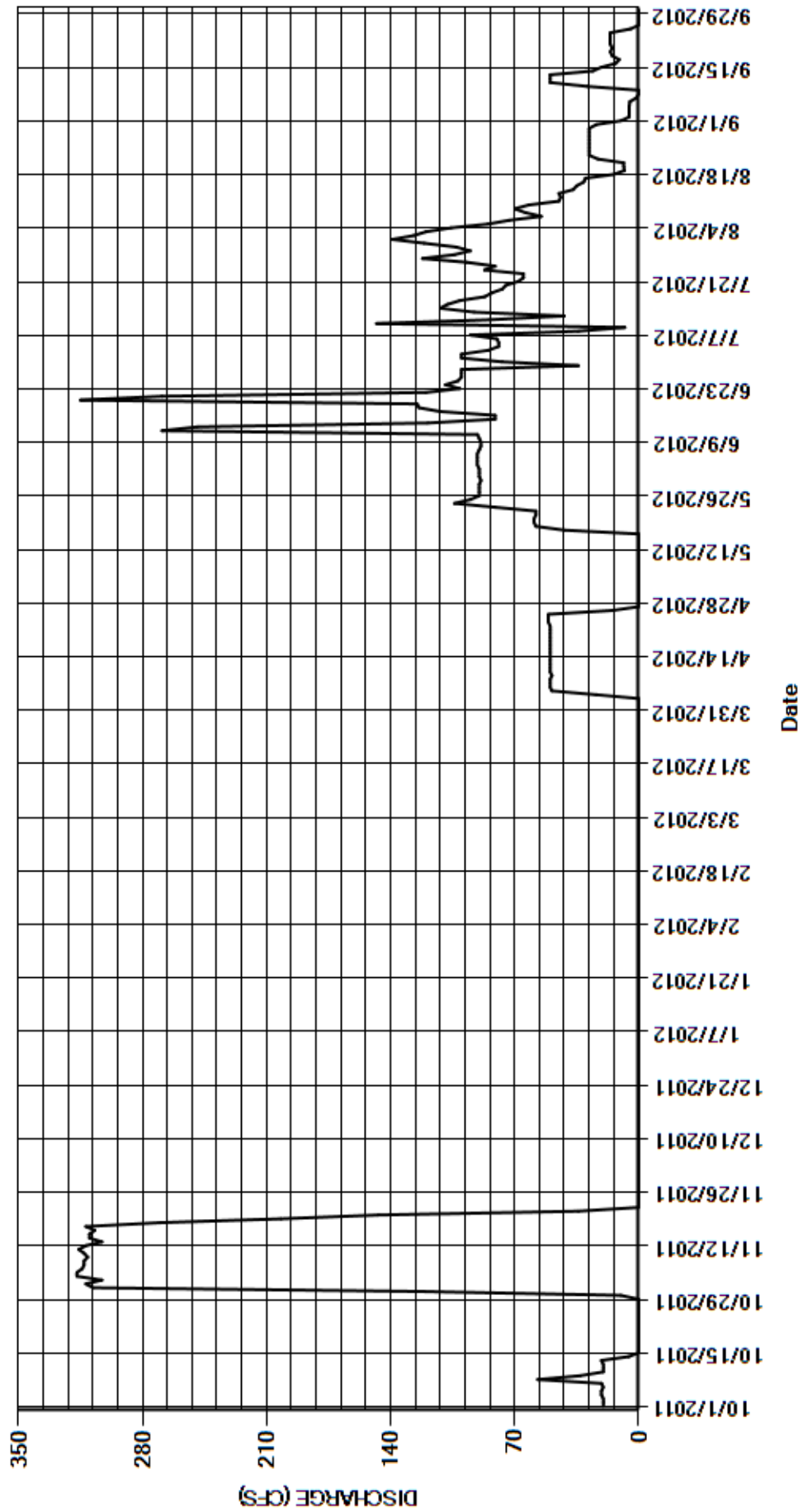
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	20	308	0.00	0.00	0.00	0.00	0.00	0.00	90	100	139	10
2	20	312	0.00	0.00	0.00	0.00	0.00	0.00	90	100	127	5.4
3	20	303	0.00	0.00	0.00	0.00	0.00	0.00	91	85	120	5.4
4	21	317	0.00	0.00	0.00	0.00	24	0.00	91	79	106	5.3
5	21	317	0.00	0.00	0.00	0.00	49	0.00	91	79	85	5.3
6	20	314	0.00	0.00	0.00	0.00	50	0.00	91	80	73	5.0
7	21	313	0.00	0.00	0.00	0.00	50	0.00	90	95	55	1.3
8	57	313	0.00	0.00	0.00	0.00	50	0.00	89	34	64	0.00
9	33	311	0.00	0.00	0.00	0.00	49	0.00	89	7.8	70	0.00
10	20	313	0.00	0.00	0.00	0.00	50	0.00	90	148	62	29
11	20	316	0.00	0.00	0.00	0.00	50	0.00	91	84	45	50
12	20	312	0.00	0.00	0.00	0.00	50	0.00	269	42	44	50
13	21	303	0.00	0.00	0.00	0.00	50	0.00	249	93	45	50
14	5.6	310	0.00	0.00	0.00	0.00	50	0.00	119	112	37	26
15	0.00	310	0.00	0.00	0.00	0.00	50	0.00	81	108	35	21
16	0.00	307	0.00	0.00	0.00	0.00	50	0.00	81	101	31	13
17	0.00	312	0.00	0.00	0.00	0.00	50	42	112	87	30	11
18	0.00	270	0.00	0.00	0.00	0.00	50	58	124	83	14	15
19	0.00	202	0.00	0.00	0.00	0.00	50	59	125	77	8.1	16
20	0.00	147	0.00	0.00	0.00	0.00	50	59	315	75	8.4	15
21	0.00	34	0.00	0.00	0.00	0.00	50	58	269	68	8.4	16
22	0.00	0.00	0.00	0.00	0.00	0.00	50	58	120	65	23	16
23	0.00	0.00	0.00	0.00	0.00	0.00	51	81	101	65	28	16
24	0.00	0.00	0.00	0.00	0.00	0.00	51	104	109	87	28	16
25	0.00	0.00	0.00	0.00	0.00	0.00	51	95	102	81	28	4.6
26	0.00	0.00	0.00	0.00	0.00	0.00	15	90	100	97	28	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	90	100	122	28	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	90	100	104	28	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	90	34	95	28	0.00
30	10	0.00	0.00	0.00	---	0.00	0.00	89	77	103	28	0.00
31	121	---	0.00	0.00	---	0.00	---	90	---	121	24	---
TOTAL	450.60	5944.00	0.00	0.00	0.00	0.00	1090.00	1153.00	3580	2677.8	1477.9	402.30
MEAN	14.5	198	0.000	0.000	0.000	0.000	36.3	37.2	119	86.4	47.7	13.4
AC-FT	894	11790	0	0	0	0	2160	2290	7100	5310	2930	798
MAX	121	317	0.00	0.00	0.00	0.00	51	104	315	148	139	50
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	34	7.8	8.1	0.00

CAL YR	2011	TOTAL	34216.80	MEAN	93.7	MAX	394	MIN	0.00	AC-FT	67870
WTR YR	2012	TOTAL	16775.60	MEAN	45.8	MAX	317	MIN	0.00	AC-FT	33270

MAX DISCH: 391 CFS AT 23:45 ON JUN 20,2012 GH 4.75 FT SHIFT 0 FT
 MAX GH: 4.75 FT AT 23:45 ON JUN 20,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

DILLE TUNNEL NEAR DRAKE
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06738000 BIG THOMPSON RIVER AT MOUTH OF CANYON NEAR DRAKE
Water Year 2012

Location.-- Lat. 40°25'18", Long. 105°13'34" (NAD 83) , in Larimer County, CO; Hydrologic Unit 10190006. Gage is on the right bank at mouth of canyon, 400 ft upstream from Handy Ditch diversion dam, and 6.0 mi east of Drake.

Drainage Area and Period of Record.-- 305 mi²; 1927-1933, 1938 to present.

Equipment.-- Sutron Constant Flow Bubbler (CFB) in 6-foot by 6-foot pre-cast concrete shelter at a low head concrete dam control. A cantilever style wire weight gage located on the right edge of water near the shelter is the primary reference with no provisions for a supplemental reference. The CFB is connected to a Sutron Satlink II Data Collection Platform (DCP) at the Hansen Feeder Canal Wasteway to the Big Thompson River (HFCWASCO) via a Design Analysis H-423 (SDI-12 to RS-485 converter unit) carried by buried copper wire placed by the United States Bureau of Reclamation (USBR). A Design Analysis H-416 (SDI-12 to 4-20mA converter) is also connected to the CFB unit to provide a Supervisory Control and Data Acquisition (SCADA) output to the USBR's control center. A Tacoma style bank operated cableway was placed approximately 120-ft. upstream from the gage shelter in April 2010. Cableway installation will allow for measurement of flows that were not captured in previous years due to condemnation and subsequent removal of the manned cableway. This gage is operated and maintained by the Colorado Division of Water Resources (DWR) and is simultaneously used by the DWR, USBR, Northern Colorado Water Conservancy District (NCWCD) and the Handy Ditch Company.

Hydrologic Conditions.-- Drainage area consisting of widely varying terrain, vegetative types, hardened surfaces and one substantial diversion, Dille Tunnel Near Drake, CO (DILTUNCO). Flow patterns are largely regulated by Colorado Big Thompson (C-BT) Project operations occurring upstream from this gage from Lake Estes to the DILTUNCO site. Bank inflow into the channel below the control continues to be an issue and is suspected to have increased in the past several years. Water traveling around the gage and control structures may contribute to differences seen in mass balance computations within the Big Thompson Canyon system.

Gage-Height Record.-- The primary record is 15-minute telemetered CFB data with the CFB's independent log and logged DCP values as backup. The record is complete and reliable except for: December 5 and 6, 2011 when the stage-discharge relation was affected by ice; December 7, 2011 and March 16, 2012, partial day records corresponding to instrument deactivation and activation days and December 8, 2011 – March 15, 2012, gage was shut down for winter, no gage-height information available.

Datum Corrections.-- Levels were run on October 10, 2012, verifying level results from the October 30, 2008 and October 15, 2009 level runs (-0.051 and -0.044 feet respectively). The correction was made at the time of levels and was applied to the gage-heights of discharge measurements as well as the record from October 1, 2011 through the time of correction.

Rating.-- The control is a concrete dam approximately 20 feet below the gage shelter. Rating No. 16 in use since October 1, 2000 was continued this year. It is defined by measurements from 4 to 2100 cfs. Flows up to about 150 cfs can be waded near the gage. Flows above the wadeable limit are measured using the Tacoma style bank operated cableway. Twelve discharge measurements (No's 361-372) were performed this year ranging in discharge from 24.7 to 439 cfs. The peak discharge of 708 cfs occurred at 1800 on July 7, 2012 at a gage-height of 3.85 ft. with a shift of 0.03 ft. exceeding this year's high flow measurement (No. 366) made July 8, 2012 by 0.42 ft. of stage.

Discharge.-- Shifting control method was used all year. Shifts were distributed by time as defined by measurements from October 1 through December 7, 2011 and July 8 through September 14, 2012. Stage dependent shift proration using variable shift table BTCANYCOVST12-A, defined by Measurement Nos. 352-366, was applied from March 16 through July 8, 2012; and, using variable shift table BTCANYCOVST12-B defined by Measurement Nos. 371-375 was applied from September 14 through November 14, 2012. Open water measurements made this year showed unadjusted shifts varying between -0.03 and +0.03 ft. All were given full weight except for Nos. 361, 364, 369 and 374 which were discounted up to 4.41% to smooth shift distributions.

Special Computations.-- Winter measurements are not made at this gage due to extremely heavy ice conditions. Discharge for the ice affected period (December 5, 6, 2011) was estimated from adjacent periods of good record and correlated to a mass balance calculation [BTBLESICO + BTNFDRCO – DILTUNCO = BTCANYCO (spreadsheet included in digital file)]. Likewise discharge for the winter period (December 7, 2011 through March 16, 2012) was computed from the mass balance calculation with respect to temperature data logged at the HFCWASCO. Reasonable agreement is illustrated from the computed BTCANYCO record and actual BTCANYCO record prior to as well as following winter operations.

Remarks.-- The record is good, except for periods of ice effect and the winter estimation period, which are estimated and poor. Station maintained by Russell V. Stroud and record developed by Matt Rusch.

Recommendations.-- Strict adherence to running levels twice per year is required. The stability of the control, reference points and the Point of Zero Flow (PZF) is questionable and needs to be monitored and substantiated. Inflow immediately below the control needs to be monitored for "piping" of road base material as well as significant changes in discharge.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06738000 BIG THOMPSON RIVER AT MOUTH OF CANYON NEAR DRAKE

RATING TABLE.-- BTCANYCO16 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

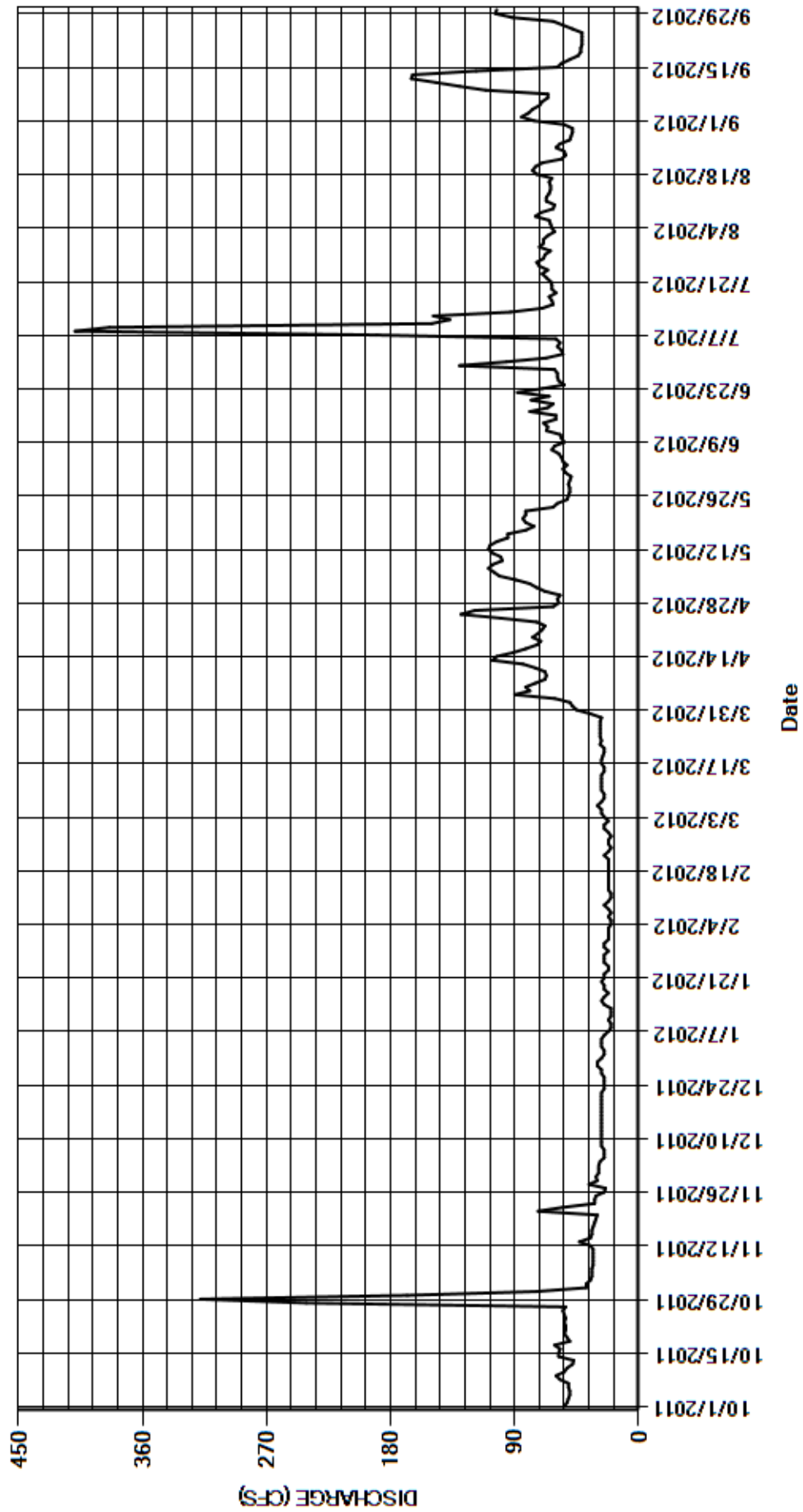
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	54	38	29	e25	e22	e25	48	68	53	67	69	76
2	52	38	e29	e25	e22	e22	50	74	55	55	66	85
3	51	35	e29	e27	e22	e25	61	79	52	56	61	80
4	50	34	e28	e27	e20	e27	90	89	55	59	63	77
5	50	34	e25	e27	e20	e27	79	101	56	57	64	72
6	51	34	e25	e25	e22	e30	82	105	58	60	65	70
7	51	33	e25	e22	e20	e27	75	109	63	190	75	66
8	57	33	e27	e20	e22	e25	68	106	61	409	71	66
9	60	33	e27	e20	e25	e25	67	99	54	384	62	111
10	54	33	e27	e22	e22	e27	68	100	56	150	61	130
11	52	33	e27	e20	e20	e27	75	106	57	137	67	147
12	48	35	e27	e20	e20	e27	84	109	67	149	67	165
13	47	43	e27	e20	e22	e27	106	108	66	93	65	164
14	58	35	e27	e25	e22	e27	103	103	69	70	64	118
15	58	34	e27	e27	e22	e25	91	95	60	62	64	59
16	57	34	e27	e25	e22	e25	82	95	60	63	65	56
17	61	33	e27	e22	e22	27	74	82	79	65	63	50
18	50	32	e27	e25	e22	27	71	76	66	60	74	44
19	52	31	e27	e25	e22	26	77	82	62	63	77	42
20	54	30	e27	e27	e22	25	73	84	78	63	75	42
21	53	73	e27	e25	e22	25	70	82	65	64	70	41
22	53	55	e27	e25	e25	28	68	82	88	67	56	41
23	54	32	e25	e22	e22	27	74	62	70	70	53	41
24	53	32	e25	e22	e20	28	100	59	54	66	54	41
25	54	31	e25	e25	e22	28	129	52	58	72	60	48
26	55	25	e25	e25	e22	28	119	51	59	74	57	55
27	53	24	e27	e25	e20	28	62	50	59	69	50	62
28	241	36	e27	e22	e22	28	58	50	61	68	49	92
29	318	30	e30	e25	e25	27	59	51	130	64	48	104
30	168	31	e30	e25	---	35	57	50	96	72	48	103
31	74	---	e27	e22	---	45	---	49	---	69	54	---
TOTAL	2243	1054	836	739	633	850	2320	2508	1967	3067	1937	2348
MEAN	72.4	35.1	27.0	23.8	21.8	27.4	77.3	80.9	65.6	98.9	62.5	78.3
AC-FT	4450	2090	1660	1470	1260	1690	4600	4970	3900	6080	3840	4660
MAX	318	73	30	27	25	45	129	109	130	409	77	165
MIN	47	24	25	20	20	22	48	49	52	55	48	41

CAL YR	2011	TOTAL	36026	MEAN	98.7	MAX	712	MIN	24	AC-FT	71460
WTR YR	2012	TOTAL	20502	MEAN	56.0	MAX	409	MIN	20	AC-FT	40670

MAX DISCH: 708 CFS AT 18:00 ON JUL 07,2012 GH 3.85 FT SHIFT 0.03 FT
 MAX GH: 3.85 FT AT 18:00 ON JUL 07,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06738000 BIG THOMPSON RIVER AT MOUTH OF CANYON NEAR DRAKE
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06739500 BUCKHORN CREEK NEAR MASONVILLE

Water Year 2012

Location.-- Lat.N40°25'19.7",Long. W105°10'34" (NAD83). Gage is on the right bank downstream from where the Larimer County Road 24H bridge crosses over the Buckhorn Creek, 4.9 miles south of Masonville, CO.

Drainage Area and Period of Record.-- 145 square miles (USGS Colorado StreamStats utility). ; April 23, 1947 - Present.

Equipment.-- Digital incremental Sutron 8500 shaft encoder connected to a Data Collection Platform (DCP) in a wooden shelter and stilling well at a timber and concrete control. An electric drop tape on the instrument shelf is the primary reference. An enameled staff gage in the weir pool is not used.

Hydrologic Conditions.-- Drainage area consists of low timber and plains drainage. Gage will intercept storm runoff but the drainage generally does not have high snow. Numerous rural road bridges and culverts span the creek upstream of the gage.

Gage-Height Record.-- The primary record is telemetered 15-minute shaft encoder data with 15-minute logged DCP data and chart record as backup. The record is complete and reliable except for: December 5-6, 22-25, 2011; January 12,17-18, 28 and February 12, 2012 when the gage had varying degrees of ice effect. Instrument calibration was maintained by 12 visit made to the gage by Colorado Division of Water Resources (CDWR) staff. No instrument corrections were made nor necessary. Missing values on October 26 and December 8, 2011 were interpolated from adjacent record without loss of accuracy.

Datum Corrections.-- Levels were last run on April 28, 2000. Levels run at that time did not indicate any correction to the base reference. However, the evels run did not follow CDWR minimum standards.

Rating.-- Low and medium water control is concrete cut-off wall with two 6-inch by 8-inch treated timbers bolted to the top of the concrete. The channel slopes up from this control towards the right bank. Higher stages also flow through the left (east) side of the bridge. The control at high stages is influenced by vegetative growth on the right side and by the channel conditions downstream of the control causing the control to submerges at high flows. Rating 10 (BUCRMVCO10), is defined by measurements to about 300 cfs. Eleven measurements (Nos. 657 - 667) were made this water year ranging in discharge from 0.57 to 4.00 cfs covering the range in stage experienced this year well, except for the peak event. The instantaneous peak flow of 423 cfs, after a early evening rain storm, occurred at 18:30 July 7, 2012 at a gage height of 8.09 ft with a shift of 0.00 ft. It exceeded the stage of this year's high Measurement (No. 664) by 3.19 feet.

Discharge.-- Shifts are caused by the movement of material through the gage pool, materials stuck on the control at lower stages and variable vegetative growth on the banks and in the channel. Shifting control method was used all year. Shifts were distributed by time as defined by measurements. Measurements made this year showed unadjusted shifts varying between -0.02 and +0.01 ft. All were given full weight except for Nos. 659 and 661 which were adjusted -18.67 and 10.7% respectively.

Special Computations.-- Discharge for periods of ice affect were estimated from adjacent good record.

Remarks.-- The record is fair, except for; periods of ice effect which are estimated and fair. The peak flow is rated poor due to lack of recent measurements confirming the upper end of the rating. Station maintained by Mark Simpson and Lee Cunning; record developed by Lee Cunning.

Recommendations.-- Outside readings are needed for all measurements and visits. The outside staff gage should be repaired or replaced. The control needs to be extended to the east where water is going around the timber. A full set of levels need to be run, re-marking all objective points. The station description needs to be updated with secondary BM information and photos.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06739500 BUCKHORN CREEK NEAR MASONVILLE

RATING TABLE-- BUCRMVCO10 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

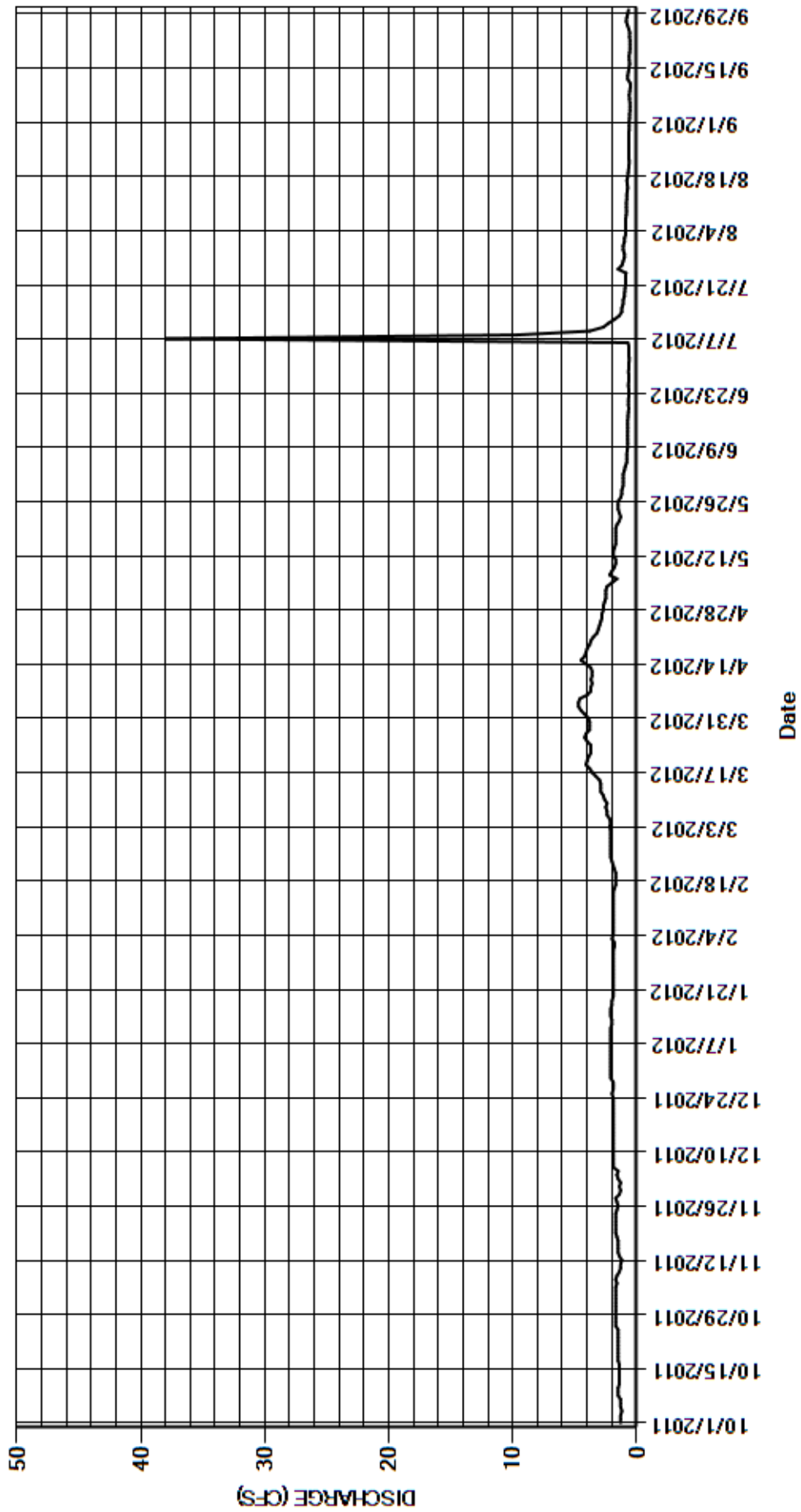
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.3	1.7	1.4	2.1	1.8	2.1	4.2	2.5	1.1	0.63	1.0	0.61
2	1.3	1.7	1.3	2.1	1.8	2.1	4.5	2.5	1.1	0.62	0.99	0.59
3	1.3	1.7	1.5	2.1	2.0	2.2	4.7	2.5	1.0	0.64	0.89	0.58
4	1.2	1.7	1.6	2.1	1.9	2.1	4.7	2.4	0.93	0.63	0.89	0.55
5	1.3	1.7	e1.5	2.1	1.9	2.2	4.6	2.0	0.82	0.63	0.88	0.54
6	1.3	1.6	e1.9	2.1	e1.9	2.4	4.0	1.6	0.81	0.72	0.90	0.55
7	1.3	1.7	1.9	2.1	1.9	2.4	3.7	2.2	0.81	38	0.89	0.59
8	1.5	1.6	1.9	2.1	1.9	2.5	3.7	2.0	0.78	9.6	0.85	0.60
9	1.5	1.4	1.9	2.1	1.9	2.4	3.6	1.8	0.74	3.8	0.82	0.56
10	1.5	1.3	1.9	2.1	1.9	2.6	3.7	1.7	0.72	2.7	0.84	0.52
11	1.4	1.3	1.9	2.1	1.9	2.7	3.6	1.7	0.73	2.3	0.84	0.53
12	1.4	1.2	1.9	e2.0	e1.9	2.9	3.6	1.9	0.74	1.8	0.81	0.72
13	1.4	1.4	1.9	2.0	1.9	2.9	3.7	1.9	0.73	1.4	0.81	0.73
14	1.4	1.5	1.9	2.1	1.9	2.9	4.1	1.8	0.72	1.2	0.78	0.68
15	1.4	1.5	1.9	2.1	1.9	3.0	4.5	1.7	0.73	1.2	0.73	0.62
16	1.4	1.5	1.9	2.1	1.8	3.3	4.2	1.7	0.73	1.1	0.77	0.58
17	1.5	1.5	1.9	e2.0	1.7	3.6	4.1	1.7	0.71	1.1	0.80	0.60
18	1.5	1.6	1.9	e2.0	1.7	3.8	4.0	1.7	0.68	1.0	0.72	0.62
19	1.5	1.7	1.9	1.9	1.7	4.1	3.8	1.7	0.64	0.98	0.69	0.57
20	1.5	1.7	1.9	1.9	1.7	4.0	3.7	1.6	0.69	0.95	0.66	0.55
21	1.5	1.7	1.9	1.9	1.8	3.9	3.5	1.4	0.68	0.90	0.63	0.55
22	1.5	1.7	e1.9	1.9	1.9	3.7	3.2	1.3	0.65	0.91	0.62	0.55
23	1.5	1.7	e1.9	1.9	2.0	3.7	3.1	1.4	0.64	0.91	0.64	0.58
24	1.5	1.7	e1.9	1.9	2.1	3.7	3.0	1.5	0.64	0.87	0.65	0.56
25	1.5	1.6	e2.0	1.9	2.1	4.0	2.9	1.5	0.68	1.5	0.63	0.64
26	1.7	1.5	1.9	1.9	2.1	4.2	2.8	1.5	0.65	1.2	0.64	0.75
27	1.7	1.6	1.9	1.9	2.1	4.1	2.8	1.3	0.65	1.1	0.65	0.85
28	1.7	1.7	1.9	e1.9	2.1	3.8	2.7	1.2	0.66	1.0	0.64	0.81
29	1.7	1.4	2.1	1.9	2.1	3.8	2.7	1.2	0.66	1.0	0.64	0.73
30	1.7	1.3	2.1	1.9	---	3.8	2.6	1.1	0.64	1.1	0.62	0.66
31	1.7	---	2.1	1.9	---	3.9	---	1.1	---	1.1	0.62	---
TOTAL	45.6	46.9	57.4	62.1	55.3	98.8	110.0	53.1	22.46	82.59	23.54	18.57
MEAN	1.47	1.56	1.85	2.00	1.91	3.19	3.67	1.71	0.75	2.66	0.76	0.62
AC-FT	90	93	114	123	110	196	218	105	45	164	47	37
MAX	1.7	1.7	2.1	2.1	2.1	4.2	4.7	2.5	1.1	38	1.0	0.85
MIN	1.2	1.2	1.3	1.9	1.7	2.1	2.6	1.1	0.64	0.62	0.62	0.52

CAL YR	2011	TOTAL	2141.30	MEAN	5.87	MAX	115	MIN	1.2	AC-FT	4250
WTR YR	2012	TOTAL	676.36	MEAN	1.85	MAX	38	MIN	0.52	AC-FT	1340

MAX DISCH: 423 CFS AT 18:30 ON JUL 07,2012 GH 8.09 FT SHIFT 0 FT
 MAX GH: 8.09 FT AT 18:30 ON JUL 07,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06739500 BUCKHORN CREEK NEAR MASONVILLE
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
CHARLES HANSEN FEEDER CANAL BELOW BIG THOMPSON SIPHON

Water Year 2012

Location.-- Lat. N40° 25'24.38", Long. W105° 13'35.81" (NAD83). Gage is located on the left side of a trapezoidal concrete canal approximately 300 ft. down canal from the Big Thompson Siphon and 4.5 mi south of Masonville, CO or 8 mi. west of Loveland, CO.

Drainage Area and Period of Record.-- N/A.; Daily values are available from January 1, 1951 to present.

Equipment.-- Digital incremental Sutron SDR-0001-4 shaft encoder connected to a Sutron SatLink2 Data Collection Platform (DCP) transmitting hourly in a 4-ft. by 4-ft. concrete shelter and stilling well at a trapezoidal concrete canal section. The stilling well is connected to the canal by two 3-in. inlets with flushing equipment. An electric tape gage placed on the instrument shelf is the primary reference with no provisions for a supplemental reference. AC power is available at the gage and heaters are used to keep the stilling well from freezing in winter months. The gage is maintained in cooperation of the United States Bureau of Reclamation (USBR), the Northern Colorado Water Conservancy District (NCWCD) and the Colorado Division of Water Resources (DWR) as a component of the Colorado Big Thompson (C-BT) project.

Hydrologic Conditions.-- Trapezoidal concrete canal with regulated releases from Flatiron Reservoir (HFCFLTCO) and Dille Tunnel (DILTUNCO). The Charles Hansen Feeder Canal conveys water released from Flatiron Reservoir and occasionally diverted water from the Big Thompson River via Dille Tunnel to terminal storage at Green Ridge Glade and Horsetooth Reservoirs. Several diversions occur throughout the Charles Hansen Feeder Canal from its release point at Flatiron Reservoir to its final delivery point at Horsetooth Reservoir with one inflow, Dille Tunnel.

Gage-Height Record.-- The primary record is 15-minute satellite data with 15-minute logged DCP data and 5-minute logged SDR data as backup. The record is complete and reliable except for: May 1 and 11, 2012 when the encoder float tape stuck to the encoder pulley during a change. Missing 15-minute gage-height values on November 19, 20, 23, 2011 and April 27, 2012 were interpolated from adjacent good record without loss of accuracy. Instrument calibration was supported by 303 documented visits to the gage by NCWCD and DWR personnel. Several instrument corrections of ± 0.01 ft. were made throughout the year. Not all instrument correction were applied to the record. Those applied were distributed by time as defined by observations made to the gage.

Datum Corrections.-- Levels were last run on May 31, 2007 using B.M.1 as base. No correction was necessary

Rating.-- The low flow control is the first fire protection check structure in the canal downstream from the gage. The control for mid to high flows is the canal itself. Rating No. 17, in use since 2005 was continued this year and is defined by measurement from 13 to 503 cfs. Ten discharge measurements (Nos. 826-835) were made during the year, ranging in discharge from 113 to 503 cfs. The peak flow of 532 cfs occurred at 0900 on October 10, 2011 at a gage height of 6.56 ft. with a shift of 0.00 ft. The peak exceeded this year's high flow Measurement No. 828 by 29 cfs and 0.23 ft. of stage.

Discharge.-- Shifts are principally caused by algal growth within the canal system. Shifts can also be caused by obstructions in downstream siphons. Shifting control method was use all year. Shifts were distributed mainly by time with consideration given to change in stage, operational events and mass balance computations of the Charles Hansen Feeder Canal system. Open water measurements showed unadjusted shifts varying between -0.48 and +0.02 ft. All were given full weight except for Nos.: 827-830, 832, 834 and 835 which were adjusted up to 5.62% to smooth shift distributions. Measurement Nos. 828-830, 832 and 835 were adjusted less than 1%.

Special Computations.-- Zero flow is determined operationally. Residual gage-heights of 0.10 ft. remain in the well when there is no active diversion occurring. Sustained gage-height of 0.10 ft. and below occurring on October 29-31, November 21, 2011, April 26, June 27 and November 14, 2012 were adjusted to zero discharge computations. The discharge record for this site was compared to the HFCFLTCO site and Charles Hansen Feeder Canal mass balance computations to determine the period that algal growth began to affect the stage-discharge relationship.

Remarks.-- The record is good, except for May 1 and 11, 2012 which are estimated and fair. Station maintained and record developed by Russell V. Stroud.

Recommendations.-- The USBR has procured a Acoustic Doppler Velocity Meter (ADVM) for this site to better quantify flows at this site and to help in mass balance computations of the system. Opportunities are being watched for installation of this instrument. The gage should be watched for algal growth accumulating in the canal system. If algal growth is noted the USBR and NCWCD should be notified immediately. Discharge measurements throughout the entire range of flows throughout the year should be made. Successful use of the ADCP indicates that it should be used here when conditions allow. The electric tape gage is beginning to fall into disrepair. Replacement should be considered in WY2013.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

CHARLES HANSEN FEEDER CANAL BELOW BIG THOMPSON SIPHON

RATING TABLE.-- HFCBBSCO17 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

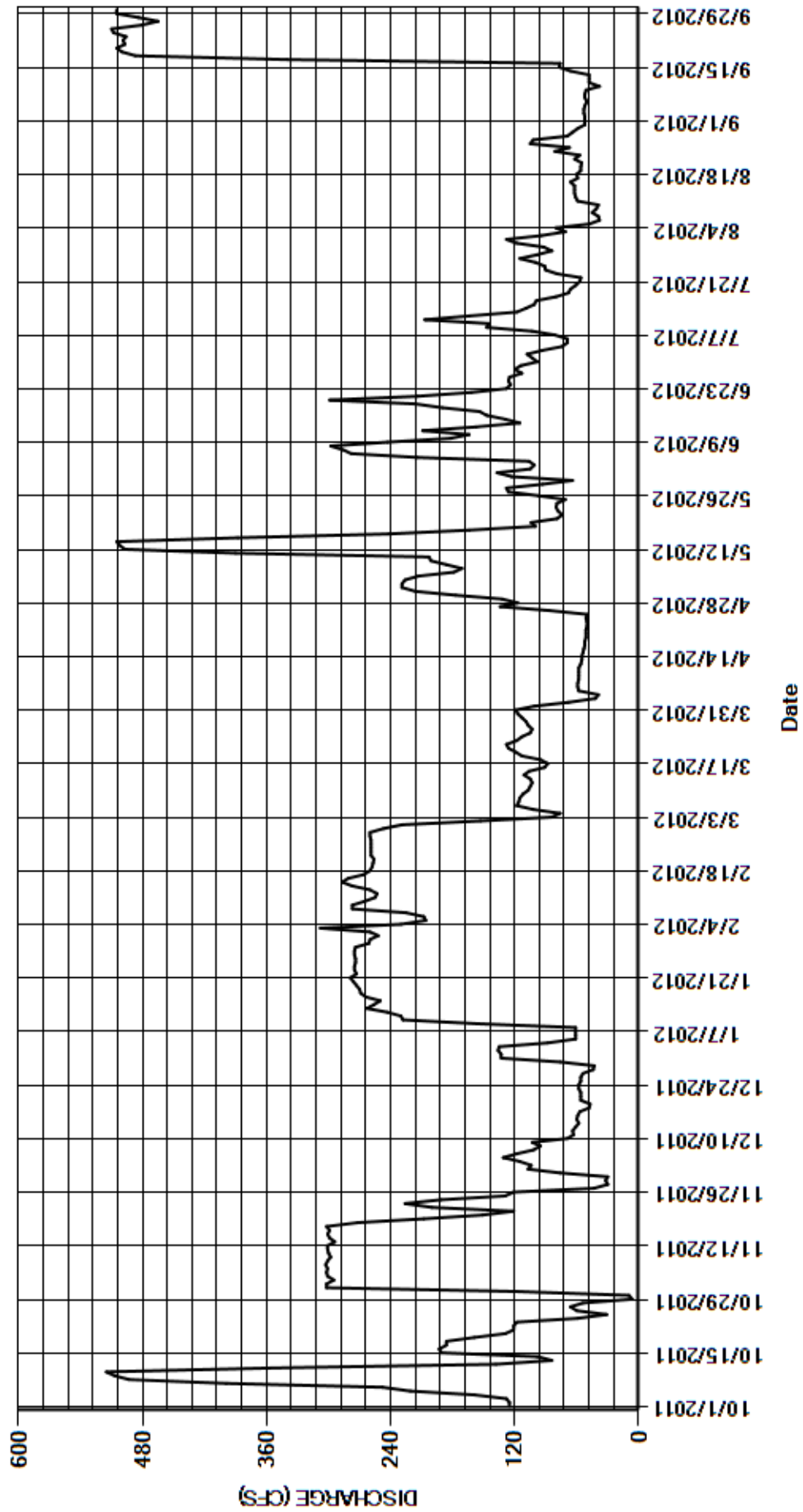
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	125	302	76	133	252	229	101	e216	137	103	128	52
2	125	302	107	136	260	153	68	229	105	108	94	52
3	128	295	104	135	308	84	42	229	101	93	71	53
4	159	301	115	88	230	76	39	226	106	74	80	53
5	221	302	131	61	206	102	58	213	214	69	48	52
6	248	301	118	61	208	118	59	179	278	69	38	50
7	399	303	102	61	225	116	59	171	286	81	39	52
8	493	301	95	61	277	115	58	186	298	103	45	52
9	507	298	103	156	277	112	58	201	243	147	41	51
10	515	300	69	228	265	107	58	203	182	145	39	38
11	357	301	63	230	255	105	58	e390	164	207	59	48
12	138	301	64	243	253	103	56	497	209	164	61	48
13	84	294	61	263	260	105	55	502	157	118	62	48
14	98	299	58	256	277	111	55	505	115	109	62	66
15	191	301	60	250	287	106	54	388	129	101	62	77
16	193	299	59	264	281	91	53	242	147	99	66	76
17	186	302	57	269	266	88	52	164	154	80	59	340
18	186	272	48	270	260	95	52	100	190	68	60	487
19	159	208	47	273	258	113	51	104	216	66	56	500
20	129	151	56	276	257	119	51	79	299	61	56	505
21	121	121	56	279	256	126	51	74	214	57	55	497
22	121	200	56	273	259	128	50	78	162	56	62	499
23	118	226	58	275	259	118	50	80	128	79	57	496
24	59	191	58	275	259	113	51	79	124	90	81	508
25	31	129	56	274	259	105	50	71	126	91	67	510
26	60	121	56	274	259	103	87	97	125	100	105	481
27	66	43	54	275	260	107	134	126	113	115	102	465
28	54	30	44	275	260	109	117	128	120	98	69	484
29	6.4	32	43	274	247	113	132	93	114	84	64	505
30	9.4	30	76	261	---	117	177	64	98	92	59	505
31	117	---	133	260	---	119	---	123	---	118	52	---
TOTAL	5403.8	6856	2283	6709	7480	3506	2036	6037	5054	3045	1999	7650
MEAN	174	229	73.6	216	258	113	67.9	195	168	98.2	64.5	255
AC-FT	10720	13600	4530	13310	14840	6950	4040	11970	10020	6040	3970	15170
MAX	515	303	133	279	308	229	177	505	299	207	128	510
MIN	6.4	30	43	61	206	76	39	64	98	56	38	38

CAL YR	2011	TOTAL	80673.8	MEAN	221	MAX	515	MIN	0.00	AC-FT	160000
WTR YR	2012	TOTAL	58058.8	MEAN	159	MAX	515	MIN	6.4	AC-FT	115200

MAX DISCH: 532 CFS AT 09:00 ON OCT 10,2011 GH 6.56 FT SHIFT 0 FT
 MAX GH: 6.56 FT AT 09:00 ON OCT 10,2011

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

CHARLES HANSEN FEEDER CANAL BELOW BIG THOMPSON SIPHON
 WY2012 HYDROGRAPH



PLATTE RIVER BASIN

06738100 CHARLES HANSEN FEEDER CANAL WASTEWAY TO BIG THOMPSON

Water Year 2012

Location.--	Lat. N40° 25'14.24", Long. W105° 13'32.15" (NAD83). Gage is located on the right side of a modified 15-ft. Parshall Flume 4.6 mi. south of Masonville, CO and 8 mi. west of Loveland, CO.
Drainage Area and Period of Record.--	N/A.; Daily values are available from October 1, 1953 to September 30, 1979 and October 1, 1990 to present.
Equipment.--	Digital incremental Sutron SDR-0001-4 shaft encoder and a Vaisala WXT520 multi-parameter weather sensor connected to a Sutron SatLink2 Data Collection Platform (DCP) transmitting hourly in a 4-ft. by 4-ft. concrete shelter and stilling well at a modified concrete 15-ft. Parshall flume. An electric tape gage placed on the instrument shelf is the primary reference with a supplemental staff gage located on the flume's left wing wall at the Ha location. The well is connected to the flume by two 2 -in. inlets with flushing equipment. A timber measurement bridge is located upstream of the Ha location in the converging section of the flume. The gage is operated in cooperation with the United States Bureau of Reclamation (USBR), the Northern Colorado Water Conservancy District (NCWCD) and the Colorado Division of Water Resources (CDWR) as a component of the Colorado Big Thompson (C-BT) project.
Hydrologic Conditions.--	Semi controlled release often experiencing rapid changes and transient flow. The Charles Hansen Feeder Canal conveys water from Flatiron Reservoir to Horsetooth Reservoir. Several diversions occur throughout the Charles Hansen Feeder Canal from its release point at Flatiron Reservoir to its final delivery point at Horsetooth Reservoir with one inflow, Dille Tunnel. The HFCWASCO structure serves double duty as both a delivery structure as well as a safety feature for the Hansen Feeder Canal System within the C-BT system. As a delivery structure, due to the placement of the Big Thompson Power Plant (BTPPMCCO) and the Handy Ditch company's diversion structure, water cannot be routed through the BTPPMCCO structure and then subsequently delivered to the Handy Ditch. Additionally, when the BTPPMCCO plant is unavailable for power generation water can be routed through the HFCWASCO structure for subsequent diversion downstream of the HFCWASCO and Big Thompson River's confluence point. In addition to performing as a water delivery structure, the HFCWASCO structure is used as a safety mechanism. In the event that the BTPPMCCO plant were to trip offline, water intended to pass through the BTPPMCCO plant would quickly overtop the Hansen Feeder Canal upstream from the plant. Therefore, the Supervisor Control and Data Acquisition (SCADA) system will open three slide gates located in the Hansen Feeder Canal conveying water into the wasteway. The same event would occur if a blockage was detected in the Big Thompson Siphon located immediately downstream from the HFCWASCO diversion point. In the event that the SCADA procedure were to fail or be delayed in slide gate activation, a siphonic spillway also located immediately upstream of the Big Thompson Siphon radial gate can convey water into the wasteway structure. However, water introduced via the siphonic spillway comes in below the flume's crest and therefore cannot be quantified by this structure.
Gage-Height Record.--	The primary record is 15-minute satellite data with 15-minute logged DCP data and 5-minute SDR data as backup. Frequent visits by NCWCD and DWR show good agreement between sensor and base gages. The record is complete and reliable. Instrument calibration was maintained by 153 visit to the gage by USBR, NCWCD and CDWR staff. Two instrument corrections of 0.01 and -0.01 ft. were made during the year. They were applied to the record as defined by observations made to the gage. Note. Flume entry for cleaning or any other purpose is strictly prohibited without prior authorization and lock-out tag-out procedures per USBR Hazardous Energy Control Program (HECP) policy (document on file).
Datum Corrections.--	Levels were last run on April 3, 2008 using the flume's crest as base. The electric tape gage was replaced and re-indexed to an elevation of 15.095 ft. at this time. The gage and control are both stable and do not require frequent level validation.
Rating.--	The control is a modified 15-ft. Parshall Flume with an upstream baffle box. Rating HFCWASCO02, is a standard 15-ft. Parshall Flume rating up to a gage-height of 2.10 ft. and customized upward based on measurement made prior to 1972. Three discharge measurement (No. 111-113) were made this year ranging in discharge from 48.7 to 100 cfs. Measurement made this year and numerous observations of no flow cover the range in stage experienced this year well except for the higher daily flows of May 18-20, 2012 which exceeded this year's high flow measurement by 150%. The peak flow of 381 cfs occurred at 0630 on August 7, 2012 at a gage height of 3.14 ft. using a shift of 0.00 ft.
Discharge.--	The rating was directly applied to the gage-height record to compute discharge. Per agreement with the USBR, NCWCD and the Water Commissioner, measurements within 5% of the rating have been adjusted to the rating. Measurements made this year showed unadjusted shifts of 0.01, 0.03 and 0.04 ft. all in the positive direction. The measurements were discounted 1.83, 5.18 and 4.49% respectively to the rating.
Special Computations.--	Zero flow is determined operationally. Due to the placement of the inlets of the structure, residual water remains in the stilling well thereby recording false positive stage values following dewatering of the structure. In previous years, it had been determined that sustained stages of 0.05 feet and below is a resultant of residual water in the stilling well. This hypothesis was confirmed by an in-flume inspection on April 3, 2008. Stages of 0.05 ft. and below were adjusted to zero computed discharges.
Remarks.--	The record is good. Any flows introduced to this structure via the siphonic spillway were not and could not be recorded by this structure. The Siphonic spillway was known to be active on June 6, 2012 when the Big Thompson Power Plant's flow meter was being calibrated. Station maintained and record developed by Russell V. Stroud.

Recommendations.--

Mass balance computations of the Hansen Feeder Canal System may be able to identify and quantify siphonic spillway usage. This has not been evaluated by CDWR as of yet. A safety evaluation of the timber measurement bridge has been conducted by the USBR this year. The bridge was deemed questionable and options for its replacement or rehabilitation are being considered. Measurement by three wheeled crane should not be done until the bridge is either replaced or rehabilitated. Measurement by sectional rod is permissible but should be done cautiously. Levels should be run in WY2013. As all unadjusted shifts were positive this year, this structure should be watched closer for permanent shifting conditions.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06738100 CHARLES HANSEN FEEDER CANAL WASTEWAY TO BIG THOMPSON

RATING TABLE-- HFCWASCO02 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

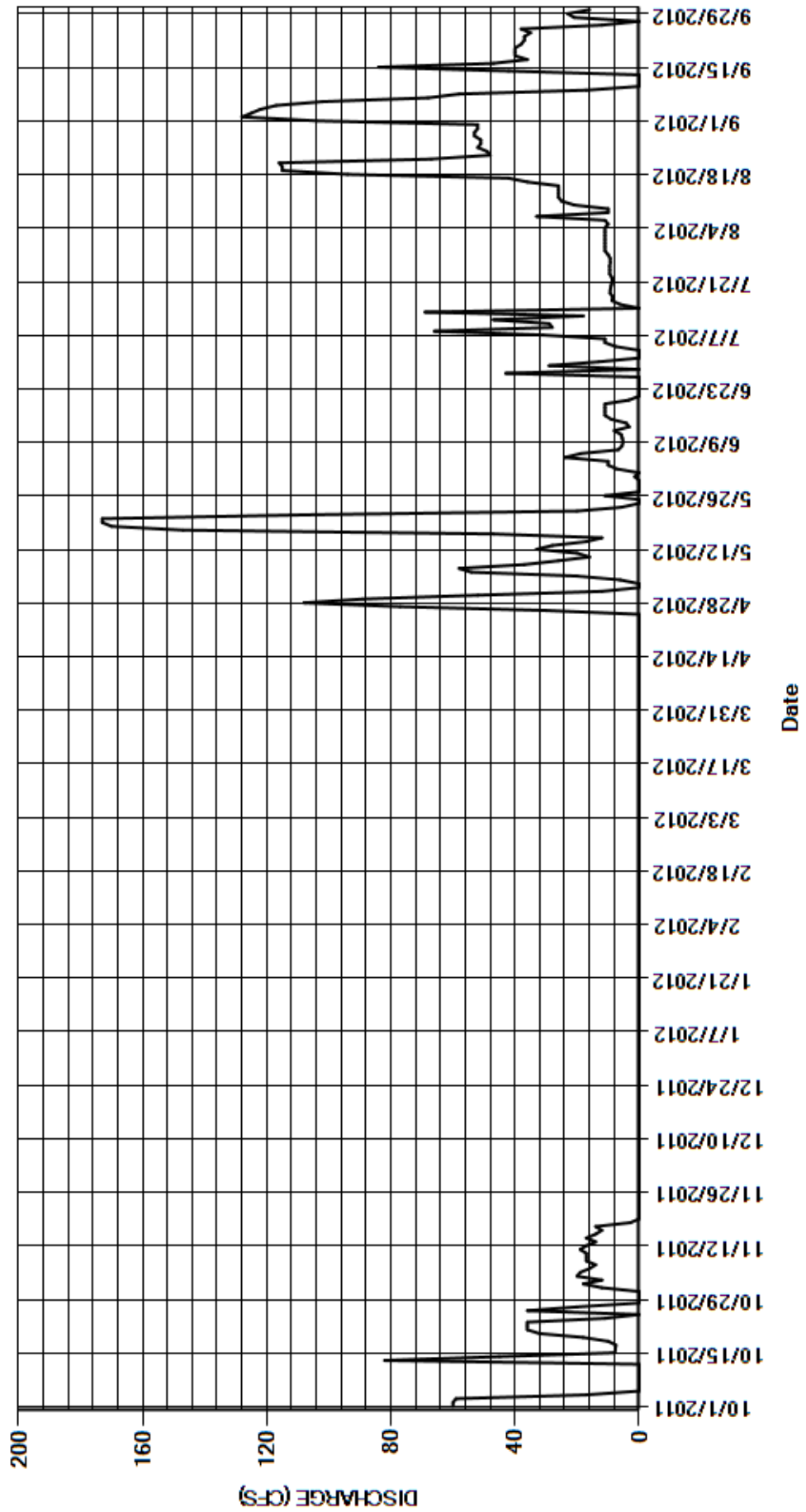
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	60	12	0.00	0.00	0.00	0.00	0.00	12	0.00	0.00	11	104
2	60	18	0.00	0.00	0.00	0.00	0.00	0.00	7.2	0.00	11	128
3	59	12	0.00	0.00	0.00	0.00	0.00	0.00	10	0.00	11	125
4	17	20	0.00	0.00	0.00	0.00	0.00	6.1	10	7.6	11	122
5	0.00	19	0.00	0.00	0.00	0.00	0.00	20	24	11	10	117
6	0.00	16	0.00	0.00	0.00	0.00	0.00	54	19	11	11	102
7	0.00	14	0.00	0.00	0.00	0.00	0.00	58	6.7	31	33	68
8	0.00	17	0.00	0.00	0.00	0.00	0.00	37	5.5	66	10	58
9	0.00	17	0.00	0.00	0.00	0.00	0.00	26	5.2	28	10	17
10	0.00	17	0.00	0.00	0.00	0.00	0.00	16	5.4	29	21	0.00
11	0.00	19	0.00	0.00	0.00	0.00	0.00	20	5.8	47	25	0.00
12	0.00	17	0.00	0.00	0.00	0.00	0.00	33	8.0	18	26	0.00
13	82	14	0.00	0.00	0.00	0.00	0.00	28	3.2	69	26	0.00
14	45	17	0.00	0.00	0.00	0.00	0.00	17	4.2	0.00	26	42
15	7.8	14	0.00	0.00	0.00	0.00	0.00	12	9.0	6.1	26	84
16	7.7	12	0.00	0.00	0.00	0.00	0.00	47	11	8.8	36	47
17	7.5	14	0.00	0.00	0.00	0.00	0.00	147	11	8.5	42	36
18	10	2.8	0.00	0.00	0.00	0.00	0.00	170	11	9.4	94	40
19	18	0.00	0.00	0.00	0.00	0.00	0.00	173	11	9.3	115	40
20	32	0.00	0.00	0.00	0.00	0.00	0.00	173	3.3	9.0	115	40
21	36	0.00	0.00	0.00	0.00	0.00	0.00	108	0.04	8.6	116	38
22	36	0.00	0.00	0.00	0.00	0.00	0.00	20	0.01	8.8	67	37
23	36	0.00	0.00	0.00	0.00	0.00	0.00	5.6	0.00	9.5	48	37
24	11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.4	49	35
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.5	52	38
26	36	0.00	0.00	0.00	0.00	0.00	30	11	0.00	9.3	51	12
27	20	0.00	0.00	0.00	0.00	0.00	77	0.00	43	9.3	51	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	108	0.00	0.00	10	53	21
29	0.00	0.00	0.00	0.00	0.00	0.00	89	0.00	29	11	53	23
30	0.00	0.00	0.00	0.00	---	0.00	52	0.00	13	11	52	16
31	0.00	---	0.00	0.00	---	0.00	---	1.4	---	11	52	---
TOTAL	581.00	271.80	0.00	0.00	0.00	0.00	356.00	1195.10	255.55	476.10	1314	1427.00
MEAN	18.7	9.06	0.000	0.000	0.000	0.000	11.9	38.6	8.52	15.4	42.4	47.6
AC-FT	1150	539	0	0	0	0	706	2370	507	944	2610	2830
MAX	82	20	0.00	0.00	0.00	0.00	108	173	43	69	116	128
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10	0.00

CAL YR	2011	TOTAL	5618.44	MEAN	15.4	MAX	517	MIN	0.00	AC-FT	11140
WTR YR	2012	TOTAL	5876.55	MEAN	16.1	MAX	173	MIN	0.00	AC-FT	11660

MAX DISCH: 381 CFS AT 06:30 ON AUG 07,2012 GH 3.14 FT SHIFT 0 FT
 MAX GH: 3.14 FT AT 06:30 ON AUG 07,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06738100 CHARLES HANSEN FEEDER CANAL WASTEWAY TO BIG THOMPSON
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
USBR POWER PLANT AT BIG THOMPSON CANYON MOUTH
Water Year 2012

Location.-- Lat. N40° 25'15.44", Long. W105° 13'23.43" (NAD83). Power plant facility is located on the right bank of the Big Thompson River 4.5 mi. south of Masonville, CO and 8 mi. west of Loveland, CO.

Drainage Area and Period of Record.-- N/A.; Daily values are available from October 1, 1997 to present.

Equipment.-- Sutron SatLink 2 Data Collection Platform (DCP) connected to an ultrasonic flow meter placed on the upper scroll casing of the Big Thompson Power Plant power turbine. Power plant facilities are owned, operated and maintained by the United State Bureau of Reclamation (USBR) with the satellite telemetry equipment being maintained by the Colorado Division of Water Resources. A Sutron 8210 high data rate enabled DCP was removed and the facility was placed in the above configuration on May 22, 2012. Similarly, the USBR replaced the ultrasonic flow meter on May 31, 2012 due to unreliable operation of the previous flow meter.

Hydrologic Conditions.-- Controlled release from the Charles Hansen Feeder Canal to the Big Thompson River. Waters transmitted via the Power Plant facility originated at or in part from either Flatiron Reservoir or the Dille Tunnel (DILTUNCO) diversion, both of which convey water to the Hansen Feeder Canal upstream from the Power Plant. Waters passed through the Power Plant facility enter the Big Thompson River downstream from the Big Thompson at Canyon Mouth (BTCANYCO) gage, Charles Hansen Feeder Canal Wasteway to Big Thompson River (HFCWASCO) delivery point, and the Handy Ditch diversion structure (WDID: 0400521).

Gage-Height Record.-- Flow meter. No gage height record.

Datum Corrections.-- Not applicable.

Rating.-- Primary data is discharge, no rating is needed. A Seimans SITRANS ultrasonic flow meter is installed on the turbine's upper scroll casing. The meter was calibrated on June 6, 2012 by USBR staff. The power plant discharges directly into the river; water can also be diverted and delivered to the river by either the HFCWASCO or Handy Ditch structures immediately upstream from the power plant. Thus, there are no opportunities to perform comparison measurements. The peak discharge recorded by the flow meter was 411 cfs occurring at 13:45 on June 6, 2012 while calibrating the meter. DWR staff was present during the calibration process.

Discharge.-- The primary record is 15-minute telemetered discharge values measured from the ultrasonic instrument. The record is complete and reliable, except for May 15 through May 31, 2012 when the flow meter's performance was impaired. Discharge for the year was computed from the telemetered flow meter data except for May 15 through May 31, 2012 which was estimated from a mass balance calculator developed to track gage performance within the Charles Hansen Feeder Canal system. Comparison of mass balance figures to USBR provided accounting for this period showed similar trends and magnitude of flows. For the remainder of the year, negligible daily discrepancies (\pm 1cfs) occur between the computed record evaluated here and USBR provided accounting. Discrepancies are assumed to be caused by precision or rounding differences between the two methods of computation.

Special Computations.-- Indirect validation method of the power plant record began in WY 2006, when a mass balance calculator was developed to help quantify the individual gage accuracies and to monitor diversions to and deliveries from the Charles Hansen Feeder Canal system. The calculations indicated that some submergence and variable backwater issues existed at Hansen Feeder Canal below Flatiron Reservoir (HFCFLTCO) gage. In the 2008 water year the USBR purchased and installed a SonTek SW Acoustic Doppler Velocity Meter (ADVM) for the HFCFLTCO gage. Under certain flow regimes, mass balance computations made after the installation of the ADVM unit have shown good agreement with the gages in the Hansen Feeder Canal system, including the power plant. To further on this effort, a SonTek IQ ADVM was procured and installed this year. It is located downstream from the HFCFLTCO gage but upstream of the trifurcation. Data from this device is still being evaluated to determine this new site's efficacy in helping with mass balance computations within the system.

Remarks.-- The record is good except for May 15 through June 1, 2012 when the flow meter's performance was impaired which is estimated and poor. Despite the inability for direct confirmatory discharge measurements, indirect measurement methods show the instrument to be accurate. Record developed by Russell V. Stroud.

Recommendations.-- Mass balance computations need to be continued to ensure operational accuracy. Efforts should be continued to improve the accuracy of all gages within the Charles Hansen Feeder Canal system. Velocity indexed ratings need to be created for the upstream sites discussed above. Once complete, a more robust mass balance analysis should be performed on the Charles Hansen Feeder Canal system.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

USBR POWER PLANT AT BIG THOMPSON CANYON MOUTH

RATING TABLE-- STCONVERT USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

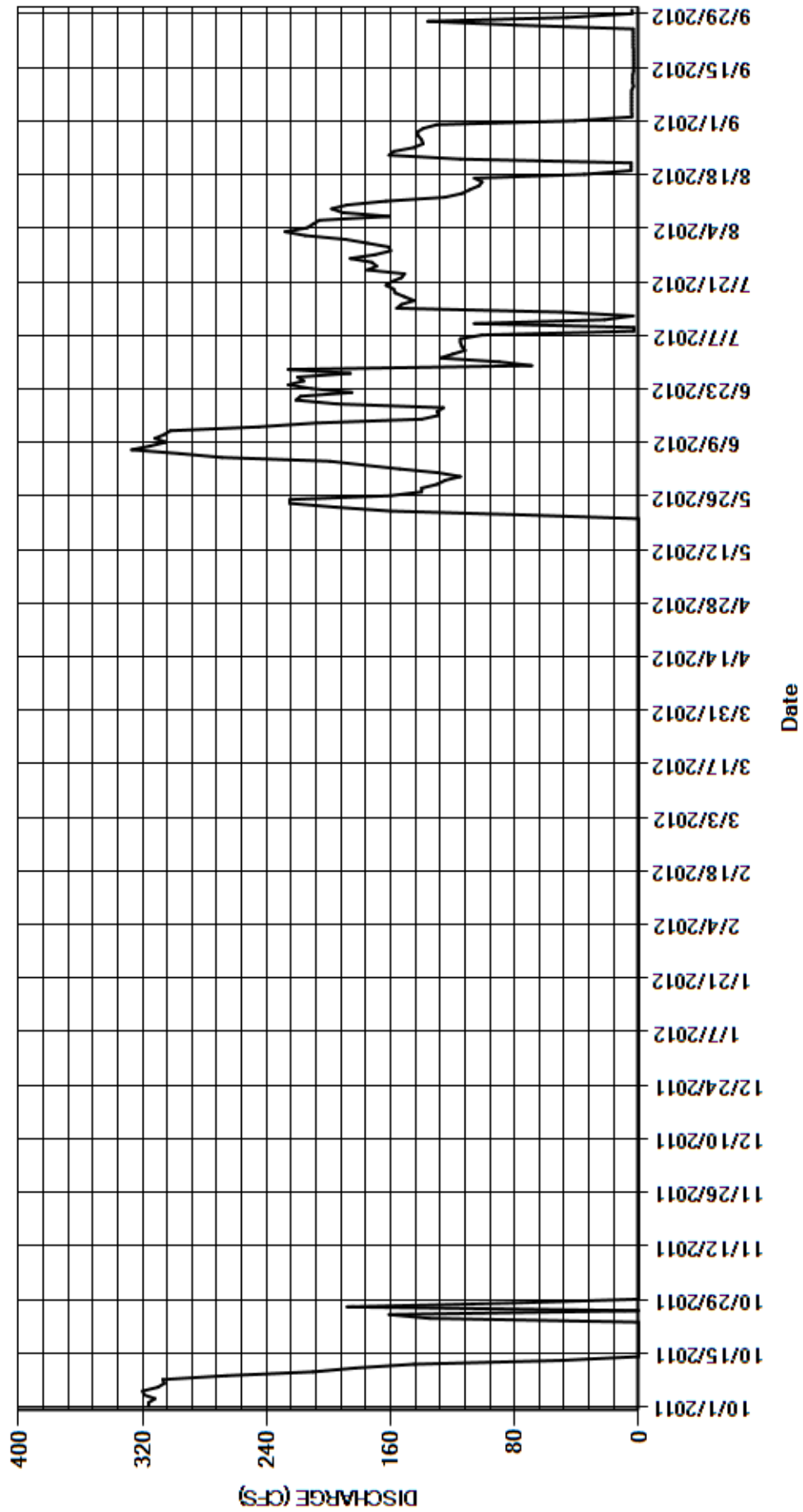
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	316	0.00	0.00	0.00	0.00	0.00	0.00	0.00	129	128	189	41
2	316	0.00	0.00	0.00	0.00	0.00	0.00	0.00	154	120	215	4.4
3	312	0.00	0.00	0.00	0.00	0.00	0.00	0.00	177	112	228	4.5
4	319	0.00	0.00	0.00	0.00	0.00	0.00	0.00	199	114	214	4.5
5	320	0.00	0.00	0.00	0.00	0.00	0.00	0.00	269	115	210	4.5
6	310	0.00	0.00	0.00	0.00	0.00	0.00	0.00	296	115	206	4.5
7	306	0.00	0.00	0.00	0.00	0.00	0.00	0.00	327	101	161	4.5
8	307	0.00	0.00	0.00	0.00	0.00	0.00	0.00	315	3.1	191	4.5
9	266	0.00	0.00	0.00	0.00	0.00	0.00	0.00	305	3.1	198	4.5
10	210	0.00	0.00	0.00	0.00	0.00	0.00	0.00	312	106	188	3.4
11	183	0.00	0.00	0.00	0.00	0.00	0.00	0.00	306	22	163	3.9
12	145	0.00	0.00	0.00	0.00	0.00	0.00	0.00	302	3.6	125	3.8
13	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	245	50	114	3.8
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	208	156	109	3.3
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	e0.00	140	153	103	3.3
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	e0.00	129	145	101	3.3
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	e0.00	130	151	106	3.3
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	e0.00	126	157	35	3.4
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	e0.00	195	158	4.8	3.4
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	e0.00	221	163	4.9	3.5
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	e75	218	159	4.8	3.5
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	e160	185	153	115	3.5
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	e195	211	151	161	3.5
24	135	0.00	0.00	0.00	0.00	0.00	0.00	e225	226	175	158	3.5
25	161	0.00	0.00	0.00	0.00	0.00	0.00	e225	216	169	145	3.5
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	e160	220	172	139	79
27	188	0.00	0.00	0.00	0.00	0.00	0.00	e140	186	186	140	136
28	81	0.00	0.00	0.00	0.00	0.00	0.00	e140	226	170	142	46
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	e130	69	160	143	4.2
30	0.00	0.00	0.00	0.00	---	0.00	0.00	e125	90	161	139	4.4
31	0.00	---	0.00	0.00	---	0.00	---	e115	---	175	130	---
TOTAL	3925.00	0.00	0.00	0.00	0.00	0.00	0.00	1690.00	6332	3906.8	4282.5	402.4
MEAN	127	0.000	0.000	0.000	0.000	0.000	0.000	54.5	211	126	138	13.4
AC-FT	7790	0	0	0	0	0	0	3350	12560	7750	8490	798
MAX	320	0.00	0.00	0.00	0.00	0.00	0.00	225	327	186	228	136
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	69	3.1	4.8	3.3

CAL YR	2011	TOTAL	39082.00	MEAN	107	MAX	403	MIN	0.00	AC-FT	77520
WTR YR	2012	TOTAL	20538.70	MEAN	56.1	MAX	327	MIN	0.00	AC-FT	40740

MAX DISCH: 411 CFS AT 13:45 ON JUN 06,2012 (FLOW METER)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

USBR POWER PLANT AT BIG THOMPSON CANYON MOUTH
 WY2012 HYDROGRAPH



PLATTE RIVER BASIN
BOULDER CREEK FEEDER CANAL NEAR LYONS

Water Year 2012

Location.-- Lat N. 40°12'58", long 105°15'28" (NAD83). Boulder County, CO. Gage is on the left side of the Boulder Feeder Canal at a 10 ft. concrete Parshall flume, approximately 355 ft downstream from its daylight point and 0.72 miles southeast from the Town of Lyons Fire Station.

Drainage Area and Period of Record.-- Transmountain water released from Carter Lake for distribution to St. Vrain and Boulder Creek drainages. Various small diversionary points from the canals conveyance point to the measurement point at the Saint Vrain Supply Canal (SVSLYOCO) gage. Flow splits below the SVSLYOCO gage whereby water can be delivered directly to the St. Vrain Creek and/or delivered to the Boulder Feeder Canal to a terminal storage facilities (Boulder, Coal Ridge Reservoirs).; 1954 to Present

Equipment.-- Sutron Stage Discharge Recorder (SDR) connected to a Sutron Satlink 1 Data Collection Platform (DCP) in a rectangular 6 ft by 8 ft precast concrete shelter at a 10 foot concrete Parshall flume with Ha stilling well. Northern Colorado Water Conservancy District (NCWCD) operates a Sutron 56-0540 incremental shaft encoder (record may be available upon request of the NCWCD) at the gage. The primary reference is an electric tape gage (ETG) located in the shelter with a supplemental staff located at the Ha location on the right wing wall of the flume. The gage is operated in cooperation with the NCWCD and the State of Colorado Division of Water Resources (CDWR).

Hydrologic Conditions.-- The Boulder Feeder Canal is a component of the water delivery system of the Colorado Big Thompson (C-BT) system and is owned and operated by the NCWCD. The Saint Vrain Supply Canal conveys water from Carter Reservoir to the Saint Vrain and Boulder Creek drainages. Water is measured at the Saint Vrain Supply Canal (15-foot Parshall flume) at Lyons, CO (SVSLYOCO) before bifurcating. Water bifurcated can be delivered to either the Saint Vrain Creek downstream from the Saint Vrain Creek at Lyons CO (SVCLYOCO) gage and/or can be delivered to the Boulder Feeder Canal (BFCLYOCO) via an inverted siphon under Hwy 66. Water delivered into the BFCLYOCO daylight approximately 200-feet upstream in a linear fashion (allowing sufficient stilling) from the 10-foot Parshall flume. After passing through the Parshall flume water again enters an inverted siphon before being conveyed to terminal storage in Boulder and Coal Ridge Reservoirs through both open and buried sections of canal. Back water from the downstream siphon is not an issue.

Gage-Height Record.-- The primary record is 15-minute telemetered SDR data with 15-minute logged DCP data and 5-minute logged SDR data as backup. Data from NCWCD 's encoder could be used as backup if necessary. The record is complete and reliable, except for several positive daily values recorded November 1-13, 2011 after the canal had been shut down for the winter. Positive stage during this period is due to residual water in the stilling well prior to being pumped out. The SDR failed to record one 15 minute value on Oct 1, 2011 which was interpolated from adjacent record without loss of accuracy. Instrument calibration was supported by 157 visits made by NCWCD and CDWR staff to the gage this year. Two instrument corrections of -0.01 feet were made this year. They were applied to the record as defined by correction made to the instrument. Another instrument correction of 3.29 ft. was made as the flume came back on in the spring. The encoder had been set to an arbitrary value at start up. This structure is not operated in winter months. Diversions were discontinued on November 1, 2011 and resumed again on April 23, 2012. The DCP was winterized on December 12, 2011 and reactivated on March 16, 2012. In preparation of the winter the NCWCD removes the instrument floats from the stilling well prior to pumping the stilling well out.

Datum Corrections.-- Levels were last run on March 29, 2012 using RM0 as base. The ETI was found to be 0.013 ft. low but was not corrected as it is within allowable tolerances. RM's 2 and 3 were established on this date.

Rating.-- The control is a 10 foot Parshall flume. Rating No. 2, a non-standard rating, in use since October 1, 1977, compensates for abnormal approach conditions and was continued this year. Moss growth upstream of the flume does occur in late July through September which can cause velocity loss in the approach section and may cause negative shifting. Six discharge measurements (Nos. 172-177) were made this water year ranging in discharge from 68.1 to 192 cfs. Discharge measurements made this year as well as four observations of zero flow cover the range in stage experienced this year well. The peak flow of 203 cfs occurred at 09:45 on June 20, 2012 at a gage-height of 2.74 feet with a shift of 0.00 ft. exceeding Msmt. No. 173 made May 10, 2012 by 0.03 feet of stage and 11 cfs respectively.

Discharge.-- Discharge measurements within 5% of the rating have historically been adjusted to the rating as per agreement with NCWCD and the Water Commissioner. Measurements made this water year showed unadjusted shifts varying between -0.06 and -0.01 feet. All measurements were adjusted to the rating; the required adjustments ranged from 0.6% to 5.0%. Discharge was computed by applying the rating directly to gage-height record.

Special Computations.-- Zero flow is determined operationally. Zero flow was determined to occur part of the day or the entire day on the following days: November 1, 2011 through April 23, 2012. Direct comparison of BFCLYOCO computed discharge values to those at the SVSLYOCO structure are made. Computed discharge at the BFCLYOCO gage should never exceed those at the SVSLYOCO gage.

Remarks.-- The record is good. A datum correction of +0.01 ft. was indicated by levels this year but was not applied as it was within tolerances. If applied to the record, raw shifts would have computed closer to the rating and adjustments to the measurements would have been smaller. Station maintained and record developed by Patrick Tyler.

Recommendations.-- Levels should be run in the 2013 Water Year to confirm establishment and stability of the new RM's. If the ETG is found to be low again it should be corrected. Measurements should be watched for evidence of permanent shift conditions. If identified a new rating may be applicable. Opportunities to perform discharge measurements at the low and high stage extremes should be watched for. An Acoustic Doppler Current Profiler (ADCP) vs. current meter measurement validation exercise could be attempted. NCWCD gage-height backup data can be obtained from NCWCD if necessary.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

BOULDER CREEK FEEDER CANAL NEAR LYONS

RATING TABLE-- BFCLYOCO02 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

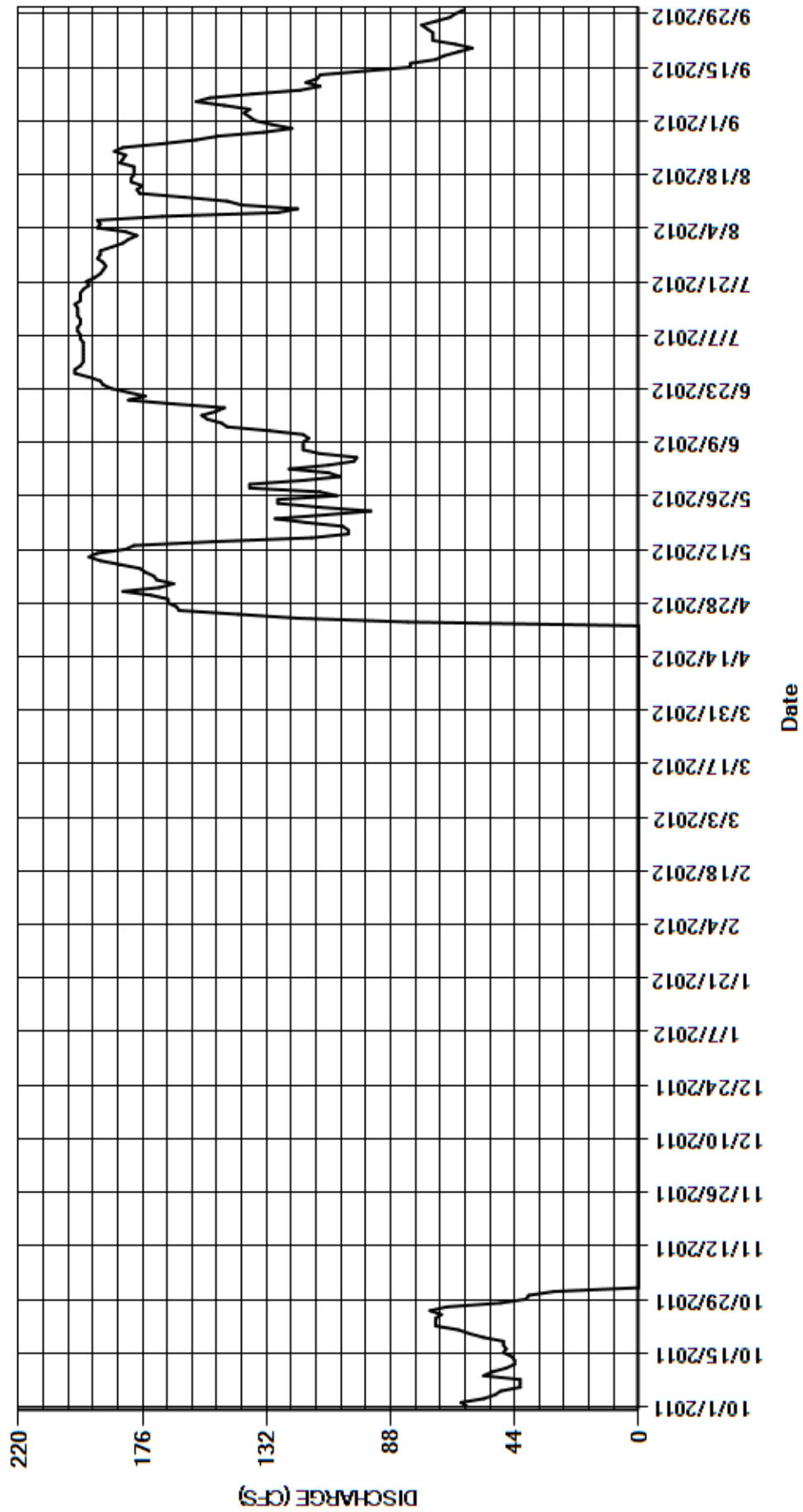
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	61	0.00	0.00	0.00	0.00	0.00	0.00	183	110	197	181	136
2	63	0.00	0.00	0.00	0.00	0.00	0.00	170	124	197	178	138
3	55	0.00	0.00	0.00	0.00	0.00	0.00	165	110	197	182	140
4	51	0.00	0.00	0.00	0.00	0.00	0.00	171	101	197	192	138
5	49	0.00	0.00	0.00	0.00	0.00	0.00	172	100	197	191	147
6	42	0.00	0.00	0.00	0.00	0.00	0.00	175	113	198	192	157
7	42	0.00	0.00	0.00	0.00	0.00	0.00	177	119	198	169	152
8	42	0.00	0.00	0.00	0.00	0.00	0.00	184	119	199	128	137
9	55	0.00	0.00	0.00	0.00	0.00	0.00	191	119	199	121	120
10	52	0.00	0.00	0.00	0.00	0.00	0.00	195	117	198	141	113
11	47	0.00	0.00	0.00	0.00	0.00	0.00	192	119	198	146	118
12	44	0.00	0.00	0.00	0.00	0.00	0.00	182	131	199	161	114
13	44	0.00	0.00	0.00	0.00	0.00	0.00	179	146	199	177	113
14	45	0.00	0.00	0.00	0.00	0.00	0.00	151	148	199	178	97
15	48	0.00	0.00	0.00	0.00	0.00	0.00	116	153	200	176	81
16	47	0.00	0.00	0.00	0.00	0.00	0.00	103	155	198	180	81
17	48	0.00	0.00	0.00	0.00	0.00	0.00	103	150	198	180	72
18	48	0.00	0.00	0.00	0.00	0.00	0.00	105	147	198	179	69
19	55	0.00	0.00	0.00	0.00	0.00	0.00	118	165	197	179	64
20	60	0.00	0.00	0.00	0.00	0.00	0.00	129	181	195	179	59
21	64	0.00	0.00	0.00	0.00	0.00	0.00	111	175	196	184	65
22	72	0.00	0.00	0.00	0.00	0.00	0.00	95	181	193	183	73
23	72	0.00	0.00	0.00	0.00	0.00	82	113	187	191	182	73
24	72	0.00	0.00	0.00	0.00	0.00	121	128	190	190	186	73
25	70	0.00	0.00	0.00	0.00	0.00	142	128	191	189	183	75
26	74	0.00	0.00	0.00	0.00	0.00	163	107	195	190	169	77
27	68	0.00	0.00	0.00	0.00	0.00	164	113	200	192	157	72
28	49	0.00	0.00	0.00	0.00	0.00	167	138	200	191	149	67
29	40	0.00	0.00	0.00	0.00	0.00	167	138	198	191	133	65
30	39	0.00	0.00	0.00	---	0.00	173	119	197	187	123	62
31	30	---	0.00	0.00	---	0.00	---	106	---	183	130	---
TOTAL	1648	0.00	0.00	0.00	0.00	0.00	1179.00	4457	4541	6051	5189	2948
MEAN	53.2	0.000	0.000	0.000	0.000	0.000	39.3	144	151	195	167	98.3
AC-FT	3270	0	0	0	0	0	2340	8840	9010	12000	10290	5850
MAX	74	0.00	0.00	0.00	0.00	0.00	173	195	200	200	192	157
MIN	30	0.00	0.00	0.00	0.00	0.00	0.00	95	100	183	121	59

CAL YR	2011	TOTAL	10187.50	MEAN	27.9	MAX	164	MIN	0.00	AC-FT	20210
WTR YR	2012	TOTAL	26013.00	MEAN	71.1	MAX	200	MIN	0.00	AC-FT	51600

MAX DISCH: 203 CFS AT 09:45 ON JUN 20,2012 GH 2.74 FT SHIFT 0 FT
 MAX GH: 2.74 FT AT 09:45 ON JUN 20,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

**BOULDER CREEK FEEDER CANAL NEAR LYONS
WY2012 HYDROGRAPH**



PLATTE RIVER BASIN
SAINT VRAIN SUPPLY CANAL NEAR LYONS, CO

Water Year 2012

Location.-- Lat 40°13'05", long 105°15'35", Boulder County, about 0.2 miles east of Lyons,CO.

Drainage Area and Period of Record.-- N/A.; Daily values are available from October 1, 1953 to present.

Equipment.-- Sutron Stage Discharge Recorder (SDR) connected to a Sutron Satlink Data Collection Platform (DCP) in a 36-inch corrugated metal pipe shelter overtop a 3-foot square concrete stilling well at a 15-foot concrete Parshall flume. Northern Colorado Water Conservancy District (NCWCD) operates a Sutron incremental shaft encoder and Stevens Type A continuous chart recorder (record may be available upon request of the NCWCD) at the gage. The primary reference is an electric tape gage (ETG) located on the instrument shelf with a supplemental staff gage located at the Ha location on the right wing wall of the flume. A foot bridge spans the flume with its upstream edge placed at the Ha location. The gage is operated in cooperation of the NCWCD and the State of Colorado Division of Water Resources (CDWR).

Hydrologic Conditions.-- The Saint Vrain Supply Canal is a component of the water delivery system of the Colorado Big Thompson (C-BT) system and is owned and operated by the NCWCD. The Saint Vrain Supply Canal conveys water from Carter Reservoir to the Saint Vrain and Boulder Creek basins. Releases are measured at the Saint Vrain Supply Canal at Lyons CO (SVSLYOCO) gage before bifurcation. Bifurcated water can be delivered to either the Saint Vrain Creek downstream from the Saint Vrain Creek at Lyons, CO (SVCLYOCO) gage and/or delivered to the Boulder Feeder Canal (BFCLYOCO) for terminal storage in Boulder Reservoir. The diversionary point is located downstream from the SVSLYOCO gage below an inverted siphon under Hwy 66. There are several minor diversions along the Saint Vrain Supply Canal before the SVSLYOCO gage (15-foot Parshall flume) location. Water conveyed from Carter Reservoir daylighted approximately 0.25 miles upstream from the flume on a hillside due north of the gage. From this point the canal drops down a steep gradient chute into the flume's forebay resulting in high velocity surging flow and unsteady stage at the gage. A small diversionary point for water deliveries to the Supply Ditch is also located in the SVSLYOCO forebay. Backwater from the inverted siphon immediately downstream from the flume has not been observed.

Gage-Height Record.-- The primary record is 15-minute telemetered SDR data with 15-minute logged DCP and NCWCD logged data as backup. The record is complete and reliable for the period of record. Diversions were discontinued on October 31, 2011 and resumed again on April 23, 2012. The DCP was winterized on December 12, 2011 and reactivated on March 16, 2012. Instrument calibration was supported by 172 visits made by NCWCD and DWR staff to the gage this year. NCWCD readings on the DWR instrument were not used for calibration, but the DWR and NCWCD data sets were compared directly. Primary (DWR) and back-up (NCWCD) data agreed to within +/-0.02 ft. The record has high reliability. This structure is not operated in winter months.

Datum Corrections.-- Levels were last run on March 29, 2012 using RM 0 as base. No corrections were required. Although no correction to the base reference was necessary, the metal drop tape was replaced. RM 1 and RM 2 were also established on this date using RM 0 as base.

Rating.-- The control is a 15 foot Parshall flume. Rating No. 5, a non-standard rating, in use since October 1, 1978, was continued this year. Rating No. 5 compensates for abnormal high approach velocities resulting from the steep gradient concrete canal chute above the flume. However, due to the aging condition of the canal, increased approach velocities seem to be somewhat offset by friction losses upstream of the flume presenting as a permanent shift condition to Rating No. 5. A proposed rating (No. 6) has been created and submitted to the NCWCD. At the time of this record no response has been given. Seven discharge measurements (Nos. 178 - 184) were made this year ranging in discharge from 75.8 to 309 cfs. Measurements made this year along with three observations of zero flow cover a majority of the range in discharge experienced this year. The peak flow of 388 cfs occurred at 1745 July 6, 2012 at a gage height of 3.24 feet with a shift of -0.08 ft. It exceeded Msmt. No. 182 made June 20, 2012 by 79 cfs and 0.42 feet of stage respectively.

Discharge.-- Shifting control method was used for all periods of record. Shifts were applied by time as defined by measurements from October 1 to October 31, 2011. Stage dependent shifting using variable shift table SVSLYOCOVST12-1 defined by Measurement Nos. 178 - 185 was applied from April 23 to September 30, 2012. This year's measurements showed shifts varying between -0.09 and -0.01 ft. All were given full weight except for Nos. 179 - 180 and 183 which were discounted from -0.95% to 1.19% to smooth the stage-shift relationship.

Special Computations.-- Zero flow is determined operationally. Observations of stages of 0.08 ft. and below have been made during periods of zero flow. As such, residual stages of 0.08 ft. and below occurring from October 31 through November 14, 2011 were adjusted to zero.

Remarks.-- The record is good. Station maintained and record developed by Patrick Tyler.

Recommendations.-- Implement SVSLYOCO06 after receipt of NCWCD review and comments. If Rating No. 5 is continued, application of shifts is warranted as shifts are showing a distinct negative trend. Levels need to be run again in the 2013 and 2014 water years to monitor stability of the newly placed RM's.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

SAINT VRAIN SUPPLY CANAL NEAR LYONS, CO

RATING TABLE-- SVSLYOCO05 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

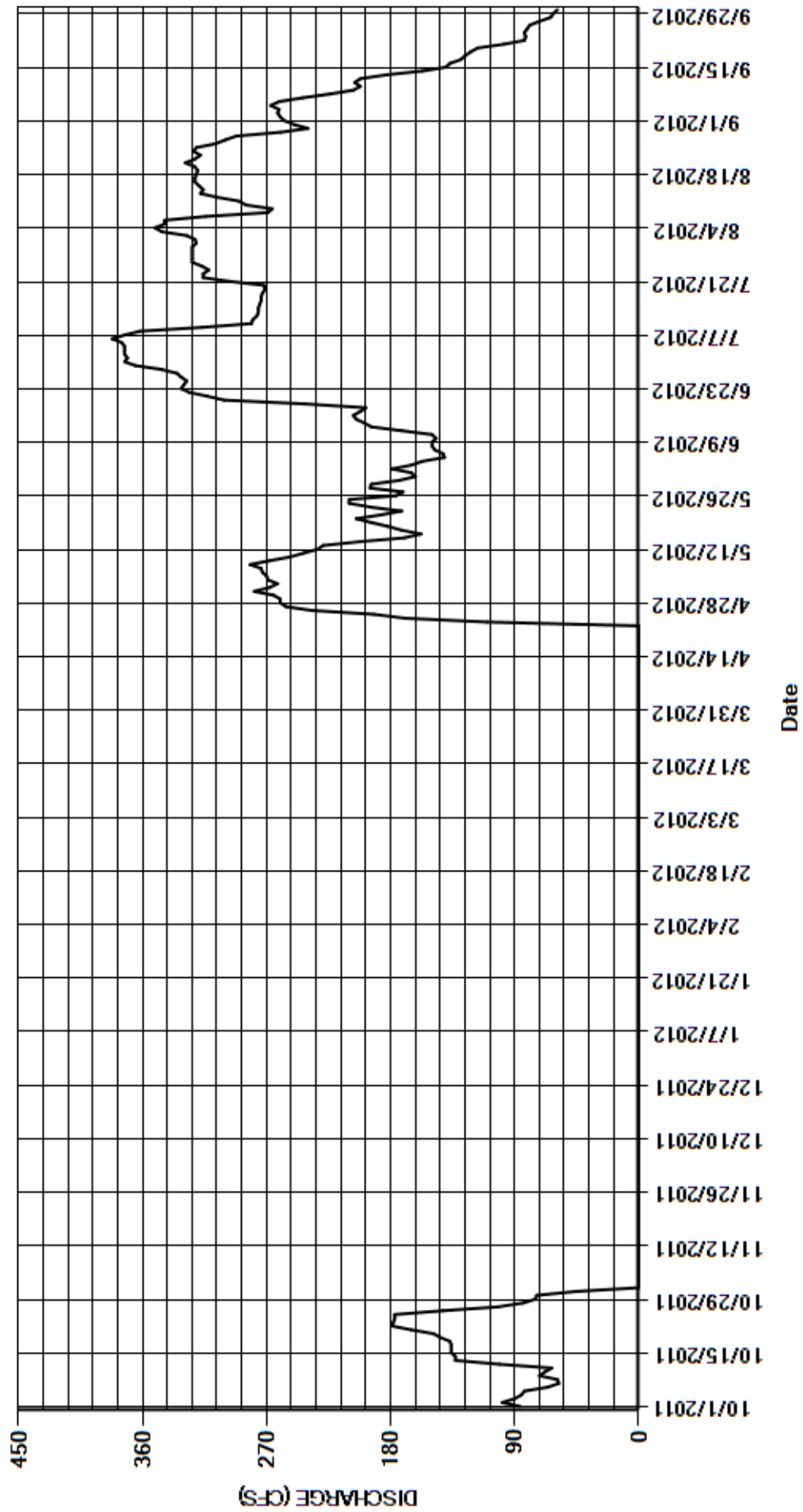
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	86	0.00	0.00	0.00	0.00	0.00	0.00	279	165	371	322	257
2	99	0.00	0.00	0.00	0.00	0.00	0.00	268	179	373	328	260
3	90	0.00	0.00	0.00	0.00	0.00	0.00	262	165	373	346	262
4	85	0.00	0.00	0.00	0.00	0.00	0.00	269	157	373	351	261
5	83	0.00	0.00	0.00	0.00	0.00	0.00	270	141	375	344	267
6	66	0.00	0.00	0.00	0.00	0.00	0.00	273	142	382	344	261
7	58	0.00	0.00	0.00	0.00	0.00	0.00	274	148	373	314	244
8	59	0.00	0.00	0.00	0.00	0.00	0.00	282	150	362	269	224
9	72	0.00	0.00	0.00	0.00	0.00	0.00	268	150	317	266	207
10	68	0.00	0.00	0.00	0.00	0.00	0.00	253	147	281	285	202
11	63	0.00	0.00	0.00	0.00	0.00	0.00	243	150	280	290	206
12	101	0.00	0.00	0.00	0.00	0.00	0.00	233	172	277	306	202
13	133	0.00	0.00	0.00	0.00	0.00	0.00	229	194	276	318	183
14	133	0.00	0.00	0.00	0.00	0.00	0.00	202	199	276	316	157
15	136	0.00	0.00	0.00	0.00	0.00	0.00	170	205	275	319	140
16	136	0.00	0.00	0.00	0.00	0.00	0.00	158	207	274	322	137
17	136	0.00	0.00	0.00	0.00	0.00	0.00	172	202	274	322	129
18	137	0.00	0.00	0.00	0.00	0.00	0.00	182	198	273	321	126
19	144	0.00	0.00	0.00	0.00	0.00	0.00	194	242	271	320	122
20	149	0.00	0.00	0.00	0.00	0.00	0.00	205	301	272	322	117
21	165	0.00	0.00	0.00	0.00	0.00	0.00	187	313	296	329	98
22	179	0.00	0.00	0.00	0.00	0.00	0.00	172	326	316	322	83
23	178	0.00	0.00	0.00	0.00	0.00	110	194	332	316	318	82
24	177	0.00	0.00	0.00	0.00	0.00	170	210	330	312	323	83
25	177	0.00	0.00	0.00	0.00	0.00	192	210	328	317	321	81
26	142	0.00	0.00	0.00	0.00	0.00	237	176	332	324	307	79
27	102	0.00	0.00	0.00	0.00	0.00	256	171	335	324	300	72
28	84	0.00	0.00	0.00	0.00	0.00	260	195	346	324	292	64
29	75	0.00	0.00	0.00	0.00	0.00	260	194	365	324	260	62
30	74	0.00	0.00	0.00	---	0.00	265	174	373	324	240	59
31	46	---	0.00	0.00	---	0.00	---	162	---	321	250	---
TOTAL	3433	0.00	0.00	0.00	0.00	0.00	1750.00	6731	6994	9826	9587	4727
MEAN	111	0.000	0.000	0.000	0.000	0.000	58.3	217	233	317	309	158
AC-FT	6810	0	0	0	0	0	3470	13350	13870	19490	19020	9380
MAX	179	0.00	0.00	0.00	0.00	0.00	265	282	373	382	351	267
MIN	46	0.00	0.00	0.00	0.00	0.00	0.00	158	141	271	240	59

CAL YR	2011	TOTAL	20663.60	MEAN	56.6	MAX	416	MIN	0.00	AC-FT	40990
WTR YR	2012	TOTAL	43048.00	MEAN	118	MAX	382	MIN	0.00	AC-FT	85390

MAX DISCH: 388 CFS AT 17:45 ON JUL 06,2012 GH 3.24 FT SHIFT -0.08 FT
 MAX GH: 3.24 FT AT 17:45 ON JUL 06,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

SAINT VRAIN SUPPLY CANAL NEAR LYONS, CO
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
LITTLE THOMPSON RIVER AT CANYON MOUTH NEAR BERTHOUD
Water Year 2012

Location.-- Lat. N. 40°15'26", Long. W. 105°12'16.6" (WGS84). Gage is on the left bank 1800 ft. upstream from the Culver Ditch Diversion and 8.5 miles southwest of Berthoud, CO in Boulder County, CO.

Drainage Area and Period of Record.-- 100 sq mi (USGS Colorado StreamStats utility). ; 1962-1969, 1993 to present.

Equipment.-- Digital incremental Sutron 8500 shaft encoder connected to a Sutron SatLink 2 Data Collection Platform (DCP) and a Steven's Type A water-stage recorder in a 42-inch metal pipe shelter and well. An electric drop tape on the instrument shelf is the primary reference.

Hydrologic Conditions.-- Drainage area consists of scrub oak and grass lands. Natural flows may be augmented by seepage from the St. Vrain Supply Canal (SVSC). The SVSC Little Thompson turnouts are located about 0.25 miles upstream of the gage, but flow enters just below the gage. At higher flows the SVSC deliveries appear to cause backwater at gage.

Gage-Height Record.-- The primary record is 15-minute satellite data with logged DCP data and chart record as backup. The gage-height record for Water Year 2012 was affected by a downstream beaver dam which affected the stage-discharge relation.

Datum Corrections.-- Levels were not run this water year. It appears that levels have not been run since 1983.

Rating.-- The control is a degraded rock dam. Rating No. 13, defined by measurements to 237 cfs was continued this year. Fourteen discharge measurements (Nos. 634-647) were made this year, ranging in discharge from 0.09 to 3.36 cfs. All periods of record were affected by a beaver dam on the control causing backwater. The peak flow is not available due to the severity of the backwater.

Discharge.-- See special computations section.

Special Computations.-- Discharges were computed using linear interpolation between discharge measurements. A mass-balance spreadsheet using the formula below was used to correlate linear interpolated values to computed mass balance figures. This spreadsheet was partially usable as a reasonable comparison to the interpolated measurement values and followed very similar trends in discharge during the water year.

Remarks.-- LTCANYCO = BOULARCO + BOUBYPCO + CULVER (Supply Lateral) - (Little Thompson #1 + Little Thompson #2)
The record is estimated and poor. Station maintained by Mark Simpson and Lee Cunning, record developed by Lee Cunning.

Recommendations.-- An outside reference should be installed. Levels need to be run in the 2013 Water Year. Consideration should be given to repairing the rock dam control. Beaver dam activity needs to be monitored and removed when noted. The vegetation surrounding the gage needs to be removed so that the control is visible from the gage. When backwater is noted, the downstream channel should be walked to see if the inflow area for C-BT water is the source of the backwater. If so, photos should be taken for possible channel improvements to be completed by the NCWCD.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

LITTLE THOMPSON RIVER AT CANYON MOUTH NEAR BERTHOUD

RATING TABLE.-- LTCANYCO13 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

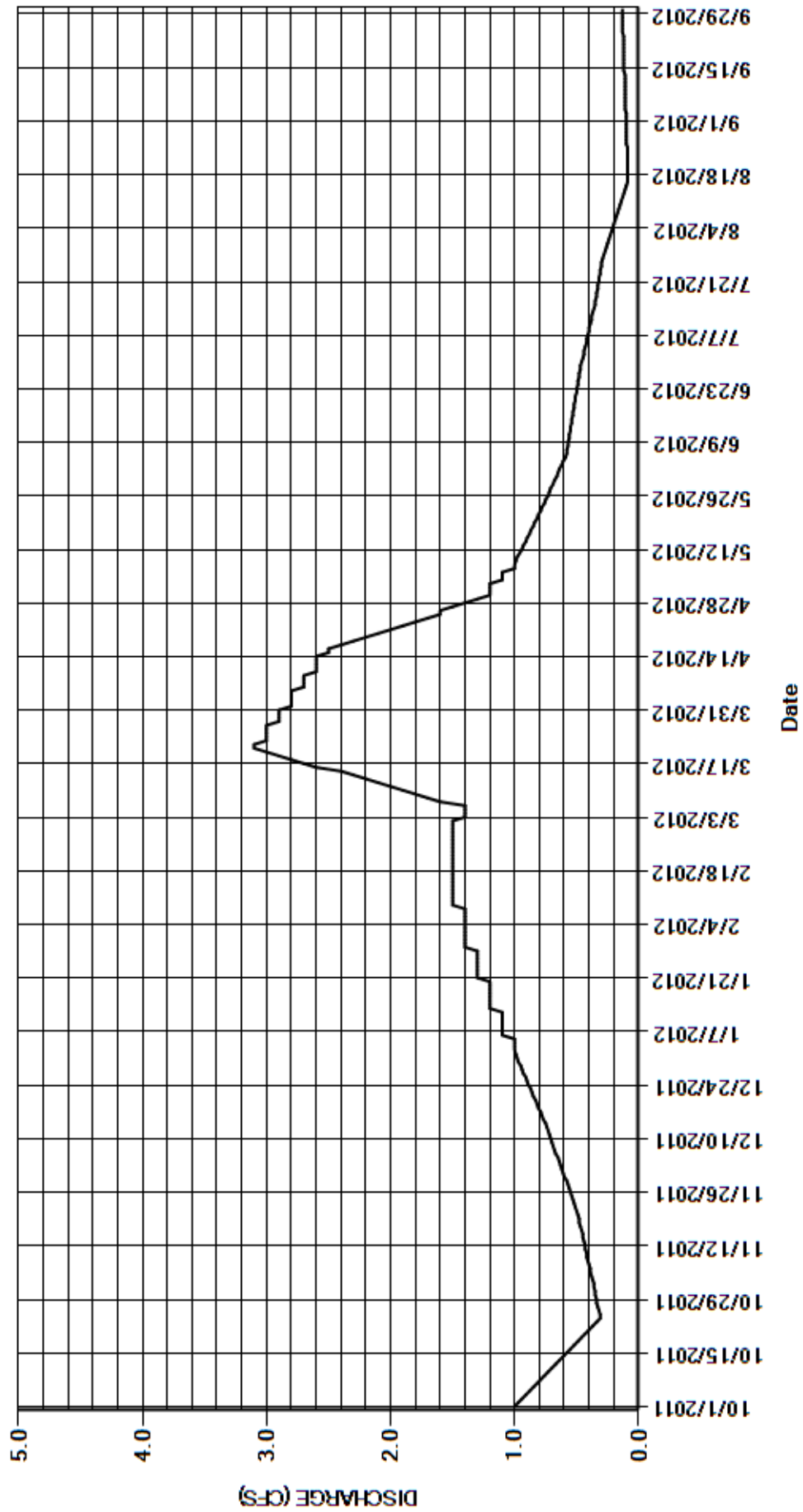
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e1.0	e0.36	e0.61	e0.99	e1.4	e1.5	e2.8	e1.2	e0.65	e0.45	e0.24	e0.10
2	e0.97	e0.36	e0.62	e1.0	e1.4	e1.5	e2.8	e1.2	e0.64	e0.44	e0.23	e0.10
3	e0.94	e0.37	e0.63	e1.0	e1.4	e1.4	e2.8	e1.2	e0.62	e0.44	e0.22	e0.10
4	e0.91	e0.38	e0.64	e1.0	e1.4	e1.4	e2.8	e1.1	e0.61	e0.43	e0.21	e0.11
5	e0.88	e0.39	e0.65	e1.0	e1.4	e1.4	e2.8	e1.1	e0.59	e0.42	e0.20	e0.11
6	e0.85	e0.39	e0.67	e1.1	e1.4	e1.4	e2.7	e1.1	e0.58	e0.42	e0.19	e0.11
7	e0.82	e0.40	e0.68	e1.1	e1.4	e1.6	e2.7	e1.0	e0.58	e0.41	e0.18	e0.11
8	e0.79	e0.41	e0.69	e1.1	e1.4	e1.7	e2.7	e1.0	e0.57	e0.40	e0.17	e0.11
9	e0.76	e0.42	e0.70	e1.1	e1.5	e1.8	e2.7	e0.99	e0.57	e0.40	e0.16	e0.11
10	e0.73	e0.42	e0.71	e1.1	e1.5	e1.9	e2.6	e0.98	e0.56	e0.39	e0.15	e0.11
11	e0.70	e0.43	e0.72	e1.1	e1.5	e2.0	e2.6	e0.96	e0.56	e0.38	e0.14	e0.11
12	e0.67	e0.43	e0.73	e1.1	e1.5	e2.1	e2.6	e0.94	e0.55	e0.38	e0.13	e0.11
13	e0.64	e0.44	e0.74	e1.2	e1.5	e2.2	e2.6	e0.93	e0.55	e0.37	e0.12	e0.11
14	e0.61	e0.45	e0.75	e1.2	e1.5	e2.3	e2.6	e0.91	e0.54	e0.36	e0.11	e0.12
15	e0.58	e0.45	e0.77	e1.2	e1.5	e2.4	e2.5	e0.90	e0.54	e0.35	e0.10	e0.12
16	e0.55	e0.46	e0.78	e1.2	e1.5	e2.6	e2.5	e0.88	e0.53	e0.35	e0.09	e0.12
17	e0.52	e0.47	e0.79	e1.2	e1.5	e2.7	e2.4	e0.87	e0.53	e0.34	e0.09	e0.12
18	e0.49	e0.48	e0.81	e1.2	e1.5	e2.8	e2.3	e0.85	e0.52	e0.34	e0.09	e0.12
19	e0.46	e0.48	e0.82	e1.2	e1.5	e2.9	e2.2	e0.84	e0.52	e0.33	e0.09	e0.12
20	e0.43	e0.49	e0.83	e1.2	e1.5	e3.0	e2.1	e0.82	e0.51	e0.33	e0.09	e0.12
21	e0.40	e0.50	e0.85	e1.3	e1.5	e3.1	e2.0	e0.81	e0.51	e0.32	e0.09	e0.12
22	e0.37	e0.51	e0.86	e1.3	e1.5	e3.1	e1.9	e0.79	e0.50	e0.32	e0.09	e0.12
23	e0.34	e0.52	e0.87	e1.3	e1.5	e3.0	e1.8	e0.78	e0.50	e0.31	e0.09	e0.12
24	e0.31	e0.53	e0.89	e1.3	e1.5	e3.0	e1.7	e0.76	e0.49	e0.31	e0.09	e0.13
25	e0.31	e0.54	e0.90	e1.3	e1.5	e3.0	e1.6	e0.75	e0.49	e0.30	e0.09	e0.13
26	e0.32	e0.55	e0.91	e1.3	e1.5	e3.0	e1.6	e0.73	e0.48	e0.30	e0.10	e0.13
27	e0.33	e0.56	e0.93	e1.3	e1.5	e3.0	e1.5	e0.72	e0.48	e0.29	e0.10	e0.13
28	e0.34	e0.57	e0.94	e1.3	e1.5	e2.9	e1.4	e0.71	e0.47	e0.28	e0.10	e0.13
29	e0.34	e0.58	e0.95	e1.4	e1.5	e2.9	e1.3	e0.69	e0.47	e0.27	e0.10	e0.13
30	e0.35	e0.60	e0.97	e1.4	---	e2.9	e1.2	e0.68	e0.46	e0.26	e0.10	e0.13
31	e0.35	---	e0.98	e1.4	---	e2.9	---	e0.66	---	e0.25	e0.10	---
TOTAL	18.06	13.94	24.39	36.89	42.7	73.4	67.8	27.85	16.17	10.94	4.05	3.51
MEAN	0.58	0.46	0.79	1.19	1.47	2.37	2.26	0.90	0.54	0.35	0.13	0.12
AC-FT	36	28	48	73	85	146	134	55	32	22	8.0	7.0
MAX	1.0	0.60	0.98	1.4	1.5	3.1	2.8	1.2	0.65	0.45	0.24	0.13
MIN	0.31	0.36	0.61	0.99	1.4	1.4	1.2	0.66	0.46	0.25	0.09	0.10

CAL YR	2011	TOTAL	2225.32	MEAN	7.49	MAX	144	MIN	0.03	AC-FT	4410
WTR YR	2012	TOTAL	339.70	MEAN	0.93	MAX	3.1	MIN	0.09	AC-FT	674

MAX DISCH: (peak not determined)
 MAX GH: (peak not determined)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

LITTLE THOMPSON RIVER AT CANYON MOUTH NEAR BERTHOUD
 WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06744000 BIG THOMPSON RIVER AT MOUTH NEAR LA SALLE
Water Year 2012

Location.-- Lat. N40° 23'2.27", Long. W104° 47'1.15" (NAD83). Gage is located on the left bank of the Big Thompson River approximately 1.6 mi upstream from the mouth and 4 mi west of LaSalle, CO.

Drainage Area and Period of Record.-- 830 sq mi (USGS Colorado StreamStats utility). ; Daily values are available from April 1, 1914 to October 31, 1915 and March 1, 1927 to present.

Equipment.-- Digital incremental Sutron 56-0540-400-DTR shaft encoder connected to a Sutron SatLink2 Data Collection Platform (DCP) in a wooden shelter overtop a galvanized stilling well at a smooth concrete control. The well is connected to the stream by two 2-in. intakes with flushing provisions. An electric tape index on the instrument shelf is the primary reference. A cantilever style chain gage was supplemental, but had been unreliable and was removed on October 17, 2011. A Stevens graphic water stage recorder was removed in March 2012, and a Constant Flow Bubbler (CFB) was installed. The CFB was removed September 4, 2012. A partial year of data is available from both of these units as backup.

Hydrologic Conditions.-- Drainage area consists of high mountain terrain, municipal and agricultural areas. Gage is located downstream from many agricultural diversions which attempt to divert all available water. Flow is mostly seepage, return flows from agriculture, local runoff and municipal runoff and wastewater. The Colorado-Big Thompson (C-BT) project historically releases 'carry-over' water at the end of October every year to downstream users that have rights to that water. Control started washing out on the south end and was repaired October 17-20, 2011. Both north and south sides of the control were refurbished May 3, 2012 and riprap was installed to prevent future erosion.

Gage-Height Record.-- The primary record is 15-minute satellite data with 15-minute logged DCP data as backup. A partial year of data is available from both a CFB and a chart recorder. The record is complete and reliable, except for the following days when the gage was ice affected and/or the well was frozen: December 1-11, 23-28, 2011, January 12, 16-18, 2012, and February 6, 2012. March 15 and 18, 2012 had missing DCP data, which were filled in with good chart data with no loss of accuracy. No instrument corrections were made this water year.

Datum Corrections.-- Levels were run September 2, 2011 using R.M.2 as base. The gage was found to be reading accurately and no adjustments were made.

Rating.-- The control is a 50-60 foot smooth concrete control on bedrock, about 2 feet high with rounded crest, located about 20 feet below the gage. At around 1000 cfs, the control submerges due to downstream channel conditions. Flood flows will go over-bank on the right side. Rating 27 was used for the entire water year and is defined by measurements from 1.14 to 6000 cfs. Rating 27 was created using Rating 25 up to 220 cfs (Measurement 567) and then measurements 568, 570 and 571. Historic high flow measurements (293, 373 and 959) which were used in creating Rating 25 were used for the high end of Rating 27. Twenty-one measurements (Nos. 593-613) were made during the water year. They ranged in discharge from 1.51 to 243 cfs. No days were seen with flows below 1.51 cfs. No daily flows exceeded 150% of this year's high measurement (No. 594). The peak flow of 516 cfs occurred at 1500 July 8, 2012 at a gage height of 3.53 ft with a shift of -0.03 ft. It exceeded the high flow measurement made October 28, 2012 by 273 cfs and 1.23 ft. of stage.

Discharge.-- Shifting control method was used all year. Shifts are caused by material scouring and filling the pool behind the control. Shifts were applied as defined by measurements. Measurements showed shifts varying between -0.06 and +0.07 ft. The higher positive shift of +0.13 ft (seen at the end of WY2011 and carried over to the beginning of WY2012) was caused by the south bank eroding around the control. After control repair, the shift went from a +0.13 to -0.02. All shifts were given full weight.

Special Computations.-- Discharge for ice affected periods were estimated by interpolation between periods of good record and temperature trends.

Remarks.-- The record is good, except for periods of ice effect and no gage height record, which are estimated and poor. The peak is also rated fair. Station maintained and record developed by Matt Rusch.

Recommendations.-- Continue efforts to get higher flow discharge measurements and define the point at which the control goes into submergence.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06744000 BIG THOMPSON RIVER AT MOUTH NEAR LA SALLE

RATING TABLE.-- BIGLASCO27 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

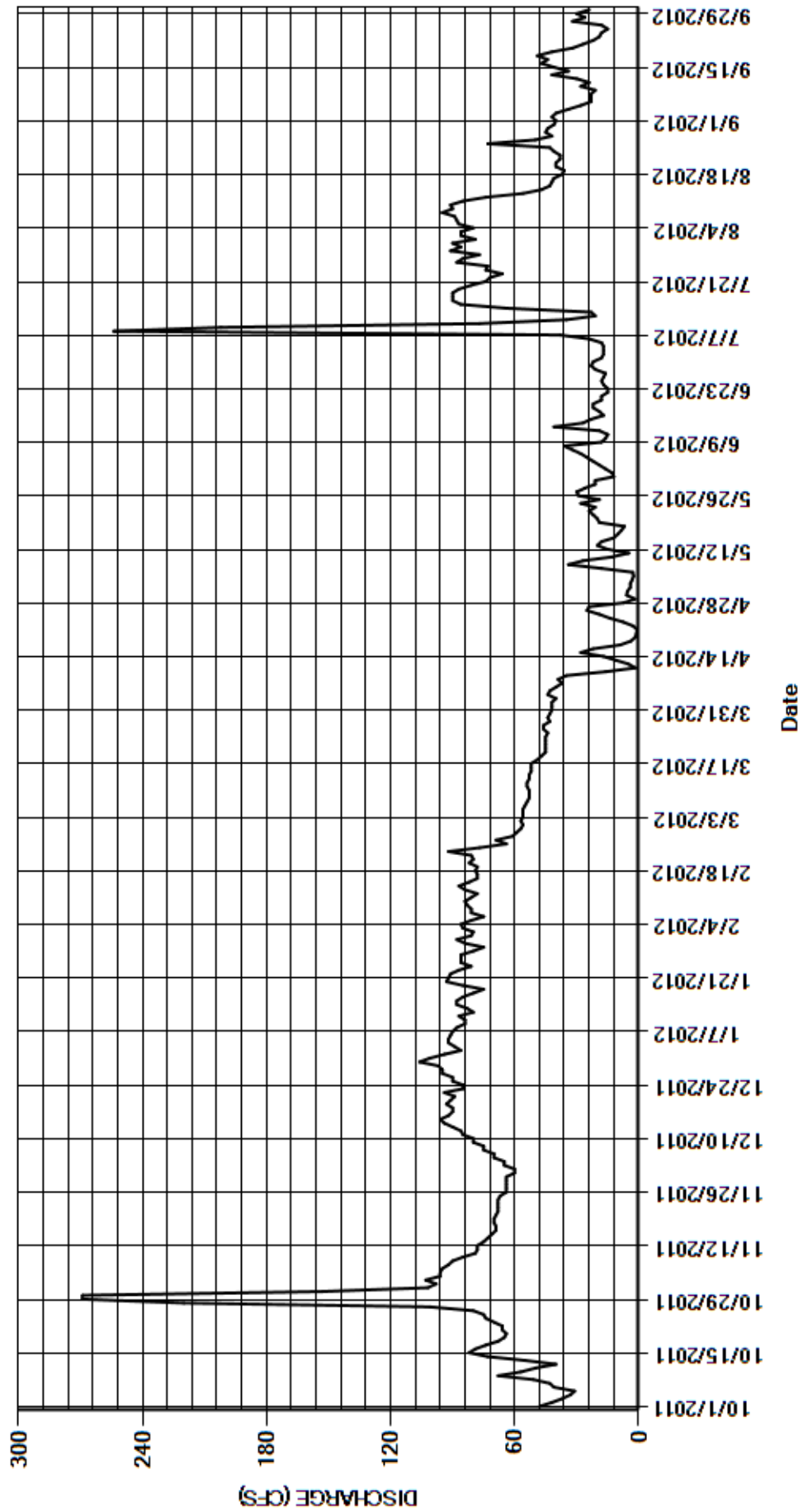
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	48	102	e60	94	81	56	42	5.5	13	18	79	40
2	42	98	e60	86	80	57	42	4.1	16	17	86	42
3	37	103	e65	89	85	56	40	4.1	19	17	86	40
4	33	96	e65	92	86	56	44	3.2	22	17	80	34
5	31	96	e70	92	81	56	43	2.5	25	18	87	28
6	41	95	e70	91	e75	55	40	2.9	28	24	88	23
7	43	92	e75	90	81	54	37	18	32	38	89	23
8	51	90	e75	88	81	53	39	34	36	254	95	23
9	68	85	e80	84	83	53	35	27	18	202	90	21
10	57	79	e80	84	84	53	16	13	16	77	91	28
11	50	78	e85	87	81	54	1.6	4.8	15	35	85	24
12	40	78	86	e80	78	54	4.9	15	19	21	74	30
13	55	75	90	83	84	53	11	20	41	23	56	42
14	73	73	94	88	87	53	17	18	27	64	47	34
15	82	71	96	88	82	52	28	12	23	86	43	41
16	79	69	92	e85	78	52	22	10	17	90	42	47
17	74	69	90	e80	78	52	8.9	8.3	19	90	41	44
18	68	70	90	e75	79	49	3.8	6.9	22	90	37	49
19	65	70	93	85	78	47	1.7	19	22	87	36	42
20	64	69	91	93	82	45	1.1	20	18	81	40	32
21	66	68	89	92	80	45	0.70	22	18	74	40	27
22	66	68	94	91	81	45	2.8	24	15	72	38	22
23	70	68	e85	87	92	45	7.5	21	15	66	38	19
24	74	68	e85	81	77	45	14	28	17	74	41	18
25	75	67	e90	86	64	44	19	19	18	73	43	15
26	80	64	e90	86	69	46	25	29	17	88	73	18
27	101	64	e95	86	61	46	24	30	16	85	50	32
28	220	64	e95	80	59	43	7.3	26	21	77	42	26
29	269	64	97	75	57	44	1.8	21	23	91	45	30
30	269	64	106	84	---	43	5.8	21	22	86	44	24
31	153	---	101	88	---	42	---	12	---	90	41	---
TOTAL	2544	2317	2634	2670	2264	1548	585.90	501.3	630	2225	1867	918
MEAN	82.1	77.2	85.0	86.1	78.1	49.9	19.5	16.2	21.0	71.8	60.2	30.6
AC-FT	5050	4600	5220	5300	4490	3070	1160	994	1250	4410	3700	1820
MAX	269	103	106	94	92	57	44	34	41	254	95	49
MIN	31	64	60	75	57	42	0.70	2.5	13	17	36	15

CAL YR	2011	TOTAL	24097.60	MEAN	66.0	MAX	344	MIN	1.2	AC-FT	47800
WTR YR	2012	TOTAL	20704.20	MEAN	56.6	MAX	269	MIN	0.70	AC-FT	41070

MAX DISCH: 516 CFS AT 15:00 ON JUL 08,2012 GH 3.53 FT SHIFT -0.03 FT
 MAX GH: 3.53 FT AT 15:00 ON JUL 08,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06744000 BIG THOMPSON RIVER AT MOUTH NEAR LA SALLE
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06752000 CACHE LA POUDRE AT CANYON MOUTH NEAR FORT COLLINS
Water Year 2012

Location.-- Lat. 40°39'52", Long. 105°13'27" (WGS84), Larimer County, Hydrologic Unit 10190007. Gage is located on the left bank at mouth of canyon, 0.5 mi downstream from headgate of Poudre Valley Canal, 1.2 mi upstream from Lewistone Creek, and 9.3 mi northwest of courthouse in Fort Collins, CO.

Drainage Area and Period of Record.-- 1,055 mi². (USGS Colorado StreamStats utility).; Sporadic and somewhat unreliable data from June 1881 to Aug. 1883. Reliable data from Oct. 1883 to current year. Periodic water-quality data from 1962 to 1995.

Equipment.-- Sutron 56-0540-400-DTR shaft encoder and a temperature sensor connected to a Sutron SatLink 2 Data Collection Platform (DCP) and a Steven's Type F weekly water-stage recorder in a concrete shelter overtop a concrete stilling well on the left bank of the channel near the canyon mouth. An Electric Tape Gage (ETG) index on the instrument shelf is the primary reference with a supplemental outside cantilever chain gage.

Hydrologic Conditions.-- Drainage area consists of high mountain forested areas of varying largely uninhabited terrain. Flows are partially controlled by upstream diversion, releases from Seaman Reservoir and several small transmountain diversions diverting water from the Colorado and North Platte River Basins into the South Platte Basin upstream of this gage. The High Park Fire of 2012 burned approximately 87,284 acres. A large portion of the burn area is tributary to the gage. Runoff in the Cache la Poudre basin this year was lower than typical due to low snow pack levels.

Gage-Height Record.-- The primary record is telemetered 15-minute data with logged DCP data and chart record as back up. The record is complete and reliable, except for the following periods: November 8-12, 16-18, 2011 and February 23 through March 3, 2012 when the stage-discharge relation was affected by ice and November 18, 2011 through February 23, 2012 when the station was shutdown for winter. Missing values on October 7, 17, 25, 26, 2011 and April 6, 2012 were filled in with chart record without loss of accuracy. The gage was visited at least weekly by CDWR staff to monitor chart and encoder calibration. No corrections were indicated or made.

Datum Corrections.-- Levels were last run August 23, 2012 using RM3 as base. The gage was found to read correctly.

Rating.-- Control is a rock and gravel riffle about 100 feet downstream. Fill and scour will cause minor shifting. Rating CLAFTRCO15 was continued this year. Twenty-three discharge measurements (Nos. 520 - 542) were made this year, ranging in discharge from 21.6 to 788 cfs covering the range in stage experienced this year well with exception of the higher daily discharges of June 6-7, 2012. The peak flow of 933 cfs occurred at 2345 June 6, 2012 at a gage height of 3.90 feet with a shift of -0.07 ft. exceeding this year's high flow measurement (No. 532) made on June 4, 2012 by 0.16 ft. of stage.

Discharge.-- Shifting control method was used all year. Shifts are caused by material moving in and out of the control section and vegetal growth in the channel. Shifts were distributed by time as defined by measurements. Measurements made this year showed unadjusted shifts varying between -0.07 and 0.00 ft. All were given full weight with exception of Nos. 521, 530, 537, 541 and 542 which were discounted up to ± 3.8% to smooth shift distributions.

Special Computations.-- Discharge for period of ice affect period as well as the winter period were estimated from adjacent good record, discharges computed at downstream gages and temperature trends recorded at the gage.

Remarks.-- The record is good, except for the periods of ice affect and the winter period, which are estimated and poor. The peak is rated good. Station maintained and record developed by Lee Cuning. Water quality instrumentation used to monitor water quality following the High Park fire was installed by cooperating agencies at the end of the water year.

Recommendations.-- Continued diligence to perform discharge measurements throughout the full range of flows experienced is recommended. Cooperative efforts to address water quality concerns following the High Park Fire should be continued.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06752000 CACHE LA POUFRE AT CANYON MOUTH NEAR FORT COLLINS

RATING TABLE-- CLAF7CCO15 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

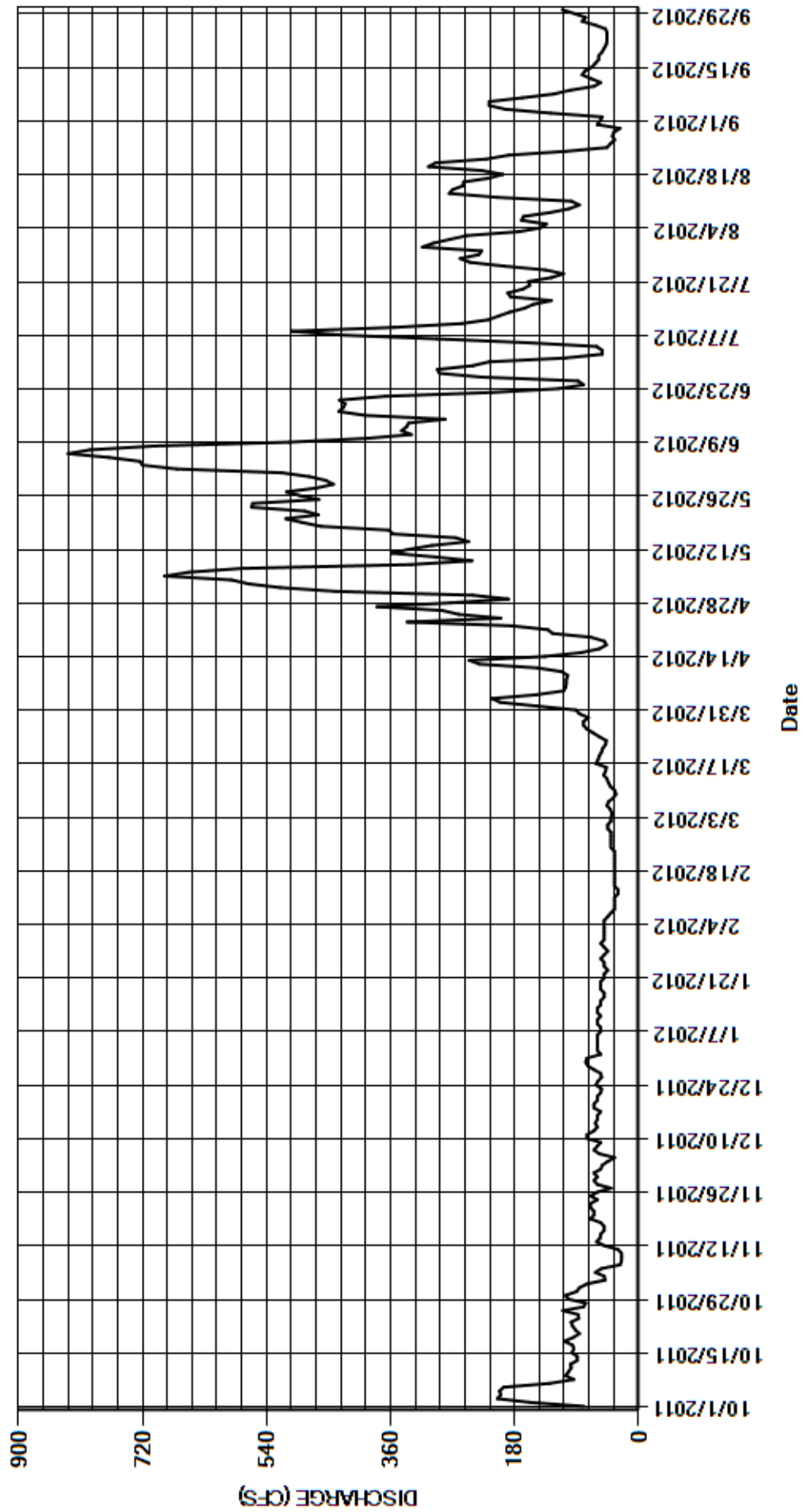
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	79	86	e65	e55	e50	e45	146	439	518	107	274	56
2	156	75	e55	e60	e50	e40	201	520	670	53	249	53
3	205	49	e53	e60	e50	e40	213	567	720	53	174	128
4	200	50	e45	e60	e50	39	148	591	724	61	143	193
5	202	63	e35	e60	e50	41	109	688	769	163	134	217
6	196	54	e57	e60	e45	46	106	653	828	293	170	217
7	129	27	e65	e55	e40	44	105	576	796	433	167	169
8	94	e25	e60	e55	e35	37	105	331	703	504	129	123
9	106	e25	e55	e60	e35	33	103	242	507	355	101	99
10	102	e25	e75	e60	e35	35	111	295	394	257	86	65
11	98	e30	e75	e55	e35	41	147	359	330	218	98	55
12	99	e50	e65	e60	e30	44	231	333	344	203	206	69
13	89	61	e60	e60	e30	46	246	300	337	187	275	82
14	89	56	e63	e55	e35	51	136	247	334	166	270	78
15	97	55	e60	e55	e35	48	83	265	281	153	255	68
16	94	e50	e60	e50	e35	47	57	357	397	127	254	63
17	96	e50	e55	e50	e35	62	47	362	435	186	217	58
18	108	e55	e65	e55	e35	59	50	461	429	190	197	58
19	95	e70	e65	e55	e35	57	69	488	426	168	228	53
20	86	e65	e60	e55	e35	54	125	512	434	158	305	50
21	92	e65	e60	e50	e35	52	132	465	368	160	295	47
22	96	e70	e55	e50	e35	48	184	485	213	127	221	46
23	98	e70	e54	e45	e35	47	336	562	116	109	189	46
24	87	e60	e62	e50	e40	57	200	560	80	135	106	46
25	88	e70	e59	e50	e40	66	261	464	88	195	46	48
26	110	e60	e54	e55	e40	75	285	491	228	245	41	63
27	80	e40	e55	e50	e40	80	380	511	289	259	35	82
28	77	e60	e65	e45	e40	80	273	468	292	232	38	77
29	102	e65	e74	e50	e45	73	189	443	240	228	36	93
30	106	e60	e77	e55	---	86	241	454	217	314	27	111
31	90	---	e75	e50	---	91	---	478	---	298	60	---
TOTAL	3446	1641	1883	1685	1130	1664	5019	13967	12507	6337	5026	2613
MEAN	111	54.7	60.7	54.4	39.0	53.7	167	451	417	204	162	87.1
AC-FT	6840	3250	3730	3340	2240	3300	9960	27700	24810	12570	9970	5180
MAX	205	86	77	60	50	91	380	688	828	504	305	217
MIN	77	25	35	45	30	33	47	242	80	53	27	46

CAL YR	2011	TOTAL	192744	MEAN	528	MAX	3500	MIN	25	AC-FT	382300
WTR YR	2012	TOTAL	56918	MEAN	156	MAX	828	MIN	25	AC-FT	112900

MAX DISCH: 933 CFS AT 23:45 ON JUN 06,2012 GH 3.90 FT SHIFT -0.07 FT
 MAX GH: 3.90 FT AT 23:45 ON JUN 06,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06752000 CACHE LA POUUDRE AT CANYON MOUTH NEAR FORT COLLINS
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06752500 CACHE LA POUUDRE NEAR GREELEY

Water Year 2012

Location.-- Lat. 40°25'04", Long. 104°39'22", in NW¼ sec. 11, T.5 N., R.65 W., Weld County, Hydrologic Unit 10190007, on right bank 15 ft. downstream from highway bridge, 2.9 miles east of courthouse in Greeley, and 3.0 miles upstream from mouth of the South Platte River.

Drainage Area and Period of Record.-- 1890 sq mi. (USGS Colorado StreamStats utility). Sporadic values available from April 1, 1903 to 1905. Daily values are available from January 1, 1914 to December 31, 1920 and June 1, 1924 to present. ; March 1903 - Present.

Equipment.-- Sutron stage-discharge recorder (SDR) connected to a Sutron SatLink2 Data Collection Platform (DCP) transmitting hourly data in a 48-inch corrugated metal pipe shelter and stilling well. The well is connected to the channel with five 2-inch intakes equipped with flushing provisions. An electric tape gage placed on the instrument shelf of the shelter serves as the primary reference with a supplemental wire weight gage located on the downstream side of the Fern Ave. bridge. The A-type continuous chart recorder and the Sutron 8500 Shaft Encoder were removed on March 15, 2012 and replaced by a Sutron Stage Discharge Recorder (SDR). The SDR is set to record data every 5-minutes with the 15-minute data transmitted over telemetry.

Hydrologic Conditions.-- Gage is located downstream of the City of Greeley Wastewater Treatment Facility and can show small diurnals from the effluent. Storm runoff events from hardened surfaces in the City of Greeley result in rapid stage increases at the gage. Colorado Big Thompson project deliveries of several hundred cfs for a few days duration also pass the gage. The snowpack in the Cache La Poudre basin produced lower than normal runoff this Water Year. Flows at the gage were much lower than normal this water year.

Gage-Height Record.-- The primary record is 15-minute satellite data with 5-minute logged SDR data as backup. Instrument calibration was insured by 30 visits made to the gage by DWR personnel. Only one instrumentation correction was required to the shaft encoder this year. Checks between the primary and backup records show agreement within ±0.02-ft. all year. Missing values on March 15, 2012 were filled in using adjacent data without loss in accuracy. The record is complete and reliable except for March 30 - April 3, 2012 when the SDR float sank. Missing values were 'backed into' using upstream gages, this data is estimated and considered poor.

Datum Corrections.-- Levels were last run on October 4, 2011 using RM 4, established in WY2009, as base. Using this RM, the primary reference was found to be 0.025 ft high which was thought to be consistent with results seen in WY2010. The datum correction was applied by correcting the tape length at the gage at 1410 October 4 and applying a -0.03 ft correction to just the period 0000 Oct 1 to 1400 Oct 4, 2011. The WY2011 record remains unchanged, allowing the existing shift distribution across the WY change to remain unchanged and correctly calculate discharge.

Rating.-- The low to mid level control is a gravel and sand channel with a downstream riffle, with channel control at higher stages. At extreme stages the Fern Ave. bridge may become the regulating feature at which time flows can bypass the gage. Large gravel bars form behind the bridge to directly adjacent to the gage effectively divide the flow into two channels at times. These gravel bars were removed in 2010 by Weld County. However, after the sustained high flows in WY2011 and sustained low flows in WY2012 (allowing vegetation growth), the gravel bars have reappeared nearly identical to before the cleaning activities. The channel adjacent to the gage is the main channel up to about 60 cfs. Above this point flows will start to flow in a smaller channel on the north side of the river. In August, 2010, Weld County cleaned upstream, downstream and under the bridge completely. The rating above a gage height of about 2.45 ft should be much different than original or stage-shifted rating 27. However, the higher flows seemed to follow pre-cleanout stage-shift relationships showing that the bridge may not be the control backing water upstream, causing minor flooding. Rating CLAGRECO27, dated January 4, 2010, in use since 2009 was continued in use for all of this year. It is defined by measurements from 50 to 4500 cfs. Twenty-one discharge measurements (Nos. 1081-1101) were made this year, ranging in discharge from 26.2 to 214 cfs covering the range in stage experienced this year well. The peak flow of 302 cfs occurred at 14:30 on February 4, 2012 at a gage-height of 3.24 ft. with a shift of +0.26 ft. It exceeded high flow Measurement No. 1088 made on February 29, 2012 by 88 cfs and 0.44 ft of stage.

Discharge.-- Shifting control method was used for all periods of open water. Shifts are caused by fill and scour of material into and out of the gage section and by in-channel and bank vegetal growth. Shifts were distributed by time with the exception of one variable shift table CLEGRECOVST12-A which was used from January 19, 2012 to February 29, 2012. This VST is defined by measurements (Nos. 1086-1088 and 1069 from WY2011). Open water measurement showed shifts ranging from -0.58 ft to +0.16 ft (The peak flow shift of +0.26 is derived from the addition of measurement No. 1069 (WY2011) being added to the VST12-A as the high point. Measurement No. 1069 was made May 12, 2011. All were given full weight.

Special Computations.-- Discharge for when the float sank into the well were calculated from upstream inflow and outflow data and a spreadsheet is included in the record files.

Remarks.-- The record is good, except for the period when the float sank and this period is estimated and poor. Station maintained and record developed by Lee Cunning.

Recommendations.-- As the channel stabilizes a new rating should be evaluated.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06752500 CACHE LA POUFRE NEAR GREELEY

RATING TABLE-- CLAGRECO27 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

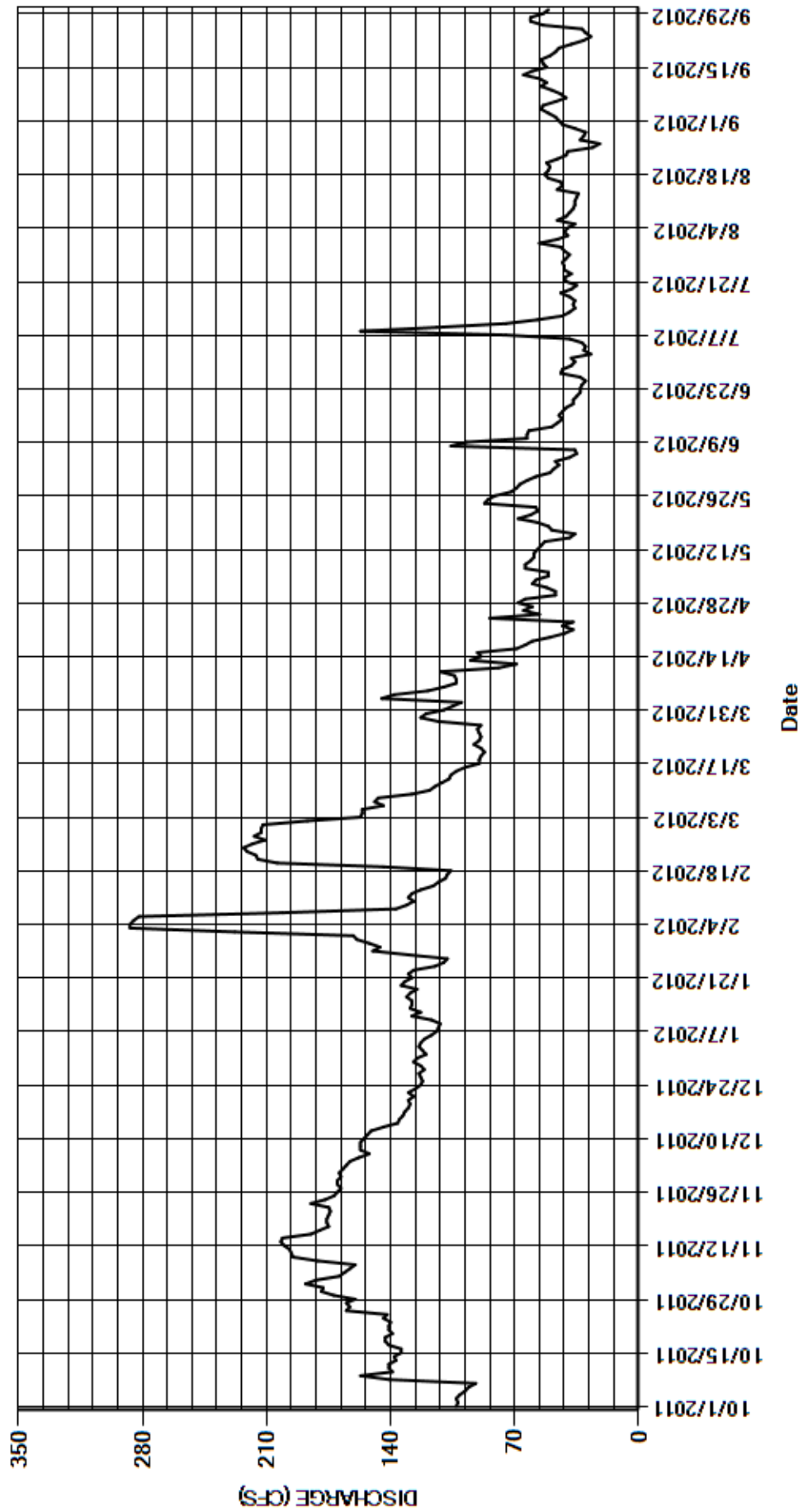
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	103	178	169	120	161	212	e105	47	50	38	46	45
2	102	188	167	122	228	187	e100	52	48	27	40	47
3	103	182	165	124	287	157	e145	60	45	31	42	51
4	101	169	163	123	287	156	138	58	47	30	40	55
5	98	166	158	121	285	156	119	51	39	32	36	54
6	96	163	152	117	282	144	110	51	35	39	46	47
7	92	160	157	114	201	149	103	64	36	75	41	41
8	141	181	157	113	137	147	103	64	106	157	39	44
9	157	195	157	112	131	128	104	61	97	114	37	49
10	139	196	155	117	127	118	112	59	63	75	36	55
11	141	197	153	128	130	115	79	59	63	57	36	52
12	141	200	151	123	128	111	69	57	62	43	35	56
13	137	202	144	129	123	107	95	55	49	39	34	65
14	138	201	136	128	116	106	89	53	46	36	46	60
15	134	185	135	128	113	103	91	39	43	37	43	52
16	134	180	133	131	109	98	69	36	45	36	44	54
17	141	175	132	129	108	90	64	49	43	39	51	55
18	143	176	130	125	106	90	60	51	41	44	53	50
19	143	176	129	134	144	89	50	57	37	38	51	47
20	139	175	130	132	204	87	42	68	37	35	50	45
21	141	174	127	128	215	89	37	61	35	41	52	38
22	141	175	130	130	216	93	43	57	33	42	46	31
23	140	185	126	127	221	90	37	58	33	38	41	27
24	144	177	123	115	223	89	84	87	32	42	40	30
25	142	172	122	110	218	90	56	85	30	42	26	32
26	165	170	123	108	211	91	65	81	33	43	22	54
27	163	168	124	130	217	89	60	72	44	41	33	61
28	165	170	121	150	213	113	68	69	43	39	31	61
29	160	170	123	146	213	123	64	67	38	42	30	54
30	172	168	127	152	---	e120	47	63	36	44	36	51
31	179	---	125	159	---	e110	---	58	---	56	43	---
TOTAL	4235	5374	4344	3925	5354	3647	2408	1849	1389	1492	1246	1463
MEAN	137	179	140	127	185	118	80.3	59.6	46.3	48.1	40.2	48.8
AC-FT	8400	10660	8620	7790	10620	7230	4780	3670	2760	2960	2470	2900
MAX	179	202	169	159	287	212	145	87	106	157	53	65
MIN	92	160	121	108	106	87	37	36	30	27	22	27

CAL YR	2011	TOTAL	114231	MEAN	313	MAX	2600	MIN	17	AC-FT	226600
WTR YR	2012	TOTAL	36726	MEAN	100	MAX	287	MIN	22	AC-FT	72850

MAX DISCH: 302 CFS AT 14:30 ON FEB 04,2012 GH 3.24 FT SHIFT 0.26 FT
 MAX GH: 3.27 FT AT 17:00 ON JUL 08,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06752500 CACHE LA POUUDRE NEAR GREELEY
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
CACHE LA POUDDRE RIVER AT GREELEY WASTEWATER PLANT
Water Year 2012

Location.-- Lat 40°25'21", Long 104°40'37" in SW ¼ section 4, T5N, R65W, Weld County. Just east of Greeley, on right bank, approximately 400 feet east of Highway 85, river mile 5.5.

Drainage Area and Period of Record.-- 1,870 sq mi. (USGS StreamStats utility). 2007 to present. ; 2002 - Present

Equipment.-- Digital incremental Sutron 56-0540-400-DTR shaft encoder connected to a Sutron SatLink2 Data Collection Platform (DCP) transmitting hourly in a 7-ft. by 7-ft. precast concrete shelter overtop a 48-in diameter concrete stilling well. The City of Greeley's effluent flow meter (GREWASCO) is also connected to and transmitted by the DCP. The stilling well is connected to the channel by three 2-inch intakes equipped with flushing apparatuses. The primary reference is an electric tape gage located on the instrument shelf in the shelter. There are no provisions for a supplemental reference presently. A bank operated cable way is located near to the shelter. Gage is owned and maintained by the City of Greeley in cooperation with the Colorado Division of Water Resources.

Hydrologic Conditions.-- Drainage area of varying topography. Stream is heavily regulated upstream by numerous diversions from and deliveries to the stream. Due to its proximity to the City of Greeley, the gage is subject to rapid changes in stage from hardened surfaces within the City of Greeley. This gage cross-section is typically subject to heavy Sago pond weed growth during late spring and summer.

Gage-Height Record.-- The primary record is 15-minute satellite data with 15-minute logged DCP data as backup. Instrument calibration was maintained by twenty-seven visits made to the gage. No instrument calibration corrections were made this water year. One flush correction of -0.07 feet which occurred on October 8, 2012 of Water Year 2013 was prorated back to September 27, 2012 of Water Year 2012. The record is complete and reliable.

Datum Corrections.-- Levels have not been run since the gage was repurposed and put into use in the 2007 Water Year.

Rating.-- The control for low to moderate flow is a 60-ft. by 7-ft. hinged-crest gage with concrete abutments approximately 50-ft. downstream from the shelter. The high flow control is the channel. Large shifts seen at this gage are typically caused by thick vegetal growth along the left side of the channel. Fill and scour of gravel, sand and mud also cause shifts. During low flows a sand bar will form just downstream of the control section. Rating CLAWASCO07, developed in WY2010 was continued in use for all of this year. Eleven discharge measurements (Nos. 90 - 100) were made during the year, ranging in discharge from 38.7 to 158 cfs covering the range in stage experienced this year well. The peak flow of 385 cfs occurred on July 8, 2012 at 1600 at a gage-height of 2.10 ft. with a shift of +0.04 ft. It exceeded high flow Measurement No. 90 made November 8, 2011 by 227 cfs and 0.91 ft. of stage.

Discharge.-- Given the low flows in the river and lack of any high flows, shifting control method was used for all periods of open free-flow record. Shifts were distributed by time as defined by measurements from October 1, 2011 to September 30, 2012. Open water measurements showed shifts varying between -0.13 and +0.12 ft. All were given full weight.

Special Computations.-- None.

Remarks.-- The record is good. Station maintained by the City of Greeley Water Pollution Control Facility in cooperation with Colorado Division of Water Resources staff. Record developed and reviewed by Division One staff.

Recommendations.-- Establishment of reference marks and running of levels should be done. Additional measurements should be made as warranted by flow conditions. Additionally, measurements at the beginning and end of the water years should be taken close to their respective date to better distribute shifts.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

CACHE LA POUDDRE RIVER AT GREELEY WASTEWATER PLANT

RATING TABLE.-- CLAWASCO07 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

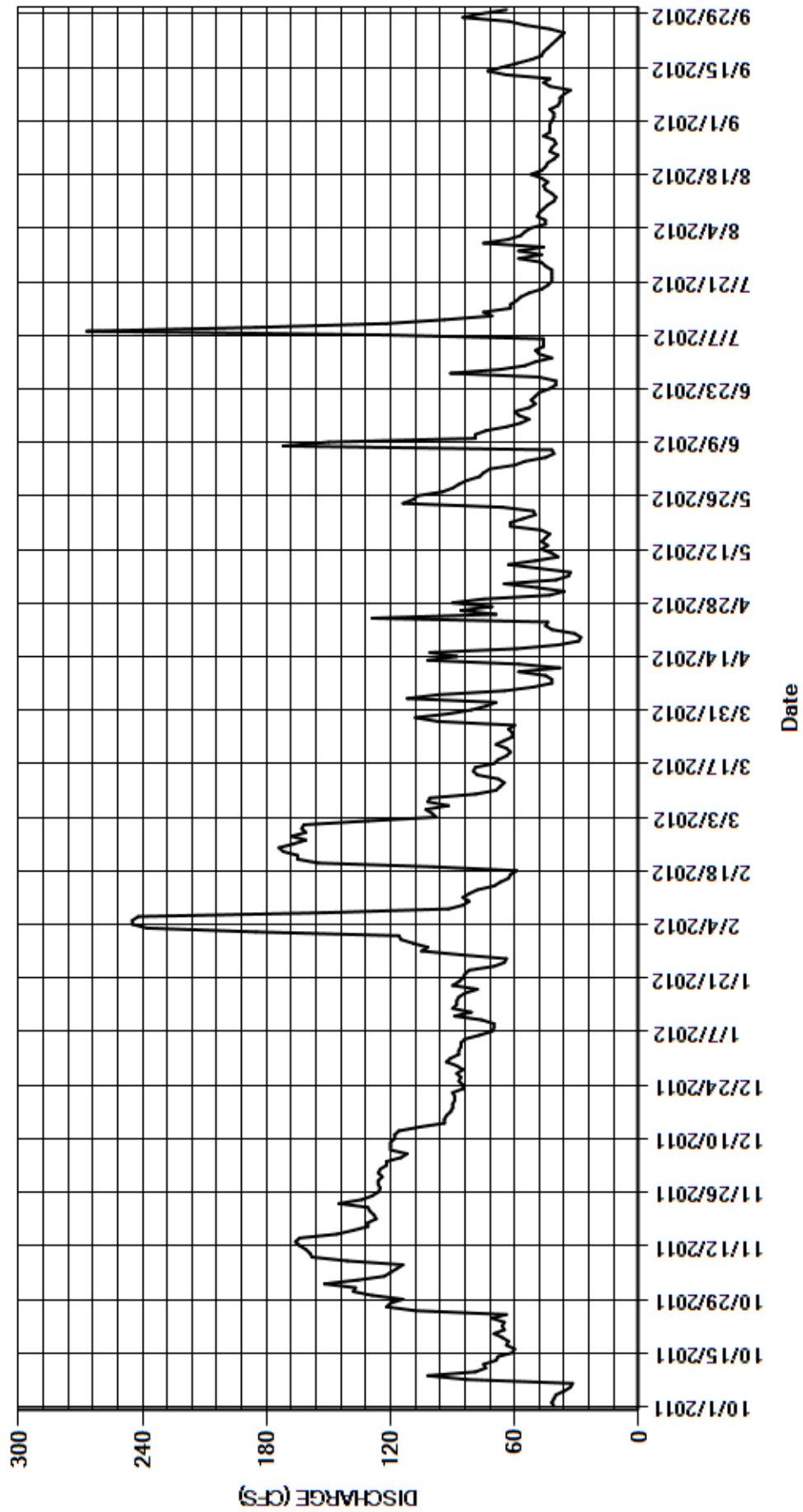
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	41	137	126	87	116	162	74	36	75	42	63	42
2	42	152	125	87	185	131	69	49	72	48	57	41
3	41	136	122	86	238	98	112	65	60	50	55	41
4	40	123	122	86	245	100	97	40	55	46	52	43
5	36	120	115	84	245	103	65	34	45	46	45	39
6	33	117	112	77	242	92	51	33	41	46	45	38
7	32	114	120	71	152	102	42	48	42	121	49	38
8	83	141	120	70	92	101	42	63	172	267	48	36
9	102	158	120	70	85	79	45	50	150	185	46	33
10	79	159	118	76	82	69	58	39	79	122	44	43
11	74	161	118	89	85	67	38	42	79	94	41	46
12	75	164	116	81	82	65	58	47	74	71	40	43
13	69	166	106	90	78	68	102	44	64	75	42	64
14	68	164	94	88	70	78	88	47	57	62	45	73
15	61	146	94	88	67	80	101	45	53	62	46	66
16	60	138	93	87	63	79	59	43	58	59	44	59
17	64	131	91	84	62	70	39	47	60	57	47	52
18	63	131	90	78	59	68	29	62	53	53	52	47
19	66	127	90	90	99	64	28	62	50	47	47	46
20	70	128	89	87	155	62	31	56	52	44	45	44
21	65	130	89	85	165	64	42	50	50	42	44	42
22	66	131	90	84	165	69	45	51	48	42	41	40
23	65	145	85	82	172	65	44	66	43	42	39	38
24	71	134	85	70	174	61	129	114	40	42	43	36
25	64	129	87	65	167	61	69	109	40	45	42	43
26	108	126	86	64	161	63	86	107	48	47	40	55
27	122	125	88	86	168	60	71	95	91	58	41	63
28	120	126	85	105	161	97	90	90	67	47	46	85
29	114	126	88	102	163	108	75	87	55	58	43	76
30	129	124	93	109	---	92	43	83	50	46	43	64
31	138	---	91	115	---	81	---	77	---	75	43	---
TOTAL	2261	4109	3148	2623	3998	2559	1922	1881	1923	2141	1418	1476
MEAN	72.9	137	102	84.6	138	82.5	64.1	60.7	64.1	69.1	45.7	49.2
AC-FT	4480	8150	6240	5200	7930	5080	3810	3730	3810	4250	2810	2930
MAX	138	166	126	115	245	162	129	114	172	267	63	85
MIN	32	114	85	64	59	60	28	33	40	42	39	33

CAL YR	2011	TOTAL	111850	MEAN	306	MAX	2640	MIN	32	AC-FT	221900
WTR YR	2012	TOTAL	29459	MEAN	80.5	MAX	267	MIN	28	AC-FT	58430

MAX DISCH: 385 CFS AT 16:00 ON JUL 08,2012 GH 2.10 FT SHIFT 0.04 FT
 MAX GH: 2.10 FT AT 16:00 ON JUL 08,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

CACHE LA POUUDRE RIVER AT GREELEY WASTEWATER PLANT
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06754000 SOUTH PLATTE RIVER NEAR KERSEY

Water Year 2012

Location.-- Lat. N.40°24'45", Long. W.104°33'47" (NAD83). Gage is located on the downstream side of the Weld County Road 53 bridge, 1.90 miles north of Kersey, CO and 2.50 miles downstream from the Cache la Poudre River mouth. The street address used by the phone company was 28474 US Highway 37, Kersey, CO.

Drainage Area and Period of Record.-- 9,659 mi² from topographic maps. ; April 27, 1901 to Present.

Equipment.-- Sutron AccuBubble and a Sutron Constant Flow Bubbler (CFB) stage sensors connected to a Sutron SatLink2 Data Collection Platform (DCP) in a concrete block shelter on the downstream left edge of water side of the State Highway 37 bridge near Kersey, CO. The primary reference is a wire weight gage located midspan between the first and second bridge pier as referenced from the left bank. A supplemental (0-6.66 ft.) staff gage is installed on the bridge pier closest to the shelter.

Hydrologic Conditions.-- The Kersey gage reflects general trends of drought or abundance throughout the South Platte basin. It is the first gage below the confluences of all major mountain tributaries of the South Platte Basin. In a low to average year this native water supply is largely captured for agricultural and municipal uses before it reaches Kersey. In this full use scenario, the Kersey gage records return flows and water passed downstream for senior users. In a year with above average snowmelt, the Kersey gage will see high water during runoff. The 25-year average for 1976-2000 was a yearly total of 914,000 acre-feet. This year saw a total of 410,700 acre-ft. The Kersey peak flow and a significant portion of the total flow in dry years often comes from front range rainstorms. These storms are often seen as sharply rising stage events.

Gage-Height Record.-- The primary record is 15-minute satellite telemetry data from the Accububble (GH2) with 15-minute logged DCP data as backup. The record is complete and reliable. Missing values occurring on March 21-23, 2012, when the GOES West Satellite failed, was filled in with logged Accububble data with no loss of accuracy. Instrument calibration was maintained by 216 wire weight readings made during measurements and visits to the gage. The Accububble instrument did not require any instrument corrections. The channel was ice-free during the winter.

Datum Corrections.-- Levels were last run to the wire weight gage on October 4, 2011 using RM6 as base. The reference was found to be reading 0.13 ft. low. The reference was corrected on October 6, 2011. Corrections were not applied to the gage-heights of measurement nor the gage-height record. Rather, shifting was used to compensate for this error for the 2011 and first part of the 2012 water year.

Rating.-- The low water control is a channel constriction and sand channel bed about 150 ft downstream from the gage, where pilings exist on the left bank for an old bridge. During very low flow the channel bed is stable. Channel bed changes occur by time for sustained low and medium flows. Large peaks will change the channel and result in a new pattern of shifts for lower flows. Brush and trees in the overflow areas cause backwater at high stages. The channel at the gage appears to be widening over time. Review of the measurement history indicates that the GH for 10,000 cfs has been gaining a foot every 10-15 years. Rating No. 24 was used again this year. It is defined by measurements from 281 to 11,000 cfs. Historic measurements run higher and lower and were used for trends. Twenty-six discharge measurements (Nos. 1078-1103) were made this year ranging in discharge from 156 to 1,900 cfs. They cover the range in daily discharge experienced this year well except for the lower daily flows on June 24 - July 6, 2012. The peak discharge of 2,370 cfs occurred at 00:45 on July 9, 2012 at a gage height of 5.55 ft with a shift of +0.11 ft. exceeding measurement 1102 made on September 13, 2012 by 0.38 ft. in stage.

Discharge.-- Shifts are caused by sand movement, vegetation, and the variable effects of the bridge piers with stage. Shifting control method was used all year. Shifts were distributed by time with consideration given to change in stage from September 19 through October 6 and December 14, 2011 through May 29, 2012. Stage dependent shifting using variable shift table PLAKERCOVST12-A was applied from October 6 through December 14, 2011. It is defined by measurements made during the period of use. Similarly, variable shift tables PLAKERCOVST12-B through PLAKERCOVST12-E were applied from May 29 through October 4, 2012. They are defined by measurement made during their respective periods of use and applied as defined by measurements with consideration given to change in stage. Measurements made this year showed unadjusted shifts varying from -0.21 ft. to +0.10 ft. All were given full weight except for: Nos. 1078, 1081, 1083, 1084, 1099 and 1100 which were discounted up to 5.24% to smooth shift distributions.

Special Computations.-- For safety reasons, high flow measurements (Nos. 1095 and 1102) are made at the WCR58 bridge crossing of the South Platte, approximately 3.75 miles upstream of the gage. Flows entering the South Platte between this measurement location and the Kersey gage were added to the total flow measured considering the lag time for travel distance. The mean gage height for the measurement was determined by inspection of the PLAKERCO stage record against assumed travel times based on measurement velocities at the WCR58 bridge vs. those made at the PLAKERCO bridge, inspection of the stage record and assumed travel time from the CLAGRECO gage and spot observations made at Wildcat Creek. This method has seemed to be fairly accurate, especially when flows at CLAGRECO are low. Its practice is being evaluated as a surrogate due to poor and dangerous measurement conditions at the Kersey Bridge.

Remarks.-- The record is rated as good. Station operated and maintained by Lee Cunning. Record developed by Division One Hydrographic staff.

Recommendations.-- The AccuBubble out-performed the CFB throughout this year. A radar stage sensor is planned to be installed in early November 2012 to replace the CFB. If the radar data are deemed good, the radar will become the primary with the AccuBubble as backup. A new wire weight gage will be installed near the new radar sensor to establish gage height at the radar. The established elevation of R.M. 7 may need to be reconsidered. During cable measurements made at the gage, wire weight readings should be taken every 15 minutes.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06754000 SOUTH PLATTE RIVER NEAR KERSEY

RATING TABLE-- PLAKERCO24 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

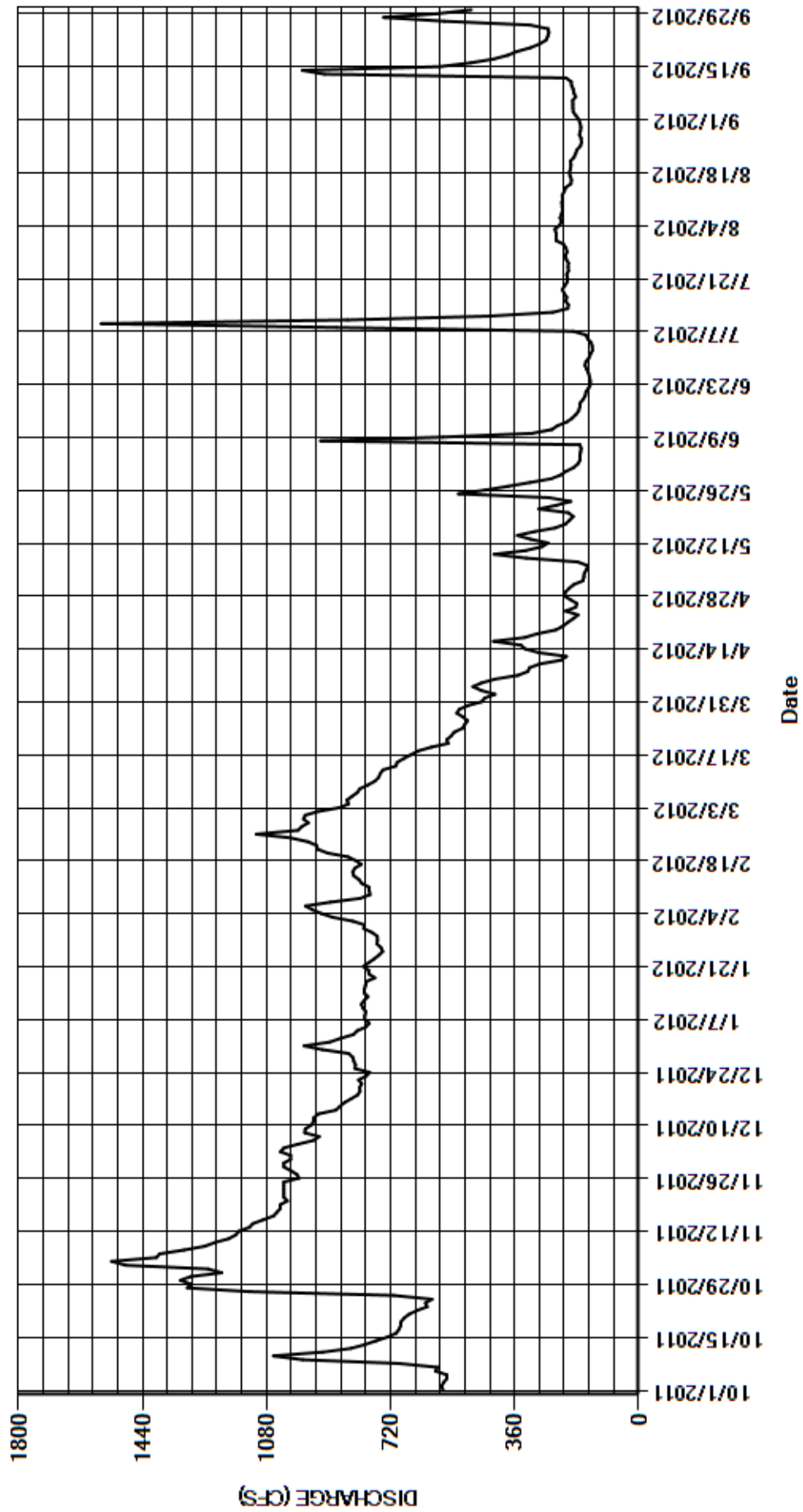
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	568	1210	1010	897	796	968	447	189	188	140	239	174
2	572	1250	1010	865	830	931	417	162	176	134	240	182
3	566	1490	1040	828	888	868	457	159	170	135	243	190
4	557	1530	1030	817	921	842	481	158	171	138	230	191
5	557	1400	989	792	947	847	456	151	169	148	224	191
6	590	1390	944	782	967	832	417	148	167	153	228	192
7	584	1320	927	796	895	817	351	177	171	190	224	183
8	696	1260	969	795	809	809	322	326	923	877	221	188
9	975	1230	968	792	780	786	317	420	568	1560	222	190
10	1060	1190	951	800	782	766	288	328	310	845	223	195
11	917	1170	944	805	783	755	226	281	252	434	221	196
12	835	1160	943	797	804	750	210	263	236	250	222	211
13	795	1130	930	786	812	742	290	314	209	206	216	912
14	762	1120	879	797	827	705	330	352	193	204	212	976
15	729	1090	867	796	830	701	342	303	182	212	197	577
16	704	1060	854	793	824	682	421	242	174	209	195	486
17	696	1050	835	791	805	661	331	213	171	216	199	421
18	691	1040	816	766	821	640	294	201	170	222	201	380
19	690	1040	809	783	844	602	241	190	161	215	198	353
20	681	1020	810	784	903	553	220	204	155	208	197	314
21	667	1030	804	799	932	557	206	290	153	207	198	287
22	644	1030	813	784	935	544	190	238	145	209	188	269
23	614	1030	791	768	960	535	176	197	140	204	183	264
24	619	1030	781	754	1010	511	212	261	141	205	179	261
25	600	1030	823	743	1110	505	183	523	143	204	169	263
26	711	986	822	748	989	497	179	446	146	210	166	316
27	1130	992	827	760	978	510	198	379	151	213	167	564
28	1310	1010	830	758	959	528	216	315	156	208	172	740
29	1300	1030	842	759	973	521	213	254	153	211	169	584
30	1330	1030	918	774	---	496	202	226	144	218	168	486
31	1300	---	971	798	---	456	---	210	---	240	170	---
TOTAL	24450	34348	27747	24507	25714	20917	8833	8120	6388	9025	6281	10736
MEAN	789	1145	895	791	887	675	294	262	213	291	203	358
AC-FT	48500	68130	55040	48610	51000	41490	17520	16110	12670	17900	12460	21290
MAX	1330	1530	1040	897	1110	968	481	523	923	1560	243	976
MIN	557	986	781	743	780	456	176	148	140	134	166	174

CAL YR	2011	TOTAL	399968	MEAN	1096	MAX	9270	MIN	132	AC-FT	793300
WTR YR	2012	TOTAL	207066	MEAN	566	MAX	1560	MIN	134	AC-FT	410700

MAX DISCH: 2370 CFS AT 00:45 ON JUL 09,2012 GH 5.55 FT SHIFT 0.11 FT
 MAX GH: 5.55 FT AT 00:45 ON JUL 09,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06754000 SOUTH PLATTE RIVER NEAR KERSEY
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06758500 SOUTH PLATTE RIVER NEAR WELDONA
Water Year 2012

Location.-- Lat N 40° 19'17.1", Long. W. 103° 55'13.46" (NAD83) in Morgan County, CO Hydrologic Unit 10190003. Gage is located on the left bank 660 ft. downstream from the Hwy. 144 bridge, 3.1 miles southeast of Weldona, CO.

Drainage Area and Period of Record.-- 13,200 mi² (USGS Colorado StreamStats Utility). ; Daily values are available from October 1, 1952 to present.

Equipment.-- Digital incremental Sutron 56-0540-400-DTR shaft encoder and a Sutron CFB bubbler connected to a Sutron SatLink2 Data Collection Platform (DCP) and a continuous graphic water-stage recorder housed in a corrugated metal pipe shelter and stilling well. The primary reference is an electric tape gage inside the shelter with a supplemental staff gage located on the left bank near the gage which was installed on September 9, 2010. The datum of the staff was not verified by levels but was established with respect to the electric tape gage reading. The CFB is primarily used when the inlets become or are near isolation at lower flows. Datum of gage is 4309.79 ft. MSL based on a 2005 survey conducted by the Colorado Water Conservation Board. A supplementary gage (PLAWE2CO) was established at the HWY 144 bridge in April of 2012 to compensate for isolation problems with the established gage (PLAWELCO). The Campbell Scientific CS476 Radar unit, connected to a SatLink 2 DCP, and wire weight were installed on April 16th and the gage was put into operation on April 26th when levels were run to establish a matching datum to the PLAWELCO gage.

Hydrologic Conditions.-- Drainage area is heavily regulated upstream by numerous reservoirs, diversions from and deliveries to the stream.

Gage-Height Record.-- The primary record is 15-minute satellite data with 15-minute logged DCP data and chart record as backup. CFB data were used from 00:00 Oct. 1, 2011 thru 22:30 Oct. 8, 2011 when low flows caused the inlets to be at or near isolation. Shaft encoder data were used from 22:45 Oct. 8, 2011 thru 14:45 Feb. 21, 2012. Due to returning low flows, CFB data were again used for the period of time 15:00 Feb. 21, 2012 through 14:30 April 26, 2012. Logged data (PLAWE2CO_log_20121002) from the radar unit were used from 14:45 April 26, 2012 thru the end of the water year. The record is complete and reliable except for the periods of time when the CFB data were used and "chatter" was eliminated. February 18-20, 2012 are estimated due to isolation of inlets to the stilling well. April 26th, 2012 is estimated due to considerable "chatter" and the transitioning into using the radar data. Four equipment corrections were made to the gage this year which were applied to the record as defined by visits to the station. One flush correction was applied as well and was based on flows. Instrument calibration was supported by 45 visits made to the gage.

Datum Corrections.-- Levels were run on April 26, 2012. A small levels loop was completed at the old gage and then used to establish datum at the bridge for calibration of the wire weight gage and radar sensor. Three new reference marks were placed at the bridge RM7, RM8, and RM9.

Rating.-- The predominant control is channel constriction with a moving sand bed over shale. High flows will spread out into relatively flat areas where vegetation has taken over in recent years. Rating No. 19 was continued in use for 2011. It was created in 2006 and is defined by measurements from 78 to 16300 cfs. Below 650 cfs, Rating 19 was created with 2006 measurements. The high water end was taken from an equation fit through historic points. Twenty-two discharge measurements (Nos. 351 - 373) were made this year ranging in discharge from 132 cfs to 1010 cfs covering the range of stage experienced during this year well, except for the lower daily flows on Oct.1 - 7, 2011, April 2 - 12, April 21 - 24, May 4 - 6, and June 1 - 7, 2012; and the higher daily flows of Dec. 31, 2011, Jan. 1 and Feb. 7, 2012.. The peak flow of 1110 cfs occurred at 22:15 on December 31, 2011 at a gage height of 3.22 ft with a shift of 0.42 ft. It exceeded Measurement No. 355 made on Dec. 12, 2011 by 100 cfs and 0.14 ft. in stage.

Discharge.-- Shifting control method was used all year. Measurements showed unadjusted shifts ranging from -0.38 ft. to +0.43 ft. The positive shifts ran from the start of the water year thru Measurement No. 361, made on April 18, 2012, using the data obtained from the PLAWELCO gage. The negative shifts occurred after the PLAWE2CO radar station came on line, starting with Measurement No. 362 and continuing thru the end of the water year. Shifts were applied by time (with consideration to stage) from 00:00 Oct. 1, 2011 thru 16:45 Oct. 12, 2011. Stage dependent shifting was applied, using variable shift curve PLAWELCOVST12-A, from 17:00 Oct. 12, 2011 thru 11:45 March 12, 2012. This shift table is defined by Measurement Nos. 351 thru 359 made during the period of use. Measurement Nos. 353, 354, 356, 357, 358, and 359 were discounted up to 5% to smooth the shift distributions. Shifts were applied by time, with consideration given to change in stage, from 12:00 March 12, 2012 thru 14:45 April 5, 2012. Variable shift table PLAWELCOWY1202 was used to distribute shifts by stage for the period of time starting 15:00 April 5, 2012 thru 14:30 April 26, 2012. Measurements Nos. 360 and 361 made during this period were used in building this table. Stage shifting was then used from 14:45 April 26, 2012 thru 11:15 July 18, 2012 using variable shift table PLAWELCOVST12-C. Measurements Nos. 362 thru 368 were used to build this table and were made during the period of use. Measurement Nos. 362, 363, 365, 366 and 368 were discounted up to 4% to better fit curve distribution. Shifts were then applied by time (with consideration to stage) from 11:30 July 18, 2012 thru the end of the water year.

Special Computations.-- None.

Remarks.-- The record is good, except for the following: February 18-20, 2012, estimated due to isolation of inlets is fair; February 22-24, March 14-20, April 1-25, 2012 downgraded to fair due to bubbler "chatter"; April 26, 2012, estimated and poor due to transition data. The gage was replaced on Oct. 2, 2012 with the station formerly named PLAWE2CO. Station maintained and record developed by Division One Hydrographic Staff.

Recommendations.-- Levels need to be run in WY2013. A new rating should be developed after a substantial number of measurements are made to cover a wide array of gage heights.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06758500 SOUTH PLATTE RIVER NEAR WELDONA

RATING TABLE-- PLAWELCO19 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

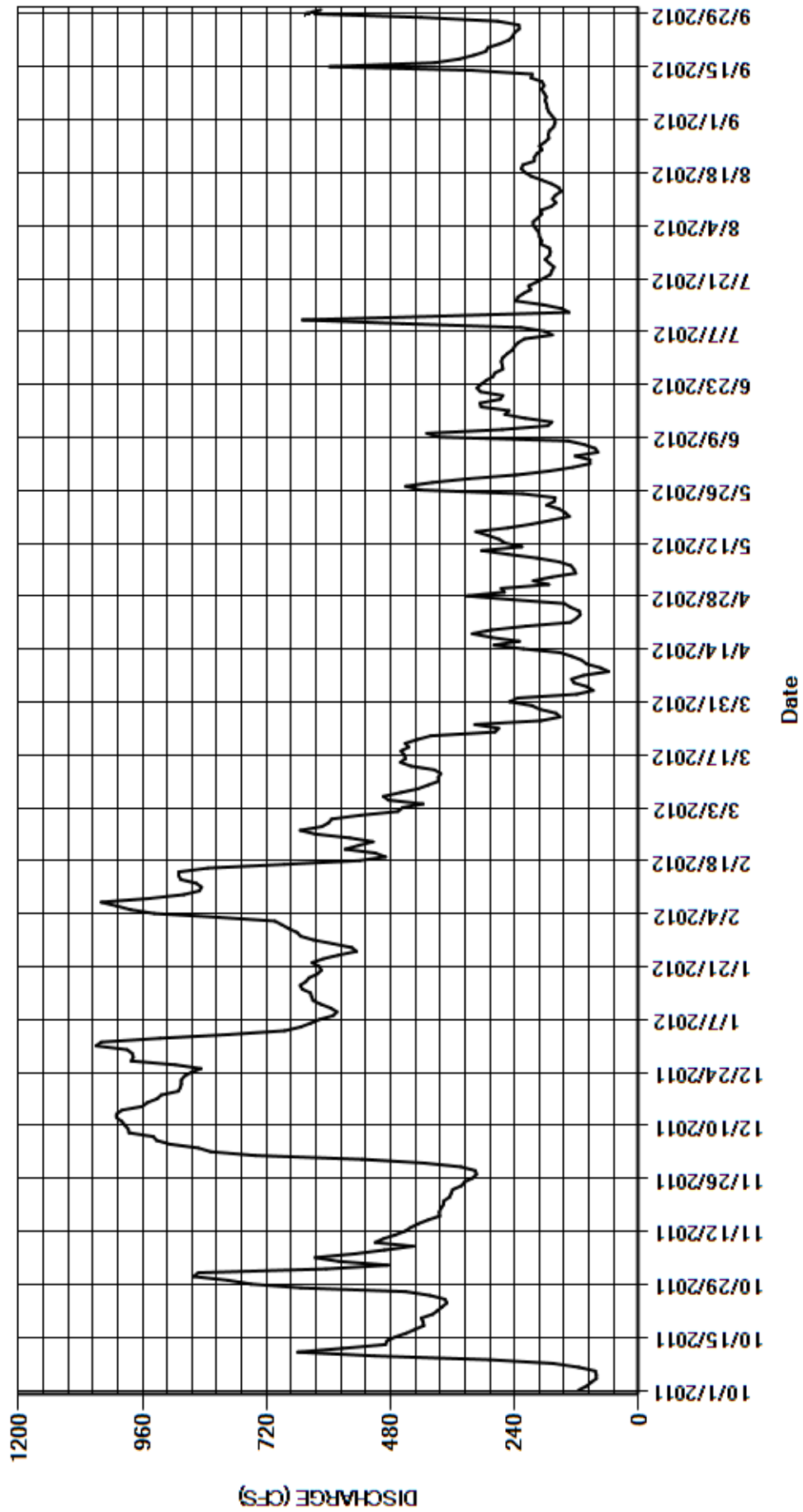
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	116	852	535	1040	690	538	234	174	128	255	192	162
2	101	605	742	926	704	466	120	204	94	245	193	168
3	92	485	828	793	812	457	88	168	94	240	198	174
4	82	580	852	685	937	417	100	122	123	233	204	177
5	82	626	907	654	983	484	125	125	79	221	204	178
6	84	550	933	635	1010	494	130	131	84	167	195	181
7	116	492	939	617	1040	460	107	154	105	182	188	179
8	165	436	986	591	946	427	58	196	137	228	189	183
9	288	510	988	584	880	407	74	253	386	457	169	188
10	511	494	994	596	850	387	101	304	410	651	160	183
11	660	471	1000	615	846	388	110	226	264	384	167	187
12	573	452	1010	630	856	383	129	259	176	135	161	208
13	490	441	1010	633	886	395	152	270	168	149	150	206
14	487	426	1000	635	890	441	223	292	220	185	155	322
15	471	407	960	651	890	461	280	315	259	237	169	598
16	450	385	951	655	834	451	231	253	251	234	188	395
17	433	386	932	644	686	454	284	207	305	223	208	347
18	416	383	924	638	e540	460	322	169	307	209	220	319
19	417	378	891	622	e490	445	285	134	268	213	227	296
20	421	377	887	614	e510	452	218	142	263	198	224	292
21	399	366	885	618	568	429	132	154	306	184	202	269
22	389	363	885	632	542	402	121	178	313	171	202	251
23	380	360	879	611	514	278	113	163	305	168	197	244
24	371	343	866	581	559	271	115	162	295	164	187	240
25	375	337	847	546	625	317	132	224	282	173	192	231
26	404	322	897	555	655	189	e144	422	278	181	182	232
27	451	314	982	591	613	152	243	451	263	173	174	273
28	654	316	978	629	600	160	332	399	264	171	175	421
29	750	344	980	654	594	191	260	329	266	173	173	645
30	795	415	990	661	---	207	266	237	263	189	165	615
31	861	---	1050	677	---	250	---	174	---	188	162	---
TOTAL	12284	13216	28508	20213	21550	11713	5229	6991	6956	6981	5772	8364
MEAN	396	441	920	652	743	378	174	226	232	225	186	279
AC-FT	24370	26210	56550	40090	42740	23230	10370	13870	13800	13850	11450	16590
MAX	861	852	1050	1040	1040	538	332	451	410	651	227	645
MIN	82	314	535	546	490	152	58	122	79	135	150	162

CAL YR	2011	TOTAL	275915	MEAN	756	MAX	8530	MIN	78	AC-FT	547300
WTR YR	2012	TOTAL	147777	MEAN	404	MAX	1050	MIN	58	AC-FT	293100

MAX DISCH: 1110 CFS AT 22:15 ON DEC 31,2011 GH 3.22 FT SHIFT 0.42 FT
 MAX GH: 3.58 FT AT 23:45 ON JUL 09,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06758500 SOUTHPLATTE RIVER NEAR WELDONA
WY2012 HYDROGRAPH



PLATTE RIVER BASIN

06759910 SOUTH PLATTE RIVER AT COOPER BRIDGE NEAR BALZAC

Water Year 2012

Location.-- Lat. N.40° 21'27.5", Long. W.103° 31'43" (NAD83) in Morgan County, CO, Hydrologic Unit 10190012. Gage is located on the left bank 4.1 miles NE of Snyder, CO and 0.7 miles downstream from the North Sterling Canal diversion structure.

Drainage Area and Period of Record.-- 16,600 mi² (USGS Colorado Streamstats utility).; 1916 to October 1, 1987. Various sites and datums at a location approximately 5 miles downstream from the present location at a bridge near the Balzac beet dump near the Washington-Morgan County line. This bridge was locally known as the Balzac Bridge. October 1, 1987 to present: Present site and datum also known as the Cooper Bridge. Diversions from Prewitt Reservoir and a few small irrigation ditches occur between the old Balzac Bridge and Cooper Bridge locations.

Equipment.-- A Sutron Radar Unit and Sutron Constant Flow Bubbler (CFB) connected to a Sutron high data rate 8210 Data Collection Platform (DCP) in a 6 ft. by 6 ft. concrete shelter. The wire weight was moved to the upstream side of the bridge on 10/03/2011 and is the primary reference. The shaft encoder was removed and the inlets to the stilling well were capped at the end of WY 2011. An electric tape gage is still located on the instrument shelf but is no longer used. A Campbell Scientific CS476 radar unit was installed on 3/05/12. The 8210 DCP was removed and a Sutron SatLink 2 DCP was installed on 3/05/2012 as well. The Constant Flow Bubbler was removed on 6/22/12.

Hydrologic Conditions.-- Channel is braided with heavily vegetated islands and banks. The channel is currently divided by an island extending above and below the bridge. Flows are generally regulated heavily upstream of the gage by numerous reservoirs, diversions from and deliveries to the channel. Operations of the North Sterling Canal diversion structure 0.7 miles upstream of the gage will affect flows and operations at the gage. The gage marks the upper extremity of the South Platte River Compact reach. Compact compliance is such that the gage is visited 2 to 3 times a week, or as stream flows dictate.

Gage-Height Record.-- The primary record is 15-minute satellite data taken from the radar unit. Backup sources include telemetered 15-minute CFB as well as DCP logged CFB and radar data. The gage typically stays open due to its proximity to the North Sterling Canal. The record is complete and reliable. Four equipment corrections were required at the gage ranging from - 0.02 ft. to 0.04 ft. and were applied as defined by visits to the station. Missing or bad values were filled in with data downloaded from the DCP on March 22. Missing or bad data was interpolated on March 5, 11, 26 and June 22.

Datum Corrections.-- Levels were last run on October 3, 2011 when the wire weight was moved to the upstream side of the bridge. The wire weight check bar was re-established at an elevation of 17.41 ft., however, a 0.06 ft adjustment was made to the wire weight dial to achieve a corresponding wire weight reading of the check bar.

Rating.-- The control is a rapidly shifting sand channel with flow in several braids at low stages. At very high stages, the flow spreads into heavily vegetated areas. Rating PLABALCO04, put into use on October 1, 2009, was continued in use the entire water year. PLABALCO04 was originally developed from measurements made in WY2009 but was subsequently extended on Jun 15, 2010 using measurement Nos. 593 (6560 cfs) and 594 (7940 cfs). The high water end was taken from an equation fit through historic points. Twenty-two discharge measurements (Nos. 639 - 660) were made this year ranging in discharge from 17.5 to 1,130 cfs covering the range in stage experienced this year well except for the higher daily flows on January 1 and 2. The peak flow of 1,400 cfs occurred at 12:30 December 27, 2011 at a gage height of 4.57 ft with a shift of 0.11 ft. It exceeded Measurement No. 644, made January 3, 2012, by 0.31 ft in stage. The peak flow occurred during an event probably caused by North Sterling Canal doing maintenance at the diversion dam. The peak gage height does not represent the average for the day.

Discharge.-- Shifting control method was used all year. Shifts are caused by the movement of sand into and out of the section as well as vegetal growth on the banks and islands in the channel. Diversion practices from the North Sterling Canal can dramatically affect the amount of sand moving through the section on almost an instantaneous basis. Measurements made this year showed shifts ranging from -0.08 ft to 0.31 ft. Shifts were distributed as follows: October 1-31, stage dependent shifting using variable shift PLABALCOVST1201. This table is defined using Measurements 638, made 9/30/11, 639 and 640, made during this period, and 646 made on 2/22/12, used to better define the top end of the table. October 31 - February 22, stage dependent shifting using variable shift table PLABALCOVST1202. Measurements 640-646, made during this period, were used to define the table. February 22 - June 1, stage dependent shifting using variable shift table PLABALCOVST1203. Measurements 646-652 made during this period were used to define the table. Measurement 645, made January 1, was used to define the higher end of the table. June 1 - July 23, stage dependent shifting using variable shift table PLABALCOVST1204. This table is defined by Measurements 646-652 made during this period along with M639 made October 21 to better define the lower end of the table. Measurement 640 made October 3, and M646 made February 22 were also used to define the higher end of the table. From July 23- October 1, shifts were distributed by time as defined by Measurements 656-661. All measurements were given full weight except for Nos. 639, 646, 649-651, 653-657, and 659, which were adjusted 0.34 to 5.60 % to smooth shift distribution.

Special Computations.-- A shift change from 0.17 ft to 0.11 ft was made at 0000 10/1/2011 to reflect the +0.06 ft datum correction made when the wire weight was moved to the upstream side of the bridge.

Remarks.-- Record is good to fair, except for March 5, and June 22 which are poor due to instrument issues. Although channel and rating instability will always be an issue at this gage, the change to using the radar unit as the primary sensor has made for a more complete and accurate record. Station maintained and record developed by Robert D. Erosky.

Recommendations.--

Visitation every few days is required due to channel instability. Levels need to be run in WY2013 to check and verify levels results from WY12.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06759910 SOUTH PLATTE RIVER AT COOPER BRIDGE NEAR BALZAC

RATING TABLE-- PLALALCO04 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

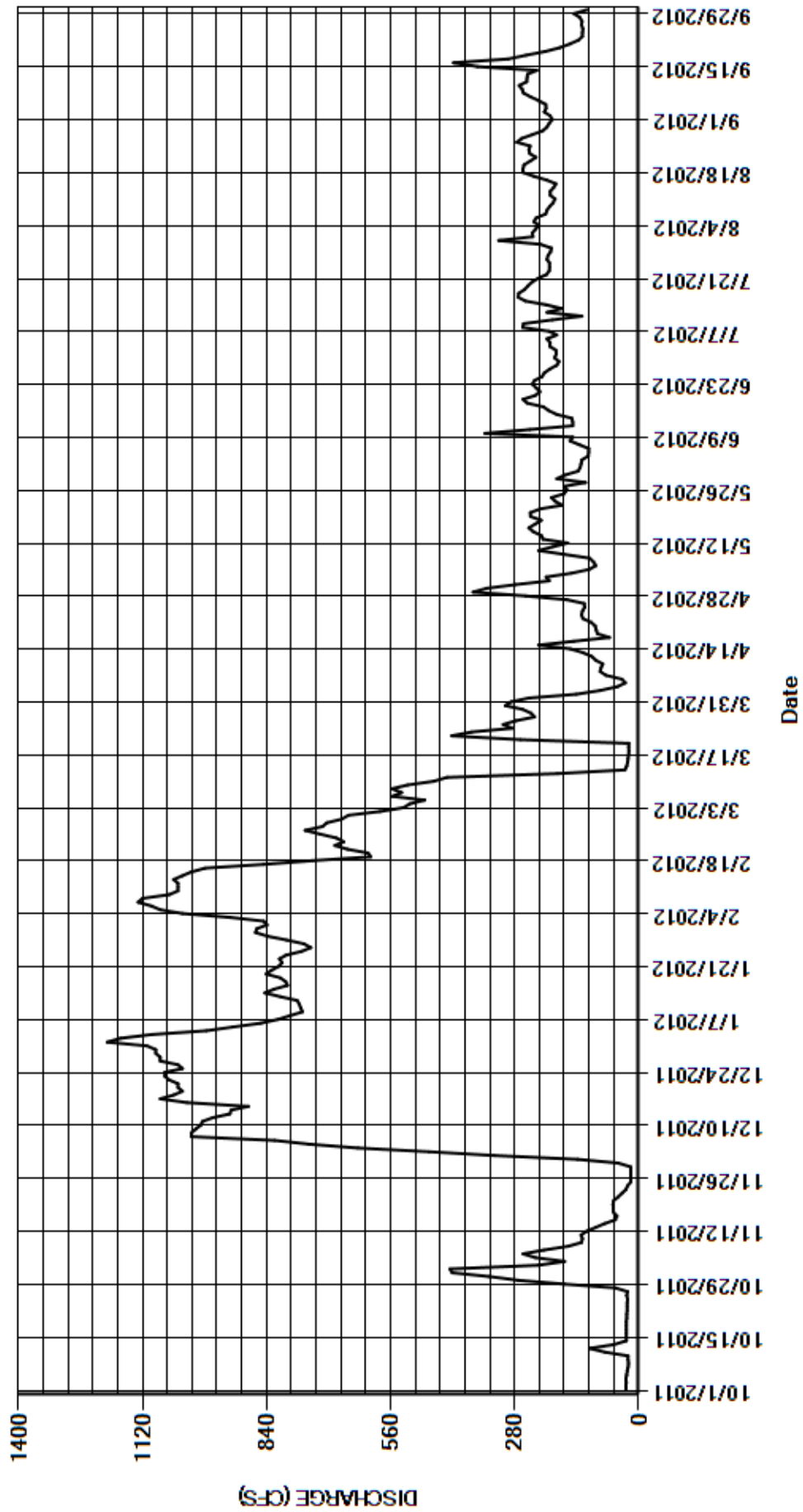
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	29	421	138	1200	839	655	248	278	132	186	239	195
2	29	426	326	1170	847	584	141	202	130	187	240	200
3	28	226	473	1100	923	531	87	209	128	201	233	213
4	29	167	634	976	1030	517	48	152	114	200	225	209
5	27	233	744	916	1080	e483	30	112	113	207	237	210
6	26	261	822	853	1100	556	38	97	113	185	231	226
7	24	214	1010	814	1130	535	74	102	134	202	210	244
8	23	159	1010	787	1120	557	87	111	155	262	207	260
9	24	129	1000	759	1060	522	85	169	149	260	201	263
10	24	127	989	763	1040	462	81	226	347	195	193	270
11	76	130	985	766	1040	433	97	194	246	128	189	253
12	111	117	962	771	1040	183	106	160	149	207	200	252
13	56	97	923	808	1050	31	126	216	149	174	200	251
14	28	77	920	844	1030	27	154	220	151	209	192	230
15	28	53	881	823	1010	25	226	238	185	256	187	364
16	28	49	1020	793	979	24	147	248	203	272	208	418
17	28	57	1080	797	847	23	66	234	215	271	237	295
18	28	57	1050	809	735	22	93	220	252	258	261	254
19	28	58	1030	841	605	23	96	244	261	250	261	211
20	27	57	1040	829	611	22	98	245	234	241	259	178
21	27	47	1040	813	657	267	107	223	223	227	245	155
22	26	38	1060	805	686	422	126	173	e231	208	232	136
23	26	29	1070	811	666	378	129	188	240	202	246	127
24	26	25	1070	796	683	286	127	197	235	201	248	127
25	25	18	1030	761	719	306	122	169	218	201	245	126
26	27	18	1040	740	753	277	123	162	213	207	275	129
27	25	18	1080	756	714	235	162	168	201	205	264	128
28	53	18	1080	795	704	243	255	120	185	199	240	133
29	168	18	1090	838	670	262	374	185	180	197	217	146
30	272	46	1090	865	---	301	344	166	190	222	207	117
31	337	---	1110	862	---	288	---	137	---	316	202	---
TOTAL	1713	3390	28797	26261	25368	9480	3997	5765	5676	6736	7031	6320
MEAN	55.3	113	929	847	875	306	133	186	189	217	227	211
AC-FT	3400	6720	57120	52090	50320	18800	7930	11430	11260	13360	13950	12540
MAX	337	426	1110	1200	1130	655	374	278	347	316	275	418
MIN	23	18	138	740	605	22	30	97	113	128	187	117

CAL YR	2011	TOTAL	210932	MEAN	578	MAX	8550	MIN	14	AC-FT	418400
WTR YR	2012	TOTAL	130534	MEAN	357	MAX	1200	MIN	18	AC-FT	258900

MAX DISCH: 1400 CFS AT 12:30 ON DEC 27,2011 GH 4.57 FT SHIFT 0.11 FT
 MAX GH: 4.57 FT AT 12:30 ON DEC 27,2011

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06759910 SOUTH PLATTE RIVER AT COOPER BRIDGE NEAR BALZAC
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
SOUTH PLATTE RIVER AT JULESBURG (CHANNEL #1)

Water Year 2012

Location.-- Lat. N. 40°58'24"; Long. W. 102°15'04" (NAD83). Gage is located on the east side of the southern most bridge of Highway 385 crossing the South Platte River south of Julesburg CO in Sedgwick County, 9 miles southeast of the Town of Julesburg, 3.0 miles upstream from Colorado-Nebraska State line, and 7 miles downstream from Lodgepole Creek. The street address used by the phone company is 15277 US 385, Julesburg, Colorado.

Drainage Area and Period of Record.-- 23,821 mi² (USGS Colorado StreamStats utility). ; Daily values are available from October 1, 1995 to present.

Equipment.-- Sutron Constant Flow Bubbler (CFB) and a Campbell Scientific CS476 Radar connected to a SatLink 2 Data Collection Platform (DCP) in a NEMA4 enclosure. A wire weight gage located on the bridge is the primary reference, with a supplemental staff located on the bridge pier closest to the shelter. The staff reads 1.17 ft lower than the wire weight, which occasionally leads to confusion.

Hydrologic Conditions.-- The South Platte channel at Julesburg, CO is a braided sand channel. Channel 1 is one of four channels, which can contain flow. The river is gaged on Channels 1, 2, and 4, and a combined flow record is published for South Platte River at Julesburg (PLAJUCCO). Channels 1 and 2 split apart about 1/3 mile upstream from the gage and the proportion of water in Channel 1 has been increasing in recent years. At low flows, 90-100% of the flow is in Channel 1, with Channels 2 and 3 being dry with local irrigation and storm runoff showing up in Channel 4. Channels 2 and 3 will have water only at high flows.
Generally the river is dried by multiple diversions upstream. Julesburg flow is usually comprised of return flows or water passed to Nebraska to meet Compact requirements (April 1- October 15, CRS: 37-65-101). However, during the winter, periods of higher flow can be seen as upstream supply is diverted less heavily and fewer dry up locations occur. Upstream diversions continue throughout the winter, except for periods of severe cold interrupting recharge and reservoir storage operations.

Gage-Height Record.-- From October 1, 2011 through February 29, 2012 the primary record is 15-minute telemetered CFB data with 15-minute logged DCP data as backup. from March 1, 2012 through the end of the water year the primary record is telemetered radar data with telemetered CFB data and logged DCP data as backup. The record is complete and reliable except for: October 17-18 and 22-24, 2011 when the CFB's performance was questionable. Missing values occurring on December 1, 2011, February 29, 2012, March 11, 2012 and June 26, 2012 were interpolated from adjacent record without loss of accuracy. Instrument calibration was supported by approximately 86 visits to the gage. 26 calibration corrections ranging from +0.12 to -0.09 ft. were made this year. The bulk (all but one) of these corrections were made to the CFB unit. Instrument calibration corrections were applied by time from the last point of known calibration to the point of adjustment.

Datum Corrections.-- Levels were last run on August 24, 2011 using RM 4 as base. No correction was necessary. The base reference was moved 45-ft. to the south at the time of levels. No change to gage datum.

Rating.-- Shifting sand channel control throughout the entire range of expected flow. The channel has tended to scour during high flow events and then slowly fill back in. An island has developed in the channel about 200-ft. downstream of the gage and can collect debris. Rating No. 8 (ONEJURCO08), was applied to the record from October 1, 2011 through November 17, 2011. Rating No. 9 (ONEJURCO09) was used for the remainder the year. Thirty-six (36) discharge measurements (Nos. 672-707) were made during the year by Colorado Division of Water Resources (CDWR) and Nebraska Department of Natural Resources (NDNR) personnel, ranging in discharge from 26.8 to 1220 cfs. Measurements made this year cover the range in stage experienced this year well. The peak flow of 1300 cfs occurred at 0430 on February 12, 2012 at a gage-height of 5.49 ft with a shift of +0.09 ft, exceeding the high flow measurement (No. 683) made February 16, 2012 by 70 cfs and 0.17 ft. of stage respectively.

Discharge.-- Shifting control method was used for all periods of open water. Shifts were mainly distributed by time as defined by measurements. Variable shift table ONEJURCOVST12-A, defined by five measurements (Nos. 683-687) made during the period of use, was applied to the record from February 16 to April 2, 2012. Open water measurements made during the period of use for rating No. 8 (Nos. 673-677) showed shifts varying between -0.37 and -0.24 ft. All were given full weight except for Nos. 674-676 which were discounted up to 6% to smooth shift distributions. Measurement made during the period of use for rating No. 9 (Nos. 677-707) shows shifts varying between -0.12 and +0.18. ft. All were given full weight except for Nos. 680, 684, 685, 688, 694, 699, 702 and 706 which were discounted up to 13.5% to smooth shift distributions.

Measurements made by NDNR personnel (Nos. 674, 676, 680, 682, 685, 689, 694, 699, 702 and 705) this year generally had large sectional discharge percentages and thereby were downgraded to fair or poor and discounted more heavily than CDWR measurements.

Special Computations.-- Record is added to the records from channels 2, 4, Town of Julesburg effluent and the State Line Ditch near Julesburg, CO (STLINECO) to form the record for the South Platte River at Julesburg, CO Combined Flow (PLAJUCCO).

Remarks.-- The record is good except as follows: October 17-18, 22-24, 2011 which is fair due to instrument chatter. Station maintained and record developed by Div. 1 staff.

Recommendations.-- Continue making regular discharge measurements and when needed on an event driven basis to tack the full range in stage experienced. Better coordination with Nebraska personnel and conformity to standard measurement practices should be strived for. Watch for debris accumulation on the island and banks downstream of the gage. Levels should be run in the 2013 water year to demonstrate stability in the base reference. Levels run should also include shots on the staff gage.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

SOUTH PLATTE RIVER AT JULESBURG (CHANNEL #1)

RATING TABLE.-- ONEJURCO08 USED FROM 01-OCT-2011 TO 17-NOV-2011
 ONEJURCO09 USED FROM 17-NOV-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

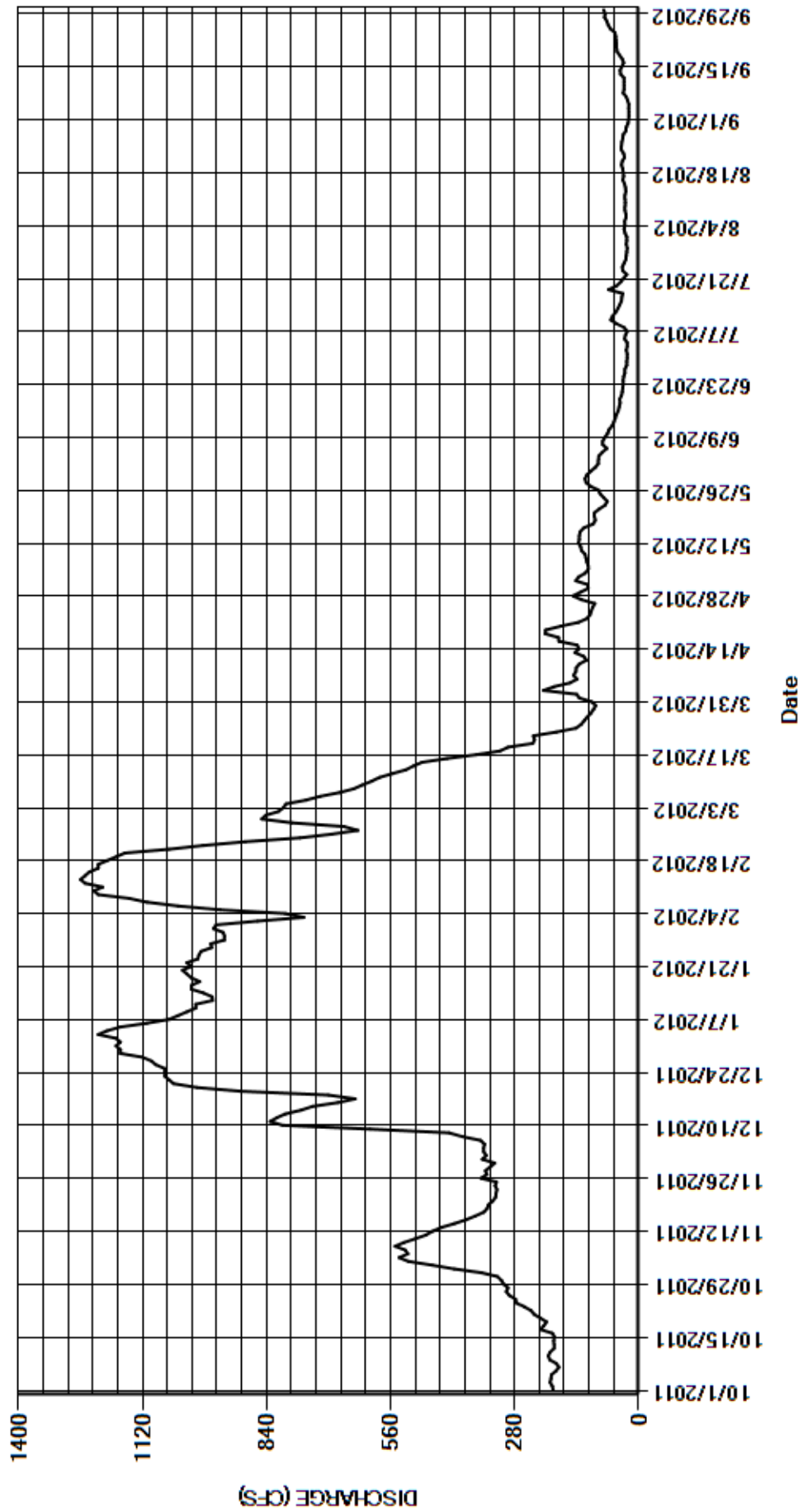
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	193	355	353	1170	954	842	134	115	98	26	27	23
2	195	416	344	1180	860	813	140	142	91	28	31	22
3	200	466	350	1220	756	802	215	136	91	26	33	22
4	198	520	350	1200	798	796	191	121	90	26	31	23
5	197	541	348	1170	945	751	155	114	82	32	32	22
6	187	521	357	1110	1040	719	139	114	72	30	29	25
7	180	527	398	1060	1110	675	147	117	81	26	29	28
8	186	550	428	1040	1150	643	142	119	81	33	31	35
9	201	530	606	1020	1220	624	141	121	76	50	31	33
10	204	504	804	1000	1230	603	134	129	70	63	30	33
11	200	480	832	1000	1210	585	118	131	67	59	31	33
12	191	465	817	962	1250	556	124	136	60	52	31	33
13	191	445	798	963	1260	526	144	134	56	47	29	41
14	192	416	762	983	1250	509	135	134	53	43	30	42
15	190	390	736	1010	1240	489	139	132	50	39	32	38
16	195	369	679	1010	1220	433	180	124	46	38	36	34
17	222	350	640	991	1220	367	181	103	44	36	34	37
18	214	342	701	1010	1200	313	211	98	42	68	35	43
19	208	339	899	1020	1180	295	210	100	43	50	36	49
20	222	329	997	1030	1160	239	176	100	39	41	39	50
21	236	323	1050	1010	1060	235	136	89	37	34	37	50
22	243	322	1060	1020	984	238	117	76	36	27	32	51
23	258	320	1070	995	888	186	110	71	35	36	34	52
24	276	324	1070	993	765	142	107	79	35	37	39	54
25	278	321	1070	988	693	130	104	87	34	33	39	64
26	292	356	1090	964	634	123	99	91	31	29	38	69
27	299	343	1100	966	665	116	129	109	31	28	36	72
28	295	346	1120	935	783	108	148	119	27	27	35	77
29	305	335	1170	935	851	102	131	121	27	26	29	76
30	310	325	1170	938	---	97	114	117	26	28	28	79
31	319	---	1180	960	---	106	---	108	---	27	24	---
TOTAL	7077	12170	24349	31853	29576	13163	4351	3487	1651	1145	1008	1310
MEAN	228	406	785	1028	1020	425	145	112	55.0	36.9	32.5	43.7
AC-FT	14040	24140	48300	63180	58660	26110	8630	6920	3270	2270	2000	2600
MAX	319	550	1180	1220	1260	842	215	142	98	68	39	79
MIN	180	320	344	935	634	97	99	71	26	26	24	22

CAL YR	2011	TOTAL	209345	MEAN	574	MAX	4570	MIN	92	AC-FT	415200
WTR YR	2012	TOTAL	131140	MEAN	358	MAX	1260	MIN	22	AC-FT	260100

MAX DISCH: 1300 CFS AT 04:30 ON FEB 12,2012 GH 5.49 FT SHIFT 0.09 FT
 MAX GH: 5.52 FT AT 16:15 ON JAN 03,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

SOUTH PLATTE RIVER AT JULESBURG (CHANNEL #1)
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06763990 SOUTH PLATTE RIVER AT JULESBURG (RIGHT CHAN. #2)
Water Year 2012

Location.-- Lat. 40°58'37", Long. 102°14'52", in NE¼SE¼ sec. 33, T.12 N., R.44 W. Gage is located on the right bank of the Channel No. bridge of Highway 385 0.9 mi. south of Julesburg, CO and 3.0 mi. upstream from the Colorado-Nebraska State Line in Sedgwick County, CO.

Drainage Area and Period of Record.-- 23,821 mi² (USGS Colorado StreamStats utility).; Daily values are available from October 1, 1995 to present.

Equipment.-- Sutron AccuBubble stage sensor connected to a SatLink 2 Data Collection Platform (DCP) transmitting hourly in a precast concrete shelter on the right downstream bridge abutment of Channel No. 2 near Julesburg, CO. A wire weight gage on the downstream side of the bridge is the primary reference with no provisions for a supplemental reference. The high data enabled Sutron 8210 DCP was removed and the gage was placed into the above configuration on June 22, 2012.

Hydrologic Conditions.-- The South Platte River channel at Julesburg, CO is a braided sand channel. Channel No. 2 is one of four channels which can contain flow. The river is gaged on Channels 1, 2, 4 and a combined flow record is published for the South Platte River at Julesburg, CO (PLAJUCCO). Channels 1 and 2 split apart about 1/3 of a mile upstream from the gage and the proportion of water in Channel No. 2 has been decreasing in recent years. Channel No. 1 generally will carry 90-100% of the total flow at lower stages with Channel No. 4 carrying local irrigation and storm runoff. Channel Nos. 2 and 3 will have water only at higher flows.

The river is dried by multiple diversions upstream. Julesburg flows are mainly comprised of return flows and waters passed to the State of Nebraska to meet Compact requirements (April 1 - October 15, CRS 37-65-101). However, during the winter, periods of higher flow can be seen as upstream supply is diverted less heavily and fewer dry-up points occur. Upstream diversions do continue throughout the winter, except for periods of severe cold interrupting recharge and reservoir storage operations.

Gage-Height Record.-- The primary record is 15-minute telemetered Accububble data with 15-minute logged DCP data as backup. The record is complete and reliable except for: January 17, February 11 and 12, 2012 when ice formed on the orifice line opening. Missing values were interpolated from adjacent record without loss of accuracy on November 30 and December 8, 2011. Missing values occurring on March 21 and 22, 2012 were also interpolated from adjacent record but are downgraded due to the amount of missing data interpolated. Missing values occurring on June 20 through 22, 2012 were not interpolated or filled in as the channel was observed to have no flow during the period. Instrument calibration was supported by 35 visits to the gage. Instrument calibration corrections ranging from -0.20 ft. to +0.16 ft. were applied to the record as defined by visits made to the gage.

Datum Corrections.-- Levels were last run on April 10, 2004.

Rating.-- The control is the shifting sand channel which has historically exhibited scour and fill activity. Flow in the channel has been infrequent in recent years, resulting in marsh like conditions at the gage without visible flow. At lower flows the control is confounded by grooved tracks of 4-wheel drive vehicles in the semi-dry channel below the gage. Heavy vegetal growth in the channel has shown measurement plotting well to the left of older ratings. Rating No. 21, defined by measurements from 0.77 to 1820 cfs made in the 2011 Water Year was continued this year. Thirteen (13) discharge measurements (Nos. 416-428) were made this year ranging in discharge from 0.05 to 47.4 cfs. Measurements made this year and numerous observations of no flow cover the range in stage experienced this year well. The peak discharge of 56.1 cfs occurred at 17:45 on February 9, 2012 at 3.59 ft. of stage using a shift of +0.10 ft. It exceeded this year's high flow measurement (No. 421) by 17.7 cfs.

Discharge.-- Shifts are caused by the movement of sand across the channel and backwatering of the gage from constant and abundant vegetal growth in the channel. Shifting control method was used all year. Shifts were mainly distributed by time as defined by measurements with some consideration given to change in stage. Measurements made this year showed shifts varying from -0.63 ft to +0.12 ft. All measurements were given full weight.

Special Computations.-- Discharge for the periods of ice accumulation on or around the orifice line were estimated from adjacent record. Discharge for the back water period were estimated on a basis of adjacent record, observations made to the gage and flow trends seen in Channel No. 1. This record is added to the records from Channel No. 1 (ONEJURCO), Channel No. 4 (PLAJULCO) and the State Line Ditch (STLINECO) to form the South Platte River at Julesburg, CO Combined Flow (PLAJUCCO).

Remarks.-- The record is good except for the periods when ice accumulated on or around the orifice line which is estimated and poor and the backwatered period (March 14 through September 30, 2012) which is estimated and poor. Station maintained and record developed by Division One Hydrographic Staff.

Recommendations.-- Levels must be run in the 2013 Water Year. Consideration is being given to replacing the AccuBubble unit with a Campbell Scientific CS476 radar unit.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06763990 SOUTH PLATTE RIVER AT JULESBURG (RIGHT CHAN. #2)

RATING TABLE-- PLA JURCO21 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

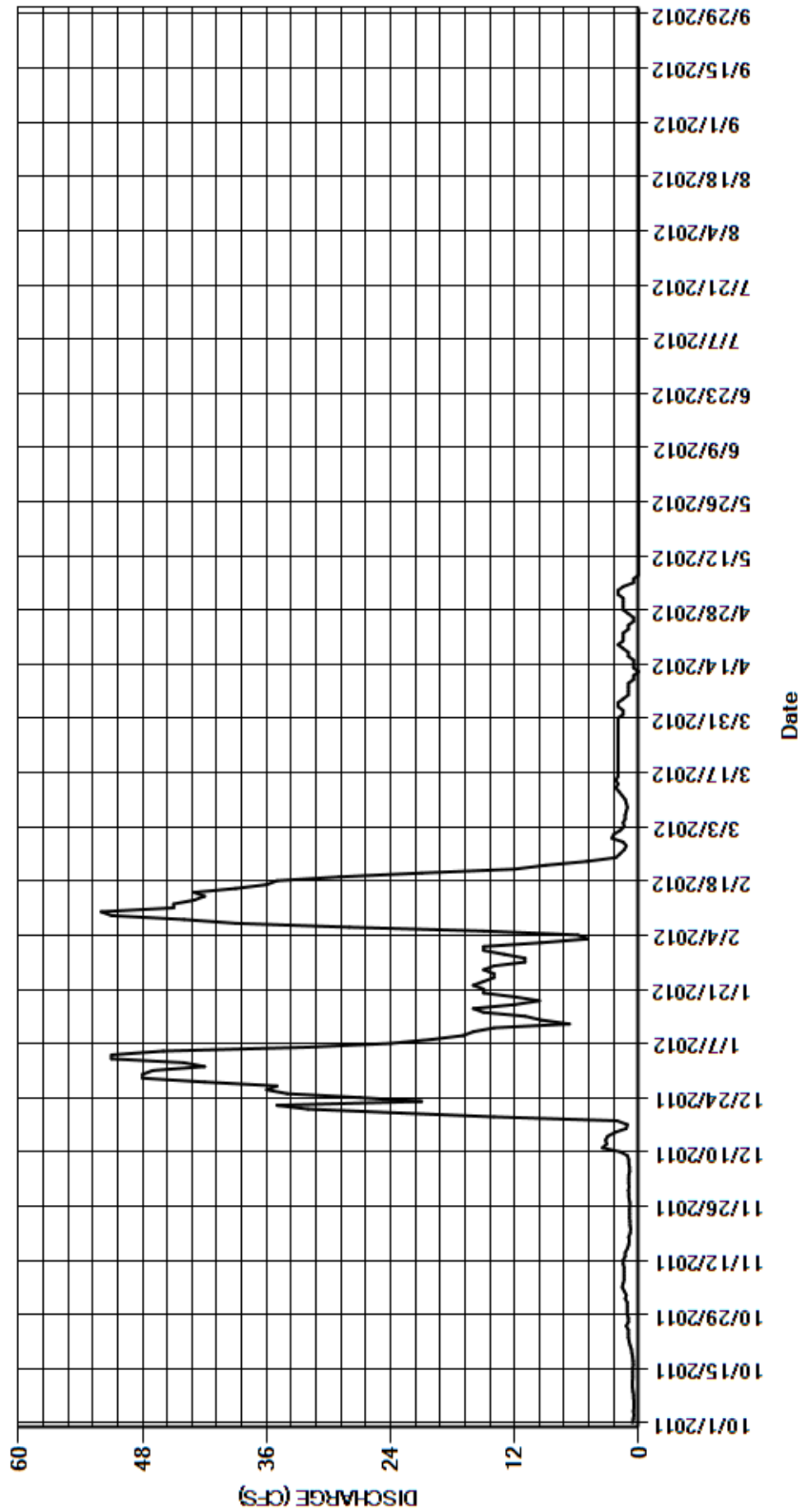
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.60	1.1	0.93	42	15	2.4	e1.5	e1.5	e0.00	e0.00	e0.00	e0.00
2	0.52	1.3	0.97	44	9.4	1.8	e1.5	e2.0	e0.00	e0.00	e0.00	e0.00
3	0.46	1.2	0.98	51	4.9	1.4	e2.0	e2.0	e0.00	e0.00	e0.00	e0.00
4	0.51	1.4	0.96	51	5.9	1.5	e2.0	e1.5	e0.00	e0.00	e0.00	e0.00
5	0.45	1.6	0.87	46	15	1.3	e1.5	e0.50	e0.00	e0.00	e0.00	e0.00
6	0.47	1.5	0.89	32	28	1.3	e1.0	e0.50	e0.00	e0.00	e0.00	e0.00
7	0.48	1.4	0.96	24	39	1.2	e1.0	e0.00	e0.00	e0.00	e0.00	e0.00
8	0.49	1.4	0.97	20	44	1.1	e1.0	e0.00	e0.00	e0.00	e0.00	e0.00
9	0.55	1.4	1.1	17	51	1.2	e1.0	e0.00	e0.00	e0.00	e0.00	e0.00
10	0.60	1.4	1.8	16	52	1.3	e0.50	e0.00	e0.00	e0.00	e0.00	e0.00
11	0.64	1.5	3.5	14	e45	1.6	e0.50	e0.00	e0.00	e0.00	e0.00	e0.00
12	0.60	1.5	3.1	6.7	e45	1.9	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00
13	0.58	1.3	3.2	9.4	43	2.2	e0.50	e0.00	e0.00	e0.00	e0.00	e0.00
14	0.60	1.3	3.0	11	42	e2.0	e0.50	e0.00	e0.00	e0.00	e0.00	e0.00
15	0.59	1.1	2.3	15	43	e2.2	e0.50	e0.00	e0.00	e0.00	e0.00	e0.00
16	0.52	0.96	1.2	16	39	e2.0	e1.0	e0.00	e0.00	e0.00	e0.00	e0.00
17	0.55	0.92	1.1	e12	36	e2.0	e1.0	e0.00	e0.00	e0.00	e0.00	e0.00
18	0.59	0.96	2.1	9.6	35	e2.0	e1.5	e0.00	e0.00	e0.00	e0.00	e0.00
19	0.66	0.82	14	12	29	e2.0	e2.0	e0.00	e0.00	e0.00	e0.00	e0.00
20	0.71	0.78	23	15	21	e2.0	e1.5	e0.00	e0.00	e0.00	e0.00	e0.00
21	0.84	0.84	32	15	12	e2.0	e1.5	e0.00	e0.00	e0.00	e0.00	e0.00
22	0.93	0.86	35	16	9.0	e2.0	e1.5	e0.00	e0.00	e0.00	e0.00	e0.00
23	1.0	0.88	21	15	5.0	e2.0	e1.0	e0.00	e0.00	e0.00	e0.00	e0.00
24	1.0	0.87	27	14	2.2	e2.0	e1.0	e0.00	e0.00	e0.00	e0.00	e0.00
25	1.0	0.89	34	14	1.8	e2.0	e0.50	e0.00	e0.00	e0.00	e0.00	e0.00
26	1.2	0.86	36	15	1.4	e2.0	e0.50	e0.00	e0.00	e0.00	e0.00	e0.00
27	1.0	0.86	35	14	1.2	e2.0	e1.0	e0.00	e0.00	e0.00	e0.00	e0.00
28	1.0	0.94	42	11	1.5	e2.0	e1.5	e0.00	e0.00	e0.00	e0.00	e0.00
29	1.1	0.95	48	11	2.6	e2.0	e1.5	e0.00	e0.00	e0.00	e0.00	e0.00
30	1.1	0.99	48	13	---	e2.0	e1.5	e0.00	e0.00	e0.00	e0.00	e0.00
31	1.1	---	47	15	---	e2.0	---	e0.00	---	e0.00	e0.00	---
TOTAL	22.44	33.78	471.93	616.7	678.9	56.4	33.50	8.00	0.00	0.00	0.00	0.00
MEAN	0.72	1.13	15.2	19.9	23.4	1.82	1.12	0.26	0.000	0.000	0.000	0.000
AC-FT	45	67	936	1220	1350	112	66	16	0	0	0	0
MAX	1.2	1.6	48	51	52	2.4	2.0	2.0	0.00	0.00	0.00	0.00
MIN	0.45	0.78	0.87	6.7	1.2	1.1	0.00	0.00	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	15539.54	MEAN	42.6	MAX	1670	MIN	0.08	AC-FT	30820
WTR YR	2012	TOTAL	1921.65	MEAN	5.25	MAX	52	MIN	0.00	AC-FT	3810

MAX DISCH: 56.1 CFS AT 17:45 ON FEB 09,2012 GH 3.59 FT SHIFT 0.1 FT
 MAX GH: 3.68 FT AT 15:15 ON JAN 03,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06763990 SOUTH PLATTE RIVER AT JULESBURG (RIGHT CHAN. #2)
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06763980 SOUTH PLATTE RIVER AT JULESBURG (LEFT CHAN. #4)
Water Year 2012

Location.-- Lat. 40°58'46", Long. 102°15'15", in NW¼NE¼ sec. 33, T.12 N., R.44 W., on the Highway 385 bridge 0.9 mi. southeast of Julesburg and 8 mi downstream from Lodgepole Creek in Sedgwick County, CO. Gage is on the left bank of Channel No. 4 215 ft. downstream from the bridge adjacent to the Town of Julesburg wastewater treatment plant.

Drainage Area and Period of Record.-- 23,821 mi² (USGS Colorado StreamStats utility).; Daily values are available from October 1, 1980 to October 4, 1982 and October 1, 1990 to present.

Equipment.-- Corrugated metal pipe shelter and stilling well. A cantilever style chain gage is located adjacent to the shelter and channel. No recording equipment is installed or maintained.

Hydrologic Conditions.-- Channel 4, the furthest channel to the North, splits off Channel 2 somewhere upstream from the point where Channel 1 splits from Channel 2. During the drought years 2000-2004, Channel 4 has filled allowing vegetation to take hold and the channel has become swampy and ponded. Stream gaging of channel 4 was abandoned beginning in water year 2008. When the total flow at Julesburg reaches around 2000 cfs, some water begins to be dumped into the channel 4; but there is no stage-discharge relationship maintained. It is difficult to find sections where measurements are possible. The State of Colorado is obliged to keep a record of flow in this channel for the South Platte River Compact with Nebraska (CRS 37-35-101). Presently at Compact levels (120 cfs), no flow from the main river is in Channel 4; however, some base flow exists from seepage and local runoff sources. These flows are usually insignificant to the total river at high flows, but can become a significant percentage of the total in a dry year.

Gage-Height Record.-- No gage height record is kept.

Datum Corrections.-- N/A.

Rating.-- Rating 22 was the last active rating used at Channel 4. Due to the typically swampy, ponded conditions around the gage, and the removal of recording equipment from the gage, there is no gage height record, nor is there any attempt to maintain or update Rating 22. Discharge is estimated during periods when ponding is present. Discharge measurements are made during periods of live flow.

Discharge.-- During WY2012, there were 7 measurements (Nos. 490-496) made at or near the site ranging from 0.48 cfs to 1.93 cfs. and numerous estimates of discharge and observations of no flow.

Discharge.-- Discharge was estimated for the entire year. See next section.

Special Computations.-- Discharge was estimated for the entire year. The estimate is based on measurements made at the gage, visual estimates of discharge and hydrologic trends recorded at the Channel 1 and Channel 2 stream gages.

Remarks.-- The record is estimated and poor. The gage is no longer operated due to ponding and the lack of a stage-discharge relationship. Record primarily contains estimates for unmeasurable base flows from local sources. This record is added to the records from Channels 1, 2, the Stateline Ditch and the Town of Julesburg effluent to form the record for South Platte River at Julesburg, Combined Flow (PLAJUCCO).

Recommendations.-- The Channel 4 gage could be reestablished if extensive machine work cleared the channel of vegetation. However, the efficacy of such an effort is questionable. A bubbler type or down-looking instrument would be needed as maintenance of the stilling well and intakes was extremely difficult (due to the mud and swamping) prior to the gage's discontinuation.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06763980 SOUTH PLATTE RIVER AT JULESBURG (LEFT CHAN. #4)

RATING TABLE.--

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

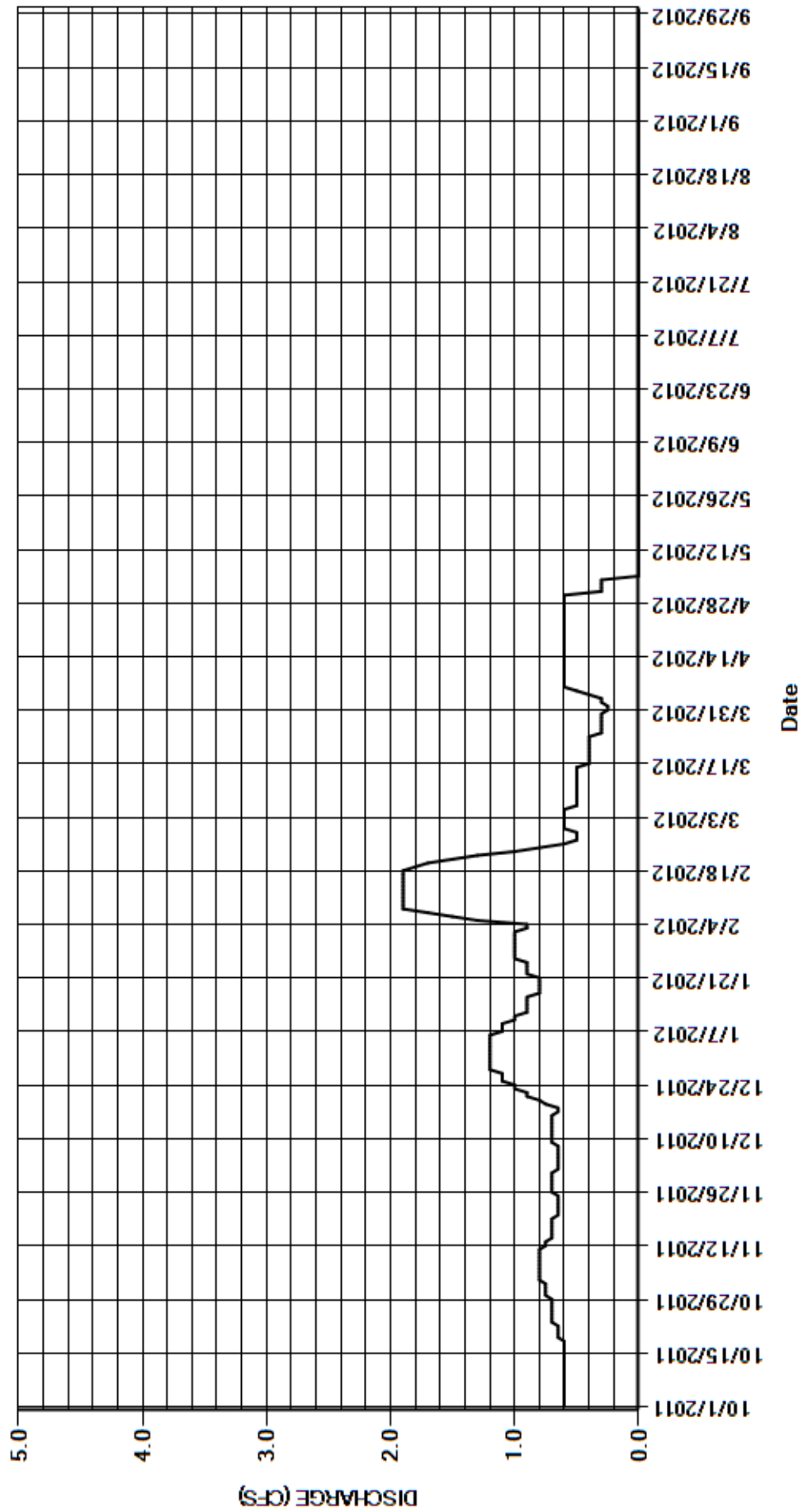
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e0.60	e0.75	e0.70	e1.2	e1.0	e0.60	e0.25	e0.30	e0.00	e0.00	e0.00	e0.00
2	e0.60	e0.75	e0.65	e1.2	e1.0	e0.60	e0.30	e0.30	e0.00	e0.00	e0.00	e0.00
3	e0.60	e0.80	e0.65	e1.2	e0.90	e0.60	e0.30	e0.30	e0.00	e0.00	e0.00	e0.00
4	e0.60	e0.80	e0.65	e1.2	e0.90	e0.60	e0.40	e0.30	e0.00	e0.00	e0.00	e0.00
5	e0.60	e0.80	e0.65	e1.2	e1.3	e0.60	e0.50	e0.00	e0.00	e0.00	e0.00	e0.00
6	e0.60	e0.80	e0.65	e1.2	e1.5	e0.50	e0.60	e0.00	e0.00	e0.00	e0.00	e0.00
7	e0.60	e0.80	e0.65	e1.1	e1.7	e0.50	e0.60	e0.00	e0.00	e0.00	e0.00	e0.00
8	e0.60	e0.80	e0.65	e1.1	e1.9	e0.50	e0.60	e0.00	e0.00	e0.00	e0.00	e0.00
9	e0.60	e0.80	e0.70	e1.1	e1.9	e0.50	e0.60	e0.00	e0.00	e0.00	e0.00	e0.00
10	e0.60	e0.80	e0.70	e1.0	e1.9	e0.50	e0.60	e0.00	e0.00	e0.00	e0.00	e0.00
11	e0.60	e0.80	e0.70	e1.0	e1.9	e0.50	e0.60	e0.00	e0.00	e0.00	e0.00	e0.00
12	e0.60	e0.75	e0.70	e0.90	e1.9	e0.50	e0.60	e0.00	e0.00	e0.00	e0.00	e0.00
13	e0.60	e0.75	e0.70	e0.90	e1.9	e0.50	e0.60	e0.00	e0.00	e0.00	e0.00	e0.00
14	e0.60	e0.70	e0.70	e0.90	e1.9	e0.50	e0.60	e0.00	e0.00	e0.00	e0.00	e0.00
15	e0.60	e0.70	e0.70	e0.90	e1.9	e0.50	e0.60	e0.00	e0.00	e0.00	e0.00	e0.00
16	e0.60	e0.70	e0.70	e0.90	e1.9	e0.50	e0.60	e0.00	e0.00	e0.00	e0.00	e0.00
17	e0.60	e0.70	e0.65	e0.80	e1.9	e0.40	e0.60	e0.00	e0.00	e0.00	e0.00	e0.00
18	e0.60	e0.70	e0.65	e0.80	e1.9	e0.40	e0.60	e0.00	e0.00	e0.00	e0.00	e0.00
19	e0.65	e0.70	e0.75	e0.80	e1.8	e0.40	e0.60	e0.00	e0.00	e0.00	e0.00	e0.00
20	e0.65	e0.65	e0.80	e0.80	e1.7	e0.40	e0.60	e0.00	e0.00	e0.00	e0.00	e0.00
21	e0.65	e0.65	e0.90	e0.80	e1.5	e0.40	e0.60	e0.00	e0.00	e0.00	e0.00	e0.00
22	e0.65	e0.65	e0.90	e0.90	e1.3	e0.40	e0.60	e0.00	e0.00	e0.00	e0.00	e0.00
23	e0.70	e0.65	e1.0	e0.90	e1.0	e0.40	e0.60	e0.00	e0.00	e0.00	e0.00	e0.00
24	e0.70	e0.65	e1.0	e0.90	e0.80	e0.40	e0.60	e0.00	e0.00	e0.00	e0.00	e0.00
25	e0.70	e0.65	e1.1	e0.90	e0.60	e0.30	e0.60	e0.00	e0.00	e0.00	e0.00	e0.00
26	e0.70	e0.70	e1.1	e1.0	e0.50	e0.30	e0.60	e0.00	e0.00	e0.00	e0.00	e0.00
27	e0.70	e0.70	e1.1	e1.0	e0.50	e0.30	e0.60	e0.00	e0.00	e0.00	e0.00	e0.00
28	e0.70	e0.70	e1.2	e1.0	e0.50	e0.30	e0.60	e0.00	e0.00	e0.00	e0.00	e0.00
29	e0.70	e0.70	e1.2	e1.0	e0.60	e0.30	e0.60	e0.00	e0.00	e0.00	e0.00	e0.00
30	e0.75	e0.70	e1.2	e1.0	---	e0.30	e0.60	e0.00	e0.00	e0.00	e0.00	e0.00
31	e0.75	---	e1.2	e1.0	---	e0.25	---	e0.00	---	e0.00	e0.00	---
TOTAL	19.80	21.80	25.60	30.60	40.00	13.75	16.75	1.20	0.00	0.00	0.00	0.00
MEAN	0.64	0.73	0.83	0.99	1.38	0.44	0.56	0.039	0.000	0.000	0.000	0.000
AC-FT	39	43	51	61	79	27	33	2.4	0	0	0	0
MAX	0.75	0.80	1.2	1.2	1.9	0.60	0.60	0.30	0.00	0.00	0.00	0.00
MIN	0.60	0.65	0.65	0.80	0.50	0.25	0.25	0.00	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	5885.95	MEAN	16.1	MAX	875	MIN	0.00	AC-FT	11670
WTR YR	2012	TOTAL	169.50	MEAN	0.46	MAX	1.9	MIN	0.00	AC-FT	336

MAX DISCH: (Non-recorded gage. No peak computed)
 MAX GH: 0.00 FT (Non-recorded gage. No peak computed)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06763980 SOUTHPLATTER RIVER AT JULESBURG (LEFT CHAN. #4)
 WY2012 HYDROGRAPH



PLATTE RIVER BASIN
STATELINE DITCH AUG. RETURN TO SOUTH PLATTE
Water Year 2012

Location.--	Lat. N40°59'58.3", Long. W102°14'54.9" (WGS84). The State Line Ditch parallels County Road 43. The gage is located on the left side of a 4-foot Parshall flume approximately 1.1 miles northeast of the Town of Julesburg and approximately 0.5 miles north of the Sedgwick County Fairgrounds in Sedgwick County, CO.
Drainage Area and Period of Record.--	The State Line Ditch conveys unused waters from the Settlers and Peterson ditch systems, as well as augmentation water added to the ditch systems for compact compliance purposes to the South Platte River above the Colorado-Nebraska state line. ; Daily values are available from CDWR from 2001 to present. Diversion records are available from 2001 to present. From October 1, 2007 to present the Hydrographic and Satellite Monitoring Branch has also maintained a record.
Equipment.--	Campbell Scientific CS476 radar unit suspended over the flume at the Ha location and a Sutron SDR-0001-1 digital incremental shaft encoder connected to a Sutron SatLink 2 Satellite Monitoring Data Collection Platform (DCP) in NEMA4 metal box enclosure at a 4-foot Parshall flume. The primary reference is a staff gage on the right side of the flume at the Ha location. No provisions for a supplemental reference are present. The steel Parshall flume is installed in concrete at a former ditch check location. The ditch is earthen above and below this point. The ditch and flume are owned and operated by the Julesburg Irrigation District (JID) and the gage is operated by the Colorado Division of Water Resources (CDWR). The CS476 unit was installed on March 23, 2012. DCP was upgraded from a Sutron SatLink 1 to a SatLink 2 on the same date.
Hydrologic Conditions.--	The gage is heavily regulated. The gage measures unused waters from the Settlers and Peterson ditch systems as well as water pumped into the ditches for compact compliance purposes. Dramatic changes in stage over short periods of time are regularly seen. These erratic stage changes stem from irrigation practices upstream of this point on the respective ditch systems.
Gage-Height Record.--	From October 1, 2011 through March 23, 2012 the primary record is 15-minute satellite data taken from the SDR (GH_1) unit with 15-minute logged SDR and DCP data as backup. From March 24 through September 30, 2012 the primary record is 15-minute telemetered taken from the radar unit (GH_2) with logged SDR and DCP data as backup. The stilling well accumulates sediment impairing accurate operation of the SDR as the float will beach on the sediment. This issue is further compounded by corrections being made to the SDR unit while beached. There were several corrections made to the SDR to "set" the SDR to zero when the float was actually on mud and above zero datum. This was done by the ditch rider at the request of the water commissioner so that real time data was accurate. When live flow resumed, the GH was re-set to live flow by the ditch rider within hours. Flows may have been present below the level where the float was beached, but these periods are considered zero for water rights administration purposes (credit is not given when record is not maintained.) The record is complete and reliable except for: November 1-9, 26-30, 2011; March 14-17 and 23, 2012 when the instrument's float was beached for a number of hours or for the whole day. Numerous undocumented instrumentation corrections to the SDR unit were made during this period. However, the SDR unit logs every interaction made to the device, including calibration corrections and was used as a surrogate for these corrections. Calibration corrections were applied to the gage-height record as defined by visits made to the gage with respect given to stage and the potential of beached instrument operations. One missing valued on April 3, 2012 was interpolated from adjacent record without loss of accuracy.
Datum Corrections.--	Levels were last run on September 1, 2010 using RM1 as base. The primary reference was found to be 0.038 ft. low with respect to the average flume crest. No correction was possible due to the anchoring system used to affix the staff gage. RM's 2 and 3 were also established on this date.
Rating.--	The control is a 4-foot Parshall flume set in concrete in an earthen ditch. A standard 4-foot Parshall flume rating (STD04FTPF) was continued again this year. Seven discharge measurements (Nos. 10-16) and were made during the year ranging in discharge from 10.7 to 16.8 cfs. Measurements made this year and several observations of no flow cover the range in stage experienced this year well except for the higher daily flows of July 21 and 22, 2012. The peak flow of 25.7 cfs occurred at 2230 on July 28, 2012 at a gage-height of 1.41 ft. with a shift of -0.06 ft., exceeding this year's high measurement (No. 16) made September 22, 2012 by 8.9 cfs and 0.37 ft. of stage respectively.
Discharge.--	Shifts are principally caused by the base reference being out of calibration with respect to the base RM (average flume crest). However, due to the mounting method used, the base reference can not be adjusted. Shifts outside those expected from the base reference issue are caused by changes in approach conditions. Shifting control method was use all year. Shifts were distributed by time as defined by measurements. This year's measurements showed unadjusted shifts varying between -0.01 and -0.07 ft. All were given full weight except for Nos. 13, 15 and 16 which were adjusted -1.19%, 0.94% and 5.00% respectively to smooth shift distributions.
Special Computations.--	Because the stilling well accumulates sediment so readily the stage where the float beaches varies (October 1, 2011 - March 23, 2012). As such, zero flow is determined operationally and was based on observations made to the gage, instrument corrections made to the SDR unit and plots of the gage-height record. Zero flow was determined to occur on part of the day or the entire day on the following days: November 1-9; November 26, 2011 - March 8, 2012; March 15, 16, May 10 - 16 and June 7 -9, 2012.
Remarks.--	The record is good except for the days where the float's operation was hindered by accumulated sediment in the stilling well which are estimated and poor. Gage reliability has been substantially improved since installation of the radar unit. Station maintained by CDWR staff and record developed by Devin Ridnour.
Recommendations.--	Continue use of the radar unit as primary reference. Consideration to relocate the SDR unit elsewhere should also be given. JID interactions with the gage need to be recorded. Remarks regarding changing conditions of the approach channel should be documented on the station visit log. Make measurements throughout the full range in stage. Levels should be run again in the WY2013 specifically focusing on the lateral and longitudinal levelness of the flume. The staff gage should also be evaluated again for adjustment or replacement.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

STATELINE DITCH AUG. RETURN TO SOUTH PLATTE

RATING TABLE-- STD04FTPF USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

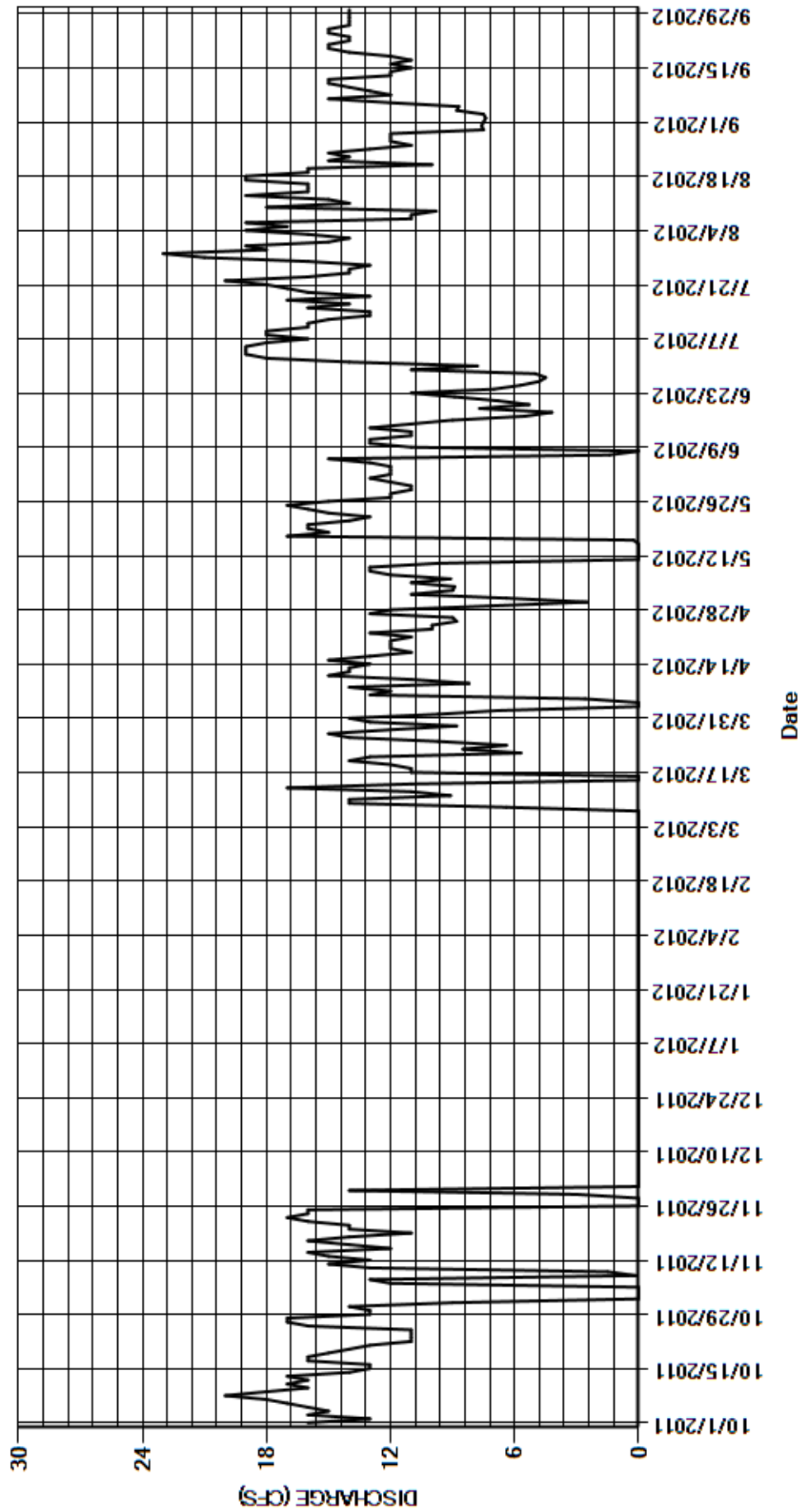
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16	e9.0	0.00	0.00	0.00	0.00	9.7	6.4	13	14	15	7.5
2	13	e0.00	0.00	0.00	0.00	0.00	6.7	11	12	18	14	7.4
3	16	e0.00	0.00	0.00	0.00	0.00	0.00	9.0	12	19	16	7.5
4	15	e0.00	0.00	0.00	0.00	0.00	0.00	8.9	12	19	19	8.8
5	16	e0.00	0.00	0.00	0.00	0.00	2.6	11	13	19	17	8.7
6	17	e12	0.00	0.00	0.00	0.00	13	9.1	15	18	19	12
7	18	e13	0.00	0.00	0.00	0.00	12	12	1.4	16	11	15
8	20	e0.15	0.00	0.00	0.00	6.4	14	13	0.00	18	11	12
9	18	e1.5	0.00	0.00	0.00	14	8.2	13	11	18	9.8	13
10	16	13	0.00	0.00	0.00	14	11	9.7	13	16	18	14
11	17	15	0.00	0.00	0.00	9.1	15	0.00	13	16	14	15
12	16	13	0.00	0.00	0.00	11	14	0.00	11	15	15	15
13	17	15	0.00	0.00	0.00	17	14	0.00	11	13	19	12
14	14	16	0.00	0.00	0.00	e11	13	0.00	13	13	16	12
15	13	12	0.00	0.00	0.00	e0.00	15	0.00	11	16	16	11
16	13	14	0.00	0.00	0.00	e0.00	13	0.25	9.0	14	16	12
17	16	16	0.00	0.00	0.00	e11	11	17	5.5	17	19	11
18	16	14	0.00	0.00	0.00	11	12	15	4.2	13	19	12
19	15	11	0.00	0.00	0.00	12	12	16	7.7	16	16	14
20	14	14	0.00	0.00	0.00	14	12	16	5.3	17	16	15
21	13	14	0.00	0.00	0.00	13	11	14	6.8	18	10	15
22	11	16	0.00	0.00	0.00	5.7	13	13	8.9	20	15	14
23	11	17	0.00	0.00	0.00	8.5	10	15	11	16	14	14
24	11	16	0.00	0.00	0.00	6.4	10	16	7.0	14	15	15
25	11	16	0.00	0.00	0.00	9.7	8.8	17	5.7	14	13	15
26	16	e0.00	0.00	0.00	0.00	14	9.0	15	4.8	13	11	14
27	17	e0.00	0.00	0.00	0.00	15	13	12	4.5	16	12	14
28	17	e0.00	0.00	0.00	0.00	12	12	12	5.0	21	12	14
29	13	e3.0	0.00	0.00	0.00	8.8	7.1	11	11	23	12	14
30	13	e14	0.00	0.00	---	13	2.5	11	7.8	18	7.5	14
31	14	---	0.00	0.00	---	14	---	12	---	19	7.6	---
TOTAL	463	284.65	0.00	0.00	0.00	250.60	304.60	315.35	265.60	517	444.9	377.9
MEAN	14.9	9.49	0.000	0.000	0.000	8.08	10.2	10.2	8.85	16.7	14.4	12.6
AC-FT	918	565	0	0	0	497	604	625	527	1030	882	750
MAX	20	17	0.00	0.00	0.00	17	15	17	15	23	19	15
MIN	11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13	7.5	7.4

CAL YR	2011	TOTAL	2783.65	MEAN	7.63	MAX	20	MIN	0.00	AC-FT	5520
WTR YR	2012	TOTAL	3223.60	MEAN	8.81	MAX	23	MIN	0.00	AC-FT	6390

MAX DISCH: 25.7 CFS AT 22:30 ON JUL 28,2012 GH 1.41 FT SHIFT -0.06 FT
 MAX GH: 1.41 FT AT 22:30 ON JUL 28,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

STATELINE DITCH AUG. RETURN TO SOUTH PLATTE
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06764000 SOUTH PLATTE RIVER AT JULESBURG (COMBINED)
Water Year 2012

Location.-- Lat 40°58'37", long 102°14'52", in NE¼SE¼ sec. 33, T.12 N., R.44 W., on Highway 385 bridge south of Julesburg CO.

Drainage Area and Period of Record.-- 23,821 mi² (USGS Colorado StreamStats utility). ; April 1902 to present. Monthly discharge for some periods published in USGS WSP 1310.

Equipment.-- Computed record. See individual gage records for specific equipment used at respective gages.

Hydrologic Conditions.-- The South Platte River at Julesburg is a braided sand channel. Four channels can contain flow with a majority of the flow occurring in Channel 1. The river is gaged on Channels 1, 2, and 4. The combined flow record for the South Platte River at Julesburg (PLAJUCCO) is the combination of records from Channels 1 (ONEJURCO), 2 (PLAJURCO), 4 (PLAJULCO), the Stateline Ditch (STLINECO) and the Town of Julesburg effluent. Channels 1 and 2 split apart about 1/3 mile upstream from the Highway 385 Bridge. The proportion of water in Channel 1 has been increasing in recent years. At low flows, 90-100% of the total flow is in Channel 1, with Channels 2 and 3 being dry. Some local irrigation and storm runoff is in Channel 4 with unused water irrigation and augmentation water being carried to the River by the Stateline ditch. Channels 2 and Channel 3 will have water only at high flows. Generally the river is dried by multiple diversions upstream. Julesburg flow is usually comprised of return flows or water passed to Nebraska to meet Compact requirements (April 1- October 15, CRS 37-65-101). However, during the winter, periods of higher flow can be seen as upstream supply is diverted less heavily and fewer dry up locations occur. Upstream diversions continue throughout the winter, except for periods of severe cold interrupting recharge and reservoir storage operations.

Gage-Height Record.-- See individual records for analyses of gage height record.

Datum Corrections.-- See individual station analyses.

Rating.-- See individual station analyses.

Discharge.-- See Special Computation section.

Special Computations.-- **DAILY FLOWS:** Combined daily flows are computed by inserting the mean daily flows for Channels 1, 2, 4, the Stateline Ditch and Julesburg effluent into a spreadsheet and adding the totals day-by-day. The spreadsheet is then used to generate a combined average daily flow file which is inputted into the State of Colorado's Hydrographic Management System (CoHMS) database.

PEAK DISCHARGE: Peak discharge occurs as a Combined Flow and this combined flow peak may or may not correspond to the peak discharges on the individual channel records. Finding the peak for the 15-minute data at a gage with multiple records requires a special procedure. Normally, the day of peak discharge can be determined from inspection of hydrograph. If flow is contained in Channel One, then the Channel One peak can be used. When flow is being recorded in multiple channels, 15-minute data peak is collated and discharges are entered on to a spreadsheet. The 15-minute peak is then determined by inspection. The peak is listed using Channel 1 gage-height, but without a shift. The above procedure was carried out in a spreadsheet and the peak flow of 1330 cfs was determined to occur at 04:30 on February 12, 2012 at a gage-height of 4.49 ft.

MAXIMUM GH: This is determined from Channel 1. Due to shift distributions, this may not be the Channel 1 gage-height corresponding to combined flow peak discharge. In 2012, the maximum Channel 1 gage-height occurred at 16:15 on January 3, 2012 at a stage of 5.52 ft.

ESTIMATED DAYS: A spreadsheet is used to compute percentage of the total daily flow that is rated as good. If 90% of the total daily computed flow is rated as good then the day is rated good. If less than 90% of the total daily computed record is rated good then the record is rated per the record rating of highest percentage contributing record.

Remarks.--

This year Channel No. 1 contributed 96% of the total combined flow. Channels Nos. 2 and 4 contributed 1.4% and 0.12% respectively with the Stateline Ditch and the Town of Julesburg Effluent contributing 2.4% and 0.1% respectively to the total combined flow. As such, the record is rated per Channel 1; "The record is good except as follows: October 17-18, 22-24, 2011 which is fair due to instrument chatter". Record developed by Division One Hydrographic staff.

The State of Nebraska Department of Natural Resources staff made one discharge measurement on May 14, 2012 downstream of the Julesburg gages where the channels come back together. The measurement discharge (136 cfs) compares well with the computed day average flow of 134 cfs.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06764000 SOUTH PLATTE RIVER AT JULESBURG (COMBINED)

RATING TABLE.--

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

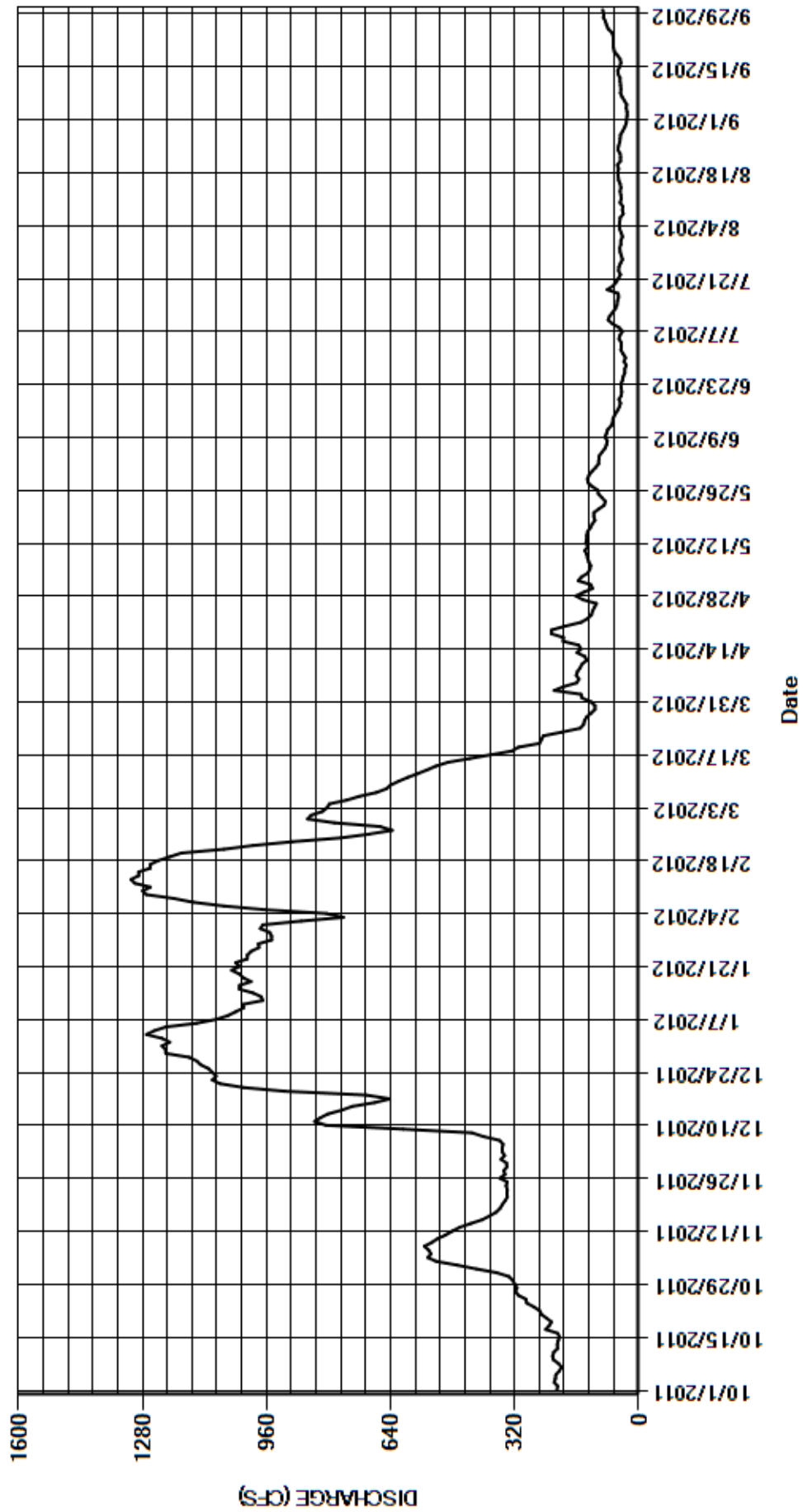
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	211	366	355	1210	970	845	146	124	111	40	42	31
2	209	418	346	1230	871	816	149	156	103	46	45	30
3	218	468	352	1270	762	804	218	148	103	45	49	30
4	215	522	352	1250	805	798	194	132	102	45	50	32
5	214	544	350	1220	962	753	160	126	95	51	49	31
6	205	536	359	1140	1070	721	154	124	87	48	48	37
7	199	542	400	1090	1150	677	161	129	83	42	40	43
8	207	553	430	1060	1200	651	158	132	81	51	42	47
9	220	534	608	1040	1270	640	151	134	87	68	41	46
10	222	519	807	1020	1280	619	146	139	83	79	48	47
11	219	498	836	1020	1260	596	134	131	80	75	45	48
12	209	481	821	970	1300	570	139	136	71	67	46	48
13	210	462	802	974	1310	546	159	134	67	60	48	53
14	208	434	766	995	1290	523	149	134	66	56	46	54
15	204	404	739	1030	1290	492	155	132	61	55	48	49
16	209	385	681	1030	1260	436	195	125	55	52	52	46
17	240	368	642	1000	1260	381	194	120	50	53	53	48
18	231	358	704	1020	1240	327	225	113	47	81	54	55
19	225	352	914	1030	1210	310	225	116	51	66	52	63
20	238	345	1020	1050	1180	256	190	116	45	58	55	65
21	251	339	1080	1030	1070	251	149	103	44	52	47	65
22	256	340	1100	1040	995	246	132	89	45	47	47	65
23	271	339	1090	1010	894	197	122	86	46	52	48	66
24	289	342	1100	1010	768	151	119	95	42	51	54	69
25	291	339	1110	1000	696	142	114	104	40	47	52	79
26	310	358	1130	980	636	140	109	106	36	42	49	83
27	318	345	1140	981	667	134	144	121	36	45	48	86
28	314	348	1160	947	785	123	162	131	32	48	47	91
29	320	340	1220	947	854	113	141	132	38	49	41	90
30	325	341	1220	952	---	113	119	128	34	46	36	93
31	335	---	1230	976	---	123	---	120	---	46	32	---
TOTAL	7593	12520	24864	32522	30305	13494	4713	3816	1921	1663	1454	1690
MEAN	245	417	802	1049	1045	435	157	123	64.0	53.6	46.9	56.3
AC-FT	15060	24830	49320	64510	60110	26770	9350	7570	3810	3300	2880	3350
MAX	335	553	1230	1270	1310	845	225	156	111	81	55	93
MIN	199	339	346	947	636	113	109	86	32	40	32	30

CAL YR	2011	TOTAL	231637	MEAN	635	MAX	7090	MIN	93	AC-FT	459500
WTR YR	2012	TOTAL	136555	MEAN	373	MAX	1310	MIN	30	AC-FT	270900

MAX DISCH: 1330 CFS AT 04:30 ON FEB 12,2012 GH 5.49 FT (Peak from Channel One)
 MAX GH: 5.52 FT AT 16:15 ON JAN 03,2012 (Peak from Channel One)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06764000 SOUTH PLATTE RIVER AT JULESBURG (COMBINED)
WY2012 HYDROGRAPH



**TRANSMOUNTAIN DIVERSIONS INTO THE SOUTH PLATTE BASIN IN COLORADO
WATER YEAR 2012 (October 2011 - September 2012)**

FROM THE COLORADO RIVER BASIN													
NAME	2011			2012									TOTAL
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	
Adams Tunnel*	15798	5818	2130	10099	7982	14764	12821	15946	12577	16464	16981	16499	147,879
Berthoud Pass Ditch	0	0	0	0	0	0	0	2.83	98.8	60.9	31.8	8.80	203
Boreas Pass Ditch	0	0	0	0	0	0	0	2.35	0	0	0	0	2.35
Grand River Ditch	0	0	0	0	0	0	16.9	1567	2216	751	316	90.2	4,957
A.P. Gumlick Tunnel**	0	0	0	0	0	0	39.9	68.1	0	0	0	0	108
Moffat Tunnel	1452	874	533	430	329	460	1893	5689	4990	2272	1531	1604	22,057
Roberts Tunnel	4501	2661	0	0	0	1441	6872	7021	9605	10242	9811	6315	58,469
Straight Creek Tunnel	8.00	6.70	5.14	3.79	2.93	3.62	5.94	17.7	18.1	9.07	6.13	5.13	92.3
Vidler Tunnel	0	0	0	0	0	0	0.230	88.1	115	18.6	0	0	222
TOTALS FROM THE COLORADO RIVER BASIN (DAY-CFS)												233,990	
TOTALS FROM THE COLORADO RIVER BASIN (ACRE-FT)												464,120	
*West slope water only **Direct release to Clear Creek only. All other flow included in Moffat Tunnel													

FROM THE LARAMIE RIVER BASIN													
NAME	2011			2012									TOTAL
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	
Bob Creek Ditch	0	0	0	0	0	0	9.69	79.2	5.52	0	0	0	94.4
Columbine Ditch	0	0	0	0	0	0	0	0	0	0	0	0	0
Deadman Ditch	0	0	0	0	0	0	22.7	191	67.8	1.81	0	0	284
Laramie-Poudre Tunnel	0	0	0	0	0	0	632	2827	3180	1635	816	174	9,264
Skyline Ditch	0	0	0	0	0	0	0	41.9	117	0	0	0	158
TOTALS FOR THE LARAMIE RIVER (DAY-CFS) WY2012												9,801	
TOTALS FOR THE LARAMIE RIVER (AF, 19875 AF per CALENDAR Year Allowed Under Laramie River Agreement) WY2012												19,440	
TOTALS FOR THE LARAMIE RIVER (AF, 19875 AF per CALENDAR Year Allowed Under Laramie River Agreement) CY2012												19,440	
NAME	2011			2012									TOTAL
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	
Wilson Supply Ditch (Gage)	0	0	0	0	0	0	24.0	331	82.1	0.42	0	0	438
minus Deadman Ditch	0	0	0	0	0	0	22.7	191	67.8	1.81	0	0	284
= SAND CR. DIVERSION***	0	0	0	0	0	0	1.3	140	14.30	-1.39	0	0	154
*** Negative Numbers due to Deadman Ditch Losses													
TOTALS FROM THE LARAMIE RIVER BASIN (DAY-CFS)												9,955	
TOTALS FROM THE LARAMIE RIVER BASIN (ACRE-FT)												19,746	

FROM THE NORTH PLATTE RIVER BASIN													
NAME	2011			2012									TOTAL
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	
Cameron Pass Ditch	0	0	0	0	0	0	0.140	17.6	20.1	0	0	0	38
Michigan Ditch	0	24.7	15.7	7.72	6.28	19.5	80.5	335	94.0	99.6	57.5	39.8	781
TOTALS FROM THE NORTH PLATTE RIVER BASIN (DAY-CFS)												819	
TOTALS FROM THE NORTH PLATTE RIVER BASIN (ACRE-FT)												1,624	

SPECIAL CATEGORIES													
NAME	2011			2012									TOTAL
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	
Hoosier Pass Tunnel *	495	501	0	0	0	0	128	497	634	37.1	20.9	0	2,312
Aurora Homestake Pipeline**	2040	2275	2415	2418	2261	2364	1233	1311	2039	2285	2277	1916	24,834
* Diverts into Division One, but entire flow is piped to the City of Colorado Springs in Division 2													
** Contains a Mixture of Colorado River Water and Water Transferred from the Arkansas River													

PLATTE RIVER BASIN
AURORA HOMESTAKE PIPELINE TO SPINNEY RESERVOIR

Water Year 2012

Location.--	Lat. N38° 54' 54.54", Long. W105° 41'03.34" (NAD83) spotted from Google Earth)). Flow meters in a vaulted turnout off the Homestake Pipeline approximately 5.25 mi. SW of the Spinney Mountain Reservoir Dam, in Park County, CO.
Drainage Area and Period of Record.--	The "Spinney Tap" is Aurora's delivery component of the Homestake pipeline project; delivering transbasin water to Spinney Mountain Reservoir. ; Daily values are available from October 1, 1998 to present.
Equipment.--	Two 30 inch Venturi meters off the Homestake Pipeline upstream of two sleeve type (Bailey) control valves with open discharge. One is the main discharge valve to Spinney Mountain Reservoir (Discharge No. 1) and the other (Discharge No. 2) serves as a pressure-relief valve for the pipeline. Both meters are monitored by a Sutron SatLink Data Collection Platform (DCP) and by Aurora and the City of Colorado Spring's Supervisory Control and Data Acquisition (SCADA) system. A Sutron Monitor 1 data logger is used as a back up to the DCP. The Venturi meters, DCP, SCADA system and facilities are owned and maintained by the City of Aurora.
Hydrologic Conditions.--	Flow is comprised of transmountain water imported from a number of sources in the Colorado River Basin, Colorado River water stored on the eastern slope from previous years, and native Arkansas River water transferred from points downstream. All flow is diverted to Twin Lakes Reservoir and transported in the Homestake Pipeline to the Otero Pump Station. The pipeline delivers water to Aurora at Spinney Mountain Reservoir and continues to the City of Colorado Springs Rampart Reservoir. Colorado River water is included in deliveries of Homestake Tunnel, Busk-Ivanhoe Tunnel and Twin-Lakes Tunnel. In general the total flow at this gage represents approximately 45% Colorado River Water, and 55% Arkansas basin water. Water deliveries are ordered to Spinney Reservoir through the main discharge (Discharge No.1). Spikes of water from the pressure relief valve (Discharge No. 2) are usually small and infrequent. Water delivered into Spinney through the relief valve can occur when water is not delivered through the main discharge valve.
Gage-Height Record.--	From October 1 to November 23, 2011 the primary record is hourly discharge values recorded by the DCP from the two Venturi meters. The primary record for the remainder of the year is 15-minute telemetered discharge values from the two Venturi meters. The record is complete and reliable.
Datum Corrections.--	Not applicable.
Rating.--	A differential pressure versus rate of flow rating is used to convert inches of head to flow in cfs. The rating is provided by Primary Flow Signal, the Venturi meter manufacturer. The differential pressure transmitter on the Venturi meters was last calibrated by the City of Aurora Instrumentation division on July 13, 2012. The transmitters were found to be in tolerance and no adjustments were made. A mass balance spreadsheet is routinely used by Otero Pump Station personnel to check discharge at the Spinney Tap. One measurement (No. 3) was made this year, with discharge 58.8 cfs. The measurements correlated within 1% of the differential pressure versus rate of flow rating provided by the manufacture and were within 1% of the reported DCP and SCADA discharge values. The peak discharge of 85.1 cfs was recorded a 13:00 hours on October 5, 2011 and was the combined flow from both Discharge 1 and Discharge 2. The peak exceeded measurement No. 3 made on April 9, 2012 by 26.3 cfs.
Discharge.--	Discharge is determined from the two Venturi meters and reported to the DCP on separate analog circuits. The two discharge records are worked independently and combined to create the total delivery to Spinney Mountain Reservoir via the Homestake Pipeline.
Special Computations.--	The two primary record parameters HOMSPACO (Aurora valve) and HOMSPRCO (Relief valve) are developed independently and combined to develop the HOMSPICO record.
Remarks.--	During the production of the record a programming error was revealed which had changed the DCP's setup from 15-minute intervals to 1-hour intervals which may have resulted in loss of resolution in discharge values recorded by the DCP, especially those flows occurring through the relief valve since those flows are transient in nature. This problem was recognized and the data collection platform (DCP) set up was changed on November 23 at 11:45. The record is regarded as fair as a result of the loss of resolution for the period. For the remainder of WY 2012 data was collected at 15 minute intervals, the record is considered good. Record developed by Russell Stroud and Mike Wild.
Recommendations.--	Continue open channel measurements to validate meter readings as time allows.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

AURORA HOMESTAKE PIPELINE TO SPINNEY RESERVOIR

RATING TABLE-- STCONVERT USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

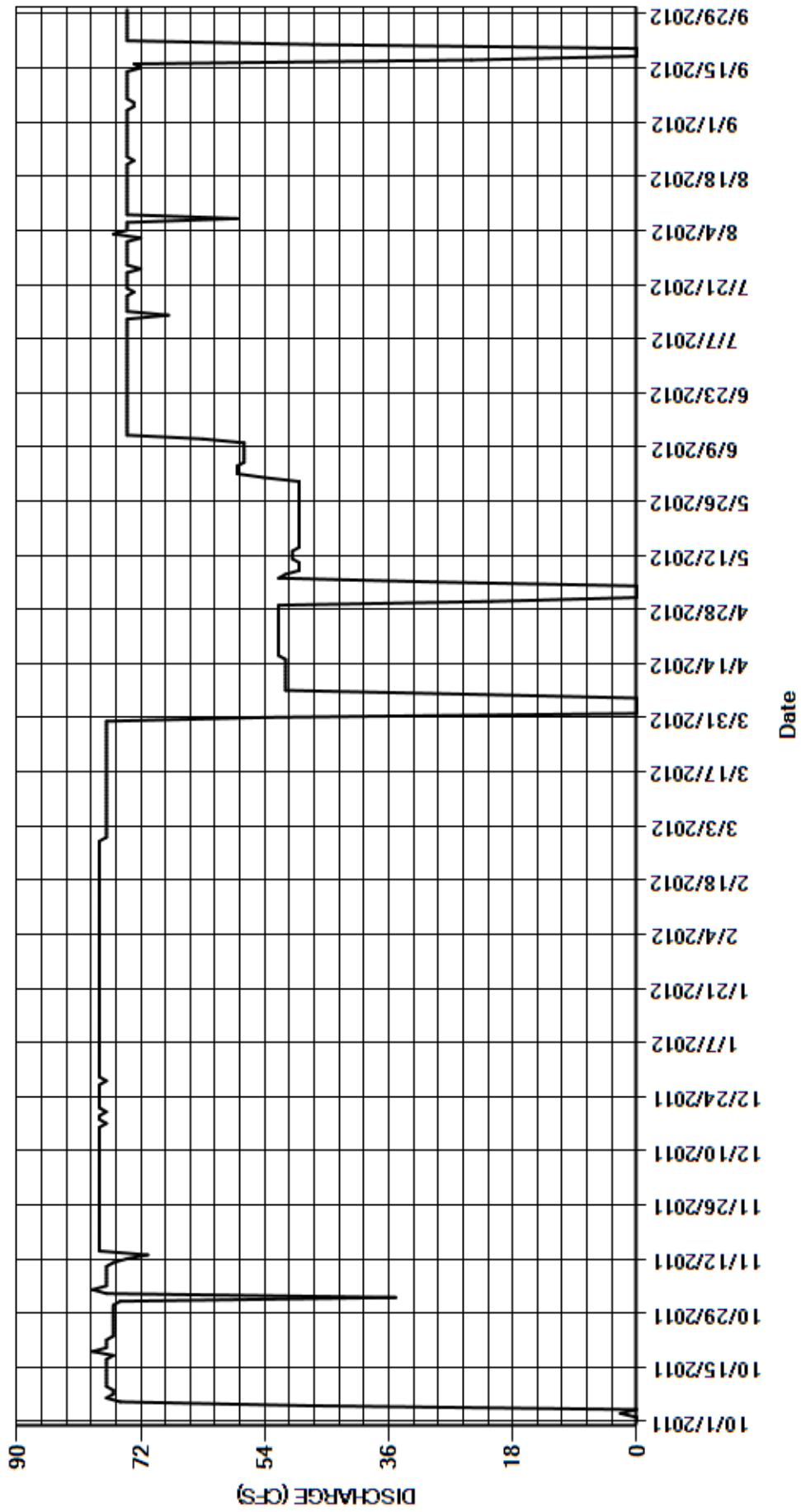
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	75	78	78	78	77	0.00	0.00	54	74	74	74
2	0.00	35	78	78	78	77	0.00	0.00	58	74	72	74
3	2.4	77	78	78	78	77	0.00	0.00	58	74	76	74
4	0.00	79	78	78	78	77	0.00	0.00	58	74	74	74
5	48	77	78	78	78	77	0.00	29	57	74	74	73
6	75	77	78	78	78	77	25	52	57	74	74	73
7	77	77	78	78	78	77	51	51	57	74	58	74
8	76	77	78	78	78	77	51	49	57	74	74	74
9	76	77	78	78	78	77	51	49	57	74	74	74
10	77	77	78	78	78	77	51	49	57	74	74	74
11	77	76	78	78	78	77	51	50	63	74	74	74
12	77	74	78	78	78	77	51	50	74	74	74	74
13	77	71	78	78	78	77	51	50	74	68	74	74
14	77	78	78	78	78	77	51	49	74	74	74	74
15	77	78	78	78	78	77	51	49	74	74	74	72
16	77	78	78	78	78	77	52	49	74	74	74	73
17	77	78	77	78	78	77	52	49	74	74	74	24
18	76	78	78	78	78	77	52	49	74	74	74	0.00
19	79	78	78	78	78	77	52	49	74	73	74	0.00
20	77	78	77	78	78	77	52	49	74	74	74	0.00
21	77	78	78	78	78	77	52	49	74	74	74	47
22	77	78	78	78	78	77	52	49	74	74	73	74
23	76	78	78	78	78	77	52	49	74	74	74	74
24	76	78	78	78	78	77	52	49	74	74	74	74
25	76	78	78	78	78	77	52	49	74	72	74	74
26	76	78	78	78	78	77	52	49	74	74	74	74
27	76	78	78	78	78	77	52	49	74	74	74	74
28	76	78	77	78	78	77	52	49	74	74	74	74
29	76	78	78	78	77	77	52	49	74	74	74	74
30	76	78	78	78	---	77	21	49	74	74	74	74
31	76	---	78	78	---	54	---	49	---	74	74	---
TOTAL	2040.40	2275	2415	2418	2261	2364	1233.00	1311.00	2039	2285	2277	1916.00
MEAN	65.8	75.8	77.9	78.0	78.0	76.3	41.1	42.3	68.0	73.7	73.5	63.9
AC-FT	4050	4510	4790	4800	4480	4690	2450	2600	4040	4530	4520	3800
MAX	79	79	78	78	78	77	52	52	74	74	76	74
MIN	0.00	35	77	78	77	54	0.00	0.00	54	68	58	0.00

CAL YR	2011	TOTAL	17791.40	MEAN	48.9	MAX	79	MIN	0.00	AC-FT	35290
WTR YR	2012	TOTAL	24834.40	MEAN	67.9	MAX	79	MIN	0.00	AC-FT	49260

MAX DISCH: 85.1 CFS AT 13:00 ON OCT 05,2012 SHIFT 0 FT
 MAX GH: 0.00 FT (N/A)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

**AURORA HOMESTAKE PIPELINE TO SPINNEY RESERVOIR
WY2012 HYDROGRAPH**



PLATTE RIVER BASIN
HOOSIER PASS TUNNEL AT MONTGOMERY RESERVOIR NEAR ALMA
Water Year 2012

Location.-- Lat. N39° 21' 36.39", Long. W106° 04' 39.15" (Spotted from Google Earth (NAD83)). Gage is located in a tunnel at the downstream end of Hoosier Pass Tunnel at Montgomery Reservoir 5.3 miles north of Alma, CO.

Drainage Area and Period of Record.-- Transmountain diversion diverting waters from tributaries of the Blue River in the Colorado River Basin to Montgomery Reservoir on the Middle fork of the South Platte River in the South Platte River Basin. ; Daily values are available from 1953 to present.

Equipment.-- Digital incremental Sutron 56-0540-400-DTR shaft encoder connected to a Sutron SatLink 2 Data Collection Platform (DCP) transmitting hourly and a Sutron SDR-0001-1 (City of Colorado Springs Utilities (CSU)) at an 8-ft. Parshall Flume set in concrete located inside the tunnel. A reference point and metal drop tape are the primary reference with a supplemental staff gage located on the left wing wall of the flume at the Ha location. Facilities are owned and maintained by the City of Colorado Springs. Gage operated and satellite equipment owned and maintained by Division of Water Resources (DWR) staff.

Hydrologic Conditions.-- Transmountain diversion operating seasonally. Flows are intercepted from the headwaters of the Blue River and follow a diurnal pattern as snowpack melts. Diversion can be called out (shut off) by senior water rights on the Blue River and further downstream. The flow is controlled by numerous diversions into the tunnel inlet from the Blue River drainage.

Gage-Height Record.-- The primary record is 15-minute satellite data with logged 15-minute DCP and SDR data as backup. Periods of missing data were filled with SDR data without loss of accuracy on the following days: July 14, 2012 and August 1, 2012. The record is complete and reliable. Instrument calibration was ensured by fifteen visits by DWR and CSU employees. Logged SDR data agreed with telemetered data within ± 0.02 ft.

Datum Corrections.-- Levels were last run on October 12, 2011 using the flume crest as base. The base reference gage was found to be within allowable tolerances. The left side of the Parshall flume was found to be 0.02 ft higher than the right side which is consistent with past results.

Rating.-- The control is an 8-ft. Parshall flume. A standard 8-ft. Parshall rating, STD08FTPF, was continued for all of WY2012. Four discharge measurements (Nos. 144-147) were made this year, ranging in discharge from 4.50 to 39.1 cfs. Measurements Nos. 144-147 and multiple observations of no flow cover the range in stage experienced this year well. The peak discharge of 51.8 cfs occurred at 2230 on June 4, 2012 at a gage-height of 1.35 ft. using a shift of 0.00 ft. The peak exceeded measurement No. 147, made on June 7, 2012 by 0.23 ft. of stage and 12.7 cfs respectively.

Discharge.-- Per agreement with the City of Colorado Springs measurements within 5% of the rating are adjusted to the rating. As such, Measurements Nos. 144, 146 and 147 were adjusted -1.05%, 1.42% and 1.82% respectively to the rating. The rating was directly applied to the gage-height record to compute discharge.

Get-away conditions are good and submergence of the flume is not a problem. Since the flume is in the tunnel, moss and algae are also not a factor. Deformities in the vertical walls of the flume, may lead to permanent shifting conditions. A stage-shift relationship was recognized for gage-heights of 1.20 ft. and higher in the 2010 water year. However, the number of confirming measurements in this "upper stage range" in the 2011 and 2012 water years do not support use of a stage-shift curve at this time.

Special Computations.-- Zero flow is determined operationally. Zero flow was determined to occur on part of the day or the entire day on the following days: October 1 - 14, November 26 - April 1, 2012; July 16 - 21 and August 6 through the end of the 2012 water year. Residual positive gage-height values on transition days were adjusted to zero to compute a zero discharge. Erroneous data on 11/28/2011 associated with equipment shut down, during a period of no flow was removed from the record.

Remarks.-- The record is good. Station maintained and record developed by Michael Wild.

CSU staff painted the Parshall flume and placed a new staff gage in the fall of 2011. The work did not appear to affect the stage discharge relationship. However, levels should be run in the 2013 water year to confirm placement of the staff gage.

Recommendations.-- Continue to look for opportunities to perform discharge measurements at gage-heights of greater than 1.20 ft. Levels should be run in the 2013 water year to confirm the base reference and placement of the newly installed staff gage.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

HOOSIER PASS TUNNEL AT MONTGOMERY RESERVOIR NEAR ALMA

RATING TABLE-- STD08FTPF USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

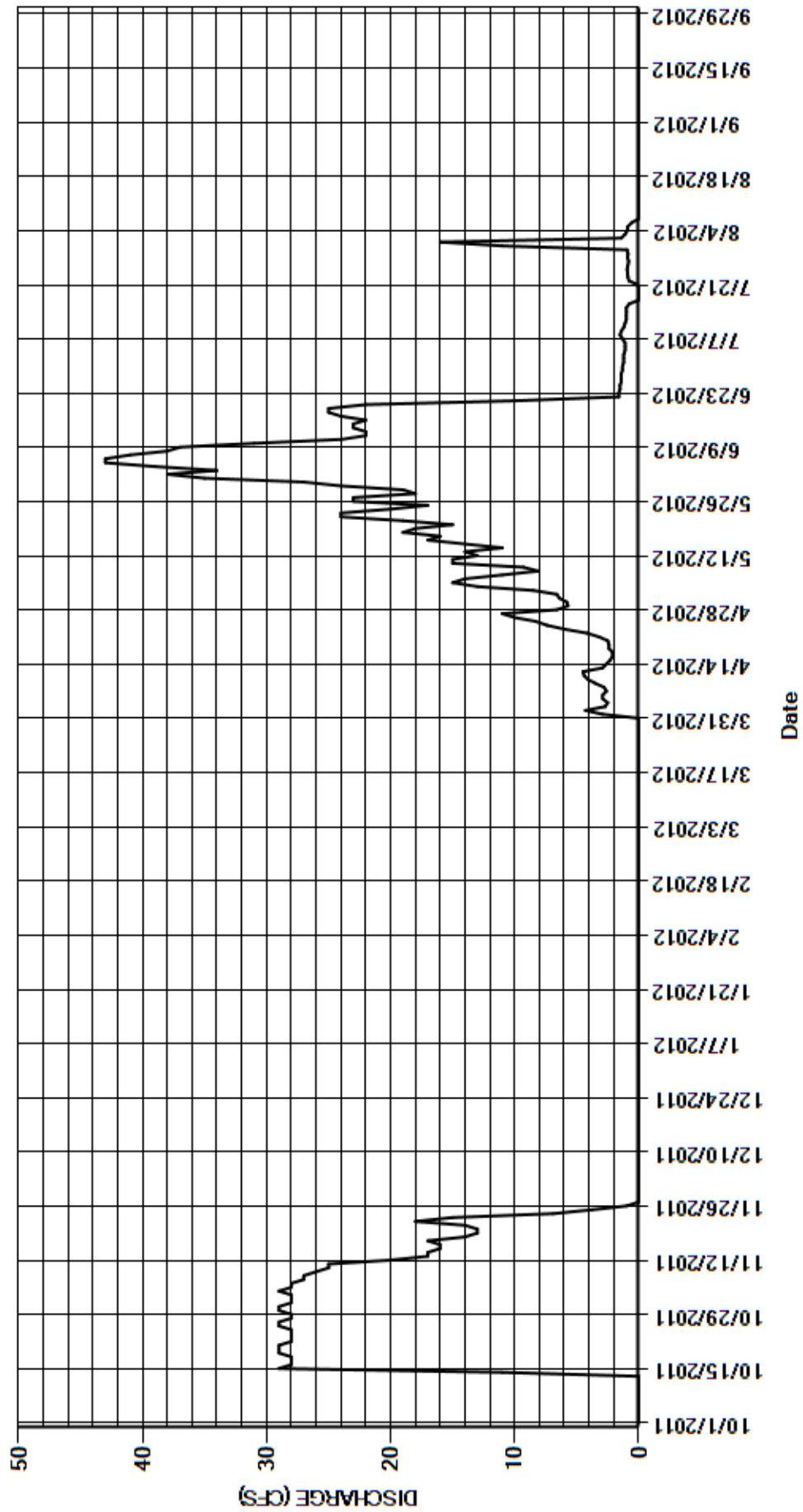
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	28	0.00	0.00	0.00	0.00	2.9	6.4	35	1.2	16	0.00
2	0.00	28	0.00	0.00	0.00	0.00	4.3	6.6	38	1.2	1.4	0.00
3	0.00	28	0.00	0.00	0.00	0.00	2.7	8.5	34	1.2	1.1	0.00
4	0.00	29	0.00	0.00	0.00	0.00	2.5	13	39	1.1	0.92	0.00
5	0.00	28	0.00	0.00	0.00	0.00	2.9	15	43	1.1	0.88	0.00
6	0.00	28	0.00	0.00	0.00	0.00	2.9	14	43	1.1	0.57	0.00
7	0.00	27	0.00	0.00	0.00	0.00	2.6	11	41	1.3	0.00	0.00
8	0.00	27	0.00	0.00	0.00	0.00	2.8	8.1	38	1.5	0.00	0.00
9	0.00	26	0.00	0.00	0.00	0.00	3.5	9.3	37	1.4	0.00	0.00
10	0.00	25	0.00	0.00	0.00	0.00	4.1	15	31	1.2	0.00	0.00
11	0.00	25	0.00	0.00	0.00	0.00	4.4	15	24	1.1	0.00	0.00
12	0.00	20	0.00	0.00	0.00	0.00	4.5	13	22	1.0	0.00	0.00
13	0.00	17	0.00	0.00	0.00	0.00	2.9	14	22	1.0	0.00	0.00
14	11	17	0.00	0.00	0.00	0.00	2.6	11	23	0.98	0.00	0.00
15	29	16	0.00	0.00	0.00	0.00	2.3	14	23	1.0	0.00	0.00
16	28	16	0.00	0.00	0.00	0.00	2.1	17	22	0.78	0.00	0.00
17	28	17	0.00	0.00	0.00	0.00	2.1	16	24	0.00	0.00	0.00
18	28	14	0.00	0.00	0.00	0.00	2.4	19	25	0.00	0.00	0.00
19	29	13	0.00	0.00	0.00	0.00	2.4	18	25	0.00	0.00	0.00
20	29	13	0.00	0.00	0.00	0.00	2.5	15	22	0.00	0.00	0.00
21	29	14	0.00	0.00	0.00	0.00	3.2	19	10	0.09	0.00	0.00
22	28	18	0.00	0.00	0.00	0.00	4.2	24	1.6	0.79	0.00	0.00
23	28	15	0.00	0.00	0.00	0.00	6.0	24	1.6	0.87	0.00	0.00
24	28	6.9	0.00	0.00	0.00	0.00	7.4	20	1.5	0.90	0.00	0.00
25	28	3.8	0.00	0.00	0.00	0.00	8.3	17	1.5	0.93	0.00	0.00
26	29	0.97	0.00	0.00	0.00	0.00	10	23	1.4	0.87	0.00	0.00
27	29	0.00	0.00	0.00	0.00	0.00	11	23	1.4	0.81	0.00	0.00
28	28	0.00	0.00	0.00	0.00	0.00	6.6	18	1.4	0.90	0.00	0.00
29	28	0.00	0.00	0.00	0.00	0.00	5.7	19	1.3	0.86	0.00	0.00
30	29	0.00	0.00	0.00	---	0.00	5.8	24	1.3	0.94	0.00	0.00
31	29	---	0.00	0.00	---	0.00	---	27	---	11	0.00	---
TOTAL	495.00	500.67	0.00	0.00	0.00	0.00	127.6	496.9	634.0	37.12	20.87	0.00
MEAN	16.0	16.7	0.000	0.000	0.000	0.000	4.25	16.0	21.1	1.20	0.67	0.000
AC-FT	982	993	0	0	0	0	253	986	1260	74	41	0
MAX	29	29	0.00	0.00	0.00	0.00	11	27	43	11	16	0.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	2.1	6.4	1.3	0.00	0.00	0.00

CAL YR	2011	TOTAL	1571.02	MEAN	4.30	MAX	39	MIN	0.00	AC-FT	3120
WTR YR	2012	TOTAL	2312.16	MEAN	6.32	MAX	43	MIN	0.00	AC-FT	4590

MAX DISCH: 51.8 CFS AT 22:30 ON JUN 04,2012 GH 1.35 FT SHIFT 0 FT
 MAX GH: 1.35 FT AT 22:30 ON JUN 04,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

HOOSIER PASS TUNNEL AT MONTGOMERY RESERVOIR NEAR ALMA
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
09046000 BOREAS PASS DITCH AT BOREAS PASS
Water Year 2012

Location.-- Lat. N39° 24' 38.36", Long. W105° 58' 5.02" ((NAD83) spotted from Google Earth)). 1.50-ft. Parshall Flume in an underground vault near the summit of Boreas Pass.

Drainage Area and Period of Record.-- Transmountain diversion diverting water from the headwaters of Indiana Creek in the Colorado River Basin to Tarryall Creek in the South Platte River Basin. ; Daily values are available from the DWR for water years 1934 to1940 and 1950 to present.

Equipment.-- Digital incremental Sutron SDR-0001-1 shaft encoder connected to a Sutron SatLink 2 Data Collection Platform (DCP) transmitting hourly at a 1.5-ft. Parshall Flume. A second Sutron SDR-0001-1 incremental shaft encoder is co-located and serves as backup to the primary encoder. The ditch goes underground after collection, and the flume and equipment are housed inside a manhole. The flume is set into the concrete pipeline, approximately 14 ft. underground. A staff gage in the flume is used as the primary reference gage. The gage and equipment are owned by the City of Englewood. The DCP and ditch gates are operated by an independent contractor under a contract arrangement with Englewood.

Hydrologic Conditions.-- Boreas Pass Ditch is a transmountain diversion diverting water from the headwaters of Indiana Creek to Tarryall Creek. The collection area is alpine tundra and talus slopes above timberline.

Gage-Height Record.-- The primary record is 15-minute satellite data with 15-minute logged DCP data and 15-minute logged SDR data as backup. The gage was operated and satellite data were collected from May 5 to June 4, 2012. The record for the period of operation is complete. Gage-heights of 0.09 ft. and below occurring from May 14 through 17 and 31 through June 4, 2012 are suspect (explained further in the Special Computations section). Five visits were made during the period of operation ensuring instrument calibration. The primary record agreed well with the backup records.

Datum Corrections.-- Levels have not been run at this site since its installation in 1992. The flume appears to be level laterally as discharge measurements made in previous years show consistent depths. However, investigation with a hand level indicates a slight increase in elevation longitudinally from the flume mouth towards the flume crest.

Rating.-- The control is a 1.50 ft. Parshall flume. Rating STD01HFTPF, a standard 1.50 ft. Parshall flume rating was continued this year. No discharge measurements were made this year as stage remained below the lower depth threshold suitable for Price Pygmy current meters. The peak discharge of 0.544 cfs occurred at 21:15 on May 22, 2012 at a gage-height of 0.25 ft. and a shift of -0.04 ft.

Discharge.-- Shifting control method was used for all periods of record. Negative shifting is most likely caused by the flume being out of level longitudinally and by increased roughness caused by the presence of concrete residue stemming from the flume's installation. Shifting has been consistent since 2008 at -0.04 ft. for all stages. This shift was applied for the 2012 water year.

Special Computations.-- Zero flow is determined operationally. Communication between the flume and stilling well has been observed to "beach" at an approximate stage of 0.09 ft. A visit to the site on June 4, 2012 noted zero flow at a recorded gage-height of 0.08 ft. As such, sustained gage-height readings of 0.09 occurring from May 31 through June 4, 2012 were adjusted to compute zero discharges. Stage values of 0.09 ft. and below observed on May 14 through 17, 2012 are suspect but were not adjusted to zero discharge as they occurred when the diversion was active.

Remarks.-- This is a seasonal gage which typically runs from May or June through August. Water year 2012 was a particularly dry year resulting in a short and non-productive diversion season. Because the stage remained below the lower definition point of a Parshall flume as well as below discharge measurement made at the site the record is fair. The record from May 14 through 17, 2012 is estimated and poor as gage-height readings are suspect. The consistent shifting at this gage and nature of the flume installation suggests that some permanent level of shift is present. Station maintained and record developed by Mike Wild.

Recommendations.-- Levels should be run in the 2013 water year. If possible the intake invert elevation should be determined.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09046000 BOREAS PASS DITCH AT BOREAS PASS

RATING TABLE-- STD01HFTPF USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

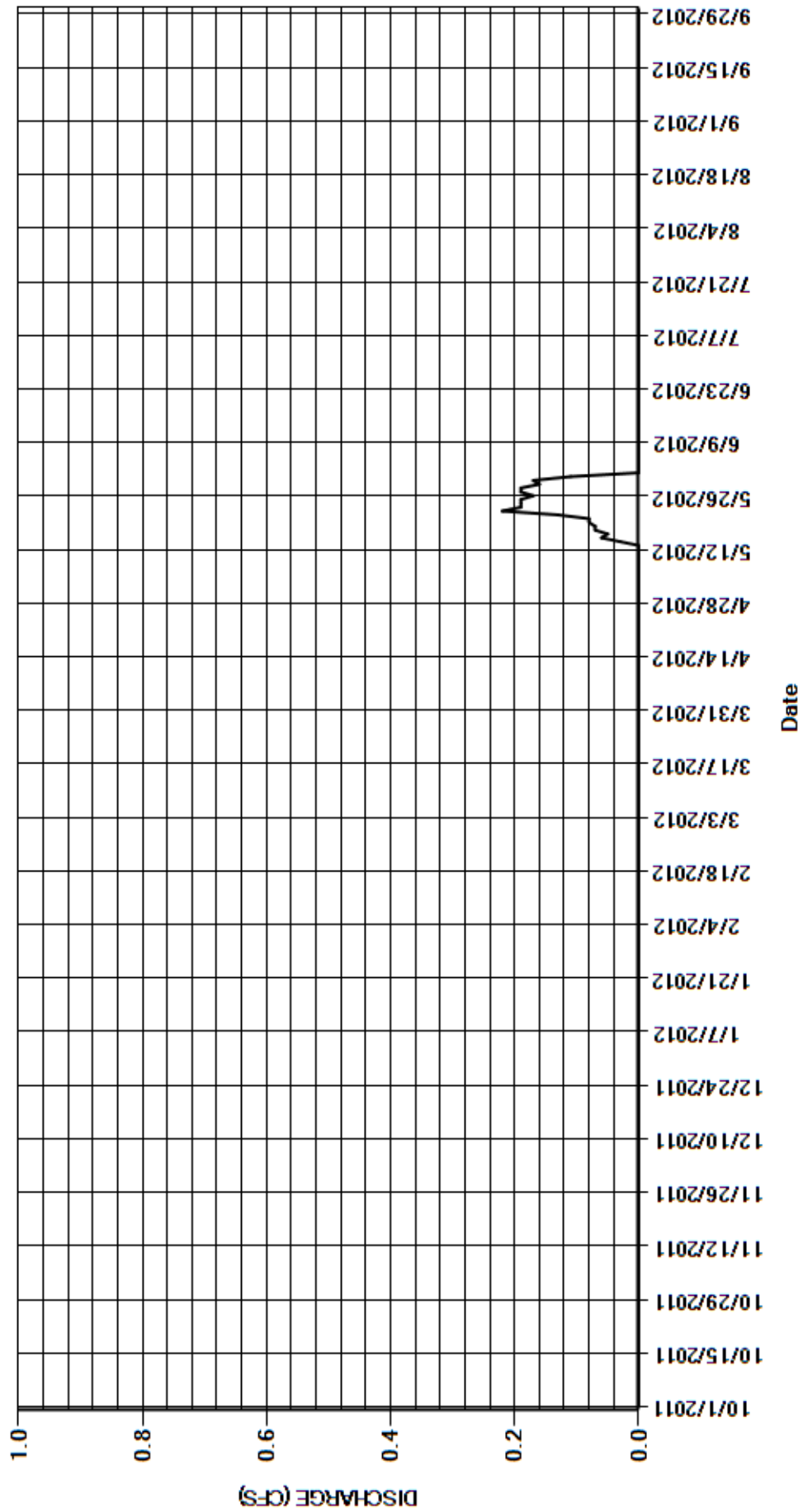
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	e0.03	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	e0.06	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	e0.05	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	e0.07	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	---	0.00	0.00	0.17	0.00	0.00	0.00	0.00
31	0.00	---	0.00	0.00	---	0.00	---	0.11	---	0.00	0.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.35	0.00	0.00	0.00	0.00
MEAN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.076	0.000	0.000	0.000	0.000
AC-FT	0	0	0	0	0	0	0	4.7	0	0	0	0
MAX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.00	0.00	0.00	0.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	119.30	MEAN	0.33	MAX	3.9	MIN	0.00	AC-FT	237
WTR YR	2012	TOTAL	2.35	MEAN	0.006	MAX	0.22	MIN	0.00	AC-FT	4.7

MAX DISCH: 0.544 CFS AT 21:15 ON MAY 22,2012 GH 0.25 FT SHIFT -0.04 FT
 MAX GH: 0.25 FT AT 21:15 ON MAY 22,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09046000 BOREAS PASS DITCH AT BOREAS PASS
 WY2012 HYDROGRAPH



PLATTE RIVER BASIN
09050590 ROBERTS TUNNEL AT EAST PORTAL NEAR GRANT
Water Year 2012

Location.-- Lat. N. 39°27'41.8", Lat. W. 105°40'36" (NAD83). Gage is located on the right side of a 20 ft. Parshall flume at the east portal of Harold D. Robert Tunnel on the north side of US 285, 0.75 miles west of Grant, CO.

Drainage Area and Period of Record.-- Roberts Tunnel diverts water from Dillon (Blue River) in Sec. 18, T5S, and R77W in the Blue river Basin, to the North Fork of the South Platte River (tributary to South Platte River) in Sec. 4, T7S, and R74W in the South Platte River basin. Included is a small amount of ground water inflow between Dillon reservoir and the East Portal of the tunnel.; Diversions began officially on July 15, 1964, when the Parshall flume was completed. However, initial flows prior to this were recorded using a 7-ft. Cipolletti weir. Record from the Cipolletti was also used for some later periods.

Equipment.-- A digital incremental Sutron Stage Discharge Recorder SDR-0001-4 connected to a Sutron SatLink 2 Data Collection Platform (DCP) in a concrete shelter and well at a 20-ft. Parshall Flume. An electric tape gage on the instrument shelf is the primary reference with a supplemental staff gage located on the left wing wall of the flume at the Ha location. The station and graphic water-stage recorder is owned and maintained by Denver Water. A Sutron 56-0450-400-DTR digital incremental shaft encoder was removed on December 3, 2011. The station was placed in the above configuration on that date.

Hydrologic Conditions.-- Roberts Tunnel is a transmountain diversion delivering water from Dillon Reservoir in the Colorado River Basin to the North Fork of the South Platte River near Grant, CO. Flow changes are generally stepwise and hydroelectric power is generated in the tunnel upstream of the Parshall Flume. The tunnel will shut down for extended periods of time for maintenance activities and delivery needs.

Gage-Height Record.-- The primary record is 15-minute logged DCP data with telemetered satellite data as backup. Chart record was not made available by Denver Water this year. The record is complete and reliable. Instrument calibration was supported by 15 visits made to the gage. Three instrumentation corrections, one of -0.01 ft and two of +0.01 ft, were applied as defined by visits. When operated in winter months heat lamps and electric heaters are used to keep the well open. Accuracy is not affected and ice accumulation is generally not an issue. Algal growth in the flume can affect the flume's performance. The flume was cleaned on October 31, 2011 returning a cleaning correction approaching 0.00 ft.

Datum Corrections.-- Levels were last run on November 27, 2008 using RM1 as base. The base reference was found to be 0.02 ft. low with respect to the flume crest. As the correction is right at the allowable threshold of ± 0.02 ft., no correction was made in lieu of confirming levels.

Rating.-- The control is a 20-foot Parshall Flume. A standard 20-foot Parshall Flume rating, STD20FTPF, was continued in use for all of WY2012. Twelve discharge measurements (Nos. 376-397) were made during the year, ranging in discharge from 64.8 to 401 cfs. Measurements made this year cover the range in stage experienced including the peak event of August 23, 2012. The peak flow of 417 cfs occurred at 1245 on August 23, 2012 at a gage-height of 2.81 ft. with a shift of +0.08 ft. It exceeded the high flow Measurement (No. 393) made July 6, 2012 by 16 cfs and 0.07 ft of stage.

Discharge.-- Shifting control method was used all year. Shifts are caused by undesirable approach conditions which can be affected by vegetal growth in the approach section. Shifts are generally positive due to inadequate stilling of waters entering the flume. Vegetal growth will decrease the magnitude of these shifts and can cause negative shifting under heavy growth conditions. Shifts were applied by time as defined by measurements from September 30, 2011 through November 30, 2011, when the tunnel was turned off for the season. Stage dependent shifting using variable shift table ROBTUNCOVST12-A was applied from March 16, when the tunnel became active, through the end of the water year. The shift table is defined by 13 measurements (Nos. 387-399) made during the period of application. Measurements Nos. 398 and 399 were made in the 2013 Water Year. Measurements made this year showed unadjusted shifts varying between +0.02 and +0.10 ft. All measurements were given full weight except for Nos. 389, 399, and 394-397 which were discounted up to $\pm 2.25\%$ to smooth the stage-shift distribution.

Special Computations.-- Zero flow is determined operationally. Small residuals draining through the flume after the tunnel is turned off were considered to be zero. Zero flow was determined to occur on part of the day or all day on the following days: November 30, 2011 – March 16, 2012.

An important consideration in shift distribution is the relationship of computed discharges to the flows computed at the North Fork of the South Platte at Grant, ½ mile downstream. Flows at Roberts Tunnel should always be less than Grant. Some native inflow below the Roberts inflow should also be seen at Grant, particularly from Geneva Creek and from Kenosha Creek. Shift effects of moss are sometimes worked backward to reconcile flows at Roberts and Grant. A spreadsheet of daily discharges for Roberts Tunnel and North Fork South Platte River at Grant (PLAGRACO) is used to insure that the difference between the two gages is reasonable.

Remarks.-- The record is rated as good. Station maintained by Tony Arnett. Record developed by Tony Arnett and Division One Staff.

Recommendations.-- Levels must be run again in the 2013 Water year. If the indicated correction to the ETI is present it should be adjusted. Measurements made at this gage should always be made in tandem with a measurement at the Grant (PLAGRACO) gage. This record should be worked on a monthly basis to insure that any bad balance of flows existing between Roberts Tunnel and the North Fork South Platte River at Grant gage is addressed promptly.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09050590 ROBERTS TUNNEL AT EAST PORTAL NEAR GRANT

RATING TABLE-- STD20FTPF USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

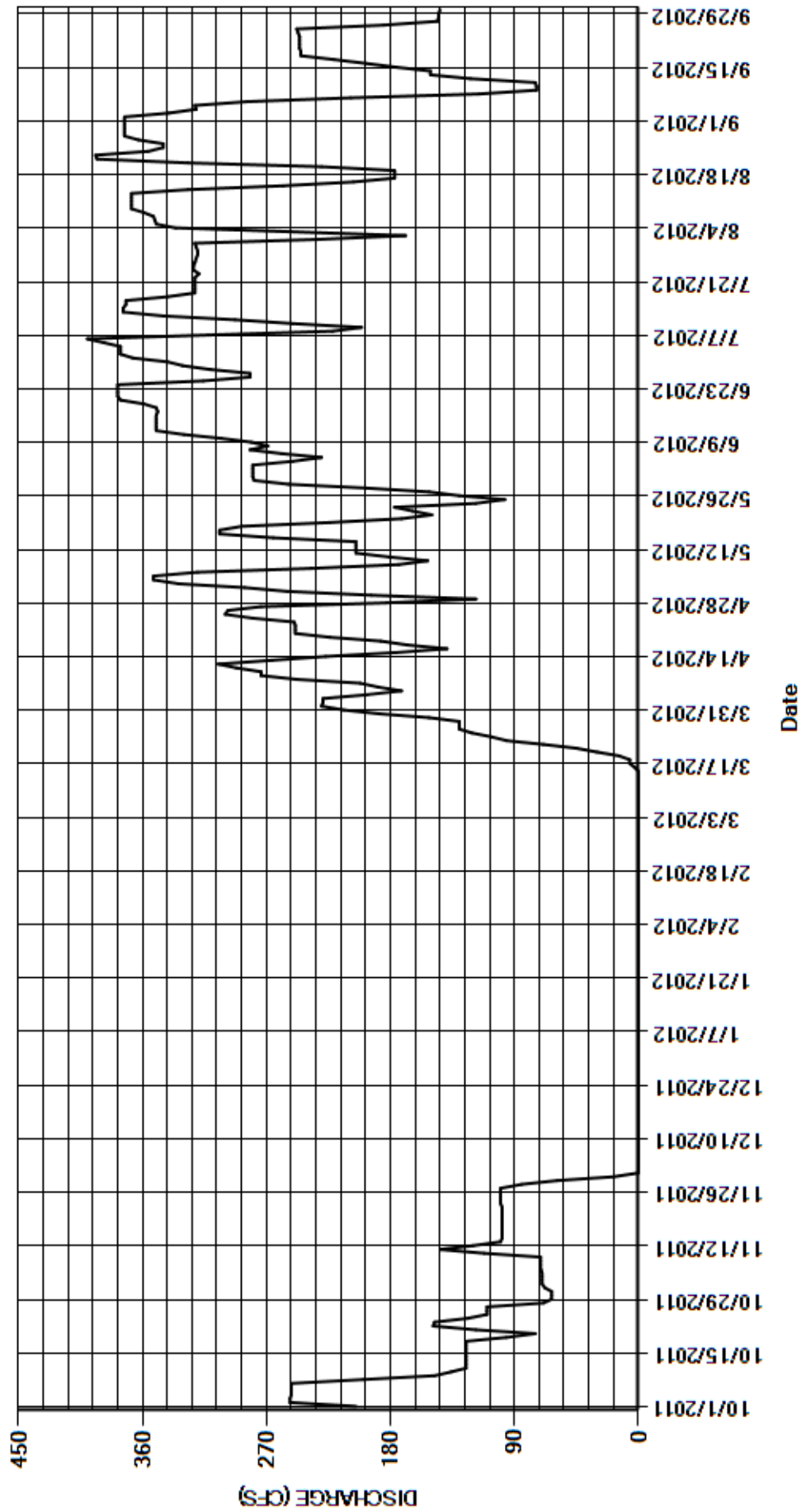
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	205	68	0.00	0.00	0.00	0.00	230	255	280	367	233	373
2	253	70	0.00	0.00	0.00	0.00	229	286	280	376	169	373
3	253	70	0.00	0.00	0.00	0.00	229	334	280	376	253	341
4	252	70	0.00	0.00	0.00	0.00	197	352	251	376	336	321
5	252	70	0.00	0.00	0.00	0.00	172	352	230	388	350	322
6	252	71	0.00	0.00	0.00	0.00	189	320	259	400	351	284
7	252	71	0.00	0.00	0.00	0.00	202	238	282	312	352	209
8	200	71	0.00	0.00	0.00	0.00	248	174	269	222	359	116
9	148	71	0.00	0.00	0.00	0.00	274	153	281	201	368	74
10	136	112	0.00	0.00	0.00	0.00	274	181	303	251	368	74
11	125	144	0.00	0.00	0.00	0.00	292	205	330	293	368	75
12	125	120	0.00	0.00	0.00	0.00	305	205	350	345	368	122
13	125	100	0.00	0.00	0.00	0.00	266	205	350	374	368	151
14	125	99	0.00	0.00	0.00	0.00	227	205	350	374	327	151
15	125	99	0.00	0.00	0.00	0.00	176	265	350	372	258	176
16	125	99	0.00	0.00	0.00	2.7	139	304	350	372	207	198
17	125	99	0.00	0.00	0.00	6.3	168	304	349	342	177	221
18	125	99	0.00	0.00	0.00	6.3	187	288	350	322	177	245
19	96	99	0.00	0.00	0.00	14	224	224	359	322	177	245
20	75	99	0.00	0.00	0.00	30	249	172	376	322	230	246
21	118	99	0.00	0.00	0.00	45	249	150	378	322	327	246
22	149	99	0.00	0.00	0.00	69	249	164	378	322	393	246
23	148	100	0.00	0.00	0.00	96	250	177	378	319	394	246
24	124	100	0.00	0.00	0.00	107	280	118	378	323	356	247
25	110	100	0.00	0.00	0.00	121	300	97	316	323	345	248
26	110	100	0.00	0.00	0.00	130	298	130	282	322	345	185
27	110	100	0.00	0.00	0.00	130	274	152	282	321	363	146
28	69	85	0.00	0.00	0.00	130	183	198	311	320	373	145
29	63	59	0.00	0.00	0.00	152	118	254	331	320	373	145
30	63	18	0.00	0.00	---	188	194	279	342	321	373	144
31	63	---	0.00	0.00	---	214	---	280	---	322	373	---
TOTAL	4501	2661	0.00	0.00	0.00	1441.30	6872	7021	9605	10242	9811	6315
MEAN	145	88.7	0.000	0.000	0.000	46.5	229	226	320	330	316	210
AC-FT	8930	5280	0	0	0	2860	13630	13930	19050	20320	19460	12530
MAX	253	144	0.00	0.00	0.00	214	305	352	378	400	394	373
MIN	63	18	0.00	0.00	0.00	0.00	118	97	230	201	169	74

CAL YR	2011	TOTAL	37143.00	MEAN	102	MAX	374	MIN	0.00	AC-FT	73670
WTR YR	2012	TOTAL	58469.30	MEAN	160	MAX	400	MIN	0.00	AC-FT	116000

MAX DISCH: 417 CFS AT 12:45 ON AUG 23,2012 GH 2.81 FT SHIFT 0.08 FT
 MAX GH: 2.81 FT AT 12:45 ON AUG 23,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09050590 ROBERTS TUNNEL AT EAST PORTAL NEAR GRANT
 WY2012 HYDROGRAPH



PLATTE RIVER BASIN
STRAIGHT CR. TUNNEL AT EAST PORTAL OF EISENHOWER
Water Year 2012

Location.-- Lat 39°40'45.28"N, long 105°54'9.96"W, NE ¼, sec. 28, Twp. 4 S, Rng. 76 W, in Clear Creek county. Gage is located in a manhole in the east portal CDOT parking lot between the east and westbound lanes. Elevation of gage is 11,013 ft.

Drainage Area and Period of Record.-- Transmountain diversion. Tunnel is a drainage culvert constructed to carry snowmelt, wash water and treated effluent from the Eisenhower and Johnson tunnels. Water accruing from the tunnel was first adjudicated on 12/31/1970. ; Daily values are available from the DWR from October 1, 1994 to present.

Equipment.-- Digital incremental Sutron SDR-0001-1 shaft encoder in a NEMA4 enclosure located on the right side of a 1-ft. Parshall Flume located in a concrete lined culvert section subsurface in between the eastbound and westbound lanes of I-70 at the Eisenhower Tunnel East Portal facilities. No provisions for telemetry are available. A staff gage located on the left wing wall at the flume's Ha location is the primary reference. The SDR unit was installed on August 1, 2007 to better monitor flow conditions in the tunnel. Prior to August 1, 2007 weekly observations by Coors staff were used to estimate the record. Coors installed a float actuated datalogger in the 2010 Water Year.

Hydrologic Conditions.-- This is considered to be a transmountain diversion from the Colorado River Basin. The flow is seepage and drainage from cleaning operations inside the Eisenhower Tunnel combined with the effluent from the CDOT facility sewage treatment plant. There is also some degree of runoff from a small drainage immediate to the West Portal which is the source of the water supply for tunnel operations. Spikes in flow originate from the tunnel cleaning operations and water treatment effluent discharges. The gage shows snow runoff characteristics in summer months.

Gage-Height Record.-- The primary record is 15-minute logged data from the SDR unit. There are no provisions for a backup record. The record is complete and reliable except for October 27, 2011 through February 8, 2012. From October 27, 2011 through January 9, 2012 the instrument's tape was dislodged from the SDR's pulley, positioned externally from the protective NEMA enclosure. The tape was corrected during a visit to the gage on January 9, 2012. However, following correcting of this issue to February 8, 2012, the SDR unit recorded values inconsistent with the normal hydrograph produced from this site. A visit to the gage on February 8, 2012 did not produce any insights to the failure mechanism but data recorded after this date was consistent with a typical hydrograph for this site.

Due to the inconsistent gage height values of Coors data and lack of daily gage height values in the 2012 Water Year, Coors data was deemed not suitable for backup purposes and was not considered this year.

Datum Corrections.-- Confined space equipment (Oxygen tester & man-hoist) is required when entering the man-hole for any reason. Levels were last run May 6, 2009 using the flume's crest as base. The staff gage was found to be within allowable tolerances.

Rating.-- The control is a steel 1-ft. Parshall flume; a standard 1-ft. Parshall flume rating (STD01FTPF) was continued in use for all of Water Year 2012. Five discharge Measurements (Nos. 14-18) were made this year, ranging in discharge from 0.14 to 0.46 cfs; covering the range in stage experienced this year well except for the higher daily flow of May 9 through June 25, 2012. The peak discharge of 1.07 cfs occurred on July 6, 2012 at a gage-height of 0.47 ft. with a shift of -0.04 ft. exceeding this year's high measurement (No. 17) by 0.61 cfs and 0.20 ft. of stage respectively.

Discharge.-- Stage dependent shifting was used of all periods of good record. Shifting is suspected to be caused by friction losses in the approach section as well as across the flume principally caused by buildup of materials (mostly gravel) upstream of the flume and corrosion of the flume itself. Variable shift table STCTUNCOVST12-1 is defined by 6 measurements (Nos. 13-18). Nos. 14-18 were made during the period of use and No. 13 was used to anchor the upper end of the table. Open water measurements made this year showed raw shifts stable at -0.02 ft. All were given full weight.

Special Computations.-- Discharge from October 27, 2011 through February 8, 2012 was estimated from adjacent good record and one observation made to the gage on January 9, 2012.

Remarks.-- The record is considered fair except for October 27, 2011 through February 8, 2012 when the record is estimated and poor.

The accuracy of all measurements can only be considered fair, since the depths involved were at or below the stated lower limit for a Pygmy meter. This record is requested by DWR Division 5 and the Upper Colorado River Commission to complete their accounting of transmountain diversions. Station maintained by Tony Arnett. Record developed by Tony Arnett and R. Stroud.

Recommendations.-- Visits should be made to the gage on a bimonthly basis. Discharge measurements should be continued throughout the full range, especially during peak runoff. Confined space procedures as per CDOT are required for tunnel entry at all times. Tunnel entry coordination with CDOT is required. Attempts to coordinate entry when Coors staff is present should be strived for. Well operation as well as free and clear instrument movement needs to be verified on every visit. Time corrections on the SDR should be performed before download of logs. Levels should be run in the 2013 Water Year. Visit Log sheet should be kept inside the NEMA enclosure and kept up to date.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

STRAIGHT CR. TUNNEL AT EAST PORTAL OF EISENHOWER

RATING TABLE-- STD01FTPF USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

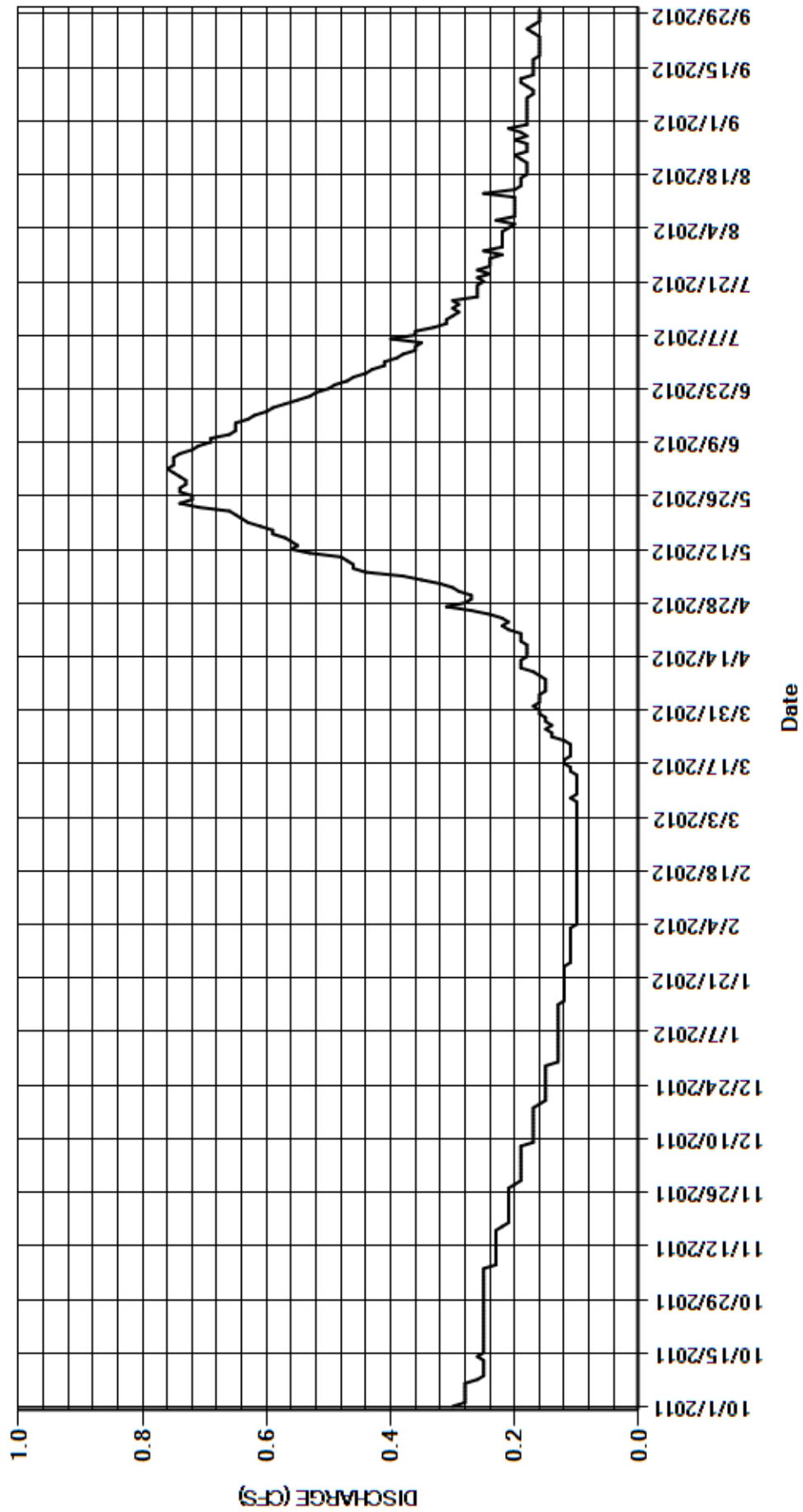
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.30	e0.25	e0.19	e0.13	e0.11	0.10	0.17	0.29	0.75	0.39	0.22	0.18
2	0.28	e0.25	e0.19	e0.13	e0.11	0.10	0.16	0.30	0.76	0.38	0.22	0.18
3	0.28	e0.25	e0.19	e0.13	e0.11	0.10	0.16	0.32	0.75	0.36	0.22	0.18
4	0.28	e0.25	e0.19	e0.13	e0.10	0.10	0.16	0.35	0.75	0.36	0.21	0.18
5	0.28	e0.25	e0.19	e0.13	e0.10	0.10	0.15	0.38	0.75	0.35	0.20	0.18
6	0.28	e0.25	e0.19	e0.13	e0.10	0.10	0.15	0.44	0.74	0.40	0.23	0.18
7	0.28	e0.23	e0.19	e0.13	e0.10	0.10	0.15	0.46	0.72	0.36	0.20	0.18
8	0.26	e0.23	e0.19	e0.13	e0.10	0.11	0.15	0.46	0.71	0.36	0.20	0.17
9	0.25	e0.23	e0.17	e0.13	0.10	0.10	0.16	0.47	0.69	0.33	0.20	0.17
10	0.25	e0.23	e0.17	e0.13	0.10	0.10	0.17	0.48	0.69	0.31	0.20	0.18
11	0.25	e0.23	e0.17	e0.13	0.10	0.10	0.19	0.53	0.66	0.31	0.20	0.19
12	0.25	e0.23	e0.17	e0.13	0.10	0.10	0.19	0.56	0.65	0.30	0.20	0.19
13	0.25	e0.23	e0.17	e0.13	0.10	0.10	0.19	0.55	0.65	0.29	0.25	0.17
14	0.26	e0.23	e0.17	e0.13	0.10	0.10	0.18	0.56	0.65	0.30	0.20	0.17
15	0.25	e0.23	e0.17	e0.12	0.10	0.11	0.18	0.57	0.63	0.29	0.19	0.17
16	0.25	e0.23	e0.17	e0.12	0.10	0.11	0.18	0.59	0.62	0.30	0.19	0.17
17	0.25	e0.22	e0.17	e0.12	0.10	0.12	0.18	0.59	0.60	0.26	0.19	0.17
18	0.25	e0.21	e0.17	e0.12	0.10	0.12	0.19	0.61	0.59	0.26	0.18	0.16
19	0.25	e0.21	e0.16	e0.12	0.10	0.11	0.19	0.63	0.57	0.26	0.18	0.16
20	0.25	e0.21	e0.15	e0.12	0.10	0.11	0.19	0.64	0.55	0.26	0.18	0.16
21	0.25	e0.21	e0.15	e0.12	0.10	0.11	0.21	0.65	0.53	0.25	0.18	0.16
22	0.25	e0.21	e0.15	e0.12	0.10	0.11	0.22	0.66	0.52	0.26	0.19	0.16
23	0.25	e0.21	e0.15	e0.12	0.10	0.12	0.21	0.71	0.50	0.24	0.20	0.16
24	0.25	e0.21	e0.15	e0.12	0.10	0.14	0.22	0.74	0.49	0.26	0.18	0.17
25	0.25	e0.21	e0.15	e0.11	0.10	0.14	0.24	0.72	0.47	0.24	0.18	0.18
26	0.25	e0.21	e0.15	e0.11	0.10	0.15	0.27	0.72	0.46	0.24	0.18	0.17
27	e0.25	e0.21	e0.15	e0.11	0.10	0.14	0.31	0.74	0.44	0.24	0.20	0.16
28	e0.25	e0.20	e0.15	e0.11	0.10	0.15	0.28	0.74	0.43	0.22	0.18	0.16
29	e0.25	e0.19	e0.15	e0.11	0.10	0.15	0.27	0.73	0.41	0.25	0.19	0.16
30	e0.25	e0.19	e0.13	e0.11	---	0.16	0.27	0.73	0.41	0.22	0.21	0.16
31	e0.25	---	e0.13	e0.11	---	0.16	---	0.74	---	0.22	0.18	---
TOTAL	8.00	6.70	5.14	3.79	2.93	3.62	5.94	17.66	18.14	9.07	6.13	5.13
MEAN	0.26	0.22	0.17	0.12	0.10	0.12	0.20	0.57	0.60	0.29	0.20	0.17
AC-FT	16	13	10	7.5	5.8	7.2	12	35	36	18	12	10
MAX	0.30	0.25	0.19	0.13	0.11	0.16	0.31	0.74	0.76	0.40	0.25	0.19
MIN	0.25	0.19	0.13	0.11	0.10	0.10	0.15	0.29	0.41	0.22	0.18	0.16

CAL YR	2011	TOTAL	176.74	MEAN	0.48	MAX	2.2	MIN	0.10	AC-FT	351
WTR YR	2012	TOTAL	92.25	MEAN	0.25	MAX	0.76	MIN	0.10	AC-FT	183

MAX DISCH: 1.07 CFS AT 17:00 ON JUL 06,2012 GH 0.47 FT SHIFT -0.04 FT
 MAX GH: 0.47 FT AT 17:00 ON JUL 06,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

STRAIGHT CR. TUNNEL AT EAST PORTAL OF EISENHOWER
WY2012 HYDROGRAPH



PLATTE RIVER BASIN

AUGUST P. GUMBLICK TUNNEL aka JONES PASS TUNNEL RELEASE TO CLEAR CREEK

Water Year 2012

Location.--	Lat. N.39°46'13", Long. 105°51'7" (NAD83); Gage is on the left side of a 10 ft. Parshall flume two miles east of Jones Pass in the Henderson Mine complex, 9 miles west of Empire, CO.
Drainage Area and Period of Record.--	Diversion is from tributaries of the Williams Fork River in the Colorado River Basin between the headgate on the right bank of Bobtail Creek in Sec. 28, T.3S, R.76 W., and the headgate on the left bank of McQueary Creek in Sec. 16 to the West Fork of Clear Creek in Sec. 24 in the South Platte River Basin. Since July, 1959, Gumlick water has been diverted into the Vasquez Tunnel to Vasquez Creek in Sec. 1, T. 3S. R. 76W., in the Frazier River and Colorado River Basins. ; Records are maintained by both the Water Administration group and the Hydrographic and Satellite Monitoring Branch of the Colorado Division of Water Resources. Sporadic daily release values are available under identifier 0704650 from July 14, 1993 to present. Daily discharge values are available under identifier GUMCLRCO from October 1, 2005 to present.
Equipment.--	Sutron SDR-0001-1 and a Steven's F-type graphic water stage recorder in a concrete shelter and stilling well at a 10-ft. Parshall flume. An adjustable reference point and metal drop tape serve as the primary reference with two supplemental staff gages, one located on the right wing wall at the flume's Ha location and the other in the stilling well. The stilling well is connected to the flume with a single 2-in. inlet. Facilities are owned, operated and maintained by Denver Water, gage operated by the Colorado Division of Water Resources (CDWR).
Hydrologic Conditions.--	Transmountain diversion diverting water from tributaries of the Williams Fork River in the Colorado River Basin between the head gate on the right bank of Bobtail Creek in Sec. 28, T. 3S, R. 76W., and the head gate on the left bank of McQueary Creek in Sec. 16, to the West Fork of Clear Creek in Sec. 24 in the South Platte River Basin. Since July, 1959, Gumlick water has been redirected through Vasquez Tunnel to Vasquez Creek in Sec. 1, T. 3S. , R. 76W, in the Frazier River and Colorado River Basins. Delivery through the 10 ft. Parshall into Clear Creek since the completion of Vasquez Tunnel in 1958 was rare prior to 2009. Currently, Denver has contracted with Golden to supply a small amount of water each year to Guanella Reservoir, delivered in one run.
Gage-Height Record.--	Deliveries through the tunnel started on April 24 and continued through May 10, 2012. The primary record is 15-minute logged SDR data with photocopies of Denver Water's weekly charts as backup. The record is complete and reliable except for: April 24 through 26, 2012 when the floats movement was impaired by ice in the stilling well. Denver Water charts were only made available from April 27 through May 11, 2012. Instrument calibration was maintained by 5 visits to the gage by CDWR staff. One instrumentation calibration correction of 0.01 ft. was made and was applied to the record as defined by visits made to the gage. Corrected Denver Water charts agreed well with logged SDR data through the periods made available.
Datum Corrections.--	Levels were last run on July 29, 2009 using the average flume crest as base. The staff gage in the flume was found to be 0.07 ft. high with respect to the average flume crest and the staff gage in the stilling well was found to be 0.02 ft. low. The RP is presumed to have been established on this date. No corrections were made to the staff gages at the time of running levels. Datum of gage is at 10,312.5 ft elevation. (Denver Water).
Rating.--	The control is a 10-ft. Parshall Flume. A standard 10-ft. Parshall Flume rating, STD10FTPF, was continued in use for all of WY2012. Two discharge measurements (No. 4 and No. 5) were made this year at a GH readings of 0.33 ft. and 0.36 ft. returning a discharge values of 6.91 cfs and 8.14 cfs respectively. The peak flow of 8.73 cfs occurred at 1545 hrs on May 3, 2012 at a gage-height of 0.38 ft. with a shift of 0.01 ft. It exceeded this year's measurement by 0.59 cfs and 0.02 ft. of stage respectively.
Discharge.--	Shifts are caused by flume conditions in conjunction with release gate conditions. The flume sits directly below two radial gates. When water is being delivered to the Moffat system, the delivery to the Clear Creek flume is under pressure. Flow leaks out from under the gate. Flow in the flume is very fast, rough and unevenly distributed across the flume. When water is not being delivered, one or both of the gates are completely open. Flow is not under pressure, but does enter the flume at a right angle and pile-up on the inlet side is possible. The degree of this angular flow could also depend on whether both gates are open or only one. This year, delivery occurred when no water was going to the Moffat system. Flow was delivered from the right gate only under non-pressurized conditions. Shifting control method was used for all periods of record. This year's two measurements both returned shifts of +0.01 ft. Both were given full weight and were applied for the period of diversion.
Special Computations.--	Zero flow is determined operationally. Zero flow was determined to occur on part of the day or the entire day on the following days: October 1, 2011 through April 24, 2012, April 27, 30, May 7 and May 10 through September 30, 2012. Residual gage-heights recorded by the SDR occurring before and after the release do not represent active diversions to Clear Creek and are therefore considered zero.
Remarks.--	Water was only delivered for 17 days in the 2012 Water Year. The record is good except for April 24-26, 2012 due to ice impairing the stilling well's operation which is estimated and poor. Station maintained by Tony Arnett and record developed by Division One Hydrographic staff.
Recommendations.--	Flume and gate conditions during releases should be photographed and documented, and both staff and stilling well readings should be taken. If the Tunnel is running water to the Moffat system, a copy of the chart from the downstream flume should be obtained for comparison. In 2010, Denver did NOT notify the hydrographic staff of the release, and neither did the commissioner. In 2011, Denver notified DWR of a release the same day the release began. Golden should also be asked to independently provide notification of a release. It is imperative that hydrographers measure and document these releases. Observations and measurements during different gate scenarios are needed to establish the most reliable measurement conditions and request cooperation from Denver.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

AUGUST P. GUMBLICK TUNNEL aka JONES PASS TUNNEL RELEASE TO CLEAR CREEK

RATING TABLE-- STD10FTPF USED FROM 24-APR-2012 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

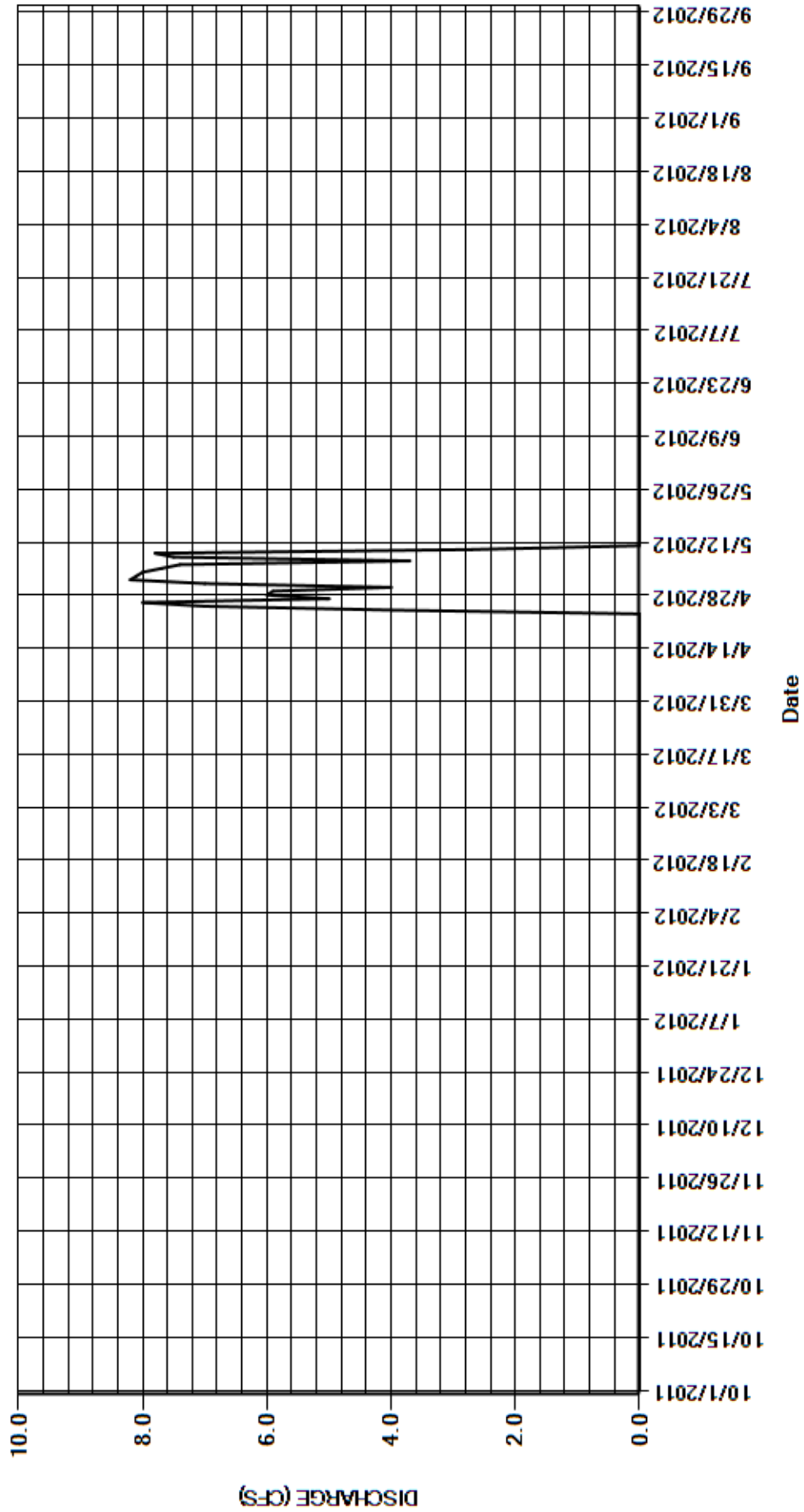
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.0	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.2	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.1	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.0	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.7	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.4	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.7	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.5	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.8	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.7	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	e4.0	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	e7.0	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	e8.0	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.0	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.0	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.9	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	---	0.00	0.00	4.0	0.00	0.00	0.00	0.00
31	0.00	---	0.00	0.00	---	0.00	---	0.00	---	0.00	0.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	39.90	68.10	0.00	0.00	0.00	0.00
MEAN	0.000	0.000	0.000	0.000	0.000	0.000	1.33	2.20	0.000	0.000	0.000	0.000
AC-FT	0	0	0	0	0	0	79	135	0	0	0	0
MAX	0.00	0.00	0.00	0.00	0.00	0.00	8.0	8.2	0.00	0.00	0.00	0.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	74.60	MEAN	0.20	MAX	19	MIN	0.00	AC-FT	148
WTR YR	2012	TOTAL	108.00	MEAN	0.30	MAX	8.2	MIN	0.00	AC-FT	214

MAX DISCH: 8.73 CFS AT 15:45 ON MAY 03,2012 GH 0.38 FT SHIFT 0.01 FT
 MAX GH: 0.38 FT AT 15:45 ON MAY 03,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

**AUGUST P. GUMBLICK TUNNEL AKA JONES PASS TUNNEL RELEASE TO CLEAR CREEK
WY2012 HYDROGRAPH**



BLUE RIVER BASIN
09047300 VIDLER TUNNEL NEAR ARGENTINE PASS

Water Year 2012

Location.-- Lat. N.39° 37' 22.36", Long. W105° 47' 29.61" (Spotted from Google Earth (NAD83)). Gage is located in a tunnel at the upstream end of Vidler tunnel near Argentine pass above the Keystone Ski Area in Summit County, CO.

Drainage Area and Period of Record.-- Transmountain diversion diverting water from around Horseshoe Basin; tributary of the Snake River in the Colorado River Basin to Leavenworth creek, tributary to Clear Creek in the South Platte River Basin. ; Daily values are available from DWR from 1971 to present.

Equipment.-- Digital incremental Sutron SDR-0001-1 shaft encoder connected to a Sutron SatLink 2 Data Collection Platform (DCP) transmitting hourly. Shaft encoder is located on the right side of a 3-ft. Parshall Flume approximately 320 ft. down-tunnel from where the DCP is located near the tunnel's west portal entrance. A staff gage on the left wing wall at the flume's Ha location is the primary reference. The City of Golden maintains a secondary SDR-0001-1 at this site. Log files can be made available upon request. The City of Golden owns, operates and maintains all facilities. The data line connecting the SDR to the DCP became compromised affecting reliability in recorded gage-height readings. The data line was replaced on July 31, 2012.

Hydrologic Conditions.-- Vidler Tunnel, is a transmountain diversion. The collection system is located in Horseshoe Basin, near the base of Argentine Pass. The tunnel is approximately 1.5 miles long and passes across the Continental Divide. Water is diverted into the tunnel by a 3 ft. diameter CMP which empties into an open rock tunnel about 40 ft. above the flume. Low snow pack conditions throughout the basin limited the amount of water taken through the tunnel this year. Water was run from April 30 through July 9, 2012.

Gage-Height Record.-- The primary record is 15-minute telemetered satellite data with 15-minute logged DWR and Golden SDR data as backup. This year's record was compiled as follows: April 10 - May 11, 2012 15-minute gage-height data downloaded from Golden's SDR unit, May 11-14, 2012 15-minute gage-height data downloaded from the CDWR's SDR unit; May 14 - August 6, 2012 telemetered satellite data. The record is complete and reliable for the period of diversion.

Datum Corrections.-- Instrument calibration was maintained by 4 visits to the gage this year. Three instrument corrections of +0.02, -0.02 and +0.01 ft. were made. The corrections were applied to the record as defined by corrections made to the instrument.

Rating.-- Levels were last run on June 23, 2000. The staff gage was found to be correctly set with respect to the crest of the flume. Flume dimensions were found to be within close agreement of design parameters, although the floor at the crest does have some slope up towards the crest in the converging section. There is nearly one foot of get-away within 8 ft downstream of the exit of the flume.

Discharge.-- The control is a 3 ft. steel Parshall flume positioned in a bare rock tunnel originally constructed for mining. A standard 3 ft Parshall Flume rating, STD03FTPF, was continued this year. Three discharge measurements (Nos. 46-48) were made ranging in discharge from 1.85 to 7.70 cfs. The peak flow of 7.97 cfs occurred at 1745 on June 1, 2012 at a gage-height of 0.83 ft. using a shift of -0.06 ft. exceeding Measurement No. 47 made the same day by 0.03 ft. of stage and 0.27 cfs respectively.

Discharge.-- A notched index board is installed on the flume to insure current meter measurement sections are consistent. The measurement section width is 4.5 ft.

Discharge.-- Shifting control method was used for all periods of record. Negative shifts are most likely caused by the floor of the flume sloping upward towards the crest in the converging section of the flume. Discharge measurements made this year showed raw shifts of -0.08, -0.05 and -0.06 ft. Measurements Nos. 46 and 47 were adjusted -7.96% and 2.80% to better fit the historic shift distribution.

Special Computations.-- Zero flow is determined operationally. Residual gage-heights of up to 0.11 ft. were recorded this year with an accompanying observation of no flow. Zero flow was determined to occur on part of the day of the entire day on the following days: October 1, 2011 - April 30, 2012 and July 9 - September 30, 2012.

Remarks.-- The record is good. Station operated and maintained by Tony Arnett. Record developed by R. Stroud and Tony Arnett.

Recommendations.-- Continued care should be taken in recording measurement staff readings and calibration information. The reading of Golden's logger should also be recorded on visit logs and measurement field notes. Levels should be run again as time allows.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09047300 VIDLER TUNNEL NEAR ARGENTINE PASS

RATING TABLE-- STD03FTPF USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

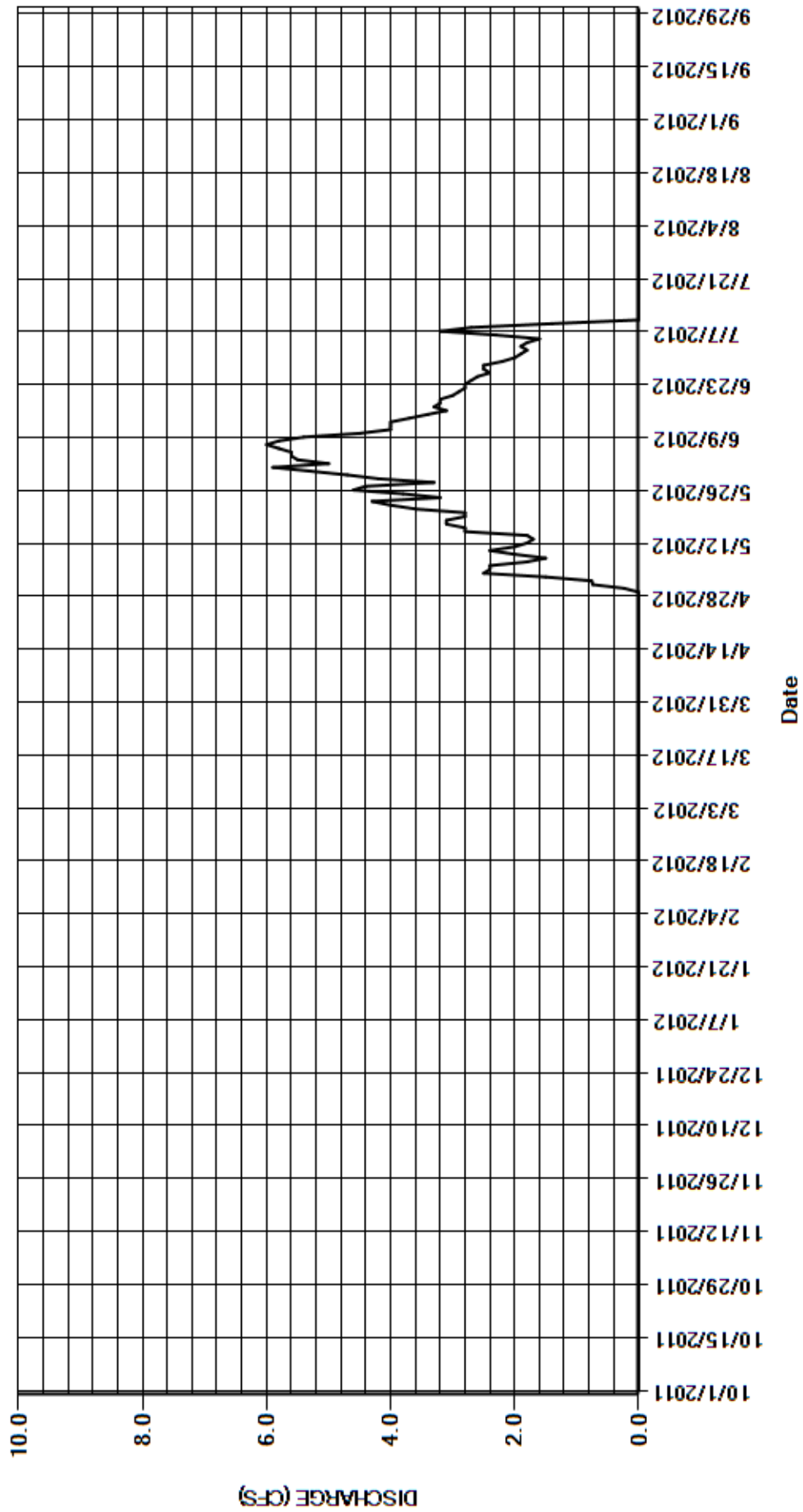
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.74	5.9	1.9	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.76	5.0	1.8	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.5	5.5	1.9	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.5	5.6	1.8	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.4	5.6	1.6	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.4	5.8	2.3	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.8	6.0	3.2	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.5	5.8	2.7	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.0	5.4	1.4	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.4	4.5	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.0	4.0	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.8	4.0	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.7	4.0	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.8	3.7	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.8	3.4	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.8	3.1	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.1	3.3	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.1	3.2	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.8	3.2	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.8	3.0	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.6	2.9	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.0	2.8	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.3	2.8	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.2	2.7	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.8	2.6	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.6	2.4	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.4	2.5	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.3	2.5	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.2	2.2	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	---	0.00	0.23	4.7	2.0	0.00	0.00	0.00
31	0.00	---	0.00	0.00	---	0.00	---	5.3	---	0.00	0.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.23	88.10	115.4	18.60	0.00	0.00
MEAN	0.000	0.000	0.000	0.000	0.000	0.000	0.008	2.84	3.85	0.60	0.000	0.000
AC-FT	0	0	0	0	0	0	0.5	175	229	37	0	0
MAX	0.00	0.00	0.00	0.00	0.00	0.00	0.23	5.3	6.0	3.2	0.00	0.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.74	2.0	0.00	0.00	0.00

CAL YR	2011	TOTAL	201.44	MEAN	0.55	MAX	8.8	MIN	0.00	AC-FT	400
WTR YR	2012	TOTAL	222.33	MEAN	0.61	MAX	6.0	MIN	0.00	AC-FT	441

MAX DISCH: 7.97 CFS AT 17:45 ON JUN 01,2012 GH 0.83 FT SHIFT -0.06 FT
 MAX GH: 0.83 FT AT 17:45 ON JUN 01,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09047300 VIDLER TUNNEL NEAR ARGENTINE PASS
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
09021500 BERTHOUD PASS DITCH AT BERTHOUD PASS
Water Year 2012

Location.-- Lat. 39° 47' 56.58", Long. 105° 46' 36.37" (NAD83). Gage is located on the left side of a 2.5 ft. by 9 ft. cutthroat flume near the summit of Berthoud Pass.

Drainage Area and Period of Record.-- Transmountain diversion diverting water from tributaries of the Fraser River into Hoop Creek in the Clear Creek Basin. ; Daily values are available from the DWR from June 18, 1931 to present.

Equipment.-- Digital Incremental Sutron 56-0540-400-DTR shaft encoder connected to a Sutron SatLink 2 Data Collection Platform (DCP) transmitting hourly in a 42-inch corrugated metal pipe shelter and well next to a 2.5-ft. by 9-ft. cutthroat flume. The stilling well has been divided to accommodate a Ha and Hb well. The primary reference is a metal drop tape and an adjustable reference point (RP). A supplemental Ha staff gage is located on the right wing wall in the converging section of the flume. An RP is present for the Hb well but its elevation has not been verified by levels. The gage is owned and operated by the city of Northglenn.

Hydrologic Conditions.-- The ditch drainage is nearly all above tree line and is adjacent to the Berthoud Pass ski area. The ditch runs parallel to US Highway 40 for part of its length and acts to divert snowmelt away from the uphill side of the road. Construction was done at the gage in October and November 2007 to cover the ditch. Prior to construction, snow-plows and traffic would drop debris into the ditch. The incoming ditch itself was replaced with a 36 inch CMP conduit and the flume was covered with sheets of metal. An extra foot of concrete was also added to the walls of the flume, extending them from 3 ft. to 4 ft. in height. The exiting ditch was replaced with a 36 inch corrugated plastic pipe conduit with extensive dirt work done in the gage's vicinity. On September 18, 2009 the flume's inlet was observed to be at a gage-height of 0.13 ft whereas the flume's point of zero flow (PZF) was observed to occur at a staff reading of 0.04 ft. Residual stilling well readings of 0.13 feet and below are assumed to be zero flow.

Gage-Height Record.-- The record is 15-minute telemetered encoder data with 15-minute logged DCP values as backup. The record is complete and reliable for the period of operation. Gage operates seasonally. This year, the DCP was activated by DWR staff on May 25, 2012, approximately two hours after the flume was operational. Instrumentation was set to a stage of 0.32 ft. to match the RP tape and the flume staff reading. Water was turned into the ditch on May 25, 2012, approximately 9:00 AM and ran through September 25, 2012, turned off approximately 9:00 AM. The flume is operational when a diversion turn-out gate is closed. The gate was only partially closed on May 25, 2012. City of Northglenn staff apparently closed the turn-out gate about noon on June 5, 2012. This gate change resulted in a spike in the record at this time.

Datum Corrections.-- The RP and tape were first established with respect to the throat of the flume on June 20, 1989. Levels run on October 9, 2008 found the gage to be reading 0.04 ft low. The RP was adjusted back to the previously established elevation 6.630 ft. Movement was possibly caused by construction activities in October and November 2007. Levels were again run on July 14, 2009; November 10, 2009 and August 10, 2010. The RP elevation was found to be within allowable tolerance in all instances.

Rating.-- Prior to 2008, the control was a 2.50-foot by 9-foot cutthroat flume, which used a standard cutthroat flume rating (BERDITCO01). Pipe-lining the ditch negated the control of the flume. The control is now the downstream corrugated plastic pipe below the flume. The departing pipe has an invert that is 0.04 feet higher than the average elevation of the flume throat, resulting in submergence of the flume throughout the range of flow. Rating BERDITCO02 was developed in water year 2008 and is based on seven measurements (Nos. 112-118), ranging in discharge from 0.82 to 7 cfs and has subsequently been confirmed by measurements from 0.27 to 15.0 cfs. Six measurements (Nos. 136-141) were made this year ranging in discharge from 0.57 cfs to 4.40 cfs. Discharge measurements made this year cover the range in stage experienced. The peak flow of 7.36 cfs occurred at 1345 June 5, 2012 at a gage height of 1.13 ft. with a shift of 0.08 ft. It exceeded Measurement No. 137 made June 12, 2012 by 0.25 feet of stage and 2.96 cfs.

Discharge.-- Shifts are caused by continually changing downstream conditions and changes in submergence of the flume not addressed by the BERDITCO02 rating. Shifting control method was used all year. Variable shift table BERDITCOVST12-B is defined by 5 measurements (Nos. 136-140) and was applied from May 5 to August 6, 2012. All measurements were given full weight except Meas. No. 140 which was discounted 6% to better smooth the shift distribution. From August 6 to September 25, 2012 (end of seasonal operation), shifts were run by time with consideration given to stage. Open water measurements showed unadjusted shifts varying from 0.04 to 0.09 ft.

Special Computations.-- Zero flow is determined operationally. Residual gage-heights of 0.13 ft and below are considered zero. Unit stage values of 0.13 ft and below occurring on September 26 through October 23, 2012 have been adjusted to zero. On May 25, 2012 DWR staff activated the equipment and started transmitting data at 11:30 AM. Northglenn operators had started the flow approximately 2 hours prior to that. Flows have been estimated on a steady increase from 9:00 to 11:15 to account for missing GH data.

Remarks.-- The record is good. Station maintained by Tony Arnett and record developed by Tony Arnett.

Recommendations.-- Strive to achieve better coordination and documentation of Northglenn's operations. Requesting Northglenn's staff to log their visits to the gage would also be highly valuable. Visits should continue to be made every two weeks throughout the water year to ensure the flume is clear and to ensure instrument calibration. A longer reference tape to measure water levels below the flume's zero datum would be helpful. Higher flow measurements should be sought to extend the BERDITCO02 or subsequent ratings. Evaluation for a new rating should be made in the 2013 water year.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09021500 BERTHOUD PASS DITCH AT BERTHOUD PASS

RATING TABLE-- BERDITCO02 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

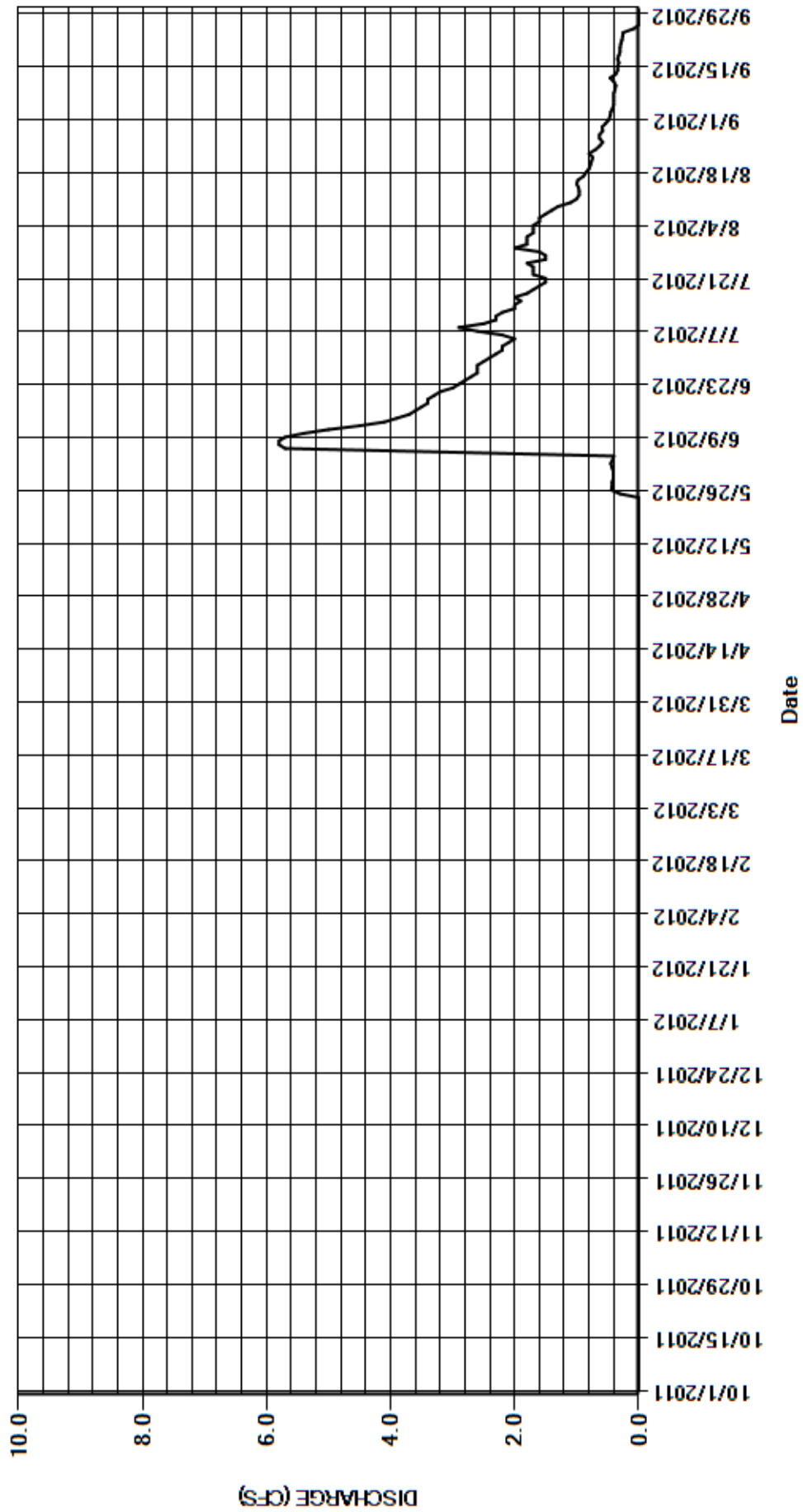
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43	2.3	1.8	0.48
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.45	2.2	1.7	0.46
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42	2.2	1.7	0.45
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40	2.1	1.7	0.42
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.0	2.0	1.6	0.40
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.7	2.2	1.6	0.40
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.8	2.6	1.5	0.40
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.8	2.9	1.4	0.40
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.7	2.5	1.3	0.38
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.4	2.3	1.1	0.37
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.0	2.3	1.0	0.40
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.5	2.2	0.96	0.46
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.1	2.0	0.96	0.37
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.9	2.0	0.97	0.34
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.7	1.9	1.0	0.34
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.6	2.0	0.98	0.32
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5	1.8	0.89	0.34
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.4	1.7	0.85	0.32
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.4	1.6	0.80	0.30
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.3	1.5	0.78	0.30
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.2	1.5	0.76	0.29
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.0	1.7	0.74	0.27
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.9	1.7	0.80	0.26
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.8	1.7	0.70	0.25
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	e0.30	2.7	1.8	0.63	0.08
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.44	2.6	1.5	0.58	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43	2.6	1.5	0.63	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43	2.6	1.6	0.63	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	2.5	2.0	0.58	0.00
30	0.00	0.00	0.00	0.00	---	0.00	0.00	0.41	2.4	1.8	0.59	0.00
31	0.00	---	0.00	0.00	---	0.00	---	0.41	---	1.8	0.53	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.83	98.80	60.9	31.76	8.80
MEAN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.091	3.29	1.96	1.02	0.29
AC-FT	0	0	0	0	0	0	0	5.6	196	121	63	17
MAX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.44	5.8	2.9	1.8	0.48
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40	1.5	0.53	0.00

CAL YR	2011	TOTAL	424.01	MEAN	1.16	MAX	19	MIN	0.00	AC-FT	841
WTR YR	2012	TOTAL	203.09	MEAN	0.55	MAX	5.8	MIN	0.00	AC-FT	403

MAX DISCH: 7.36 CFS AT 13:45 ON JUN 05,2012 GH 1.13 FT SHIFT 0.08 FT
 MAX GH: 1.13 FT AT 13:45 ON JUN 05,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09021500 BERTHOUD PASS DITCH AT BERTHOUD PASS
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
09022500 MOFFAT WATER TUNNEL AT EAST PORTAL
Water Year 2012

Location.-- Lat. N39° 54' 6.57", Long. 105° 38' 43.77" (NAD83). Gage is located on the right side of a 15-ft. Parshall Flume downstream from Moffat Tunnel's East Portal and 7.6 mi. west of the town of Rollinsville in Gilpin County, CO.

Drainage Area and Period of Record.-- Transmountain diversion delivering waters diverted off the Fraser River and its tributaries and the Williams Fork in the Colorado River Basin to South Boulder Creek in the South Platte River Basin. Daily values are available from the DWR from June 1, 1936 to present. ; (USGS): October 1955 to September 1960. Published in annual water-supply papers as a supplementary record with Fraser River near West Portal for water year 1936, and with Fraser River at Granby for water years 1938-1950.; For water year 1937, diversion to the tunnel is the sum of diversions published with the records for Fraser River near West Portal and for Vasquez Creek near West Portal. (COLORADO DWR): 1950 to present.

Equipment.-- F-type graphic water-stage recorder, a digital incremental Sutron SDR-0001-1 shaft encoder connected to a Sutron SatLink 2 Data Collection Platform (DCP) transmitting hourly in a wooden shelter overtop a concrete stilling well at a 15 ft. concrete Parshall Flume. An ElectricTape Gage (ETG) placed on the instrument shelf is the primary reference with a supplementary staff gage on left wing wall of the flume at the Ha location. The gage is operated in cooperation with Denver Water.

Hydrologic Conditions.-- The flow is collected from transmountain diversions on Vasquez, Frazier-Jim, and Ranch Creeks in the Winter Park area, as well as some water imported from other drainages. Water is collected year-round and will show diurnal variations.

Gage-Height Record.-- The primary record is 15-minute satellite data with 15-minute logged DCP data and 5-minute logged SDR data as backup. The stage-discharge relationship is generally not affected by icing conditions as water is still warm from the tunnel. However, the well will freeze in extreme temperatures if heat lamps and space heaters are not turned on or adjusted correctly. Algal growth in the approach channel and flume can affect the flume's performance. Rapid algal growth generally occurs in the fall, winter and spring months. Twenty visits by DWR staff were made this year ensuring instrument calibration. The record is complete and reliable. The flume was cleaned on November 18, January 26, April 4, June 22, July 31, and September 14. These cleanings did not return cleaning corrections of notable magnitude. One 15 minute stage value was missing (June 21 at 1530 while work was being done on the DCP), and replaced from backup log with no loss of accuracy.

Datum Corrections.-- Levels were last run on November 10, 2011. The elevation of the primary reference was found to be within allowable tolerances. No corrections were made. Reference Marks No. 2 and 3 were established on this date.

Rating.-- The control is a 15 ft. Parshall Flume. A standard 15 ft. Parshall Flume rating, STD15FTPF, was continued for all of WY2012. Seventeen measurements (Nos. 649-666) were made during the year, ranging in discharge from 10.7 to 239 cfs. Measurements made cover the range in stage experienced this year except for the higher daily flows from May 22 through June 6. The peak flow of 326 cfs occurred at 20:30 on May 26, 2012 at a gage-height of 2.95 ft. with a shift of 0.00 ft.

Discharge.-- Shifting control method was used all year. The flume is in good condition but negative shifts can be caused by rock and gravel deposition as well as algal growth in the approach canal, flume and flume departure. Higher flows come into the flume with substantial approach velocity, and with faster velocities and deeper depths on the gage side. This leads to positive shifts at higher stages. Special shift distributions are used when flume cleaning changes the shift and staff readings in the flume before and after cleanings. Measurements for this water year show unadjusted shifts varying from - 0.03 to + 0.04 ft. Shifts were distributed by time as defined by measurements from September 29, 2011 through February 16, 2012 and August 15 to October 22, 2012. Shifts were distributed by stage, using variable stage shift table MOFTUNCOVST12-1 from February 16 through June 1, and MOFTUNCOVST12-4 from June 1 through August 15. All measurements were given full weight, except for measurements 651, 657, 663, 665, and 666, which were adjusted up to 3% to better fit the distributions.

Special Computations.--

Remarks.-- The record is good. Station maintained by DWR staff and record developed by Matt Rusch.

Recommendations.-- The bottom of flume should be cleaned on a regular basis. Steps should be installed into the side of the canal above the flume. A non-standard rating may be developed if enough clean flume condition measurements can be made. Notations of algal growth should be included on all measurements. Levels should be shot again in WY2013 to verify establishment of reference marks 2 and 3.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09022500 MOFFAT WATER TUNNEL AT EAST PORTAL

RATING TABLE-- STD15FTPF USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

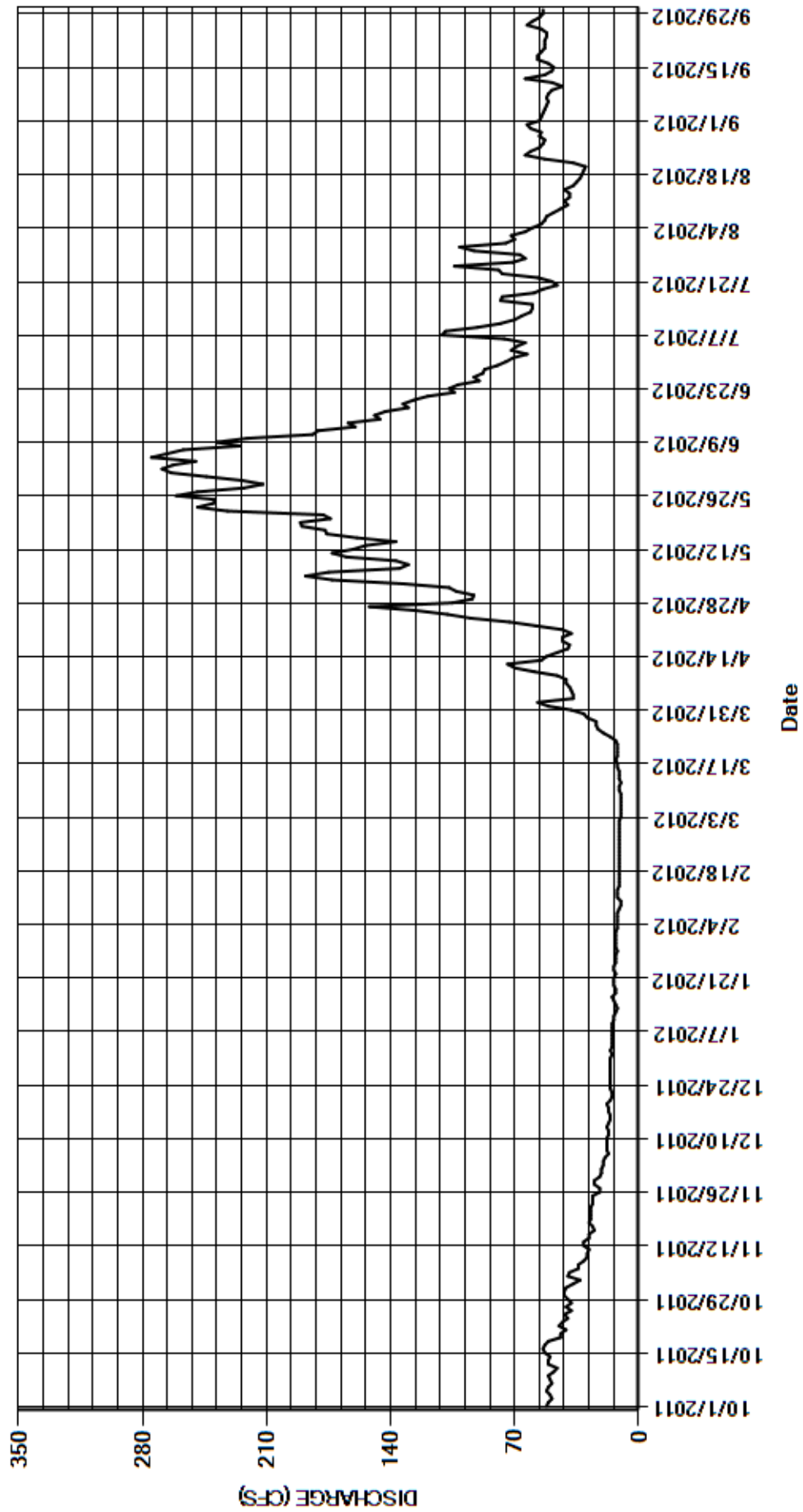
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	52	41	21	15	13	11	51	103	264	71	70	56
2	51	37	21	16	13	11	57	107	269	63	72	55
3	49	33	20	15	12	10	37	133	263	72	64	54
4	50	40	20	15	12	10	37	173	250	69	60	53
5	52	39	19	15	12	10	38	188	275	64	55	52
6	51	34	17	15	12	10	39	175	266	76	53	51
7	49	34	18	15	12	10	41	135	257	111	52	52
8	50	31	18	15	11	10	41	130	225	109	48	51
9	51	29	18	15	10	10	46	137	238	91	44	49
10	48	29	18	14	10	11	59	165	221	78	40	43
11	46	28	17	14	12	11	70	173	184	70	42	49
12	51	31	17	13	12	10	74	161	181	66	39	64
13	51	31	18	12	12	11	55	154	160	61	39	53
14	50	28	17	13	11	11	52	137	164	60	42	49
15	53	28	16	14	11	11	46	159	146	60	37	48
16	54	25	16	15	11	12	40	176	149	78	35	51
17	53	26	17	13	11	12	39	177	143	77	33	57
18	51	28	17	13	11	13	43	190	130	59	32	57
19	44	27	18	14	11	12	43	191	133	54	31	55
20	44	27	16	14	11	12	38	174	127	46	30	53
21	41	27	15	14	11	12	43	178	119	49	37	53
22	45	27	15	13	11	12	58	232	104	57	53	53
23	43	26	16	14	11	13	73	249	107	77	64	52
24	40	26	16	14	11	16	95	240	102	79	61	52
25	42	26	16	13	11	20	108	239	90	104	56	55
26	38	22	16	13	11	23	126	261	93	71	54	63
27	41	22	16	13	11	24	152	249	88	64	53	60
28	38	25	16	12	11	24	105	223	87	67	56	56
29	40	25	16	13	11	29	94	212	80	93	55	54
30	42	22	16	13	---	31	93	224	75	101	61	54
31	42	---	16	13	---	38	---	244	---	75	63	---
TOTAL	1452	874	533	430	329	460	1893	5689	4990	2272	1531	1604
MEAN	46.8	29.1	17.2	13.9	11.3	14.8	63.1	184	166	73.3	49.4	53.5
AC-FT	2880	1730	1060	853	653	912	3750	11280	9900	4510	3040	3180
MAX	54	41	21	16	13	38	152	261	275	111	72	64
MIN	38	22	15	12	10	10	37	103	75	46	30	43

CAL YR	2011	TOTAL	26742	MEAN	73.3	MAX	861	MIN	0.00	AC-FT	53040
WTR YR	2012	TOTAL	22057	MEAN	60.3	MAX	275	MIN	10	AC-FT	43750

MAX DISCH: 326 CFS AT 20:30 ON MAY 26,2012 GH 2.95 FT SHIFT 0 FT
 MAX GH: 2.95 FT AT 20:30 ON MAY 26,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09022500 MOFFAT WATER TUNNEL AT EAST PORTAL
WY2012 HYDROGRAPH



PLATTE RIVER BASIN

09013000 ALVA B. ADAMS TUNNEL AT EAST PORTAL NEAR ESTES PARK

Water Year 2012

Location.--	Lat. N40° 19' 40", Long. W105° 34' 42" (NAD83). Gage is located on the right side of a 15-foot Parshall flume located at the upstream end of Aspen Creek Siphon, 600 ft. downstream from the Alva B. Adams Tunnel East Portal afterbay and 4.9 mi. SW of the Town of Estes Park Visitors Center.
Drainage Area and Period of Record.--	Alva B. Adam's tunnel, the transmountain diversion component of the Colorado-Big Thompson (C-BT) system diverts water from Grand Lake, Shadow Mountain Reservoir and Windy Gap Reservoir in the Colorado River Basin 13.35 miles west of the east portal gage to the South Platte River Basin west of Estes Park, CO. ; Daily values are available from August 11, 1947 to present.
Equipment.--	Digital incremental Sutron SDR-0001-4 shaft encoder connected to a Sutron SatLink2 Data Collection Platform (DCP) transmitting hourly in a rectangular concrete shelter and concrete Ha / Hb well at a 15-foot Parshall flume. Gage is equipped with electric tape gages on both Ha and Hb wells. Submergence is not an issue. A supplementary staff gage is located on the left wing wall of the flume at the Ha location. The gage is operated in cooperation with the United States Bureau of Reclamation (USBR) and the Colorado Division of Water Resources (CDWR).
Hydrologic Conditions.--	Alva B. Adam's tunnel, the transmountain diversion component of the Colorado-Big Thompson (C-BT) system empties into a stilling reservoir before entering the measurement flume. The stilling reservoir intercepts native (east slope) water from Wind River. Wind River water can be diverted under the stilling pond, or it can be taken into the pond and run through the C-BT system for power generation purposes, a process called "skimming". Wind River water is skimmed into the C-BT system during peak runoff periods of the summer when Wind River is in excess of 2 cubic feet per second (cfs). Skimmed water is determined from the difference of Wind River Above Adam's Tunnel (WINDESCO) and Wind River Below Adam's Tunnel (WINBYPCO). Skimming operations of Wind River did not occur in the 2012 water year as Wind River flows were insufficient.
Gage-Height Record.--	<p>The primary record is 15-minute satellite data with 15-minute logged DCP data and 5-minute logged SDR data as backup. The record is complete and reliable except for: December 27 and 28 when boulders and rocks were forced into and across the flumes throat section upon resuming diversions through the tunnel. These rocks and boulders were first noticed by CDWR staff on January 30, 2012 and subsequently removed on February 7, 2012. Missing satellite data values on October 19, November 22, 2011, January 30, March 27, May 14 and July 23, 2012 were either taken from backup record or interpolated from adjacent good record without loss of accuracy.</p> <p>Frequent visits by USBR and CDWR staff showed good agreement between sensor and base gage. Two instrument corrections of -0.01 ft. made in the field were applied to the record as defined by field observations and operations.</p> <p>Heat lamps and an electric radiant heater are used to keep the well open in winter months. Accuracy is not affected and ice accumulation is generally not an issue. Algal growth in the flume can affect the flume's performance. The flume was cleared of algal growth on July 19, 2012 during a short outage. Because the flume was cleaned on a rapidly falling and then rising stage no cleaning correction could be determined.</p> <p>Note.: Flume entry for cleaning or any other purpose is strictly prohibited without prior authorization and lock-out tag-out procedures as per USBR Hazardous Energy Control Program (HECP) policy (document on file). Both flume entries were carefully coordinated with USBR staff.</p>
Datum Corrections.--	Levels were last run on December 14, 2011. No correction was indicated nor made to the base or supplemental reference. Reference mark Nos. 2 and 3 were established on this date using bench mark 0 as base.
Rating.--	The control is a 15-foot Parshall flume. Rating ADATUNCO06, in use since October 1, 1971 was continued in use for all of WY2012. The rating is standard for a 15-foot Parshall flume at and above 0.60 ft. of stage and custom below 0.60 ft. of stage. The lower portion of the rating is defined by measurements to 6.40 cfs. Twelve discharge measurements (Nos. 387-398) were made this year, ranging in discharge from 149 to 558 cfs. Measurements made this year and three observations of no flow cover the range in stage experienced this year well except for higher daily flows occurring on December 30 and 31, 2011; April 5, 6, 30 through May 3, 2012. The peak flow of 594 cfs occurred at 05:45 on April 5, 2012 at a gage-height of 4.11 ft. with a shift of +0.18 ft. exceeding the high flow measurement (No. 396) made August 8, 2012 by 36 cfs.
Discharge.--	Shifts were distributed by time as defined by measurements with consideration given to operational events. Open water measurements showed unadjusted shifts varying between 0.05 and 0.20 ft. All measurements were given full weight except for Nos. 387, 389, 392, 396 and 398 which were discounted up to 2.5% to smooth shift distributions.

Special Computations.-- Discharge for December 27 and 28, 2011, when boulders were passing into and across the flume's throat section causing backwater conditions, were taken from USBR provided accounting. Zero flow is determined operationally. Small residuals draining through the flume after the tunnel is turned off are considered to be zero. Zero flow was determined to occur on part of the day or the whole day on the following days: November 25 through December 27, 2011 and February 7, 2012.

The Alva B. Adam's Tunnel Net (West Slope) delivery (ADANETCO) record is determined by calculating the amount of "skimmed" Wind River water moved through the ADATUNCO structure and subtracting that amount from the ADATUNCO record on days when skimming occurred. Thus, $ADANETCO = ADATUNCO - (WINDESCO - WINBYPCO)$. Wind River skimming operations did not occur this year as the native Wind River flow did not remain above the minimum skim threshold of 2 cfs for a sustained period.

Remarks.-- The record is good except for December 27 and 28, 2011 which was taken from provided USBR accounting and is fair. Zero flow is determined operationally and was determined to occur on part of the day of the whole day on the following days: November 25 through December 27, 2011 and February 7, 2012.

The ADATUNCO record is gross water through the structure including native east slope water skimmed into Alva B. Adam's Tunnel from Wind River for power generation and appropriation purposes. For transmountain (west slope only) deliveries to the South Platte Basin see the ADANETCO record.

In previous years shifts of $\pm 5\%$ have historically been zeroed per request of the USBR and agreement of the Water Commissioner. This historic paradigm was discarded in WY2011. Since then shifts have been applied to the record.

Station maintained by USBR and CDWR staff. Record developed by Russell V. Stroud.

Recommendations.-- Efforts to measure this structure regularly with increased frequency as algal growth is identified should be continued. Levels need to be run again in the 2015 water year.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09013000 ALVA B. ADAMS TUNNEL AT EAST PORTAL NEAR ESTES PARK

RATING TABLE-- ADATUNCO06 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

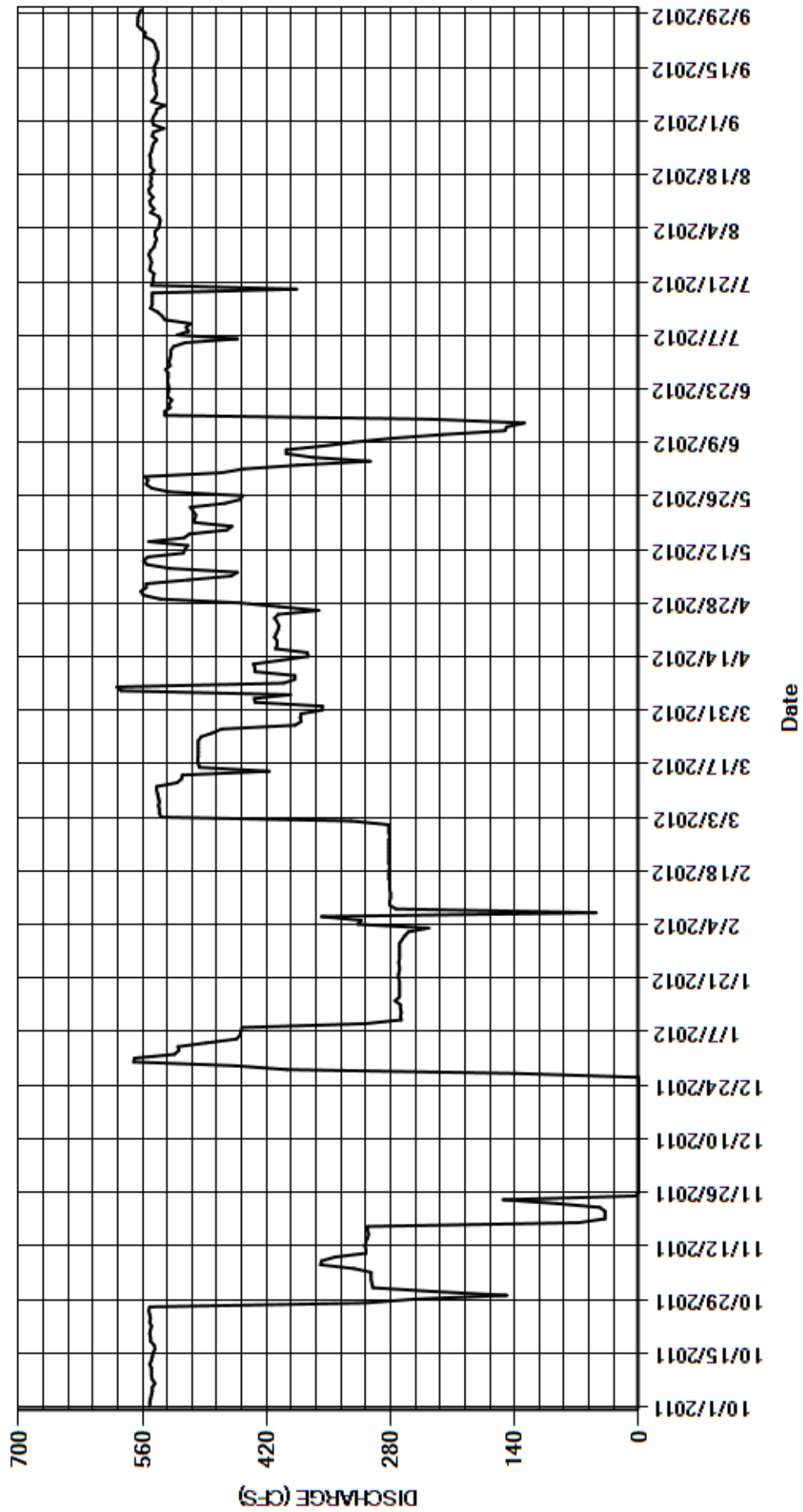
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	552	300	0.00	524	264	282	357	562	471	529	544	549
2	552	301	0.00	519	260	325	433	556	446	528	546	548
3	551	302	0.00	520	237	539	434	556	385	528	546	545
4	550	302	0.00	488	317	541	393	508	303	525	542	544
5	549	302	0.00	454	313	541	584	460	367	512	541	535
6	549	321	0.00	450	358	542	589	453	398	453	540	550
7	546	359	0.00	449	48	541	401	529	398	521	542	546
8	549	358	0.00	448	274	542	388	555	356	508	551	544
9	550	343	0.00	309	281	543	388	559	322	511	547	545
10	550	308	0.00	268	281	544	433	554	279	506	551	545
11	550	308	0.00	269	280	544	433	514	221	535	552	547
12	552	309	0.00	268	280	521	435	512	151	538	548	548
13	550	308	0.00	269	281	516	404	509	149	543	552	546
14	549	306	0.00	269	281	515	373	553	129	551	553	547
15	548	305	0.00	275	281	417	374	513	235	549	550	547
16	546	306	0.00	270	282	496	410	507	535	549	551	545
17	547	306	0.00	270	282	497	408	465	535	549	550	543
18	551	68	0.00	270	282	498	408	459	529	549	551	543
19	551	38	0.00	270	281	497	411	501	530	386	547	543
20	552	38	0.00	270	282	497	409	501	527	550	551	545
21	551	38	0.00	271	282	497	407	500	532	548	551	546
22	550	44	0.00	271	282	497	406	503	531	548	551	549
23	552	92	0.00	270	282	497	408	506	530	547	552	558
24	551	153	0.00	270	282	494	411	467	531	552	550	557
25	552	2.9	0.00	271	282	481	407	450	532	551	549	562
26	553	0.00	0.00	270	282	471	361	447	531	550	548	566
27	552	0.00	e139	270	281	388	406	530	531	551	544	565
28	309	0.00	e397	270	282	381	451	550	534	553	549	565
29	253	0.00	455	270	282	382	540	556	529	551	548	564
30	149	0.00	570	270	---	381	559	554	530	547	536	562
31	232	---	569	267	---	357	---	557	---	546	548	---
TOTAL	15798	5817.90	2130.00	10099	7982	14764	12821	15946	12577	16464	16981	16499
MEAN	510	194	68.7	326	275	476	427	514	419	531	548	550
AC-FT	31340	11540	4220	20030	15830	29280	25430	31630	24950	32660	33680	32730
MAX	553	359	570	524	358	544	589	562	535	553	553	566
MIN	149	0.00	0.00	267	48	282	357	447	129	386	536	535

CAL YR	2011	TOTAL	134761.30	MEAN	369	MAX	574	MIN	0.00	AC-FT	267300
WTR YR	2012	TOTAL	147878.90	MEAN	404	MAX	589	MIN	0.00	AC-FT	293300

MAX DISCH: 594 CFS AT 05:45 ON APR 05,2012 GH 4.11 FT SHIFT 0.18 FT
 MAX GH: 6.02 FT AT 03:45 ON DEC 28,2011 (backwater due to debris)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09013000 ALVA B. ADAMS TUNNEL AT EAST PORTAL NEAR ESTES PARK
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
ADAMS TUNNEL AT EAST PORTAL-COMPUTED FLOW
Water Year 2012

Location.--	Lat. N40° 19' 40", Long. W105° 34' 42" (NAD83). Gage is located on the right side of a 15-foot Parshall flume located at the upstream end of Aspen Creek Siphon, 600 ft. downstream from the Alva B. Adams Tunnel East Portal afterbay and 4.9 mi. SW of the Town of Estes Park Visitors Center.
Drainage Area and Period of Record.--	Alva B. Adam's Tunnel, the transmountain diversion component of the Colorado-Big Thompson (C-BT) system diverts water from Grand Lake, Shadow Mountain Reservoir and Windy Gap Reservoir in the Colorado River Basin 13.35 miles west of the east portal gages to the South Platte River Basin. Daily ADANETCO (West Slope Water only) values are available from October 1, 1996 to present. Daily ADATUNCO (gross water through Structure) values are available from August 11, 1947 to present.; October 1, 1996 to present
Equipment.--	Alva B. Adam's Tunnel (Net) (ADANETCO) is a computed record. This record is comprised of data obtained from the Alva B. Adam's Tunnel Near Estes Park, CO (ADATUNCO), Wind River Near Estes Park, CO (WINDESCO) and Wind River Bypass Below Adam's Tunnel Near Estes Park, CO (WINBYPCO). See individual records for WINDESCO and WINBYPCO station equipment. ADATUNCO equipment includes a Sutron SDR-0001-4 shaft encoder and a satellite monitored Sutron SatLink2 data collection platform in a rectangular concrete shelter and concrete Ha / Hb well at a 15-foot Parshall flume. Gage is equipped with electric tape gages on both Ha and Hb wells. A supplementary staff gage is located on the left wing wall of the flume at the Ha location. The well is connected to the stream by two 1.5- inch intakes. Intakes are flushed by a pressure device and have street keys and gate valves. 110 volt power is available to shelter for winter heating. The gage is operated in cooperation with the US Bureau of Reclamation (USBR) and the Colorado Division of Water Resources (DWR) as part of the Colorado-Big Thompson (C-BT) project.
Hydrologic Conditions.--	Alva B. Adam's Tunnel, the transmountain diversion component of the Colorado-Big Thompson (C-BT) system empties into a stilling reservoir before entering the measurement flume. The stilling reservoir intercepts native (east slope) water from Wind River. Wind River water can be diverted under the stilling pond, or it can be taken into the pond and run through the C-BT system for power generation purposes (a process called "skimming"). Wind River water is skimmed into the C-BT system during peak runoff periods of the summer when Wind River is in excess of 2 cubic feet per second (cfs). Skimmed water is determined from the difference of Wind River Above Adam's Tunnel (WINDESCO) and Wind River Below Adam's Tunnel (WINBYPCO). Skimming operations of Wind River did not occur in the 2012 water year as Wind River flow were insufficient.
Gage-Height Record.--	Computed record. See gage-height record comments for individual gages.
Datum Corrections.--	Computed record. See individual gage station analyses.
Rating.--	Computed record. See individual gage station analyses.
Discharge.--	Computed record. See special computations section for discharge computations. The computed peak discharge of 594 cfs occurred at 05:45 on April 5, 2012 at a gage-height of 4.11 ft. with a shift of +0.18 ft. No skimming of Wind River water occurred this year, thus the peak is also the peak for the ADATUNCO gage.
Special Computations.--	Discharge for the ADANETCO gage is determined by calculating the amount of skimmed Wind River water moved through the ADATUNCO structure, then subtracting that amount from the ADATUNCO record on days when skimming occurred. Thus, $ADANETCO = ADATUNCO - (WINDESCO - WINBYPCO).$
Remarks.--	Wind River skimming operations did not occur this year as the native Wind River water did not remain above the minimum skim threshold of 2 cfs for a sustained period. Thus, the ADANETCO record will equal the ADATUNCO record this year. The majority of flow in this computed record is through the ADATUNCO structure. The ADANETCO record is rated as per ADATUNCO: "The record is good except for December 27 and 28, 2011 which was taken from provided USBR accounting and is fair. Zero flow is determined operationally and was determined to occur on part of the day of the whole day on the following days: November 25 through December 27, 2011 and February 7, 2012." Computed record developed by Russell V. Stroud. Individual stations maintained by and records developed by Russell V. Stroud.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

ADAMS TUNNEL AT EAST PORTAL-COMPUTED FLOW

RATING TABLE.--

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

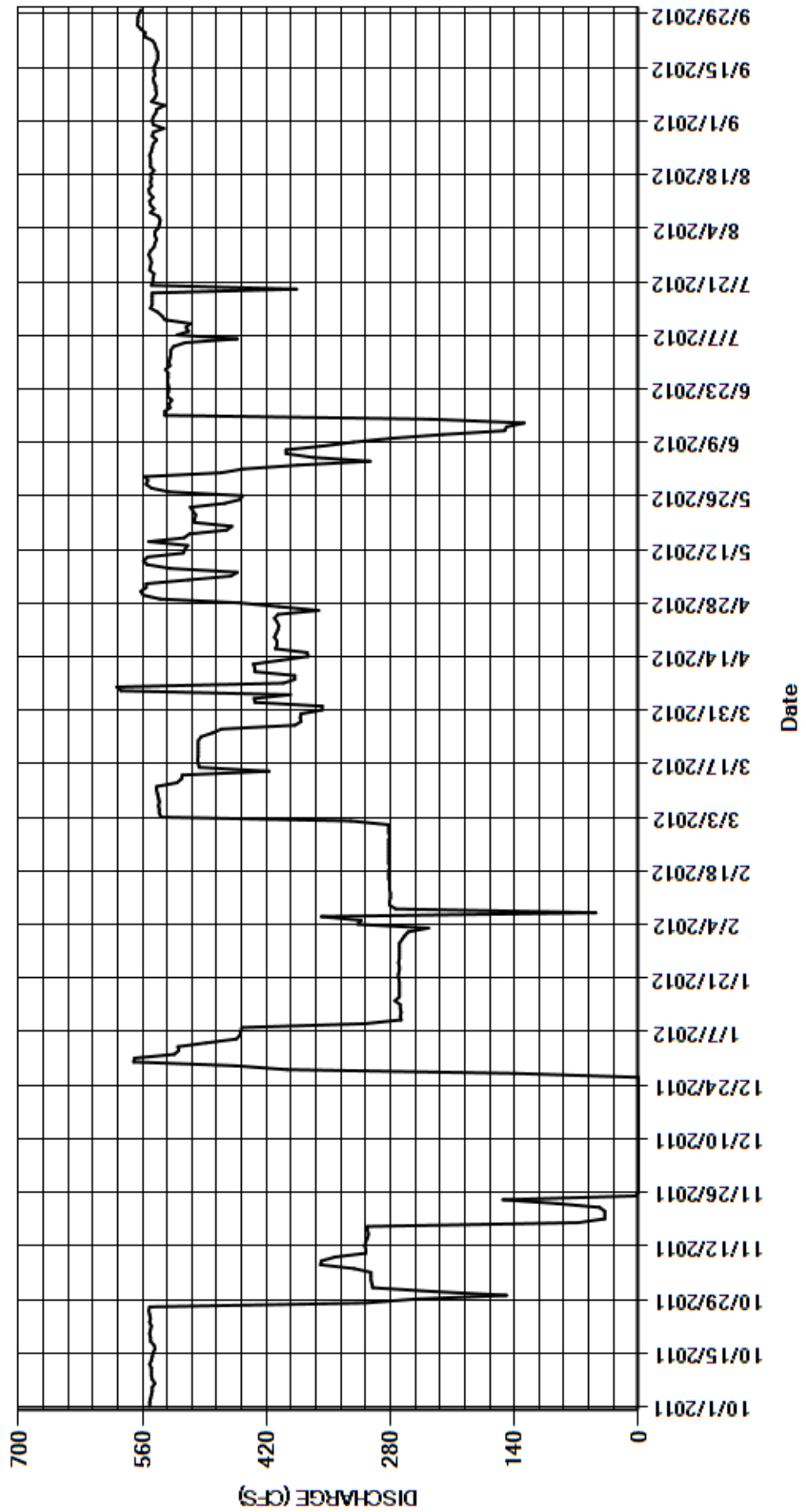
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	552	300	0.00	524	264	282	357	562	471	529	544	549
2	552	301	0.00	519	260	325	433	556	446	528	546	548
3	551	302	0.00	520	237	539	434	556	385	528	546	545
4	550	302	0.00	488	317	541	393	508	303	525	542	544
5	549	302	0.00	454	313	541	584	460	367	512	541	535
6	549	321	0.00	450	358	542	589	453	398	453	540	550
7	546	359	0.00	449	48	541	401	529	398	521	542	546
8	549	358	0.00	448	274	542	388	555	356	508	551	544
9	550	343	0.00	309	281	543	388	559	322	511	547	545
10	550	308	0.00	268	281	544	433	554	279	506	551	545
11	550	308	0.00	269	280	544	433	514	221	535	552	547
12	552	309	0.00	268	280	521	435	512	151	538	548	548
13	550	308	0.00	269	281	516	404	509	149	543	552	546
14	549	306	0.00	269	281	515	373	553	129	551	553	547
15	548	305	0.00	275	281	417	374	513	235	549	550	547
16	546	306	0.00	270	282	496	410	507	535	549	551	545
17	547	306	0.00	270	282	497	408	465	535	549	550	543
18	551	68	0.00	270	282	498	408	459	529	549	551	543
19	551	38	0.00	270	281	497	411	501	530	386	547	543
20	552	38	0.00	270	282	497	409	501	527	550	551	545
21	551	38	0.00	271	282	497	407	500	532	548	551	546
22	550	44	0.00	271	282	497	406	503	531	548	551	549
23	552	92	0.00	270	282	497	408	506	530	547	552	558
24	551	153	0.00	270	282	494	411	467	531	552	550	557
25	552	2.9	0.00	271	282	481	407	450	532	551	549	562
26	553	0.00	0.00	270	282	471	361	447	531	550	548	566
27	552	0.00	e139	270	281	388	406	530	531	551	544	565
28	309	0.00	e397	270	282	381	451	550	534	553	549	565
29	253	0.00	455	270	282	382	540	556	529	551	548	564
30	149	0.00	570	270	---	381	559	554	530	547	536	562
31	232	---	569	267	---	357	---	557	---	546	548	---
TOTAL	15798	5817.90	2130.00	10099	7982	14764	12821	15946	12577	16464	16981	16499
MEAN	510	194	68.7	326	275	476	427	514	419	531	548	550
AC-FT	31340	11540	4220	20030	15830	29280	25430	31630	24950	32660	33680	32730
MAX	553	359	570	524	358	544	589	562	535	553	553	566
MIN	149	0.00	0.00	267	48	282	357	447	129	386	536	535

CAL YR	2011	TOTAL	134129.10	MEAN	367	MAX	574	MIN	0.00	AC-FT	266000
WTR YR	2012	TOTAL	147878.90	MEAN	404	MAX	589	MIN	0.00	AC-FT	293300

MAX DISCH: 594 CFS AT 05:45 ON APR 05,2012 GH 4.11 FT SHIFT 0.18 FT
 MAX GH: 6.02 FT AT 03:45 ON DEC 28,2011 (Backwater)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

ADAMS TUNNEL AT EAST PORTAL-COMPUTED FLOW
 WY2012 HYDROGRAPH



PLATTE RIVER BASIN

09010000 GRAND RIVER DITCH AT LA POUVRE PASS @ 10 FT PARSHALL FLUME

Water Year 2012

Location.-- Lat. N40° 28' 39", Long. W105° 49' 19"(NAD83) in the Cache La Poudre River Basin. Altitude of gage is 10,190 ft. Gage is on boundary of Rocky Mountain Park.

Drainage Area and Period of Record.-- Transmountain diversion. Converging near La Poudre Pass are two collection ditches. The north collection ditch is 15 -miles long, winding around the east slope of the Never Summer Mountain Range, and the south collection ditch is 2-miles long and diverts water from Specimen Creek. Water is diverted into La Poudre Creek and stored in Long Draw Reservoir. ; Daily values are available from May 16, 1928 to present.

Equipment.-- F-Type graphic water-stage recorder and a Sutron 56-0540-400-DTR shaft encoder connected to a Sutron SatLink2 satellite monitored data collection platform (DCP) in a 6-foot by 6-foot timber shelter ovetop a 3-foot by 3.5-foot concrete stilling well at a 10-foot Parshall flume. A metal drop tape and reference point serve as the primary reference. A supplemental staff gage is placed in the stilling well but it is not accurate.

Hydrologic Conditions.-- Regulated diversion. This was a below average year for snow-pack. The ditch was turned on April 24, 2012 and ran until it was turned off on September 25, 2012.

Gage-Height Record.-- The primary record is 15-minute satellite data with 15-minute logged DCP data and chart record as backup. The record is complete and reliable from April 24, 2012 through September 25, 2012 when the station was winterized for the season.

At startup (April 24, 2012 00:00 thru May 1, 2012 12:00), the shaft encoder float was set in reversal. Raw gage-height data for this period was edited in a spreadsheet to correct the reversal error. The revised gage-height data was inputted in to the application without loss of accuracy.

Three missing values occurring on May 4, 2012 resulting from a firmware upgrade were filled in with observed gage-height readings without loss of accuracy.

Datum Corrections.-- Levels were run to the inside gage on September 10, 2012 using average flume crest (RM1) as base. The gage was found to read 0.021 ft. low. No correction was made on September 10, 2012. Corrections were made to gage-heights of measurements and to the record for all periods of active diversion this year.

Reference mark (RM) 2, a domed metal pin in the top of the left upstream wing wall, was also established on this date at an elevation of 5.881 ft.

Rating.-- The control is a 10-foot concrete Parshall flume. A standard 10-foot Parshall flume rating (STD10FTPF) was continued in use again this year. Four discharge measurements (Nos. 66 - 69) were made during the year ranging in discharge from 5.78 to 104 cfs. The peak flow of 146 cfs occurred at 20:15 on June 4, 2012 at a gage-height of 2.29 ft. with a shift of -0.02 ft. exceeding this year's high measurement (No. 68) by 42 cfs and 0.45 ft. of stage respectively.

Discharge.-- Shifting control method was used for all periods of active diversion. Measurements Nos. 67 and 68 were adjusted -3% and 1% respectively to smooth shift distributions.

Special Computations.-- Zero flow is determined operationally. Residual gage-height values of 0.05 ft. have been observed with accompanying observations of no flow. Zero flow was determined to occur on part of the day or the entire day on the following days: October 1, 2011 through April 24, 2012 and September 25, 2012 through the end of the water year.

Remarks.-- The record is good. This is a seasonal diversion that does not operate in the winter. Ancillary flows occurring in the ditch prior to starting the chart recorder and DCP are not credited. Station maintained by Mark Simpson and Lee Cuning. Record developed by Lee Cuning.

Recommendations.-- The indicated 0.021 correction to the tape length from levels run on September 10, 2012 was not made. The correction should be made when the diversion is first started. Levels should also be run in the 2013 water year to confirm the correction as well as gage stability.

The chart recorder float hangs up on something as it rises above ~ GH= 1.93 ft. The obstruction should be removed or the recorder repositioned.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09010000 GRAND RIVER DITCH AT LA POU DRE PASS @ 10 FT PARSHALL FLUME

RATING TABLE-- STD10FTPF USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

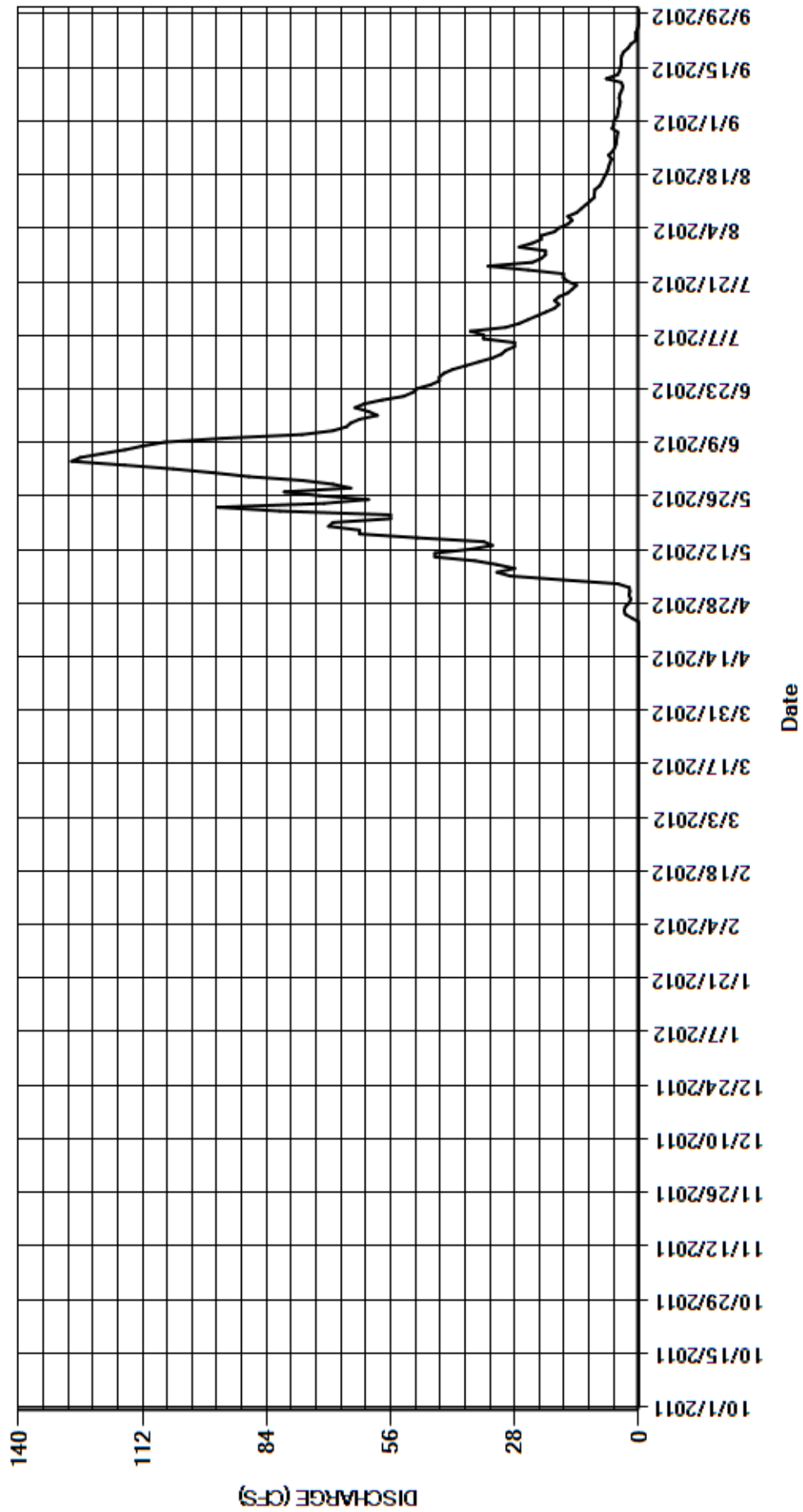
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.0	96	33	22	5.6
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.1	105	31	22	4.9
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.8	116	30	19	4.7
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17	128	28	18	4.6
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	29	126	28	16	4.3
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32	121	35	15	4.2
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	28	116	35	16	4.4
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32	112	38	14	4.2
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	37	107	30	13	3.8
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	46	94	27	12	3.6
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	46	76	25	11	3.9
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	38	69	23	10	7.3
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	33	66	21	10	4.8
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	35	65	19	9.9	4.3
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	50	63	18	8.8	4.1
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	63	59	19	8.3	3.9
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	63	61	18	7.9	4.0
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70	64	16	7.4	3.8
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	69	62	15	7.0	3.4
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	56	58	14	6.8	2.4
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	56	53	16	6.5	1.8
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	81	51	17	6.1	0.67
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	95	50	17	6.8	0.59
24	0.00	0.00	0.00	0.00	0.00	0.00	1.5	71	47	25	5.9	0.65
25	0.00	0.00	0.00	0.00	0.00	0.00	3.0	61	45	34	5.4	0.29
26	0.00	0.00	0.00	0.00	0.00	0.00	3.3	72	45	24	5.1	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	3.0	80	44	22	5.0	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	2.1	65	42	21	4.9	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	1.8	69	39	21	4.7	0.00
30	0.00	0.00	0.00	0.00	---	0.00	2.2	76	36	27	6.0	0.00
31	0.00	---	0.00	0.00	---	0.00	---	88	---	24	5.6	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	16.90	1566.9	2216	751	316.1	90.20
MEAN	0.000	0.000	0.000	0.000	0.000	0.000	0.56	50.5	73.9	24.2	10.2	3.01
AC-FT	0	0	0	0	0	0	34	3110	4400	1490	627	179
MAX	0.00	0.00	0.00	0.00	0.00	0.00	3.3	95	128	38	22	7.3
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.0	36	14	4.7	0.00

CAL YR	2011	TOTAL	8571.40	MEAN	23.5	MAX	202	MIN	0.00	AC-FT	17000
WTR YR	2012	TOTAL	4957.10	MEAN	13.5	MAX	128	MIN	0.00	AC-FT	9830

MAX DISCH: 146 CFS AT 20:15 ON JUN 04,2012 GH 2.29 FT SHIFT -0.02 FT
 MAX GH: 2.29 FT AT 20:15 ON JUN 04,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09010000 GRAND RIVER DITCH AT LA POUVRE PASS @ 10 FT PARSHALL FLUME
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
CAMERON PASS DITCH NEAR CAMERON PASS
Water Year 2012

Location.-- Latitude 40° 31' 14", Longitude 105° 53' 33", in section 2, T. 6N, R 76 W., On US Highway 14 at Cameron Pass. Elevation of gage is 10, 276 ft., from the Highway sign.

Drainage Area and Period of Record.-- Transmountain diversion, diverting water from Michigan River tributaries in the North Platte River Basin to Joe Wright Creek in the South Platte Basin. This is a controlled diversion.; Daily values available from May 25, 1930 to present.

Equipment.-- Standalone Sutron SDR-0001-1 shaft encoder in a timber shelter ovetop a concrete stilling well at a 2-foot concrete Parshall flume. The primary reference is a staff gage located in the stilling well.

Hydrologic Conditions.-- Controlled diversion. Ditch is straight immediately above and below the flume. Lower than normal snowpack did not allow much diversion this water year. The amount diverted is related to how early the ditch is started. The ditch was started on April 24, 2012 and shut down on June 26, 2012.

Gage-Height Record.-- The primary record is 15-minute values collected by the SDR. The record is complete and reliable for the operational period.

Datum Corrections.-- Levels were last run on October 9, 2012 using RM2 as base. The staff gage was found be 0.018 feet high with respect to the flume crest confirming the July 15, 2009 level run. The staff gage is anchored to the stilling well disallowing correction of the staff plate. No correction was made on site. A datum correction of +0.02 ft. was applied to the gage-height record.

Rating.-- The control is a degraded 2 ft. Parshall flume. A standard 2 ft. Parshall flume rating, STD02FTPF, was used all year. The flume has been verified by measurements to 5.76 cfs. One discharge measurement (No. 16) of 1.13 cfs was made this year. The peak discharge of 2.24 cfs occurred at 21:00 on June 3, 2012 at a gage-height of 0.44 ft. with a shift of 0.00 ft.

Discharge.-- Shifting control method was use for all operation periods of the record. Msmt No. 16 shift was adjusted -3.42% to the rating. A shift of 0.00 ft. was applied for the entire oeprational period.

Special Computations.-- None.

Remarks.-- According to the USBR Water Measurement Manual Table A8-12 flows below 0.20 ft. of stage are outside the reliable definition range of a Parshall flume of this size. As such, the record is good except April 24, 25, May 4, 9-17 and June 12-19, 2012 when it is fair due to lack of definition of rating. Station maintained by Mark Simpson. record developed by Lee Cunning.

Recommendations.-- It should be noted that the flume width at the Ha location is 3.10 ft. at the bottom and 3.20 ft. at the top of the flume. The flume walls are beginning to collapse. Replacement of the flume is highly suggested. Reinstallation of the staff gage inside of the stilling well for more accurate readings should be considered. Additional measurements throughout the range in stage to verify the rating and evaluate the flume's performance should be watched for.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

CAMERON PASS DITCH NEAR CAMERON PASS

RATING TABLE-- STD02FTPF USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

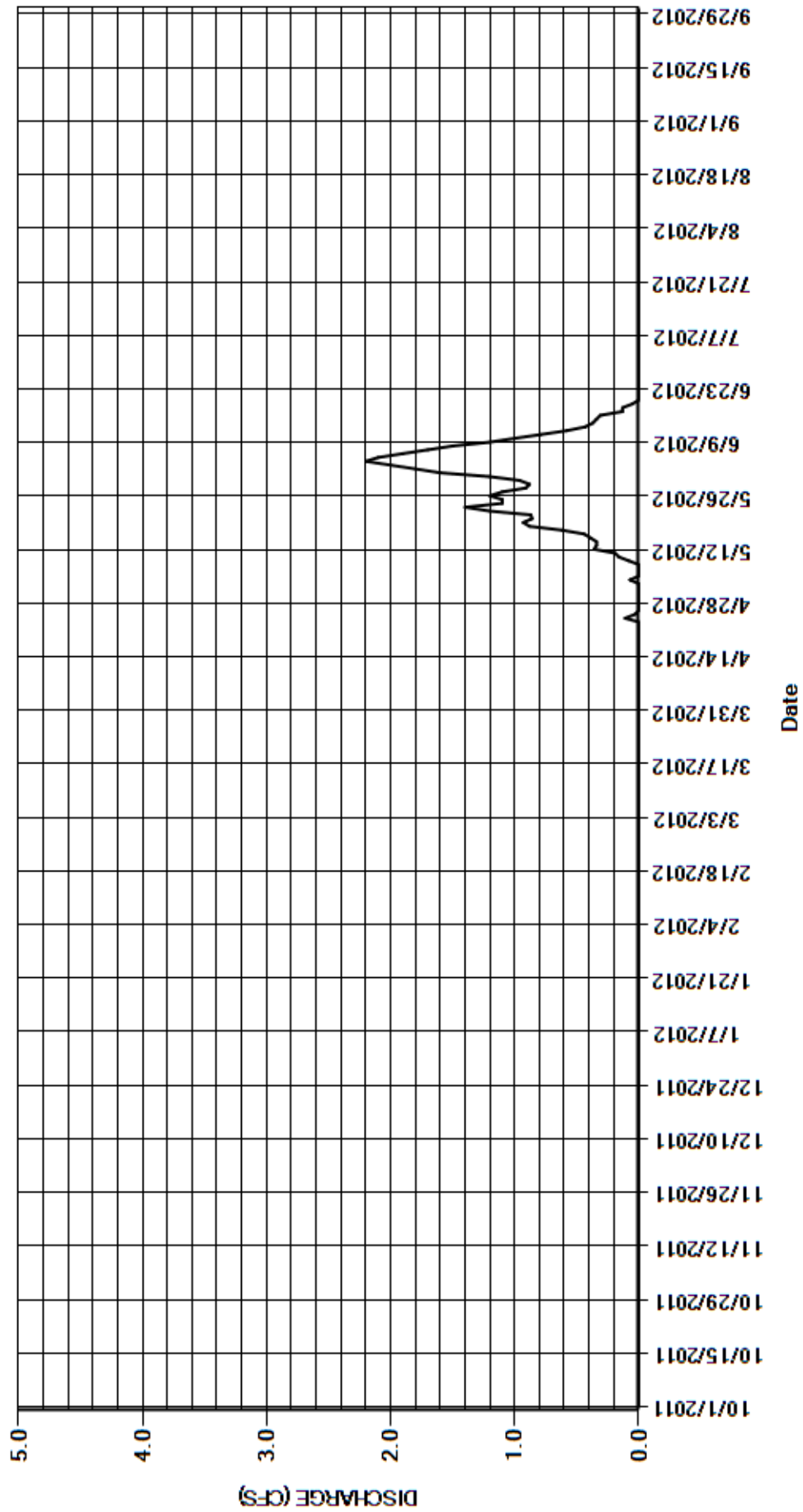
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.6	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.8	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.0	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	2.2	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.1	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.9	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.7	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.5	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	1.2	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	1.0	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.79	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.36	0.58	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.43	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.37	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.34	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.31	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.62	0.13	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.88	0.13	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.93	0.05	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.86	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.87	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.2	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.4	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.11	1.1	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.03	1.1	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.2	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.1	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.91	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.88	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	---	0.00	0.00	0.96	0.00	0.00	0.00	0.00
31	0.00	---	0.00	0.00	---	0.00	---	1.2	---	0.00	0.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.14	17.58	20.13	0.00	0.00	0.00
MEAN	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.57	0.67	0.000	0.000	0.000
AC-FT	0	0	0	0	0	0	0.3	35	40	0	0	0
MAX	0.00	0.00	0.00	0.00	0.00	0.00	0.11	1.4	2.2	0.00	0.00	0.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	0.00	MEAN	0.000	MAX	0.00	MIN	0.00	AC-FT	0
WTR YR	2012	TOTAL	37.85	MEAN	0.10	MAX	2.2	MIN	0.00	AC-FT	75

MAX DISCH: 2.24 CFS AT 21:00 ON JUN 03,2012 GH 0.44 FT SHIFT 0 FT
 MAX GH: 0.44 FT AT 21:00 ON JUN 03,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

CAMERON PASS DITCH NEAR CAMERON PASS
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06746000 MICHIGAN DITCH AT CAMERON PASS

Water Year 2012

Location.-- Lat. 40°31'20", Long. 105°53'30"; Diverts water from Michigan River and tributaries, to Joe Wright Creek (tributary to Cache la Poudre River) in sec. 2, T.6 N., R. 76 W., at Cameron Pass and Colorado Highway 14. Altitude of gage is 10,300 ft. (from topographic map).

Drainage Area and Period of Record.-- Diversion is from Michigan River and tributaries in Sec. 12, T 6N, R. 76W. in North Platte River basin (WD 47, Division 6) to Joe Wright Creek in Sec 2, T. 6N, R. 76W in the Cache La Poudre Basin. Flow can be stored in Joe Wright Reservoir and Chambers Lake. Ditch is 5.2 miles in length.;

Equipment.-- Digital incremental Sutron 56-0540-400-DTR shaft encoder connected to a Sutron SatLink 2 data collection platform (DCP) with temperature and precipitation sensors and a weekly Steven's Type F graphic water-stage recorder in a log shelter with a PVC well at 9-inch and 8-foot Parshall flume. The smaller 9-inch flume is used in winter months or other times when flows are low (below about 4.5 cfs). Both flumes are monitored by a single stilling well equipped with an electric tape index. Operationally, only one flume is used at a time. Facilities are owned and operated by the City of Fort Collins. Gage operated by the Colorado Division of Water Resources (CDWR). City of Fort Collins personnel have placed sections of halved 2 foot culverts in the ditch below the flume in an attempt to stop backwater conditions experienced in the past.

Hydrologic Conditions.-- Controlled diversion. Low snow pack levels allowed 1490 AF of water to be diverted this year.

Gage-Height Record.-- The primary record is 15-minute telemetered data with logged DCP data and chart record as backup. Encoder calibration was maintained by twenty visits made to the gage by CDWR personal this year. The record is complete and reliable except for: March 23 - 28, 2012 and April 2 - 4, 2012 when the stage-discharge relationship was affected by ice.

Datum Corrections.-- Levels were run August 24, 2010 using the average crest elevation of the 8-foot Parshall flume as base. The two flume crests were found to be 0.03 ft. different in elevation from one another. The common electric tape index (ETI) was set to an elevation between the two crests. Reference Mark (RM) No. 3 was also established on this date. Per the water year 2010 levels and setting of the ETI to a point between the two flume crest elevations; a datum correction application method was developed as follows: when operating on the 8-foot Parshall flume a -0.02 ft. correction is applied to the gage-height record and the gage-heights of all measurements; when operating on the 9-inch Parshall flume a +0.01 ft. correction applied to the gage-height record and the gage-heights of all measurements. Levels were run on September 11, 2012 but were found to be incomplete. RM 3 was used as base but neither RM 1 nor RM 2 were shot to confirm establishment of RM3. Levels indicated potential movement in the ETI elevation. A complete confirming levels run, using RM 1 as base is needed in WY2013. The datum correction application paradigm developed following the August 24, 2010 levels run was continued this year.

Rating.-- The control is either an 8-foot Parshall flume using a standard 8-foot Parshall flume rating (STD08FTPF) or a 9-inch Parshall flume using a standard 9-inch Parshall flume rating (STD09INFP). These rating were used for all periods of open water. Four discharge measurements were made this year (Nos. 40 and 41 on the 9-inch flume and Nos. 42 and 43 on the 8-foot flume) ranging in discharge from 0.24 to 15.9 cfs. Measurements made this year and two observations of zero flow cover the full range in stage experienced except for May 22 and 23, 2012. The peak discharge of 23.3 cfs occurred while operating on the 8-foot Parshall flume at 17:15 on May 22, 2012 at a gage-height of 0.82 ft. using a shift of 0.00 ft. exceeding the high flow measurement (No. 43) by 0.18 ft. of stage and 7.4 cfs respectively.

Discharge.-- Shifting control method was used for all periods of open water. Shifts were distributed by time as defined by measurements with consideration given to operational conditions (control changes). Open water measurements showed shifts varying between +0.01 and -0.02 ft. Measurements Nos. 40-43 were all discounted up to 7.6% to a zero shift.

Special Computations.-- Discharge for periods of backwater due to ice were estimated from adjacent good record with consideration given to temperature trends. Zero flow is determined operationally. Zero flow was determined to occur part of the day or the entire day on the following days: October 1 - November 5, 2011, August 19 - 25 and September 7-19, 2012. Discharges on control transition days were carefully examined for continuity.

Remarks.-- The record is good, except for: ice affected periods which are estimated and poor; June 10 - July 17 and August 7 - 19, 2012 which is fair due to lack of definition in the rating (STD08FTPF). Station maintained by Mark Simpson and Lee Cunning. Record developed by R. Stroud.

Recommendations.-- Levels must be run in WY2013 using RM1 as base to confirm establishment of RM3. When this is done, two separate tape indexes should be established and used independently depending on the control in operation. Because of the crest elevation issue well depths should never be used for discharge measurement depths. Transition from the 8-foot to the 9 -inch flume should be observed and a pygmy meter measurement should be made at the time of the switch. The elevation of the boards placed in front of the 8 ft. flume should be documented. If flows above a gage-height of 1.50 ft. are experienced in the 9 in flume, the rating will need to be verified by measurements.

STATE OF COLORADO
DIVISION OF WATER RESOURCES
OFFICE OF STATE ENGINEER

06746000 MICHIGAN DITCH AT CAMERON PASS

RATING TABLE.-- STD09INPF USED FROM 01-OCT-2011 TO 03-MAY-2012
 STD08FTPF USED FROM 03-MAY-2012 TO 18-SEP-2012
 STD09INPF USED FROM 19-SEP-2012 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

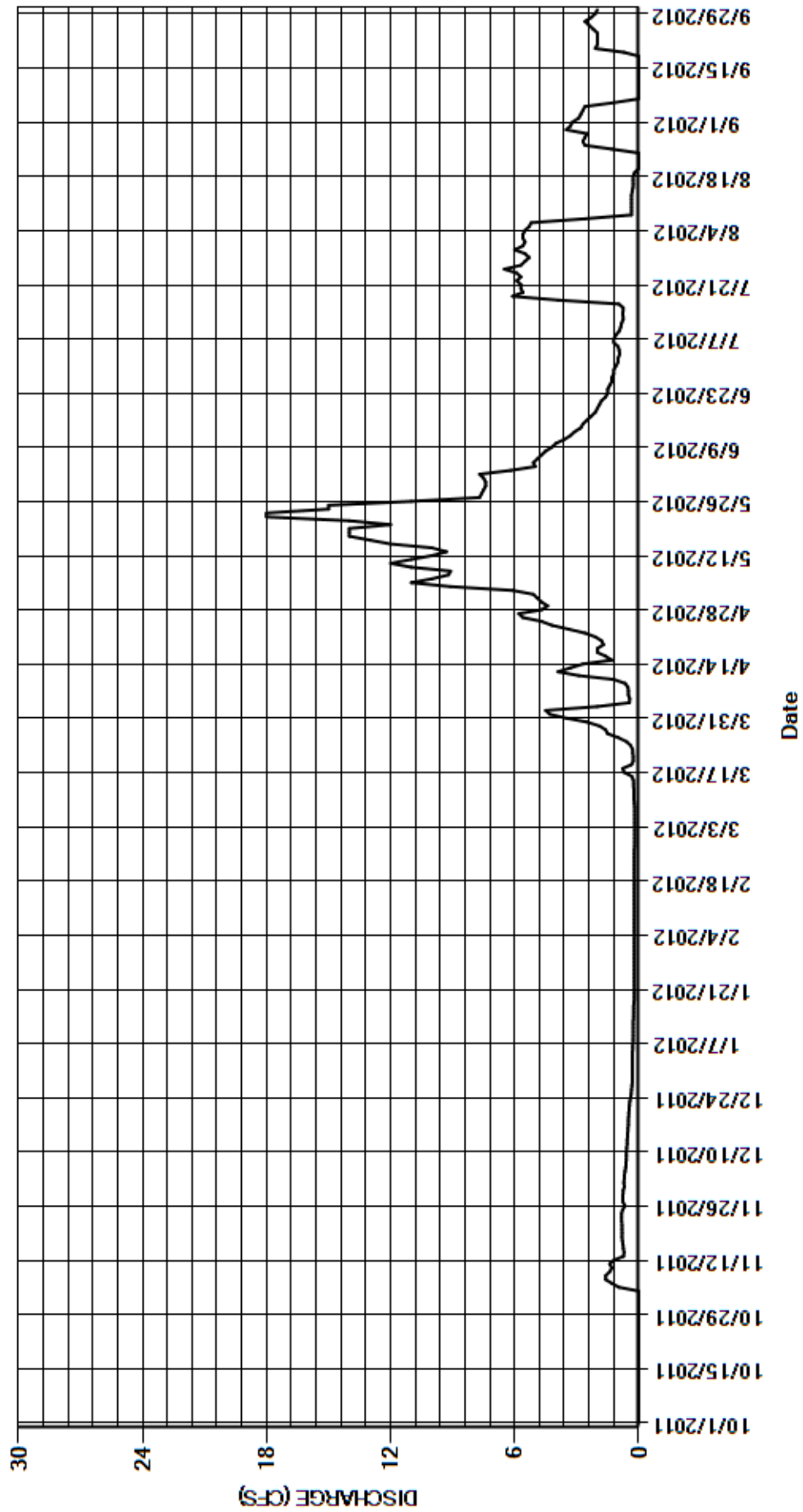
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.69	0.31	0.22	0.20	4.3	4.9	7.5	1.0	5.5	3.2
2	0.00	0.00	0.72	0.31	0.22	0.20	e4.5	5.1	7.7	1.0	5.6	2.9
3	0.00	0.00	0.70	0.31	0.22	0.20	e2.0	6.1	6.2	0.92	5.6	2.8
4	0.00	0.00	0.69	0.30	0.22	0.20	e0.45	9.1	5.0	0.94	5.5	2.7
5	0.00	0.96	0.66	0.30	0.22	0.20	0.43	11	5.1	1.0	5.3	2.6
6	0.00	1.3	0.63	0.29	0.22	0.20	0.50	10	4.9	1.2	5.2	1.2
7	0.00	1.6	0.61	0.28	0.22	0.20	0.50	9.2	4.7	1.2	2.6	0.00
8	0.00	1.6	0.60	0.27	0.22	0.20	0.52	9.1	4.5	1.1	0.35	0.00
9	0.00	1.4	0.59	0.26	0.21	0.21	0.66	11	4.2	0.94	0.35	0.00
10	0.00	1.3	0.59	0.26	0.21	0.23	1.2	12	4.0	0.87	0.35	0.00
11	0.00	1.4	0.58	0.26	0.21	0.23	2.9	11	3.6	0.83	0.35	0.00
12	0.00	1.2	0.56	0.26	0.22	0.23	3.9	10	3.3	0.75	0.35	0.00
13	0.00	0.73	0.56	0.26	0.22	0.24	3.3	9.3	3.1	0.76	0.35	0.00
14	0.00	0.71	0.54	0.25	0.22	0.25	2.7	10	2.8	0.76	0.32	0.00
15	0.00	0.74	0.53	0.24	0.22	0.26	1.3	12	2.7	0.75	0.28	0.00
16	0.00	0.76	0.52	0.24	0.22	0.34	1.6	13	2.5	0.96	0.26	0.00
17	0.00	0.79	0.50	0.24	0.22	0.70	2.0	14	2.3	3.9	0.27	0.00
18	0.00	0.81	0.50	0.22	0.22	0.78	2.0	14	2.1	6.1	0.27	0.00
19	0.00	0.80	0.49	0.22	0.22	0.35	1.7	14	2.0	5.6	0.19	0.70
20	0.00	0.81	0.48	0.22	0.22	0.26	1.8	12	1.9	5.7	0.00	2.1
21	0.00	0.81	0.46	0.22	0.22	0.26	2.1	14	1.8	5.7	0.00	2.0
22	0.00	0.82	0.45	0.22	0.22	0.29	2.6	18	1.6	5.9	0.00	2.0
23	0.00	0.83	0.43	0.22	0.22	e0.30	3.4	18	1.5	5.7	0.00	2.0
24	0.00	0.83	0.39	0.22	0.22	e0.40	4.2	15	1.5	5.9	0.00	2.0
25	0.00	0.78	0.36	0.22	0.22	e0.60	4.7	15	1.4	6.5	1.3	2.2
26	0.00	0.66	0.35	0.22	0.21	e1.0	5.6	11	1.3	5.7	2.6	2.4
27	0.00	0.76	0.33	0.22	0.20	e1.5	5.8	7.7	1.3	5.5	2.7	2.6
28	0.00	0.77	0.31	0.22	0.20	e1.6	4.7	7.6	1.2	5.3	2.6	2.3
29	0.00	0.76	0.30	0.22	0.20	1.9	4.4	7.5	1.2	5.5	2.5	2.1
30	0.00	0.75	0.30	0.22	---	2.5	4.7	7.4	1.1	6.0	3.5	2.0
31	0.00	---	0.30	0.22	---	3.5	---	7.4	---	5.6	3.3	---
TOTAL	0.00	24.68	15.72	7.72	6.28	19.53	80.46	335.4	94.0	99.58	57.49	39.80
MEAN	0.000	0.82	0.51	0.25	0.22	0.63	2.68	10.8	3.13	3.21	1.85	1.33
AC-FT	0	49	31	15	12	39	160	665	186	198	114	79
MAX	0.00	1.6	0.72	0.31	0.22	3.5	5.8	18	7.7	6.5	5.6	3.2
MIN	0.00	0.00	0.30	0.22	0.20	0.20	0.43	4.9	1.1	0.75	0.00	0.00

CAL YR	2011	TOTAL	256.76	MEAN	0.70	MAX	6.1	MIN	0.00	AC-FT	509
WTR YR	2012	TOTAL	780.66	MEAN	2.13	MAX	18	MIN	0.00	AC-FT	1550

MAX DISCH: 23.3 CFS AT 17:15 ON MAY 22,2012 GH 0.82 FT SHIFT 0 FT (STD08FTPF)
 MAX GH: 1.71 FT AT 12:45 ON APR 12,2012 (STD09INPF)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06746000 MICHIGAN DITCH AT CAMERON PASS
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06746500 SKYLINE DITCH AT CHAMBERS LAKE

Water Year 2012

Location.-- Lat. N.40°39'50", Long. W.105°53'10" (NAD27). Diverts water from the west branch of the Laramie River to Chambers Lake (tributary to Cache la Poudre River).

Drainage Area and Period of Record.-- Controlled diversion. This ditch runs in a southerly direction and diverts water from the west branch of the Laramie River and flows to a point (Lat. N.40°39'50", Long.W.105°53'10") where it is measured through the Parshall flume before reaching Chambers Lake. Near the top of the ditch, water can be diverted at various locations and transported down Rawah Creek for transfer through the Laramie-Poudre Tunnel. The ditch is approximately 5 miles long.; 1894 to present.

Equipment.-- Sutron Stage Discharge Recorder (SDR-0001-1) in a 6-foot by 6-foot timber shelter overtop a 3-foot by 3.5-foot concrete stilling well at a 10-foot Parshall flume. A drop tape and reference point serve as the primary reference and there are staff gages present in the flume and stilling well as supplemental references.

Hydrologic Conditions.-- Controlled diversion. The Skyline Ditch collapsed approximately 1.0 miles upstream from Chambers Lake in the fall of 2011. There is the ability to run a small amount of water through the collapsed portion into Chambers Lake. However, low snowpack this water year only allowed a very small amount of water to be diverted into Chambers Lake.

Gage-Height Record.-- The primary record is 15-minute SDR data. Water was run from May 21, 2012 until June 21, 2012. The record is complete and reliable, except for stages below 0.15 ft. occurring on June 27 through 29, 2012. The flume's intakes sit approximately 0.15 to 0.20 ft. above the flume floor. Stages below this threshold are suspect as the stilling well may become isolated from the flume.

Datum Corrections.-- Levels were last run on October 9, 2012 using the average flume crest as base. The reference point was found to be reading correctly. Reference Mark 2 was also established on this date.

Rating.-- A standard 10 ft. Parshall flume rating (STD10FTPFXP) is used. Two discharge measurements (Nos. 15 and 16) were made this year at discharge rates of 2.42 and 4.03 cfs, respectively. The peak discharge of 7.01 cfs occurred at 19:45 on June 2, 2012 at a gage-height of 0.34 ft. and a shift of 0.00 ft.

Discharge.-- The rating was applied directly to the gage-height record to compute discharge. Measurement No. 16 was discounted - 6.06% to the rating as there is no history of a permanent shift condition.

Special Computations.-- None.

Remarks.-- The record is fair except for June 27 through 29, 2012 when stilling well communication to the flume is questionable, record is poor. Record developed by Lee Cuning.

Recommendations.-- If water is run in WY2013, measurements should be made through the full range diverted. The intake invert elevation should be determined and documented.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06746500 SKYLINE DITCH AT CHAMBERS LAKE

RATING TABLE-- STD10FTPFEXP USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

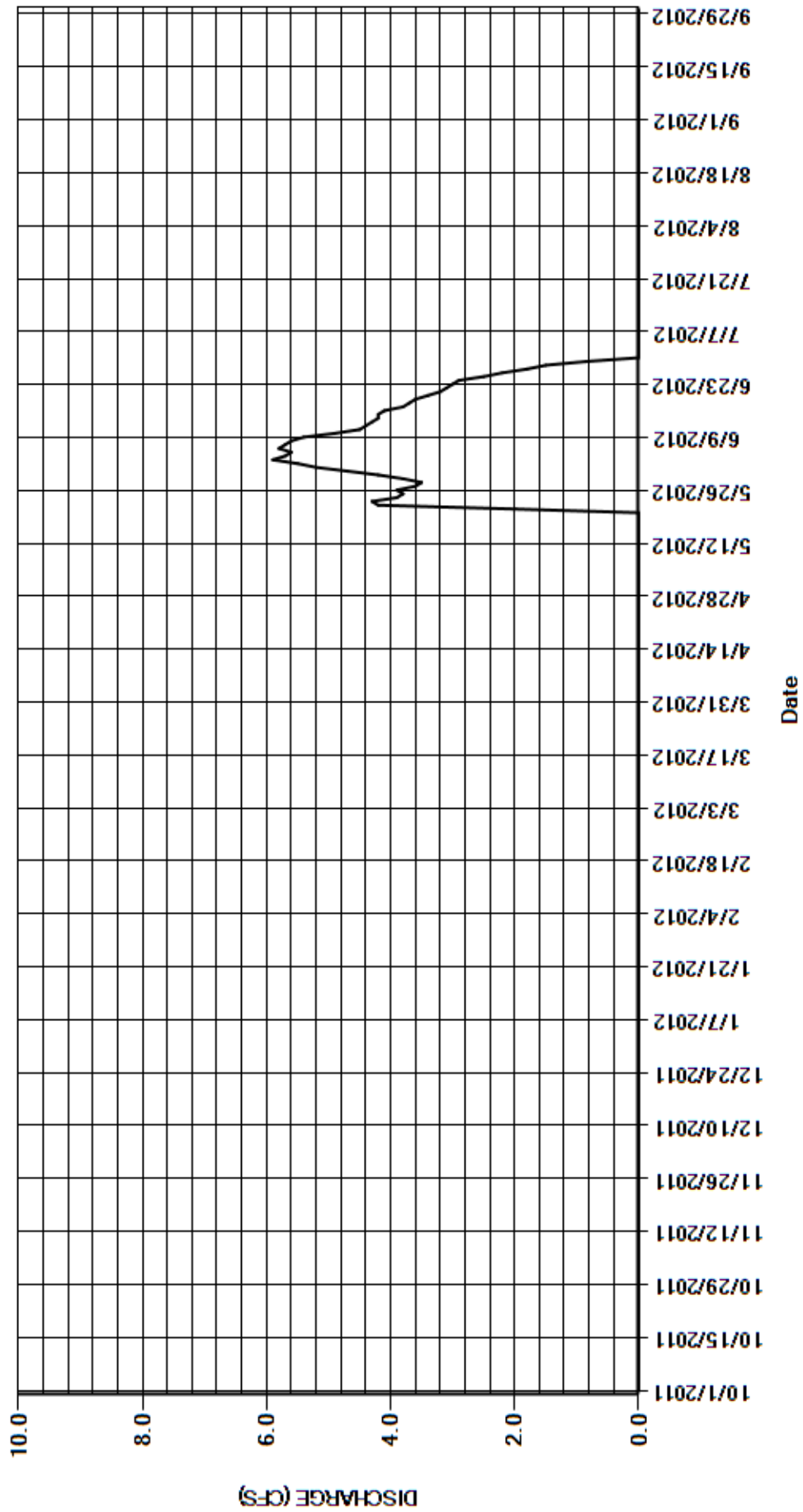
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.2	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.5	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.9	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.7	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.6	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.8	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.7	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.6	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.4	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.9	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.5	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.4	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.3	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.2	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.2	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.1	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.8	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.7	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.6	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.4	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	e2.0	3.2	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.2	3.1	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.3	3.0	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.9	2.9	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.8	2.5	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.9	2.2	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.6	1.8	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5	1.5	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.8	0.85	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	---	0.00	0.00	4.2	0.00	0.00	0.00	0.00
31	0.00	---	0.00	0.00	---	0.00	---	4.7	---	0.00	0.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	41.90	116.55	0.00	0.00	0.00
MEAN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.35	3.88	0.000	0.000	0.000
AC-FT	0	0	0	0	0	0	0	83	231	0	0	0
MAX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.7	5.9	0.00	0.00	0.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	0.00	MEAN	0.000	MAX	0.00	MIN	0.00	AC-FT	0
WTR YR	2012	TOTAL	158.45	MEAN	0.43	MAX	5.9	MIN	0.00	AC-FT	314

MAX DISCH: 7.01 CFS AT 19:45 ON JUN 02,2012 GH 0.34 FT SHIFT 0 FT
 MAX GH: 0.34 FT AT 19:45 ON JUN 02,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06746500 SKYLINE DITCH AT CHAMBERS LAKE
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
06747000 LARAMIE POUDDRE TUNNEL @ 10 FT PARSHALL FLUME
Water Year 2012

Location.-- Lat. 40°40'34", Long. 105°50'49"; Laramie-Poudre tunnel diverts water from Laramie River and tributaries to Cache la Poudre River.

Drainage Area and Period of Record.-- Transmountain diversion diverting water from Rawah Creek, a tributary of the Laramie River, to the Cache La Poudre River. ; Daily data is available from May 1, 1931 to present.

Equipment.-- Sutron 56-0540-400-DTR shaft encoder connected to a Sutron SatLink 2 data collection platform (DCP) and a F-type graphic water stage recorder in a timber shelter at a 10 foot Parshall flume. The primary reference is an adjustable reference point and metal drop and a supplemental staff gage located within the flume.

Hydrologic Conditions.-- Controlled diversion. The ditch is straight above and below the flume; however, approach conditions do not allow sufficient stilling of waters entering the flume. The tunnel was started on April 11th and water was diverted until September 17th, 2012. The tunnel produced 18,380 acre-feet of the 19,875 acre-foot "quota".

Gage-Height Record.-- The primary record is 15-minute satellite data with 15-minute logged DCP data and chart record as backup. The record is complete and reliable.

Datum Corrections.-- Levels were last run on August 28, 2012 using RM2 (established July 15, 2009) as base. The gage was found to be reading accurately.

Rating.-- The control is a degraded 10-ft. Parshall flume. A standard 10-ft. Parshall flume rating, STD10FTPFEXP was used all year. Four discharge measurements (Nos. 54-57) were made this year ranging in discharge from 16.8 to 142 cfs. The peak discharge of 177 cfs occurred at 20:00 on June 4, 2012 at a gage-height of 2.50 ft. and a shift of 0.06 ft.

Discharge.-- The floor of the flume continues to degrade and needs replacement. Measurements have been showing positive shifting. Shifts were distributed by stage using variable shift curve LAPTUNCOVST12-3, which was applied from April 11 through September 17, 2012, the period of operation. Variable shift curve LAPTUNCOVST12-3 is defined by four measurements made during the period of use. All measurements were given full weight except for No. 55 which was adjusted 3.92% to better fit the shift distribution.

Special Computations.-- Zero flow is determined operationally. Residual positive stage values recorded after the diversion is turned off are adjusted to compute a zero discharge. Zero flow was determined to occur on part of the day or the entire day on the following days: October 1 - April 11 and September 17 - 30, 2012.

Remarks.-- Record is good. Record developed by Lee Cunning.

Recommendations.-- Positive shifting is suspected to be caused for insufficient stilling of water entering the flume and the degraded flume floor. Replacement of the flume is highly suggested. Until replacement, increased measurement frequency is required. A custom rating may need to be developed and applied.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06747000 LARAMIE POWDRE TUNNEL @ 10 FT PARSHALL FLUME

RATING TABLE-- STD10FTPFXP USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

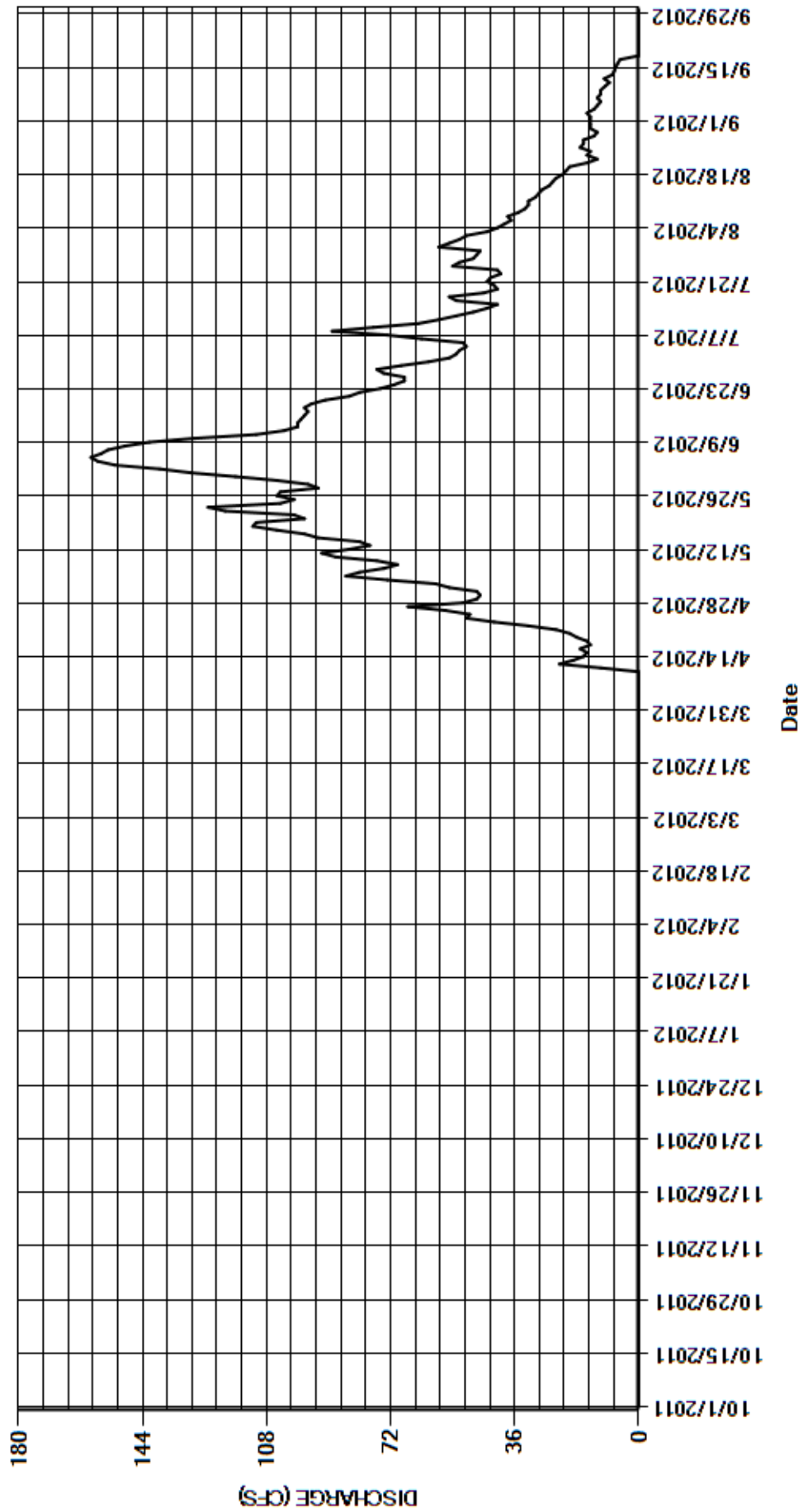
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	47	130	55	52	14
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	55	139	53	50	14
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	59	152	52	44	15
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	73	157	50	41	13
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	85	159	51	39	12
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	81	156	63	37	11
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	74	154	73	38	12
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70	149	89	35	11
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	76	142	77	33	11
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	88	129	64	32	9.8
11	0.00	0.00	0.00	0.00	0.00	0.00	11	92	111	58	32	8.5
12	0.00	0.00	0.00	0.00	0.00	0.00	23	84	103	53	30	10
13	0.00	0.00	0.00	0.00	0.00	0.00	19	78	99	48	29	7.7
14	0.00	0.00	0.00	0.00	0.00	0.00	16	81	99	44	28	7.1
15	0.00	0.00	0.00	0.00	0.00	0.00	15	93	98	41	26	6.7
16	0.00	0.00	0.00	0.00	0.00	0.00	17	97	97	53	25	6.1
17	0.00	0.00	0.00	0.00	0.00	0.00	14	105	96	55	24	5.4
18	0.00	0.00	0.00	0.00	0.00	0.00	15	112	97	45	22	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	18	111	95	41	21	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	20	97	91	42	20	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	24	100	84	44	15	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	32	120	81	43	12	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	42	125	75	40	15	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	50	104	71	41	14	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	49	100	68	54	17	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	56	105	68	52	16	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	67	104	74	48	16	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	51	93	76	47	13	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	47	96	69	46	12	0.00
30	0.00	0.00	0.00	0.00	---	0.00	46	105	61	58	14	0.00
31	0.00	---	0.00	0.00	---	0.00	---	117	---	55	14	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	632.00	2827	3180	1635	816	174.30
MEAN	0.000	0.000	0.000	0.000	0.000	0.000	21.1	91.2	106	52.7	26.3	5.81
AC-FT	0	0	0	0	0	0	1250	5610	6310	3240	1620	346
MAX	0.00	0.00	0.00	0.00	0.00	0.00	67	125	159	89	52	15
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	47	61	40	12	0.00

CAL YR	2011	TOTAL	7861.60	MEAN	21.5	MAX	219	MIN	0.00	AC-FT	15590
WTR YR	2012	TOTAL	9264.30	MEAN	25.3	MAX	159	MIN	0.00	AC-FT	18380

MAX DISCH: 177 CFS AT 20:00 ON JUN 04,2012 GH 2.50 FT SHIFT 0.06 FT
 MAX GH: 2.50 FT AT 20:00 ON JUN 04,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06747000 LARAMIE POWDRE TUNNEL @ 10 FT PARSHALL FLUME
WY2012 HYDROGRAPH



PLATTE RIVER BASIN
BOBCREEK DITCH NEAR DEADMAN MTN., NEAR GLENDEVEY
Water Year 2012

Location.-- Lat. 40° 45' 50", Long. 105° 45' 40" (Spotted from topographic map, NAD27). Gage is located on the left side of a 3 ft. Parshall flume 3 miles south of Deadman Hill and 3 miles SE of Glendevey, CO.

Drainage Area and Period of Record.-- Transmountain diversion diverting water from Nunn Creek in the Laramie River Basin to Roaring Creek in the Cache la Poudre River Basin. Daily values are available from the DWR from May 1, 1940 to present. ; Published (USGS) records are available from 1919. Daily DWR records are available from May 1, 1940 to present.

Equipment.-- F-type graphic water-stage recorder and Sutron SDR-0001-1 shaft encoder in a metal shelter with stilling well at a 3-foot Parshall flume. A metal drop tape and reference point serve as the primary reference. A supplemental staff gage is present. Gage is owned, operated and maintained by the City of Greeley. Elevation of gage is 9,890 ft. (from topographic map).

Hydrologic Conditions.-- The snow pack in this area was below normal this year. Due to higher temperatures, and below average snowpack the ditch was turned on earlier than normal this water year.

Gage-Height Record.-- Primary record was taken from 5-minute SDR data log with chart gage heights as backup. Access to this gage is very difficult. The gage was dug out and the recorder was installed on April 23, 2012. Water diverted from April 23, 2012 12:15 until June 7, 2012 at 12:00 PM. Two instrument corrections of +0.01 (April 23, 2012 - May 3, 2012) and -0.02 (May 13, 2012 - May 21, 2012) were used. The record is complete and reliable.

Datum Corrections.-- The crest of the flume is nearly level (only about 0.01 ft change across the crest). There is a slight 'tilt' at the staff to the inlets of about 0.15 feet above the flume floor. The floor of the flume at the staff is about 0.04 feet higher causing the outside staff to read about 0.04 feet less than the drop tape. Levels were ran on September 25, 2012. Flume crest and RP were found to be stable and reading correctly. The only reference was the average elevation of the crest which was established as 0.000 feet. A new Reference Mark (R.M. #2) was established September 25, 2012 at an elevation of 3.739 feet.

Rating.-- Levels show tape needs to be adjusted +0.020 feet in length. This Water Year the +0.02 shift from measurement 8 takes this into account and was used all water year.

Rating.-- Rating No. 1, a standard 3-foot Parshall flume rating table, was used. One discharge measurement (No. 8) of 2.07 cfs was made during the period of operation. The peak flow of 5.11 cfs occurred at 17:45 on May 4, 2012 at a gage height of 0.56 ft with a shift of 0.02 ft.

Discharge.-- Shifting section control method was used. Measurement 8 showed a +0.02 ft shift. This shift was used for the entire operationall period during WY 2012.

Special Computations.-- None.

Remarks.-- Record good. Record developed by Lee Cuning.

Recommendations.-- Levels should be run again at the end of Water Year 2013 to verify R.M. #2.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

BOBCREEK DITCH NEAR DEADMAN MTN., NEAR GLENDEVEY

RATING TABLE-- STD03FTPF USED FROM 01-OCT-2011 TO 07-JUN-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

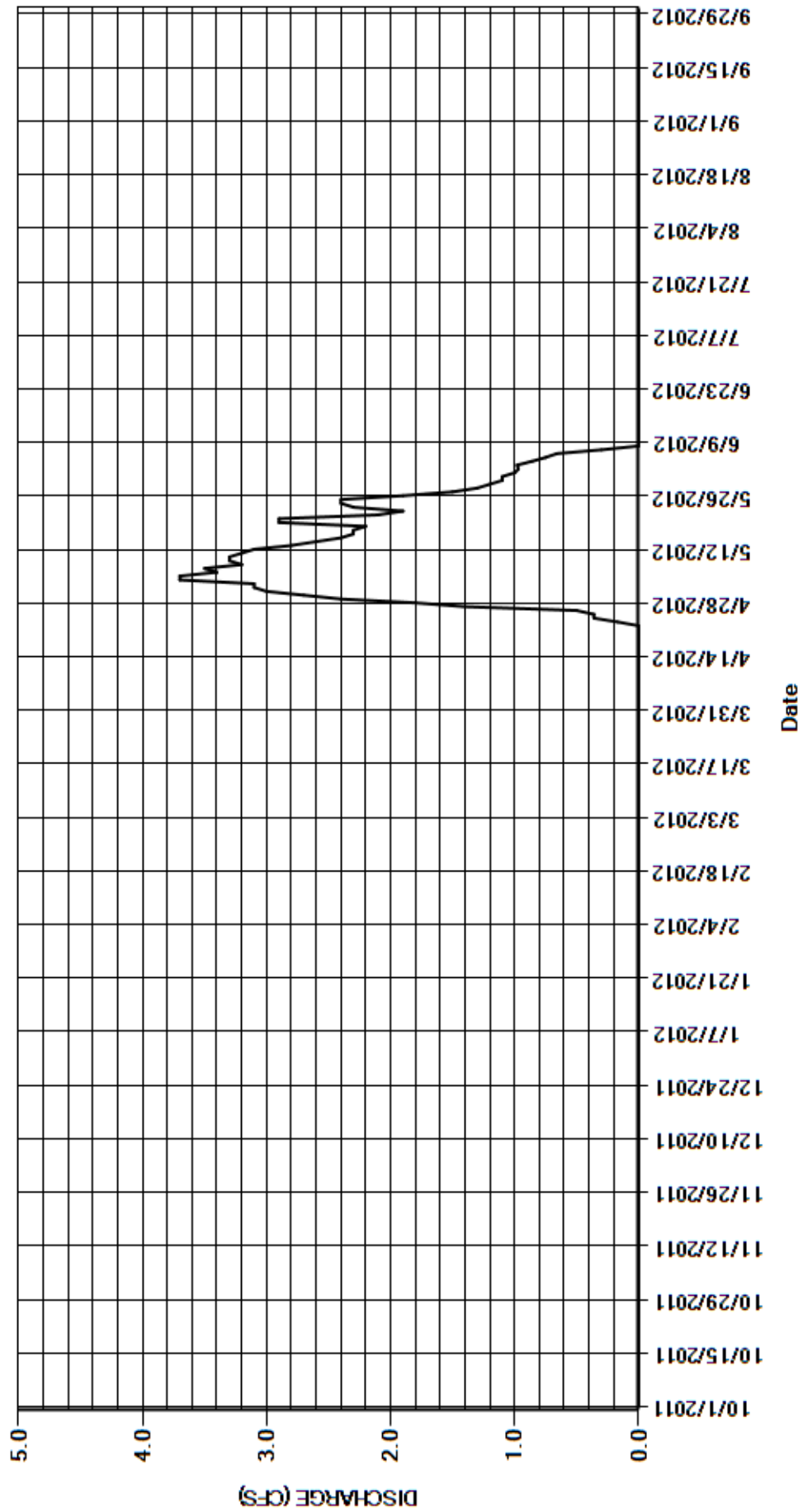
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.0	1.0	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.1	0.97	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.1	0.98	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.7	0.86	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.7	0.75	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.4	0.66	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5	0.30	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.2	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.3	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.3	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.2	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.1	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.8	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.6	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.4	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.3	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.3	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.2	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.9	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.9	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.1	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.9	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	e0.17	2.3	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.36	2.4	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.36	2.4	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.50	1.9	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	1.4	1.5	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	1.8	1.3	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	2.4	1.2	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	---	0.00	2.7	1.1	0.00	0.00	0.00	0.00
31	0.00	---	0.00	0.00	---	0.00	---	1.1	---	0.00	0.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	9.69	79.2	5.52	0.00	0.00	0.00
MEAN	0.000	0.000	0.000	0.000	0.000	0.000	0.32	2.55	0.18	0.000	0.000	0.000
AC-FT	0	0	0	0	0	0	19	157	11	0	0	0
MAX	0.00	0.00	0.00	0.00	0.00	0.00	2.7	3.7	1.0	0.00	0.00	0.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.1	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	0.00	MEAN	0.000	MAX	0.00	MIN	0.00	AC-FT	0
WTR YR	2012	TOTAL	94.41	MEAN	0.26	MAX	3.7	MIN	0.00	AC-FT	187

MAX DISCH: 5.11 CFS AT 17:45 ON MAY 04,2012 GH 0.56 FT SHIFT 0.02 FT
 MAX GH: 0.56 FT AT 17:45 ON MAY 04,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

BOBCREEK DITCH NEAR DEADMAN MTN., NEAR GLENDEVEY
 WY2012 HYDROGRAPH



PLATTE RIVER BASIN
DEADMAN DITCH NEAR DEADMAN PARK
Water Year 2012

Location.-- Lat 40°50'04", long 105°48'05", sec. 9, T. 10 N., R. 75 W., Diverts water from Laramie River and tributaries, to Sheep Creek (tributary to Cache La Poudre River) via Sand Creek.

Drainage Area and Period of Record.-- The ditch is 4.5 miles long. There are turnouts that allow collected water to be returned to the Laramie River drainage, thus making this a controlled diversion. The water is diverted to the headwaters of Sand Creek. About 5 miles downstream it is diverted by Wilson Supply ditch into Sheep Creek in the Cache La Poudre Basin.; October 1902 to present.

Equipment.-- Digital incremental Sutron SDR-0001-1 shaft encoder in a steel shelter at a 6-foot Parshall flume. The flume is referenced by a staff gage at the Ha location in the flume.

Hydrologic Conditions.-- Controlled diversion. Lower than average snow pack levels this year allowed an early turn-on date but flows for the year were lower than average. Only 589 AF of water was diverted this year.

Gage-Height Record.-- The primary record is 15-minute logged SDR data with no provisions for backup. The period of record for WY 2012 is April 23, 2012 to July 2, 2012. The record is complete and reliable.

Datum Corrections.-- Levels were run to the staff gage using RM2 as base on September 25, 2012. The staff gage was found to be 0.015 ft. low whereas levels run in 2009 showed the staff gage to be 0.011 ft. high. No correction was made as confirming levels are needed.

Rating.-- The control is a 6-foot Parshall flume . A standard 6-foot Parshall flume rating (STD06FTPF) was used for the period of record this year. One discharge measurement (No. 23) was made this year at a discharge rate of 6.17 cfs. The peak discharge of 14.2 cfs occurred at 15:00 on May 25, 2012 at a gage-height of 0.73 ft. using a shift of -0.01 ft. exceeding this year's measurement by 8.03 cfs and 0.29 ft. of stage respectively.

Discharge.-- Historically, discharge measurements within 5% of the rating have been adjusted to the rating. However, this year's measurement was not discounted from a computed shift of -0.01 ft. to the rating as it appears that the shift is a result of datum issue at the flume. The -0.01 ft. shift was applied for the entire period of diversion.

Special Computations.-- None.

Remarks.-- Using the USBR Water Measurement Manual, Third Edition, Figure A8-12, the range of accurate (within +/-5%) discharge measurement for a 6 ft Parshall Flume is 2.63 to 103 cfs. Anything above or below this range is outside the +/- 5% accuracy range, unless defined by measurements. As such the record is good except for April 23 - 24 and June 9 through July 2, 2012 which is fair due to lack of definition in the rating. No credit was given to residual or leak flows recorded prior to or after the stated period of record. Gage maintained by Mark Simpson and Lee Cunning, record developed by Lee Cunning.

Recommendations.-- Levels must be run in the 2013 Water Year to confirm results found in 2012. An additional reference mark, independent of the flume structure should be established and an RP and metal drop should be placed and used as the base reference. Levels should be run for several subsequent years to confirm flume stability. Multiple discharge measurements through the full range of stage should be made annually.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

DEADMAN DITCH NEAR DEADMAN PARK

RATING TABLE-- STD06FTPF USED FROM 01-OCT-2011 TO 02-JUL-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

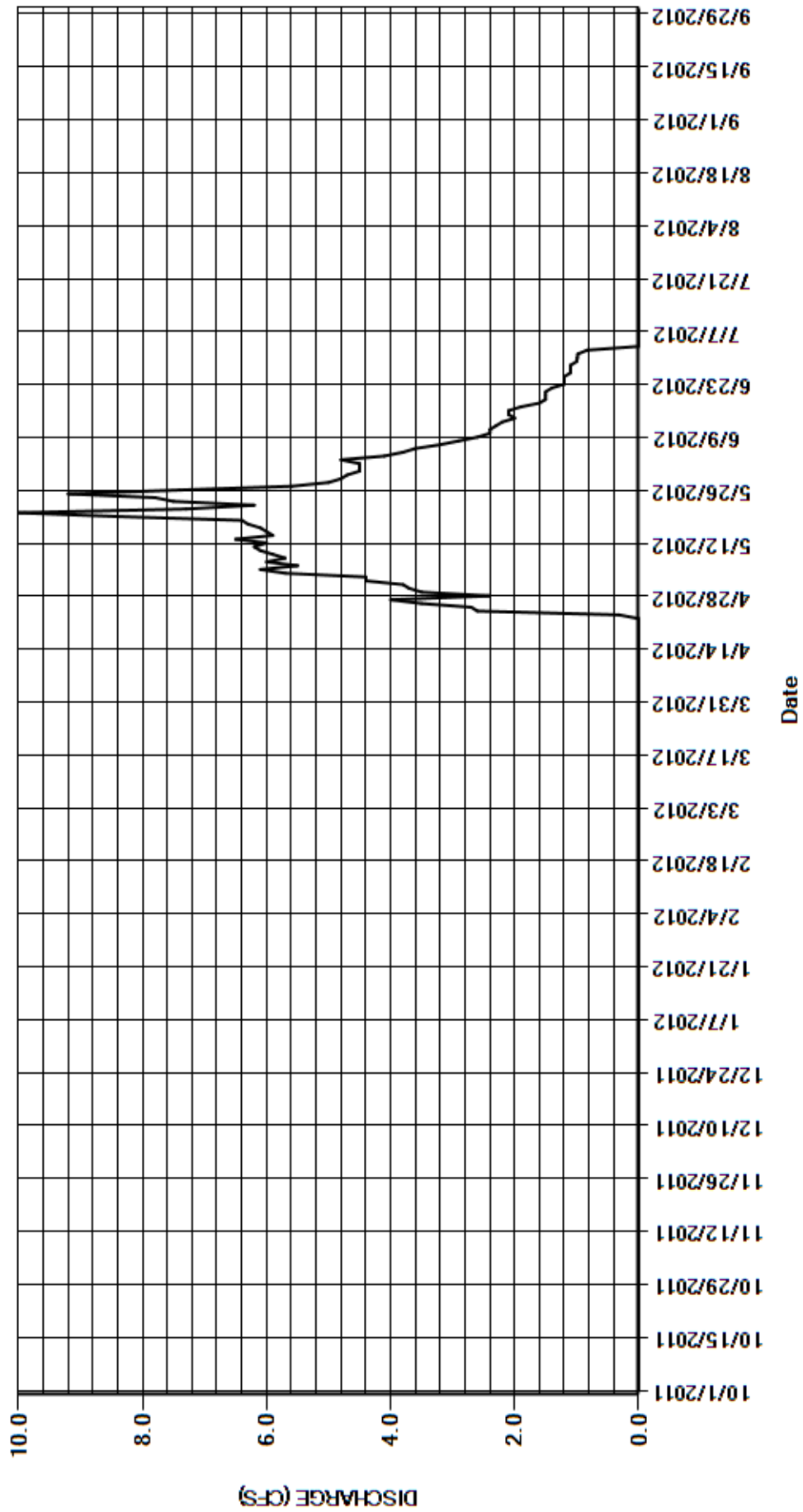
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.8	4.5	0.98	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.4	4.5	e0.83	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.4	4.8	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.7	4.1	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.1	3.8	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.5	3.6	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.0	3.2	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.7	2.9	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.9	2.6	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.1	2.4	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.2	2.4	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.0	2.3	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.5	2.2	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.9	2.0	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.0	2.1	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.1	2.1	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.3	1.9	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.4	1.6	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.4	1.5	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10	1.5	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.3	1.5	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.2	1.4	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	e0.32	7.5	1.2	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	2.6	7.8	1.2	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	2.7	9.2	1.2	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	3.5	7.4	1.1	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	4.0	5.6	1.1	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	2.4	5.0	1.1	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	3.5	4.8	1.0	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	---	0.00	3.7	4.7	0.99	0.00	0.00	0.00
31	0.00	---	0.00	0.00	---	0.00	---	4.5	---	0.00	0.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	22.72	191.4	67.79	1.81	0.00	0.00
MEAN	0.000	0.000	0.000	0.000	0.000	0.000	0.76	6.17	2.26	0.058	0.000	0.000
AC-FT	0	0	0	0	0	0	45	380	134	3.6	0	0
MAX	0.00	0.00	0.00	0.00	0.00	0.00	4.0	10	4.8	0.98	0.00	0.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.8	0.99	0.00	0.00	0.00

CAL YR	2011	TOTAL	526.78	MEAN	1.44	MAX	42	MIN	0.00	AC-FT	1040
WTR YR	2012	TOTAL	283.72	MEAN	0.78	MAX	10	MIN	0.00	AC-FT	563

MAX DISCH: 14.2 CFS AT 17:00 ON MAY 25,2012 GH 0.73 FT SHIFT -0.01 FT
 MAX GH: 0.73 FT AT 17:00 ON MAY 25,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

DEADMAN DITCH NEAR DEADMAN PARK
 WY2012 HYDROGRAPH



PLATTE RIVER BASIN

06750500 WILSON SUPPLY DITCH NEAR EATON RESERVOIR @ 10 FT PARSHALL FLUME

Water Year 2012

Location.-- Lat. N40° 54' 26", Long. W105° 46' 47" (NAD83) in the Cache la Poudre River Basin.

Drainage Area and Period of Record.-- Transmountain diversion, diverting water from Sand Creek and Deadman Creek in the Laramie River Basin to Sheep Creek in the Cache la Poudre River Basin. ; Data is available from the USGS (WSP 1310) from October 1912 to September 1947. Daily values are available from the DWR from May 1, 1933 to present.

Equipment.-- F-Type graphic water-stage recorder and a Sutron 56-0540-400-DTR shaft encoder connected to a satellite monitored data collection platform in a 42-inch corrugated metal pipe shelter ovetop a 2.50-foot square concrete stilling well at a 10-foot Parshall flume. A metal drop tape and an adjustable reference point are the primary reference. A supplemental staff gage is present but set too deep in the flume's converging section

Hydrologic Conditions.-- Regulated diversion. This was a below average year for snow-pack. The ditch started April 9, 2012 and turned off August 7, 2012. Only a couple small rain events were captured on July 6-7, 2012.

Gage-Height Record.-- The primary record is 15-minute satellite data with chart record as backup. The record is complete and reliable. The chart was stated on April 9, 2012 by the Ditch Rider and the satellite equipment was brought online at the same time; however, the shaft encoder was not calibrated correctly at this time. On April 23, 2012 the shaft encoder was reset to match the primary reference. Chart values were used on April 9 and 10, 2012 and an instrumentation correction was applied for the remainder of the period as defined by observations. The gage was visited three times during the season by a hydrographer and was found to be reading accurately on all visits.

Datum Corrections.-- Levels were run August 28, 2012 using RM. 2 as base. RM. 2 was established in 2009 using the flume crest as base. RM. 2 was found to be accurate with respect to flume crest. The tape also was found to be reading accurately.

Rating.-- The control is a 10-foot Parshall flume. A standard 10-foot Parshall flume rating was continued again this year. Two discharge measurements (Nos. 24 and 25) were made during the year at 2.86 and 9.15 cfs, respectively. The peak discharge of 23.3 cfs occurred at 21:00 on May 20, 2012 at a gage height of 0.72 ft. with a shift of 0.00 ft.

Discharge.-- This year's measurement and previous year's measurements do not show signs of permanent shifting conditions. Historically, measurements within $\pm 5\%$ of the rating have been adjusted to the rating. As such, Msmt. No. 25 was adjusted -3% to the rating, while No. 24 returned a zero shift. The rating was applied directly to the gage-height record to compute discharge.

Special Computations.-- None.

Remarks.-- The record is good. As the peak event of May 20, 2012 is well within the range of measurements previously made at this site it is considered good. Water was run from April 9, 2012 until August 7, 2012 when the ditch was shut off. Gage maintained and record developed by Lee Cunning.

Recommendations.-- Multiple measurements per year should be endeavored specifically watching for measurement opportunities at low, mid and higher flow rates.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06750500 WILSON SUPPLY DITCH NEAR EATON RESERVOIR @ 10 FT PARSHALL FLUME

RATING TABLE-- STD10FTPFXP USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

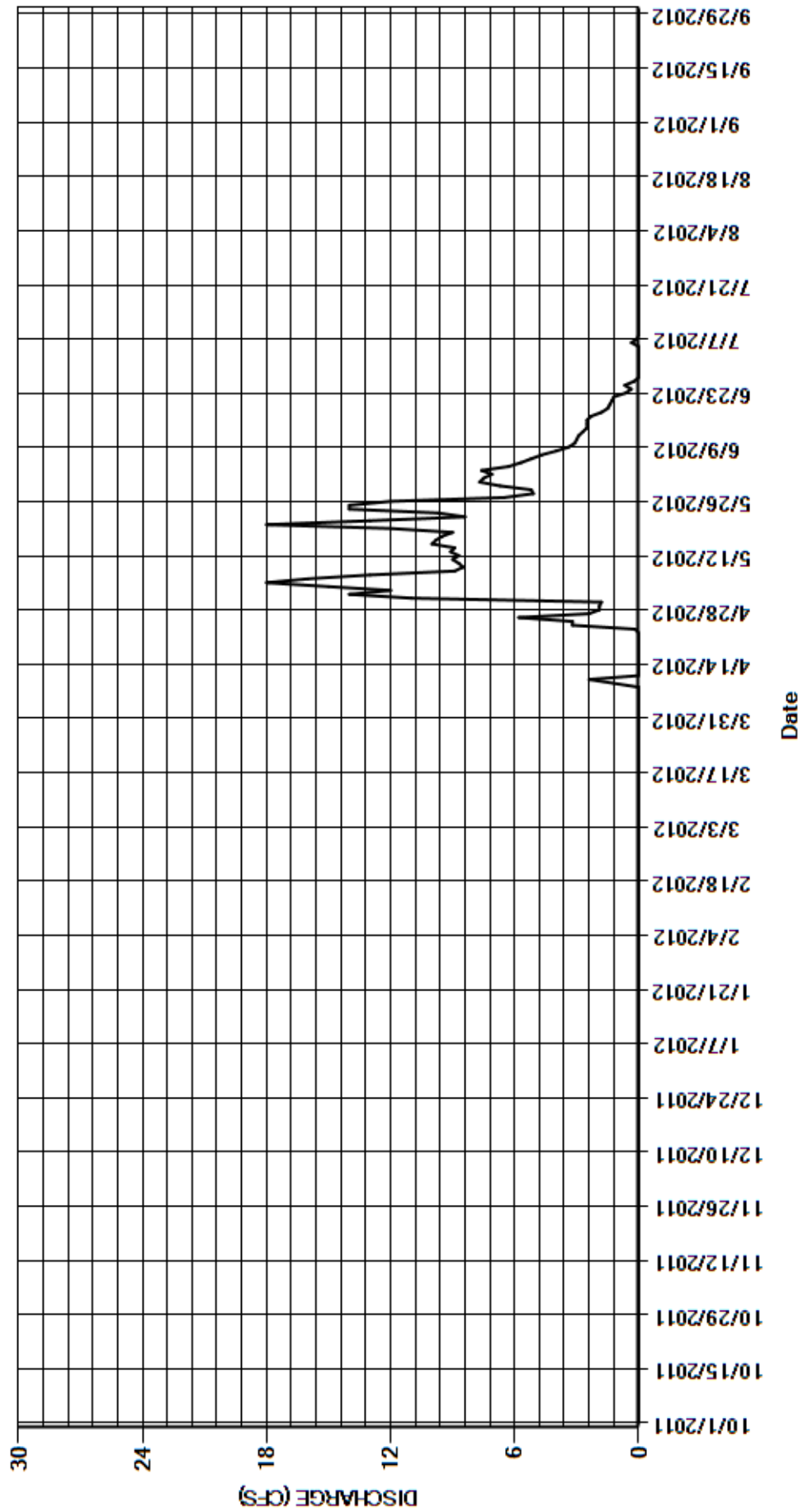
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11	7.5	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14	7.1	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12	7.6	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15	6.3	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18	5.7	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16	5.2	0.35	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13	4.7	0.07	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.9	4.0	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	e1.2	8.5	3.4	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	2.4	8.7	3.1	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.0	3.0	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.7	2.9	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.1	2.7	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.9	2.5	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10	2.5	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.8	2.5	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.5	2.3	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.0	1.8	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12	1.5	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18	1.4	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13	1.3	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.4	1.2	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	e0.18	9.7	0.63	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	3.2	14	0.36	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	3.2	14	0.67	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	5.8	12	0.23	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	2.4	6.5	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	1.9	5.1	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	1.9	5.2	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	---	0.00	1.8	6.7	0.00	0.00	0.00	0.00
31	0.00	---	0.00	0.00	---	0.00	---	7.7	---	0.00	0.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	23.98	331.4	82.09	0.42	0.00	0.00
MEAN	0.000	0.000	0.000	0.000	0.000	0.000	0.80	10.7	2.74	0.014	0.000	0.000
AC-FT	0	0	0	0	0	0	48	657	163	0.8	0	0
MAX	0.00	0.00	0.00	0.00	0.00	0.00	5.8	18	7.6	0.35	0.00	0.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.1	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	1353.51	MEAN	3.71	MAX	66	MIN	0.00	AC-FT	2680
WTR YR	2012	TOTAL	437.89	MEAN	1.20	MAX	18	MIN	0.00	AC-FT	869

MAX DISCH: 23.3 CFS AT 21:00 ON MAY 20,2012 GH 0.72 FT SHIFT 0 FT
 MAX GH: 0.72 FT AT 21:00 ON MAY 20,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06750500 WILSON SUPPLY DITCH NEAR EATON RESERVOIR @ 10 FT PARSHALL FLUME
WY2012 HYDROGRAPH



REPUBLICAN RIVER BASIN

PIONEER DITCH

Water Year 2012

Location.--	Lat. N.40°04'54.0"; Long. W. 102°7'23.24" (WGS84). Gage is on the right side of a 5 ft. Parshall flume along the Pioneer Ditch 4 mi east of Wray, CO, and 1000 ft. south of U.S. Highway 34. in Yuma County, CO.
Drainage Area and Period of Record.--	Controlled diversion from the North Fork of the Republican River. Since the ditch is senior to any downstream users, it will frequently dry the river at its headgate, which is about 5 miles from the Stateline. Rush Creek comes into the river between the Pioneer headgate and the USGS gage on the Stateline.;
Equipment.--	Digital incremental Sutron 8500 shaft encoder connected to a SatLink 1 Data Collection Platform (DCP) and a weekly Stevens Type F chart recorder at a 5 ft. Parshall flume in a concrete lined canal section. A staff gage at the flume's left Ha location serves as the primary and only reference. The canal has a timber suspended upstream of the gage to slow approach velocities of waters entering the flume.
Hydrologic Conditions.--	The Pioneer Ditch is a controlled diversion from North Fork of the Republican River, which is derived from underground sources and sand hill plains storm runoff. Diversion is regulated by obligations to the states of Kansas and Nebraska under the Republican River Compact .
Gage-Height Record.--	The primary record is telemetered 15-minute data with logged DCP data and chart record as backup. The record is complete and reliable. Diversions from the river ended on October 17, 2011 for the winter and resumed on April 10, 2012. Instrument calibration was supported by 68 visits made to the gage. An encoder correction of -0.15 ft was applied to the record without loss of accuracy when the flow was started in April. Instrument calibration corrections were applied to the record as defined by observations made at the gage. Residual, non-zero gage-heights are typically seen after the water is turned off. This year gage-heights below about 0.12 ft were considered zero flow.
Datum Corrections.--	Levels were last run on May 9, 2011 using the average flume crest elevation of 0.000 ft. as base. The staff was found to be 0.027 ft. high but was not corrected. These findings account for a large portion of the negative shifts typically found at this gage.
Rating.--	The control is a 5 ft. Parshall flume set in a trapezoidal concrete canal section with a concave transition section to the flume. The canal is straight above and below the flume and submergence is generally not a problem. A timber is suspended in the canal upstream of the Parshall flume to slow waters entering the flume. Accumulation of debris on the timber can cause unpredictable velocity variations in the flume. A standard 5 ft. Parshall flume rating, STD05FTPF, was continued this year. Seventeen discharge measurements (Nos. 725-741) were made this year by Colorado Division of Water Resources and Nebraska Natural Resources staff ranging in discharge from 9.78 to 24.4 cfs. The peak discharge of 27.8 cfs occurred at 04:30 on April 27, 2012 at a gage-height of 1.25 ft. with a shift of -0.02 ft. exceeding this year's high measurement (No. 726), made October 5, 2011 by 0.07 ft. of stage. Using the USBR Water Measurement Manual, Third Edition, Figure 8-9, Page 8-44, the range of accurate (within +/-5%) discharge measurement for a 5 ft Parshall Flume is 1.56 to 85.6 cfs. Anything above or below this range is outside the +/- 5% accuracy range, unless defined by measurements.
Discharge.--	Shifts are primary caused by the changes in approach velocities or the accumulation of vegetal growth in the flume itself. Given the variability of approach conditions, time shifting is generally used. Shifting control method was used all year and shifts were distributed by time as defined by measurements. Measurements made this year showed shifts varying between -0.01 and -0.13 ft. Measurement Nos. 728, 730, 738, 739 and 742, made by State of Nebraska staff, were not used for the following reasons: inconsistency in depths, angle coefficients, and velocities. All remaining measurements were given full weight except for Nos. 725, 729, 734 and 736 which were discounted up to 8% to smooth shift distributions. By agreement with the State of Nebraska, all discharge measurements are made at an angle iron brace 6.0 ft. in width at the staff cross section. Measured depths are usually quite close to the staff GH, which gives a reasonable check on depths. Velocities are compared with Colorado measurements that are close in time and at similar GH.
Special Computations.--	Zero flow is determined operationally. Sustained stages at or below 0.12 ft. in depth are assumed to be zero flow and were adjusted as such. State of Colorado personnel measured with a custom rated Mag-Head Pygmy meter, taking 21 depths and velocities across the flume at 0.30 ft. intervals. Nebraska Natural Resources personnel used a standard rating AA meter, taking 13 sections at 0.5 ft intervals.
Remarks.--	Water was run in the ditch on November 3 and 4, 2011 to dewater the river channel for pipe line construction. Water diverted in to the ditch was redelivered back to the river upstream of the Stateline flume. No water was put to beneficial use during this period. The record otherwise good. Station maintained and record developed by Devin Ridnour.
Recommendations.--	Do not make encoder or pen corrections when the ditch is off and the floats are bottomed out. Make sure the encoder and pen floats are clear of each other and the well cylinder. Cooperation between the Colorado Hydrographer/Water Commissioner and Nebraska personnel has been helpful in arriving at consistent measurement techniques at this flume. Nebraska's spin times could be documented better. At the start of next season we should meet with Nebraska and ask them to write on our visit sheets and compare notes on technique. The pygmy meter should always be used at this flume, but if one State uses it and the other does not, then there may be problems with shifts.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

PIONEER DITCH

RATING TABLE-- STD05FTPF USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

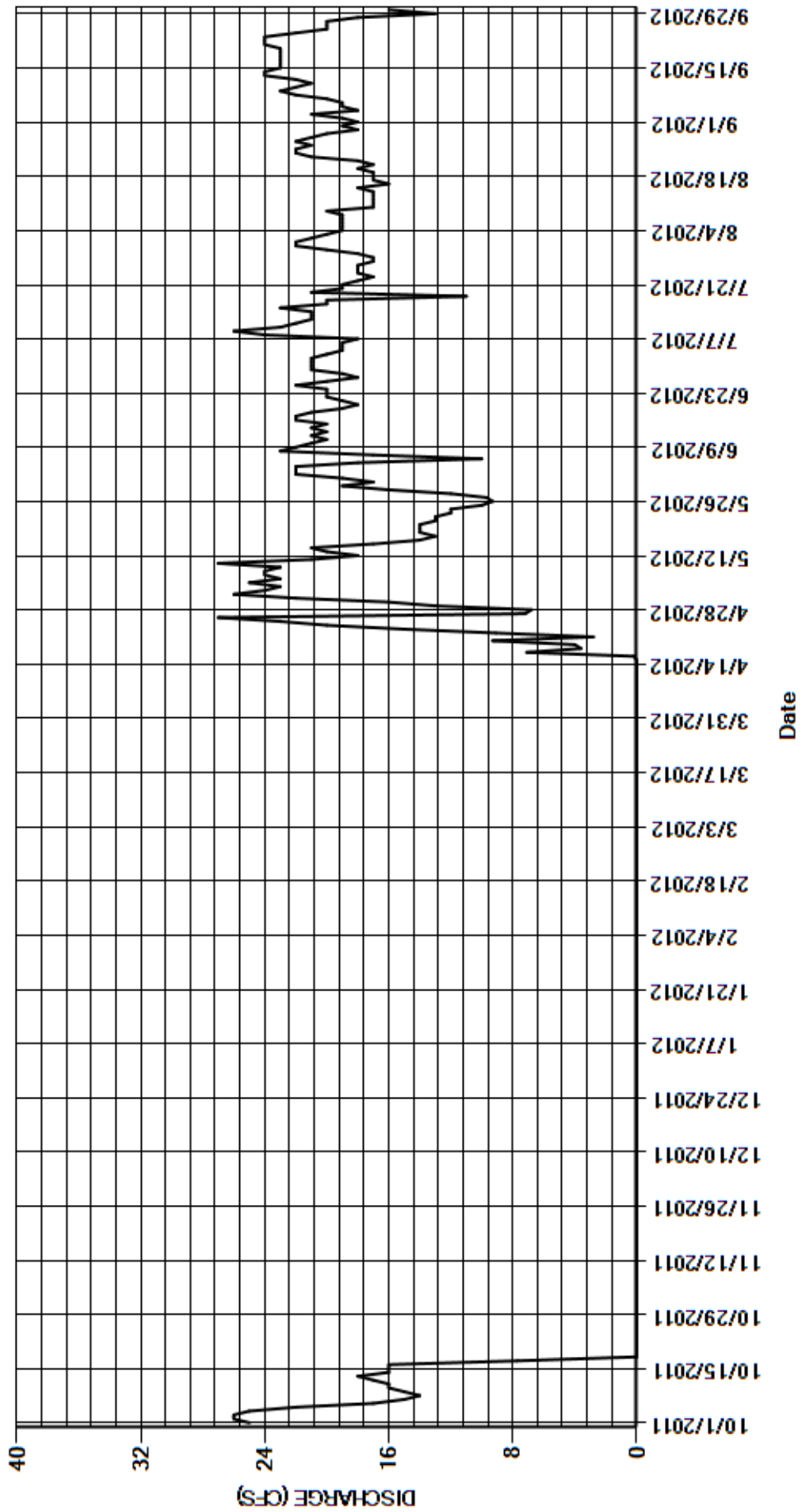
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	25	0.00	0.00	0.00	0.00	0.00	0.00	22	19	21	22	18
2	26	0.00	0.00	0.00	0.00	0.00	0.00	26	22	21	21	19
3	26	0.00	0.00	0.00	0.00	0.00	0.00	24	22	20	20	21
4	25	0.00	0.00	0.00	0.00	0.00	0.00	23	22	19	19	18
5	22	0.00	0.00	0.00	0.00	0.00	0.00	25	18	19	19	19
6	17	0.00	0.00	0.00	0.00	0.00	0.00	23	10	19	19	19
7	15	0.00	0.00	0.00	0.00	0.00	0.00	24	17	18	19	20
8	14	0.00	0.00	0.00	0.00	0.00	0.00	24	23	24	19	22
9	15	0.00	0.00	0.00	0.00	0.00	0.00	23	22	26	20	23
10	16	0.00	0.00	0.00	0.00	0.00	0.00	27	21	23	17	22
11	16	0.00	0.00	0.00	0.00	0.00	0.00	21	20	22	17	21
12	17	0.00	0.00	0.00	0.00	0.00	0.00	18	21	21	17	22
13	18	0.00	0.00	0.00	0.00	0.00	0.00	20	20	21	17	24
14	16	0.00	0.00	0.00	0.00	0.00	0.00	21	21	21	17	24
15	16	0.00	0.00	0.00	0.00	0.00	0.00	17	20	23	18	23
16	16	0.00	0.00	0.00	0.00	0.00	0.19	14	22	20	16	23
17	7.7	0.00	0.00	0.00	0.00	0.00	7.1	13	22	20	17	23
18	0.00	0.00	0.00	0.00	0.00	0.00	3.6	14	21	11	17	23
19	0.00	0.00	0.00	0.00	0.00	0.00	4.0	14	19	21	17	23
20	0.00	0.00	0.00	0.00	0.00	0.00	9.3	14	18	19	18	23
21	0.00	0.00	0.00	0.00	0.00	0.00	2.8	13	19	19	17	24
22	0.00	0.00	0.00	0.00	0.00	0.00	9.1	13	20	18	18	24
23	0.00	0.00	0.00	0.00	0.00	0.00	15	12	20	17	21	24
24	0.00	0.00	0.00	0.00	0.00	0.00	20	12	20	18	22	22
25	0.00	0.00	0.00	0.00	0.00	0.00	23	10	22	18	22	20
26	0.00	0.00	0.00	0.00	0.00	0.00	27	9.3	20	18	21	20
27	0.00	0.00	0.00	0.00	0.00	0.00	7.2	9.7	18	17	22	20
28	0.00	0.00	0.00	0.00	0.00	0.00	6.8	12	19	17	21	18
29	0.00	0.00	0.00	0.00	0.00	0.00	13	16	21	18	20	13
30	0.00	0.00	0.00	0.00	---	0.00	16	19	21	20	18	16
31	0.00	---	0.00	0.00	---	0.00	---	17	---	22	19	---
TOTAL	307.70	0.00	0.00	0.00	0.00	0.00	164.09	550.0	600	611	587	631
MEAN	9.93	0.000	0.000	0.000	0.000	0.000	5.47	17.7	20.0	19.7	18.9	21.0
AC-FT	610	0	0	0	0	0	325	1090	1190	1210	1160	1250
MAX	26	0.00	0.00	0.00	0.00	0.00	27	27	23	26	22	24
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.3	10	11	16	13

CAL YR	2011	TOTAL	2883.80	MEAN	7.90	MAX	26	MIN	0.00	AC-FT	5720
WTR YR	2012	TOTAL	3450.79	MEAN	9.43	MAX	27	MIN	0.00	AC-FT	6840

MAX DISCH: 27.8 CFS AT 04:30 ON APR 27,2012 GH 1.25 FT SHIFT -0.02 FT
 MAX GH: 1.25 FT AT 04:30 ON APR 27,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

PIONEER DITCH
WY2012 HYDROGRAPH



REPUBLICAN RIVER BASIN
PIONEER DITCH AT THE COLORADO-NEBRASKA STATELINE
Water Year 2012

Location.-- Lat. N. 40°03'39"; Long. W. 102°03'4.70" (WGS84) on the right bank of the Pioneer Ditch at a 4 ft. Parshall flume 6.77 miles northwest of Haigler, NE, 1200 ft. south of US 34 near the Colorado-Nebraska Stateline.

Drainage Area and Period of Record.-- Controlled diversion from the North Fork of the Republican River. Since the ditch is senior to any downstream users, it will frequently dry the river at its headgate, which is about 5 miles from the Stateline. Rush Creek comes into the river between the Pioneer headgate and the USGS gage on the Stateline.

Nebraska also maintains a gage at the end of the ditch where wastewater tails back into the Arikaree River (aka "Middle Fork of the Republican River"). This is at a point just above where the Arikaree confluences with the North Fork of the Republican River.;

Equipment.-- Digital incremental Sutron 8500 shaft encoder connected to a SatLink 1 Data Collection Platform (DCP) and a weekly Steven's Type F chart recorder at a 4 ft. Parshall flume. The site has two outside vertical enameled steel staffs (Ha-Hb, with the Hb staff set with 4.0 ft = 0.0). The Ha staff is the primary and only reference gage.

Hydrologic Conditions.-- The Pioneer Ditch is a controlled diversion from North Fork of the Republican River, which is derived from underground sources and sand hill plains storm runoff. This gage measures water delivered to Nebraska under the Republican River Compact. Heavy rains and some natural springs will cause flows to show up at the flume when the headgate is off. During the winter months an earth dam is in place to let the natural springs flow to the North Fork Republican River.

Gage-Height Record.-- The primary record is telemetered 15-minute data with logged DCP data and chart record as backup. The record is complete and reliable. Recorded gage-heights less than 0.05 feet were considered zero flow due to the float being beached on the mud in the stilling well. If it is noted the ditch was off on visit logs and some residual GH's were between 0.00 and 0.05, then flow was considered zero. Instrument calibration was maintained by over 65 visits to the gage. Instrument calibration corrections were applied to the record as defined by visits made to the gage.

Datum Corrections.-- Levels were last run on May 9, 2011 using the average flume crest elevation of 0.000 ft as base. The flume was found to be out of level laterally, with the right side (stilling well intake side) found to be about 0.07 ft lower than the left (staff gage side). This accounts for a part of the positive shifts being measured. No correction was made to the staff.

Rating.-- The control is a 4 ft. Parshall flume with concrete wing walls in an earthen canal section. The canal is mostly straight above and below the flume. Submergence can be caused by vegetal growth downstream of the flume. A standard 4 ft. Parshall flume rating, STD04FTPF, was continued this year. Nineteen discharge measurements (Nos. 724-742) were made this year by Colorado Division of Water Resources and Nebraska Natural Resources staff ranging in discharge from 7.99 to 21.7 cfs. The peak discharge of 23 cfs occurred at 05:45 on April 27, 2012 at a gage-height of 1.19 ft using a shift of +0.07 ft. exceeding this year's high measurement (No. 728) made May 2, 2012 by 0.04 ft. in stage.

Using the USBR Water Measurement Manual, Third Edition, Figure 8-9, Page 8-44, the range of accurate (within +/-5%) discharge measurement for a 4 ft Parshall Flume is 1.26 to 67.9 cfs. Anything above or below this range is outside the +/-5% accuracy range, unless defined by measurements.

Discharge.-- Shifts are primarily caused by changes in approach and departure conditions. Positive shifts can arise from the tilt and the slightly warped geometry of the flume. Encroachment of the flume wing walls into the flume entrance section and the resulting turbulence wake also is contributing to the positive shift and may also cause variability in staff gage readings and/or the need for gage height corrections to the shaft encoder. Shifting control method was used all year. Shifts were distributed by time as defined by measurements. Measurements made this year showed unadjusted shifts varying between -0.01 to +0.10 ft. Measurement No. 736, made by State of Nebraska staff, was not used because of inconsistencies in in depths and angle coefficients. All remaining measurements were given full weight except for Nos. 724, 730, 732, 734, 735, 739, 740 and 742 which were discounted up to 5.5% to smooth shift distributions.

Special Computations.-- Zero flow is determined operationally. Sustained stages at or below 0.05 ft. are assumed to be zero flow and were adjusted as such. State of Colorado personnel measure using a custom rated Mag-Heady Pygmy meter at 0.30 ft. intervals where as State of Nebraska staff generally use a standard AA meter using 0.50 ft. intervals. The record is compared with Pioneer Ditch at the Headgate figures to make sure Stateline flows are consistent with the amounts diverted above. Daily flows greater at Stateline only occurred as a result of time delays when flow was dropping at the headgate or due to rain events causing runoff into the ditch between the two gages.

Remarks.-- The record is good. Station maintained and record developed by Devin Ridnour.

Recommendations.-- Do not make encoder or pen corrections when the ditch is off and the floats are bottomed out. Make sure the encoder and pen floats are clear of each other and the well cylinder.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

PIONEER DITCH AT THE COLORADO-NEBRASKA STATELINE

RATING TABLE-- STD04FTPF USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

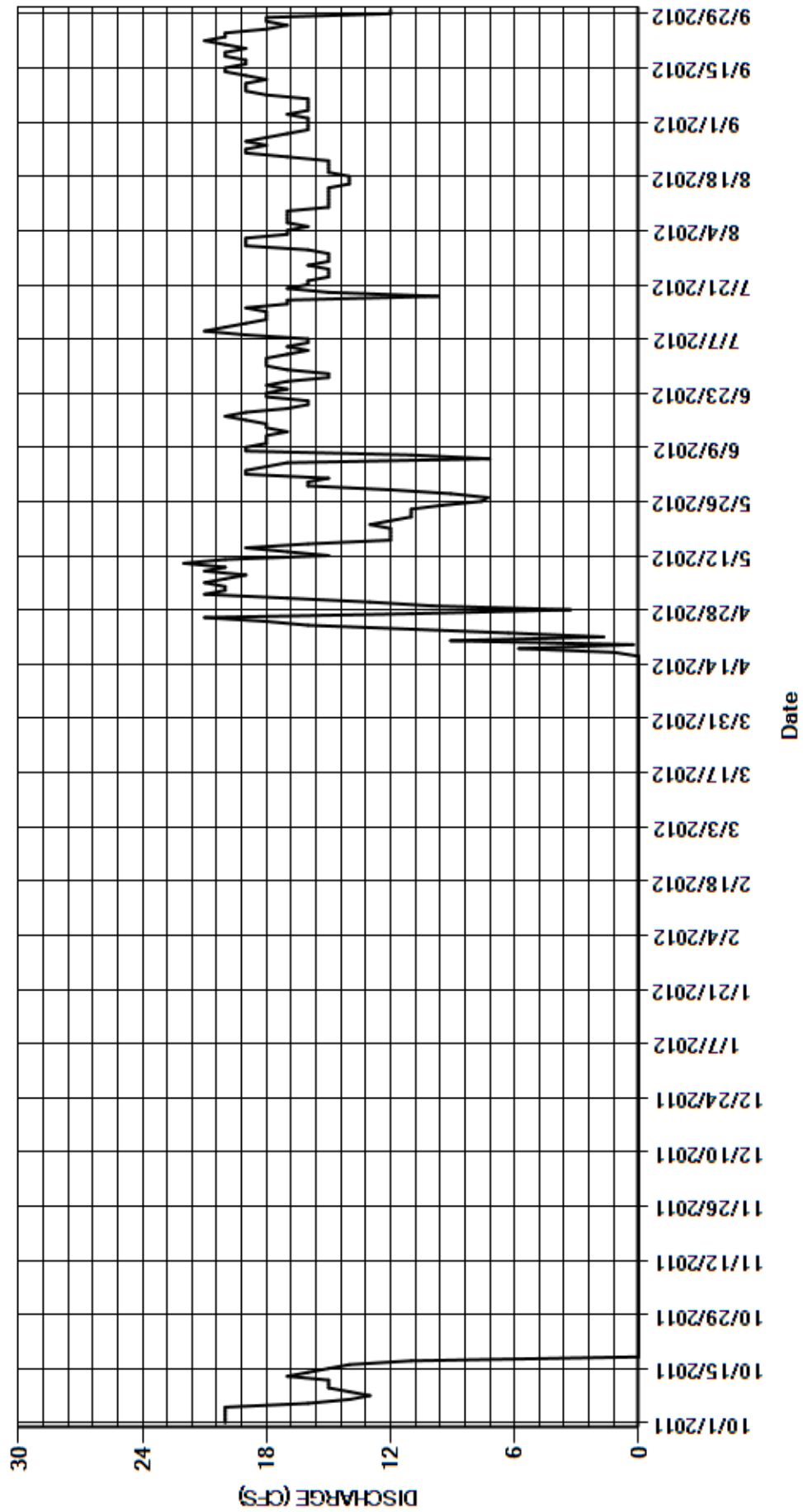
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	20	0.00	0.00	0.00	0.00	0.00	0.00	17	15	18	19	16
2	20	0.00	0.00	0.00	0.00	0.00	0.00	21	19	18	19	16
3	20	0.00	0.00	0.00	0.00	0.00	0.00	20	19	17	17	17
4	20	0.00	0.00	0.00	0.00	0.00	0.00	20	18	16	17	16
5	20	0.00	0.00	0.00	0.00	0.00	0.00	21	17	17	16	16
6	16	0.00	0.00	0.00	0.00	0.00	0.00	20	7.2	16	17	16
7	14	0.00	0.00	0.00	0.00	0.00	0.00	19	11	16	17	16
8	13	0.00	0.00	0.00	0.00	0.00	0.00	21	19	19	17	18
9	14	0.00	0.00	0.00	0.00	0.00	0.00	20	19	21	17	19
10	15	0.00	0.00	0.00	0.00	0.00	0.00	22	18	20	15	19
11	15	0.00	0.00	0.00	0.00	0.00	0.00	20	18	19	15	19
12	15	0.00	0.00	0.00	0.00	0.00	0.00	15	18	18	15	18
13	17	0.00	0.00	0.00	0.00	0.00	0.00	17	17	18	15	19
14	16	0.00	0.00	0.00	0.00	0.00	0.00	19	18	18	15	20
15	15	0.00	0.00	0.00	0.00	0.00	0.00	16	18	19	15	20
16	14	0.00	0.00	0.00	0.00	0.00	0.00	12	19	17	14	19
17	11	0.00	0.00	0.00	0.00	0.00	1.2	12	20	17	14	19
18	0.00	0.00	0.00	0.00	0.00	0.00	5.8	12	19	9.7	14	20
19	0.00	0.00	0.00	0.00	0.00	0.00	0.26	12	17	15	15	20
20	0.00	0.00	0.00	0.00	0.00	0.00	9.1	13	16	17	15	19
21	0.00	0.00	0.00	0.00	0.00	0.00	1.7	12	16	16	15	20
22	0.00	0.00	0.00	0.00	0.00	0.00	6.3	11	18	16	15	21
23	0.00	0.00	0.00	0.00	0.00	0.00	11	11	18	15	17	20
24	0.00	0.00	0.00	0.00	0.00	0.00	16	11	17	15	19	20
25	0.00	0.00	0.00	0.00	0.00	0.00	18	9.5	18	15	19	18
26	0.00	0.00	0.00	0.00	0.00	0.00	21	7.6	17	16	18	17
27	0.00	0.00	0.00	0.00	0.00	0.00	11	7.3	15	15	19	18
28	0.00	0.00	0.00	0.00	0.00	0.00	3.3	9.1	15	15	18	18
29	0.00	0.00	0.00	0.00	0.00	0.00	10	12	17	15	17	12
30	0.00	0.00	0.00	0.00	---	0.00	13	16	18	16	16	12
31	0.00	---	0.00	0.00	---	0.00	---	16	---	19	16	---
TOTAL	275.00	0.00	0.00	0.00	0.00	0.00	127.66	471.5	511.2	518.7	507	538
MEAN	8.87	0.000	0.000	0.000	0.000	0.000	4.26	15.2	17.0	16.7	16.4	17.9
AC-FT	545	0	0	0	0	0	253	935	1010	1030	1010	1070
MAX	20	0.00	0.00	0.00	0.00	0.00	21	22	20	21	19	21
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.3	7.2	9.7	14	12

CAL YR	2011	TOTAL	2480.34	MEAN	6.80	MAX	23	MIN	0.00	AC-FT	4920
WTR YR	2012	TOTAL	2949.06	MEAN	8.06	MAX	22	MIN	0.00	AC-FT	5850

MAX DISCH: 23 CFS AT 05:45 ON APR 27,2012 GH 1.19 FT SHIFT 0.07 FT
 MAX GH: 1.19 FT AT 05:45 ON APR 27,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

PIONEER DITCH AT THE COLORADO-NEBRASKA STATELINE
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
07082500 LAKE FORK CREEK BELOW SUGAR LOAF DAM NEAR LEADVILLE
Water Year 2012

Location.-- Lat. 39°15'05", Long. 106°22'28", Lake County, SE¼NW¼NW¼ sec. 19, T.9 S., R.80 W., on right bank 4.2 miles upstream from junction of Lake Fork Creek and Arkansas River.

Drainage Area and Period of Record.-- 27.55 sq. mi.;

Equipment.-- Satellite-monitored data collection platform including a shaft encoder and a Stage Discharge Recorder for backup purposes. The gage is constructed from a 42-inch diameter corrugated metal pipe CMP and concrete well. Shaft encoder and SDR are set to inside electric tape gage mounted on instrument shelf. An outside staff gage is also used for reference purposes. Shelter is equipped with AC power for the well heater. Control is a concrete weir/apron tapered lower from left to right bank, located at gage. The ET broke on Sept 28, 2011 and has not been repaired or replaced. The OG is being used as the primary reference gage.

Hydrologic Conditions.-- This gage is located approximately 500 ft from the discharge gates of Sugar Loaf Dam on Turquoise Reservoir. During winter months the flow comes from the gates of the dam and runs through and below the very large boulders in the stream bed and surfaces just before the gage. The water released is warm enough the control does not experience ice affected days. The well is also kept thawed with small tank heater during the winter months.

Gage-Height Record.-- The primary record is 15-minute satellite data. SDR record is used for back-up purposes. Record is complete and reliable.

Datum Corrections.-- Levels were last run on May 31, 2007, from BM#3 to the RP. No corrections were needed.

Rating.-- The control is a 38-ft. wide, concrete weir/apron with ogee lip. Rating No. LFCBSLCO04A, dated Oct. 1, 1975, was used all water year. It is well defined to about 350 cfs. Four discharge measurements (Nos. 573-576) ranging from 3.29 cfs to 14.5 cfs were made this water year. They cover the range in stage experienced, except for the higher daily flows Apr 27 -Jun 17; Aug 28-Sept 30, 2012; and the lower daily flows of Mar 4, 2012. The peak flow of 17.2 cfs occurred at 0930 on Aug 28, 2012 at a gage height of 0.51 ft with a shift of 0.04 ft. It exceeded the stage of maximum discharge Measurement No. 576 made Sep 18, 2012 by 0.02 ft.

Discharge.-- Shifting control method was used for the entire water year. Shifts were applied as defined by measurements and distributed by stage and time. From Oct 1 thru June 18, 2012 shifts were applied by time/event at the point of a reservoir gage change. Variable stage-shift relationship LFCBSLCOVS12A was used the rest of the year. This shift curve is based on historical measurements and current water year measurements. Measurement 576 was discounted 8.23% to fit the variable stage shift relationship.

Special Computations.--

Remarks.-- Record is complete and is considered good. The peak discharge and gage height are rated good based on a related measurement and site visit. Station maintained and record developed by Cheston Hart.

Recommendations.-- Levels need to be run in WY2013 to verify the PZF and previous levels, as level history indicates a correction to the ET index elevation may be warranted. High water measurements cannot be made at this gage at this time. A bank operated cable way installation should be further investigated. The electric tape gage should be repaired or replaced.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

07082500 LAKE FORK CREEK BELOW SUGAR LOAF DAM NEAR LEADVILLE

RATING TABLE.-- LFCBSLCO04A USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

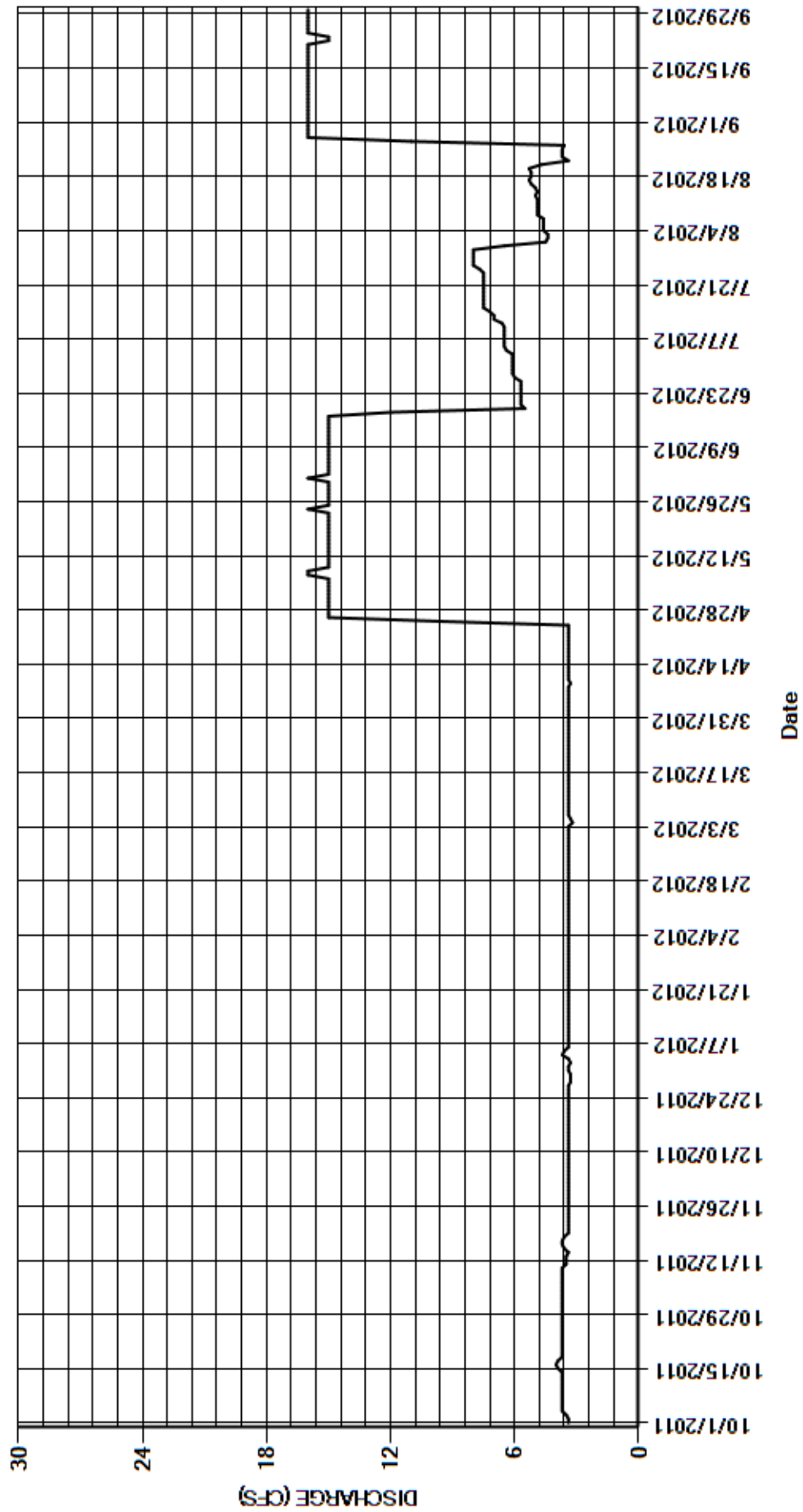
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.4	3.7	3.4	3.4	3.4	3.4	3.4	15	16	6.1	4.5	16
2	3.4	3.7	3.4	3.3	3.4	3.4	3.4	15	15	6.1	4.4	16
3	3.5	3.7	3.4	3.4	3.4	3.4	3.4	15	15	6.1	4.4	16
4	3.7	3.7	3.4	3.7	3.4	3.2	3.4	15	15	6.4	4.6	16
5	3.7	3.7	3.4	3.6	3.4	3.3	3.4	15	15	6.5	4.6	16
6	3.7	3.7	3.4	3.4	3.4	3.4	3.4	15	15	6.5	4.6	16
7	3.7	3.7	3.4	3.4	3.4	3.4	3.4	16	15	6.5	4.6	16
8	3.7	3.7	3.4	3.4	3.4	3.4	3.4	16	15	6.5	4.9	16
9	3.7	3.7	3.4	3.4	3.4	3.4	3.3	15	15	6.5	4.9	16
10	3.7	3.7	3.4	3.4	3.4	3.4	3.4	15	15	6.5	4.9	16
11	3.7	3.5	3.4	3.4	3.4	3.4	3.4	15	15	6.6	4.9	16
12	3.7	3.5	3.4	3.4	3.4	3.4	3.4	15	15	7.0	4.9	16
13	3.7	3.5	3.4	3.4	3.4	3.4	3.4	15	15	7.0	5.0	16
14	3.7	3.4	3.4	3.4	3.4	3.4	3.4	15	15	7.2	4.9	16
15	3.9	3.6	3.4	3.4	3.4	3.4	3.4	15	15	7.5	5.0	16
16	4.0	3.7	3.4	3.4	3.4	3.4	3.4	15	15	7.5	5.2	16
17	3.9	3.7	3.4	3.4	3.4	3.4	3.4	15	15	7.5	5.3	16
18	3.7	3.6	3.4	3.4	3.4	3.4	3.4	15	12	7.5	5.2	16
19	3.7	3.4	3.4	3.4	3.4	3.4	3.4	15	5.5	7.5	5.2	16
20	3.7	3.4	3.4	3.4	3.4	3.4	3.4	15	5.7	7.5	5.3	16
21	3.7	3.4	3.4	3.4	3.4	3.4	3.4	15	5.7	7.5	4.7	16
22	3.7	3.4	3.4	3.4	3.4	3.4	3.4	15	5.7	7.5	3.4	15
23	3.7	3.4	3.4	3.4	3.4	3.4	3.4	15	5.7	7.5	3.7	15
24	3.7	3.4	3.4	3.4	3.4	3.4	3.4	16	5.7	7.5	3.7	16
25	3.7	3.4	3.4	3.4	3.4	3.4	9.5	15	5.7	7.7	3.7	16
26	3.7	3.4	3.4	3.4	3.4	3.4	15	15	5.7	8.0	3.6	16
27	3.7	3.4	3.4	3.4	3.4	3.4	15	15	6.0	8.0	11	16
28	3.7	3.4	3.3	3.4	3.4	3.4	15	15	6.1	8.0	16	16
29	3.7	3.4	3.3	3.4	3.4	3.4	15	15	6.1	8.0	16	16
30	3.7	3.4	3.3	3.4	---	3.4	15	15	6.1	8.0	16	16
31	3.7	---	3.4	3.4	---	3.4	---	15	---	6.5	16	---
TOTAL	114.6	106.3	105.1	105.8	98.6	105.1	166.0	468	337.7	220.7	195.1	478
MEAN	3.70	3.54	3.39	3.41	3.40	3.39	5.53	15.1	11.3	7.12	6.29	15.9
AC-FT	227	211	208	210	196	208	329	928	670	438	387	948
MAX	4.0	3.7	3.4	3.7	3.4	3.4	15	16	16	8.0	16	16
MIN	3.4	3.4	3.3	3.3	3.4	3.2	3.3	15	5.5	6.1	3.4	15

CAL YR	2011	TOTAL	14849.3	MEAN	40.7	MAX	354	MIN	3.1	AC-FT	29450
WTR YR	2012	TOTAL	2501.0	MEAN	6.83	MAX	16	MIN	3.2	AC-FT	4960

MAX DISCH: 17.2 CFS AT 09:30 ON AUG 28,2012 GH 0.51 FT SHIFT 0.04 FT
 MAX GH: 0.51 FT AT 09:30 ON AUG 28,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

07082500 LAKE FORK CREEK BELOW SUGAR LOAF DAM NEAR LEADVILLE
 WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
07084500 LAKE CREEK ABOVE TWIN LAKES RESERVOIR

Water Year 2012

Location.-- Lat 39°03'47", Long 106°24'28" (Mt. Elbert, Colorado quadrangle, 1:24000 scale), in NE1/4 SE1/4 Sec. 26, T11S, R81W, Lake County, Hydrologic Unit 11020001, on left bank at refurbished concrete section and bridge over Lake Creek originally established by US Forest Service, 1.35 mile upstream from high water line of Twin Lakes Reservoir, 0.65 miles upstream from Willis Creek tributary, and 2.1 miles southwest of village of Twin Lakes CO.

Drainage Area and Period of Record.-- 75 mi².;

Equipment.-- A Sutron Constant Flow Bubbler (CFB) stage sensor and satellite-monitored data collection platform in a 4 ft x 4 ft metal shelter. Primary reference gage is a drop wire weight mounted on the pedestrian bridge over the control. A temperature sensor is operated at the site. No changes this water year.

Hydrologic Conditions.-- Lake Creek fills Twin Lakes Reservoir and is tributary to the main stem of the Arkansas River. Flows at the gage are heavily affected by transmountain diversions from the Roaring Fork Basin in Division 5 through Twin Lakes Tunnel and into Lake Creek several miles above the gage. Diversions occur year round. Lake Creek Basin is approximately 73.1 sq miles with a mean elevation of 11,900 ft. The basin consists primarily of high mountain terrain, some of which is above tree line, with very little development except many low volume trail roads and Highway 82 that travels over Independence Pass. No hydrologic condition changes were apparent this water year.

Gage-Height Record.-- The primary record is fifteen minute satellite transmitted data with DCP log and CFB log used as backup. Record is complete and reliable, except for the following periods: Nov 3-6 2011; Mar 20-27, 2012, when ice affected the stage discharge relationship; June 18-20 2012 during upstream channel cleaning; and, Nov 7, 2011 – Mar 19, 2012 when the station was closed for the winter. Turbulence at the gage, caused by the high flow velocities and large boulders, makes reading the wire weight gage for the site very difficult -- with accuracy of only ±0.10 ft during high water. This water year the wire weight gage was read to note the large discrepancies in gage height, but corrections to the CFB were not applied during times of high water. The CFB is calibrated before high water commences and is checked again once high water subsides and is re-calibrated as needed. Upstream channel work took place from June 18-20. Large boulders were removed from approximately 60 ft above the control at an average depth of 3 ft of fill removed. Boulders and fill gravel were removed about 1ft below control. Dramatic changes to GH and turbulence were found after the fill was removed.

Datum Corrections.-- Levels were last run May 9, 2006.

Rating.-- The control at low flow (±50 cfs) is the 25-ft. long by 41.8 ft. wide concrete apron edged with angle iron on the upstream and downstream sides. At higher flows the channel immediately above the concrete section along with the vertical walls of the concrete section form the control. The concrete section also serves as a measuring base for high flow measurements made from a bridge directly over the control. Wading measurements are made on the same concrete apron during winter as this section stays more open than surrounding sections, although considerable ice breaking is required. Outside of winter, wading measurements are made downstream at the old gage location as flow is more laminar and steady there. Whether wading or cabling, velocities are in the extreme range and this station is difficult to measure. This is especially true for cable measurements. For any flows above 500 cfs, a 100 lb. weight is required, and the depths are so shallow that placing the meter in the correct velocity profile is problematic. Rating No. 23, dated Nov 20, 2007, was used this year. Eighteen discharge measurements (Nos. 1024-1041) were made during the water year, ranging in discharge from 13.5 to 246 cfs. Seven of these measurements were during the winter period and have no gage heights or shift but are used for winter estimation. Measurements covered the range in stage experienced, except higher daily flows of Apr 27, May 4-7, 9-31; June 1-11, 13, 14 2012. The peak discharge of 719 cfs occurred at 0015 hours on May 22, 2012 at a gage height of 4.74 ft. with a shift of -0.42 ft. It exceeded maximum flow Measurement No. 1035, made June 14, 2012, by 1.12 ft. in stage.

Discharge.-- Shifting control method was used for all periods of good record. Shifts were applied as defined by measurements and were distributed by stage and by time. Variable stage shift relationship LAKATLCO12B was developed for the hydrograph peak and before the upstream channel cleaning, using Measurement No. 1032-1035, and was applied for the period March 20 - June 20, 2012. Shifts were prorated by time for all other open water periods. Open water measurements for this water year indicated shifts varying from -0.55 to 0.26 ft. Measurement Nos. 1033-1034 were discounted -3.3% and 5.79%, respectively, for smoothing purposes. Shifts were negative throughout the water year until June 20th when upstream channel work was complete, after the channel work the shifts were consistently positive.

Special Computations.-- Discharge for periods of no gage-height or ice affected record were estimated based on record from the upstream station of Twin Lakes Tunnel added to an estimated base flow and adjusted daily from weather records. Estimated base flow is derived from seven measurements (Nos. 1025-1031). A hydrograph was used comparing estimated and computed flows with the upstream gage Twin Lakes Tunnel. Temperature data from this site was used in the estimating winter flows.

Remarks.-- Record is good, except during periods of ice affect, channel cleaning, and no record, which are estimated and poor. Peak discharge is rated fair due to inability to accurately read the primary outside gage during the event. Station maintained and record developed by Cheston Hart.

Recommendations.-- With the upstream control cleaned measurements based on stage will be needed to define and adjust the rating. If the upstream control remains clear a new rating should be established.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

07084500 LAKE CREEK ABOVE TWIN LAKES RESERVOIR

RATING TABLE.-- LAKATLCO23 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

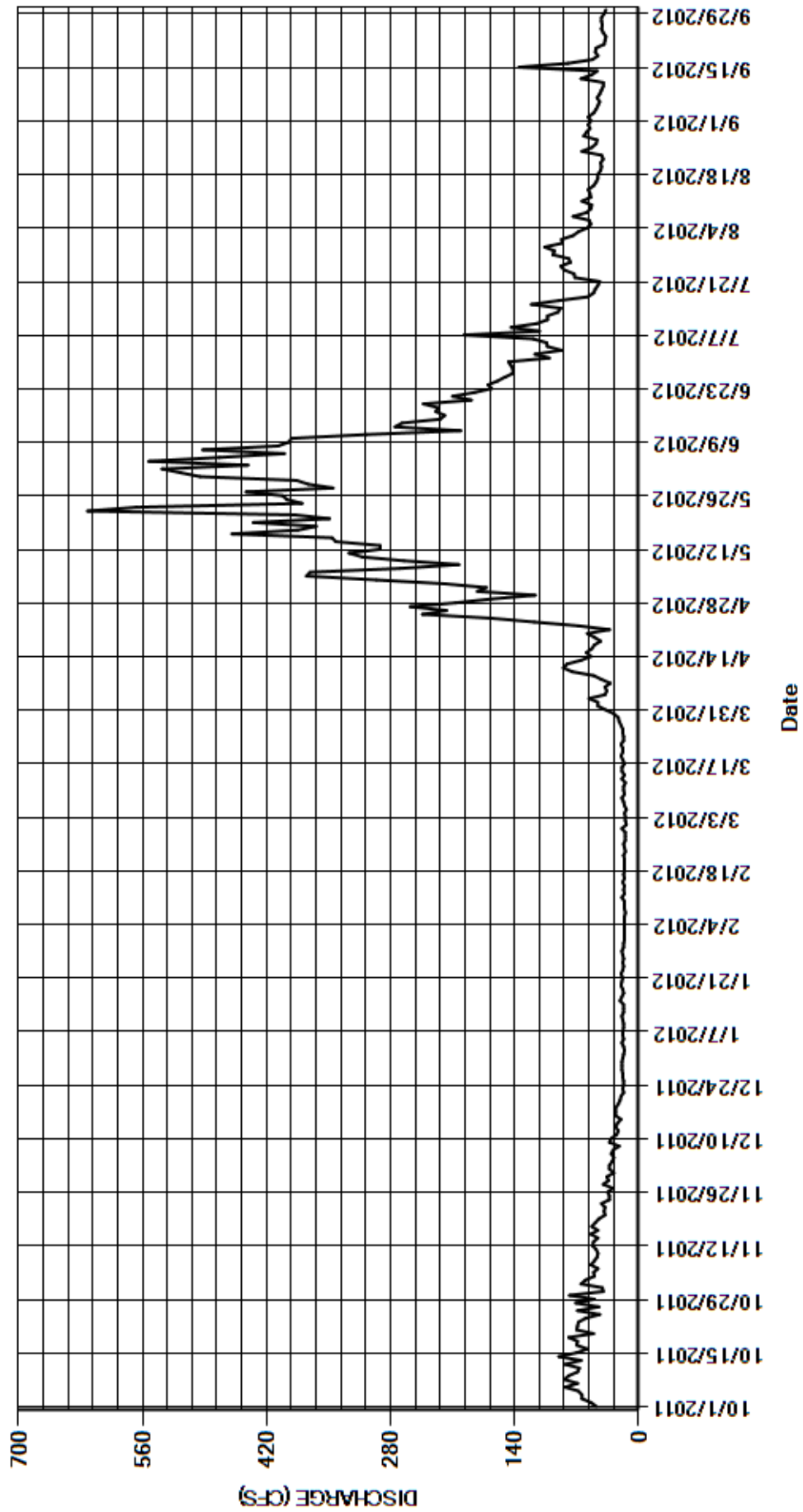
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	48	41	e28	e17	e16	e14	46	182	517	101	87	54
2	54	65	e33	e16	e16	e15	46	172	538	117	74	57
3	64	e60	e33	e17	e16	e15	56	219	441	87	68	51
4	64	e50	e30	e19	e16	e16	38	296	553	103	58	48
5	68	e51	e28	e17	e16	e14	36	375	473	104	54	46
6	83	e46	e31	e18	e16	e16	38	371	400	119	56	44
7	69	e54	e29	e18	e15	e17	32	269	492	197	74	47
8	84	e50	e22	e17	e16	e19	42	203	407	112	59	44
9	79	e47	e33	e17	e16	e16	51	265	395	144	54	42
10	69	e46	e31	e18	e16	e17	75	312	392	115	53	40
11	67	e48	e25	e19	e19	e17	85	327	307	103	64	40
12	83	e52	e23	e17	e16	e15	81	292	201	103	54	65
13	65	e51	e26	e17	e17	e19	65	292	275	91	55	53
14	90	e46	e24	e17	e16	e16	54	342	267	88	57	47
15	70	e54	e20	e21	e18	e19	59	346	224	121	51	135
16	58	e46	e26	e19	e16	e19	53	459	219	90	48	80
17	70	e53	e26	e17	e17	e16	50	385	229	57	46	52
18	69	e49	e26	e18	e16	e18	43	364	e226	51	46	46
19	79	e45	e23	e20	e16	e20	50	435	e243	49	43	49
20	51	e38	e21	e19	e16	e18	58	349	e189	46	42	48
21	70	e39	e20	e18	e16	e18	33	388	210	44	43	39
22	69	e38	e17	e20	e17	e20	68	622	185	72	40	38
23	68	e42	e18	e18	e15	e17	118	567	166	73	42	37
24	60	e33	e17	e17	e16	e17	167	380	170	84	64	40
25	44	e33	e17	e18	e17	e18	244	397	159	88	53	42
26	69	e35	e18	e17	e15	e18	217	402	151	77	48	41
27	e45	e29	e18	e18	e15	e20	258	443	142	79	47	42
28	71	e40	e19	e19	e15	22	207	345	142	97	62	42
29	50	e34	e19	e17	e19	23	167	373	144	95	59	39
30	78	e36	e19	e17	---	28	117	386	147	106	55	37
31	40	---	e18	e16	---	37	---	495	---	86	57	---
TOTAL	2048	1351	738	553	471	574	2654	11053	8604	2899	1713	1485
MEAN	66.1	45.0	23.8	17.8	16.2	18.5	88.5	357	287	93.5	55.3	49.5
AC-FT	4060	2680	1460	1100	934	1140	5260	21920	17070	5750	3400	2950
MAX	90	65	33	21	19	37	258	622	553	197	87	135
MIN	40	29	17	16	15	14	32	172	142	44	40	37

CAL YR	2011	TOTAL	96924	MEAN	266	MAX	1740	MIN	12	AC-FT	192200
WTR YR	2012	TOTAL	34143	MEAN	93.3	MAX	622	MIN	14	AC-FT	67720

MAX DISCH: 719 CFS AT 00:15 ON MAY 22,2012 GH 4.74 FT SHIFT -0.42 FT
 MAX GH: 4.74 FT AT 00:15 ON MAY 22,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

07084500 LAKE CREEK ABOVE TWIN LAKES RESERVOIR
 WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
LAKE CREEK BELOW TWIN LAKES RESERVOIR

Water Year 2012

Location.-- Lat. 39°04'34", Long. 106°18'35", in NE¼SE¼, sec. 22, T.11 S., R. 80 W., Lake County, on right bank 1.2 miles upstream from confluence of Lake Creek and Arkansas River and 1500 ft downstream of Twin Lakes Dam.

Drainage Area and Period of Record.-- N/A.;

Equipment.-- Satellite-monitored high data collection platform, shaft encoder, stage-discharge recorder (SDR) in a concrete shelter and well. Shaft encoder and SDR are set to an inside electric tape-down mounted on instrument shelf. Outside staff gage installed in flume but generally used as backup to primary reference tape-down gage. Control is a 30-foot concrete Parshall flume.

Hydrologic Conditions.-- The gage is located approximately 400 ft downstream of the outlet of Twin Lakes Reservoir. The water released is warm enough so the control does not experience ice affected days. No hydrologic condition changes were apparent this year.

Gage-Height Record.-- Primary record is 15-minute satellite data with the SDR data log used for backup purposes. Record is complete and reliable for the entire year.

Datum Corrections.-- Levels were last run on Sept. 6, 2007. Results were well within allowable limits; no corrections were needed/ taken. For the five years prior to that levels results indicated the gage is very stable.

Rating.-- Control at all stages is a 30-ft. concrete Parshall flume. A standard 30 ft. Parshall flume table was used all year. It is well defined at all stages. Three discharge measurements (Nos. 136-138) were made this year ranging from 17 cfs to 202 cfs. Measurements cover the range in stage experienced except for the lower mean daily flows on Sept 15-19 2011 and higher daily stages of Dec 15, 16, 22-28 2011; Jan 8, 9, 24-31; Feb 1-29; Apr 28 2012 . The peak discharge of 335 cfs occurred at 1900 May 6, 2012 at a gage height of 1.87 ft with a shift of 0.10 ft. The maximum gage height exceeded maximum measurement No. 136 by 0.51 ft. in stage.

Discharge.-- Shifting control method was used for the entire water year. Shifts were distributed using variable stage shift relationship, LAKBTLCOVS12A, which is based on historical low flow measurements and high flow measurements made at the gage in WY10 and WY11 using an ADCP.

Special Computations.-- None.

Remarks.-- The record is good. Peak GH and discharge are rated good. Wading measurements are made in the flume at the staff gage/ intake cross section. Eyebolts in the flume walls at this section are used to attach a safety cable with 2 ft. markings. The maximum flow that can be safely waded in the flume is about 250 cfs (gage height = 1.61 ft). Flows up to about 400 cfs (gage height = 2.20 ft) can be waded about 150 ft downstream of the flume. There is no bridge at this flume. Approximately 1,000 ft downstream is the Highway 82 Bridge across Lake Creek. Conventional cable measurement from this bridge would be very difficult due to traffic and varying angle of flow caused by the bridge itself. ADCP measurements are made from this section with positive results. Station maintained and record developed by Cheston Hart.

Recommendations.-- Installation of a bank operated cable system below the control will allow safe and timely measurements at all stages for this site.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

LAKE CREEK BELOW TWIN LAKES RESERVOIR

RATING TABLE-- STD30FTPF USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

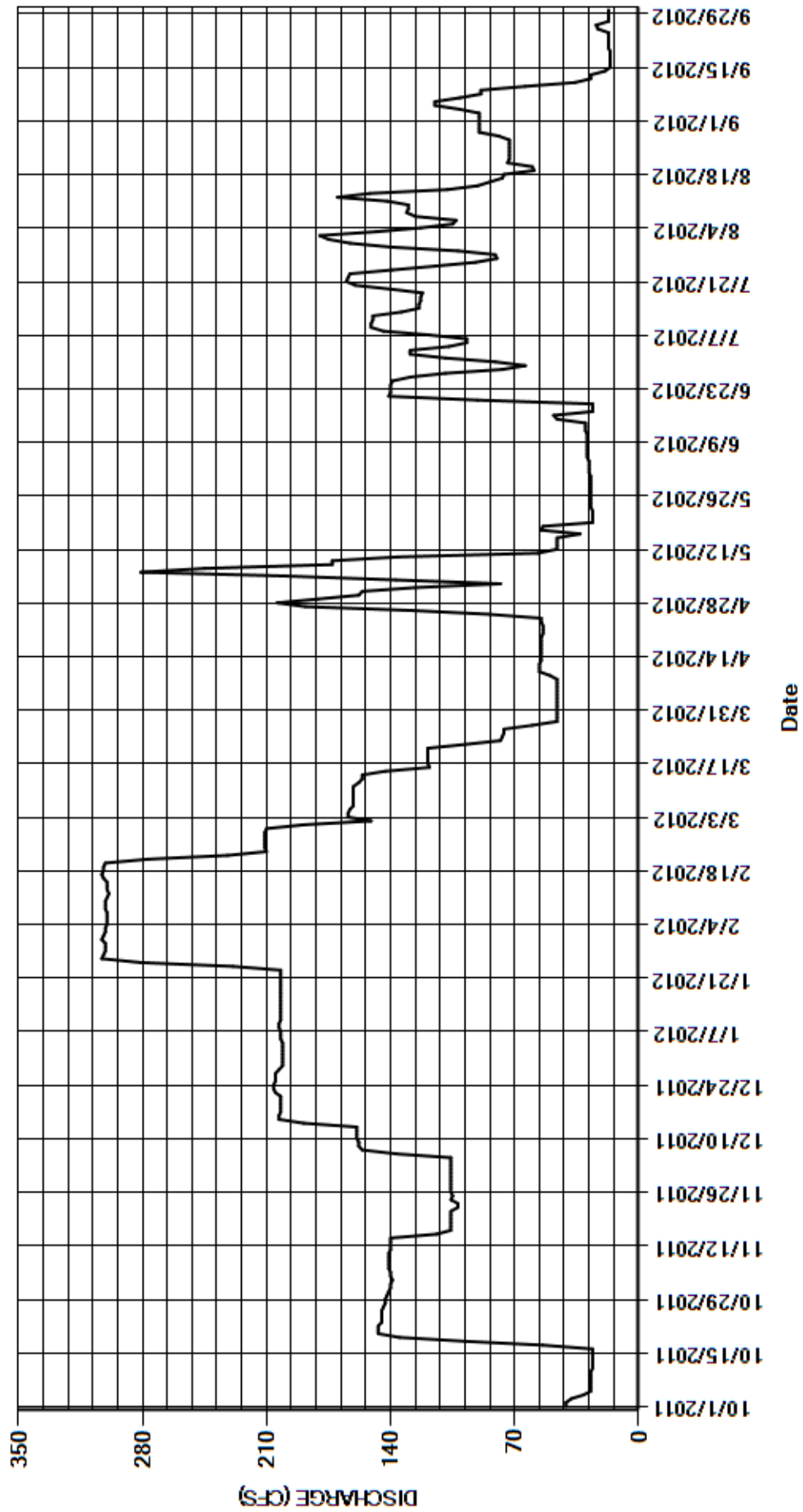
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	41	140	106	201	302	189	46	156	28	109	175	90
2	41	140	106	201	301	151	46	126	28	129	180	90
3	38	139	106	201	301	164	46	78	28	129	148	90
4	31	140	106	201	300	164	46	137	28	107	123	101
5	27	140	106	202	300	163	46	199	29	97	105	115
6	27	141	137	202	300	161	46	281	29	97	103	115
7	27	141	156	202	300	161	46	245	29	118	126	101
8	27	141	158	203	301	161	46	173	29	144	131	89
9	27	141	158	203	301	161	50	173	29	151	130	89
10	27	141	159	202	301	161	56	136	29	151	130	64
11	26	140	159	202	300	161	56	57	29	150	142	36
12	26	140	159	202	299	158	56	46	30	150	170	27
13	26	140	159	202	300	156	55	46	30	134	152	27
14	26	140	189	202	300	156	55	46	30	124	108	19
15	26	114	203	202	300	143	55	46	46	124	91	16
16	26	106	203	202	302	118	55	33	48	123	84	16
17	54	106	202	202	303	119	55	55	26	123	77	16
18	98	106	202	202	302	119	55	54	26	122	76	16
19	135	106	202	202	302	119	55	26	26	140	59	16
20	147	106	202	202	301	119	54	26	91	160	60	17
21	147	106	202	202	277	119	54	26	141	165	74	17
22	147	102	205	202	232	98	54	26	140	164	73	17
23	145	102	206	202	210	78	55	27	140	163	73	17
24	145	106	206	229	211	77	55	27	140	139	73	17
25	145	105	205	281	211	76	84	27	139	115	73	23
26	145	106	205	303	211	76	128	27	129	92	73	24
27	144	106	205	302	211	60	188	27	109	80	73	17
28	143	106	203	301	211	46	204	27	77	81	79	17
29	143	106	201	301	210	46	181	27	64	102	90	17
30	142	106	201	301	---	46	158	27	81	140	90	17
31	141	---	201	303	---	46	---	27	---	163	90	---
TOTAL	2490	3659	5418	6965	8000	3772	2186	2434	1828	3986	3231	1333
MEAN	80.3	122	175	225	276	122	72.9	78.5	60.9	129	104	44.4
AC-FT	4940	7260	10750	13820	15870	7480	4340	4830	3630	7910	6410	2640
MAX	147	141	206	303	303	189	204	281	141	165	180	115
MIN	26	102	106	201	210	46	46	26	26	80	59	16

CAL YR	2011	TOTAL	112090	MEAN	307	MAX	1610	MIN	25	AC-FT	222300
WTR YR	2012	TOTAL	45302	MEAN	124	MAX	303	MIN	16	AC-FT	89860

MAX DISCH: 335 CFS AT 19:00 ON MAY 06,2012 GH 1.87 FT SHIFT 0.1 FT
 MAX GH: 1.87 FT AT 19:00 ON MAY 06,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

LAKE CREEK BELOW TWIN LAKES RESERVOIR
 WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
07086000 ARKANSAS RIVER AT GRANITE
Water Year 2012

Location.-- Lat. 39°02'34", Long. 106°15'55", in SE¼SW¼ sec. 31, T.11 S., R.79 W., Chaffee County, Hydrologic Unit 11020001, on right bank at Granite, 100 ft east of U.S. Highway 24, 100 ft downstream from county bridge, and 200 ft upstream from Cache Creek.

Drainage Area and Period of Record.-- 427 mi². ; Gage established April 1895. Sporadic data from April 1895 to May 1901. Complete data from April 1910 to current year. Monthly data for some periods only.

Equipment.-- Graphic water-stage recorder, satellite-monitored data collection platform and shaft encoder in 42-inch diameter corrugated metal pipe (CMP) shelter and well. Shaft encoder and chart set to inside electric tape gage. Gage shelter is supplied with AC power. A stock tank heater is used inside the well during periods of freezing weather to keep well open. A cableway for high flow measurements is located approximately 100 feet downstream from gage.

Hydrologic Conditions.-- The Arkansas River at Granite is located below both Twin Lakes and Turquoise Lake. The flow conditions are subject to releases from these lakes as well as native flows. Natural drainage area is approximately 427 sq miles. The basin consists of high mountain terrain some of which is above tree line with very little development.

Gage-Height Record.-- Primary record is 15-minute satellite data with DCP log and chart record used for back-up purposes. The record is complete and reliable, except for the following periods: Dec 15, 16, 23, 24, 2011; Jan 12, 17; Feb 28 2012, when the stage discharge relationship was affected by ice. The shelter and well are situated on the right bank in calm water subject to significant shore ice, including complete channel and control freeze-over during periods of extreme cold weather.

Datum Corrections.-- No levels were run this water year. Levels were last run Aug. 8, 2005.

Rating.-- Control is a boulder riffle 150 ft downstream. At high water stages channel and banks are the control. Rating No. 11A, implemented in Dec 2002, was used for the water year. Twelve discharge measurements (Nos. 405-416) were made during the water year ranging in discharge from 143 to 470 cfs. They cover the range in flows experienced except for the lower daily flow of Oct 1-4, 11-16 2011; Apr 4, 5-9, 16-18; June 19; Aug 19, 20; Sept 10-30, 2012. The peak flow of 475 cfs occurred at 1330 on May 6, 2012 at a of gage height of 3.39 ft with a shift of -0.03. ft. It exceeded mean stage of Measurement No. 410, made May 7, 2012 by 0.01 ft. in stage.

Discharge.-- Shifting control method was used during all periods of ice-free record. Shifts were distributed by time and event the entire year, except between Dec 22, 2011 thru Mar 27 2012 when variable shift ARKGRNCOVS12 was used during the winter months. Variable ARKGRNCOVS12 was based on four measurement (406-409). Measurements show shifts varying from -0.05 ft. to +0.03 ft. All were given full weight and applied directly.

Special Computations.-- Discharge for periods of no or suspect gage-height record and ice-affected record were estimated on the basis of related measurements, surrounding good record, weather records, site visits and by using the final record from Lake Creek below Twin Lakes. A hydrograph was used comparing flows with up and downstream gages.

Remarks.-- Record good, except during periods of no or suspect gage height record and ice affect, which are poor. Peak is rated good given the field measurement taken one day after the peak. Station maintained and record developed by Cheston Hart.

Recommendations.-- Continued use of the ADCP from the cableway should help confirm its effectiveness during the high water periods.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

07086000 ARKANSAS RIVER AT GRANITE

RATING TABLE-- ARKGRNCO11A USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

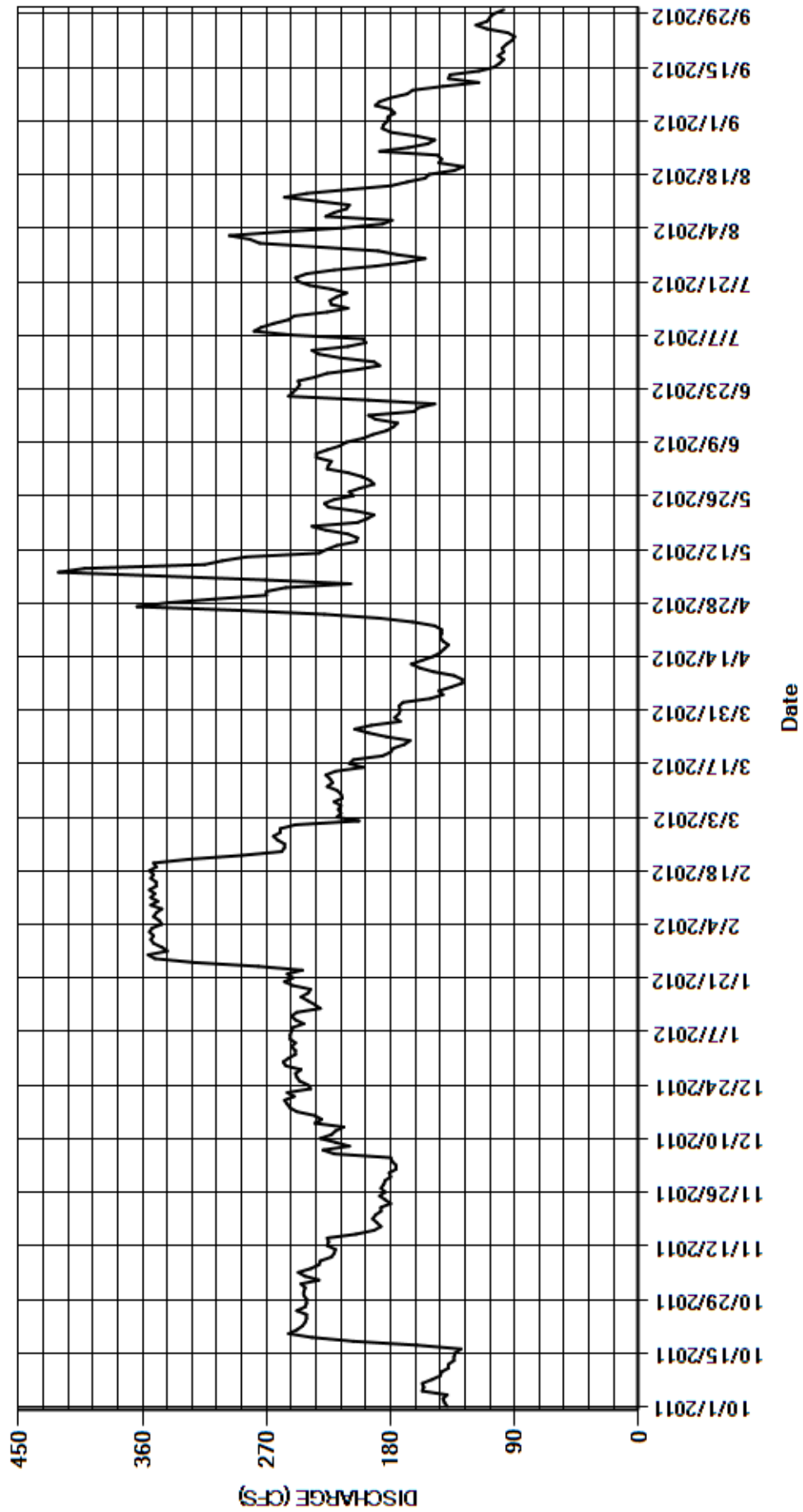
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	139	242	181	249	352	249	174	270	211	216	282	182
2	141	245	176	249	355	203	171	256	226	232	297	182
3	142	232	176	252	353	219	151	209	225	237	258	177
4	139	242	179	249	346	216	142	271	223	211	214	180
5	157	247	180	253	348	218	145	347	234	198	186	191
6	156	238	221	253	352	216	136	421	234	200	179	188
7	157	232	229	252	350	221	128	402	226	252	227	180
8	150	231	210	251	346	215	128	315	217	279	221	168
9	144	223	220	243	354	216	134	302	212	274	212	164
10	143	221	231	249	349	219	149	285	200	265	210	142
11	138	220	223	252	354	226	159	232	193	254	233	116
12	138	226	220	e248	351	222	165	226	183	250	257	138
13	134	225	214	231	355	224	157	219	178	226	241	137
14	134	226	235	235	350	227	149	205	175	211	211	116
15	133	205	e230	240	350	220	144	204	191	223	180	105
16	129	192	e235	245	354	200	141	211	196	224	168	101
17	161	187	248	e240	352	210	138	227	163	219	155	98
18	207	190	253	238	355	207	142	237	160	212	152	102
19	237	193	255	251	350	186	144	204	148	223	134	98
20	254	191	257	257	352	180	143	197	196	239	127	99
21	248	187	250	251	326	178	143	192	254	247	145	96
22	244	187	255	255	288	170	148	205	251	249	143	92
23	242	180	e238	244	259	166	164	225	248	241	146	90
24	241	184	e240	276	257	183	188	228	246	221	188	95
25	241	188	246	322	257	196	228	221	247	191	167	110
26	248	184	248	351	262	206	288	207	235	169	153	118
27	242	187	249	356	265	194	364	210	226	155	148	110
28	241	185	245	342	e260	173	342	202	204	175	161	108
29	241	184	256	346	260	177	308	192	188	189	180	105
30	243	180	258	352	---	174	270	195	192	232	186	98
31	243	---	254	354	---	173	---	201	---	275	185	---
TOTAL	5807	6254	7112	8386	9462	6284	5383	7518	6282	6989	5946	3886
MEAN	187	208	229	271	326	203	179	243	209	225	192	130
AC-FT	11520	12400	14110	16630	18770	12460	10680	14910	12460	13860	11790	7710
MAX	254	247	258	356	355	249	364	421	254	279	297	191
MIN	129	180	176	231	257	166	128	192	148	155	127	90

CAL YR	2011	TOTAL	212469	MEAN	582	MAX	2880	MIN	104	AC-FT	421400
WTR YR	2012	TOTAL	79309	MEAN	217	MAX	421	MIN	90	AC-FT	157300

MAX DISCH: 475 CFS AT 13:30 ON MAY 06,2012 GH 3.39 FT SHIFT -0.03 FT
 MAX GH: 3.39 FT AT 13:30 ON MAY 06,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

07086000 ARKANSAS RIVER AT GRANITE
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
07086500 CLEAR CREEK ABOVE CLEAR CREEK RESERVOIR
Water Year 2012

Location.-- Lat. 39°01'05", Long. 106°16'38", in SE¼ sec. 12, T,12 S., R.80 W., Chaffee County, Hydrologic Unit 11020001, on left bank 0.5 mi upstream from water line of Clear Creek Reservoir at elevation 8,875 ft, 1.5 mi downstream from unnamed tributary, and 1.9 mi southwest of Granite.

Drainage Area and Period of Record.-- 67.1 mi².; May 1946 to present.

Equipment.-- Graphic water-stage recorder, satellite-monitored data collection platform and shaft encoder in a 42-inch diameter corrugated metal pipe (CMP) shelter and well. Shaft encoder and chart set to inside drop tape gage with adjustable RP on instrument shelf. Control is a concrete dam tapered lower towards the center, located approximately 10 feet downstream. An outside staff gage is used as a supplemental reference gage. However, since its installation, it does not agree with the inside tape, most likely due to draw-down. No changes this water year.

Hydrologic Conditions.-- Clear Creek fills Clear Creek Reservoir and is tributary to the main stem of the Arkansas River. Clear Creek basin is approximately 42,880 acres with a mean elevation of 11,700 ft. The basin consists primarily of high mountain terrain, some of which is above tree line, with very little development except a low volume trail road. No hydrologic condition changes were apparent this water year.

Gage-Height Record.-- Primary record is 15-minute satellite data with the chart record used for back-up purposes. The record is complete and reliable, except for the following periods: Oct 26-31; Nov 1, 2011 and March 21, 2012 when the stage-discharge relationship was affected by ice; Nov. 2, 2011 through March 20, 2012 when the station was closed for the winter.

Datum Corrections.-- Levels were last run on Aug 19, 2009. No corrections were needed or taken.

Rating.-- The control is a concrete dam tapered lower towards the center and located 10 ft below the gage. Control at high stages includes brush and boulders lining the edges of the channel. Rating No. 14, dated 20 Feb 1996, was used for the entire water year. Fourteen discharge measurements (Nos. 124-137) were made during the water year, ranging in discharge from 13.1 to 126 cfs. They cover the range in stage experienced, except for the higher daily flows of May 16-18, 22-24, 27, 31; June 1-9 2012 and lower daily flows of Dec 22-25 2011; Jan 12,13, 16-18, 23, 24, 27-29, 31; Feb 1-29; Mar 1-11, 20-24 2012. The peak flow of 211 cfs occurred at 0100 May 23, 2012 at a gage height of 3.85 ft with a shift of +0.16 ft. It exceeded Measurement No. 133, made May 18, 2012, by 0.28 ft. in stage. The peak gage height of 3.86 ft occurred at 0015 June 2, 2012.

Discharge.-- Shifting control method was used for all periods of good, ice-free record. Shifts were applied as defined by measurements and were distributed by time. The condition of this weir and the approach channel are assumed to be the cause of the more positive shifts. Open water measurements indicated shifts varying from +0.11 to +0.18 ft. All open water measurements were given full weight and applied directly.

Special Computations.-- Discharge for periods of no gage-height record and ice-affected record were estimated on the basis of six measurements (Nos. 125-129) and temperature records from Clear Creek Reservoir. Use of the ADCP was attempted and found to have issues with both the limited depth during normal flows and high velocities during peak flows. ADCP usage will be limited at this site.

Remarks.-- Record good, except during periods of no gage height record and ice effect, which are estimated and poor. The peak gage height and peak discharge are rated good considering related measurements and site visits. Station maintained and record developed by Cheston Hart.

Recommendations.-- More documentation of the weir condition is needed to track damage and wear that the weir is exhibiting. As damage to the weir continues, a new structure should be considered. Levels should be run in WY2013 to document the weir condition and to investigate differences between the outside gage and inside gage.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

07086500 CLEAR CREEK ABOVE CLEAR CREEK RESERVOIR

RATING TABLE-- CCACRCO14 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

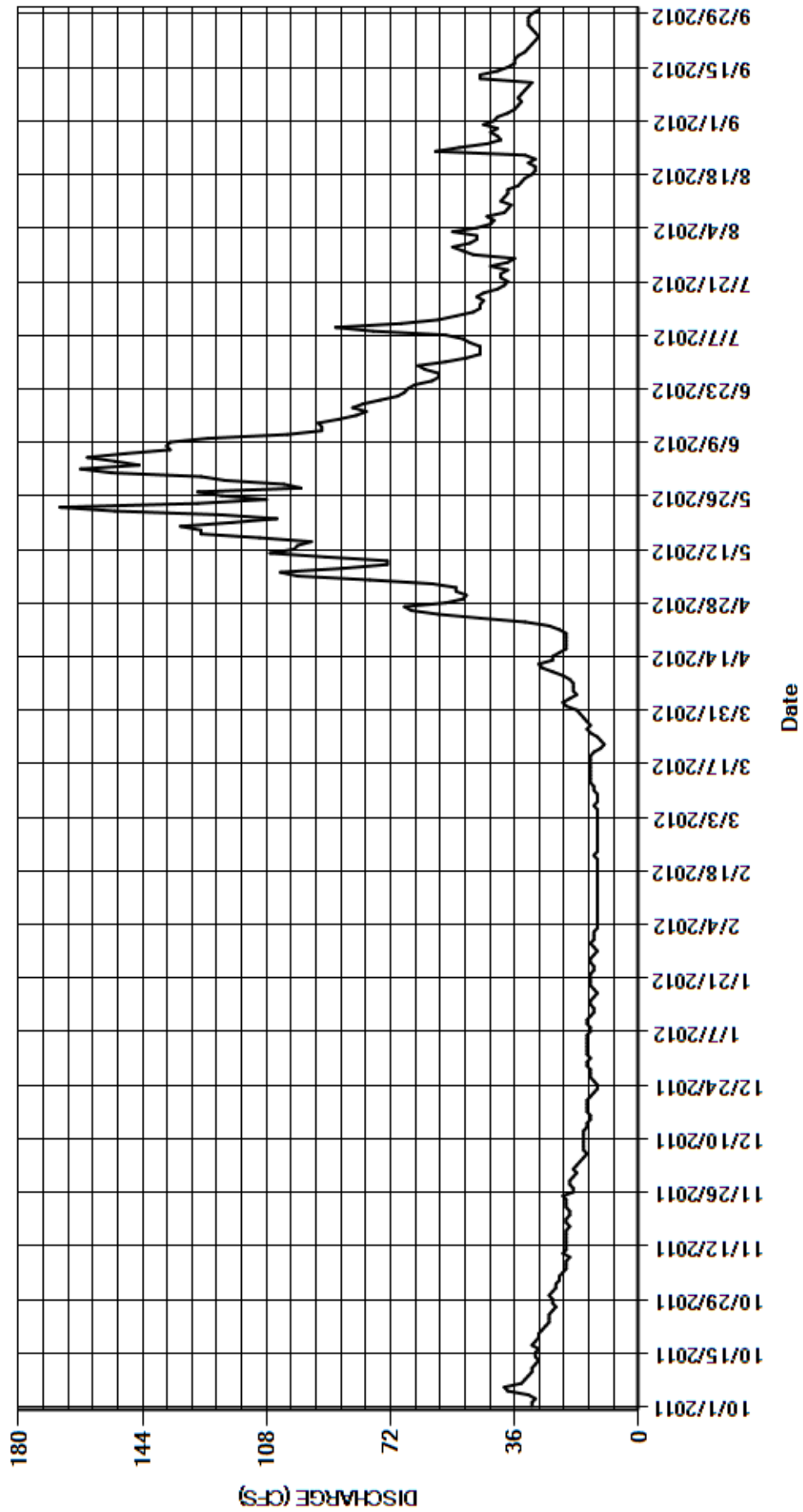
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	31	e24	e18	e15	e13	e12	21	53	153	50	47	42
2	31	e24	e19	e15	e13	e12	22	53	162	46	47	41
3	30	e23	e18	e15	e12	e12	20	60	145	46	54	38
4	32	e23	e17	e15	e12	e12	18	78	152	46	47	36
5	38	e22	e16	e15	e12	e12	19	99	160	49	43	35
6	39	e21	e15	e15	e12	e13	19	104	149	51	42	34
7	34	e21	e16	e14	e12	e12	19	86	136	56	44	35
8	33	e21	e16	e14	e12	e12	20	73	137	77	39	34
9	32	e20	e16	e15	e12	e12	22	73	136	88	38	33
10	31	e22	e16	e15	e12	e13	25	91	125	69	37	32
11	31	e21	e16	e14	e12	e13	28	107	102	58	40	31
12	30	e21	e16	e13	e12	e14	29	100	92	53	39	46
13	29	e21	e15	e13	e12	e14	25	99	92	48	38	46
14	30	e21	e15	e14	e12	e14	25	95	93	46	38	41
15	30	e21	e14	e14	e12	e14	23	110	87	46	35	38
16	29	e21	e14	e13	e12	e14	21	127	82	45	34	36
17	31	e20	e15	e12	e12	e14	21	127	79	47	33	36
18	30	e21	e15	e13	e12	e14	21	133	83	45	31	35
19	29	e21	e15	e14	e12	e14	21	118	80	41	30	33
20	29	e20	e15	e14	e12	e13	21	105	75	39	30	32
21	28	e20	e14	e14	e12	e11	23	121	70	38	32	31
22	27	e21	e13	e14	e13	10	26	152	68	40	30	30
23	26	e21	e12	e13	e12	11	33	168	67	40	33	29
24	26	e21	e12	e13	e12	12	46	128	65	38	59	30
25	26	e22	e13	e14	e12	14	58	108	60	43	52	31
26	e25	e19	e14	e14	e12	15	66	121	58	38	44	32
27	e24	e19	e14	e13	e12	14	68	128	58	36	40	32
28	e25	e20	e14	e12	e12	15	56	98	62	48	41	32
29	e25	e20	e15	e13	e12	16	51	103	64	51	43	31
30	e26	e19	e15	e14	---	17	50	120	56	54	41	29
31	e25	---	e14	e13	---	18	---	127	---	49	45	---
TOTAL	912	631	467	429	351	413	917	3265	2948	1521	1246	1041
MEAN	29.4	21.0	15.1	13.8	12.1	13.3	30.6	105	98.3	49.1	40.2	34.7
AC-FT	1810	1250	926	851	696	819	1820	6480	5850	3020	2470	2060
MAX	39	24	19	15	13	18	68	168	162	88	59	46
MIN	24	19	12	12	12	10	18	53	56	36	30	29

CAL YR	2011	TOTAL	32206	MEAN	88.2	MAX	672	MIN	11	AC-FT	63880
WTR YR	2012	TOTAL	14141	MEAN	38.6	MAX	168	MIN	10	AC-FT	28050

MAX DISCH: 211 CFS AT 01:00 ON MAY 23,2012 GH 3.85 FT SHIFT 0.16 FT
 MAX GH: 3.86 FT AT 01:15 ON JUN 02,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

07086500 CLEAR CREEK ABOVE CLEAR CREEK RESERVOIR
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
CLEAR CREEK BELOW CLEAR CREEK RESERVOIR
Water Year 2012

Location.-- Lat 39°01'20", long 106°14'07", Lake County, on left bank 200 ft. upstream from junction of Clear Creek and Arkansas River, and approximately 1500 ft downstream of Clear Creek Dam.

Drainage Area and Period of Record.-- 68.98 sq. mi. ;

Equipment.-- High-Data-Rate data collection platform and shaft encoder in a wood frame shelter and concrete stilling well. A Stage Discharge Recorder (SDR) is used for backup purposes. The shaft encoder and SDR are set to the inside drop tape gage with adjustable RP on instrument shelf. Outside gage is used as supplemental reference. A bridge is located across the concrete section at the entrance to the converging section of the flume and used for making high water measurements. The compound weir was repaired March 2, 2011.

Hydrologic Conditions.-- The gage is located approximately 1500 ft downstream of the outlet of Clear Creek Reservoir. The stream flows under the highway approximately 200 ft above the gage through three separate 6 ft diameter culverts. During the winter the water flows solely in the south culvert where shallow water can be measured. The water released is warm enough the control does not experience ice affected days. No hydrologic condition changes were apparent this year.

Gage-Height Record.-- Primary record is fifteen-minute satellite data with the SDR log used for backup purposes. Record is complete and reliable.

Datum Corrections.-- Levels were last run on July 14, 2006. No corrections were required and level results in previous years have shown this gage to be stable.

Rating.-- The control is a 20-ft wide, compound, broad crested weir constructed in 1993 and repaired February 28 through March 2, 2011. Rating No. 4 was used all year. It is well defined to about 400 cfs. Eight discharge measurements (Nos. 250-256) were made during the year. Measurements range in discharge from 0.63 to 131 cfs. They cover the range in stage except lower flows of Nov 16 - Dec 14, 2011; and higher flow days of May 17, 22,-24, 27; June 1-10 2012. The peak flow of 251 cfs occurred at 0745 June 5, 2012 at a gage height of 2.51 ft with a shift of 0.11 ft. It exceeded the stage of Measurement No. 254 made June 5, 2012, by 0.67 ft.

Discharge.-- Shifting control method was used for the entire water year. Shifts were applied as defined by measurements and were distributed by variable stage-shift relationship, CCBCRCOV512A, the entire year. All measurements were given full weight except for No. 251.1 and 252, which were discounted by 9% to smooth shift distribution. Measurement 250 was not used after considering the measurement section and comparing similar measurements made this water year.

Special Computations.-- No special computations were used this year.

Remarks.-- Record is good, except for the winter low flow period: Nov 16, 2011 to Mar 15, 2012, which is poor due to difficulty measuring the low flows and defining shifts. Peak GH and discharge are rated good based on site visits and measurement near the peak. Due to the depths at the measurement section the ADCP has become the primary measurement device. Station maintained and record developed by Cheston Hart.

Recommendations.-- Continued measurements to confirm shifts at upper and lower ranges of the rating.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

CLEAR CREEK BELOW CLEAR CREEK RESERVOIR

RATING TABLE-- CCBCRCO04 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

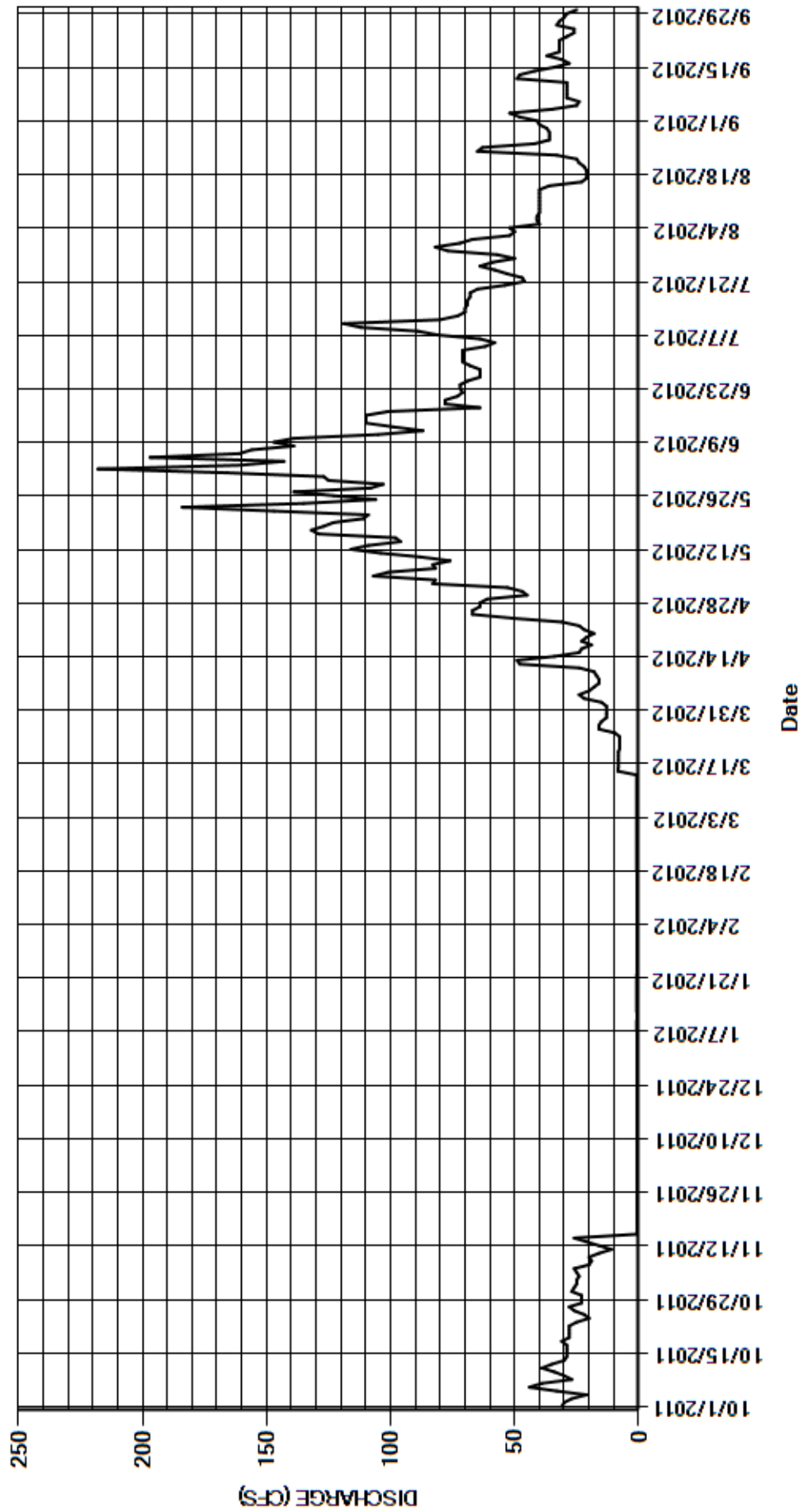
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	31	26	0.60	0.66	0.66	0.72	13	47	166	71	67	41
2	30	25	0.60	0.68	0.66	0.72	15	53	218	71	52	48
3	27	25	0.60	0.70	0.66	0.72	22	83	160	71	50	52
4	21	24	0.60	0.68	0.66	0.72	24	82	143	62	52	35
5	33	25	0.60	0.71	0.66	0.72	20	107	197	58	40	25
6	44	26	0.60	0.71	0.66	0.73	18	101	161	64	41	24
7	39	20	0.60	0.72	0.66	0.72	16	82	156	81	41	29
8	27	19	0.60	0.72	0.66	0.72	16	83	139	89	40	29
9	30	20	0.60	0.72	0.66	0.72	17	76	147	112	40	29
10	34	16	0.60	0.72	0.66	0.73	18	88	139	119	40	29
11	39	11	0.60	0.71	0.69	0.72	24	104	105	80	40	29
12	35	16	0.60	0.72	0.69	0.72	48	116	87	73	40	49
13	30	21	0.62	0.72	0.70	0.72	49	109	99	70	40	48
14	29	26	0.64	0.72	0.72	0.72	34	96	110	70	40	42
15	29	0.66	0.66	0.72	0.70	8.4	24	98	110	69	36	34
16	29	0.59	0.66	0.72	0.69	8.2	23	129	110	69	23	28
17	29	0.59	0.66	0.72	0.71	8.2	19	132	101	68	21	31
18	31	0.59	0.66	0.72	0.72	8.2	23	127	64	68	21	37
19	28	0.60	0.66	0.72	0.72	8.2	21	123	78	65	21	32
20	28	0.60	0.66	0.72	0.72	8.2	18	111	78	54	22	32
21	28	0.60	0.66	0.72	0.72	7.6	22	109	73	46	24	32
22	28	0.58	0.66	0.72	0.72	7.6	24	147	71	47	25	32
23	25	0.58	0.66	0.70	0.72	7.6	31	184	72	53	33	29
24	20	0.60	0.66	0.66	0.72	7.6	51	135	72	58	65	26
25	22	0.58	0.66	0.66	0.72	9.6	67	106	69	64	63	26
26	26	0.56	0.66	0.66	0.72	16	67	123	64	59	42	33
27	28	0.60	0.66	0.66	0.72	16	64	139	64	50	36	32
28	23	0.60	0.66	0.66	0.72	15	64	108	64	57	36	30
29	23	0.60	0.66	0.66	0.72	13	61	103	68	77	36	29
30	23	0.60	0.68	0.66	---	13	45	125	71	82	37	25
31	27	---	0.66	0.66	---	13	---	127	---	72	40	---
TOTAL	896	309.53	19.70	21.63	20.14	185.50	958	3353	3256	2149	1204	997
MEAN	28.9	10.3	0.64	0.70	0.69	5.98	31.9	108	109	69.3	38.8	33.2
AC-FT	1780	614	39	43	40	368	1900	6650	6460	4260	2390	1980
MAX	44	26	0.68	0.72	0.72	16	67	184	218	119	67	52
MIN	20	0.56	0.60	0.66	0.66	0.72	13	47	64	46	21	24

CAL YR	2011	TOTAL	30087.90	MEAN	82.4	MAX	408	MIN	0.56	AC-FT	59680
WTR YR	2012	TOTAL	13369.50	MEAN	36.5	MAX	218	MIN	0.56	AC-FT	26520

MAX DISCH: 251 CFS AT 07:45 ON JUN 05,2012 GH 2.51 FT SHIFT 0.11 FT
 MAX GH: 2.51 FT AT 07:45 ON JUN 05,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

CLEAR CREEK BELOW CLEAR CREEK RESERVOIR
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
07089250 COTTONWOOD CREEK NEAR BUENA VISTA
Water Year 2012

Location.-- Lat 38°50'07.88", Long 106°07'17.01" , NAD83, (Buena Vista East, Colorado quadrangle, 1:24000 scale), in NW1/4, NW1/4, NW1/4 Sec 16, T14S, R78W, Chaffee County, Hydrologic Unit 11020001, on left bank about 1500 ft upstream from confluence of Cottonwood Creek and Arkansas River, and about 1200 ft upstream from bridge near Buena Vista High School.

Drainage Area and Period of Record.-- 109.24 sq.mi.;

Equipment.-- Graphic water-stage recorder, satellite-monitored data collection platform and constant flow bubbler in a 42-inch corrugated metal pipe shelter. Primary reference gage is outside staff. Inside well can be used for supplemental reference but no data is collected from stilling well elevation. No changes this water year.

Hydrologic Conditions.-- Cottonwood Creek is tributary to the main stem of the Arkansas River. The Cottonwood Creek basin is approximately 108 sq miles with a mean elevation of 10,900 ft. The basin consists primarily of high mountain terrain, some of which is above tree line, with very little development except many low volume trail roads. The creek does flow through the town of Buena Vista and a small pond that is about one surface acre in size. In the fall this pond is drained and large amounts silt and sand are released to the creek filling most of the channel including the control. No hydrologic condition changes were apparent this water year.

Gage-Height Record.-- Primary record is fifteen minute satellite data with DCP log as backup. The record is complete and reliable, except for the following periods: Nov 4, 27; Dec 6, 23, 2011; Jan 12; March 3, 2012; when ice affected the stage-discharge relationship..

Datum Corrections.-- Levels were last run on Sep. 19, 2011. Results were well within acceptable limits, so no corrections were made at that time.

Rating.-- The control is a concrete compound broad-crested weir with a center V- notch for low flows and a rectangular shape for higher flows. Rating No. 4, dated Mar. 25, 1996, was used the entire water year, and is well defined to about 676 cfs. Eleven discharge measurements (Nos. 762-772) were made during the year. Measurements ranged in discharge from 0.96 to 35.5 cfs. They cover the range in stage experienced except for the lower daily flows of Oct 4, 2011; April 28, 29; July 22, 23; Aug 19, 29 2012. The peak discharge of 45.2 cfs occurred at 1445 on Dec 7, 2012 at a gage height of 2.52 ft with a shift of -0.01 ft. It exceeded the mean stage of Measurement No. 764, made Feb 6, 2012 by 0.15 feet.

Discharge.-- Shifting control method was used for periods of good, ice-free record. Shifts were applied as defined by measurements and distributed by time for the entire water year. Many fill and scour events are assumed to cause varied shifts especially in the spring and fall when the city lake fills and releases. The control does appear to change slightly during these times of fill and scour therefore making it inadequate for a variable shift curve. Shifts ranged from -0.05 to +0.04 feet. All shifts were applied directly and given full weight.

Special Computations.-- Estimation of discharge for periods of ice effect and no gage height were made using surrounding good record, partial day records, weather records and discharge measurements. A hydrograph was developed and used.

Remarks.-- Record is good, except during periods of ice effect which are estimated and considered poor. Peak GH and discharge are rated good based on measurements and site visits during this time. Station maintained and record developed by Cheston Hart.

Recommendations.-- Continued use of the ADCP at high flows to better define upper end of rating. Additional research to understand inflows and outflows of this stream through town of Buena Vista would be beneficial. Continue to monitor Rating No. 4 for validity, especially at gage heights greater than 2.0 feet.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

07089250 COTTONWOOD CREEK NEAR BUENA VISTA

RATING TABLE-- COCRBVCO04 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

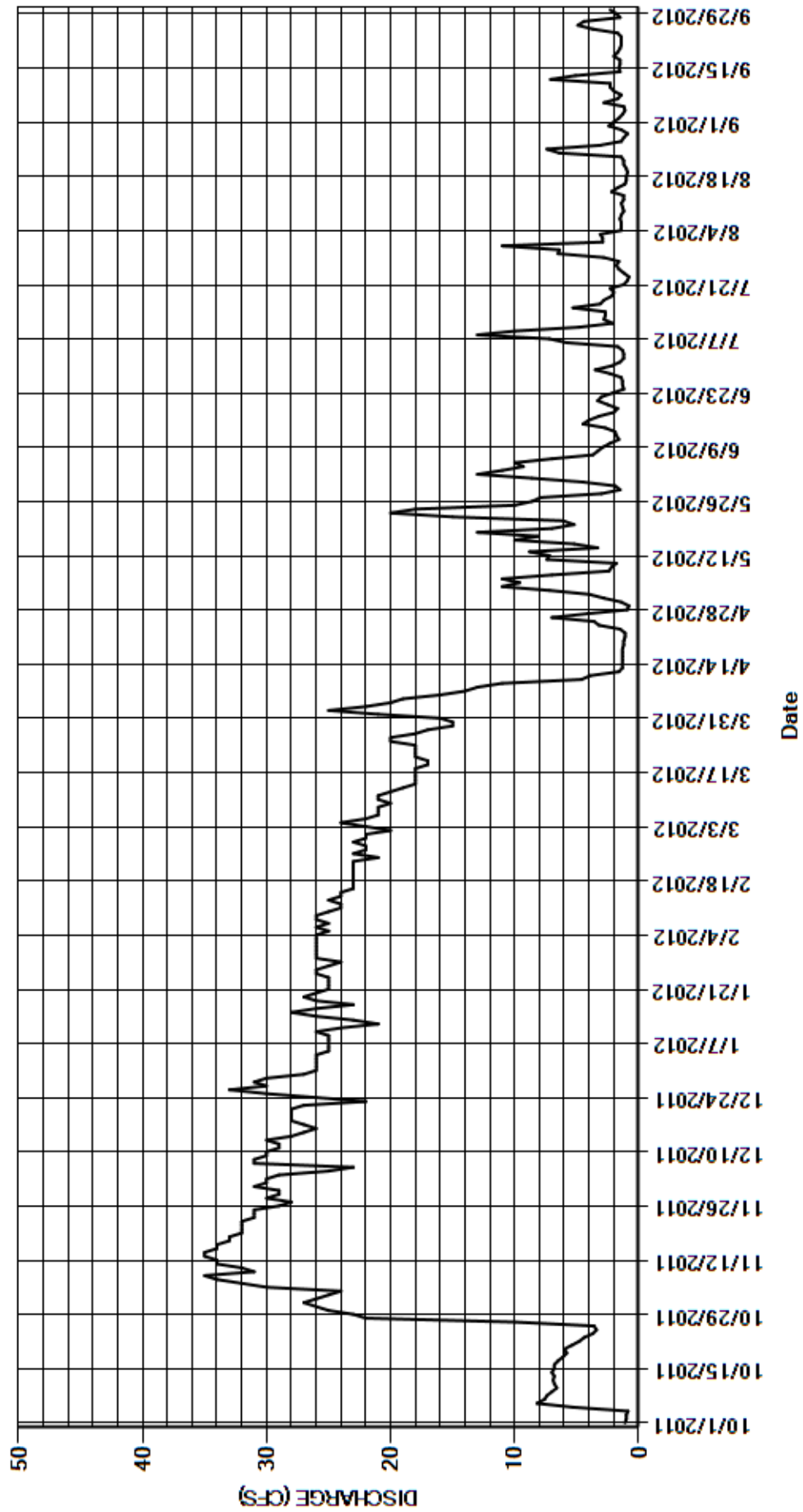
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.1	27	31	26	26	22	21	2.8	8.6	1.5	2.9	2.0
2	1.0	26	30	26	26	20	25	4.0	13	1.2	2.9	1.6
3	1.0	25	30	26	26	e22	22	7.2	11	1.2	3.1	1.3
4	0.87	e24	29	26	26	24	20	11	9.3	1.3	1.4	1.1
5	5.3	30	25	25	25	22	19	9.6	10	1.7	1.4	1.2
6	8.2	32	e23	25	26	21	16	11	7.0	5.8	1.4	2.8
7	7.6	34	31	25	25	21	14	7.0	3.7	7.2	1.5	1.7
8	7.4	35	31	25	26	21	13	2.4	3.3	13	1.4	1.4
9	7.0	31	30	25	26	20	11	2.2	2.9	10	1.2	2.0
10	6.6	32	30	26	25	21	4.6	1.8	2.3	4.8	1.3	2.3
11	6.8	34	29	24	24	21	3.9	7.4	1.6	2.1	1.4	2.3
12	6.9	34	29	e21	24	20	1.6	7.2	1.8	2.8	1.2	7.1
13	6.8	35	30	23	25	19	1.3	8.8	1.9	2.7	1.2	5.1
14	7.0	35	28	26	24	18	1.3	3.3	2.7	2.7	2.2	1.5
15	6.8	34	27	28	24	18	1.3	5.2	4.5	5.3	1.7	1.6
16	6.8	34	26	26	23	18	1.3	10	4.0	3.1	1.1	1.5
17	6.5	33	27	23	23	18	1.3	8.1	3.2	2.8	1.0	1.5
18	6.1	33	28	26	23	18	1.3	13	2.0	2.2	1.0	2.0
19	5.8	32	28	27	23	17	1.2	7.0	1.7	2.0	0.90	1.7
20	6.0	32	28	26	23	17	1.2	5.2	2.5	2.3	1.0	1.5
21	5.4	32	28	25	23	18	1.1	6.1	3.3	1.2	1.2	1.4
22	4.8	32	27	25	23	18	1.1	15	3.0	0.92	1.2	1.4
23	4.4	31	e22	25	23	18	1.5	20	2.1	0.78	1.4	1.4
24	3.7	31	26	25	21	18	3.2	18	1.2	1.2	6.4	1.7
25	3.4	31	30	26	23	20	3.6	10	1.3	1.6	7.4	3.7
26	3.6	29	33	26	22	20	7.0	8.6	1.3	1.8	3.1	4.9
27	10	e28	30	25	22	18	4.1	7.9	1.4	1.6	1.4	4.4
28	22	30	31	24	23	17	0.92	3.0	2.3	2.8	1.2	1.5
29	23	29	30	26	22	15	0.78	1.5	3.5	6.5	0.89	1.8
30	25	29	27	26	---	15	1.4	1.9	2.2	6.4	1.4	2.3
31	26	---	26	26	---	16	---	4.5	---	11	2.4	---
TOTAL	242.87	934	880	784	695	591	206.00	230.7	118.6	111.50	59.19	67.7
MEAN	7.83	31.1	28.4	25.3	24.0	19.1	6.87	7.44	3.95	3.60	1.91	2.26
AC-FT	482	1850	1750	1560	1380	1170	409	458	235	221	117	134
MAX	26	35	33	28	26	24	25	20	13	13	7.4	7.1
MIN	0.87	24	22	21	21	15	0.78	1.5	1.2	0.78	0.89	1.1

CAL YR	2011	TOTAL	14506.48	MEAN	39.7	MAX	285	MIN	0.24	AC-FT	28770
WTR YR	2012	TOTAL	4920.56	MEAN	13.4	MAX	35	MIN	0.78	AC-FT	9760

MAX DISCH: 45.2 CFS AT 14:45 ON DEC 07,2011 GH 2.52 FT SHIFT -0.01 FT
 MAX GH: 2.52 FT AT 14:45 ON DEC 07,2011

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

07089250 COTTONWOOD CREEK NEAR BUENA VISTA
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
07091015 CHALK CREEK AT NATHROP
Water Year 2012

Location.-- Lat. 38°44'30", Long. 106°04'57", in SW¼SE¼NE¼SW¼ sec. 14, T.15 S., R.78 W., Chaffee County, on left bank, 640' north of the Junction of Co. Hwy. 162 and U.S. 285 on the frontage rd. parallel to U.S. 285, ¼ mi. south of Nathrop, Co., and 1 mi. west of the confluence of Chalk Creek and the Arkansas River.

Drainage Area and Period of Record.-- 88.74 sq. mi. ;

Equipment.-- Graphic water-stage recorder, satellite-monitored data collection platform with shaft encoder in 32-inch diameter corrugated metal pipe (CMP) shelter and well with tipping bucket rain gage. Shaft encoder and SDR are set to the inside drop tape gage with adjustable RP on instrument shelf. Outside staff gage is also used for reference purposes. Control is a concrete dam, tapered lower towards the center, located approximately 5 feet downstream.

Hydrologic Conditions.-- Chalk Creek is tributary to the main stem of the Arkansas River. The Chalk Creek basin is approximately 88.74 sq miles with a mean elevation of 11,200 ft. The basin consists primarily of high mountain terrain, some of which is above tree line, with very little development except many low volume trail roads. No hydrologic condition changes were apparent this water year.

Gage-Height Record.-- Primary record is 15-minute transmitted data with SDR log as backup. Record is complete and reliable except for the following periods: Dec 18-28 2011; when ice formed in the well affecting float movement.

Datum Corrections.-- Levels were run on August 18, 2009. Results were well within acceptable limits, so no corrections were needed or taken.

Rating.-- The low concrete dam is the control at all stages, except at higher stages the webbed box culvert (~approx. 75 ft. downstream) under the highway will sometimes cause backwater and affect the rating. Rating No. 7 (dated Jan. 19, 2006) was used the entire water year. It is well defined to about 1000 cfs. Eleven discharge measurements (Nos. 759-769) were made during the year. Measurements ranged in discharge from 6.90 to 53.1 cfs. They cover the range in flows experienced, except for higher daily flows of May 16-27, 29-31; June 1-6 2012 and lower daily flows of Mar 13-19, 21-25, 2012. The peak discharge of 102 cfs occurred at 0500 on May 23, 2012 at a gage height of 3.82 ft with a shift of 0.01 ft. It exceeded the mean stage of Measurement No. 764, made May 15, 2012 by 0.25 feet.

Discharge.-- Shifts were applied as defined by measurements and distributed by time for the entire water year. Measurements showed shifts ranged from 0.00 to +0.05 ft. All measurements were given full weight and shifts applied directly.

Special Computations.-- This site is fairly difficult to make a high water measurement at in a typical year due to high velocity for wading and shallow conditions for bridge measurements. ADCP measurements have been attempted during high water but unfortunately this river has high sediment load causing inconsistent reading from the Acoustic equipment. People have continued to stack rocks above and near the control. Also beavers built small dams above the gage causing irregular approach angles to control. Before each measurement an attempt was made to remove debris from beavers and rocks that caused a change in the stream. This gage stays open and is seldom ice effected given it is located approx 5mi downstream of the Mt Princeton hot springs. Ice effected days are usually caused by ice within the well and are estimated using surrounding good days and weather data from the ARKWELCO gage.

Remarks.-- Record is considered good, except during periods of frozen well which are poor. Peak gage height is rated good due to surrounding site visits and the peak discharge is rated fair based on lack of recent confirming high water measurements. Station maintained and record developed by Cheston Hart.

Recommendations.-- Levels should be run in WY13. Inspection of control and documentation of wear should be completed.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

07091015 CHALK CREEK AT NATHROP

RATING TABLE-- CHCRNACO07 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

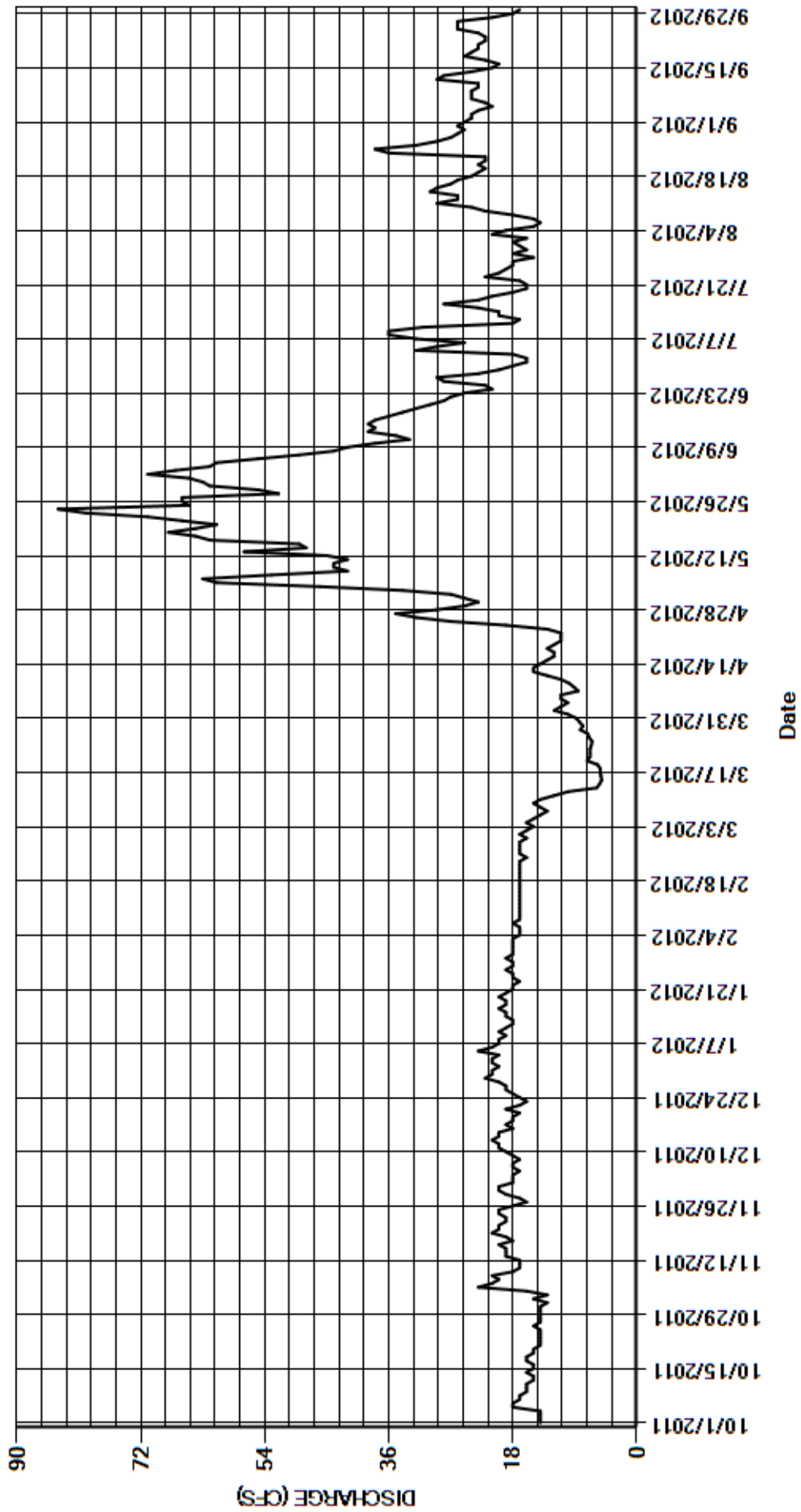
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	14	13	20	20	18	17	10	25	65	16	18	25
2	14	15	18	21	18	16	12	27	71	16	16	24
3	14	13	18	21	18	15	11	34	67	18	21	24
4	14	16	18	20	17	16	10	46	62	32	19	23
5	18	23	17	23	17	15	11	61	61	29	15	21
6	18	21	18	21	17	14	11	63	55	25	14	22
7	17	20	18	20	18	13	8.5	53	49	32	15	24
8	17	21	17	20	17	14	9.1	42	44	36	18	24
9	16	18	18	19	17	15	9.8	44	42	36	22	24
10	16	17	19	20	17	14	11	44	38	31	24	23
11	16	17	20	19	17	12	13	42	33	18	29	23
12	15	17	20	18	17	10	15	45	35	17	26	29
13	15	19	21	18	17	5.8	15	57	39	20	26	28
14	16	19	20	19	17	5.4	14	48	38	20	30	24
15	15	19	20	19	17	5.1	13	49	39	23	29	21
16	15	20	18	20	17	5.2	12	62	38	28	27	20
17	16	18	19	19	17	5.3	12	64	36	23	26	22
18	16	19	e18	19	17	5.3	13	68	34	21	24	25
19	15	21	e18	20	17	5.7	12	64	32	18	23	24
20	15	20	e17	19	17	7.2	11	61	30	16	22	23
21	14	20	e19	18	17	6.8	11	66	28	16	23	23
22	14	19	e17	18	17	6.8	11	71	27	17	22	22
23	14	19	e16	17	17	6.8	13	80	25	22	22	22
24	14	20	e17	18	16	6.6	19	84	21	20	36	23
25	14	20	e18	18	17	6.5	27	65	22	19	38	26
26	15	18	e19	19	17	6.9	32	66	28	18	32	26
27	14	16	e19	18	17	7.1	35	66	29	18	29	26
28	14	17	e20	18	17	8.2	29	52	23	15	27	21
29	14	19	22	19	16	7.8	25	55	20	18	26	18
30	14	20	21	18	---	8.3	23	62	18	16	25	17
31	14	---	21	18	---	8.8	---	63	---	17	26	---
TOTAL	467	554	581	594	495	296.6	458.4	1729	1149	671	750	697
MEAN	15.1	18.5	18.7	19.2	17.1	9.57	15.3	55.8	38.3	21.6	24.2	23.2
AC-FT	926	1100	1150	1180	982	588	909	3430	2280	1330	1490	1380
MAX	18	23	22	23	18	17	35	84	71	36	38	29
MIN	14	13	16	17	16	5.1	8.5	25	18	15	14	17

CAL YR	2011	TOTAL	18312.8	MEAN	50.2	MAX	321	MIN	4.8	AC-FT	36320
WTR YR	2012	TOTAL	8442.0	MEAN	23.1	MAX	84	MIN	5.1	AC-FT	16740

MAX DISCH: 102 CFS AT 05:00 ON MAY 23,2012 GH 3.82 FT SHIFT 0.01 FT
 MAX GH: 3.82 FT AT 05:00 ON MAY 23,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

07091015 CHALK CREEK AT NATHROP
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
07091500 ARKANSAS RIVER AT SALIDA
Water Year 2012

Location.-- Lat. 38°32'45", Long. 106°00'36", in NE¼ sec. 31, T.50 N., R.9 E., Chaffee County on right bank at Salida, 450 ft. upstream from bridge on State Highway 291, and 2.7 mi. upstream from South Arkansas River.

Drainage Area and Period of Record.-- 1,218 mi²;

Equipment.-- Graphic water-stage recorder, satellite-monitored data collection platform (High data rate DCP transmitter) and shaft encoder in a 4 ft x 4 ft steel shelter placed over a CMP stilling well. Shaft encoder set to inside drop tape from an adjustable RP on instrument shelf. A cableway is approximately 35 feet downstream from gage. A constant flow bubbler (CFB) was installed Jan 26, 2012 as a test for potential usage during periods of frozen well. No other changes this water year.

Hydrologic Conditions.-- The Arkansas River at Salida is located below Twin Lakes, Turquoise Lake and Clear Creek Reservoirs. The flow conditions are subject to releases from these lakes as well as native flows of tributary creeks. Natural drainage area is approximately 1200 sq miles with a mean elevation of 10300 ft. The basin consists of high mountain terrain some of which is above tree line.

Gage-Height Record.-- The primary record is fifteen minute DCP log data with a chart record used for back-up. Record is complete and reliable, except for the following periods: Dec 20-31, 2012; Jan 1-18; Feb 4-21 2012 when the stilling well was frozen with no effective GH, and Nov 27 when the control was affected by ice. Faulty GH data were replaced using SDR and CFB data.

Datum Corrections.-- No levels were run this year. Levels were last run on Feb 26, 2009. The drop tape was adjusted due to the RP being moved when the shelf was replaced.

Rating.-- The control consists of placed boulders 80 ft downstream of gage which affect flow at all ranges of stage. Heavy brush on both banks also affects flows at high stages. Rating No. 30, dated August 26, 2009 was used for entire water year. It is well defined to about 3500 cfs. Fourteen discharge measurements (Nos. 456 to 469), ranging in discharge from 261 to 540 cfs, were made during the water year. They cover the range in stage experienced, except lower flow days of Oct 4, 5, 14-17 2011; Mar 23, 24; Apr 5-12, 14-25; June 19, 20; Sep 15-25, 28-30 2012 and higher flow days of May 7 and Jul 9, 2012. The peak discharge of 1120 cfs occurred at 1930 on July 9, 2012 at a gage height 3.80 ft with a shift of 0.01 ft. It exceeded maximum flow Measurement No. 465, made July 9, 2012 by 0.68 ft. in stage.

Discharge.-- Shifting control method was used for the entire water year record. Shift distribution was made on a time basis for the entire water year. Site visit and measurements show the placed rock riffle appears to be unstable and moving causing control changes throughout the year. Measurements indicated shifts varying from -0.11 to +0.05 ft. Even though there were very few high water conditions exhibited this water year, considerable scour and fill was still witnessed within the stream. All shifts were given full weight and applied directly.

Special Computations.-- Estimates of flow during ice affected periods were made based on good record prior to, during, and after such periods, measurements 457-460, and a hydrographic comparison to upstream and downstream gages: Arkansas River at Granite and Arkansas River near Wellsville, respectively.

Remarks.-- Record good, except for those periods of ice affected record, which are estimated and poor. Peak gage height and discharge occurred from localized rainfall/runoff event are rated fair based on limited measurements at this relative GH. Station maintained and record developed by Cheston Hart.

Recommendations.-- Continued use of the ADCP will prove its reliability at this site, use was limited this year due to low flows and shallow conditions. Main issue with the usage of the ADCP at this site is the location of cable way to the control. This has been mitigated by attaching the boat to a hanging weight from the cable car. Installation of an OG and CFB usage could help reduce estimated days when the well is frozen. OG and CFB readings were found to be slightly different than the tape and SE most of the time. Levels should be run to verify stability of the two reference gages and determine which one needs adjustment.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

07091500 ARKANSAS RIVER AT SALIDA

RATING TABLE-- ARKSALCO30 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

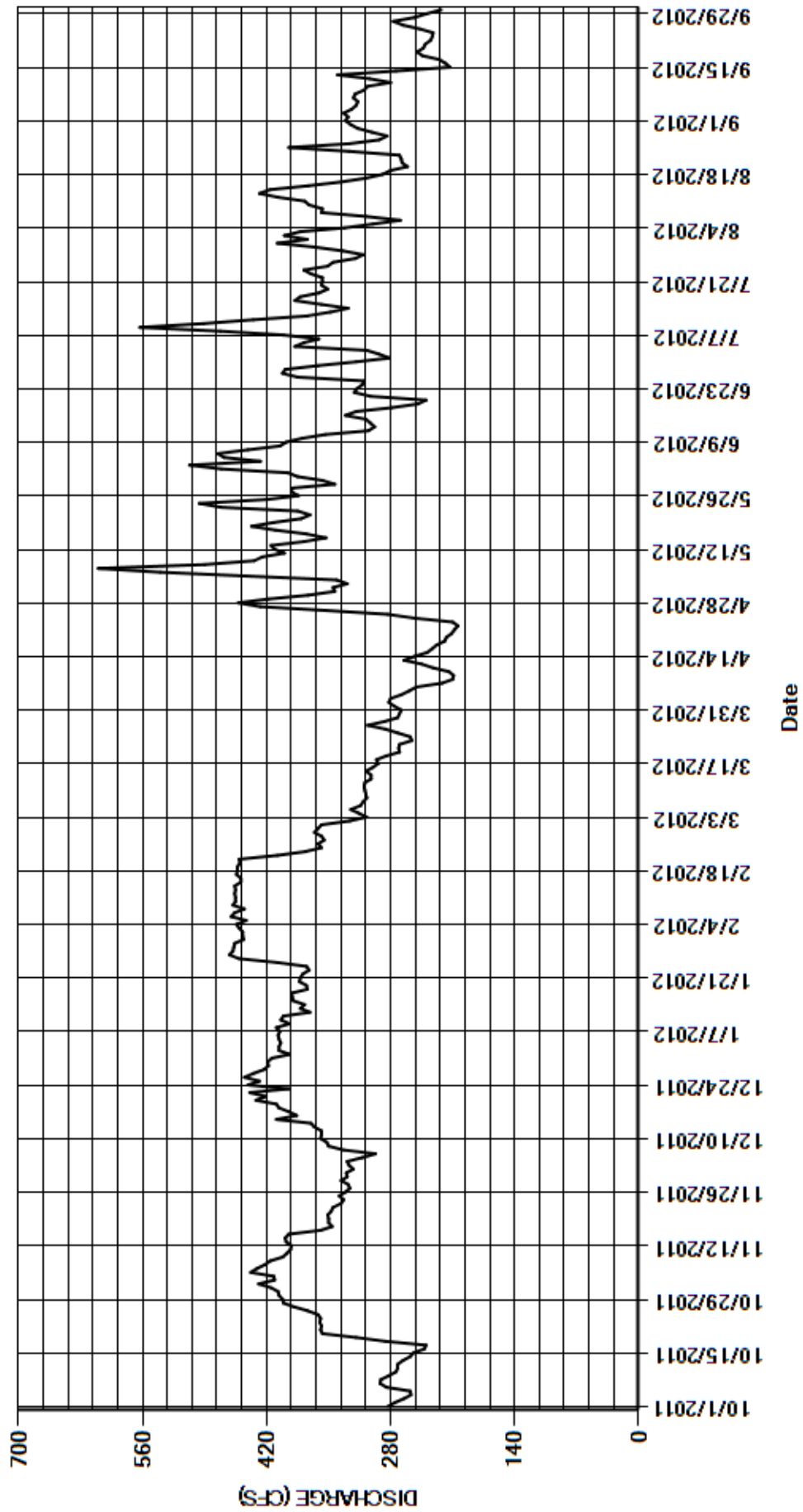
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	283	415	330	e394	447	358	276	343	396	281	374	331
2	275	429	322	e406	447	326	282	345	471	293	400	328
3	265	411	327	e406	451	307	280	329	507	307	382	333
4	257	412	329	e404	e454	316	268	341	427	388	332	324
5	258	438	312	e406	e443	325	259	443	468	378	300	319
6	285	431	297	e407	e460	314	251	540	475	361	269	317
7	292	422	333	e405	e456	311	222	610	441	401	308	322
8	291	416	350	e409	e445	307	210	490	405	472	358	320
9	282	402	352	e394	e458	308	209	434	398	563	357	310
10	274	397	359	e404	e455	309	214	425	380	491	372	306
11	272	393	358	e401	e455	310	232	400	354	435	377	280
12	272	392	358	e371	e456	309	245	411	305	374	407	304
13	266	398	366	e382	e455	302	265	415	298	348	428	340
14	258	399	370	e377	e456	302	253	378	303	328	416	274
15	254	395	409	e390	e449	308	239	353	308	358	373	213
16	242	359	386	e391	e449	300	233	375	331	388	336	218
17	240	346	395	e392	e454	294	228	410	319	382	308	225
18	286	350	406	e374	e453	296	219	437	279	361	289	244
19	319	350	409	375	e453	285	217	412	249	351	280	250
20	357	351	e432	383	e450	270	211	381	240	358	261	243
21	359	347	e421	382	e451	271	208	371	303	357	267	241
22	358	345	e439	379	408	270	204	385	321	357	268	235
23	360	336	e395	372	376	256	210	472	318	370	270	233
24	359	333	e441	375	358	258	253	496	312	378	327	232
25	362	338	e428	408	362	272	283	420	310	351	395	247
26	374	331	e445	451	355	286	353	384	385	345	327	266
27	389	e326	e435	462	358	306	427	392	402	320	293	277
28	401	328	e423	458	366	287	452	391	399	311	284	253
29	402	336	e418	457	362	272	418	343	362	334	301	239
30	406	329	e419	456	---	270	373	357	319	366	317	223
31	407	---	e414	446	---	268	---	385	---	408	325	---
TOTAL	9705	11255	11878	12517	12442	9173	7994	12668	10785	11515	10301	8247
MEAN	313	375	383	404	429	296	266	409	360	371	332	275
AC-FT	19250	22320	23560	24830	24680	18190	15860	25130	21390	22840	20430	16360
MAX	407	438	445	462	460	358	452	610	507	563	428	340
MIN	240	326	297	371	355	256	204	329	240	281	261	213

CAL YR	2011	TOTAL	301863	MEAN	827	MAX	3850	MIN	201	AC-FT	598700
WTR YR	2012	TOTAL	128480	MEAN	351	MAX	610	MIN	204	AC-FT	254800

MAX DISCH: 1120 CFS AT 19:30 ON JUL 09,2012 GH 3.80 FT SHIFT 0.01 FT
 MAX GH: 3.80 FT AT 19:30 ON JUL 09,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

07091500 ARKANSAS RIVER AT SALIDA
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
07093700 ARKANSAS RIVER NEAR WELLSVILLE

Water Year 2012

Location.-- Lat. 38°30'10", Long. 105°56'21", in SW¼NE¼ sec. 14, T.49 N., R.9 E., Chaffee County, Hydrologic Unit 11020001, on right bank 50 ft upstream from Chaffee-Fremont County line, 2.0 mi northwest of Wellsville, 2.8 mi downstream from South Arkansas River, and 3.5 mi southeast of Salida.

Drainage Area and Period of Record.-- 1,485 mi². ; April 1961 to current year.

Equipment.-- Station is equipped with a high data rate satellite-monitored data collection platform with a Constant Flow Bubbler (CFB). The CFB is referenced using an outside horizontal chain weight gage. Cableway located 400 feet downstream from gage.

Hydrologic Conditions.-- The Arkansas River near Wellsville is located below Twin Lakes, Turquoise Lake and Clear Creek Reservoirs. The flow conditions are subject to releases from these lakes as well as native flows of tributary creeks. Natural drainage area is approximately 1485 sq miles with a mean elevation of 10,200 feet. The basin consists of high mountain terrain some of which is above tree line.

Gage-Height Record.-- The primary record is 15-minute satellite-monitored data with the DCP and CFB logs used as back-up. Record is complete and reliable, except for the following periods: Dec 25 2012, when gage height was affected by ice. Data missing on Nov 11, 2011; Mar 11, Sep 2, 2012 were filled in using the CFB backup file.

Datum Corrections.-- Levels were last run Sept 12, 2007. No adjustments were needed or taken.

Rating.-- Control is a rock riffle about 90 ft downstream. High water control is channel and rock banks. Rating No. 6A, dated Dec. 20, 1993 (extended lower on Dec. 30, 2002), was used this water year. It is well defined from about 170 to 5500 cfs. Fifteen discharge measurements (Nos. 953-967) were made during the water year ranging in discharge from 255 cfs to 565 cfs. They cover the range in flows experienced except for the lower daily flows of Apr 18-23; Sep 15-17, 24, 30, 2012 and the higher daily flows of May 6, 7; Jun 9, 2012. The peak flow of 1520 cfs occurred at 1945 July 9, 2012 at a gage height of 5.23 ft with a shift of +0.00 ft. It exceeded mean gage height of Measurement No. 963, made June 9, 2012 by 1.40 ft. in stage.

Discharge.-- Shifting control method used the entire year. All shifts were distributed and applied by time. Measurements show shifts varying from -0.12 to +0.05 ft. All were given full weight and applied directly, except Measurement Nos. 954 and 953 which were discounted -9.00% and 1.1% respectfully to smooth shift distribution. Changing stream conditions throughout the year included heavy moss and channel scour/fill.

Special Computations.-- For comparison, the station Arkansas River at Salida, located 2.5 miles upstream, was plotted on the same hydrograph. Initially, the record for Arkansas River at Salida (ARKSALCO) is worked, determining flows for ice-affected days there. Then, flows for missing/ice affected/suspect days at Arkansas River near Wellsville can be estimated from the ARKSALCO data, as there is a reasonable correlation that exists between the two stations. There are no known withdrawals from the river between these two stations; only inflows, especially from the South Arkansas River. After preliminary shifting and daily flows are plotted for both gages, if the Salida plot line crosses over the Wellsville line (or vice-versa), then shifts are adjusted until there is at least some separation between the two, since in theory there is always, on a daily basis, more flow at Wellsville than Salida.

Remarks.-- Record good, except for periods of ice affected record, which are estimated and poor. Peak gage height and discharge occurred from localized rainfall runoff event and are rated fair based on limited measurements at this relative GH. Station maintained and record developed by Cheston Hart.

Recommendations.-- Preventative maintenance on outside horizontal chain gage should be performed. Installation of a radar reference gage should be researched.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

07093700 ARKANSAS RIVER NEAR WELLSVILLE

RATING TABLE.-- ARKWELCO06A USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

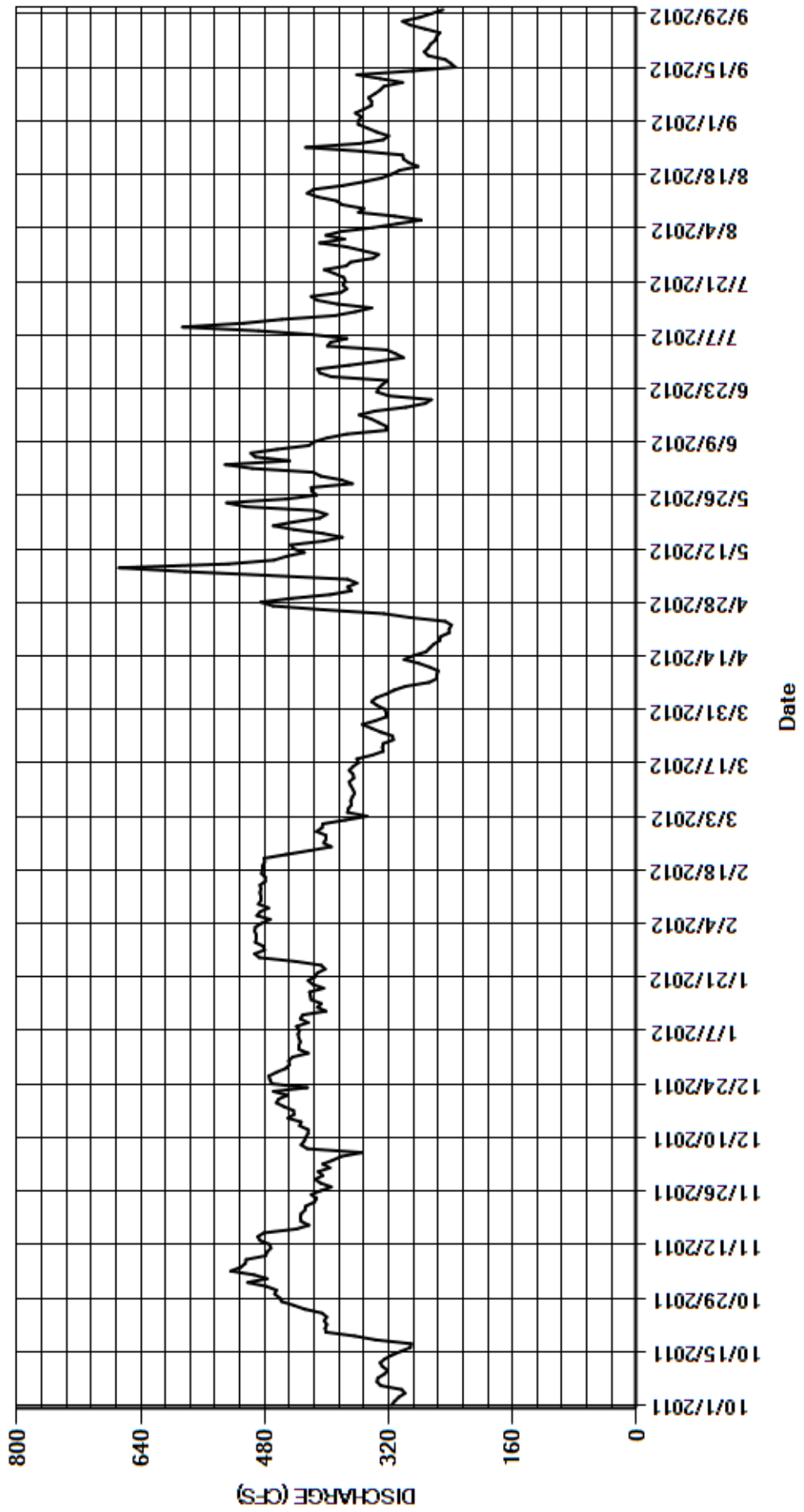
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	316	478	411	424	491	405	335	368	417	301	377	359
2	312	502	396	436	493	376	342	373	496	311	401	355
3	307	477	405	436	492	348	336	361	531	322	381	363
4	299	494	392	434	484	373	323	373	448	399	340	352
5	303	524	381	436	473	372	313	476	492	395	309	342
6	330	511	354	437	490	368	298	583	498	374	278	342
7	335	505	425	435	486	369	268	668	464	419	312	346
8	334	504	433	439	475	367	258	527	423	488	359	338
9	326	479	429	424	488	364	258	468	416	586	352	331
10	321	477	427	434	485	366	256	452	399	507	380	326
11	328	472	424	431	485	369	267	429	374	458	387	302
12	331	474	424	401	486	371	281	443	323	389	411	331
13	325	486	435	412	485	365	300	446	323	363	425	361
14	316	489	433	407	486	366	288	404	333	342	417	289
15	304	481	450	420	479	371	272	380	343	386	379	234
16	292	439	442	421	479	366	267	405	358	412	352	240
17	291	423	443	422	484	359	262	442	338	420	329	247
18	337	433	455	404	483	361	254	469	298	382	316	269
19	364	434	465	418	483	341	253	442	273	374	306	274
20	401	433	462	424	480	327	242	409	265	379	282	269
21	402	428	451	415	481	328	242	400	320	376	294	266
22	400	427	469	412	452	327	239	416	335	378	301	260
23	403	416	425	402	422	314	247	505	333	390	302	258
24	400	413	471	407	394	315	293	529	328	403	356	254
25	406	420	e473	440	404	330	326	452	321	375	427	273
26	428	408	475	487	401	342	403	413	394	369	358	292
27	442	394	465	493	401	354	469	419	409	340	327	302
28	458	408	453	480	413	337	485	420	412	333	320	280
29	461	415	448	482	406	323	445	367	371	354	335	265
30	467	405	449	492	---	323	395	381	334	375	347	250
31	465	---	444	491	---	325	---	408	---	409	359	---
TOTAL	11204	13649	13509	13496	13461	10922	9217	13628	11369	12109	10819	8970
MEAN	361	455	436	435	464	352	307	440	379	391	349	299
AC-FT	22220	27070	26800	26770	26700	21660	18280	27030	22550	24020	21460	17790
MAX	467	524	475	493	493	405	485	668	531	586	427	363
MIN	291	394	354	401	394	314	239	361	265	301	278	234

CAL YR	2011	TOTAL	333527	MEAN	914	MAX	4080	MIN	226	AC-FT	661600
WTR YR	2012	TOTAL	142353	MEAN	389	MAX	668	MIN	234	AC-FT	282400

MAX DISCH: 1520 CFS AT 19:45 ON JUL 09,2012 GH 5.65 FT SHIFT 0 FT
 MAX GH: 5.23 FT AT 19:45 ON JUL 09,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

07093700 ARKANSAS RIVER NEAR WELLSVILLE
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
07095000 GRAPE CREEK NEAR WESTCLIFFE

Water Year 2012

Location.-- Lat. 38°11'10", Long. 105°29'02" (Westcliffe, Colorado quadrangle, 1:24000 scale) in NW¼, NW¼, Section 31, T21S, R72W, Custer County, Hydrologic Unit 11020001, on left bank 0.5 mi upstream from waterline of DeWeese Reservoir at elevation 7690 ft, 0.5 mile downstream from Swift Creek, and 3.6 mile NW of Westcliffe CO.

Drainage Area and Period of Record.-- 320 square miles (furnished by Corps of Engineers).; April 1, 1925-June 30, 1928; April 1, 1930-Sept 30, 1961; Oct 1, 1962 to present.

Equipment.-- Graphic water stage recorder, shaft encoder, and satellite monitored data collection platform (Sutron Model 8210 DCP with HDR GOES radio) in a 48-inch diameter metal pipe (CMP) shelter and well until May 9, 2012. On May 9, 2012, the 8210 DCP and shaft encoder were replaced with Sutron a SatLink II V2 DCP and stage-discharge recorder (SDR). A new antenna was also installed. Primary reference gage is an electric drop tape inside the well. No outside staff gage. The control is a compound, broad-crested weir located 17 ft. downstream from the gage. An air temperature sensor, installed in radiation shield, and a tipping bucket raingage are also installed at the gage and monitored by the DCP. During the period 1100 Mar 13 to 1330 Mar 19 a weir refurbishment project was completed. The right side abutment of the weir was replaced and the weir crest was cleaned of loose concrete, filled, and capped with a 1/4" steel plate. No other changes.

Hydrologic Conditions.-- The gage is located on Grape Creek approximately 3000 ft upstream of the high water line of DeWeese Reservoir. Grape Creek is one of two major creeks draining the Wet Mountain Valley. The gage is located downstream of approximately 15,000 acres of grass hay and pasture fields in the south and central portions of the valley. The gage is at elevation 7690 ft MSL with a drainage area consisting of the high mountain valley and east slope of the Sangre de Cristo mountains which rise to elevations of 12,000 ft to over 14,000 ft. Snowpack and snowmelt runoff, and summer thunderstorms dictate the shape and volume of the annual streamflow hydrograph. Peak runoff often occurs in the spring (late March-late May) due to high elevation snowmelt or melt of very wet (and often deep) spring snows in the valley. As a result of irrigation diversions, streamflows at the gage can generally be low during late May to late August, but often flashy peaks during this period are experienced due to intense summer thunderstorms. WY2012 was very dry with low snowpack and very low runoff.

Gage-Height Record.-- Primary record is 15-minute satellite data with the graphic chart record, DCP and SDR log data used for backup purposes. Record is complete and reliable, except for the following periods: October 28-29, November 2-4, 9-11, 17, 21-22, 26-28, 30, December 2-4, 2011, March 1-4, April 3, 2012, when the stage-discharge relationship was affected by ice on the control; December 5 2011-February 29, 2012, when chart floats were frozen in ice in the well, the well was frozen, intakes were frozen, and the control/weir pool was frozen over; March 13-19 when a weir refurbishment project caused backwater conditions at the gage. Missing data from 0930 to 1415 on May 9 when the DCP was upgraded were filled in using backup chart data without loss of accuracy. Missing satellite data values on May 11-12 were filled in using values from the DCP data log file without loss of accuracy.

Datum Corrections.-- Levels were run May 9, 2012 to the electric tape index using RM No. 1 as base. No corrections were necessary as the electric tape index elevation was found to be within allowable tolerances. Weir crest elevations across the refurbished weir were also taken at 2 foot intervals on this date. Low point on the weir (estimated PZF) was found to be an elevation of 0.301 ft.

Rating.-- The control is a compound, broad-crested weir located 17 feet downstream from the gage. The PZF on the weir is gage height of approximately 0.30 ft. From Oct 1 through March 13, there was an approximately 6-foot wide section where the concrete has broken out on the downstream edge of the weir near the center. At high stages (greater than 3.00 ft gage height), the flow will go overbank on the right side of the weir, and the control includes grass-lined banks and secondary channel on right bank. The weir was refurbished during the period Mar 13-19. Weir crest now consists of a 1/4-inch steel plate. Right bank weir abutment was replaced. Rating No. 9, in use since October 6, 2005, was continued in use for all of WY2012. It is well-defined to flows of about 525 cfs, 150% of the historical highest discharge measurement made in WY2007. Eighteen discharge measurements (Nos. 288-305) were made during the year, ranging in discharge from 2.46 to 32.1 cfs. They cover the range in stage experienced except the the higher daily flows of April 5-6, May 13-15, 2012. The peak flow of 125 cfs occurred at 0445 on May 14, 2012 at a gage height of 1.44 ft with a shift of -0.02 ft. It exceeded the stage of high flow measurement No. 299, made May 15, 2012 by 0.60 feet.

Discharge.-- Shifting section control method was used for all periods of good record as the range in stage experienced this year was confined to the weir section for all periods of good record. Shifts were applied as defined by measurements and were distributed by time, with consideration of stage change, for the periods 0000 Oct 1, 2011 to 0800 Mar 20, 2012. Shifts were distributed by stage using variable shift curve GRAWESCOVSC12A for the period 0815 Mar 20 to 0915 Jun 1. For the period 0930 Jun 1 to 0730 Jun 23 shifts were applied by stage by transition from variable shift curve GRAWESCOVSC12A to variable shift curve GRAWESCOVSC12B. VSC12A and VSC12B are based on Msmts 296-301 made during the period of application. Shifts were then applied by time proration with consideration of stage changes for the remainder of the water year. During this period shift changes were primarily due to algae/moss buildup on the weir crest and minor "cleansing/scouring" rainfall events. Open water measurements showed raw shifts varying between -0.03 ft and 0.00 ft. All open water measurements were given full weight, except Msmt 299 was discounted -4.5% to smooth shift distribution.

Special Computations.--

Discharge for periods of ice-affected record was estimated on the basis of 3 measurements (Nos. 291-293), and air temperature data collected at the gage. A hydrograph and air temperature graph was used to determine estimated discharge trends. During the period of weir refurbishment (Mar 13-19) discharge was estimated on the basis of Msmt 295, made Mar 14, gage visits on March 15 and 16, and Msmt 296, made Mar 20, after the project was completed.

Remarks.-- Record is good, except for periods of ice effect and no gage height record, which are estimated and poor; and the period the weir refurbishment project when the gage was backwatered, which is fair. The peak gage height and discharge are considered good. Station maintained and record developed by Thomas W. Ley

Recommendations.-- None.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

07095000 GRAPE CREEK NEAR WESTCLIFFE

RATING TABLE-- GRAWESCO09 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

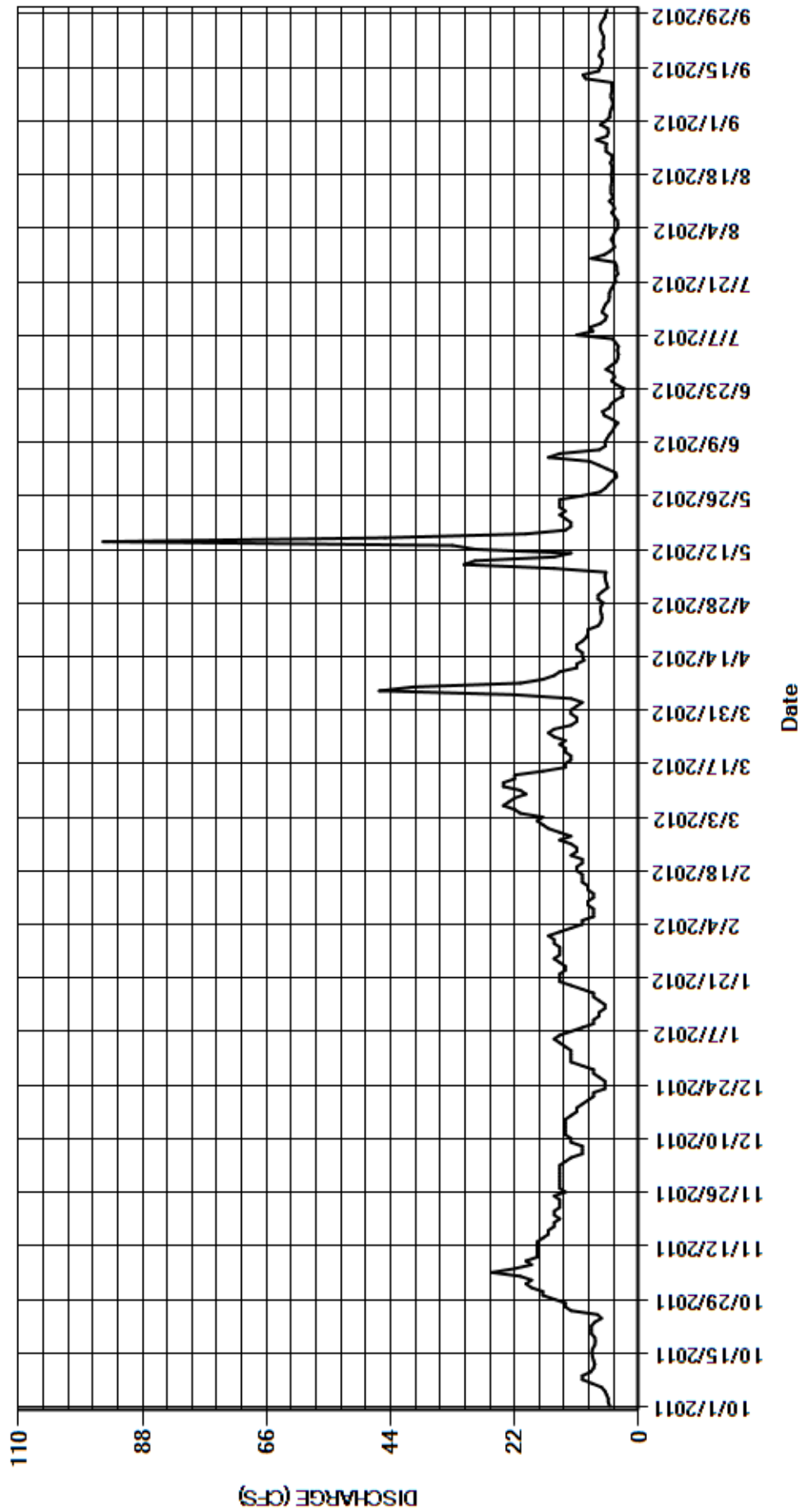
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.1	19	14	e12	e16	e17	11	6.4	4.1	3.7	4.9	5.8
2	5.4	e20	e14	e12	e14	e18	10	5.5	5.6	3.6	4.5	5.1
3	5.4	e19	e14	e13	e12	e17	e12	5.7	7.1	3.8	4.2	5.1
4	5.7	e21	e13	e14	e10	e21	22	5.9	8.7	3.6	3.7	4.9
5	6.0	26	e12	e15	e10	22	46	6.0	16	4.1	3.7	4.6
6	6.6	22	e10	e14	e8.0	24	40	5.8	14	4.6	3.8	4.6
7	8.3	19	e10	e12	e8.0	23	21	15	7.0	11	4.3	4.9
8	10	20	e10	e10	e8.0	22	17	31	5.9	8.1	4.8	4.9
9	10	e18	e12	e8.0	e9.0	20	15	29	6.0	8.7	4.3	4.7
10	8.5	e18	e12	e8.0	e9.0	21	14	15	5.6	6.8	4.5	4.8
11	8.0	e18	e13	e7.0	e8.0	24	11	12	5.2	5.9	5.2	4.8
12	7.8	18	e13	e7.0	e8.0	24	11	29	4.6	5.7	4.5	9.4
13	8.0	18	e13	e6.0	e9.0	e22	9.7	33	4.3	6.5	4.9	9.9
14	8.2	17	e13	e6.0	e9.0	e22	10	95	3.7	6.2	4.9	7.1
15	8.3	16	e13	e7.0	e10	e17	10	45	4.7	5.9	4.9	6.8
16	8.2	16	e12	e8.0	e10	e13	11	20	6.1	5.3	4.8	6.5
17	7.8	e15	e11	e8.0	e10	e13	11	13	6.4	5.2	4.8	6.5
18	7.7	15	e11	e10	e11	e12	10	12	5.2	5.2	4.9	7.0
19	7.8	14	e10	e12	e11	e12	9.3	12	4.9	4.9	4.7	6.8
20	8.4	15	e9.0	e14	e10	13	9.0	13	4.1	4.5	4.7	6.2
21	8.4	e15	e8.0	e14	e10	13	9.0	14	2.8	4.1	5.0	6.3
22	8.4	e14	e8.0	e14	e12	14	7.2	13	3.0	4.2	4.7	6.3
23	7.8	14	e6.0	e13	e11	13	6.7	14	2.6	3.7	4.8	6.2
24	6.6	14	e6.0	e13	e11	15	6.5	14	3.9	3.9	5.8	6.5
25	7.3	15	e6.0	e14	e12	16	6.6	14	4.8	3.9	5.8	6.8
26	12	e13	e7.0	e15	e14	15	6.8	10	4.3	4.2	5.7	6.8
27	13	e14	e8.0	e14	e12	12	6.7	6.8	4.5	8.4	7.5	6.5
28	e13	e14	e8.0	e14	e14	11	6.3	5.9	5.8	6.1	5.6	6.0
29	e15	14	e10	e14	e16	11	7.2	5.3	4.9	5.0	5.4	5.9
30	17	e14	e12	e15	---	12	7.2	4.6	4.0	4.3	5.5	5.6
31	17	---	e12	e15	---	12	---	3.9	---	4.5	6.8	---
TOTAL	276.7	505	330.0	358.0	312.0	521	380.2	514.8	169.8	165.6	153.6	183.3
MEAN	8.93	16.8	10.6	11.5	10.8	16.8	12.7	16.6	5.66	5.34	4.95	6.11
AC-FT	549	1000	655	710	619	1030	754	1020	337	328	305	364
MAX	17	26	14	15	16	24	46	95	16	11	7.5	9.9
MIN	5.1	13	6.0	6.0	8.0	11	6.3	3.9	2.6	3.6	3.7	4.6

CAL YR	2011	TOTAL	3692.0	MEAN	10.1	MAX	33	MIN	2.6	AC-FT	7320
WTR YR	2012	TOTAL	3870.0	MEAN	10.6	MAX	95	MIN	2.6	AC-FT	7680

MAX DISCH: 125 CFS AT 04:45 ON MAY 14,2012 GH 1.44 FT SHIFT -0.02 FT
 MAX GH: 1.44 FT AT 04:45 ON MAY 14,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

07095000 GRAPE CREEK NEAR WESTCLIFFE
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
07096000 ARKANSAS RIVER AT CANON CITY

Water Year 2012

Location.-- Lat. 38°26'02", Long. 105°15'24", in SE¼SE¼ sec. 31, T.18 S., R.70 W., Fremont County, Hydrologic Unit 11020002, on right bank 800 ft upstream from Sand Creek, 0.7 mi downstream from Grape Creek, and 0.7 mi upstream from First Street Bridge in Canon City.

Drainage Area and Period of Record.-- 3,060 square miles according to the USGS. ; January 1888 to current year. Monthly data only for some periods. Published as near Canyon 1900-1906.

Equipment.-- A float controlled Sutron shaft encoder logged and transmitted with a Satlink 2 data collection platform in a 4-ft x 4-ft steel outhouse-type shelter over a 42-inch stilling well. Backup data is logged by an independently float controlled Sutron SDR. Primary reference gage is electric drop tape in the stilling well. Water temperature and specific conductance is monitored by the USGS and logged and transmitted with the Satlink 2. No equipment modifications this water year. A manned cableway is positioned 25 feet downstream from gage. Control is a 2-stage diversion dam for the Canon City Water Works pump station (diversion structure #503) located approximately 250 ft downstream of the gage.

Hydrologic Conditions.-- The drainage basin above the gage includes elevation differences from Mt. Elbert at 14,433 ft to the gage at elevation 5,361 ft with vegetation ranging from alpine tundra to sparse pinon-juniper. Upstream from the gage, the Arkansas River is characterized by steep gradient, high velocity flows that are confined to a relatively narrow rock and cobble stream channel. The gage is located downstream of the Royal Gorge bridge 3.10± miles and is 0.7± miles downstream of Grape Creek inflows. Streamflow exhibits considerable seasonal variability with the majority of the total annual streamflow resulting from snowmelt runoff with high intensity – short duration summer thunderstorms contributing in the minor. Mean annual precipitation for the basin is 18.02± inches. Flow varies seasonally due mainly to snowmelt in the Sawatch Range. Snowmelt generally runs from May through July and peak flows typically occur during this period. Flows can also be affected by thunderstorm runoff and flash flooding on upstream tributaries during the summer months. Otherwise flows are affected by regulation of upstream reservoirs. Upstream diversions, Hydraulic and South Canon ditches, affect flows and often cause flows at the gage to be lower than those at the upstream Parkdale gage. No hydrologic conditions changes in the basin observed this water year.

Gage-Height Record.-- Primary record is 15-minute satellite-monitored shaft encoder (SE) data, with DCP log and the Stage Discharge Recorder (SDR) log as backup. Record is complete and reliable noting that for the period April 25, 2012 to May 31, 2012, the SE float was slowly taking in water and was replaced. During this period, gage height data from the independently float controlled back up SDR was used without loss of accuracy or reliability. Ice affected gage height is considered insignificant this water year with only a short period in December 2011 and January 2012 when shore ice was noted intermittently along the right bank and extending out approximately 3 feet. No ice appeared on the control structure. Primary and backup stage sensor calibration to reference gage is supported by 17 visits made to the gage station this water year. Numerous flush corrections were made this year and applied in the record from the point of flush back to an inflection point in the hydrograph.

Datum Corrections.-- Levels were run on April 25, 2012 using RM11 as base. The electric tape index was found to be reading within allowable tolerance and no corrections were made. A new brass cap reference mark, RM11A, was established on the top of concrete on the south side of right bank cableway frame adjacent to the southwest leg at elevation 13.674 feet.

Rating.-- The 1st stage of the control consists of a grouted riprap whitewater bypass chute, approximately 13 ft wide, with sloped sides, and a concrete sill with a point of zero flow at approximately 3.65 ft, gage datum, according to construction plans. Flow through the chute appears to go through critical depth at most stages but could be subject to submergence due to downstream obstructions. The whitewater bypass was cut into the original ogee weir around 1993. The 2nd stage control consists of an ogee weir, about 65 ft wide and with a crest elevation of about 4.90 ft, gage datum. Boulders were grouted to the downstream face of the weir during the 1993 work. The weir and whitewater bypass have vertical abutments up to a gage height around 12 feet above which the channel banks would become part of the control. At a gage height of approximately 14-ft, flows would spill into floodplain along the left bank. Rating No. 23, implemented on November 6, 2003, was used all water year. The rating is well-defined by historical measurements ranging from 132 cfs to 4320 cfs with approximately 53% of the historical measurements falling to the left of the rating curve (negative shift) and 47% falling to the right of the curve (positive shift). Rating No. 23 remains applicable given that the percent error between the measured values and the un-shifted rating curve (R-Error) averages -0.36% for measurements this water year. Seventeen discharge measurements (Nos. 765-781) were made this water year ranging from 175 cfs (5.06 ft) to 560 cfs (5.91 ft). WY2012 measurements covered the range in stage experienced except for intermittent lower daily flows in April, June and September 2012 and the intermittent higher daily flows in November, December 2011 and February 2012. The peak instantaneous flow of 838 cfs occurred at 07:15 on July 10, 2012 at a gage height of 6.39 ft with a shift of -0.05 ft. It exceeded high measurement no. 767, made December 30, 2011, by 0.48 feet in stage.

Discharge.-- Shifting control method was used to compute discharge for the entire water year. Shifts were applied as defined by measurements and distributed by time, event and stage. Shifts were distributed by time proration from the beginning of the water year to the start of a variable shift curve. Variable shift curve ARKCANCOVSC12A was utilized from 12:45 February 22, 2012 to 13:30 September 25, 2012. The variable shift curve is based on Msmts 768-781. Shifts were again distributed by time proration from 1345 September 25 to the end of the water year. Open water measurements showed shifts ranging from -0.06 to +0.07 ft. Measurements 769-774 and 777-781 were discounted from -5.2 to +4.9% for smoothing purposes.

Special Computations.-- Hydrographic comparison was made with upstream, downstream and tributary gages: Arkansas River at Wellsville, seasonal gage Arkansas River at Parkdale, Grape Creek near Westcliffe, Minnequa Canal and Arkansas River at Portland to check/validate average daily flows.

Remarks.-- Record is good for the entire water year. The peak instantaneous flow is rated good given physical measurements made 4 days prior to and 3 days after the peak. Station maintained and record developed by Charles DiDomenico.

Recommendations.-- An outside reference gage is recommended to validate stilling well levels. All chiseled benchmarks should be replaced with either a brass cap or concrete pin for improved accuracy during levels. The whitewater bypass section of the control should be surveyed during any low flow events (less than 200 cfs) to confirm the point of zero flow.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

07096000 ARKANSAS RIVER AT CANON CITY

RATING TABLE-- ARKCANCO23 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

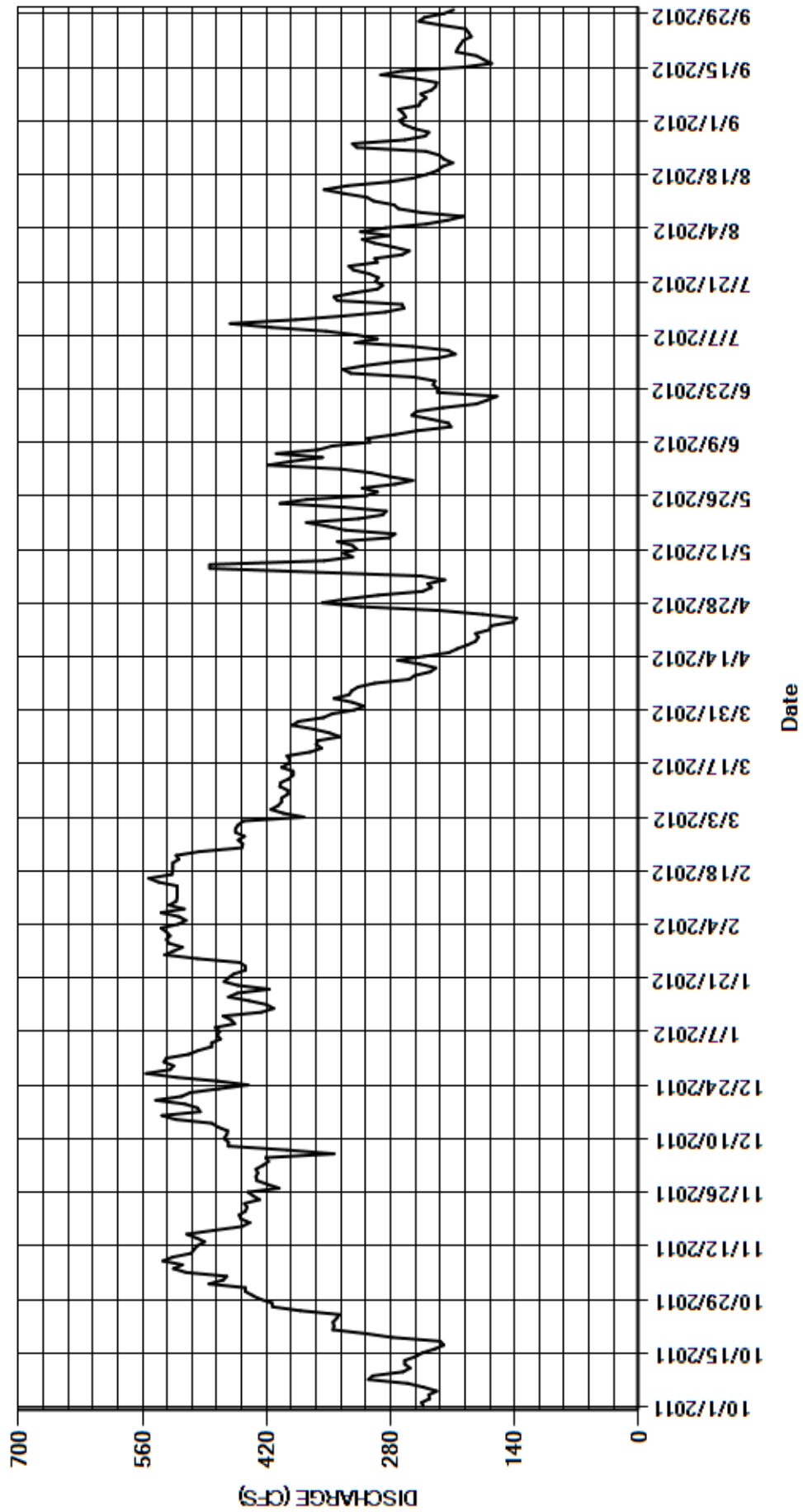
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	243	444	430	508	529	452	310	244	302	226	312	270
2	245	485	432	497	533	446	323	234	337	207	282	263
3	236	469	424	482	539	378	344	238	418	215	314	266
4	237	465	418	482	520	401	327	219	392	255	286	271
5	228	511	421	472	511	415	324	245	357	320	240	248
6	243	525	344	476	519	407	317	364	409	295	216	246
7	261	515	397	473	539	403	298	484	362	318	198	240
8	305	537	463	478	513	403	259	484	346	353	245	246
9	300	526	463	456	530	396	253	355	303	415	271	234
10	266	505	468	460	522	396	235	323	306	461	276	229
11	258	502	465	469	521	405	229	333	275	387	299	228
12	264	498	464	426	521	404	247	318	250	333	307	252
13	264	490	475	412	521	395	272	323	212	286	333	291
14	252	499	482	420	521	390	242	340	215	265	355	267
15	244	510	523	440	542	390	214	282	234	267	329	198
16	230	479	538	463	553	403	205	275	256	340	282	166
17	220	448	495	453	527	395	193	331	251	344	255	175
18	224	439	498	417	526	394	184	351	221	322	239	183
19	278	449	512	452	526	397	181	375	183	295	227	206
20	308	451	545	468	526	371	184	316	171	289	222	204
21	345	444	516	463	519	358	168	289	160	297	210	201
22	344	442	506	457	522	364	167	285	227	294	220	198
23	345	445	474	444	495	362	142	333	227	304	225	189
24	341	428	441	444	448	337	138	405	232	322	240	192
25	338	435	475	450	447	349	176	375	230	327	318	195
26	382	441	522	498	452	367	225	308	253	295	323	223
27	413	406	556	535	445	391	314	295	325	298	264	248
28	414	419	529	525	455	384	357	312	334	267	241	242
29	427	431	525	515	455	356	330	275	309	259	237	220
30	436	432	536	530	---	346	294	255	275	277	254	209
31	444	---	533	533	---	321	---	281	---	298	265	---
TOTAL	9335	14070	14870	14598	14777	11976	7452	9847	8372	9431	8285	6800
MEAN	301	469	480	471	510	386	248	318	279	304	267	227
AC-FT	18520	27910	29490	28960	29310	23750	14780	19530	16610	18710	16430	13490
MAX	444	537	556	535	553	452	357	484	418	461	355	291
MIN	220	406	344	412	445	321	138	219	160	207	198	166

CAL YR	2011	TOTAL	313919	MEAN	860	MAX	4030	MIN	195	AC-FT	622700
WTR YR	2012	TOTAL	129813	MEAN	355	MAX	556	MIN	138	AC-FT	257500

MAX DISCH: 838 CFS AT 07:15 ON JUL 10,2012 GH 6.39 FT SHIFT -0.05 FT
 MAX GH: 6.39 FT AT 07:15 ON JUL 10,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

07096000 ARKANSAS RIVER AT CANON CITY
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
07097000 ARKANSAS RIVER AT PORTLAND
Water Year 2012

Location.-- Lat 38°23'18", Long 105°00'56" (Florence, Colorado quadrangle, 1:24000 scale) in NE¼, NE¼, Section 20, T19S, R68W, Fremont County, Hydrologic Unit 11020002, on right bank on upstream side of State Highway 120 bridge, 5.4 mi. west of the intersection of State Highway 120 and US Highway 50 on SH120, 1 mile downstream of Hardscrabble Creek, and across the road approximately 170 ft ENE of entrance to Holcim Cement Plant (previously known as Portland and Holnam) at Portland Colorado.

Drainage Area and Period of Record.-- 3,950 mi².; October 1, 1939 to present.

Equipment.-- Primary sensor is a Sutron Shaft Encoder and float inside a 36-inch CMP stilling well/shelter housed on the lower right bank terrace. The primary reference gage is drop tape referenced to an adjustable RP on the shelf inside the CMP well/shelter. A 4-ft x 4-ft steel shelter on the right bank upper terrace houses the Satlink 2 Data Collection Platform and a secondary CFB sensor. The upper shelter also accommodates a tipping bucket rain gage. The CFB monitors water level approximately 102 feet upstream of the stilling well intakes and its companion staff gage is set in the river adjacent to the CFB end cap. Water temperature and specific conductance is monitored by the USGS and logged – transmitted with the Satlink 2. A cable car is suspended from a monorail attached to upstream side of Highway 120 Bridge 10-15 feet downstream from gage. Equipment modifications for this water year include: Graphic water-stage recorder became non-operational in November 2010 and is no longer utilized. No other changes.

Hydrologic Conditions.-- Flow varies seasonally due mainly to snowmelt. Snowmelt generally runs from May through July and peak flows typically occur during this period. Flows can also be affected by thunderstorm runoff and flash flooding on upstream tributaries during the summer months. Otherwise, flows are highly affected by regulation of upstream reservoirs. Upstream operations from the Minnequa Canal also affect flows at the gage. No hydrologic conditions changes in the basin observed this water year.

Gage-Height Record.-- Primary record is 15-minute satellite-monitored shaft encoder data with DCP log and CFB backup. Record is complete and reliable. The stage-discharge relationship was affected by ice on December 4-6 and 9-29, 2011, January 1-3, 7-9, 12-13, 17-18, 28 and February 4-6, 2012. Missing unit values and/or suspect data were replaced with linear interpolation using adjacent good data with no loss of accuracy on the following dates: October 26, and November 2, 2011. Primary and backup stage sensor calibration to reference gage is supported by 17 visits made this water year. Three minor instrument calibration corrections ranging from -0.01 ft to +0.01 ft were applied.

Datum Corrections.-- An abbreviated level survey was run from RM 102 to the water surface at the CFB staff gage to recalibrate the staff gage and CFB on Sept 25, 2012.

Rating.-- The control at low flow is a downstream rock riffle that consists of gravel to large cobble in the stream channel. At medium to high flows, the riverbank, railway abutments and the highway bridge abutments are part of the control. Rating No.10 dated October 31, 2007 was used the entire water year. Seventeen discharge measurements (Nos. 1015-1031) were made this water year ranging in discharge from 183 cfs to 572 cfs. They cover the range in stage experienced except for the lower mean daily flows on April 19-25, June 19-21, July 2-3, September 16-19, 23-25, 2012 and the higher mean daily flows of November 6, 2011, May 8, and July 31, 2012. The peak flow of 1860 cfs occurred at 2130 on July 31, 2012 at a gage height of 3.90 ft with a shift of 0.17 ft. The peak exceeded the stage of high flow Measurement No. 1018 made February 2, 2012 by 1.76 feet.

Discharge.-- Shifting control method was used for the entire water year. Shifts were applied as defined by measurements and were distributed by time proration for the entire water year. Measurements showed shifts varied from 0.06 ft to 0.26 ft. with all measurements made in open channel conditions. All measurements were given full weight and shifts applied directly, except Msmt No 1015, which was discounted 1%.

Special Computations.-- An overlay of water temperature and gage height combined with site visits revealed several ice effect days this water year. The record is also affected by Minnequa Canal sluicing operations which occur upstream of the gage approximately 8.75 miles and at irregular intervals throughout the water year. This operation causes the gage height to increase then decrease rapidly over a short period of time before returning to pre-operation levels and is essentially smoothed in the record by the computation of the daily average of unit data. A hydrograph was used to compare the mean daily flows with upstream gage Arkansas River at Canon City. Minnequa Canal diversions were also examined for sluicing operations.

Remarks.-- The record is good, except periods of ice effect which are estimated and considered poor. The peak discharge is considered good. The State Highway Bridge that is part of the control at this gaging station is scheduled to be replaced in WY2012-13. At that time, the upstream staff gage and CFB will become the primary reference and sensor as the lower stilling well/shelter will be demolished. Station maintained and record development started by Charles DiDomenico and finished by Joseph Talbott.

Recommendations.-- Since this gaging station is the only inflow measurement for water administration in Pueblo Reservoir, recommend running the gaging station simultaneously with a proposed new gaging station located approximately 7-miles above Pueblo Reservoir during and after the bridge replacement project.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

07097000 ARKANSAS RIVER AT PORTLAND

RATING TABLE-- ARKPORCO10 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

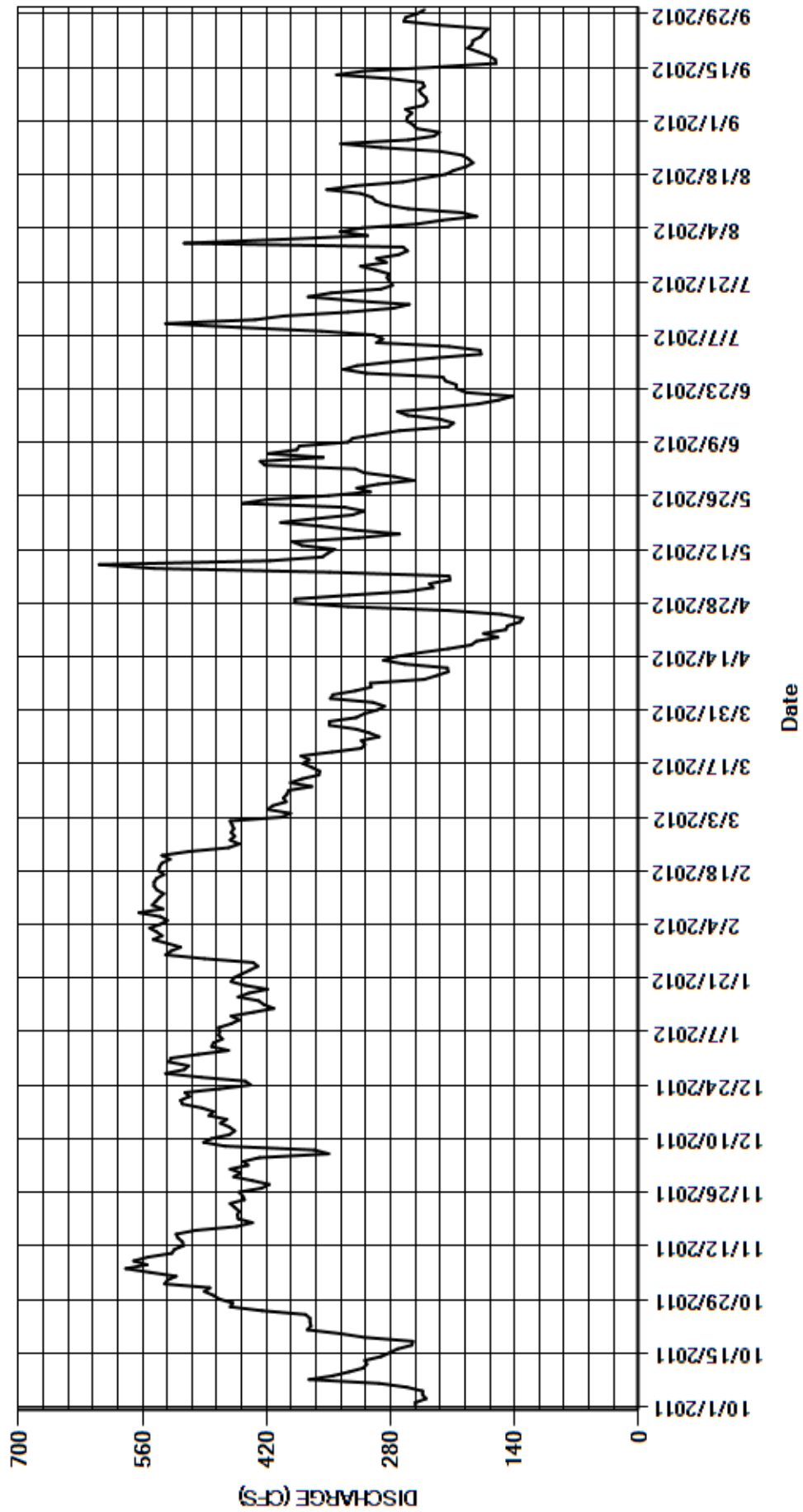
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	252	484	449	e497	538	459	287	261	310	232	403	262
2	252	e535	461	e463	544	461	300	232	320	178	306	261
3	240	532	441	e482	552	403	348	236	422	179	337	256
4	244	522	e446	480	e540	393	345	213	427	214	312	263
5	244	551	e428	470	e532	419	320	214	356	296	250	243
6	262	579	e350	474	e540	413	302	349	418	289	222	239
7	293	555	366	e473	564	398	303	547	386	299	183	240
8	372	570	467	e474	537	401	242	609	383	358	200	245
9	345	554	e491	e460	549	397	228	416	328	451	260	248
10	327	527	e482	451	545	395	215	357	323	534	285	242
11	311	524	e462	460	541	369	216	351	297	433	297	244
12	307	514	e456	e435	536	393	264	343	270	400	301	280
13	309	515	e462	e412	544	380	288	380	215	328	314	341
14	291	520	e472	423	547	361	273	391	209	277	352	309
15	281	522	e465	429	547	360	246	316	224	259	320	231
16	272	500	e485	452	544	369	215	270	261	324	266	161
17	256	454	e480	e440	536	379	189	320	272	373	243	162
18	255	436	e493	e419	542	372	183	358	223	347	218	169
19	309	452	e515	444	541	381	159	404	181	291	209	181
20	337	453	e517	460	538	346	175	365	158	278	195	193
21	374	451	e507	457	529	313	150	323	142	281	187	188
22	370	456	e512	448	538	309	148	310	195	284	192	187
23	371	461	e473	439	508	313	134	332	206	282	199	178
24	371	445	e438	430	463	293	131	447	206	297	224	175
25	376	447	e444	435	451	304	155	420	218	314	291	170
26	e425	451	e494	490	461	319	215	350	221	285	336	225
27	461	426	e534	534	456	349	328	303	307	296	260	265
28	458	417	e513	e528	460	349	388	318	333	271	231	263
29	473	436	e508	517	457	319	388	294	318	261	225	250
30	480	457	530	532	---	310	327	254	278	266	251	242
31	490	---	528	548	---	295	---	276	---	513	255	---
TOTAL	10408	14746	14669	14456	15180	11322	7462	10559	8407	9690	8124	6913
MEAN	336	492	473	466	523	365	249	341	280	313	262	230
AC-FT	20640	29250	29100	28670	30110	22460	14800	20940	16680	19220	16110	13710
MAX	490	579	534	548	564	461	388	609	427	534	403	341
MIN	240	417	350	412	451	293	131	213	142	178	183	161

CAL YR	2011	TOTAL	314549	MEAN	862	MAX	3750	MIN	153	AC-FT	623900
WTR YR	2012	TOTAL	131936	MEAN	360	MAX	609	MIN	131	AC-FT	261700

MAX DISCH: 1860 CFS AT 21:30 ON JUL 31,2012 GH 3.90 FT SHIFT 0.17 FT
 MAX GH: 3.90 FT AT 21:30 ON JUL 31,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

07097000 ARKANSAS RIVER AT PORTLAND
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
07099400 ARKANSAS RIVER ABOVE PUEBLO

Water Year 2012

Location.-- Lat. 38°16'18", Long. 104°43'03", in SE¼NE¼ sec. 36, T.20 S., R.66 W., Pueblo County, Hydrologic Unit 11020002, on left bank of Arkansas River, 100' downstream from NE corner of Arkansas River bridge, approx. 0.25 mi. downstream from Pueblo Dam, and 7 mi. West of Pueblo.

Drainage Area and Period of Record.-- 4,670 mi². ; October 1965 to current year. Periodic water quality and sediment data available Oct. 1965 to current year.

Equipment.-- Satellite-monitored data collection platform (high data rate Sutron SatLink 2 DCP) with a Sutron Constant Flow Bubbler (CFB) and shaft encoder; and a Sutron Stage Discharge Recorder (SDR) in a 4 ft x 4 ft concrete block shelter over a CMP stilling well. The primary reference when the well has good contact to the river (gage heights greater than 1.80 ft) is an electric drop tape referenced to a fixed index mounted on the instrument shelf. A cableway located approximately 20 feet upstream from gage is used for high flow measurement. USGS Hydrolab measuring water temperature and specific conductance is co-located at the gage and monitored by the DCP. An outside staff gage was installed on June 13 2012. No other equipment changes made this water year.

Hydrologic Conditions.-- The gage is located approximately a quarter mile downstream of the Pueblo Reservoir Dam at an elevation of 4740 ft above MSL. Streamflow is directly affected at all stages by regulation of the reservoir gates. The riverbed mainly consists of gravel and cobble to large rocks 24+ inches. The channel is subject to moss growth of various types, varying from light accumulations to very dense at any time during the year, with increased growth from October - April due to the cold and low flows. The moss growth contributes to negative shifts as it tends to back up and slow down the flow of the water. Discharge measurements in the range from 650 to 800 cfs are of poor quality as the gage height is too deep to wade and too shallow for a good cable measurement. Measurements of less than 650 cfs are made from 50 to 450 feet below the gage depending on the gage height, while measurements over the 650 cfs are made from the cableway.

Gage-Height Record.-- Primary record is 15-minute satellite data. For the periods: October 1, 2011 to 1130 May 2, 2012 and from 1500 July 3 to 2345 September 30, 2012, when gage heights were less than 2.50 ft, the CFB was used for primary record. For the period: 1145 May 2 to 1500 July 3, 2012 when gage heights were over 2.50 ft, the shaft encoder was used for primary record, with stage discharge recorder used for backup purposes. The CFB is not used during high water, due to a problem with it tracking accurately at high stages. The record is complete and reliable for entire water year. This gage is immediately below the Pueblo Reservoir and does not experience ice effects.

Datum Corrections.-- Levels were run April 25, 2012 to the electric tape index using BM 6 as base. The ET index elevation was found to be 0.06 ft low. No corrections were taken as a problem was noted with the first shot on the ET index. A levels circuit was attempted on May 2, but was unsuccessful. Levels were also run on June 12, 2012 to establish the elevation of a new outside staff gage. Levels need to be run again in WY13 to check results of WY12 levels.

Rating.-- The control at low flow is a series of rock riffles and large rocks, forming jetties below the gage. The large rocks (36 inch plus) were placed in clusters, starting at 100 feet below the gage house at various points crossing the river, while the "riffles" which start 150 feet below the gage house consist of 24 to 36 inch rock placed in a series of jetties extending from the left bank angling upstream at lengths from 30% to 50% across the river. The control at medium and high flows is the riverbed (gravel to large cobble) along with the large rock placements and banks (grass and brush). Negative shifts continued to be measured at gage-heights less than 2.50 ft this water year due to moss growth in the channel. Various moss conditions were noted for the entire water year. Rating No.18, implemented on November 19, 2008, was used this entire water year and is well defined to 7370 cfs. Forty-four discharge measurements (Nos. 1217 – 1260) were made this water year, ranging in discharge from 61.4 to 1630 cfs. They cover the range in stage experienced, except for the lower daily flows of September 25 - 28, 2012. The peak discharge of 1640 cfs occurred at 1600 June 26, 2012 at a gage height of 4.70 ft with a shift of 0.08 ft. Measurement 1248 was made June 26 at 1535 at this same mean gage height.

Discharge.-- Shifting control method was used for the entire water year. Shifts were applied as defined by measurements and prorated by time and/or stage change events due to upstream reservoir gate changes. The water year began with shift curve SC11_22 carried over from WY 2011 ending at 1400 October 4. Shifts were prorated by time with consideration of stage change events due to gate changes from 1415 October 4, 2011 to 1215 July 12, 2012 and from 1200 August 22 to the end of the water year. Two variable shift curves were developed and applied to account for shift changes that occurred due to moss growth and as determined by discharge measurements after reservoir releases. Variable shift curve ARKPUECOVSC12A (based on measurement Nos 1252 - 1254) was applied from 1230 July 12 to 1000 July 27. Variable shift curve ARKPUECOVSC12B (based on measurement Nos 1255 - 1258) was applied from 1130 July 27 to 1145 August 22. Shifts varied from -0.12 to +0.08 ft, with all measurements being made in open channel conditions. All measurements were given full weight with the exception of Nos 1222, 1224, 1227, 1235, 1253, and 1256, which were discounted from -2 to + 5% for smoothing purposes. Measurements 1237 and 1238, 1239 and 1240, 1241 and 1242, 1243 and 1244 (paired measurements), 1246, and 1247, made during the SDS test run, were discounted from -4 to +4%. Measurement No 1236 was not used.

Special Computations.-- The downstream hydrograph at ARKMOFCO was compared to the final hydrograph for general validation of daily flows. On May 2, the stilling well was flushed. There was also a concurrent change in the primary stage sensor from the CFB to the shaft encoder. There was a gage height and shift change associated with the sensor change as follows: 1115 (CFB) GH= 2.85 ft, shift = -0.03 ft; 1130 (SE) GH = 2.77 ft, shift = +0.05 ft. The release from the reservoir was stable and flat during this change. The paired discharge measurements made during the SDS run were adjusted to have same shifts, with the last two having only one measurement adjustment due to problems with the other measurement. The primary gage-height data for the period from 1245 June 15 to 1315 June 18 was changed from the transmitted CFB data to the log file of the SE for continuity. During the period from 0845 to 1500 July 3 the CFB log was used as the well had isolated.

Remarks.-- The record is rated fair, due to the low flows with moss in the channel observed for most of the year. The peak gage-height and discharge are rated good due to the proximity of high water measurements to the peak. Station maintained and record developed by Anthony D. Gutierrez.

Recommendations.-- A new outside gage covering the full range of stage was installed June 13, 2012 however due to a warping of the bottom of the mounting board it has seen limited use. This will be reworked in WY 2013. Levels need to be run in WY 2013 to check results of the WY12 levels.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

07099400 ARKANSAS RIVER ABOVE PUEBLO

RATING TABLE-- ARKPUECO18 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

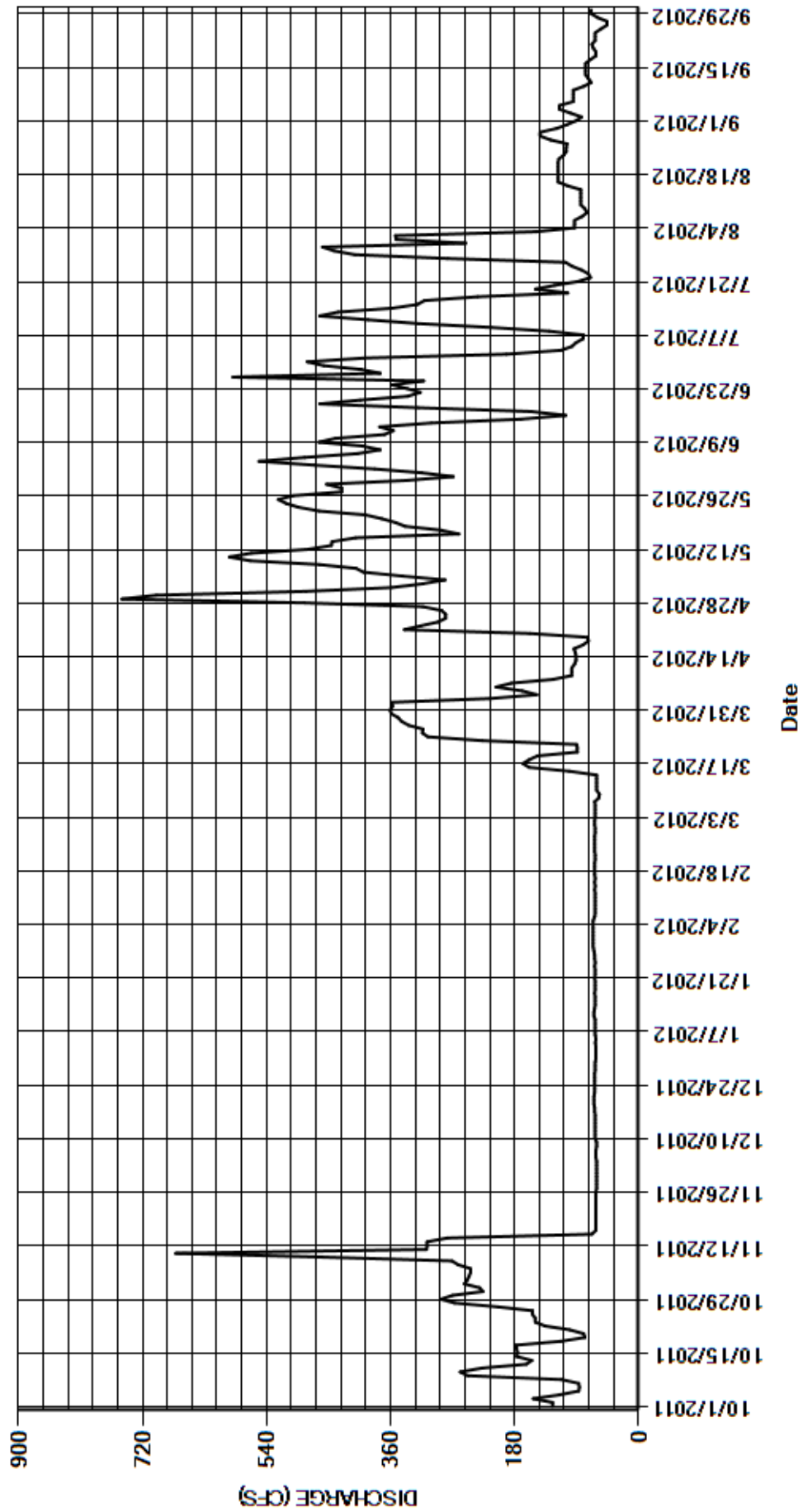
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	125	231	61	62	66	64	357	483	315	398	352	91
2	125	253	61	62	66	64	359	359	383	192	353	83
3	153	249	61	62	66	63	216	313	470	113	149	99
4	115	246	61	63	66	63	148	281	551	97	93	115
5	87	244	62	62	66	63	169	343	485	91	93	115
6	86	244	62	63	64	63	207	399	408	81	93	95
7	87	262	62	63	63	64	185	410	375	80	82	95
8	112	271	61	63	63	58	124	463	401	130	75	95
9	248	459	61	63	63	57	97	564	464	215	78	95
10	259	672	63	63	63	61	97	594	440	320	84	80
11	227	308	63	65	63	61	97	562	369	393	84	69
12	163	307	63	65	63	61	93	479	356	463	84	73
13	155	307	63	64	64	61	91	446	376	436	84	77
14	177	278	63	63	63	61	91	445	301	358	84	77
15	176	68	63	63	64	101	92	411	171	321	103	77
16	177	62	63	63	63	159	94	261	106	311	117	77
17	178	62	64	64	64	168	81	287	156	234	117	70
18	113	62	64	63	64	159	73	339	320	103	117	62
19	78	62	65	63	64	147	74	353	463	150	117	62
20	80	62	65	63	64	89	158	373	404	122	117	66
21	100	62	65	64	63	89	340	397	335	88	117	68
22	136	62	64	63	63	90	316	464	317	70	116	63
23	150	62	64	63	64	227	291	494	336	73	109	63
24	150	62	64	64	64	306	280	512	358	83	105	63
25	154	62	64	63	64	314	280	523	312	97	105	55
26	154	62	64	64	64	313	286	502	589	106	104	46
27	204	61	64	64	64	334	313	431	375	277	128	46
28	267	61	63	65	63	344	485	431	403	412	143	60
29	287	61	63	66	63	349	750	453	457	442	143	69
30	270	61	63	66	---	359	700	337	481	459	119	69
31	226	---	62	66	---	361	---	269	---	251	104	---
TOTAL	5019	5325	1951	1970	1854	4773	6944	12978	11277	6966	3769	2275
MEAN	162	178	62.9	63.5	63.9	154	231	419	376	225	122	75.8
AC-FT	9960	10560	3870	3910	3680	9470	13770	25740	22370	13820	7480	4510
MAX	287	672	65	66	66	361	750	594	589	463	353	115
MIN	78	61	61	62	63	57	73	261	106	70	75	46

CAL YR	2011	TOTAL	246654	MEAN	676	MAX	3490	MIN	25	AC-FT	489200
WTR YR	2012	TOTAL	65101	MEAN	178	MAX	750	MIN	46	AC-FT	129100

MAX DISCH: 1640 CFS AT 16:00 ON JUN 26,2012 GH 4.70 FT SHIFT 0.08 FT (peak occurred at end of SDS test run)
 MAX GH: 4.70 FT AT 16:00 ON JUN 26,2012 (max GH occurred at end of SDS test run)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

07099400 ARKANSAS RIVER ABOVE PUEBLO
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
07111000 HUERFANO R AT MANZANARES XING, NR REDWING, CO

Water Year 2012

Location.-- Latitude 37 deg 43' 41.3", Longitude 105 deg 21' 12" by NAD83 (Redwing, Colorado quadrangle, 1:24000 scale) in NW1/4, SE1/4, Sec. 5, T27S, R71W, Hydrologic Unit 1102006, Huerfano County, 500 ft downstream from Manzanares Crossing private bridge, 0.2 mi downstream from Manzanares Creek and 4.0 mi WSW of Redwing, Colorado

Drainage Area and Period of Record.-- 73 mi²;

Equipment.-- Sutron model 8210 High Data Rate (HDR) satellite-monitored data collection platform (DCP) with shaft encoder and graphic water-stage recorder, inside a 48-inch diameter corrugated metal pipe (CMP) shelter and stilling well. The 8210 was replaced by a Sutron SatLink2 DCP along with addition of a Sutron Stage Discharge Recorder (SDR) to replace the shaft encoder on May 10, 2012. Shaft encoder and chart/SDR are set to inside electric tape gage. A tipping bucket rain gage and temperature sensor are also recorded and transmitted by the DCP. A Bank Operated Cableway (BOC) is installed 10 ft above the gage for high water measurements. No other changes this water year.

Hydrologic Conditions.-- The gage is set in a narrow reach of the Upper Huerfano Valley at an elevation of 8190 feet MSL. Above the gage is a combination of mountainous and high alpine terrain which are subject to flash flooding. There are tributaries to the river along with diversions above the gage. Below the gage are several agricultural diversions, which are in a wide valley that extends to the eastern prairie of Colorado.

Gage-Height Record.-- The primary gage height record is 15-minute satellite data, with the DCP log and A-35 chart record / SDR used for back-up purposes. The record is complete and reliable, except for the following periods: October 26 - 28; November 2 - 30; December 1 - 11, 2011; January 23, 24, 28 - 31, February 1 - 3; March 7 - 16, 19 - 25; April 3, 4, 8, 14, 17, 2012, when the stage-discharge relationship was affected by ice in the river and/or well or ice on the control; December 12 - 31, 2011; January 1 - 22, 25 - 27; February 4 - March 6, 2012 when the well was frozen. Missing data on October 8, November 30, April 23, June 17, 25 were filled in with good chart data without loss of accuracy.

Datum Corrections.-- No levels were run this water year. Levels were last run May 12, 2009.

Rating.-- A boulder/rock weir is the current control for stages up to about 3.6 ft (90 cfs). At higher stages the banks (left side is a concrete wing wall and right side covered with grass) become part of the control. Rating No. 25 was used the entire water year; it was developed from cross sections made May 20, 2009 along with a measurement of 93.6 cfs at gage-height of 3.65 ft. It has been extended to a gage-height of 5.31 ft and discharge of 400 cfs, approximately four times the historic high measurement, but is not well-defined above about 150 cfs. Twenty discharge measurements (Nos. 517 - 536) were made this water year, ranging in discharge from 10.5 to 45.4 cfs. They cover the range in stage experienced, except for the lower daily flows of October 1 - 3; November 6 - 30, December 1 - 5, 9 - 25, 28, 2011; January 5 - 8; 23 - 31; February 1 - 29; March 1 - 25; July 1, 2, 6; August 5, 6, 12, 13, 17 - 22; September 1, 2, 5 - 11, 20 - 25, 28, 2012 and the higher daily flows of May 23, 24, 2012. The peak discharge of 50.0 cfs occurred at 0245 May 23, 2012 at a gage height of 3.47 ft with a shift of -0.20 ft. It exceeded high Measurement No. 527 made May 22, 2012 by 0.05 feet in stage.

Discharge.-- Shifting control method was used the entire water year. Shifts were applied as defined by measurements and distributed by time or event from 0000 October 1, 2011 to 1145 March 6, 2012 and from 1230 Sept 19 to the end of the water year. Two variable stage shift relationships were used during the period of runoff: HURREDCOVSC12A (based on M522-527 made during the period of use) was used from 1200 March 6 to the peak at 0245 May 23; and, HURREDCOVSC12C (based on M527-536 made during the period of use and M522 to anchor the low end) was used from 0300 May 23 to 1215 Sept 19. All measurements were made in open water and showed shifts ranging from -0.20 to +0.15 feet. All measurements were given full weight and shifts applied accordingly, except for Measurement Nos. 524, 525, 529, 533, and 536, which were adjusted -5% and +4% for smoothing purposes. Rain events along with apparent filling in and washing out of fines material at the weir caused some of the shift changes. The shift change during the ice period in March may have been due to a change in the weir from the ice.

Special Computations.-- Discharges for periods of ice effect were estimated based on eight discharge measurements (No. 518 - 525), temperature record, partial days of usable data and trends in flow. It should be noted that the measurements during the period of ice were all made in open water, with ice in the well either broken or cleared.

Remarks.-- Record good, except during periods of ice effect which are estimated and poor. The peak gage-height and discharge is considered good due to measurement no. 527 being made the day before at a gage-height of 0.05 feet less than the peak gage-height. Station maintained and record developed by Anthony D. Gutierrez, PS/ET II.

Recommendations.-- A new rating should be developed in WY2013 after levels have been run at the gage which should include a cross section of the weir to help define the PZF.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

07111000 HUERFANO R AT MANZANARES XING, NR REDWING, CO

RATING TABLE.-- HURREDCO25 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

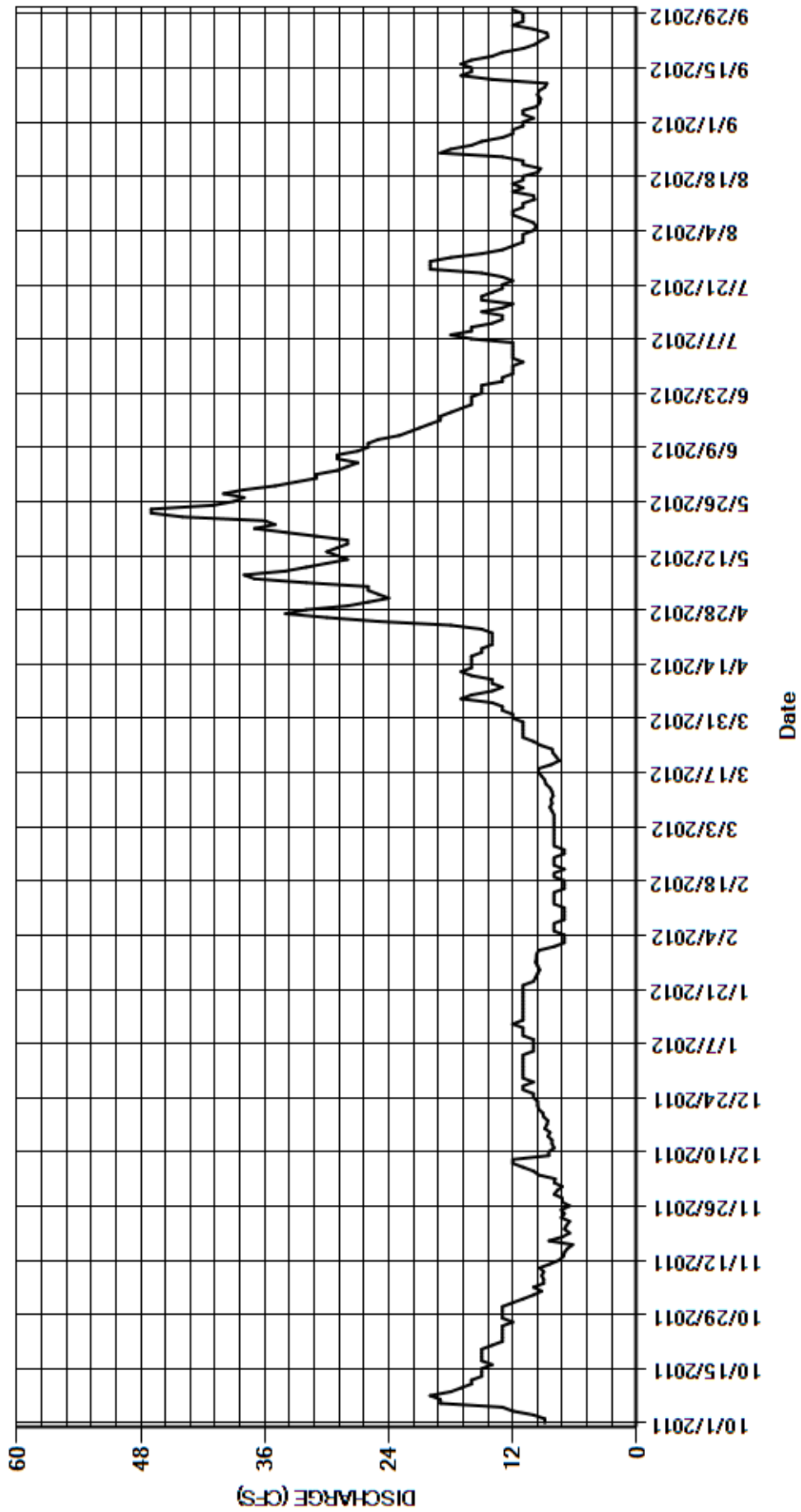
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.9	12	e7.2	e11	e8.0	e8.0	12	24	31	11	11	11
2	8.9	e11	e8.0	e11	e7.0	e8.0	13	25	31	12	11	10
3	10	e10	e7.9	e11	e7.0	e8.0	e13	26	29	12	11	11
4	12	e9.2	e9.5	e11	e7.0	e8.0	e14	26	28	12	10	11
5	13	e10	e10	e10	e8.0	e8.0	17	32	27	12	9.7	9.7
6	19	e9.0	e11	e10	e8.0	e8.0	16	37	29	12	10	9.4
7	19	e9.0	e12	e10	e8.0	e8.2	14	38	29	16	11	9.3
8	20	e9.2	e12	e10	e7.0	e8.4	e13	34	27	18	12	9.6
9	18	e9.0	e8.5	e11	e7.0	e8.2	14	32	26	16	12	9.5
10	17	e9.4	e8.5	e11	e7.0	e8.3	14	30	26	16	11	8.9
11	16	e8.4	e8.0	e11	e7.0	e8.1	16	28	25	14	11	8.7
12	16	e7.5	e8.2	e12	e8.0	e8.2	17	29	23	13	9.9	14
13	15	e7.1	e8.2	e11	e8.0	e8.4	16	30	22	13	10	17
14	15	e7.0	e8.6	e11	e8.0	e8.8	e16	29	21	15	12	16
15	15	e6.7	e8.4	e11	e8.0	e8.9	16	28	20	13	11	16
16	14	e6.2	e8.9	e11	e7.0	e9.2	16	28	19	12	12	17
17	15	e8.5	e8.7	e11	e7.0	9.5	e15	31	19	15	11	16
18	15	e7.2	e8.6	e11	e7.0	9.5	15	34	18	15	11	14
19	15	e6.5	e9.0	e11	e8.0	e8.3	14	37	17	14	9.6	13
20	15	e7.0	e9.1	e11	e8.0	e7.5	14	35	16	13	9.3	11
21	14	e6.8	e9.5	e11	e7.0	e7.8	14	36	16	13	11	9.9
22	13	e6.5	e9.6	e11	e8.0	e8.1	14	44	16	12	11	9.3
23	13	e7.3	e9.6	e10	e8.0	e8.2	15	47	15	13	13	8.6
24	13	e7.0	e10	e9.8	e8.0	e9.3	18	47	15	15	19	8.7
25	13	e7.3	e10	e9.6	e7.0	e10	25	41	15	20	18	10
26	e13	e6.5	e11	e9.4	e7.0	11	30	39	13	20	16	12
27	e12	e7.2	e11	e9.6	e8.0	11	34	38	13	20	15	11
28	e13	e7.2	e10	e9.8	e8.0	11	32	40	12	18	13	11
29	13	e8.0	e11	e9.7	e8.0	11	28	38	12	15	12	11
30	13	e7.7	e11	e9.7	---	11	26	35	12	13	12	12
31	13	---	e11	e9.5	---	12	---	33	---	12	11	---
TOTAL	439.8	241.4	294.0	326.1	219.0	277.9	531	1051	622	445	366.5	345.6
MEAN	14.2	8.05	9.48	10.5	7.55	8.96	17.7	33.9	20.7	14.4	11.8	11.5
AC-FT	872	479	583	647	434	551	1050	2080	1230	883	727	685
MAX	20	12	12	12	8.0	12	34	47	31	20	19	17
MIN	8.9	6.2	7.2	9.4	7.0	7.5	12	24	12	11	9.3	8.6

CAL YR	2011	TOTAL	5906.5	MEAN	16.2	MAX	87	MIN	5.2	AC-FT	11720
WTR YR	2012	TOTAL	5159.3	MEAN	14.1	MAX	47	MIN	6.2	AC-FT	10230

MAX DISCH: 50 CFS AT 02:45 ON MAY 23,2012 GH 3.47 FT SHIFT -0.2 FT
 MAX GH: 3.47 FT AT 02:45 ON MAY 23,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

07111000 HUERFANO R AT MANZANARES XING, NR REDWING, CO
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
07112500 HUERFANO RIVER AT BADITO

Water Year 2012

Location.-- Lat. 37°43'40.1", Long. 105°00'49.5" (Farisita, Colorado quadrangle, 1:24000 scale) in the SE¼ NE¼ SE¼ Sec.5, T27S, R68W, Huerfano County on left bank, 30 feet downstream of the crossing of CR 616 bridge over the Huerfano River, 13.1 mi west of the I-25 exit 56.

Drainage Area and Period of Record.-- 532 sq mi. ;

Equipment.-- Sutron Satlink-2 with high data rate (HDR) satellite-monitored data collection platform (DCP) attached to a Sutron Constant Flow Bubbler (CFB) in a 4 ft x 6 ft steel shelter. The primary gage is a concrete slope-gage immediately below the orifice. No changes this water year.

Hydrologic Conditions.-- The gage is located at a site across the river from the old Badito jail and settlement approximately 13.1 miles west of Interstate 25 on SR 69 elevation 6450 MSL with a drainage area of 532 mi² as the river enters the Eastern Colorado prairie. There are several diversions above the gage, primarily for alfalfa irrigation. The river is subject to flash floods with numerous "feeder" streams contributing discharge above the gage.

Gage-Height Record.-- The primary record is 15-minute satellite-monitored continuous flow bubbler data with DCP and CFB log data used for backup. The record is complete. The record shows extreme gage height variability caused by debris and silt moving on and off the bubbler orifice and control and therefore its reliability is of concern. The stage-discharge relationship was affected on the following dates by ice in the channel and/or ice on the control: November 2, 3, 6 - 11, 16, 17, 20, 25 - 27, 29; December 1 - 31, 2011; January 1 - 18, 22 - 31; February 1 - 29; March 1- 4, 7 - 13, 18 - 24, 2012. October 26 -28, 2011 the orifice line was plugged up, giving false high reading. March 27 - April 23 a leak in the orifice line resulted in gage heights being low. Placement of rocks on the right upstream side of the bridge above the gage caused large amounts of sediment to cover the muffler and plug it up. This caused bad data from May 31 to June 14, when the muffler was dug out and the line purged. Twenty-four different instrument calibration corrections ranging in magnitude from -0.17 ft to +0.30 ft were applied to the record. Peak gage height values were entered from visual observation of high water marks on the slope-gage after events that occurred on July 26; August 26; and September 29, 2012.

Datum Corrections.-- No levels were run this water year. Levels were last run on September 3, 2008.

Rating.-- The primary control at all stages is the channel, along with thick bank vegetation on both banks downstream at higher stages. The bottom part of the concrete apron structure of the gage is buried by mud and debris; this has formed a riffle control at lower flows. The channel immediately below the gage narrows and has thick growth with overhang on either side. Extreme flows with gage height over 9 feet will go into open field on both sides of the river 300+ feet across. Rating 4, dated April 4, 2012, was used for the entire water year with, Rating 4B, is the same as Rating 4 to a gage height of 3.15 ft, and was developed as an extension of Rating 4 (straight line extension in log-log coordinates) for the high water this year. Rating 4 is well defined to approximately 50 cfs with only a limited number of higher flow measurements. Twenty-one discharge measurements (Nos. 155 – 175) were made this water year ranging in discharge from 2.67 to 15.9 cfs. They cover the range in stage experienced except for the lower daily flows of November 16, 18, 19, 21, 26 - 30; December 1 - 4, 2011; January 30, 31; Feb 1 - 3, 19 - 24; March 1, 2, 5, 6; July 1; August 29 - 31; September 1 -, 7, 10 - 12; and the higher daily flows of April 25 - 28; May 8, 9, 12 - 14, 18, 20, 27; June 1 - 3; July 26; Aug 26; and September 29, 30, 2012. The peak discharge of 1290 cfs occurred at 1600 on July 26, 2012 at a gage height of 5.10 ft. with a shift of 0.00 ft (this is considered an estimated peak discharge). It exceeded the highest measured flow this water year (No. 166), made June 5, 2012, by 3.75 feet in stage.

Discharge.-- Shifting-control method was used for the entire water year. Shifts were applied as defined by measurements and distributed by time for the entire water year. Discharge measurements showed shifts ranging from -0.12 to +0.06 ft, with all measurements being made in open channel. Shifts were prorated by time and/or event due to the extreme variability in shifts at similar unit values. All measurements were given full weight.

Special Computations.-- Discharge during periods of ice-effect was estimated based on measurements, temperature record from the Huerfano River near Redwing gage (HURREDCO) temperature sensor and partial day data. Hydrographs from this gage and upstream gage HURREDCO were used as a general comparison to validate events. The high water during the July peak was due to rain below the HURREDCO gage.

Remarks.-- The overall record and the peak (including any flows where the gage height exceeded 2.5 feet) are considered poor due to the extreme gage height variability caused by debris, silt and large rocks moving on and off the bubbler orifice and control, ice effect, lack of any recent higher flow measurements to support the rating extension and lack of precision in the primary reference gage. The rocks moving across the control tend to stop just past the concrete, resulting in an unstable riffle which changes in height. Station maintained and record developed by Anthony D. Gutierrez .

Recommendations.-- Continue to make frequent measurements and gage visits to ensure debris is not caught on the bubbler orifice. Run levels, including channel cross sections, and perform a HEC-RAS modeling evaluation of the rating extension. Evaluate possible suitable alternative to the concrete slope gage used as a primary reference.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

07112500 HUERFANO RIVER AT BADITO

RATING TABLE.-- HUEBADCO04 USED FROM 01-OCT-2011 TO 22-JUL-2012
 HUEBADCO04B USED FROM 23-JUL-2012 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.5	4.6	e2.0	e5.4	e2.4	e2.2	e3.8	12	e12	2.4	5.9	1.7
2	5.1	e4.0	e2.6	e5.0	e2.0	e2.0	e4.0	9.6	e17	2.9	5.0	2.3
3	5.8	e3.6	e2.4	e4.9	e2.3	e2.8	e3.0	16	e22	3.2	3.8	2.1
4	6.6	2.8	e2.0	e5.1	e3.4	e2.9	e5.0	14	e14	5.4	3.5	2.0
5	7.7	3.7	e3.0	e5.0	e3.6	2.5	e9.2	15	e13	5.0	3.3	2.3
6	7.5	e4.2	e4.0	e4.5	e4.0	2.3	e8.0	11	e13	3.9	3.3	3.4
7	11	e4.3	e5.0	e4.7	e4.2	e2.4	e6.4	15	e12	3.5	3.2	2.6
8	12	e5.0	e5.5	e3.4	e2.6	e2.6	e6.6	20	e11	5.3	3.3	2.7
9	11	e4.8	e5.6	e4.2	e3.4	e2.9	e6.8	17	e12	5.8	5.8	3.2
10	12	e3.8	e5.8	e4.0	e4.3	e2.7	e6.5	15	e13	12	7.9	2.3
11	12	e4.0	e5.5	e5.0	e4.8	e2.6	e5.3	13	e11	9.6	3.7	1.0
12	11	4.8	e5.0	e5.3	e5.8	e2.4	e5.6	19	e12	11	3.9	1.1
13	13	4.2	e5.2	e5.1	e5.1	e2.6	e5.5	21	e11	10	4.3	4.2
14	13	3.2	e5.4	e5.0	e4.0	3.4	e5.9	18	e11	6.1	3.5	6.3
15	13	2.9	e6.0	e5.4	e4.6	5.8	e5.8	13	10	11	4.2	7.3
16	13	e2.2	e6.2	e4.5	e4.6	3.3	e6.2	13	9.0	5.6	5.8	6.2
17	13	e3.2	e6.3	e5.0	e4.2	3.7	e6.1	14	9.3	4.8	3.4	5.1
18	14	2.5	e6.0	e4.3	e3.2	e3.2	e6.0	18	8.2	5.6	3.6	5.2
19	15	2.3	e5.6	3.2	e2.5	e2.8	e6.0	16	8.0	6.0	4.3	6.9
20	14	e2.8	e5.7	3.8	e1.5	e3.1	e6.4	17	10	4.7	3.1	5.8
21	13	2.3	e4.5	3.5	e2.6	e3.3	e6.5	15	13	4.5	4.0	4.9
22	14	3.9	e5.0	e3.2	e1.0	e2.9	e6.8	15	11	4.6	4.4	4.8
23	13	3.9	e6.0	e5.8	e1.4	e3.3	e7.5	11	11	5.2	4.5	4.9
24	13	3.6	e6.4	e5.0	e2.2	e3.0	11	13	8.7	5.2	6.8	4.2
25	10	e3.0	e6.2	e3.2	e3.4	3.8	18	14	6.7	3.7	10	4.6
26	e9.3	e2.3	e6.0	e3.0	e3.8	3.5	21	15	4.9	e41	e42	5.6
27	e8.0	e2.4	e5.4	e3.0	e4.0	e3.4	27	19	4.5	6.3	9.0	6.8
28	e6.5	2.0	e5.4	e3.8	e3.1	e3.8	17	16	4.4	7.1	4.2	8.4
29	5.0	e2.1	e5.1	e4.0	e3.1	e4.0	11	9.8	6.0	5.3	2.2	e22
30	5.2	1.7	e5.1	e2.0	---	e4.1	9.1	10	3.5	4.7	1.9	21
31	4.6	---	e5.1	e2.5	---	e4.2	---	e11	---	4.9	1.7	---
TOTAL	316.8	100.1	155.0	131.8	97.1	97.5	253.0	455.4	312.2	216.3	175.5	160.9
MEAN	10.2	3.34	5.00	4.25	3.35	3.15	8.43	14.7	10.4	6.98	5.66	5.36
AC-FT	628	199	307	261	193	193	502	903	619	429	348	319
MAX	15	5.0	6.4	5.8	5.8	5.8	27	21	22	41	42	22
MIN	4.6	1.7	2.0	2.0	1.0	2.0	3.0	9.6	3.5	2.4	1.7	1.0

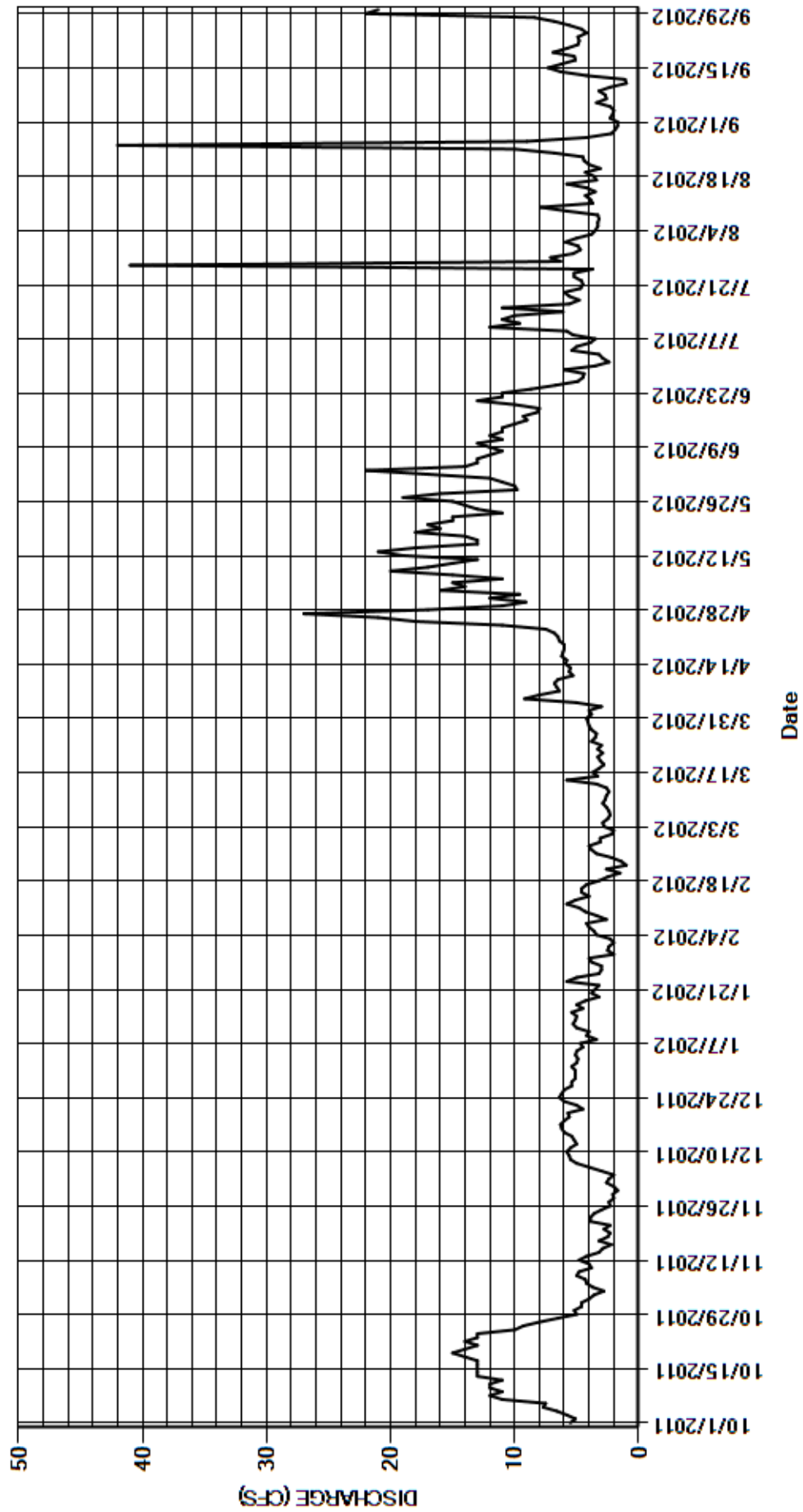
CAL YR	2011	TOTAL	3417.8	MEAN	9.36	MAX	38	MIN	1.7	AC-FT	6780
WTR YR	2012	TOTAL	2471.6	MEAN	6.75	MAX	42	MIN	1.0	AC-FT	4900

MAX DISCH: 1290 CFS AT 16:00 ON JUL 26,2012 GH 5.10 FT SHIFT 0 FT (peak from HWM on staff gage)

MAX GH: 5.10 FT AT 16:00 ON JUL 26,2012 (peak from HWM on staff gage)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

07112500 HUERFANO RIVER AT BADITO
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
07114000 CUCCHARAS RIVER AT BOYD RANCH NEAR LA VETA
Water Year 2012

Location.-- Latitude 37° 25' 12", Longitude 105° 03' 08" (Cuchara, Colorado quadrangle, 1:24000 scale) in the SE¼ NE¼ SE¼ Sec.24, T30S, R69W, Huerfano County on left bank at Boyd Ranch, 29 feet downstream from private bridge, 6.5 miles southwest of La Veta CO on Highway 12.

Drainage Area and Period of Record.-- 56 mi². ;

Equipment.-- Sutron model 8210 satellite-monitored data collection platform (DCP) with a High Data Rate (HDR) radio transmitter, with shaft encoder and graphic water-stage recorder in a 4 ft x4 ft x 8 ft steel shelter over 48-inch corrugated pipe well. Shaft encoder and chart are set to the reference mark on the front of the equipment shelf using a drop-tape. A temperature sensor is also connected to the DCP. There is no outside staff gage. No changes this year.

Hydrologic Conditions.-- The gage is located in a gentle slope section of the Cucharas River Valley at an elevation of approximately 7,790 feet by topographic map. There are several diversions upstream of the gage for agriculture and the town of Cuchara. State Highway 12 is parallel to the right riverbank at an elevation of approximately 10 feet higher than pastureland adjacent to the left bank. Flooding would spill into the pasture on the left before flooding the highway. The gage is subject to freezing during the winter months.

Gage-Height Record.-- Primary record is 15-minute satellite data with DCP log and graphic chart record used for back-up purposes. Record is complete and reliable, except for the following periods: October 26 - 28; November 4 -11, 16, 17, 20, 26, 27, 29; December 1 - 3, 2011; March 14 - 22, April 2 - 4, 2012 when the stage-discharge relationship was affected by ice in the river and December 4, 2011 - March 13, 2012 when the well was frozen and the floats were trapped in the ice and the river was also ice covered, with ice on the control. Flush corrections were applied to the record, ranging from -0.02 ft to +0.04 ft. The control continues to collect considerable amounts of silt in the weir pool, which help to "seal" the weir. Positive shifts started at the beginning of April which is an indication of the weir beginning to leak. On October 19, 2011, several cobbles were placed behind the weir in order to help with trapping fines material for sealing the weir.

Datum Corrections.-- No levels were run this year. Levels were last run April 24, 2009.

Rating.-- The control is a rock weir constructed in April 2009. It is rated for flows up to 350 cfs by cross section. Flows higher than 350 cfs are controlled by the brush-lined bank on the right side and the left bank, which was constructed using 4 – 8 inch cobble with large rocks lining the bottom of the bank. Rating No. 15 dated June 1, 2009 was used the entire water year. Rating 15 was developed as a result of the weir construction. Shifts for Rating 15 were plotting slightly to the left during the winter measurements, as the runoff occurred the shifts started plotting to the right. Starting in July, shifts began increasing positive to the end of the water year. Eighteen discharge measurements (Nos. 567 - 584) were made and ranged in discharge from 5.49 cfs to 77.9 cfs. They cover the range in stage experienced for the water year, except for the lower daily flows of October 1, 23, 24, 2011; February 29; March 1 - 13; August 30, 31; September 1, 2, 5, 6, 23, and 24, 2012. The peak discharge of 77.7 cfs occurred at 2245 April 11, 2012 at a gage height of 2.51 ft with a shift of +0.10. The peak gage-height held for approximately an hour on April 11 and occurred again on April 27, holding at or near 2.51 feet for the entire day. Measurement No. 575 was made on April 27 at the peak gage-height of 2.51 with a discharge of 77.9 cfs.

Discharge.-- Shifting control method was used for all periods of good, ice-free record. Shifts were applied by time and stage proration through the year. The water year started with the continuation of variable stage-shift relation, CRBRLVCOVSC11B, to 1145 October 19, 2011, with a maximum shift of -0.56 ft. Shifts were then applied as defined by measurements and were distributed by time from 1200 October 19, 2011 to 1200 March 22, 2012 and from 1045 July 10 to the end of the water year. Two variable stage-shift relationships were developed and used during runoff: CRBRLVCOVSC12A from 1215 March 22 to 1200 April 27 and CRBRLVCOVSC12B from 1215 April 27 to 1030 July 10. The large positive shifts starting at the end of July through late September indicate weir leakage, this falls well to the right of rating 15 at the lower end. Measurements showed shifts varying from -0.04 to +0.32 ft. All open water measurements were given full weight, except Measurement 578 which was adjusted -6% for smoothing purposes.

Special Computations.-- Discharges for periods of ice-affected record were estimated based on eight measurements (Nos. 567 – 574), air temperature data collected at the gage, and the hydrograph. The shift change on October 19 was the result of placing cobbles behind the weir and cleaning leaves off of the weir.

Remarks.-- The record is good, except during periods when the well was frozen and of ice effect in the river and on the weir which are estimated and considered poor. The peak is considered good due to the measurement being made at the peak gage-height 16 days after the first occurrence of the peak. This station maintained and record developed by Anthony D. Gutierrez PS/ET 2.

Recommendations.-- Levels need to be run in water year 2013. Repair of the leakage in the rock weir should be considered and a new rating developed.

STATE OF COLORADO
DIVISION OF WATER RESOURCES
OFFICE OF STATE ENGINEER

07114000 CUCCHARAS RIVER AT BOYD RANCH NEAR LA VETA

RATING TABLE.-- CRBRLVCO15 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

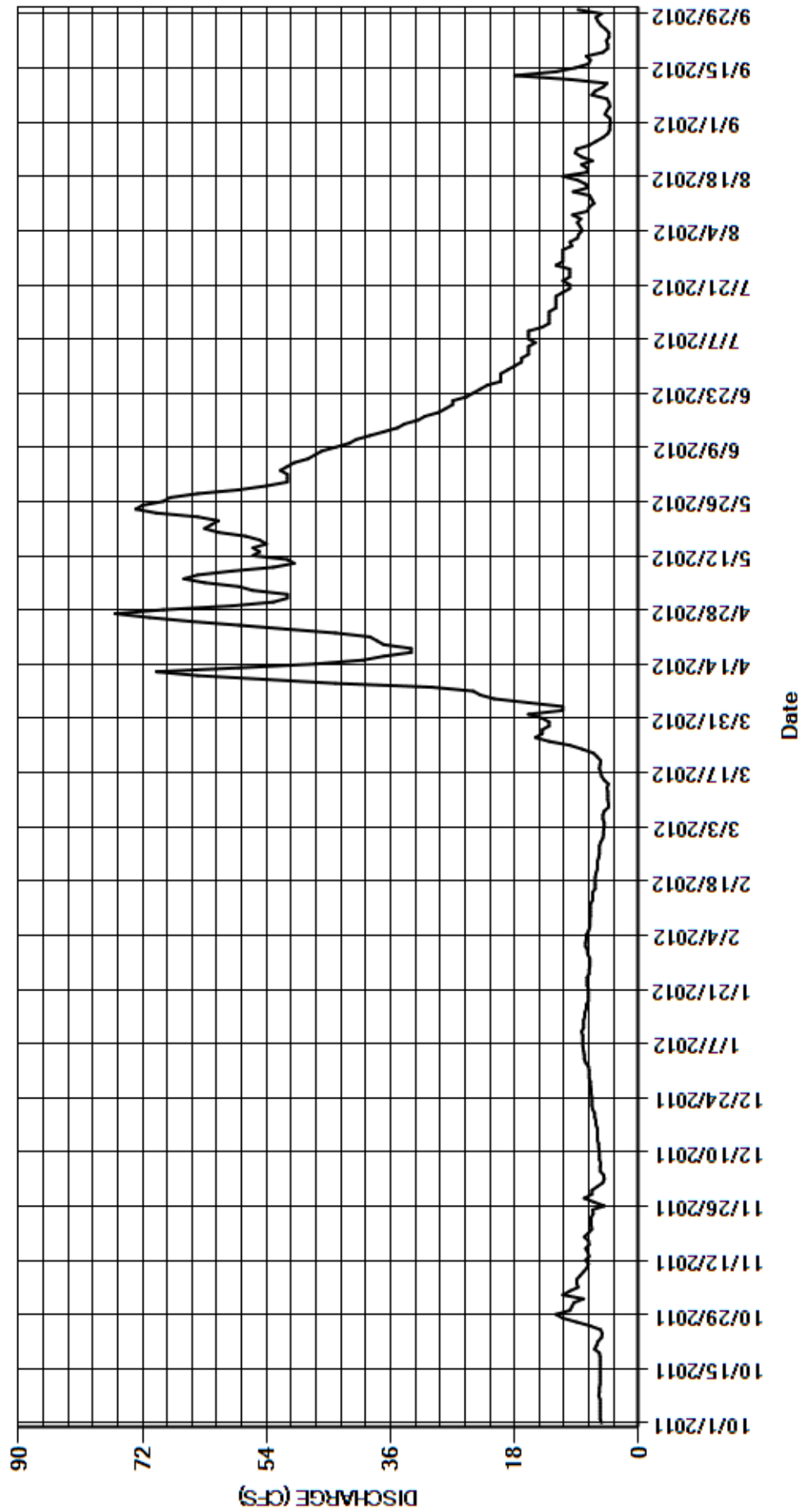
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.4	9.4	e6.0	e7.3	e7.7	e5.1	16	51	51	17	10	4.1
2	5.6	8.0	e5.2	e7.7	e7.7	e5.1	e11	51	51	17	8.9	4.2
3	5.6	11	e5.0	e7.9	e7.6	e5.0	e11	56	52	16	8.7	4.9
4	5.6	10	e5.1	e7.9	e7.6	e5.0	e16	58	51	16	8.2	4.6
5	5.6	8.8	e5.6	e8.0	e7.3	e5.2	21	63	50	16	8.5	4.2
6	5.6	9.0	e5.6	e8.1	e7.1	e5.2	23	66	48	15	8.9	4.3
7	5.6	e9.0	e5.5	e8.1	e7.1	e5.0	24	64	47	16	8.4	4.6
8	5.8	e8.5	e5.7	e8.1	e7.1	e4.4	30	59	46	16	9.6	6.8
9	5.7	e8.0	e5.7	e8.1	e7.0	e4.4	44	53	44	16	7.4	6.3
10	5.7	e7.5	e5.7	e8.3	e7.0	e4.5	54	50	42	14	7.2	5.2
11	5.6	e7.3	e5.8	e8.0	e7.0	e4.5	64	51	41	13	6.5	4.6
12	5.6	7.7	e5.8	e8.0	e7.0	e4.5	70	56	39	13	6.8	10
13	5.6	7.2	e6.0	e8.0	e6.7	e4.6	58	55	37	13	7.1	18
14	5.6	7.4	e6.0	e7.8	e6.7	e4.4	47	56	35	13	9.5	12
15	5.6	7.7	e6.0	e7.8	e6.7	e5.0	40	54	34	12	7.4	9.2
16	5.6	e7.2	e6.0	e7.6	e6.3	e5.4	37	55	32	12	7.7	7.3
17	5.6	e7.3	e6.2	e7.6	e6.3	e5.5	33	57	31	12	8.9	7.0
18	5.6	7.9	e6.2	e7.3	e6.3	e5.7	33	61	29	12	11	7.6
19	5.7	7.3	e6.4	e7.3	e6.3	e5.6	37	63	28	11	7.5	5.2
20	6.4	e6.8	e6.4	e7.3	e6.2	e5.5	38	62	27	10	7.4	4.5
21	6.1	6.9	e6.7	e7.3	e6.0	e6.0	39	61	27	10	8.3	4.5
22	5.9	6.9	e6.8	e7.5	e6.0	e6.6	44	64	25	11	6.7	4.7
23	5.4	6.9	e6.8	e7.5	e6.0	8.2	51	70	24	10	8.3	4.3
24	5.3	6.6	e6.8	e7.5	e5.8	10	58	73	23	10	9.2	4.3
25	5.5	6.7	e6.9	e7.2	e5.7	13	65	72	22	10	9.0	4.8
26	e7.0	e5.0	e6.9	e7.2	e5.7	15	71	69	20	12	7.2	5.5
27	e9.0	e6.5	e7.0	e7.1	e5.7	14	76	68	20	11	6.2	5.9
28	e11	7.9	e7.0	e7.1	e5.5	14	69	64	20	11	5.2	6.2
29	12	e6.8	e7.2	e7.1	e5.2	13	59	58	19	11	4.5	5.4
30	10	6.8	e7.2	e7.4	---	13	53	54	18	11	4.2	8.8
31	9.7	---	e7.2	e7.4	---	14	---	51	---	9.7	4.2	---
TOTAL	200.0	230.0	192.4	236.5	190.3	226.4	1292	1845	1033	396.7	238.6	189.0
MEAN	6.45	7.67	6.21	7.63	6.56	7.30	43.1	59.5	34.4	12.8	7.70	6.30
AC-FT	397	456	382	469	377	449	2560	3660	2050	787	473	375
MAX	12	11	7.2	8.3	7.7	15	76	73	52	17	11	18
MIN	5.3	5.0	5.0	7.1	5.2	4.4	11	50	18	9.7	4.2	4.1

CAL YR	2011	TOTAL	3543.3	MEAN	9.71	MAX	29	MIN	5.0	AC-FT	7030
WTR YR	2012	TOTAL	6269.9	MEAN	17.1	MAX	76	MIN	4.1	AC-FT	12440

MAX DISCH: 77.7 CFS AT 22:45 ON APR 11,2012 GH 2.51 FT SHIFT 0.1 FT
MAX GH: 2.51 FT AT 22:45 ON APR 11,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

07114000 CUCHARAS RIVER AT BOYD RANCH NEAR LA VETA
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
CUCHARAS RIVER AT HARRISON BRIDGE NEAR LA VETA, CO
Water Year 2012

Location.-- Latitude 37° 33' 02", Longitude 104° 56' 11" (Ritter Arroyo, Colorado quadrangle, 1:24000 scale) in the NE1/4 SW1/4 Sec.6, T29S, R67W, Huerfano County on the Harrison Bridge, 0.66 miles south on the Valley Road from Highway 160 and 9.93 miles west of Walsenburg, Colorado on Highway 160.

Drainage Area and Period of Record.-- 196.16 sq.mi.;

Equipment.-- A Sutron SatLink 2 satellite-monitored high data rate (HDR) data collection platform (DCP) and shaft encoder. The DCP is housed inside a 4 ft x 4 ft x 8 ft metal shelter at a higher elevation than the riverbank on the right side, while the shaft encoder is in a 20 in x 30 in metal "half" shelter atop an 18 inch diameter CMP stilling well attached to the downstream side of the center pier of Harrison Bridge. The shaft encoder is set using an electric tape inside of the well. A temperature sensor is attached to the antenna mast on the main shelter. No changes this water year.

Hydrologic Conditions.-- The gage sits in a wide valley of the Cucharas River approximately 4.5 miles NNE of the town of La Veta. There are several tributaries as well as the urban runoff from La Veta which contribute to the flows. There are several irrigation diversions and a pipe line for the city of Walsenburg municipal water as well as the LaVeta Municipal Pipe line. Due to the where the gage sits east of La Veta Pass it is subject to flash flooding from rain storms in the summer and blizzard conditions in the winter.

Gage-Height Record.-- The primary record is 15-minute satellite data with DCP log data used for back-up purposes. Record is complete and reliable except for the following periods: November 3; December 1 – 21, 30, 31, 2011; January 1 - 4, 7 – 13, 16 – 18, 20 – 29; February 2 – 29; March 1 – 3, 8 – 11, 2012, when the stage-discharge relationship was affected due to ice in the river and or the well. The periods of November 8 - 14 and December 22 – 29, the well was frozen giving false discharge readings..

Datum Corrections.-- No levels were run this year. Levels were last run April 4, 2007 when the electric tape was set..

Rating.-- The control at low and medium flows up to 50 cfs is the gravel to large cobble bed of the river channel. At medium to high stages the riverbanks and brush lining the edges of the channel as well as the center bridge pier, become part of the control. High flows of up to approximately 2000 cfs should be contained by the bridge. Extreme high flows can go out of channel to the flood plain north of the bridge, which is at a slightly lower elevation, and extends for approximately 200 feet to the north. Rating No. 2, dated Oct 1, 2003, was used the entire water year. Rating No. 2 was developed using measurement history and a theoretical rating extension based on channel survey work and is well-defined to about 500 cfs. Eighteen discharge measurements (Nos. 145 to 162) were made during water year. Measured discharges ranged from 1.71 cfs to 83.2 cfs, with seven observations of no flow. They cover the range in stage experienced, except for the higher daily flow of April 10 – 14, 2012. The peak discharge of 178 cfs occurred at 1030 on April 12, 2012, at gage height of 3.12 ft with a shift of -0.26 ft. The peak exceeded measurement No.153 made on April 27, 2012 by 0.39 feet in stage.

Discharge.-- Shifting control method was used for all periods of flow. A variable stage-shift relationship, CRHBLVCOVSC12A, was developed and used from 1445 October 19 to end of the water year. The stage-shift relation covers all periods of flow. Open water measurements indicated shifts varying from -0.26 to +0.03 feet. All measurements were given full weight and applied directly, with the exception of Nos. 152, 154, and 155 which were discounted from -4.85% to +6.37% for smoothing purposes.

Special Computations.-- Discharge for periods of ice-affected record was estimated utilizing five measurements (Nos. 147 – 151), station temperature record, and partial days of usable record.

Remarks.-- Record is fair, except during periods of ice effect and no gage height, which are estimated and poor. The peak is rated fair. Station maintained and record developed by Anthony Gutierrez .

Recommendations.-- Need to run levels in WY2013.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

CUCHARAS RIVER AT HARRISON BRIDGE NEAR LA VETA, CO

RATING TABLE-- CRHBLVCO02 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

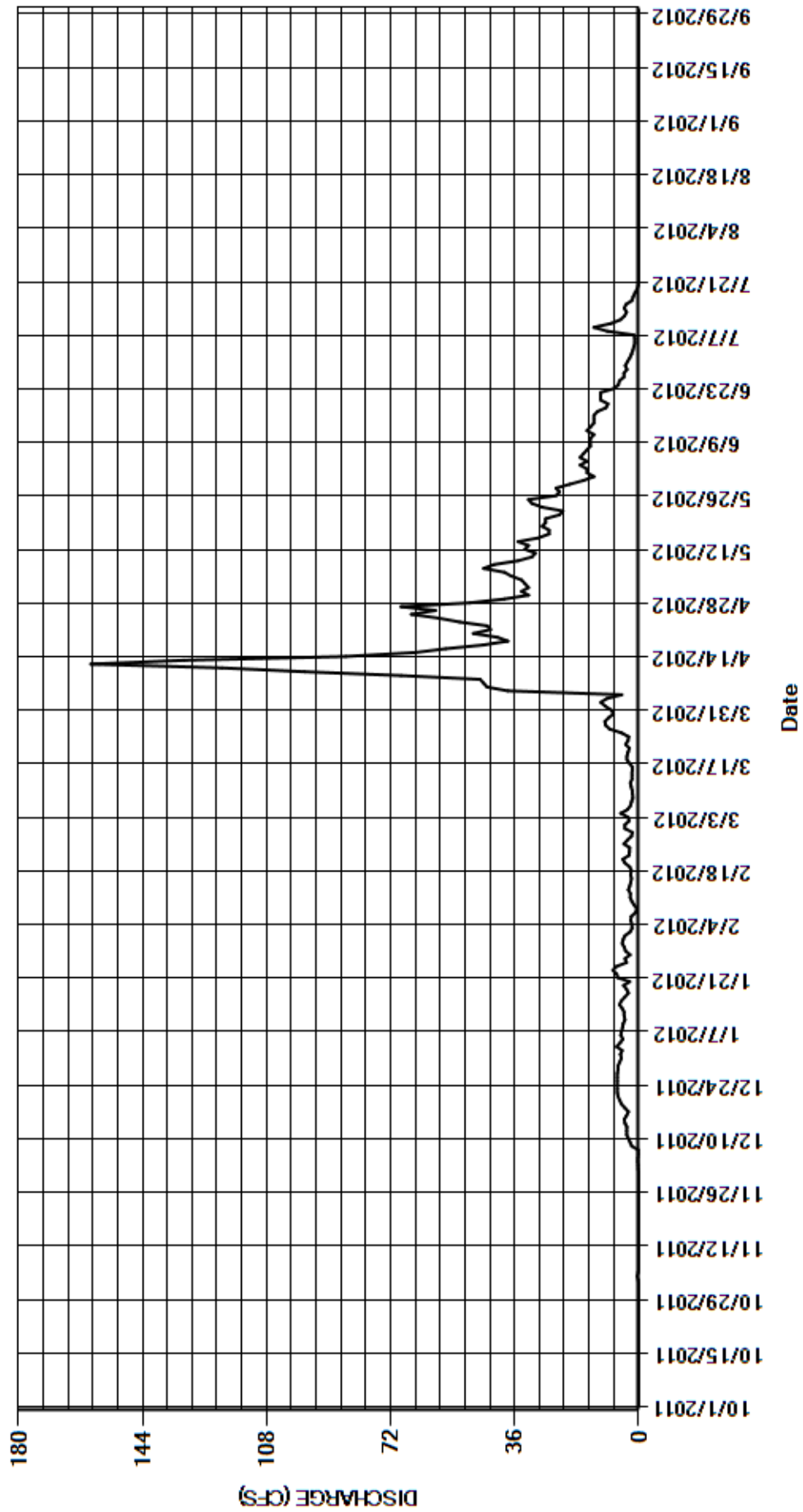
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	e0.00	e5.3	4.0	e4.0	9.7	34	15	2.6	0.00	0.00
2	0.00	0.00	e0.10	e4.8	e2.5	e2.8	11	32	15	2.1	0.00	0.00
3	0.00	e0.10	e0.15	e6.4	e1.9	e3.1	9.2	33	17	1.7	0.00	0.00
4	0.00	0.42	e0.20	e5.4	e2.0	5.2	4.9	34	15	1.4	0.00	0.00
5	0.00	0.10	e0.20	4.6	e2.3	3.2	38	37	17	1.1	0.00	0.00
6	0.00	0.00	e0.10	5.2	e2.2	2.4	44	39	16	1.1	0.00	0.00
7	0.00	0.00	e0.10	e5.0	e1.0	2.1	45	45	15	1.4	0.00	0.00
8	0.00	e0.00	e2.0	e4.7	e0.50	e1.7	46	42	14	9.1	0.00	0.00
9	0.00	e0.00	e2.5	e4.5	e1.3	e1.8	69	35	14	13	0.00	0.00
10	0.00	e0.00	e3.0	e4.0	e2.0	e1.9	97	31	14	8.1	0.00	0.00
11	0.00	e0.00	e3.5	e4.2	e2.5	e2.2	121	30	13	5.3	0.00	0.00
12	0.00	e0.00	e3.5	e4.2	e2.4	2.4	159	33	15	4.1	0.00	0.00
13	0.00	e0.00	e3.4	e4.8	e3.0	1.9	132	32	14	3.5	0.00	0.00
14	0.00	e0.00	e4.0	5.6	e2.6	1.9	85	35	13	4.2	0.00	0.00
15	0.00	0.00	e4.2	5.0	e2.3	1.9	65	29	13	3.7	0.00	0.00
16	0.00	0.00	e3.5	e4.0	e2.1	1.8	56	26	13	2.0	0.00	0.00
17	0.00	0.00	e3.0	e3.0	e2.4	2.6	45	26	12	1.6	0.00	0.00
18	0.00	0.00	e4.0	e3.5	e2.1	3.4	38	28	9.5	1.1	0.00	0.00
19	0.00	0.00	e5.0	4.4	e2.6	3.4	41	27	8.9	0.48	0.00	0.00
20	0.00	0.00	e5.5	e2.6	e4.0	3.1	48	27	11	0.09	0.00	0.00
21	0.00	0.00	e6.0	e6.0	e4.6	2.7	43	23	11	0.00	0.00	0.00
22	0.00	0.00	e6.2	e6.4	e2.8	3.8	44	22	11	0.00	0.00	0.00
23	0.00	0.00	e6.2	e7.5	e2.7	3.1	52	28	7.2	0.00	0.00	0.00
24	0.00	0.00	e6.2	e6.4	e2.6	2.9	58	31	5.9	0.00	0.00	0.00
25	0.00	0.00	e6.2	e3.5	e4.3	4.9	66	32	5.6	0.00	0.00	0.00
26	0.00	0.00	e6.2	e4.0	e3.3	8.4	59	24	4.3	0.00	0.00	0.00
27	0.00	0.00	e6.2	e2.5	e2.1	9.6	69	23	4.3	0.00	0.00	0.00
28	0.00	0.00	e6.0	e3.8	e1.8	9.8	49	24	3.4	0.00	0.00	0.00
29	0.00	0.00	e6.0	e4.2	e4.0	8.7	39	20	3.9	0.00	0.00	0.00
30	0.00	0.00	e5.5	4.8	---	7.3	32	16	3.3	0.00	0.00	0.00
31	0.00	---	e5.0	4.5	---	8.0	---	13	---	0.00	0.00	---
TOTAL	0.00	0.62	113.65	144.8	73.90	122.0	1674.8	911	334.3	67.67	0.00	0.00
MEAN	0.000	0.021	3.67	4.67	2.55	3.94	55.8	29.4	11.1	2.18	0.000	0.000
AC-FT	0	1.2	225	287	147	242	3320	1810	663	134	0	0
MAX	0.00	0.42	6.2	7.5	4.6	9.8	159	45	17	13	0.00	0.00
MIN	0.00	0.00	0.00	2.5	0.50	1.7	4.9	13	3.3	0.00	0.00	0.00

CAL YR	2011	TOTAL	1199.21	MEAN	3.29	MAX	14	MIN	0.00	AC-FT	2380
WTR YR	2012	TOTAL	3442.74	MEAN	9.41	MAX	159	MIN	0.00	AC-FT	6830

MAX DISCH: 178 CFS AT 10:30 ON APR 12,2012 GH 3.12 FT SHIFT -0.26 FT
 MAX GH: 3.12 FT AT 10:30 ON APR 12,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

CUCCHARAS RIVER AT HARRISON BRIDGE NEAR LA VETA, CO
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
OXFORD FARMERS DITCH COMPANY

Water Year 2012

Location.-- Lat. 38°10'34", Long. 104°08'42", in the NE¼ NW¼ SW¼ Sec.32, T21S, R60W Pueblo County, Hydrologic Unit 11020005, approximately 0.33 mi upstream from Arkansas River at Nepesta Rd. Bridge river gage.

Drainage Area and Period of Record.-- N/A.;

Equipment.-- Sutron SatLink DCP/logger with High Data Rate radio and shaft encoder in a stilling well inside a wood frame shelter at a twelve-foot standard concrete Parshall flume. A float-activated A-35 graphic water-stage recorder is also in the stilling well. Primary reference gage is outside staff gage installed in flume. No changes this water year.

Hydrologic Conditions.-- The Oxford Farmers ditch diverts water from the Arkansas River upstream from the Arkansas River at Nepesta Bridge gage approximately 0.40 miles. The ditch company owns a variety of direct flow water rights and receives Winter Water and Fry-Ark Project water from Pueblo Reservoir. Pueblo Reservoir regulates flows throughout the water year and is located approximately 43 river miles upstream from the gage with a travel time of approximately 18 hours. Non-regulated inflows to the Arkansas River below Pueblo Reservoir and above the gage include Fountain Creek, St. Charles River and the Huerfano River. The influence of urbanization provides the largest affect to the runoff regime. No hydrologic condition changes this water year

Gage-Height Record.-- Primary record is 15-minute satellite-monitored data with DCP log data and the graphic chart recorder used for backup purposes. Record is complete and reliable for this seasonally operated gage, except for the period from March 21-23, 2012 when there were several hours of missing data each day. For the period from November 15 to March 14, there is no flow in the ditch as the company participates in the Winter Water Storage Program in Pueblo Reservoir.

Datum Corrections.-- No levels were run to the flume this water year.

Rating.-- The control is a standard, 12-foot, concrete Parshall Flume. A standard 12-ft Parshall Flume table was used all year. One discharge measurement was made this year. Measurement Number 15 (17.9 cfs) was made in open water in the flume at the staff gage position. The peak discharge of 57.7 cfs occurred at 0300 on October 9, 2011 at a gage height of 1.16 feet with a shift of -0.02 ft. The peak exceeded Measurement No.15 by 0.56 ft in stage.

Discharge.-- Shifting control method was used for the entire water year. Measurement 15 showed a shift of -0.05 ft after adjusting the weighted mean gage height and was discounted -8.67% to -0.02 ft (see Special Computations). A -0.02 ft shift was applied from the beginning of the water year to the end of the irrigation season, November 15, 2011. There is no notation of the flume being cleaned this water year. A shift of 0.00 was used from March 15, 2012 to end of the water year.

Special Computations.-- Measurement 15 was made at the staff gage position, and it appears that gage height during the measurement was artificially increased due to the presence of the hydrographer in the flume. The field note does not have the start and stop gage heights recorded. The gage height noted on arrival is 0.61 ft and on departure is 0.60 ft. The CoHMS note start and stop gage heights are 0.61 ft, while the 15-minute data starts at 0.63 ft and ends at 0.60 ft. Measurement section depths on the CoHMS note are 0.61 ft during the measurement. The note states that the flume was clean. The record for the end of water year 2011 shows a prorated GH correction of -0.02 ft starting at 2200 September 14 and ending at 1330 October 4. There is no documentation of this on either the field or CoHMS notes. The gage-height of Measurement 15 was adjusted -0.01 ft to 0.60 ft (matching the web data), resulting in a shift of -0.05 ft. This shift was then adjusted -8.67% for a final shift of -0.02 ft. The original measurement rating was good (5%), this was also adjusted to fair (8%) which allows the final shift to be used. The shift of -0.02 ft was applied to the to the end of irrigation season, which includes the peak gage-height and discharge for Water Year 2012. The shift was hand entered for the beginning of the water year. Discharge during periods of missing data in March 2012 were estimated using the flow trends from previous and following periods good record.

Remarks.-- Record is considered fair due to the sand and moss buildup that occurs in the flume during the irrigation season, which would introduce uncertainty into the shifts, and also due to the poor precision of the gage heights (chatter) measured in the stilling well. Periods of missing data are estimated and rated poor. Station was maintained by Steve Anselmo and Garrett Markus this water year. Station record was developed by Anthony D Gutierrez.

The Arkansas River near Nepesta CO gaging station was moved from above the Oxford Farmers Ditch diversion to the Nepesta Road Bridge below the Oxford diversion beginning October 1, 2000. For consistency and comparison with previously published historical record in this reach of the Arkansas River, the Oxford Ditch mean daily discharge is combined with the mean daily discharge measured at Arkansas River at Nepesta Road Bridge near Nepesta CO gaging station.

Recommendations.-- A complete flume inspection should be performed during the non irrigation season to confirm the floor elevations, the position of the staff gage and the overall flume geometry. A measurement bridge should be positioned at the outside staff gage. The flume should be measured a minimum of twice during the period of flow, with measurement made at higher gage-heights to verify shifts.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

OXFORD FARMERS DITCH COMPANY

RATING TABLE-- STD12FTPF USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

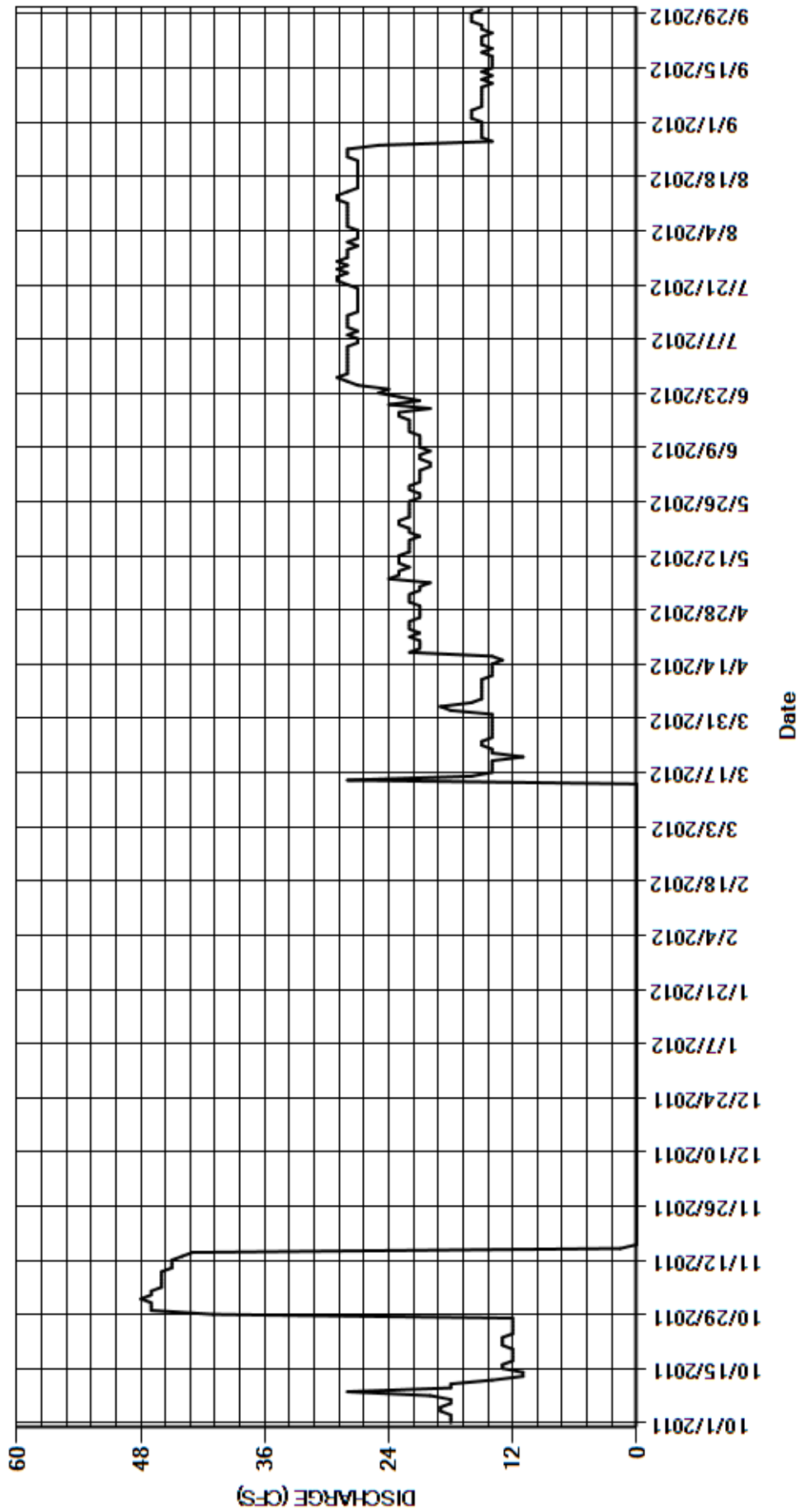
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	18	47	0.00	0.00	0.00	0.00	14	22	21	28	28	15
2	18	48	0.00	0.00	0.00	0.00	18	22	21	28	27	16
3	18	47	0.00	0.00	0.00	0.00	19	21	21	28	27	16
4	19	47	0.00	0.00	0.00	0.00	16	21	20	28	27	16
5	19	46	0.00	0.00	0.00	0.00	15	20	20	28	28	15
6	18	46	0.00	0.00	0.00	0.00	15	24	21	27	28	15
7	18	46	0.00	0.00	0.00	0.00	15	23	21	27	28	15
8	20	46	0.00	0.00	0.00	0.00	15	23	20	28	28	15
9	28	46	0.00	0.00	0.00	0.00	15	22	21	27	28	15
10	18	45	0.00	0.00	0.00	0.00	15	23	21	28	28	15
11	18	45	0.00	0.00	0.00	0.00	14	23	21	28	28	14
12	14	45	0.00	0.00	0.00	0.00	14	23	21	28	29	15
13	11	44	0.00	0.00	0.00	0.00	14	22	22	28	29	14
14	11	43	0.00	0.00	0.00	0.00	14	22	22	27	28	15
15	13	1.6	0.00	0.00	0.00	28	13	22	22	27	27	14
16	13	0.00	0.00	0.00	0.00	16	14	22	22	27	27	14
17	12	0.00	0.00	0.00	0.00	14	22	21	23	27	27	14
18	12	0.00	0.00	0.00	0.00	14	21	22	23	27	27	14
19	12	0.00	0.00	0.00	0.00	14	21	22	20	27	27	15
20	12	0.00	0.00	0.00	0.00	14	21	23	24	27	27	14
21	13	0.00	0.00	0.00	0.00	e11	22	23	21	28	27	15
22	13	0.00	0.00	0.00	0.00	e14	21	22	23	29	27	15
23	13	0.00	0.00	0.00	0.00	e14	22	22	25	29	28	15
24	12	0.00	0.00	0.00	0.00	15	22	22	24	28	28	14
25	12	0.00	0.00	0.00	0.00	15	22	22	27	29	28	15
26	12	0.00	0.00	0.00	0.00	14	21	22	28	28	25	15
27	12	0.00	0.00	0.00	0.00	14	21	21	29	29	14	16
28	12	0.00	0.00	0.00	0.00	14	21	21	28	28	15	16
29	41	0.00	0.00	0.00	0.00	14	21	22	28	28	15	16
30	47	0.00	0.00	0.00	---	14	22	22	28	28	15	15
31	47	---	0.00	0.00	---	14	---	21	---	27	15	---
TOTAL	556	642.60	0.00	0.00	0.00	253.00	540	683	688	861	790	448
MEAN	17.9	21.4	0.000	0.000	0.000	8.16	18.0	22.0	22.9	27.8	25.5	14.9
AC-FT	1100	1270	0	0	0	502	1070	1350	1360	1710	1570	889
MAX	47	48	0.00	0.00	0.00	28	22	24	29	29	29	16
MIN	11	0.00	0.00	0.00	0.00	0.00	13	20	20	27	14	14

CAL YR	2011	TOTAL	14534.79	MEAN	39.8	MAX	133	MIN	0.00	AC-FT	28830
WTR YR	2012	TOTAL	5461.60	MEAN	14.9	MAX	48	MIN	0.00	AC-FT	10830

MAX DISCH: 57.7 CFS AT 03:00 ON OCT 09,2011 GH 1.16 FT SHIFT -0.02 FT
 MAX GH: 1.16 FT AT 03:00 ON OCT 09,2011

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

OXFORD FARMERS DITCH COMPANY
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN

07117000 ARKANSAS RIVER AT NEPESTA BRIDGE NEAR NEPESTA, CO

Water Year 2012

Location.-- Lat. 38°10'44", Long. 104°08'20", in the NE¼ SE¼ NW¼ Sec.32, T21S, R60W Pueblo County, Hydrologic Unit 11020005, on the left bank downstream side of the Nepesta Road Bridge crossing the Arkansas River, 0.8 mi downstream of Kramer Creek, 9 mi downstream from Huerfano River, 1 mile NNW of the Nepesta Cemetery. Oxford Farmers Ditch gage located approximately 0.25 miles upstream of Nepesta Bridge near right bank of Arkansas River. Note: Nepesta was originally a station on the AT&SF Railway, which was abandoned and razed several years ago. Present site of Nepesta is 0.6 miles SE of the railway station site.

Drainage Area and Period of Record.-- 9,345 mi² of which 54 sq.mi. is probably noncontributing (furnished by the U.S Army Corp of Engineers). ; Established May 1, 1901. Intermittent record until June 1921 at various sites and datums above the current site. From June 1921 to September 30, 2000 at various sites within 2 miles of the present site. At present site October 1, 2000 through current water year.

Equipment.-- A Sutron SatLink2 (DCP), constant flow bubbler (CFB) and radar water level sensor. The equipment is housed in a 4 ft x 4 ft x 8 ft steel shelter. The primary reference gage is a wire weight located in the same river section as the end of the orifice line with muffler and attached to the bridge approximately 120 ft south of the gage shelter. A temperature sensor is also monitored and logged by the DCP.

Hydrologic Conditions.-- The gage is located at the Pueblo County Road 613 bridge over the Arkansas River on a fairly straight stretch of river that extends from 800 feet upstream to a half mile downstream of the gage. The gage elevation is 4380 ft MSL. The riverbed consists of moving sand at all stages. Upstream sluice outlets from the Colorado Canal, Rocky Ford Highline Canal and Oxford Farmers Ditch as well as Fountain Creek contribute a supply of loose sand, especially during the irrigation season and high water. The upper basin consists of mountain topography above Pueblo Reservoir. The lower basin consists of several unregulated tributaries below Pueblo (Fountain Creek, Salt Creek, the St. Charles River, Six Mile Creek, and the Huerfano River), large agricultural areas, and urban runoff from Pueblo and portions of the Colorado Springs area.

Gage-Height Record.-- Primary record is 15-minute transmitted data with DCP log used as backup. The CFB log and radar gage are used as additional backup. Record is complete and reliable, except for the periods: November 2 - 4, 10, 11, 16 -30; December 1 - 31, 2011; January 1 - 31; February 1 - 29; March 1 - 5, 9, 10, 2012 when ice at or near the gage affected the stage-discharge relationship.

Datum Corrections.-- Levels were run April 11, 2012 to the wire-weight check bar, using RM No. 4 as base. Results were within allowable limits and no corrections were needed.

Rating.-- The primary control at all stages is a shifting sand channel. At the gage, the channel is contained by the county road bridge and the railroad bridge. Flows of up to approximately 5000 cfs are contained in well-defined channel under the bridge. At higher flows, large riprap, which continues up to the bottom of the bridge, and heavy vegetation on both banks below the bridge, become part of the control. Backwater flow is negated by the elevation of the road and a large fan area below the gage. The rating is defined to 25,000 cfs by a high water mark on the bridge piers made during May 1999 flood and an indirect rating extension performed by the USGS. Discharge measurements of up to 1500 cfs can be made approximately 400 - 500 feet downstream of the bridge, with higher flows measured from the bridge. Extremely low discharge measurements (less than 50 cfs) are made as much as a quarter of a mile upstream, near the Oxford Farmers Ditch flume. Rating No. 16 was used the entire water year. This rating was developed as the result of large negative shifts in previous years. This rating incorporated both high flow (USGS indirect measurement) and extreme low flows (due to drought conditions). Estimated PZF is 10.42 ft. Twenty-two discharge measurements (Nos. 244 - 265) were made this water year ranging in discharge from 43.2 cfs to 821 cfs. All measurements were made in open water by wading, with one measurement (No.256) made using a StreamPro ADCP. The measurements cover the range in stage, except for the lower daily flows of Jun 22 - 24, July 5 - 8, 23 - 27, August 7, 10 - 13, and September 3, 23, 24, 2012. The peak discharge of 1140 cfs occurred at 0300 June 8, 2012 at a gage height of 13.53 ft with a shift of -0.37 ft. It exceeded the gage height of Measurement No.256 by 0.39 ft. The maximum measured discharge and the peak occurred on the same day.

Discharge.-- Shifting-control method was used for the entire water year. Shifts were applied by both time and stage proration. Variable stage-shift relationship, ARKNEPCO72C, was continued from water year 2011 until 1030 October 4, 2011. Shifts were then applied as defined by measurements and distributed by time from 1045 October 4, 2011 to 1200 March 6, 2012 and from 0715 September 6 to the end of the water year. Two variable stage-shift relations were developed, ARKNEPCOVSC12A used from 1215 March 6 to 0300 June 8 and ARKNEPCOVSC12B used from 0315 June 8 to 0700 September 6. Discharge measurements showed shifts ranging from -0.91 ft to -0.13 ft. All measurements were given full weight with the exception of Measurements 252, 256, 257, and 260, which were discounted -5.46% to +3.14% for smoothing purposes.

Special Computations.-- Esitmated discharge during periods of ice were based on six discharge measurements (Nos. 244 - 249) along with temerature record form the gage site and comparison of the Arkansas River near Avondale hydrograph. The Colorado Canal near Boone was also used for comparison as it ran water from January 4 to February 7.

Remarks.-- The record is considered good to fair except during the periods of ice effect, which are estimated and considered poor. The peak is considered fair due to a lack of recent confirming measurements made near the peak gage-height. Measurement No. 256 was made approximately seven hours after the peak, but this measurement should be considered poor due several problems encountered during the measurement. Gage operated and maintained by Steven Anselmo and Garrett Markus. Record developed by Anthony D. Gutierrez.

Recommendations.-- A new rating based on recent measurements and channel aggradation due to sand deposition should be developed. The new rating should tie into Rating 16 at a gage height of 14.80 ft.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

07117000 ARKANSAS RIVER AT NEPESTA BRIDGE NEAR NEPESTA, CO

RATING TABLE-- ARKNEPCO16 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

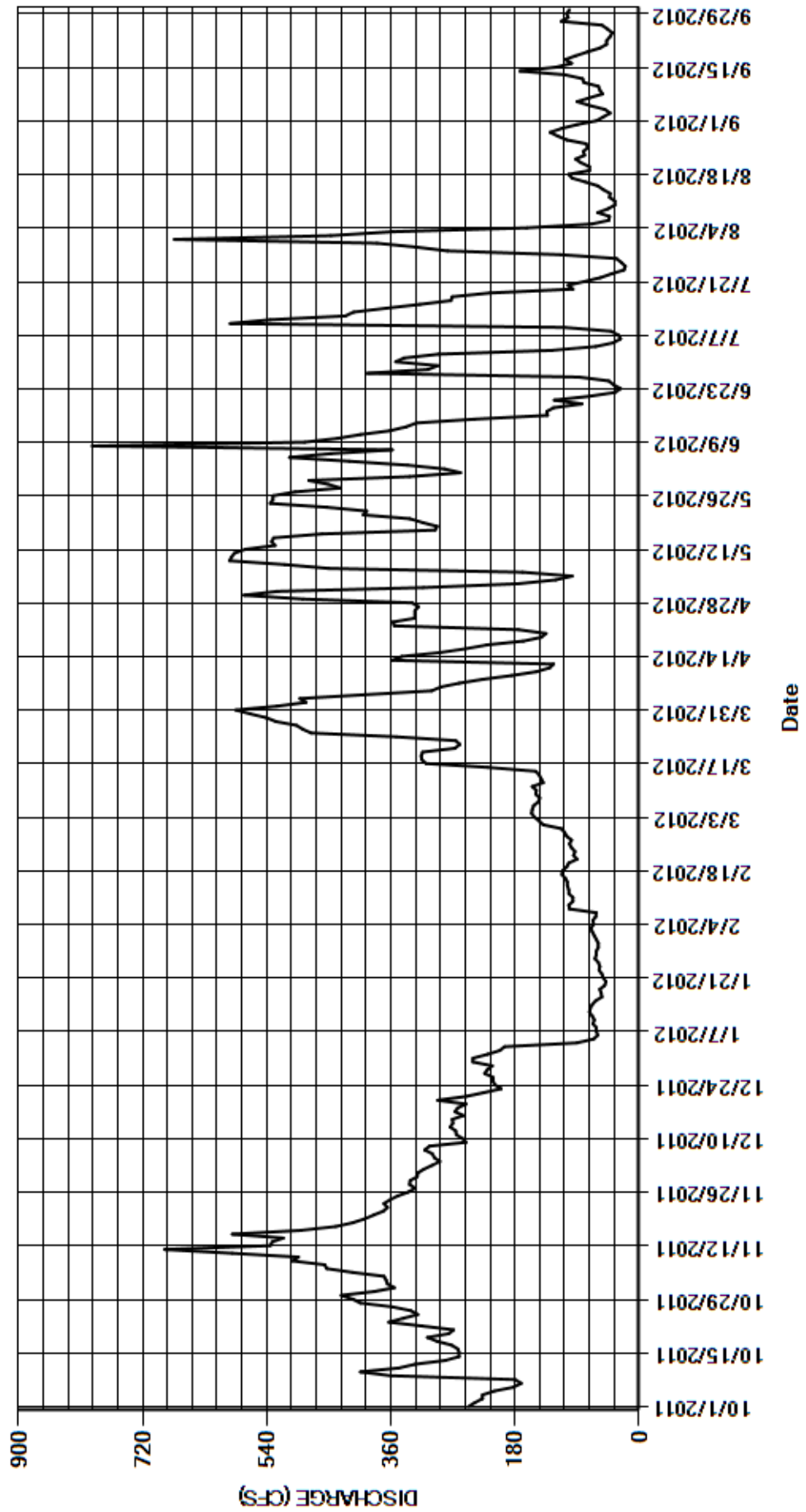
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	247	355	e321	e220	e65	e139	525	525	259	341	674	62
2	238	e365	e312	e202	e68	e145	483	313	282	291	447	52
3	227	e367	e300	e195	e70	e152	492	176	336	126	357	42
4	227	e370	e289	e90	e66	e156	398	121	420	63	163	50
5	210	415	e297	e66	e67	e155	301	97	507	37	69	72
6	182	453	e300	e60	e63	153	288	169	447	27	44	90
7	171	456	e311	e62	e62	146	261	450	358	30	43	72
8	180	503	e304	e62	e101	144	227	514	793	41	60	53
9	360	494	e251	e67	e102	e150	185	594	485	109	45	57
10	404	e590	e256	e65	e96	e149	149	591	437	593	35	59
11	349	e688	e265	e68	e96	155	130	587	404	535	35	80
12	325	535	e266	e72	e102	139	124	571	361	426	43	82
13	281	532	e274	e71	e102	142	358	528	338	414	42	107
14	261	516	e270	e68	e104	145	344	533	323	367	52	173
15	261	590	e271	e63	e104	150	289	530	239	318	60	121
16	263	e490	e255	e54	e107	219	252	460	133	273	78	98
17	272	e440	e267	e55	e112	309	221	296	134	271	97	107
18	293	e415	e263	e57	e111	315	168	293	124	216	102	92
19	307	e398	e251	e50	e105	316	142	314	83	96	72	75
20	276	e385	e292	e48	e102	314	135	333	123	103	72	57
21	269	e371	e251	e52	e90	267	175	400	72	79	84	47
22	315	e365	e225	e54	e95	260	355	395	35	56	92	47
23	363	e370	e200	e58	e93	266	357	453	27	40	79	42
24	342	e361	e209	e57	e98	352	325	535	37	22	81	39
25	321	e350	e212	e59	e101	476	325	531	44	20	74	46
26	331	e335	e212	e64	e98	488	325	531	87	26	77	54
27	358	e325	e224	e62	e105	497	320	499	394	33	105	113
28	404	e333	e220	e62	e108	527	329	433	306	114	118	103
29	415	e332	e213	e59	e113	541	488	451	292	278	129	105
30	432	e322	e241	e59	---	564	573	479	353	324	112	101
31	384	---	e241	e62	---	585	---	333	---	380	90	---
TOTAL	9268	12821	8063	2343	2706	8516	9044	13035	8233	6049	3631	2298
MEAN	299	427	260	75.6	93.3	275	301	420	274	195	117	76.6
AC-FT	18380	25430	15990	4650	5370	16890	17940	25850	16330	12000	7200	4560
MAX	432	688	321	220	113	585	573	594	793	593	674	173
MIN	171	322	200	48	62	139	124	97	27	20	35	39

CAL YR	2011	TOTAL	211429	MEAN	579	MAX	2470	MIN	39	AC-FT	419400
WTR YR	2012	TOTAL	86007	MEAN	235	MAX	793	MIN	20	AC-FT	170600

MAX DISCH: 1140 CFS AT 03:00 ON JUN 08,2012 GH 13.53 FT SHIFT -0.37 FT
 MAX GH: 13.53 FT AT 03:00 ON JUN 08,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

07117000 ARKANSAS RIVER AT NEPESTA BRIDGE NEAR NEPESTA, CO
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN

07117000 ARKANSAS RIVER AT NEPESTA ROAD BRIDGE NEAR NEPESTA, CO (COMBINED)

Water Year 2012

Location.-- Combined record from Arkansas River at Nepesta Rd. Bridge gage: Lat 38° 10' 44", Long 104° 8' 20", in the NE¼ SE¼ NW¼ Sec.32, T21S, R60W Pueblo County, Hydrologic Unit 11020005 and Oxford Farmers Ditch gage: Lat. 38°10'34",Long. 104°08'42", in the NE¼ NW¼ SW¼ Sec.32, T21S, R60W Pueblo County, Hydrologic Unit 11020005.

Drainage Area and Period of Record.-- 9,345 sq. mi. of which 54 sq. mi. is probably noncontributing (furnished by the Army Corp of Engineers).;

Equipment.-- See individual records for gage equipment descriptions.

Hydrologic Conditions.-- See individual station analyses.

Gage-Height Record.-- See individual records for gage height record analyses.

Datum Corrections.-- See individual station analyses.

Rating.-- See individual station analyses.

Discharge.-- The combined record of mean daily discharge was obtained by the addition of Oxford Farmers Ditch mean daily flows to the corresponding mean daily flows in the Arkansas River at Nepesta Road Bridge. Mean daily discharge was estimated on the following days: November 2 - 4, 10, 11, 16 -30; December 1 - 31, 2011; January 1 – 31; February 1 – 29; March 1 - 5, 9, 10, 2012 when ice at or near the gage affected the stage-discharge relationship. The peak unit value discharge for the year was 1160 cfs at 03:00 June 8, 2012.

Special Computations.-- See individual station analyses.

Remarks.-- Combined record is fair, except during periods of estimated flow, which should be considered poor. Record developed by Division 2 Staff.

The Arkansas River near Nepesta CO gaging station was moved from above the Oxford Farmers Ditch diversion to the Nepesta Road bridge below the diversion beginning October 1, 2000. For consistency and comparison with previously published historical record in this reach of the Arkansas River, the total Arkansas River flow is computed by combining the Oxford Ditch mean daily discharge with the mean daily discharge measured at Arkansas River at Nepesta Road Bridge near Nepesta CO gaging station.

Recommendations.-- See individual station analyses.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

07117000 ARKANSAS RIVER AT NEPESTA ROAD BRIDGE NEAR NEPESTA, CO (COMBINED)

RATING TABLE.--

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

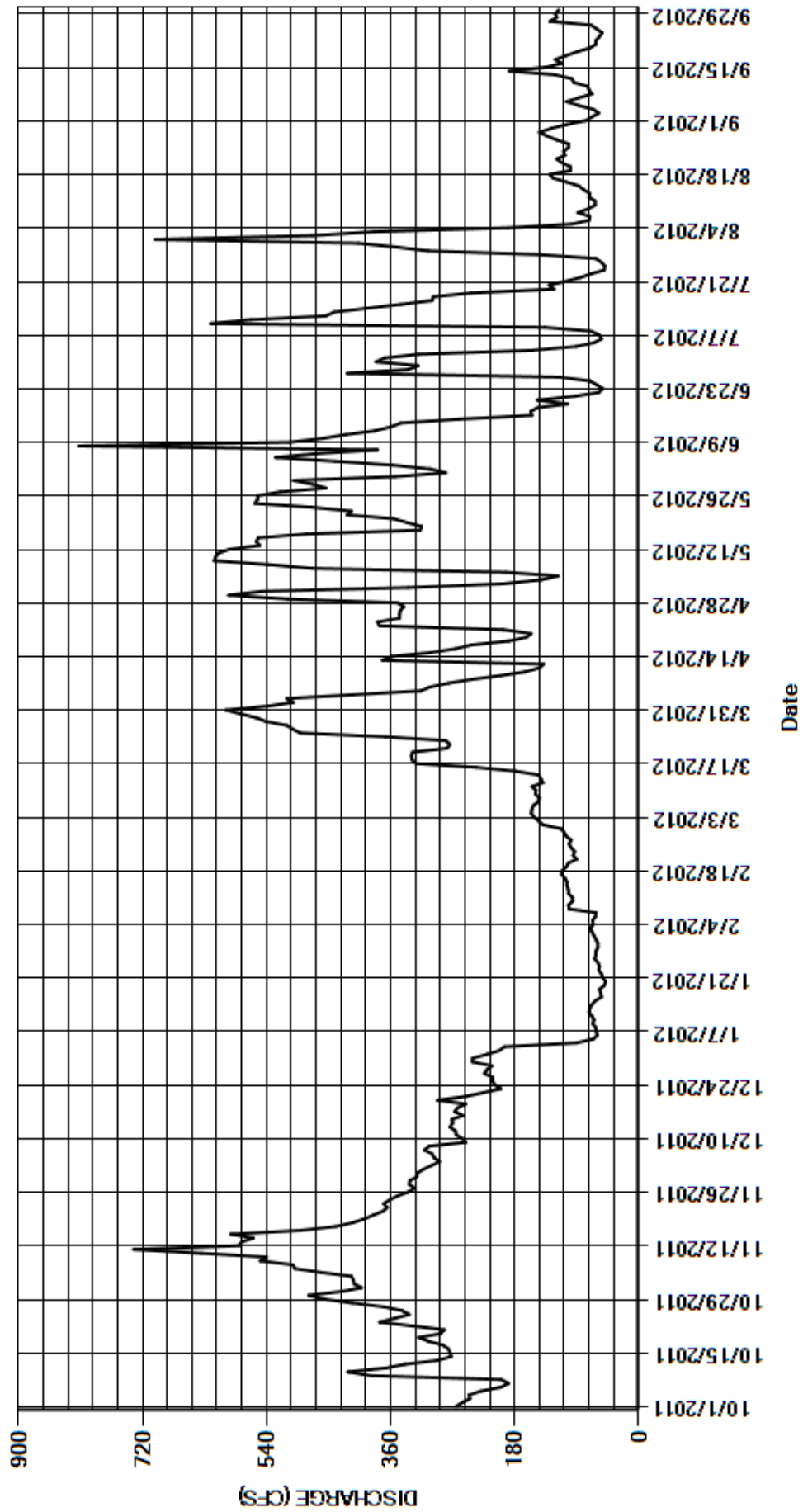
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	265	402	e321	e220	e65	e139	539	547	280	369	702	77
2	256	e413	e312	e202	e68	e145	501	335	303	319	474	68
3	245	e414	e300	e195	e70	e152	511	197	357	154	384	58
4	246	e417	e289	e90	e66	e156	414	142	440	91	190	66
5	229	461	e297	e66	e67	e155	316	117	527	65	97	87
6	200	499	e300	e60	e63	153	303	193	468	54	72	105
7	189	502	e311	e62	e62	146	276	473	379	57	71	87
8	200	549	e304	e62	e101	144	242	537	813	69	88	68
9	388	540	e251	e67	e102	e150	200	616	506	136	73	72
10	422	e635	e256	e65	e96	e149	164	614	458	621	63	74
11	367	e733	e265	e68	e96	155	144	610	425	563	63	94
12	339	580	e266	e72	e102	139	138	594	382	454	72	97
13	292	576	e274	e71	e102	142	372	550	360	442	71	121
14	272	559	e270	e68	e104	145	358	555	345	394	80	188
15	274	592	e271	e63	e104	178	302	552	261	345	87	135
16	276	e490	e255	e54	e107	235	266	482	155	300	105	112
17	284	e440	e267	e55	e112	323	243	317	157	298	124	121
18	305	e415	e263	e57	e111	329	189	315	147	243	129	106
19	319	e398	e251	e50	e105	330	163	336	103	123	99	90
20	288	e385	e292	e48	e102	328	156	356	147	130	99	71
21	282	e371	e251	e52	e90	278	197	423	93	107	111	62
22	328	e365	e225	e54	e95	274	376	417	58	85	119	62
23	376	e370	e200	e58	e93	280	379	475	52	69	107	57
24	354	e361	e209	e57	e98	367	347	557	61	50	109	53
25	333	e350	e212	e59	e101	491	347	553	71	49	102	61
26	343	e335	e212	e64	e98	502	346	553	115	54	102	69
27	370	e325	e224	e62	e105	511	341	520	423	62	119	129
28	416	e333	e220	e62	e108	541	350	454	334	142	133	119
29	456	e332	e213	e59	e113	555	509	473	320	306	144	121
30	479	e322	e241	e59	---	578	595	501	381	352	127	116
31	431	---	e241	e62	---	599	---	354	---	407	105	---
TOTAL	9824	13464	8063	2343	2706	8769	9584	13718	8921	6910	4421	2746
MEAN	317	449	260	75.6	93.3	283	319	443	297	223	143	91.5
AC-FT	19490	26710	15990	4650	5370	17390	19010	27210	17690	13710	8770	5450
MAX	479	733	321	220	113	599	595	616	813	621	702	188
MIN	189	322	200	48	62	139	138	117	52	49	63	53

CAL YR	2011	TOTAL	226014	MEAN	619	MAX	2570	MIN	39	AC-FT	448300
WTR YR	2012	TOTAL	91469	MEAN	250	MAX	813	MIN	48	AC-FT	181400

MAX DISCH: 1160 CFS AT 03:00 ON JUN 08,2012
 MAX GH:

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

07117000 ARKANSAS RIVER AT NEPESTA ROAD BRIDGE NEAR NEPESTA, CO (COMBINED)
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN

07119700 ARKANSAS RIVER AT CATLIN DAM NEAR FOWLER

Water Year 2012

Location.--	Lat. 38°07'33", Long. 103°54'41", in NW¼NW¼ sec. 21, T.22 S., R.58 W., Otero County, Hydrologic Unit 11020005, at Catlin Canal gage, on right bank 2.2 mi downstream from diversion dam for Catlin Canal, 2.3 mi downstream from Apishapa River, and 6.0 mi east of Fowler.
Drainage Area and Period of Record.--	10,800 sq mi.; October 1964 to current water year.
Equipment.--	Satellite-monitored data collection platform (Sutron Satlink 2 DCP) with Sutron Constant Flow Bubbler (CFB) housed in an 8 ft x 8 ft shelter. This DCP also monitors the Catlin Canal's flume gage height and USGS water quality sensors. The primary reference gage is an outside staff gage which is attached to a concrete flood block that holds the bubbler orifice. A cableway approximately 2 miles upstream of the gage was used for high flow measurements. No changes were made this water year.
Hydrologic Conditions.--	The drainage basin characteristics include elevation differences from Mt. Elbert at 14,433± ft to the gage at elevation 4,245± ft with vegetation ranging from alpine tundra to sparse pinon-juniper in the upper reaches and from irrigated farmland to rangeland in the lower reaches. The gage is located downstream from Pueblo Reservoir approximately 61 miles. Pueblo Reservoir regulates flows through the reservoir year round including the Winter Water Storage Program period of November 15 to March 15 when the gates are essentially closed and streamflow is stored for release during the irrigation season. Release of water from Pueblo Reservoir takes approximately 38 hours to reach the gage. Unregulated tributaries below Pueblo Reservoir that contribute to the gage include Fountain Creek, St. Charles River, Huerfano River and the Apishapa River. The Apishapa River's confluence with the Arkansas River is approximately 2.4 miles above the gage. Numerous irrigation diversion points exist above the gage including Catlin Canal operations which sluice approximately 0.24 miles above the gage and also divert from the river approximately 2.25 miles above the gage. All of these factors influence streamflow at the gage. Mean annual precipitation for the basin is 17.09± inches. No hydrologic conditions changes in the basin observed this water year.
Gage-Height Record.--	Primary record is 15-minute satellite transmitted CFB data, with DCP log backup. Record is complete and reliable, except for the following periods: missing data: Mar 11, Dec 14-15, Jan 13, Mar 21-22, Jun 16, and Sept 27. Missing data periods of less than 4-hour duration were filled in using adjacent good record before and after each period without loss of accuracy. Missing data periods of 4 hours or more were denoted as a-days. The stage-discharge relation was affected by ice Dec 23 – Jan 4. A single erroneous unit value was recorded March 19, due to CFB repairs and was corrected using adjacent good data. Primary stage sensor calibration to the reference gage is supported by 40 visits made this water year. Thirty three instrument calibration corrections ranging in magnitude from -0.12 ft to +0.12 ft were applied to the gage height record.
Datum Corrections.--	Levels were last run on August 22, 2008. No corrections were made.
Rating.--	A shifting sand channel is the control at all stages with heavily vegetated bank areas contributing to the control at gage heights of 9.5 feet and above. Rating curve ARKCATCO11, dated June 26, 2003, was used for the entire water year. Twenty discharge measurements (Nos. 1234-1253) were made throughout the water year covering a range in discharge from 37.5 to 337 cfs. The measurements cover the range in stage except for lower flows that occurred June 24-25, July 16 -18, 28-30, and September 4; and higher daily flows that occurred November 10-16, December 8-23, 26-31, January 1-2, April 1-2, 30, May 1, June 8, and August 1. The peak discharge of 822 cfs occurred at 1215 on June 8, 2012 at a gage height of 3.36 ft with a shift of -0.26 ft. It exceeded the stage of high Measurement No. 1243 made Apr 30, 2012 by 0.78 ft.
Discharge.--	Shifting sand channel control method was used to compute discharge for the entire water year. Shifts were applied as defined by measurements and distributed by time and stage. Shifts were prorated by time from the beginning of the water year to Msmt 1236 on Nov 1. Variable stage-shift relation ARKCATCOVS12B was applied from 1800 November 1 to 1630 November 30, 2011 or to Msmt 1237, and is based on those two measurements. Msmt Nos.1236-1237 were given full weight. From 1645 November 30 to 0945 January 10 shifts prorated by time. Variable stage-shift relation ARKCATCOVS12A was applied from 1000 January 10 to 1315 September 27, 2012, and is based on measurements made during the period of application. Msmt Nos. 1238-1253 were discounted from -12.42% to +7.83% to fit the trends and smooth the variable stage-shift relationship. Shifts were time prorated from 1330 September 27 to the end of the water year.
Special Computations.--	The potential for ice-affected gage heights were analyzed using on-site USGS water temperature data, air temperature data from the Arkansas River at Nepesta Road Bridge (ARKNEPCO) gage, gage height time series traces, field measurement notes, and up- and downstream hydrographs. Discharges were estimated by using trends in flow before and after ice affected periods, and by hydrographic comparison with the ARKNEPCO, Arkansas River near Rocky Ford (ARKROCCO), and Ft Lyon Storage Canal (FLSCANCO) gages.
Remarks.--	Record is fair, except the ice effected periods and missing data periods which are estimated and poor. The instantaneous peak discharge for the year is rated fair. Station maintained and record developed by Garrett Markus.
Recommendations.--	Radar unit should be installed for primary or backup gage height record. Levels should be run in WY2013. All chiseled benchmarks should be replaced with either a brass cap or concrete pin for improved accuracy during levels. Measurement should be made at the established frequency for sand channel gages. Since this record is effected by sluice operations on the Catlin Canal, it is recommended that more measurements be taken at the sluice to verify the sluice structure rating CATSLUCO02.

STATE OF COLORADO
DIVISION OF WATER RESOURCES
OFFICE OF STATE ENGINEER

07119700 ARKANSAS RIVER AT CATLIN DAM NEAR FOWLER

RATING TABLE-- ARKCATCO11 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

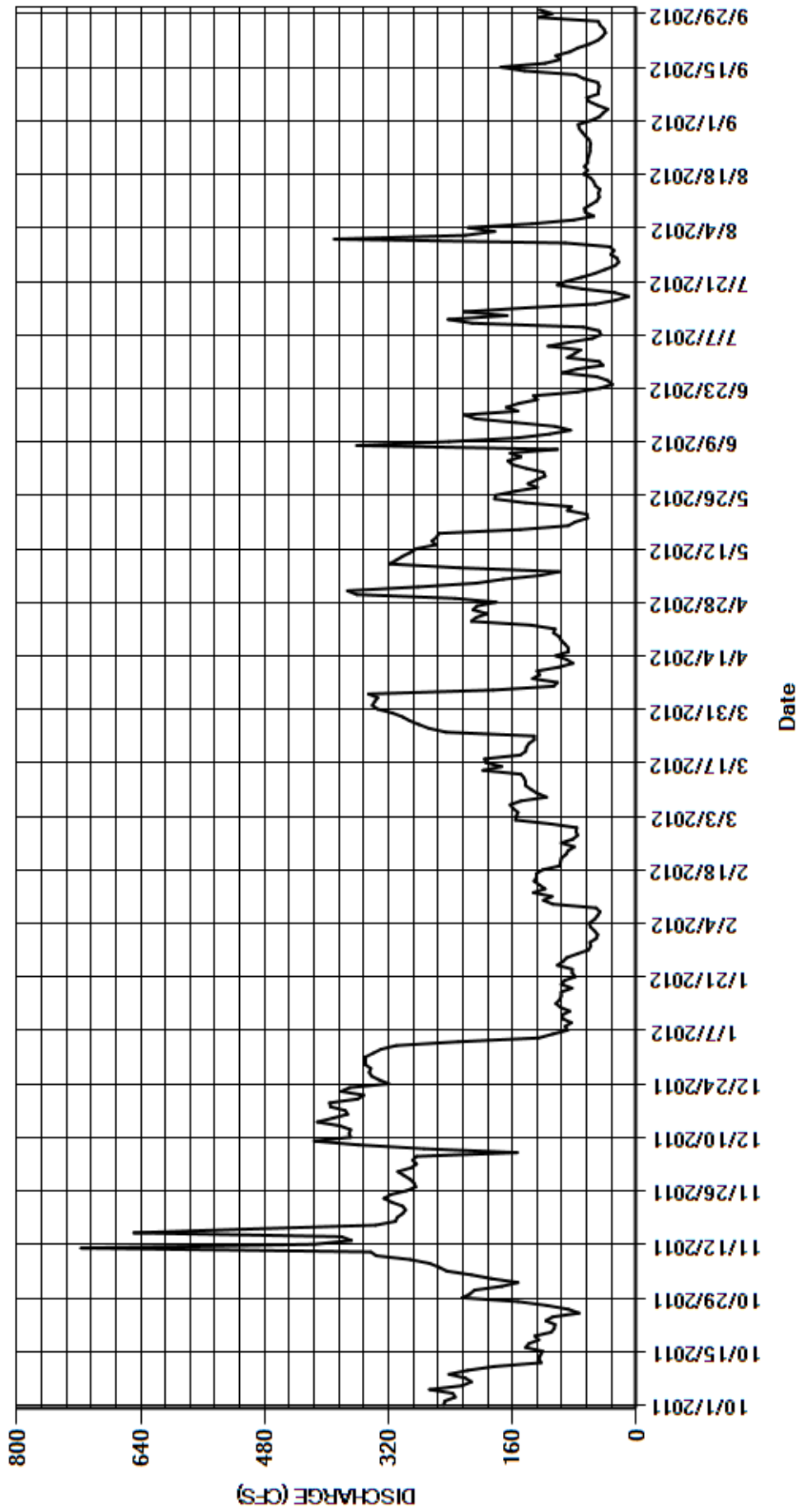
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	249	174	308	e340	50	111	341	373	120	89	390	59
2	247	153	291	e330	54	156	338	282	142	80	221	48
3	234	187	284	e310	59	155	334	206	160	72	183	43
4	237	213	289	e230	61	153	346	172	166	114	217	37
5	267	245	284	126	54	159	185	124	149	87	135	50
6	225	255	154	108	50	163	107	100	163	57	81	61
7	213	267	274	89	47	149	102	229	102	46	55	64
8	221	292	359	92	52	116	134	319	361	48	66	49
9	242	336	416	84	108	128	125	310	242	69	67	49
10	218	343	369	95	120	136	128	302	153	212	59	48
11	184	717	371	96	109	143	100	292	112	243	51	50
12	123	416	369	86	133	143	82	284	85	167	48	68
13	126	368	383	98	118	145	90	259	105	223	49	78
14	124	381	e412	104	125	149	104	264	156	143	47	144
15	121	649	e392	99	132	198	88	258	208	53	53	175
16	143	499	373	97	129	174	88	255	222	27	55	118
17	139	337	376	97	129	194	92	150	153	9.9	59	98
18	126	311	395	83	121	196	97	88	168	28	68	104
19	131	309	396	97	99	150	100	79	152	71	63	86
20	110	302	360	93	98	143	107	63	128	102	67	76
21	106	298	352	79	97	e142	105	64	133	90	63	61
22	105	302	381	83	91	139	136	89	76	71	63	50
23	117	316	e370	83	88	132	213	84	47	54	61	44
24	108	326	e320	102	80	132	207	143	31	41	60	40
25	74	317	e332	95	97	246	193	183	37	28	60	42
26	88	297	e342	90	82	268	211	182	51	23	59	47
27	116	285	e345	76	76	281	206	157	96	25	61	49
28	153	287	e343	62	78	293	181	128	77	33	66	126
29	225	292	e350	59	77	302	234	140	43	29	70	109
30	215	300	e350	60	---	315	361	129	48	34	74	125
31	209	---	e350	52	---	334	---	118	---	92	75	---
TOTAL	5196	9774	10690	3595	2614	5645	5135	5826	3886	2460.9	2746	2198
MEAN	168	326	345	116	90.1	182	171	188	130	79.4	88.6	73.3
AC-FT	10310	19390	21200	7130	5180	11200	10190	11560	7710	4880	5450	4360
MAX	267	717	416	340	133	334	361	373	361	243	390	175
MIN	74	153	154	52	47	111	82	63	31	9.9	47	37

CAL YR	2011	TOTAL	165578.0	MEAN	454	MAX	2030	MIN	19	AC-FT	328400
WTR YR	2012	TOTAL	59765.9	MEAN	163	MAX	717	MIN	9.9	AC-FT	118500

MAX DISCH: 822 CFS AT 12:15 ON JUN 08,2012 GH 3.36 FT SHIFT -0.26 FT
MAX GH: 3.36 FT AT 12:15 ON JUN 08,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

07119700 ARKANSAS RIVER AT CATLIN DAM NEAR FOWLER
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
07119705 CATLIN CANAL AT CATLIN DAM NEAR FOWLER
Water Year 2012

Location.-- Lat. 38°07'33", Long. 103°54'41", in NW¼NW¼ sec. 21, T.22 S., R.58 W., Otero County, Hydrologic Unit 11020005, at river gage.

Drainage Area and Period of Record.-- N/A;

Equipment.-- Float-activated graphic water-stage recorder and shaft encoder in 8 ft x 8 ft shelter with well (with equipment for Arkansas River below Catlin Dam near Fowler CO river gage). Shaft encoder is connected to satellite-monitored data collection platform (DCP) used for river gage. Fifteen-foot standard concrete Parshall flume is the control. Primary reference gage is outside staff gage installed in flume.

Hydrologic Conditions.-- The Catlin Canal diverts water from the Arkansas River just downstream from the confluence of the Apishapa River. The Catlin Canal Company owns a variety of both native and transmountain water rights and thus the hydrologic characteristics of the basins are highly variable. The influence of urbanization provides the largest affect to the runoff regime

Gage-Height Record.-- Primary record is 15-minute satellite data with the graphic chart recorder and DCP log used for backup purposes. Record is complete and reliable for this seasonally operated gage, except for the following: Dec 14-15, Mar 11; Mar 21-22, and Sept 27. With stable adjacent gage height, missing data periods of less than 4 hour duration, were filled in without loss of accuracy. Missing data periods of 4 hours or more duration were denoted as 'missing values days' (a-days). Non representative gage heights were recorded during a documented zero-flow period. Dec 14 – Jan 10 were denoted as 'zero flow days' (z-days). Six shaft encoder calibration corrections ranging from -0.05 ft to +0.02 ft were made during periods of operation during the year. All corrections were applied by time proration from the previous visit.

Datum Corrections.-- Levels were last run 8 Oct 2003. No corrections needed. The 2003 level survey did identify the flume floor is not level and the floor at the upstream right corner was found to be 0.05 feet higher than the floor at the intakes/staff gage.

Rating.-- A standard 15-ft Parshall Flume table was used all year. One discharge measurement, No. 21, made April 19, 2012, of 64.8 cfs was made this year. The peak flow of 302 cfs occurred at 1200 on August 1, 2012 at a gage height of 2.81 ft with a shift of 0.00 ft. The peak exceeded the stage of measurement No. 21 by 1.73 feet.

Discharge.-- Measurement Number 21 was discounted -0.92% to a 0.00 ft shift. Adjusting measurements to provide for a zero shift has been the historical practice at this structure. Discharge record was computed by direct application of the standard rating to the gage height record.

Special Computations.-- Periods of zero flow (during winter water storage program), days with missing values and non representative gage height were denoted as z-days. Days with 4 or more hours of missing data in periods during flow were denoted as a-days.

Remarks.-- The record is good except for missing data in periods of flow, which were considered poor. Station maintained and record developed by Garrett Markus.

Recommendations.-- A levels survey and flume inspection should be performed during the non irrigation season to confirm the floor elevations and the position of the staff gage.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

07119705 CATLIN CANAL AT CATLIN DAM NEAR FOWLER

RATING TABLE-- STD15FTPF USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

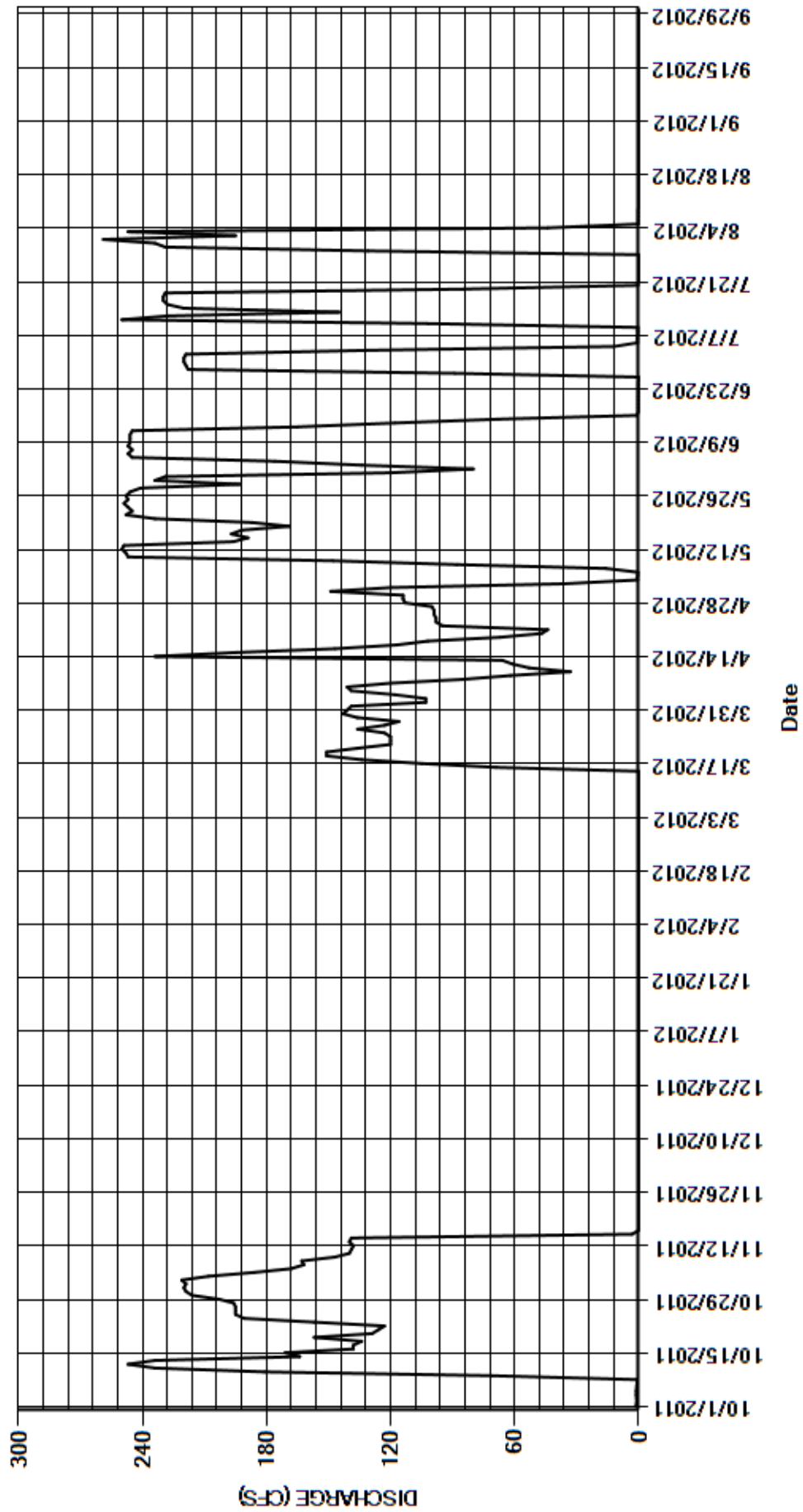
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.5	220	0.00	0.00	0.00	0.00	139	149	120	220	259	0.00
2	0.98	219	0.00	0.00	0.00	0.00	103	120	80	219	195	0.00
3	1.0	221	0.00	0.00	0.00	0.00	103	36	134	132	247	0.00
4	1.2	208	0.00	0.00	0.00	0.00	118	0.48	176	12	44	0.00
5	1.2	186	0.00	0.00	0.00	0.00	139	0.48	245	0.48	0.21	0.00
6	0.98	168	0.00	0.00	0.00	0.00	141	0.41	247	0.48	0.21	0.00
7	0.84	162	0.00	0.00	0.00	0.00	120	16	245	0.48	0.13	0.00
8	0.86	163	0.00	0.00	0.00	0.00	85	88	247	0.42	0.11	0.00
9	71	147	0.00	0.00	0.00	0.00	62	148	246	0.34	0.11	0.00
10	181	140	0.00	0.00	0.00	0.00	33	247	246	102	0.04	0.00
11	234	139	0.00	0.00	0.00	0.00	53	248	246	250	0.04	0.00
12	247	138	0.00	0.00	0.00	0.00	61	250	245	228	0.04	0.00
13	234	140	0.00	0.00	0.00	0.00	66	249	165	145	0.00	0.00
14	164	139	0.00	0.00	0.00	0.00	234	196	118	220	0.00	0.00
15	171	3.2	0.00	0.00	0.00	0.00	195	189	68	228	0.00	0.00
16	138	0.00	0.00	0.00	0.00	69	147	197	0.82	230	0.00	0.00
17	138	0.00	0.00	0.00	0.00	105	117	192	0.22	230	0.00	0.00
18	134	0.00	0.00	0.00	0.00	134	102	169	0.21	229	0.00	0.00
19	157	0.00	0.00	0.00	0.00	151	67	187	0.21	85	0.00	0.00
20	129	0.00	0.00	0.00	0.00	151	47	234	0.21	0.42	0.00	0.00
21	126	0.00	0.00	0.00	0.00	e136	44	248	0.21	0.04	0.00	0.00
22	123	0.00	0.00	0.00	0.00	120	95	245	0.13	0.00	0.00	0.00
23	157	0.00	0.00	0.00	0.00	120	98	247	0.11	0.00	0.00	0.00
24	191	0.00	0.00	0.00	0.00	120	98	249	0.11	0.00	0.00	0.00
25	195	0.00	0.00	0.00	0.00	123	99	247	0.11	0.00	0.00	0.00
26	195	0.00	0.00	0.00	0.00	136	99	248	0.04	0.00	0.00	0.00
27	195	0.00	0.00	0.00	0.00	123	100	246	89	0.00	0.00	0.00
28	196	0.00	0.00	0.00	0.00	116	113	241	218	0.04	0.00	0.00
29	203	0.00	0.00	0.00	0.00	136	114	193	219	131	0.00	0.00
30	216	0.00	0.00	0.00	---	143	114	234	220	229	0.00	0.00
31	219	---	0.00	0.00	---	141	---	229	---	234	0.00	---
TOTAL	4022.56	2393.20	0.00	0.00	0.00	2024.00	3106	5543.37	3576.38	3126.70	745.89	0.00
MEAN	130	79.8	0.000	0.000	0.000	65.3	104	179	119	101	24.1	0.000
AC-FT	7980	4750	0	0	0	4010	6160	11000	7090	6200	1480	0
MAX	247	221	0.00	0.00	0.00	151	234	250	247	250	259	0.00
MIN	0.84	0.00	0.00	0.00	0.00	0.00	33	0.41	0.04	0.00	0.00	0.00

CAL YR	2011	TOTAL	47418.06	MEAN	130	MAX	347	MIN	0.00	AC-FT	94050
WTR YR	2012	TOTAL	24538.10	MEAN	67.0	MAX	259	MIN	0.00	AC-FT	48670

MAX DISCH: 302 CFS AT 12:00 ON AUG 01,2012 GH 2.81 FT SHIFT 0 FT
 MAX GH: 2.81 FT AT 12:00 ON AUG 01,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

07119705 CATLIN CANAL AT CATLIN DAM NEAR FOWLER
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
ARKANSAS RIVER AND CATLIN CANAL (COMBINED)

Water Year 2012

Location.-- Combined record from Arkansas River below Catlin Dam and Catlin Canal gages both located at Lat 38°07'33", long 103°54'41", in NW¼NW¼ sec. 21, T.22 S., R.58 W., Otero County.

Drainage Area and Period of Record.-- 10,800 mi²;

Equipment.-- See individual records for gage equipment descriptions.

Hydrologic Conditions.-- See individual station analyses.

Gage-Height Record.-- See individual records for gage height record analyses.

Datum Corrections.-- See individual station analyses.

Rating.-- See individual station analyses.

Discharge.-- The combined record of discharges was obtained by the addition of Catlin Canal daily flows to the corresponding daily flows in the Arkansas River below Catlin Dam. The peak unit value discharge for the year was 1040 cfs at 1215 on June 8, 2012. See individual station analyses.

Special Computations.--

Remarks.-- Combined record is good, except during periods of estimated flow, which should be considered poor. Record developed by Div. 2 hydrographic staff.

Recommendations.--

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

ARKANSAS RIVER AND CATLIN CANAL (COMBINED)

RATING TABLE.--

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

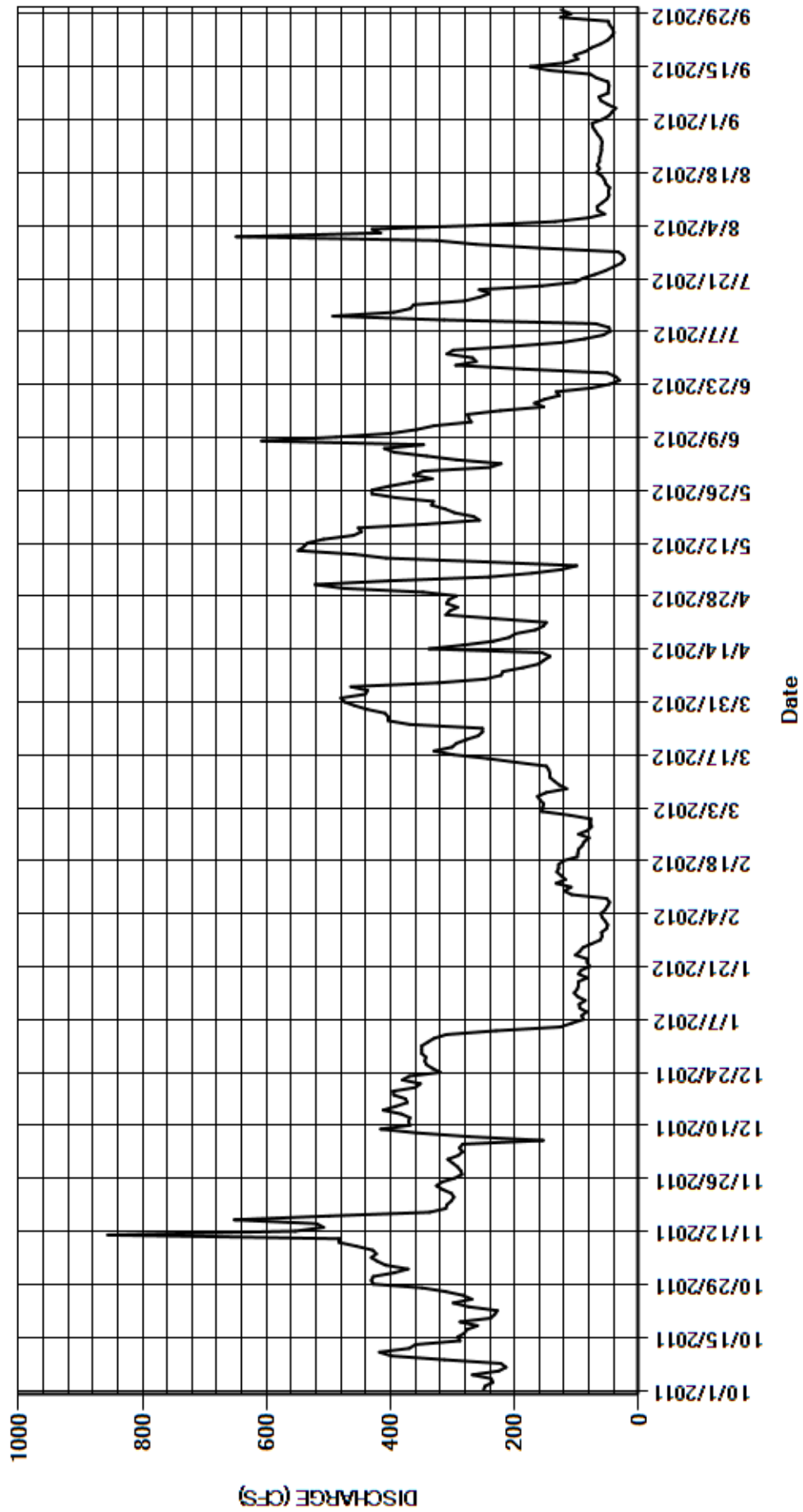
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	250	394	308	e340	50	111	480	522	240	309	649	59
2	248	372	291	e330	54	156	441	402	222	299	416	48
3	235	408	284	e310	59	155	437	242	294	204	430	43
4	238	421	289	e230	61	153	464	172	342	126	261	37
5	268	431	284	126	54	159	324	124	394	87	135	50
6	226	423	154	108	50	163	248	100	410	57	81	61
7	214	429	274	89	47	149	222	245	347	46	55	64
8	222	455	359	92	52	116	219	407	608	48	66	49
9	313	483	416	84	108	128	187	458	488	69	67	49
10	399	483	369	95	120	136	161	549	399	314	59	48
11	418	856	371	96	109	143	153	540	358	493	51	50
12	370	554	369	86	133	143	143	534	330	395	48	68
13	360	508	383	98	118	145	156	508	270	368	49	78
14	288	520	e412	104	125	149	338	460	274	363	47	144
15	292	652	e392	99	132	198	283	447	276	281	53	175
16	281	499	373	97	129	243	235	452	223	257	55	118
17	277	337	376	97	129	299	209	342	153	240	59	98
18	260	311	395	83	121	330	199	257	168	257	68	104
19	288	309	396	97	99	301	167	266	152	156	63	86
20	239	302	360	93	98	294	154	297	128	102	67	76
21	232	298	352	79	97	e278	149	312	133	90	63	61
22	228	302	381	83	91	259	231	334	76	71	63	50
23	274	316	e370	83	88	252	311	331	47	54	61	44
24	299	326	e320	102	80	252	305	392	31	41	60	40
25	269	317	e332	95	97	369	292	430	37	28	60	42
26	283	297	e342	90	82	404	310	430	51	23	59	47
27	311	285	e345	76	76	404	306	403	185	25	61	49
28	349	287	e343	62	78	409	294	369	295	33	66	126
29	428	292	e350	59	77	438	348	333	262	160	70	109
30	431	300	e350	60	---	458	475	363	268	263	74	125
31	428	---	e350	52	---	475	---	347	---	326	75	---
TOTAL	9218	12167	10690	3595	2614	7669	8241	11368	7461	5585	3491	2198
MEAN	297	406	345	116	90.1	247	275	367	249	180	113	73.3
AC-FT	18280	24130	21200	7130	5180	15210	16350	22550	14800	11080	6920	4360
MAX	431	856	416	340	133	475	480	549	608	493	649	175
MIN	214	285	154	52	47	111	143	100	31	23	47	37

CAL YR	2011	TOTAL	212990	MEAN	584	MAX	2340	MIN	19	AC-FT	422500
WTR YR	2012	TOTAL	84297	MEAN	230	MAX	856	MIN	23	AC-FT	167200

MAX DISCH:
 MAX GH:

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

ARKANSAS RIVER AND CATLIN CANAL (COMBINED)
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
ARKANSAS RIVER NEAR ROCKY FORD

Water Year 2012

Location.-- Lat. 38°03'52", Long. 103°41'24" in SE ¼, NW ¼, Sec. 9, T23S, R56W, Hydrologic Unit 11020005, Otero County, on right bank of Arkansas River, approximately 250 feet upstream from State Highway 266, and approximately 1.6 miles NE of Rocky Ford, Colorado.

Drainage Area and Period of Record.-- 11,438 sq. mi. ; Oct 1, 1999 to present.

Equipment.-- Sutron Satlink2 DCP with a Sutron Constant Flow Bubbler (CFB) in a 4 ft x 4 ft steel gage shelter with a tipping bucket rain gage. The CFB orifice line terminates in the channel on the streamside of a concrete floodblock situated on the right edge of water below the shelter. The primary reference gage is the top of an angle iron installed on a floodblock with a drop tape reference point.

Hydrologic Conditions.-- The drainage basin, which contributes to the gage encompasses approximately 11,300 square miles. Basin characteristics include elevation differences from Mt. Elbert at 14,433 ft to the gage at elevation 4,131 ft with vegetation ranging from alpine tundra to sparse pinyon-juniper in the upper reaches and from irrigated farmland to rangeland in the lower reaches. The gage is located downstream from Pueblo Reservoir approximately 79 miles. Pueblo Reservoir regulates flows through the reservoir year round including the Winter Water Storage Program period of November 15 to March 15 when the gates are essentially closed and streamflow is stored for release during the irrigation season. Release of water from Pueblo Reservoir takes approximately 42 hours to reach the gage. Unregulated tributaries that contribute to the gage include Fountain Creek, St. Charles River, Huerfano River and the Apishapa River, and several other small streams. Numerous irrigation diversion points exist above the gage but contribute to the river with return flows. All of these factors influence streamflow at the gage. Mean annual precipitation for the basin is 16.87± inches. No hydrologic conditions changes in the basin observed this water year.

Gage-Height Record.-- Primary record is 15-minute satellite transmitted CFB data, with DCP and CFB logs as backup. Record is complete and reliable, except for periods of Mar 21-22, (12 and 16 values, respectively) when there were GOES satellite transmission failures. Missing data were replaced using the relatively flat gage height trend surrounding the missing periods without appreciable loss of accuracy. During the periods Dec 3-12, Dec 19-31, 2011, Jan 1-5, 11-15, 17-18, 2012 ice in the channel affected the stage-discharge relationship.

Datum Corrections.-- Levels were run on Apr. 10, 2012 using BM1 as base. The elevation of the tapedown RP on the flood block was found to be 0.021 ft low (elev 7.400 ft versus est. elev. of 7.421 ft). Tape length was not checked at this levels run. Two new reference marks: RM7, elev 15.243 ft, and RM8 4.294 ft were established. No corrections were made. A full set of levels needs to be run in WY2013 to check and verify these results.

Rating.-- The control is a shifting sand channel with earthen banks at low to medium flows and medium to high flows are controlled by tamarisk and bank vegetation and the abutments of the downstream bridge. Rating No. 2, dated Oct. 1, 2003, was used the entire water year. Twenty-one discharge measurements (Nos. 404-424) were made this water year, ranging in discharge from 24.3 cfs to 400 cfs). Minimum measured stage was 1.26 ft with a discharge of 27.7 cfs. WY2012 measurements covered the range in stage experienced except for lower mean daily flows on Dec 13-14, 2011; Jan 27-Feb 1, Feb 20-Mar 9, July 7-8, 17-19, 24, 28-30, Aug 11-17, and Sept 11; and the higher mean daily flows of Nov 9-14, 2011; Mar 28-30, Apr 1-5, and Jun 9. The instantaneous peak flow of 773 cfs occurred at 0400 June 9 at a gage height of 2.60 ft with a shift of 0.09 ft. The peak exceeded the stage of Measurement No. 412, made March 30, 2012, by 0.50 feet.

Discharge.-- Shifting control method was used for the entire water year. Shifts were applied as defined by measurements and distributed by time, event and stage. Shifts were prorated by time from the beginning of the water year to the start of the ascending limb of the peak runoff at 1015 May 23, 2011 except for a period when shifts were distributed by event during a period of increased flows occurring 0000 Feb 10 to 1300 Feb 18. Variable shift curve (ARKROCCOVS1201) based on M405-407, and M412, was used to distribute shifts by stage during a high flow period from 1215 Oct 18 through 0845 Nov 30, 2011. Variable shift curve (ARKROCCOVS1202) based on M417-420, and M412, was used to distribute shifts by stage from 0915 Jun 1 through 1615 Aug 20, 2012. Measurements showed shifts ranging from -0.19 ft to +0.12 ft. All measurements were given full weight, except Msmt Nos. 417-421, which were discounted from -6.12% to +8.12% for smoothing purposes.

Special Computations.-- The potential for ice-affected gage heights was analyzed using air temperature data from the ROCKY FORD 2 SE approximately 2 miles away and water temperatures from ARKCATCO approximately 13 miles upstream. Discharges on ice affected days and days of missing data were estimated using good record before and after the affected periods and by comparison to up and downstream hydrographs using the Arkansas River below Catlin Dam and Arkansas River at La Junta.

Remarks.-- Record is good, except for periods of ice affect, which were estimated and are considered poor. Periods of missing data are estimated and fair. Peak gage height and discharge are considered fair. Station maintained and record developed by Garrett Markus.

Recommendations.-- A full set of levels needs to be run in WY2013 to check and verify the results of WY12 levels. A new rating needs to be developed.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

ARKANSAS RIVER NEAR ROCKY FORD

RATING TABLE-- ARKROCCO02 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

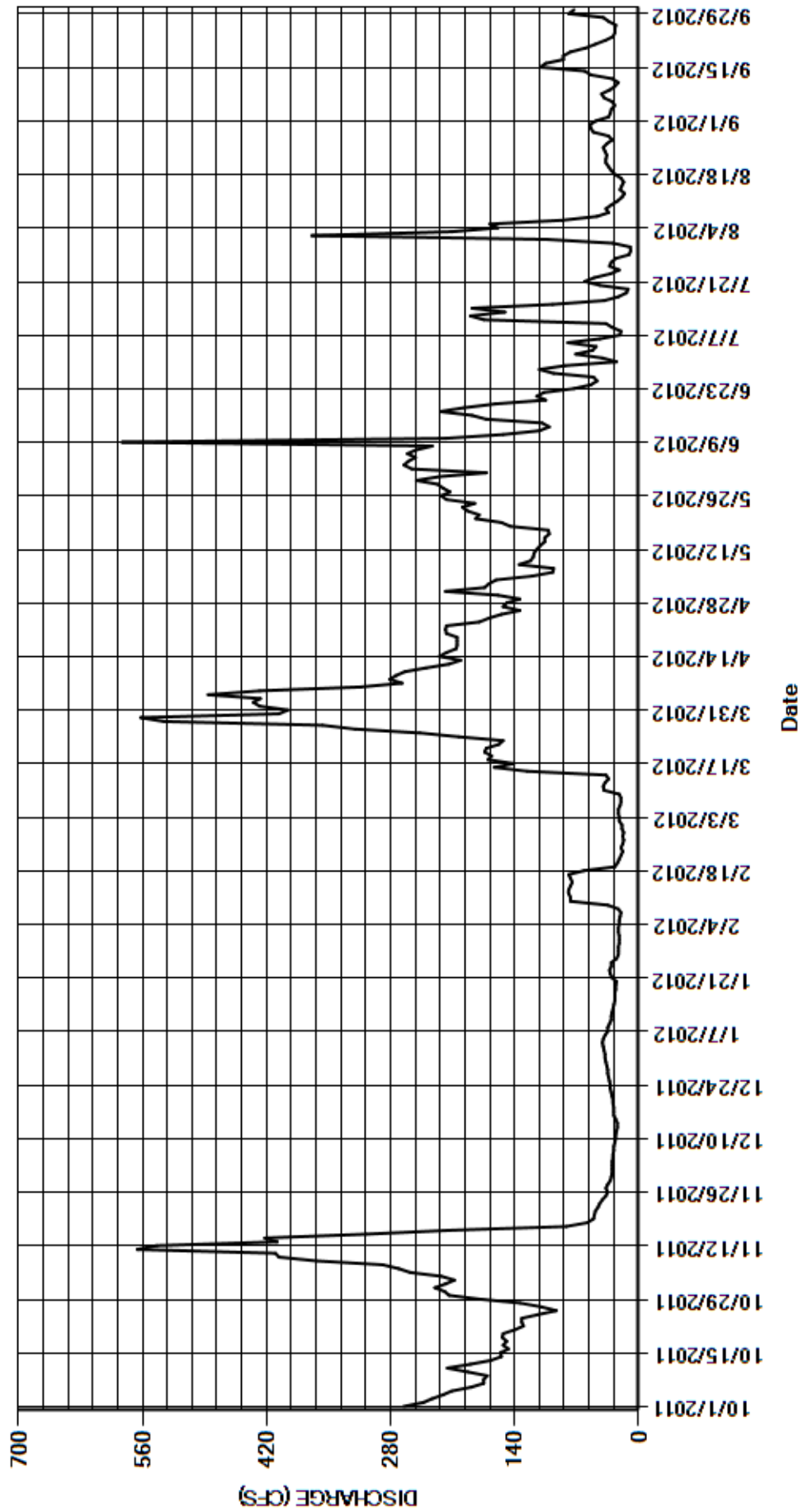
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	265	230	30	e38	22	19	428	218	172	41	103	48
2	243	218	30	e39	23	22	435	174	256	71	369	34
3	233	208	e30	e40	23	22	427	169	265	52	211	32
4	221	223	e30	e41	22	23	486	161	260	48	159	31
5	211	258	e29	e40	22	23	428	120	252	80	168	27
6	189	271	e29	38	21	21	314	97	261	44	86	30
7	175	289	e28	35	20	20	267	96	251	21	47	39
8	175	364	e28	35	23	20	281	135	233	20	34	42
9	171	406	e27	33	35	22	274	122	583	30	37	33
10	193	410	e26	31	77	39	264	119	218	37	31	27
11	216	566	e26	e31	77	40	240	118	153	175	24	23
12	190	544	e25	e30	79	38	214	115	112	190	19	30
13	167	408	24	e29	79	34	201	111	101	151	16	54
14	155	422	24	e28	77	37	225	106	109	188	21	61
15	156	308	26	e27	75	126	217	106	172	97	19	111
16	147	215	28	27	77	163	206	101	188	39	17	105
17	153	82	28	e27	79	141	205	102	224	23	20	85
18	149	58	28	e26	62	170	205	145	197	14	27	85
19	154	51	e29	26	27	166	205	155	162	12	31	77
20	153	50	e29	25	24	174	217	184	105	44	34	60
21	140	49	e30	30	22	172	218	180	115	61	37	49
22	130	46	e31	32	20	e158	217	193	107	50	37	38
23	132	44	e32	33	18	153	180	199	73	32	36	29
24	132	41	e32	31	20	203	169	185	54	22	38	27
25	113	37	e33	31	18	247	155	217	47	33	40	27
26	93	35	e34	25	17	320	134	223	51	31	36	26
27	110	37	e35	23	18	357	153	213	96	26	30	34
28	134	35	e35	23	17	536	149	221	112	11	34	40
29	179	32	e36	23	19	562	134	227	83	9.1	51	79
30	214	31	e37	22	---	406	159	251	25	9.5	54	73
31	219	---	e38	22	---	396	---	225	---	29	55	---
TOTAL	5312	5968	927	941	1113	4830	7407	4988	5037	1690.6	1921	1456
MEAN	171	199	29.9	30.4	38.4	156	247	161	168	54.5	62.0	48.5
AC-FT	10540	11840	1840	1870	2210	9580	14690	9890	9990	3350	3810	2890
MAX	265	566	38	41	79	562	486	251	583	190	369	111
MIN	93	31	24	22	17	19	134	96	25	9.1	16	23

CAL YR	2011	TOTAL	140321.0	MEAN	384	MAX	1710	MIN	13	AC-FT	278300
WTR YR	2012	TOTAL	41590.6	MEAN	114	MAX	583	MIN	9.1	AC-FT	82490

MAX DISCH: 773 CFS AT 04:00 ON JUN 09,2012 GH 2.60 FT SHIFT 0.09 FT
 MAX GH: 2.60 FT AT 04:00 ON JUN 09,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

ARKANSAS RIVER NEAR ROCKY FORD
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
07122400 CROOKED ARROYO NEAR SWINK, CO
Water Year 2012

Location.-- Lat. 37°58'56", Long. 103°35'52", in SW¼SW¼ sec. 5, T.24 S., R.55 W., Otero County, on right bank 54 ft. downstream from bridge on State Highway 10, 2.0 mi. upstream from mouth, and 2.8 mi. southeast of Swink.

Drainage Area and Period of Record.-- 108 mi².; Gage established at present site and datum by USGS February 1, 1968. Operated by USGS until September 30, 1993. Operated and maintained by State of Colorado Division of Water Resources from October 1, 1993 to present.

Equipment.-- High data rate Sutron Satlink 2 DCP and Sutron Constant Flow Bubbler (CFB) installed in a 4 ft x 4 ft steel shelter. Primary reference gage is a staff gage in the channel. No changes were made this water year.

Hydrologic Conditions.-- Drainage basin characteristics include land uses primarily of rangeland with the lower portion of the basin used as irrigated agricultural land. Surface cover in the rangeland area is primarily native grasses and weeds. Streamflow exhibits considerable seasonal variability with the majority of the total annual streamflow resulting from short duration summer thunderstorms and snowmelt runoff contributing in the minor. Flows at the gaging station can be affected by minor irrigation diversions from the channel and highly variable irrigation return flows from the Catlin Canal. Flows can also be regulated by two reservoirs in the upstream basin as well as by beaver dams. No hydrologic conditions changes in the basin observed this water year.

Gage-Height Record.-- Primary record is 15-minute satellite-monitored constant flow bubbler data with DCP log backup. Record is complete and reliable, except for the following periods of missing data: October 1-2, 4-16, 18-27, March 11, and September 25. Missing data were filled in via backup log or manually filled in by referencing stable adjacent data with no loss in accuracy. Primary stage sensor calibration to the reference gage is supported by 20 visits made this water year. Four instrument calibration corrections of -0.05 ft, -0.02 ft, +0.03 ft. and -0.02 ft were made. The stage-discharge relationship was affected by backwater from downstream beaver dams Oct 10-28, Apr 28-May 3, May 9-31, Jun 1-27. Beaver dams were removed on Oct 28 and June 27.

Datum Corrections.-- Levels were last run August 22, 2008. No corrections were made.

Rating.-- The control is a sand, gravel, clay, and mud channel with earthen banks. Bank vegetation of variable density affects medium to high flows considerably. During low flow periods in the winter months, considerable moss/algae growth appears in the channel bottom affecting the stage-discharge relationship. Rating CANSWKCO07 was used the entire water year and is well defined to approximately 100 cfs. Seventeen discharge measurements (Nos. 292-308) were made this water year ranging in discharge from 0.13 to 15.1 cfs. They cover the range in stage experienced except for the lower daily flows on May 7-8, August 29-September 1, September 3, 5-11, 17-21, 23, and 28-29 and higher daily flows on October 31 -November 9, November 11-15, 19-21, March 18 and 22. The peak flow of 67.7 cfs occurred at 0815 on November 6, 2011 at a gage height of 3.39 ft with a shift of -0.07 ft. The peak exceeded the stage of Measurement 294 by 1.41 ft. The peak gage height of 3.47 ft occurred at 0645 on June 14, 2012 and was due to backwater from a beaver dam.

Discharge.-- Shifting control method was used. Shifts were distributed by time proration except for periods when beaver dams affected the stage-discharge relationship. Shifts by time were applied directly and given full weight except for Measurement 297, which had a moss affected velocity profile and did not follow hydrographic protocol. The shift for Msmt 297 was discounted to match the shift of Msmt 296. Shift applicaiton during periods of backwater due to beaver dams was made using variable stage shift relationship CANSWKCOVS12BA. VS12BA was logically defined above gage height 2.17 ft but is not well defined above 3.22 ft. Long periods of flow below gage height 2.17 ft and which were beaver dam affected were held at stable adjacent shifts. The VS12BA is based on Measurement Nos. 293, 300-302 made during the periods of backwater affect. Measurements 293 and 301 were discounted 27.10% and -4.46%, respectively, for smoothing purposes. VS12BA was applied during time periods of: 1500 October 10 to 1515 October 28, 1530 April 28 to 0900 May 03, and 0315 May 9 to 1315 June 27. Shifts from Measurements 292, 299, and 300 were held to the initiation of VS12BA at matching shifts.

Special Computations.-- Temperature and precipitation data from the Arkansas River at La Junta (ARKLAJCO) gage and La Junta Municipal Airport NOAA station were utilized to analyze potential ice affect and unusual spikes. Diversions from the Catlin Canal and Catlin at Crooked Arroyo were compared to the discharges for this gage for mass balance consideration and to identify potential sources of large variable flows.

Remarks.-- Record is good, except for periods of backwater caused by beaver dam, which are estimated and considered poor. The peak flow is considered poor due to the lack of recent flow measurements of similar magnitude. Station maintained and record developed by Garrett Markus.

Recommendations.-- Levels need to be run in WY13. All chiseled benchmarks should be replaced with either a brass cap or concrete pin for improved accuracy during levels. Rating CANSWKCO07 needs to be updated to correct a negative shift trend. Beaver dam activity needs to be more closely monitored and beaver dams removed as soon as practical.

STATE OF COLORADO
DIVISION OF WATER RESOURCES
OFFICE OF STATE ENGINEER

07122400 CROOKED ARROYO NEAR SWINK, CO

RATING TABLE-- CANSWKCO07 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

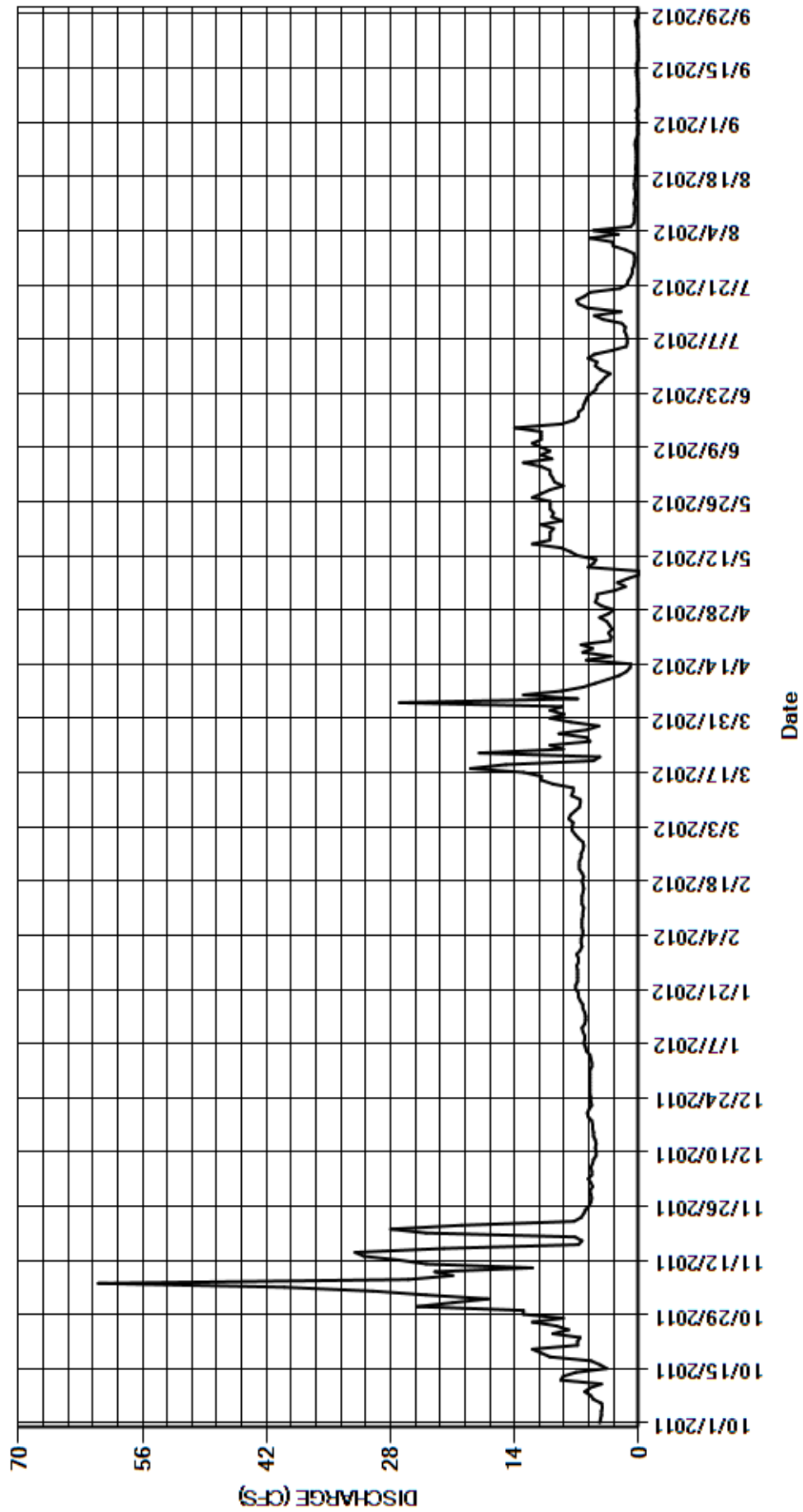
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.4	21	5.2	5.3	6.4	7.2	8.4	e4.7	e9.7	4.7	2.9	0.04
2	4.3	17	5.4	5.3	6.5	7.5	10	e4.7	e10	5.7	5.5	0.22
3	4.2	24	5.7	5.4	6.5	7.5	8.6	e2.7	e10	5.0	2.3	0.12
4	4.2	30	5.3	5.5	6.3	7.4	27	1.5	e11	3.0	5.1	0.28
5	4.1	40	5.3	5.9	6.3	7.9	6.9	2.4	e13	1.4	0.89	0.03
6	4.2	61	5.4	6.0	6.4	7.7	13	1.3	e9.8	1.3	0.53	0.01
7	5.1	26	5.2	6.2	6.4	7.2	8.7	0.00	e11	1.3	0.49	0.02
8	5.4	21	5.1	6.1	6.4	6.7	6.3	0.00	e10	1.4	0.46	0.04
9	6.1	23	4.8	6.1	6.3	6.6	4.9	e5.7	e11	1.6	0.42	0.09
10	e5.5	12	4.8	6.3	6.3	6.6	3.5	e5.1	e12	1.5	0.41	0.10
11	e4.2	24	4.9	6.4	6.2	7.6	2.2	e4.8	e11	1.9	0.51	0.08
12	e8.8	27	4.8	6.1	6.4	7.4	1.4	e6.9	e11	4.0	0.42	0.14
13	e8.5	31	4.9	6.0	6.4	7.4	0.98	e7.7	e11	5.0	0.37	0.23
14	e7.1	32	5.1	6.0	6.4	9.7	0.88	e8.8	e14	2.0	0.37	0.27
15	e3.6	22	5.1	6.1	6.3	11	5.9	e12	e8.7	5.8	0.46	0.22
16	e4.4	6.8	5.2	6.3	6.2	11	3.1	e10	e7.3	6.8	0.49	0.24
17	e5.4	6.4	5.2	6.3	6.3	13	6.3	e10	e6.8	7.0	0.42	0.05
18	e10	7.2	5.3	6.6	6.4	19	5.2	e10	e6.8	6.1	0.43	0.06
19	e11	24	5.7	6.8	6.2	15	6.5	e9.6	e6.3	5.5	0.27	0.06
20	e12	28	5.8	6.8	6.4	5.1	3.2	e11	e6.2	2.1	0.38	0.07
21	e6.9	20	5.6	7.1	6.7	4.4	3.1	e8.7	e6.0	1.3	0.30	0.09
22	e6.9	7.3	5.3	7.1	6.7	18	3.4	e9.8	e5.8	1.2	0.27	0.15
23	e6.6	6.5	5.4	6.9	6.7	8.5	3.0	e9.6	e5.3	0.92	0.27	0.09
24	e9.7	6.2	5.4	6.9	6.5	10	3.3	e10	e4.8	0.73	0.29	0.13
25	e7.9	6.0	5.5	6.9	6.5	5.5	3.6	e10	e4.7	0.71	0.31	0.19
26	e9.3	5.6	5.5	6.9	6.3	5.9	4.4	e10	e4.2	0.54	0.41	0.30
27	e12	5.4	5.5	7.0	6.2	9.0	3.4	e12	e3.8	0.47	0.38	0.40
28	e8.5	5.3	5.5	6.8	6.3	5.8	e2.8	e11	3.2	0.44	0.22	0.05
29	13	5.4	5.5	6.8	6.8	4.5	e4.2	e10	4.3	0.55	0.06	0.07
30	13	5.5	5.5	7.0	---	7.7	e4.9	e8.5	4.9	1.5	0.11	0.15
31	25	---	5.5	6.6	---	10	---	e9.5	---	2.9	0.07	---
TOTAL	241.3	556.6	164.4	197.5	185.7	267.8	169.06	228.00	243.6	84.36	25.81	3.99
MEAN	7.78	18.6	5.30	6.37	6.40	8.64	5.64	7.35	8.12	2.72	0.83	0.13
AC-FT	479	1100	326	392	368	531	335	452	483	167	51	7.9
MAX	25	61	5.8	7.1	6.8	19	27	12	14	7.0	5.5	0.40
MIN	3.6	5.3	4.8	5.3	6.2	4.4	0.88	0.00	3.2	0.44	0.06	0.01

CAL YR	2011	TOTAL	3776.70	MEAN	10.3	MAX	61	MIN	1.8	AC-FT	7490
WTR YR	2012	TOTAL	2368.12	MEAN	6.47	MAX	61	MIN	0.00	AC-FT	4700

MAX DISCH: 67.7 CFS AT 08:15 ON NOV 06,2011 GH 3.39 FT SHIFT -0.07 FT
 MAX GH: 3.47 FT AT 06:45 ON JUN 14,2012 (backwater due to beaver dam)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

07122400 CROOKED ARROYO NEAR SWINK, CO
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
07123000 ARKANSAS RIVER AT LA JUNTA
Water Year 2012

Location.-- Lat. 37°59'26", Long. 103°31'55", in SE¼NE¼ sec. 2, T.24 S., R.55 W., Otero County, Hydrologic Unit 11020005, on right bank at upstream side of bridge on State Highway 109 in La Junta, 450 ft upstream from King Arroyo.

Drainage Area and Period of Record.-- 12,210 mi².; Water stage recorder in use since Oct. 1933 at several locations. Gage site in continuous use since then.

Equipment.-- Satellite-monitored data collection platform (high data rate Sutron Satlink 2 DCP), Sutron Constant Flow Bubbler (CFB) in 4 ft x 4 ft steel shelter. An air temperature sensor and a radar water level sensor are also connected to the DCP. A wire-weight gage on the Hwy 109 Bridge serves as the primary reference gage. The data from the radar sensor was not used for this streamflow record. No changes were made this water year.

Hydrologic Conditions.-- Drainage basin characteristics include elevation differences from Mt. Elbert at 14,433 ft to the gage at elevation 4,041 ft with vegetation ranging from alpine tundra to sparse pinon-juniper in the upper reaches and from irrigated farmland to rangeland in the lower reaches. The gage is located downstream from Pueblo Reservoir approximately 92 miles. Pueblo Reservoir regulates flows through the reservoir year round including the Winter Water Storage Program period of November 15 to March 15 when the gates are essentially closed and streamflow is stored for release during the irrigation season. Release of water from Pueblo Reservoir takes approximately 46 hours to reach the gage. Unregulated tributaries that contribute to the gage include Fountain Creek, St. Charles River, Huerfano River, Apishapa River, Timpas Creek, and Crooked Arroyo. Numerous irrigation diversion points exist above the gage. All of these factors influence streamflow at the gage. The heavy vegetation was removed and maintained on both banks up and downstream of the gage. No other observed hydrologic conditions changes in the basin this water year.

Gage-Height Record.-- Primary record is 15-minute transmitted data with DCP log as backup. Record is complete and reliable, except for the following periods of missing data: March 11, Sep. 26. Ice affected the stage-discharge relationship on Dec. 4-12, Dec. 20-Jan. 3, Jan. 9, and Jan. 12-13. Missing values were replaced using surrounding good values and trend in gage height change without loss of accuracy. Thirteen instrument calibration corrections were applied ranging from -0.04 ft to 0.05 ft.

Datum Corrections.-- Levels were last run on April 10, 2012. No corrections were made.

Rating.-- A shifting sand channel is the primary control at low stages with bridge piers, abutments, lightly vegetated banks and islands contributing at medium flows and above. At high flows (flooding stage) river will flow out of bank on the north side approximately 150 to 200 feet upstream of the gage. Rating No. 42, implemented on May 13, 2009, was used during the entire water year. Twenty discharge measurements (Nos. 1195-1214), ranging in discharge from 26.1 to 362 cfs, were made during the water year. They cover the range in stage experienced except for the lower daily flows of Nov 10, Mar 16-17, Apr 11-15, Apr 17-27, May 7, 22, and 24, Jun 14-15, Jul 28-31, Aug 6-7, 13-18, 28, Sept 5-6, 29-30. No daily flows exceeded Msmt No.1202. The peak flow of 466 cfs occurred at 1400 on Jun 09, 2012 at a gage-height of 7.61 ft with a shift of -0.22 ft. It exceeded the stage of high flow Measurement No. 1202 by 0.35 feet.

Discharge.-- Shifting channel control method used all year. Shifts were applied as defined by measurements and distributed by time and stage. Shifts were distributed by stage using three variable stage-shift relationships: ARKLAJCOVS1107, ARKLAJCOVS1202, and ARKLAJCOVS1203. WY2011 ended with VS1107 and it was continued in use in WY2012 to Msmt No.1195 on Oct 6, which was discounted 5.26%. Shifts were distributed by time from Oct 6 to Nov 1. Shifts were then distributed by stage for the period Nov 1, 2011 to Jul 31, 2012, using variable stage-shift relationship ARKLAJCOVS1202, which is based on measurements made during the period of application. Msmt Nos. 1197-1210 were discounted from -5.91% to +4.43% to fit the trends and smooth the variable stage-shift relationship. Variable stage shift relationship ARKLAJCOVS1203 was applied from Jul 31 to the end of the water year. VS1203 is based on Msmt Nos. 1210-1215 made during the period of application. Msmt Nos. 1210 and 1212 were discounted -5.41% and +5.10%, respectively, for smoothing purposes.

Special Computations.-- Flows were estimated on ice affected days using ARKLAJCO temperature data and good partial day record and good record before and after periods of ice effect. A hydrograph was used and daily average flows were compared to upstream gage: Arkansas River near Rocky Ford. Rapid increases/decreases in gage height observed at the gage during the irrigation season can be due to the effects of Ft. Lyon Canal gage changes and sluice gate operations, both of which are within three miles upstream of the gage.

Remarks.-- The record is considered good. Record during periods of ice-affected gage height should be considered poor. The peak is rated fair considering the high flow measurement this year was 77.7% of the magnitude of the peak flow. Also, the gage has a long history of supporting data that influenced the implemented variable shift curves to help with accuracy of capturing peak events around or higher than the experienced peak flow and corresponding gage height to justify a more positive rating. Station maintained and record developed by Garrett Markus.

Recommendations.-- The radar sensor should become the primary stage sensor and the CFB should be secondary.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

07123000 ARKANSAS RIVER AT LA JUNTA

RATING TABLE-- ARKLAJCO42 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

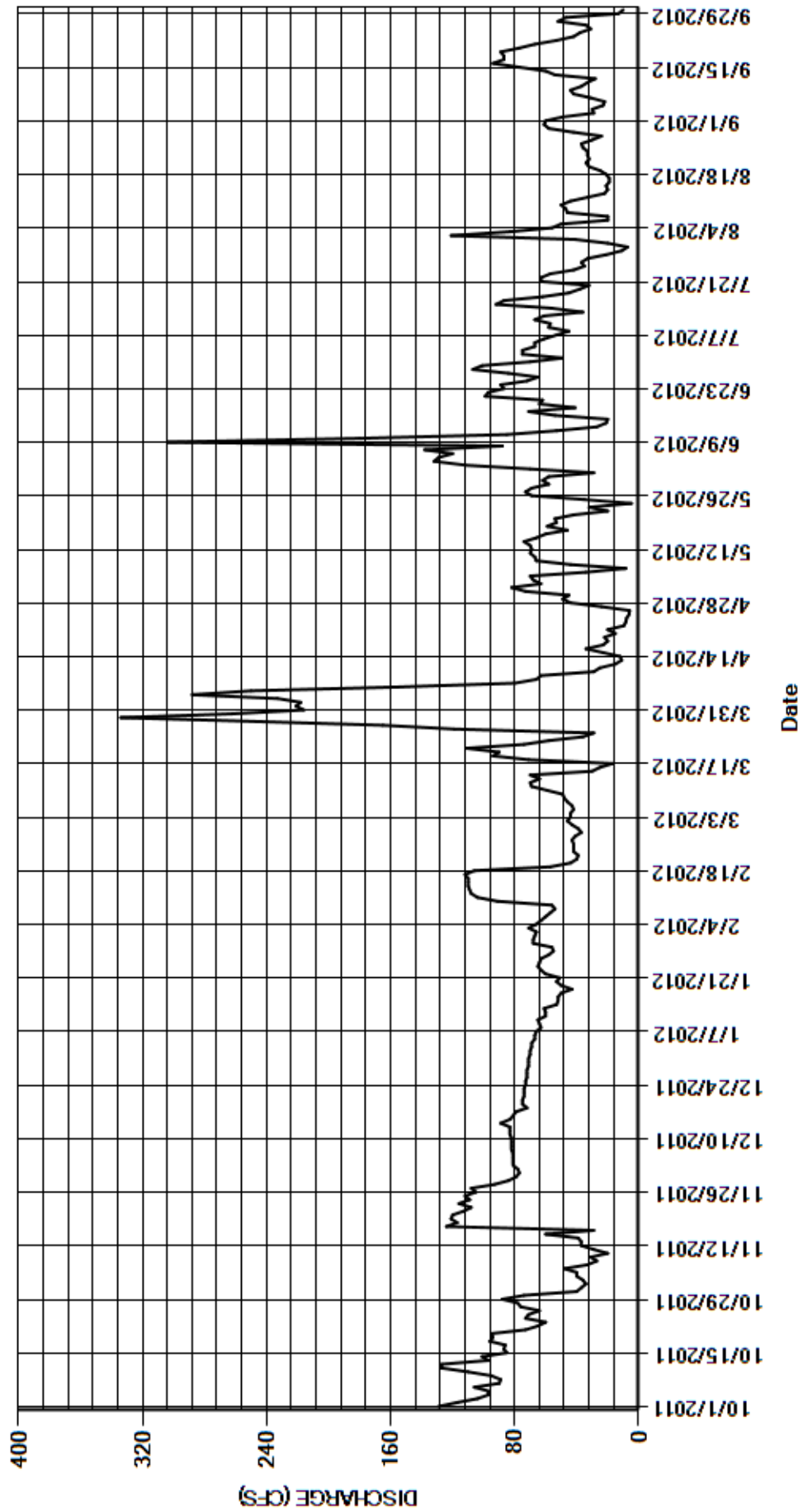
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	129	37	77	e70	67	43	221	73	29	49	41	60
2	117	34	78	e70	66	46	218	82	70	75	121	49
3	104	36	81	e69	71	44	233	63	112	75	83	29
4	97	40	e81	69	66	44	288	68	132	67	56	30
5	97	40	e81	67	63	42	250	70	129	67	50	23
6	106	48	e81	67	60	43	155	34	120	61	20	22
7	90	33	e82	66	57	46	80	8.3	138	53	20	31
8	89	27	e82	63	54	48	66	44	88	45	46	42
9	95	31	e82	e64	56	49	63	66	304	58	47	44
10	110	20	e82	65	91	59	29	67	180	57	50	37
11	127	29	e83	60	104	69	25	70	85	67	44	33
12	127	37	e83	e60	108	70	15	69	53	61	33	28
13	97	37	83	e61	109	64	11	70	27	36	22	54
14	101	39	89	53	110	70	12	74	21	56	20	60
15	85	60	83	52	110	30	23	66	20	92	21	77
16	87	29	81	52	110	25	34	60	54	87	19	94
17	86	124	79	50	112	17	23	46	71	62	19	87
18	96	117	72	43	106	71	20	59	41	45	21	87
19	94	121	75	50	57	94	22	53	64	38	25	89
20	95	120	e75	53	44	90	15	54	62	32	32	77
21	73	113	e74	51	40	111	20	42	99	63	34	67
22	65	108	e74	60	39	74	9.6	20	97	63	32	53
23	60	116	e74	63	42	58	8.3	32	87	57	33	42
24	73	109	e73	65	42	36	7.8	4.7	89	42	33	38
25	71	112	e73	64	42	29	6.2	35	72	35	36	31
26	64	105	e72	63	43	119	5.9	69	65	37	37	34
27	76	108	e72	58	41	165	24	73	84	33	30	52
28	78	93	e72	55	37	247	44	69	107	21	24	47
29	88	84	e71	56	39	334	49	58	101	11	42	13
30	74	79	e71	68	---	262	45	62	70	7.2	58	10
31	40	---	e71	68	---	216	---	58	---	20	61	---
TOTAL	2791	2086	2407	1875	1986	2715	2022.8	1719.0	2671	1572.2	1210	1440
MEAN	90.0	69.5	77.6	60.5	68.5	87.6	67.4	55.5	89.0	50.7	39.0	48.0
AC-FT	5540	4140	4770	3720	3940	5390	4010	3410	5300	3120	2400	2860
MAX	129	124	89	70	112	334	288	82	304	92	121	94
MIN	40	20	71	43	37	17	5.9	4.7	20	7.2	19	10

CAL YR	2011	TOTAL	67696.0	MEAN	185	MAX	1140	MIN	20	AC-FT	134300
WTR YR	2012	TOTAL	24495.0	MEAN	66.9	MAX	334	MIN	4.7	AC-FT	48590

MAX DISCH: 466 CFS AT 14:00 ON JUN 09,2012 GH 7.61 FT SHIFT -0.22 FT
 MAX GH: 7.61 FT AT 14:00 ON JUN 09,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

07123000 ARKANSAS RIVER AT LA JUNTA
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
HORSE CREEK AT HIGHWAY 194
Water Year 2012

Location.-- Lat. 38°05'06", Long. 103°21'12", in SE1/4,SW1/4, sec. 33, T.22S., R.53 W., Bent County, Hydrological Unit 11020008, on right bank 15 ft upstream from right end of box culverts on State Highway 194, 3.2 mi upstream from mouth, 3.4 mi downstream from Ft. Lyon Canal Aqueduct, and 7.5 mi west of Las Animas, Co.

Drainage Area and Period of Record.-- 1403 sq.mi.; Established and operated Oct. 19, 1979 to Sep. 30, 1993 by USGS. Operated and maintained by State of Colorado Oct. 1, 1993 to present.

Equipment.-- Sutron Satlink 2 high data rate satellite-monitored data collection platform (DCP) with a Sutron constant flow bubbler sensor (CFB) in a 4 ft x 4 ft steel shelter. Primary reference gage is a staff gage on the right side of the channel just upstream of the concrete weir control. A Texas Electronics Series 525 tipping bucket rain gage is operated at the site. Control is a compound 2-stage weir: Cipolletti weir for lower flows and rectangular broad crested weir for higher flows. The Constant Flow Bubbler was replaced on May 17, 2012. No other changes were made this water year.

Hydrologic Conditions.-- The Horse Creek watershed above the gage is approximately 1,420 sq miles and consists primarily of rangeland with native grasses and weeds dotted with the occasional cacti. Grazing along with irrigated and non-irrigated farming comprise the major land uses. Mean annual precipitation is 13.79 inches with soils moderately contributing to runoff. Streamflow exhibits seasonal variation with the majority of the natural flow resulting from high intensity – short duration summer thunderstorms. The Fort Lyon canal extends over the creek in a large diameter pipe approximately 3.4 miles above the gage and is capable of discharging canal water into the creek for overflow and augmentation. The Fort Lyon augmentation station at Horse Creek (FLYAUGCO located 3.4 mi. above gage) will contribute to flows of 15 cfs to the gage during augmentation.

Gage-Height Record.-- Primary record is 15-minute transmitted data with DCP and CFB logs as backup. Record is complete and reliable except for the following periods. Missing data: March 11, 4 values from DST; March 21, 38 values; March 22, 46 values; and May 17, 4 values. Missing data was filling in using downloaded log data that failed to transmit or was replaced using observed stable and adjacent gage height data without loss of accuracy. Equipment problems occurred from May 10 to May 17.

Datum Corrections.-- Levels were last performed on October 4, 2007. On Nov. 27, 2007, a short level loop was re-run from RM7 in order to verify the Cipolletti weir crest and the staff gage elevations.

Rating.-- The compound Cipolletti - rectangular 2-stage weir control was installed in April 2005. The stainless steel Cipolletti weir controls low flows up to a head of 1 foot or approximately 14.4 cfs. Medium flows are controlled by the rectangular second stage of the compound weir with flows up to approximately 137 cfs. The high flows are controlled by the box culverts under Highway 194 and bank vegetation. There is a fence and drop structure on Horse Creek on the downstream side of Hwy 194. Weeds and debris can collect on the fence and cause the gage control structure to become submerged. When visiting this gage, care needs to be taken to ensure that the downstream fence is clear of debris. Rating No. 7 was used for the 2012 water year. Sixteen discharge measurements (Nos. 322-337) were made during this water year, ranging in discharge from 0 to 9.74 cfs. The peak discharge of 28.6 cfs occurred at 0415 on April 10, 2012 at a gage height of 1.32 ft, with a shift of 0.05 ft. The peak exceeded the stage of maximum discharge Msmt No. 328 by 0.57 ft.

Discharge.-- Shifting section control used. Shifts were distributed by time proration throughout the water year. Over 95% of the recorded gage heights this water year flowed through the more accurate Cipolletti control and all fifteen discharge measurements were also within the Cipolletti. Measurements showed shifts ranged from -0.02 to 0.06 ft Shifting may be due to the upstream weir pool needing to be cleaned combined with depth measurement errors on the wading rod due to the creek's soft bottom.

Special Computations.-- The 8 day period from May 10 to May 17, 2012, the CFB preliminary gage height values were not representative of the actual conditions present. Release measured by the Ft Lyon Canal Augmentation station (FLYAUGCO) were used in conjunction with base flow estimates to determine the actual daily flow through the gage during this period.

Remarks.-- Record is good except for periods of erroneous data due to a malfunctioning Constant Flow Bubbler during April 3, 2012 through May 17, 2012, which are estimated and poor. The peak gage height and discharge are rated poor given it occurred during the same time as when the CFB was malfunctioning and raw gage heights are unreliable to a certain degree. Station maintained and record developed by Garrett Markus.

Recommendations.-- It's recommended that the weir pool in front of the weir be free of silt for proper weir mechanics. A clean and un-submerged weir crest should be sought and remedied every gage visit.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

HORSE CREEK AT HIGHWAY 194

RATING TABLE.-- HRC194CO07 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

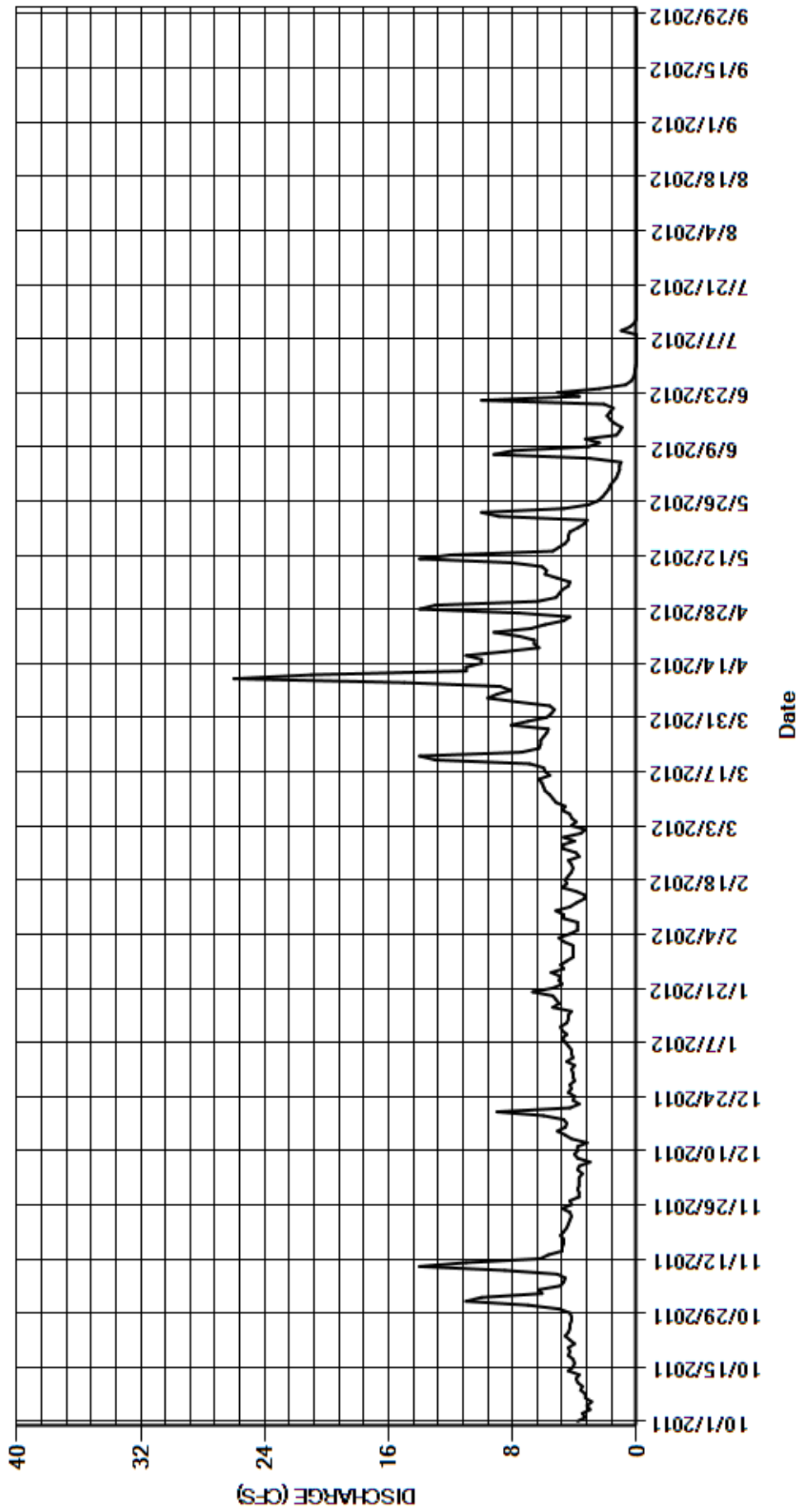
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.8	11	3.7	4.0	4.1	3.6	5.5	5.2	1.3	0.00	0.00	0.00
2	3.3	10	3.7	4.5	4.7	3.3	5.3	5.0	1.2	0.00	0.00	0.00
3	3.5	6.1	3.7	4.1	5.0	4.2	5.6	4.8	1.1	0.00	0.00	0.00
4	3.0	6.3	3.5	4.2	4.3	3.9	7.7	4.4	1.1	0.00	0.00	0.00
5	3.2	4.9	3.8	4.2	3.8	4.2	9.6	4.3	1.0	0.00	0.00	0.00
6	2.9	4.7	3.7	4.4	3.8	4.3	9.0	5.1	3.0	0.00	0.00	0.00
7	3.3	4.6	3.0	4.6	3.8	4.8	8.1	5.9	9.2	0.00	0.00	0.00
8	3.3	5.1	3.8	4.8	4.7	4.6	8.8	5.8	7.9	0.00	0.00	0.00
9	3.6	8.5	4.0	4.5	4.7	5.2	15	6.1	3.1	0.98	0.00	0.00
10	3.5	14	3.8	4.8	5.2	5.4	26	e8.1	2.4	0.42	0.00	0.00
11	3.8	11	3.8	4.9	4.3	5.6	21	e14	3.3	0.13	0.00	0.00
12	3.9	6.2	3.2	4.5	3.9	5.9	11	e12	1.3	0.00	0.00	0.00
13	3.7	5.7	4.2	4.4	3.4	6.0	11	e5.4	1.1	0.00	0.00	0.00
14	4.4	4.8	4.6	4.4	3.3	6.1	10	e5.0	0.95	0.00	0.00	0.00
15	4.1	4.8	5.1	4.2	3.9	6.3	10	e4.6	1.4	0.00	0.00	0.00
16	4.0	4.7	4.6	5.4	4.8	5.6	11	e4.4	1.7	0.00	0.00	0.00
17	4.1	4.7	4.5	5.0	4.5	5.9	8.5	e4.4	1.9	0.00	0.00	0.00
18	4.4	4.9	4.7	5.2	4.6	6.0	6.3	4.3	1.7	0.00	0.00	0.00
19	4.3	4.7	6.0	5.4	4.4	6.9	6.6	3.8	1.5	0.00	0.00	0.00
20	4.4	4.5	9.0	6.7	4.2	13	6.6	3.4	2.1	0.00	0.00	0.00
21	4.0	4.4	4.3	5.4	4.1	14	7.6	3.2	10	0.00	0.00	0.00
22	4.3	4.3	3.7	4.8	4.2	7.4	9.2	8.9	3.7	0.00	0.00	0.00
23	4.6	4.2	4.1	5.0	4.4	6.3	6.8	10	5.1	0.00	0.00	0.00
24	4.4	4.3	4.0	4.9	3.7	6.2	5.9	4.7	2.4	0.00	0.00	0.00
25	4.3	4.8	4.4	5.5	3.9	6.2	4.7	3.1	0.71	0.00	0.00	0.00
26	4.3	4.2	4.2	4.7	4.7	6.0	4.3	2.5	0.34	0.00	0.00	0.00
27	4.2	4.3	4.3	4.9	4.8	5.8	7.6	2.2	0.18	0.00	0.00	0.00
28	4.2	3.7	4.0	4.5	4.0	5.7	14	2.0	0.12	0.00	0.00	0.00
29	4.3	3.7	4.1	4.1	4.7	8.1	13	1.8	0.09	0.00	0.00	0.00
30	5.0	3.8	4.1	4.1	---	7.0	6.4	1.7	0.02	0.00	0.00	0.00
31	7.0	---	4.2	4.1	---	5.8	---	1.5	---	0.00	0.00	---
TOTAL	125.1	172.9	131.8	146.2	123.9	189.3	282.1	157.6	70.91	1.53	0.00	0.00
MEAN	4.04	5.76	4.25	4.72	4.27	6.11	9.40	5.08	2.36	0.049	0.000	0.000
AC-FT	248	343	261	290	246	375	560	313	141	3.0	0	0
MAX	7.0	14	9.0	6.7	5.2	14	26	14	10	0.98	0.00	0.00
MIN	2.9	3.7	3.0	4.0	3.3	3.3	4.3	1.5	0.02	0.00	0.00	0.00

CAL YR	2011	TOTAL	2246.90	MEAN	6.16	MAX	33	MIN	2.3	AC-FT	4460
WTR YR	2012	TOTAL	1401.34	MEAN	3.83	MAX	26	MIN	0.00	AC-FT	2780

MAX DISCH: 28.6 CFS AT 04:15 ON APR 10,2012 GH 1.32 FT SHIFT 0.05 FT
 MAX GH: 1.32 FT AT 04:15 ON APR 10,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

HORSE CREEK AT HIGHWAY 194
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
RATON CREEK ABOVE STARKVILLE, CO

Water Year 2012

Location.-- Lat. 37°07'35.5", Long. 104°31'24.8" in NW¼, NE¼, NE¼, Section 35,T33S, R64W, Las Animas County, 20 feet away from the creek on the left upstream side of bridge for County Road 18.3 approximately half a mile south of Interstate 25 exit 8 south of Trinidad.

Drainage Area and Period of Record.-- 54.49 sq.mi.;

Equipment.-- Sutron SatLink2 data collection platform (DCP) with High Data Rate (HDR) radio and shaft encoder. The data logger is housed inside a 4 ft x 4 ft x 8 ft metal shelter about 20 feet from the creek, while the shaft encoder is in a 20 in x 30 in metal "half" shelter atop an armored 18 inch corrugated metal pipe stilling well attached to the left wing wall on the upstream side of the bridge. A Texas Instruments tipping bucket rain gage is mounted on the antenna mast. The shaft encoder is set to an electric drop tape inside the half shelter and well. No changes this water year.

Hydrologic Conditions.-- The gage is situated in a valley at the town of Starkville approximately two miles above the Purgatoire at Trinidad gage. The gage is subject to flash flooding from the higher mountainous area above the gage with several smaller tributary streams. The channel is contained on the left side by railroad tracks set higher and a sheer wall several feet higher, the right side is contained by the county road for about a hundred feet and then the valley wall. Channel work done by Las Animas County as part of bridge repair changed the shape of the channel in 2010 and again in May 2011.

Gage-Height Record.-- Primary record is the fifteen minute satellite data with the DCP log data used for back-up purposes. Record is complete and reliable for the entire water year, except for April 3 2012 when runoff event piled debris on the low flow control and then washed out. The creek was dry from October 1, 2011 to March 14, 2012 and from June 9 to the end of the water year, with the exception of rain events on August 13, 26 , and September 27.

Datum Corrections.-- No levels were run this year. Previous levels were run September 18, 2007. No corrections were needed.

Rating.-- The control at low flows up to 10 cfs was a gravel riffle in the creek channel, however, this washed out on April 3, 2012. The control is now a channel control from low to high stage with the bridge confining flows. Extreme high flows can go out of the channel on the right bank into an area upstream and extending approximately 30 feet south of the bridge and on the left bank 30 feet to the north which is at a slightly lower elevation than the gage. The extreme high flow would bypass the gage on the left side. Rating No. 4, dated December 1, 2010, was used from the beginning of the water year until 1200 April 3 2012 when the control washed out. Rating 5 was developed using low flow measurements made in WY2012 after April 3 and higher flow measurements (Nos. 39-42). Rating No. 4 and 5 are both fairly well defined to about 40 cfs. Nineteen discharge measurements (Nos. 141 – 159) were made during the water year (Nos. 141-149 made before the low flow control washed out, and Nos. 150-159 made after). Measurements 141 - 147, 153 - 159 were observations of zero flow. Measurements ranged in discharge from 0.00 to 4.17 cfs. They cover the range in stage experienced, except for the higher daily flows of April 3 - 9, 2012. The peak discharge of 59.0 cfs occurred at 1845 April 5 at a gage height of 4.00 ft with a shift of +0.00 ft. It exceeded Measurement No 149, made April 10 by 1.12 feet in stage.

Discharge.-- Shifting control method was used the entire water year. Shifts were applied by stage from the beginning of the water year until 1445 March 29 using shift curve RACRSTCO11_1. During this period there was no flow until March 14. Shifts were then prorated by time with consideration of stage change from 1500 March 29 to end of the water year. Open water measurements indicated a shift of -0.17 ft (M 148) prior to the control washout. After the washout and the application of Rating 5, all open water measurements (M149-152) showed shifts of 0.00 ft. and were given full weight.

Special Computations.-- The control washout on April 3 caused an abrupt change in stage with a rapid increase due to debris pileup and then a rapid decrease as the washout occurred. Flows across this period (and for the day) were estimated by prorating from a -0.17 ft shift (Rtg 4) at the beginning of the rise) to a 0.00 ft shift (Rtg 5) at the peak of the event.

Remarks.-- The record should be considered fair to poor due to the quality of the measurements and the small discharges measured. The peak should be considered poor due to the lack of rating definition above flows of 40 cfs and large changes in channel conditions due to runoff events on April 3-6, 2012. Station maintained and record developed by Anthony D. Gutierrez.

Recommendations.-- Levels need to be run in Water Year 2013, due to the changes in the creek channel over the past two years. Need to re-establish PZF. A new rating needs to be evaluated after more measurements are made. Need to possibly install an artificial control to stabilize the channel and keep the well from isolating.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

RATON CREEK ABOVE STARKVILLE, CO

RATING TABLE.-- RACRSTCO04 USED FROM 01-OCT-2011 TO 03-APR-2012
 RACRSTCO05 USED FROM 03-APR-2012 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

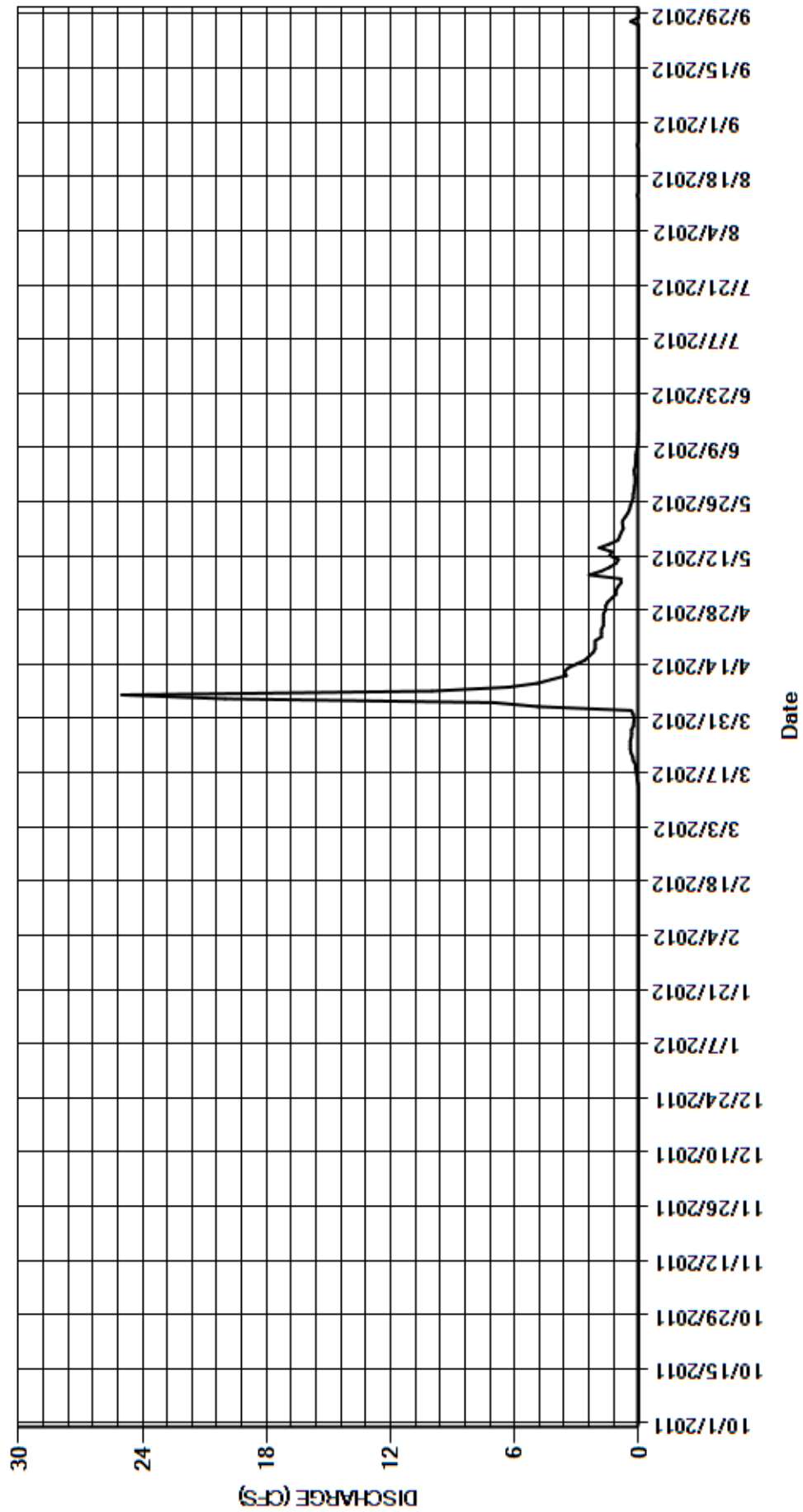
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	0.27	1.3	0.17	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.36	1.1	0.20	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	e4.9	1.1	0.23	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	7.0	1.0	0.17	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	20	0.85	0.15	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	25	0.87	0.14	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	10	2.4	0.14	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	6.3	1.8	0.10	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	4.9	1.4	0.06	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	4.2	1.1	0.03	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	3.5	0.98	0.02	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	3.6	1.4	0.01	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	3.4	1.3	0.01	0.00	0.06	0.00
14	0.00	0.00	0.00	0.00	0.00	0.02	3.0	1.9	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.07	2.6	1.4	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.09	2.4	1.0	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.12	2.2	0.92	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.15	2.1	0.84	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.16	2.1	0.74	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.26	2.1	0.78	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.29	1.8	0.78	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.37	1.8	0.65	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.41	1.8	0.52	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.41	1.7	0.44	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.41	1.7	0.40	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.36	1.7	0.32	0.00	0.00	0.06	0.00
27	0.00	0.00	0.00	0.00	0.00	0.34	1.7	0.26	0.00	0.00	0.00	0.39
28	0.00	0.00	0.00	0.00	0.00	0.35	1.6	0.26	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.25	1.6	0.22	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	---	0.24	1.5	0.20	0.00	0.00	0.00	0.00
31	0.00	---	0.00	0.00	---	0.23	---	0.17	---	0.00	0.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	4.53	126.83	28.40	1.43	0.00	0.12	0.39
MEAN	0.000	0.000	0.000	0.000	0.000	0.15	4.23	0.92	0.048	0.000	0.004	0.013
AC-FT	0	0	0	0	0	9.0	252	56	2.8	0	0.2	0.8
MAX	0.00	0.00	0.00	0.00	0.00	0.41	25	2.4	0.23	0.00	0.06	0.39
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.27	0.17	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	76.03	MEAN	0.21	MAX	0.93	MIN	0.00	AC-FT	151
WTR YR	2012	TOTAL	161.70	MEAN	0.44	MAX	25	MIN	0.00	AC-FT	321

MAX DISCH: 59 CFS AT 18:45 ON APR 05,2012 GH 4.00 FT SHIFT 0 FT
 MAX GH: 4.00 FT AT 18:45 ON APR 05,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

RATON CREEK ABOVE STARKVILLE, CO
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
07124500 PURGATOIRE RIVER AT TRINIDAD
Water Year 2012

Location.-- Lat. 37°10'21", Long. 104°30'27", in NW¼SE¼ sec. 13, T.33 S., R.64 W., Las Animas County, in city of Trinidad, on left bank. This is at the west end of the Commercial Street Bridge 20 feet upstream.

Drainage Area and Period of Record.-- 795 mi² (furnished by the US Army Corp of Engineers); Staff gage first established May 1, 1896. Partial records from May 1896 - Nov 1912. Continuous record from Nov 1921 to present.

Equipment.-- Sutron 8210 High Data Rate DCP (satellite monitored data collection platform) connected to a Sutron Constant Flow Bubbler Gage (CFB) inside a 4 ft x 4 ft steel shelter on the left bank above the main channel. The CFB is connected to an orifice line inside a 1.5-inch galvanized pipe, which is anchored to the bank extending down and into the channel. The 8210 DCP was replaced with a Sutron SatLink 2 DCP with high data-rate radio transmitter on May 9, 2012. The primary reference is a wire weight gage on the Commercial Street Bridge immediately downstream and in line with the orifice line and staff gage set in the streambed near the orifice. A Texas Electronics Series 525 rainfall sensor is also monitored by the DCP. No other changes were made this year.

Hydrologic Conditions.-- The gage is located in the city of Trinidad approximately 3.5 miles downstream of the Trinidad Lake Reservoir and 2.65 miles downstream from the confluence with Raton Creek. It is on a fairly straight section of channel above and below the gage at an elevation of 5992 feet above MSL. The left side of the channel consists of gravel and small cobble at the orifice pool with the right side having fairly heavy vegetation consisting of grass to trees above and below the bridge. The regulation of Trinidad reservoir greatly influences the flow at the gage in town, while Raton Creek is subject to flash flooding. A small amount of irrigation is above the gage as well as the intake pipes for the city of Trinidad water supply. Urban runoff can affect the gage.

Gage-Height Record.-- Primary record is the 15-minute transmitted data with DCP and CFB logs as backup. Record is complete and reliable, except for the following periods: December 25 - 31, 2011; January 7, 2012 when ice at or near the gage affected the stage-discharge relationship. November 2 - 8, 20 - 29, 2011; February 28 - March 12, March 25 - March 29, 2012 when beaver dams were constructed 20 - 30 feet below the gage and on April 27 - May 3 when trash had piled on the control. Missing data on April 5 and 6 was supplied from the DCP backup. Occasional bad data was filled in from the CFB data.

Datum Corrections.-- No levels were run this water year. Levels were last run June 21, 2007. No corrections needed.

Rating.-- The river channel consists of gravel to small cobble from the reservoir down to a diversion dam 500 feet below the gage. The control for low flows is a gravel riffle below the gage under the bridge. Medium flows of up to 400 - 500 cfs are controlled by the channel, with dense vegetation on either side, or the center pier of the bridge. High flows are confined on the right bank by a stone and masonry wall with dense vegetation starting 250 feet above the gage and downstream of the bridge which changes to a three foot high "river walk" wall on the right across from the gage and under the bridge and on the left bank by a gunite and rock wall up to the bridge to an elevation of ~11 feet (9000 cfs by USGS extension). Discharge of up to 9000 cfs can be contained under the Commercial Street Bridge, with higher flow coming out of the left bank and flooding the area immediately next to the river including the railroad tracks less than 40 feet from the river. Rating 28 was used the entire water year. Twenty-one measurements (Nos. 1309 - 1328) made during the water year ranged from 0.47 to 163 cfs. They cover the range in stage except for the lower daily flows on January 1, 20 - 26, 31; February 24, 26, 27; March 25 - 28 and the higher daily flows of May 16 - 28, 2012. The peak discharge of 352 cfs occurred at 0545 May 27, 2012 at a gage height of 3.14 ft with a shift of -0.12 ft. It exceeded measurement No. 1319 made May 15, 2012 by 0.53 feet in stage.

Discharge.-- Shifting control method was used all year. Shifts were applied as defined by measurements and were distributed by time and event through the water year. All measurements were made in open channel and were given full weight. Measurements 1310 to 1316 were made immediately after removal of beaver dams. Measurements this year showed shifts ranging from -0.22 feet to -0.09 feet.

Special Computations.-- Discharge during periods of ice and beaver dams were estimated using measurements 1311 - 1313, and hydrographic comparison with the Purgatoire River below Trinidad Reservoir gage. A man made dam was found and removed at M1328 on Sep 25. The observed change in gage height (-0.05 ft) after dam removal was applied as a datum correction to the previous day when the dam was suspected to have been built.

Remarks.-- Record is considered to be good during periods of open channel and fair to poor during periods of ice affected gage height record and beaver dams. Winter releases from Trinidad Reservoir often help reduce the amount of ice in the channel. This gage is reported in the State Surface Water Supply Index Monthly Report. This report is used as an indicator of mountain-based water supply conditions in the major river basins of the state. Station maintained and record developed by Anthony D. Gutierrez PS/ET II.

Recommendations.-- Shifts have continued to be negative this water year, mainly due to the amount of beaver activity in the river. The riffle below the gage has increased in height as a result of the beavers adding rocks when building dams. Arrangements should be made to mitigate the amount of beaver "influence" in the river. During good record and measurement periods a new rating should be considered.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

07124500 PURGATOIRE RIVER AT TRINIDAD

RATING TABLE.-- PURTRICO28 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

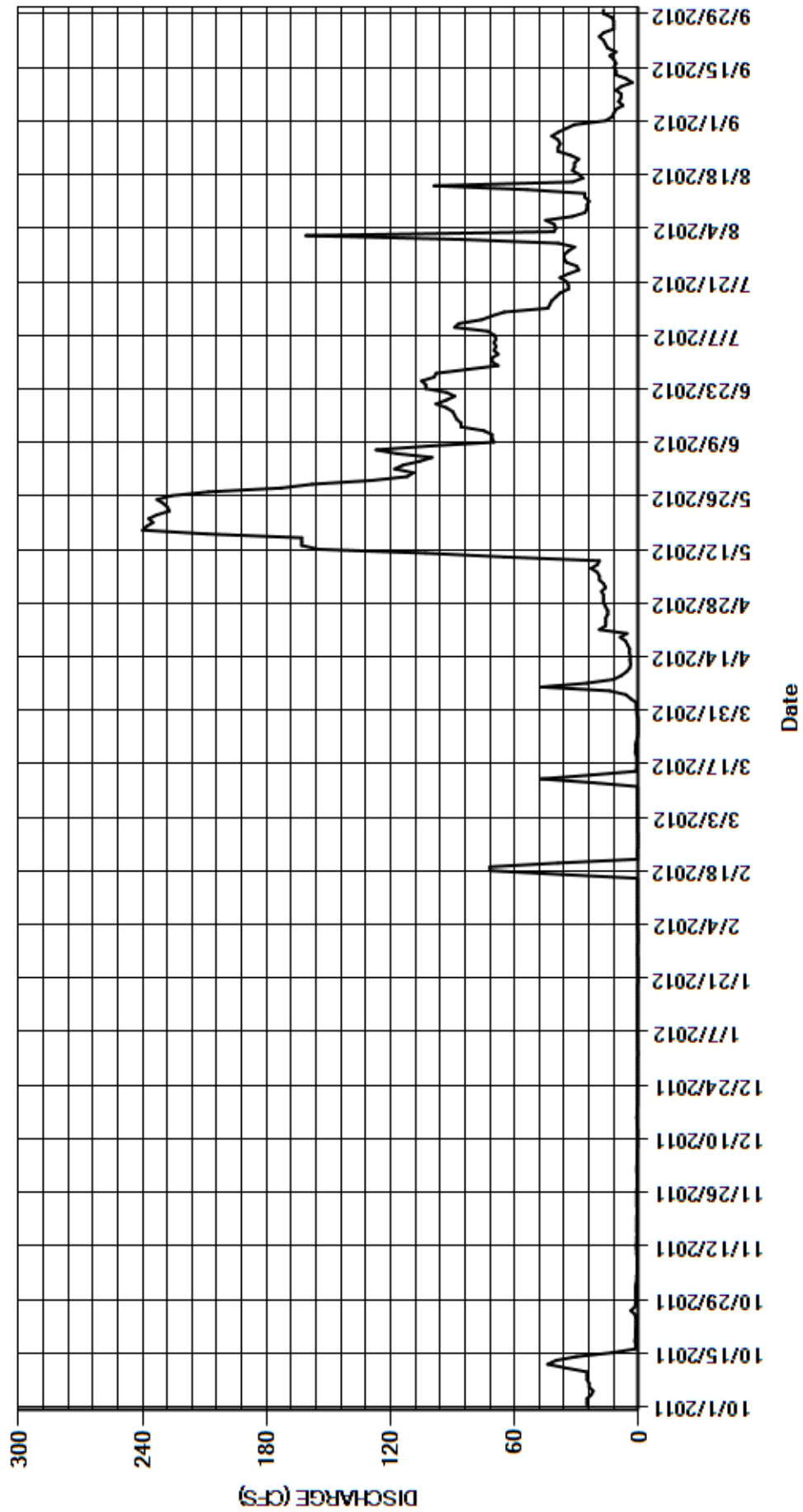
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	25	1.6	0.89	0.45	0.48	e0.52	1.1	e18	109	71	86	16
2	25	e1.3	0.89	0.50	0.47	e0.52	1.3	e16	118	68	161	13
3	25	e1.0	0.88	0.49	0.56	e0.52	4.0	e17	114	70	41	12
4	23	e1.0	0.80	0.48	0.55	e0.56	6.2	19	106	69	40	11
5	22	e0.75	0.77	0.50	0.53	e0.56	14	19	100	70	41	7.6
6	24	e0.85	0.88	0.62	0.50	e0.57	47	20	117	69	45	9.7
7	24	e0.85	0.76	e0.63	0.57	e0.57	25	23	127	70	32	8.6
8	25	e0.85	0.57	0.63	0.53	e0.60	12	20	101	73	26	8.5
9	25	0.85	0.54	0.53	0.57	e0.60	8.4	19	70	89	25	11
10	25	1.0	0.60	0.56	0.55	e0.64	5.9	65	71	87	25	8.3
11	35	1.1	0.60	0.57	0.49	e0.64	4.3	103	71	76	24	3.1
12	44	1.2	0.56	0.52	0.62	e22	3.9	155	75	71	26	6.1
13	40	1.0	0.80	0.52	0.59	47	4.2	163	86	65	26	11
14	30	0.98	0.75	0.51	0.54	23	4.1	163	86	44	54	11
15	13	0.86	0.89	0.48	0.56	1.3	4.5	163	88	43	99	12
16	1.7	0.97	0.89	0.49	0.66	1.0	4.4	209	89	42	32	11
17	1.3	0.94	0.77	0.59	37	0.97	5.4	240	90	40	27	12
18	1.8	0.89	0.72	0.62	72	1.0	6.3	238	93	38	29	14
19	1.6	0.89	0.62	0.60	72	1.1	8.9	235	98	34	32	11
20	1.6	e0.90	0.70	0.34	39	1.7	5.7	237	93	34	31	15
21	1.5	e0.85	0.66	0.38	0.56	1.4	19	233	89	35	31	16
22	1.4	e0.87	0.57	0.45	0.50	1.5	16	227	93	38	29	17
23	1.4	e0.86	0.55	0.44	0.64	1.0	16	228	103	34	33	19
24	1.4	e0.90	0.55	0.43	0.45	0.54	16	230	103	29	39	17
25	1.8	e0.90	e0.55	0.44	0.48	e0.30	15	233	105	30	39	12
26	3.8	e0.88	e0.56	0.43	0.43	e0.35	15	226	99	35	38	12
27	1.8	e0.86	e0.56	0.55	0.43	e0.37	e16	208	98	36	39	12
28	1.5	e0.82	e0.55	0.49	e0.50	e0.37	e17	173	83	36	42	13
29	1.4	e0.83	e0.55	0.52	e0.50	e0.50	e17	158	68	34	39	17
30	1.6	0.85	e0.55	0.50	---	0.96	e17	129	71	31	35	17
31	1.6	---	e0.55	0.44	---	1.1	---	112	---	39	31	---
TOTAL	432.2	28.40	21.08	15.70	233.26	113.76	340.6	4299	2814	1600	1297	363.9
MEAN	13.9	0.95	0.68	0.51	8.04	3.67	11.4	139	93.8	51.6	41.8	12.1
AC-FT	857	56	42	31	463	226	676	8530	5580	3170	2570	722
MAX	44	1.6	0.89	0.63	72	47	47	240	127	89	161	19
MIN	1.3	0.75	0.54	0.34	0.43	0.30	1.1	16	68	29	24	3.1

CAL YR	2011	TOTAL	11509.12	MEAN	31.5	MAX	171	MIN	0.54	AC-FT	22830
WTR YR	2012	TOTAL	11558.90	MEAN	31.6	MAX	240	MIN	0.30	AC-FT	22930

MAX DISCH: 352 CFS AT 05:45 ON MAY 27,2012 GH 3.14 FT SHIFT -0.12 FT
 MAX GH: 3.14 FT AT 05:45 ON MAY 27,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

07124500 PURGATOIRE RIVER AT TRINIDAD
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
07126500 PURGATOIRE RIVER AT NINEMILE DAM NEAR HIGBEE

Water Year 2012

Location.-- Lat. 37°42'53", Long. 103°30'38", in NW¼ sec. 7, T.27 S., R.54 W., Otero County, Hydrologic Unit 11020010, on left bank at Ninemile Dam, 4 mi southwest of Higbee, and 5.5 mi upstream from Smith Canyon. Prior to Apr. 21, 1978 gage located 850 ft, upstream.

Drainage Area and Period of Record.-- 2,752 mi²;

Equipment.-- Sutron Satlink 2 high data rate satellite-monitored data collection platform (DCP) with a Sutron constant flow bubbler sensor (CFB) in a 4 ft x 4 ft steel shelter. The primary gage is an outside drop tape from a reference point on a steel "I" beam on the wall face between Ninemile Dam and the Ninemile Canal headgate. Control is the Ninemile Diversion Dam. No changes were made this water year.

Hydrologic Conditions.-- Characteristics within the basin include uplands and hills forested with pine and juniper trees. Rolling short-grass prairie lies between the uplands and the canyons. Livestock grazing exists in the watershed. Rock cliffs are exposed along the 400- to 500- foot deep Purgatoire River canyon, and riparian vegetation grows along the bottom of incised reaches of the major tributaries near their confluence with the Purgatoire River. The months of November through March tend to produce little runoff because precipitation is mainly snow. Sublimation and slow melting remove water from the snowpack during warm periods of the winter. These processes might increase soil moisture but they also decrease the volume of surface water. Precipitation from April through October generally is in the form of snow that melts rapidly or high intensity-short duration rainfall, which produces the vast majority of the streamflow in the tributaries. Snowmelt from the mountains generally produces high flow in the Purgatoire River during the months May through June and storm runoff also generates streamflow. The Purgatoire River will generally convey the most streamflow in August. Typically, the increased streamflows in August were a result of mountain snowmelt stored in upstream reservoirs that was subsequently released for downstream irrigation needs. The August increased streamflows also may be a result of convective storms that commonly occur during the late July through August summer monsoon. The influence of urbanization and over grazing provides the largest affect to the runoff regime.

Gage-Height Record.-- Primary record is 15-minute satellite-monitored constant flow bubbler data with DCP log backup. Record is complete and reliable, except for the following periods: November 8 and March 11, missing values due to time change; May 13-14, due to missing transmissions; and January 9, 12, due to ice effect. Missing data were filled in using observed stable and adjacent gage height data without loss of accuracy. Primary stage sensor calibration to reference gage was supported by 29 site visits this water year, 16 of which were physical measurements.

Datum Corrections.-- Levels were last run Aug 22, 2008.

Rating.-- The control is the Ninemile Canal diversion dam which is constructed of wood timbers. Data for the stage-discharge relationship at this location is based on stage data collected on the upstream side of the diversion dam and discharge measurements made below the dam. Observations of zero flow past the dam are corroborated by measurements in the channel below the dam. Upstream from the dam, water will pond in bedrock pockets and holes. At low to medium flows, debris will collect along the dam and will clear at higher flows, thus changing the shift. Rating No.17 was developed on October 5, 1998 and was used the entire water year. Rating No. 17 is well defined to about 500 cfs. Sixteen discharge measurements (Nos. 1037-1052) were made ranging in discharge from 0 to 18.6 cfs. WY2012 measurements covered the range in stage experienced except for the higher daily flows of March 16, April 7-12, May 13-17, and June 8-9. The instantaneous peak flow of 420 cfs occurred at 0145 on May 15, 2012 at a gage height of 3.87 ft with a shift of 0.04 ft. It exceeded the stage of measurement No. 1041, made January 19, 2012, by 0.83 feet.

Discharge.-- Shifting control method was used for the entire water year. Shifts were distributed by time for the period October 1 to 5, 2011 and by stage using variable shift curves PURNINCOVSC12 A and VSC12B for the remainder of the water year. All measurements were given full weight and applied directly. Msmt No. 1039 and 1042 were visually estimated and carried no weight in determining VSC geometry. Shifts computed from observations of zero flow were applied to periods of low or no flow.

Special Computations.-- Flows during periods of ice effect were estimated using air temperature data from Division of Water Resources ARKLAJCO temperature gage located approximately 19.05 miles north from the gage and a gage visit.

Remarks.-- Record fair, except during periods flows over 500 cfs and ice days, which should be considered poor. Since the peak was below 500 cfs (420 cfs) and no recent measurements have been conducted at similar flows, the peak was rated fair. The record for total flow in the river at this location is computed by adding Ninemile Canal flows to this record. Station maintained and record developed by Garrett Markus.

Recommendations.-- High flows have not been measured at or near the gage due to a lack of facilities. Recommend installation of a bank operated cableway. Periods of trickle flows can occur when water elevation is below Constant Flow Bubbler orifice line. Recommend that orifice conduit and line be lowered to accommodate these circumstances. Run levels in WY2013.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

07126500 PURGATOIRE RIVER AT NINEMILE DAM NEAR HIGBEE

RATING TABLE-- PURNINCO17 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

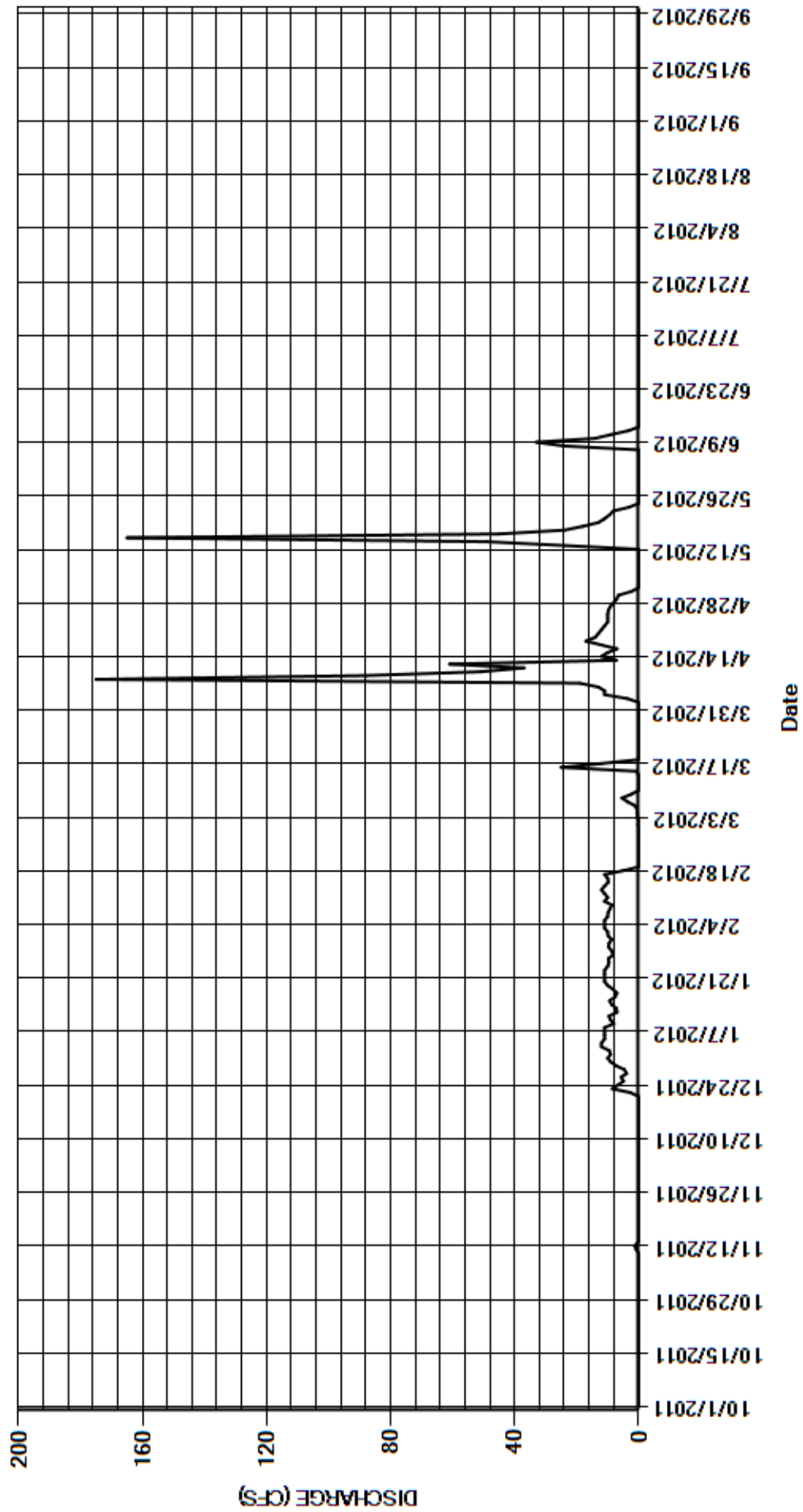
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	9.1	9.9	0.15	0.00	2.3	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	9.5	10	0.03	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	12	11	0.42	3.8	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	12	11	0.45	11	0.00	0.00	0.00	0.00	0.00
5	0.00	0.01	0.00	11	11	0.55	11	0.00	0.00	0.00	0.00	0.00
6	0.01	0.00	0.00	11	10	1.2	13	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	11	9.9	3.6	19	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	11	9.3	5.4	175	0.00	24	0.00	0.00	0.00
9	0.00	0.00	0.00	e8.0	8.6	2.3	88	0.00	33	0.00	0.00	0.00
10	0.00	0.00	0.00	9.1	11	0.00	51	0.00	14	0.00	0.00	0.00
11	0.00	0.80	0.00	9.6	10	0.00	37	0.00	8.8	0.00	0.00	0.00
12	0.00	1.3	0.00	e7.0	11	0.00	61	0.00	3.3	0.00	0.00	0.00
13	0.00	0.00	0.00	7.2	12	0.00	7.2	24	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	8.7	11	0.00	12	49	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	9.4	9.8	0.68	10	165	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	7.6	10	25	7.0	45	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	7.0	11	12	12	24	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	8.3	5.1	0.12	17	18	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	10	0.00	0.00	14	13	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	11	0.00	0.00	13	11	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	11	0.00	0.00	12	9.4	0.00	0.00	0.00	0.00
22	0.00	0.00	2.7	11	0.00	0.00	11	8.2	0.00	0.00	0.00	0.00
23	0.00	0.00	8.5	11	0.00	0.00	10	3.1	0.00	0.00	0.00	0.00
24	0.00	0.00	6.7	10	0.00	0.00	10	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	4.9	9.6	0.00	0.00	10	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	5.7	9.8	0.00	0.00	9.8	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	3.9	8.2	0.00	0.00	9.2	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	4.6	8.7	0.03	0.00	8.1	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	7.2	9.7	0.00	0.00	7.1	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	9.0	9.6	---	0.00	6.5	0.00	0.00	0.00	0.00	0.00
31	0.00	---	10	8.7	---	0.00	---	0.00	---	0.00	0.00	---
TOTAL	0.01	2.11	63.20	296.8	181.63	51.90	655.70	372.00	83.10	0.00	0.00	0.00
MEAN	0.0003	0.070	2.04	9.57	6.26	1.67	21.9	12.0	2.77	0.000	0.000	0.000
AC-FT	.02	4.2	125	589	360	103	1300	738	165	0	0	0
MAX	0.01	1.3	10	12	12	25	175	165	33	0.00	0.00	0.00
MIN	0.00	0.00	0.00	7.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	2061.01	MEAN	5.65	MAX	359	MIN	0.00	AC-FT	4090
WTR YR	2012	TOTAL	1706.45	MEAN	4.66	MAX	175	MIN	0.00	AC-FT	3380

MAX DISCH: 420 CFS AT 01:45 ON MAY 15,2012 GH 3.87 FT SHIFT 0.04 FT
 MAX GH: 3.87 FT AT 01:45 ON MAY 15,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

07126500 PURGATOIRE RIVER AT NINEMILE DAM NEAR HIGBEE
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
NINEMILE CANAL AT NINEMILE DAM NEAR HIGBEE
Water Year 2012

Location.-- Lat. 37°42'53", Long. 103°30'38", in NW¼ sec. 7, T.27 S., R.54 W., Otero County.

Drainage Area and Period of Record.-- N/A.;

Equipment.-- Float-activated graphic water-stage recorder, SDI shaft encoder, and a High Data Rate Sutron SatLink 2 V2 DCP in a 3 ft by 3 ft steel shelter with well. Six-foot standard concrete Parshall flume is the control. Primary reference gage is outside staff gage installed in flume. The Satlink was upgraded to a Satlink 2 V2 on July 26, 2012. No other changes were made this water year.

Hydrologic Conditions.-- The Ninemile Canal diverts water from the Purgatoire River approximately 75 miles downstream from Trinidad Reservoir. The basin as a whole encompasses approximately 2752 square miles with nearly 18 percent of the basin above 7500 feet in elevation and the mean elevation at 6270 feet. Mean annual precipitation for the basin is approximately 16.8 inches. The influence of urbanization in the basin along with reservoir operations and irrigation practices provides the largest affect to the runoff regime. No changes evident this water year.

Gage-Height Record.-- Primary record is 15-minute satellite data with the graphic chart recorder and DCP log used for backup purposes. Record is complete and reliable. Missing unit value gage height data were filled in on March 11--4 values (change to DST); May 7--21 values; May 8--18 values; May 12, 14-15--4 values each; and July 26--4 values using the flat gage height record trend before and after each period, without loss of accuracy. The shaft encoder float is observed to "beach:" on silt and mud accumulation in the bottom of stilling well at a gage height of 0.05 ft. Thus, operationally flow is zero for gage heights of 0.05 ft and below.

Datum Corrections.-- No levels were run to the flume this water year.

Rating.-- Control is a standard 6-ft concrete Parshall Flume. A standard 6-foot Parshall flume rating was used the entire water year. No discharge measurements were made this water year. The peak discharge of 36.5 cfs occurred at 2230 on March 15, 2012 at a gage height of 1.30 ft with a shift of 0.00 ft.

Discharge.-- No discharge measurements were made this water. Historically, measurements have been adjusted to a zero shift at this structure. Discharge record was computed by direct application of the rating to the corrected gage height record.

Special Computations.--

Remarks.-- Record is fair due to lack of measurements. The peak flow and gage height are rated fair due to lack of measurements. Station maintained and record developed by Garrett Markus.

Recommendations.-- Discharge measurements should be scheduled once per year during the irrigation season to verify the accuracy of the standard rating table. Additionally, a levels survey and flume inspection should be completed to verify the condition of the flume.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

NINEMILE CANAL AT NINEMILE DAM NEAR HIGBEE

RATING TABLE-- STD06FTPF USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

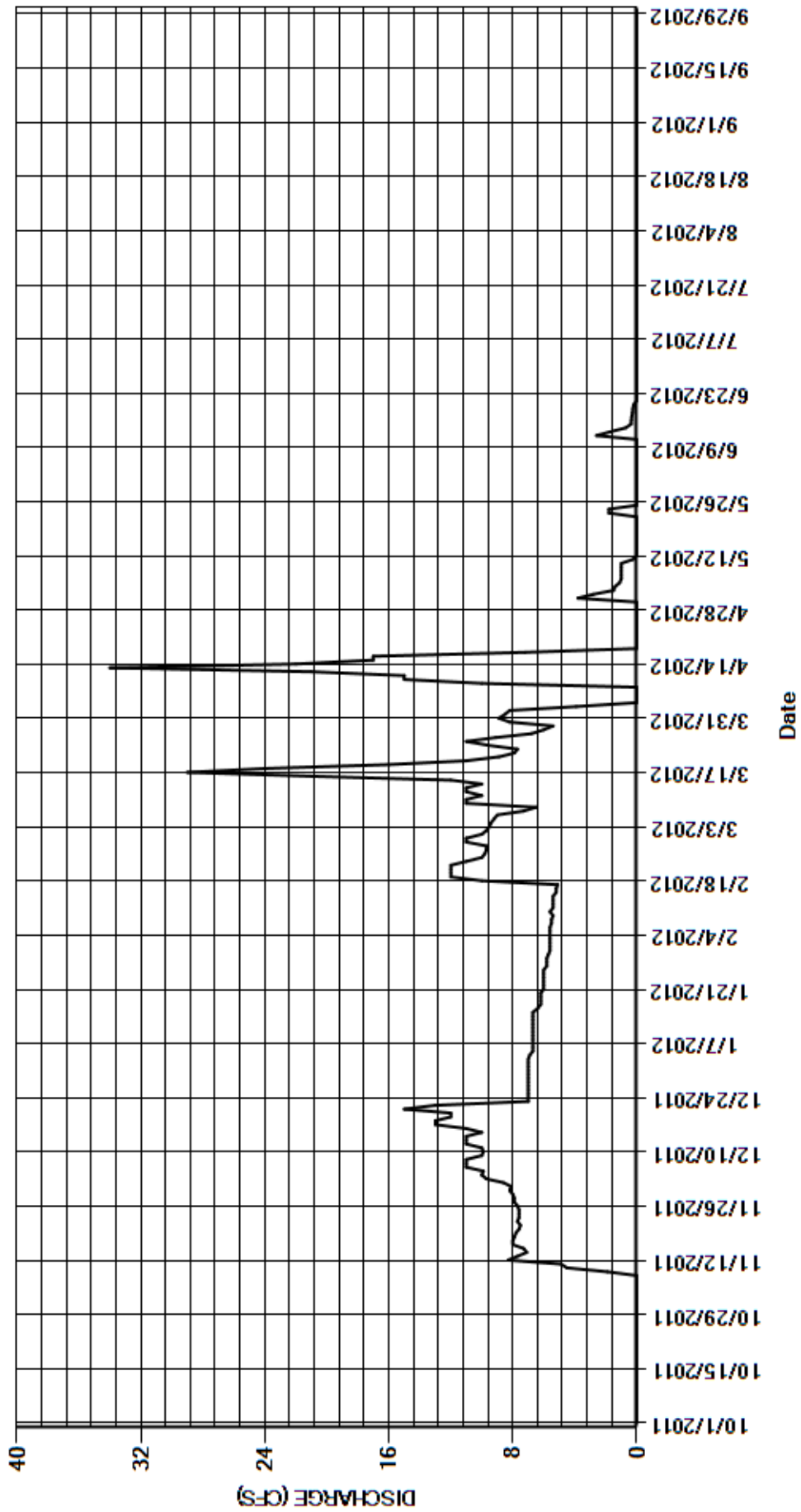
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	8.1	7.0	5.6	10	8.5	3.8	0.00	0.00	0.00	0.00
2	0.00	0.00	8.6	7.0	5.6	9.7	8.2	2.8	0.00	0.00	0.00	0.00
3	0.00	0.00	9.7	7.0	5.6	9.5	3.9	1.5	0.00	0.00	0.00	0.00
4	0.00	0.00	10	6.9	5.6	9.4	0.00	1.4	0.00	0.00	0.00	0.00
5	0.00	0.00	9.9	6.7	5.6	9.2	0.00	1.1	0.00	0.00	0.00	0.00
6	0.00	0.00	11	6.7	5.6	9.0	0.00	1.0	0.00	0.00	0.00	0.00
7	0.00	0.00	11	6.7	5.5	7.3	0.00	1.0	0.00	0.00	0.00	0.00
8	0.00	0.00	11	6.7	5.5	6.5	0.00	1.0	0.00	0.00	0.00	0.00
9	0.00	1.9	10	6.7	5.4	11	10	1.0	0.00	0.00	0.00	0.00
10	0.00	4.5	9.9	6.7	5.6	11	15	0.99	0.00	0.00	0.00	0.00
11	0.00	4.9	10	6.7	5.4	10	15	0.26	0.00	0.00	0.00	0.00
12	0.00	8.3	11	6.7	5.4	11	21	0.00	2.6	0.00	0.00	0.00
13	0.00	7.7	11	6.7	5.4	11	34	0.00	1.7	0.00	0.00	0.00
14	0.00	7.1	11	6.7	5.4	10	22	0.00	0.71	0.00	0.00	0.00
15	0.00	7.3	10	6.7	5.2	12	17	0.00	0.36	0.00	0.00	0.00
16	0.00	8.0	11	6.4	5.2	21	17	0.00	0.35	0.00	0.00	0.00
17	0.00	8.0	13	6.2	5.1	29	7.2	0.00	0.32	0.00	0.00	0.00
18	0.00	7.9	13	6.2	10	24	0.00	0.00	0.27	0.00	0.00	0.00
19	0.00	7.8	12	6.2	12	16	0.00	0.00	0.25	0.00	0.00	0.00
20	0.00	7.6	12	6.2	12	11	0.00	0.00	0.20	0.00	0.00	0.00
21	0.00	7.5	15	6.0	12	8.9	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	7.7	13	6.0	12	7.9	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	7.6	7.0	6.0	11	7.7	0.00	1.8	0.00	0.00	0.00	0.00
24	0.00	7.6	7.0	6.0	10	9.6	0.00	1.8	0.00	0.00	0.00	0.00
25	0.00	7.6	7.0	6.0	9.8	11	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	7.7	7.0	6.0	9.7	9.1	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	7.9	7.0	5.8	9.7	6.8	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	7.9	7.0	5.8	11	6.0	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	8.0	7.0	5.8	11	5.4	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	8.2	7.0	5.7	---	8.2	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	---	7.0	5.6	---	8.9	---	0.00	---	0.00	0.00	---
TOTAL	0.00	158.70	304.2	197.5	222.9	337.1	178.80	19.45	6.76	0.00	0.00	0.00
MEAN	0.000	5.29	9.81	6.37	7.69	10.9	5.96	0.63	0.23	0.000	0.000	0.000
AC-FT	0	315	603	392	442	669	355	39	13	0	0	0
MAX	0.00	8.3	15	7.0	12	29	34	3.8	2.6	0.00	0.00	0.00
MIN	0.00	0.00	7.0	5.6	5.1	5.4	0.00	0.00	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	3007.62	MEAN	8.24	MAX	61	MIN	0.00	AC-FT	5970
WTR YR	2012	TOTAL	1425.41	MEAN	3.89	MAX	34	MIN	0.00	AC-FT	2830

MAX DISCH: 36.5 CFS AT 22:30 ON MAR 15,2012 GH 1.30 FT SHIFT 0 FT
 MAX GH: 1.30 FT AT 22:30 ON MAR 15,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

**NINEMILE CANAL AT NINEMILE DAM NEAR HIGBEE
WY2012 HYDROGRAPH**



ARKANSAS RIVER BASIN
PURGATOIRE RIVER AT NINEMILE DAM, NEAR HIGBEE (C)
Water Year 2012

Location.-- Combined record from Purgatoire River at Ninemile Dam and Ninemile Canal below Ninemile Dam gages both located at Lat 37°42'53", long 103°30'38", in NW¼ sec. 7, T.27 S., R.54 W., Otero County, Hydrologic Unit 11020010, on left bank at Ninemile Dam, 4 mi southwest of Higbee, and 5.5 mi upstream from Smith Canyon.

Drainage Area and Period of Record.-- 2,752 mi²;

Equipment.-- See individual records for gage equipment descriptions.

Hydrologic Conditions.-- See individual station analyses.

Gage-Height Record.-- See individual records for gage height record analyses.

Datum Corrections.-- See individual station analyses.

Rating.-- See individual station analyses.

Discharge.-- The combined record of discharges was obtained by the addition of daily flows from the Ninemile Canal to the corresponding daily flows in the Purgatoire River at Ninemile Dam. The peak unit value combined discharge for the year was 420 cfs at 0145 on May 15, 2012. See individual station analyses.

Special Computations.--

Remarks.-- Combined record is fair, except record should be considered poor during periods of estimated flow and during periods where discharge in the river exceeds 500 cfs, above which the rating has not been verified by measurements. See individual records for more details. Record developed by Div. 2 hydrographic staff.

Recommendations.--

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

PURGATOIRE RIVER AT NINEMILE DAM, NEAR HIGBEE (C)

RATING TABLE.--

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

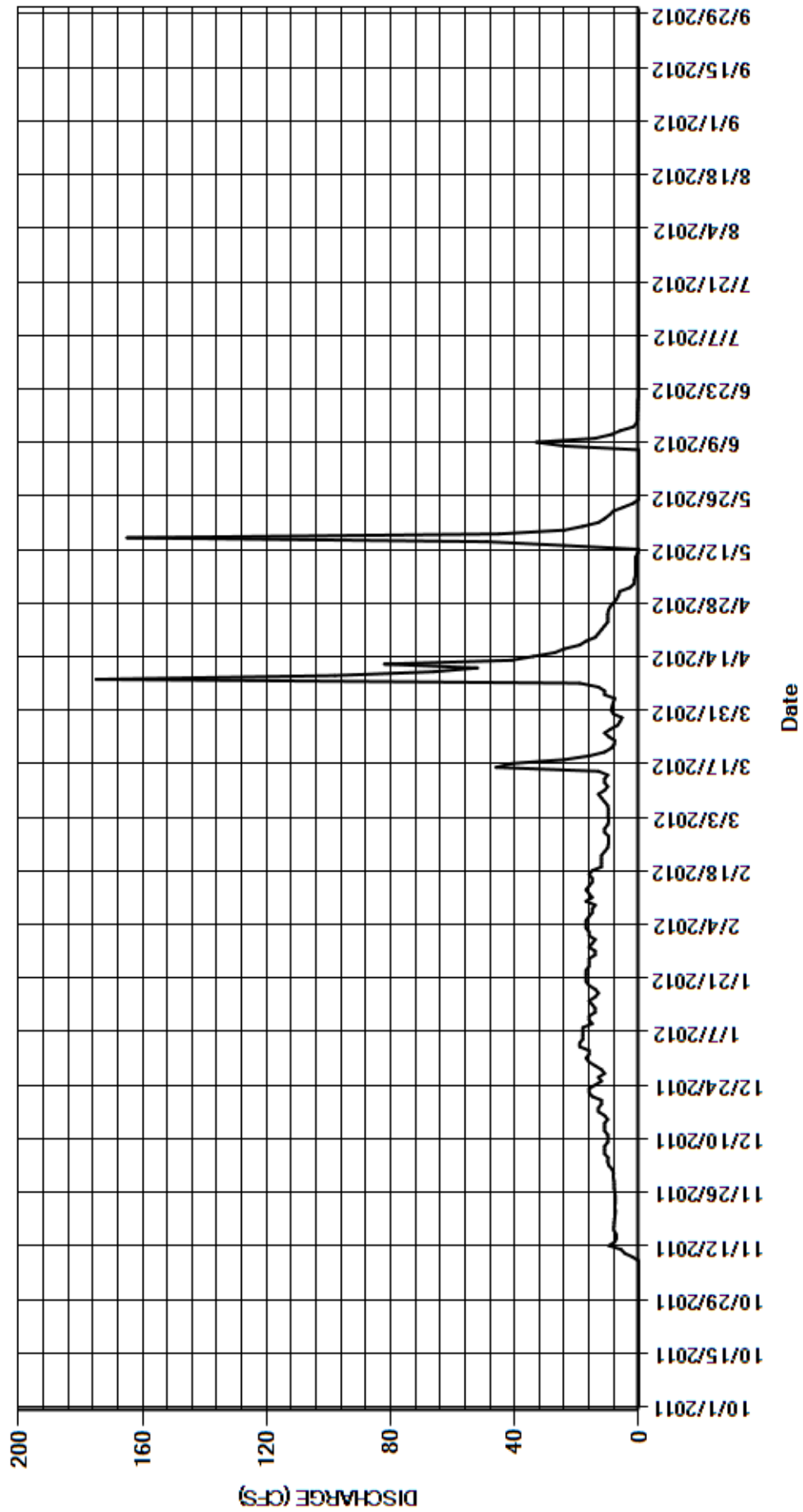
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	8.1	16	16	10	8.5	6.1	0.00	0.00	0.00	0.00
2	0.00	0.00	8.6	16	16	9.7	8.2	2.8	0.00	0.00	0.00	0.00
3	0.00	0.00	9.7	19	17	9.9	7.7	1.5	0.00	0.00	0.00	0.00
4	0.00	0.00	10	19	17	9.8	11	1.4	0.00	0.00	0.00	0.00
5	0.00	0.01	9.9	18	17	9.8	11	1.1	0.00	0.00	0.00	0.00
6	0.01	0.00	11	18	16	10	13	1.0	0.00	0.00	0.00	0.00
7	0.00	0.00	11	18	15	11	19	1.0	0.00	0.00	0.00	0.00
8	0.00	0.00	11	18	15	12	175	1.0	24	0.00	0.00	0.00
9	0.00	1.9	10	e15	14	13	98	1.0	33	0.00	0.00	0.00
10	0.00	4.5	9.9	16	17	11	66	0.99	14	0.00	0.00	0.00
11	0.00	5.7	10	16	15	10	52	0.26	8.8	0.00	0.00	0.00
12	0.00	9.6	11	e14	16	11	82	0.00	5.9	0.00	0.00	0.00
13	0.00	7.7	11	14	17	11	41	24	1.7	0.00	0.00	0.00
14	0.00	7.1	11	15	16	10	34	49	0.71	0.00	0.00	0.00
15	0.00	7.3	10	16	15	13	27	165	0.36	0.00	0.00	0.00
16	0.00	8.0	11	14	15	46	24	45	0.35	0.00	0.00	0.00
17	0.00	8.0	13	13	16	41	19	24	0.32	0.00	0.00	0.00
18	0.00	7.9	13	14	15	24	17	18	0.27	0.00	0.00	0.00
19	0.00	7.8	12	16	12	16	14	13	0.25	0.00	0.00	0.00
20	0.00	7.6	12	17	12	11	13	11	0.20	0.00	0.00	0.00
21	0.00	7.5	15	17	12	8.9	12	9.4	0.00	0.00	0.00	0.00
22	0.00	7.7	16	17	12	7.9	11	8.2	0.00	0.00	0.00	0.00
23	0.00	7.6	16	17	11	7.7	10	4.9	0.00	0.00	0.00	0.00
24	0.00	7.6	14	16	10	9.6	10	1.8	0.00	0.00	0.00	0.00
25	0.00	7.6	12	16	9.8	11	10	0.00	0.00	0.00	0.00	0.00
26	0.00	7.7	13	16	9.7	9.1	9.8	0.00	0.00	0.00	0.00	0.00
27	0.00	7.9	11	14	9.7	6.8	9.2	0.00	0.00	0.00	0.00	0.00
28	0.00	7.9	12	14	11	6.0	8.1	0.00	0.00	0.00	0.00	0.00
29	0.00	8.0	14	16	11	5.4	7.1	0.00	0.00	0.00	0.00	0.00
30	0.00	8.2	16	15	---	8.2	6.5	0.00	0.00	0.00	0.00	0.00
31	0.00	---	17	14	---	8.9	---	0.00	---	0.00	0.00	---
TOTAL	0.01	160.81	369.2	494	405.2	388.7	834.1	391.45	89.86	0.00	0.00	0.00
MEAN	0.0003	5.36	11.9	15.9	14.0	12.5	27.8	12.6	3.00	0.000	0.000	0.000
AC-FT	.02	319	732	980	804	771	1650	776	178	0	0	0
MAX	0.01	9.6	17	19	17	46	175	165	33	0.00	0.00	0.00
MIN	0.00	0.00	8.1	13	9.7	5.4	6.5	0.00	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	5068.00	MEAN	13.9	MAX	370	MIN	0.00	AC-FT	10050
WTR YR	2012	TOTAL	3133.33	MEAN	8.56	MAX	175	MIN	0.00	AC-FT	6210

MAX DISCH: 420 CFS AT 01:45 ON MAY 15,2012
 MAX GH: 0.00 FT

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

PURGATOIRE RIVER AT NINEMILE DAM, NEAR HIGBEE (C)
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
PURGATOIRE RIVER BLW HIGHLAND DAM NR LAS ANIMAS

Water Year 2012

Location.-- Lat. 37°54'03", Long. 103°17'56" (Hackamore Ranch, CO Quadrangle, Scale 1:24,000), NE1/4, SW1/4, Section 1, T25S, R53W. On the left bank approximately ¼ mile downstream of the Highland Canal Diversion Dam, Bent County, 11 mi southwest of Las Animas, Colorado.

Drainage Area and Period of Record.-- 3320 sq.mi.; WY2001 to present.

Equipment.-- Sutron Constant Flow Bubbler water level sensor and a Satlink 2 satellite-monitored DCP installed in a 4 ft x 4 ft steel shelter. Primary reference gage is a drop tape gage referenced to the top of "C" channel attached to face of concrete flood block on left channel bank holding bubbler orifice line. No changes were made this water year.

Hydrologic Conditions.-- Drainage basin characteristics within the basin include uplands and hills forested with pine and juniper trees. Rolling short-grass prairie lies between the uplands and the canyons. Livestock grazing exists in the watershed. Rock cliffs are exposed along the 400- to 500- foot deep Purgatoire River canyon, and riparian vegetation grows along the bottom of incised reaches of the major tributaries near their confluence with the Purgatoire River. The months of November through March tend to produce little runoff because precipitation is mainly snow. Sublimation and slow melting remove water from the snowpack during warm periods of the winter. These processes might increase soil moisture but they also decrease the volume of surface water. Precipitation from April through October generally is in the form of snow that melts rapidly or high intensity-short duration rainfall, which produces the vast majority of the streamflow in the tributaries. Snowmelt from the mountains generally produces high flow in the Purgatoire River during the months May through June and storm runoff also generates streamflow. The Purgatoire River will generally convey the most streamflow in August. Typically, the increased streamflows in August were a result of mountain snowmelt stored in upstream reservoirs that was subsequently released for downstream irrigation needs. The August increased streamflows also may be a result of convective storms that commonly occur during the late July through August summer monsoon. The influence of urbanization and over grazing provides the largest affect to the runoff regime.

Gage-Height Record.-- Primary record is 15-minute satellite-monitored constant flow bubbler data with DCP log backup. Record is complete and reliable, except for the following periods of missing data: March 11, March 21-22. The stage-discharge relationship was affected by ice during the periods Dec 2-16 and Feb 11-14. Primary stage sensor calibration to reference gage is supported by 25 visits and 16 measurements made this water year. Five instrumentation calibration corrections ranging from -0.05 ft to +0.02 ft were applied to the gage height record.

Datum Corrections.-- Levels were last run August 22, 2008 to the water surface and the drop tape RP using RM No. 1 as base. No corrections were required.

Rating.-- The control at low to medium flows (up to 500 cfs) is the primary channel with silt, sand, gravel and cobble bed and earthen banks. Bank vegetation of variable density in secondary overbank areas (primarily left side) affects flows above 500 cfs considerably. Rating No. 3, dated October 1, 2003 was used from the beginning of the water year to January 19, 2012. Rating No. 4 was used from this point to the end of the water year. Rating 4 is identical to Rating No. 3 except it was extended (straight line extension in log-log coordinates) to capture peak flows experienced during the water year. Rating 3 and 4 are well-defined to approximately 500 cfs, which is considered to be the primary channel capacity. Above 500 cfs, flow spills out of the channel and the control changes – this portion of the rating is based on a channel survey. Sixteen discharge measurements (Nos. 186 – 201) were made during the water year ranging from 0.00 to 130 cfs. Measurements cover the range in stage experienced except for the following higher flow days: Apr 12, 2012. The peak discharge of 7100 cfs occurred at 1700 on April 12, 2012 at a gage height of 11.54 ft with a shift of -0.27 ft. It exceeded the stage of maximum flow measurement for the water year (No. 194) made on May 14, 2012) by 8.52 ft.

Discharge.-- Shifting control method was used for the entire water year. Shifts were distributed throughout the water year using the following methods: From 0000 Oct 1 – 1100 Oct 5, variable stage-shift relationship PURHILCOVSC02B was continued in use from water year 2011. Shifts were prorated by time from this point to 1100 Dec 9 (Msmt No.188). Shifts were distributed by stage using variable stage shift relationship PURHILCOVSC12A from 1115 Dec 9 to the local peak of the flow event on May 5. VSC12A is based on measurements made during the period of application. Measurement Nos. 189-194 were discounted from -4.77% to +4.17% to fit the trends and smooth the variable stage-shift relationship. On the recession limb of the flow event, shifts were prorated to May 24 (Msmt No. 195) between VSC12A and variable stage shift relationship PURHILCOVSC12B. VSC12B was then used to the end of the water year to distribute shifts by stage. All measurements used to develop VSC12B were given full weight.

Special Computations.-- Discharges during ice-affected periods were determined by examination of Las Animas NOAA air temperature data; trends in gage height before, during, and after ice affected periods; and comparison with flows at upstream gage Purgatoire River at Ninemile Dam (PURNINCO). Missing data was replaced in most cases with DCP log data when applicable. On days when the log data were also missing, the missing unit values were interpolated between two good values before and after the period of missing data. Gage heights were stable during these periods.

Remarks.-- Record fair, except during periods when flows were estimated and when flows exceed 500 cfs, which should be considered poor. The peak flow for the water year is also poor due to the lack of rating definition. No facilities exist at the gage to measure flows above about 500 cfs. Station maintained and record developed by Garrett Markus.

Recommendations.-- High flows have not been measured at or near the gage due to a lack of facilities. Recommend installation of a bank operated cableway. Levels need to be run in WY2013.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

PURGATOIRE RIVER BLW HIGHLAND DAM NR LAS ANIMAS

RATING TABLE.-- PURHILCO03 USED FROM 01-OCT-2011 TO 19-JAN-2012
 PURHILCO04 USED FROM 19-JAN-2012 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

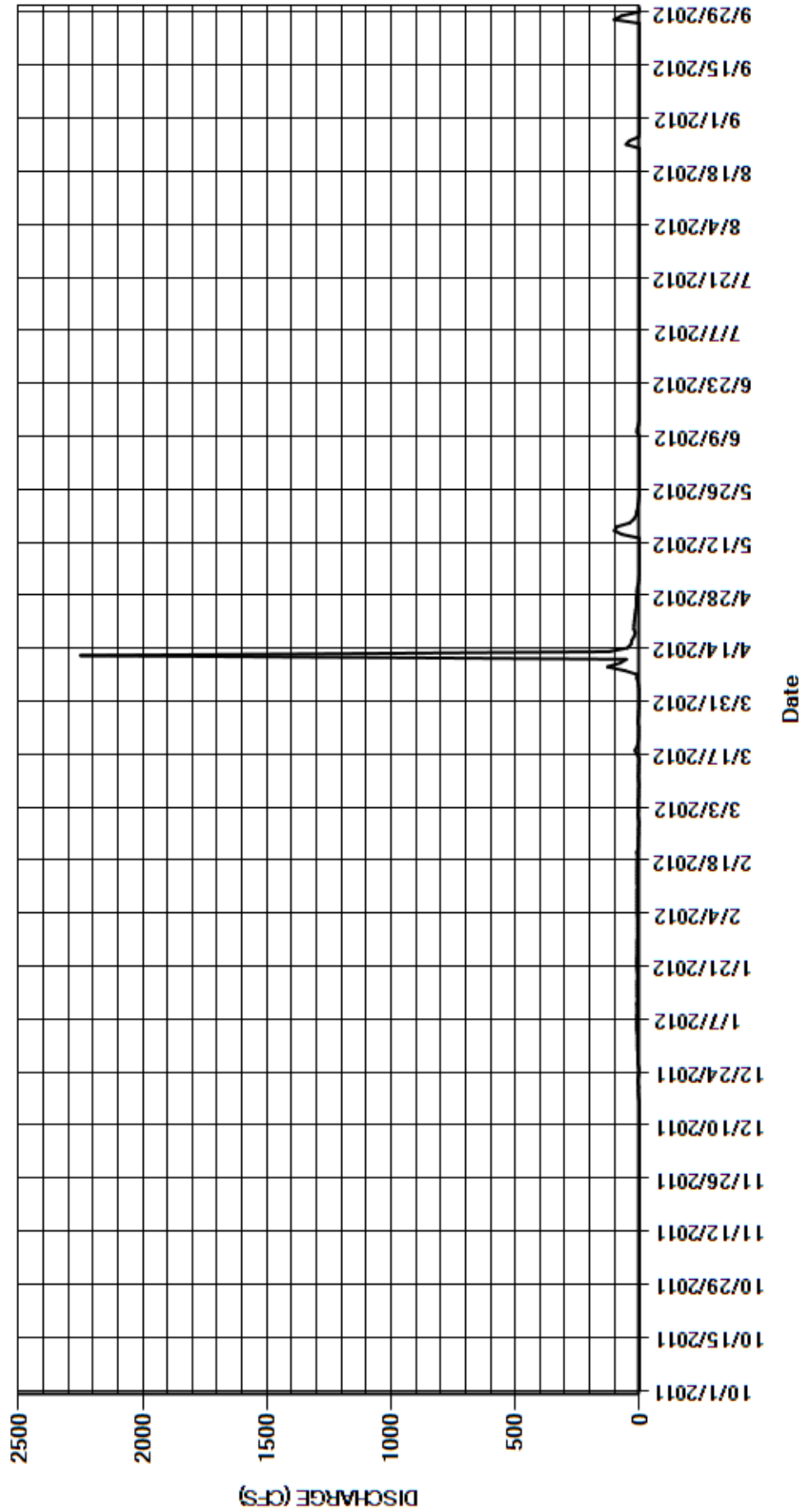
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.02	0.08	0.03	8.5	7.8	6.9	1.2	4.2	0.00	0.00	0.00	0.00
2	0.02	0.10	e0.02	8.4	7.6	4.8	1.1	1.7	0.00	0.00	0.00	0.00
3	0.02	0.08	e0.05	9.0	8.6	4.4	1.9	1.0	0.00	0.00	0.00	0.00
4	0.03	0.08	e0.04	11	10	4.5	3.6	0.13	0.00	0.00	0.00	0.00
5	0.06	0.05	e0.04	11	10	4.6	5.6	0.05	0.00	0.00	0.00	0.00
6	0.07	0.03	e0.04	12	10	3.0	11	0.03	0.00	0.00	0.00	0.00
7	0.09	0.05	e0.04	11	10	2.6	10	0.02	0.00	0.00	0.00	0.00
8	0.11	0.09	e0.04	11	9.8	2.4	60	0.02	0.00	0.00	0.00	0.00
9	0.14	0.06	e0.05	9.4	9.5	1.9	129	0.02	0.00	0.00	0.00	0.00
10	0.14	0.06	e0.07	10	9.4	3.4	78	0.02	10	0.00	0.00	0.00
11	0.14	0.06	e0.07	11	e8.5	4.7	53	0.02	8.6	0.00	0.00	0.00
12	0.15	0.06	e0.07	8.3	e10	3.7	2250	0.02	3.2	0.00	0.00	0.00
13	0.12	0.07	e0.07	9.3	e10	2.5	123	0.01	0.73	0.00	0.00	0.00
14	0.11	0.07	e0.08	9.1	e10	2.9	48	72	0.04	0.00	0.00	0.00
15	0.10	0.06	e0.07	9.6	10	1.8	34	101	0.00	0.00	0.00	0.00
16	0.09	0.07	e0.30	10	9.5	1.7	31	91	0.00	0.00	0.00	0.00
17	0.08	0.06	2.1	9.3	9.0	12	22	40	0.00	0.00	0.00	0.00
18	0.09	0.06	3.8	7.7	9.0	18	17	23	0.00	0.00	0.00	0.00
19	0.09	0.06	4.5	8.7	7.8	9.0	23	14	0.00	0.00	0.00	0.00
20	0.10	0.06	3.6	10	11	5.8	22	11	0.00	0.00	0.00	0.00
21	0.06	0.07	6.5	12	5.8	e3.7	21	7.1	0.00	0.00	0.00	0.00
22	0.06	0.07	6.3	11	4.9	3.0	19	4.9	0.00	0.00	0.00	0.00
23	0.06	0.06	4.0	11	4.3	2.4	17	2.8	0.00	0.00	0.00	0.00
24	0.06	0.07	2.3	10	4.6	2.5	15	1.1	0.00	0.00	0.00	0.00
25	0.05	0.08	2.6	10	2.8	5.8	13	0.21	0.00	0.00	54	0.00
26	0.07	0.08	5.8	9.9	4.0	5.7	12	0.05	0.00	0.00	40	0.00
27	0.06	0.06	6.8	9.7	2.2	4.2	14	0.02	0.03	0.00	2.8	102
28	0.07	0.06	6.2	8.8	1.6	3.3	11	0.00	0.00	0.00	0.03	72
29	0.08	0.06	7.0	7.6	4.3	2.1	9.4	0.00	0.00	0.00	0.00	1.4
30	0.08	0.06	7.9	7.8	---	1.8	8.5	0.00	0.00	0.01	0.00	0.00
31	0.08	---	9.0	8.3	---	1.3	---	0.00	---	0.00	0.00	---
TOTAL	2.50	1.98	79.48	300.4	222.0	136.4	3064.3	375.42	22.60	0.01	96.83	175.40
MEAN	0.081	0.066	2.56	9.69	7.66	4.40	102	12.1	0.75	0.0003	3.12	5.85
AC-FT	5.0	3.9	158	596	440	271	6080	745	45	.02	192	348
MAX	0.15	0.10	9.0	12	11	18	2250	101	10	0.01	54	102
MIN	0.02	0.03	0.02	7.6	1.6	1.3	1.1	0.00	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	3050.41	MEAN	8.36	MAX	832	MIN	0.00	AC-FT	6050
WTR YR	2012	TOTAL	4477.32	MEAN	12.2	MAX	2250	MIN	0.00	AC-FT	8880

MAX DISCH: 7100 CFS AT 17:00 ON APR 12,2012 GH 11.54 FT SHIFT -0.27 FT
 MAX GH: 11.54 FT AT 17:00 ON APR 12,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

PURGATOIRE RIVER BLW HIGHLAND DAM NR LAS ANIMAS
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN

HIGHLAND CANAL

Water Year 2012

Location.-- Lat. 37°54'03", Long. 103°17'56" (Hackamore Ranch, CO Quadrangle, Scale 1:24,000), NE1/4, SW1/4, Section 1, T25S, R53W. On the left bank approximately ¼ mile downstream of the Highland Canal Diversion Dam, Bent County, 11 mi southwest of Las Animas, Colorado.

Drainage Area and Period of Record.-- N/A;

Equipment.-- Float-activated graphic water-stage recorder and shaft encoder in small shelter over CMP stilling well. Shaft encoder wired to satellite-monitored data collection platform (Sutron Satlink 2 HDR DCP) located in Purgatoire River below Highland Dam gage shelter. Standard 5-ft steel Parshall flume is the control. Primary reference gage is outside staff gage installed in flume. No changes were made this water year.

Hydrologic Conditions.-- The Highland Canal diverts water from the Purgatoire River, which has a drainage basin of approximately 3320 square miles.

Gage-Height Record.-- Primary record is 15-minute satellite data with the graphic chart record and DCP log used for backup purposes. Record is complete and reliable for this seasonally operated gage except for the following periods. Missing data March 11, March 21-22. The record was filled in manually from stable adjacent gage height data or the graphical chart was relied upon without loss of accuracy. At the end of the water year, Sept 27-28 flood water from the Purgatoire River inundated the Highland Canal causing backwater effect. On Sept 29-30, silt in stilling well affected gage height reliability at low to no flow.

Datum Corrections.-- Levels were last run to the flume on August 5, 2003. No corrections needed.

Rating.-- The control is a standard, 5-foot, steel Parshall flume. A standard 5-ft Parshall flume rating table in use since May 23, 2001 was used during the entire water year. No measurements were made this water year. The peak gage height occurred at 2100 on Sept 27, 2012 but was backwater affected. The peak discharge of 6.87 cfs occurred at 1730 on Aug 26, 2012, at a gage height of 0.51 ft with a shift of 0.00 ft.

Discharge.-- The rating was directly applied to the gage height record to compute discharge.

Special Computations.-- High flows from the Purgatoire that inundated the Highland Canal that caused the recorded peak gage height. The event was verified by District 17 water commissioners. These two days were denoted as "c-days" or other backwater affected gage height and were considered to be zero flow. The days following, the stilling well was silted-in with mud causing non-zero gage heights to exist with zero flow. These days were denoted as "z-days" or zero-flow days.

Remarks.-- Record is fair due to lack of measurements since WY2010. Periods of low flow when the shaft encoder was affected by silt in the stilling well are considered poor. Station maintained and record developed by Garrett Markus.

Recommendations.-- Discharge measurements should be made every year. A levels survey and flume inspection should be conducted before the 2013 irrigation season.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

HIGHLAND CANAL

RATING TABLE-- STD05FTPF USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

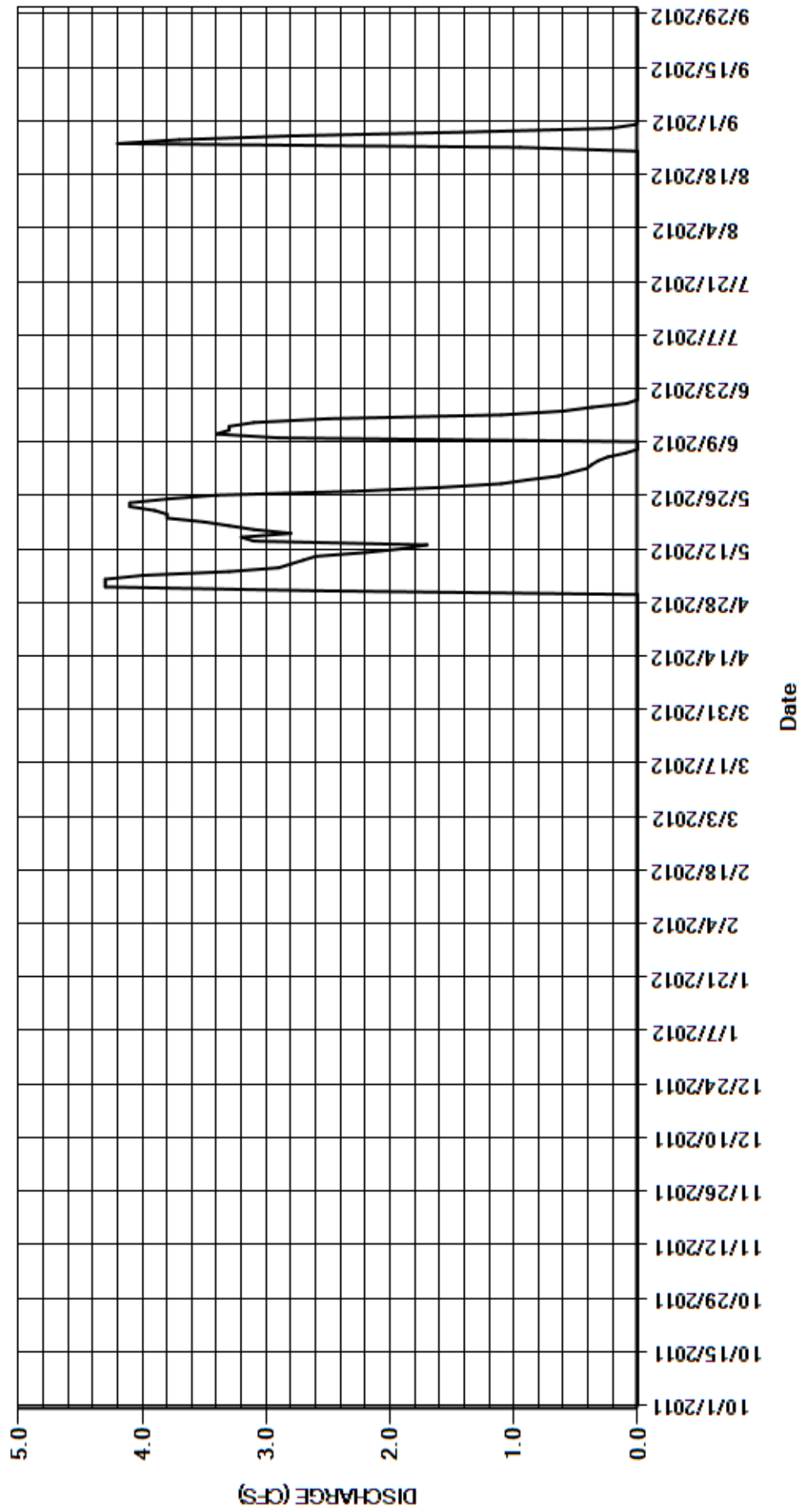
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.6	0.53	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.3	0.41	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.3	0.37	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.3	0.32	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.0	0.24	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.3	0.10	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.9	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.8	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.7	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.6	2.9	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.2	3.4	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.9	3.3	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.7	3.3	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.1	3.1	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.2	2.5	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.8	1.1	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.1	0.60	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.3	0.37	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5	0.09	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.8	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	e0.00	0.00	3.8	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.9	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.1	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.1	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.8	0.00	0.00	0.95	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.4	0.00	0.00	4.2	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.3	0.00	0.00	3.7	e0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.6	0.00	0.00	2.8	e0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.1	0.00	0.00	1.4	0.00
30	0.00	0.00	0.00	0.00	---	0.00	0.00	0.89	0.00	0.00	0.22	0.00
31	0.00	---	0.00	0.00	---	0.00	---	0.64	---	0.00	0.01	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	92.03	22.63	0.00	13.28	0.00
MEAN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.97	0.75	0.000	0.43	0.000
AC-FT	0	0	0	0	0	0	0	183	45	0	26	0
MAX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.3	3.4	0.00	4.2	0.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.64	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	247.83	MEAN	0.68	MAX	4.5	MIN	0.00	AC-FT	492
WTR YR	2012	TOTAL	127.94	MEAN	0.35	MAX	4.3	MIN	0.00	AC-FT	254

MAX DISCH: 6.87 CFS AT 17:30 ON AUG 26,2012 GH 0.51 FT SHIFT 0 FT
 MAX GH: 4.94 FT AT 20:15 ON SEP 27,2012 (Canal inundated by Purgatoire)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

HIGHLAND CANAL
 WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
PURGATOIRE RIVER BELOW HIGHLAND DAM NEAR LAS ANIMA
Water Year 2012

Location.-- Combined record from Purgatoire River below Highland Dam and Highland Canal below Highland Dam gages located Lat 37°54'03", Long 103°17'56" (Hackamore Ranch, CO Quadrangle, Scale 1:24,000), NE1/4, SW1/4, Section 1, T25S, R53W. On the left bank approximately ¼ mile downstream of the Highland Canal Diversion Dam, Bent County, 11 mi southwest of Las Animas, Colorado.

Drainage Area and Period of Record.-- 3320 square miles.; WY2001 to present.

Equipment.-- See individual records for gage equipment descriptions.

Hydrologic Conditions.-- See individual station analyses.

Gage-Height Record.-- See individual station analyses.

Datum Corrections.-- See individual station analyses.

Rating.-- See individual station analyses.

Discharge.-- The combined record of discharges was obtained by the addition of Highland Canal daily flows to the corresponding daily flows in the Purgatoire River below Highland Dam. The peak unit value combined discharge for the water year was 7100 cfs at 1700 on April 12, 2012. See individual station analyses.

Special Computations.-- None.

Remarks.-- Combined record is fair, except during periods of estimated flow and flows greater than 500 cfs, which should be considered poor. See individual station analyses for the two gages for more details. Record developed by Div. 2 hydrographic staff.

Recommendations.--

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

PURGATOIRE RIVER BELOW HIGHLAND DAM NEAR LAS ANIMA

RATING TABLE.--

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

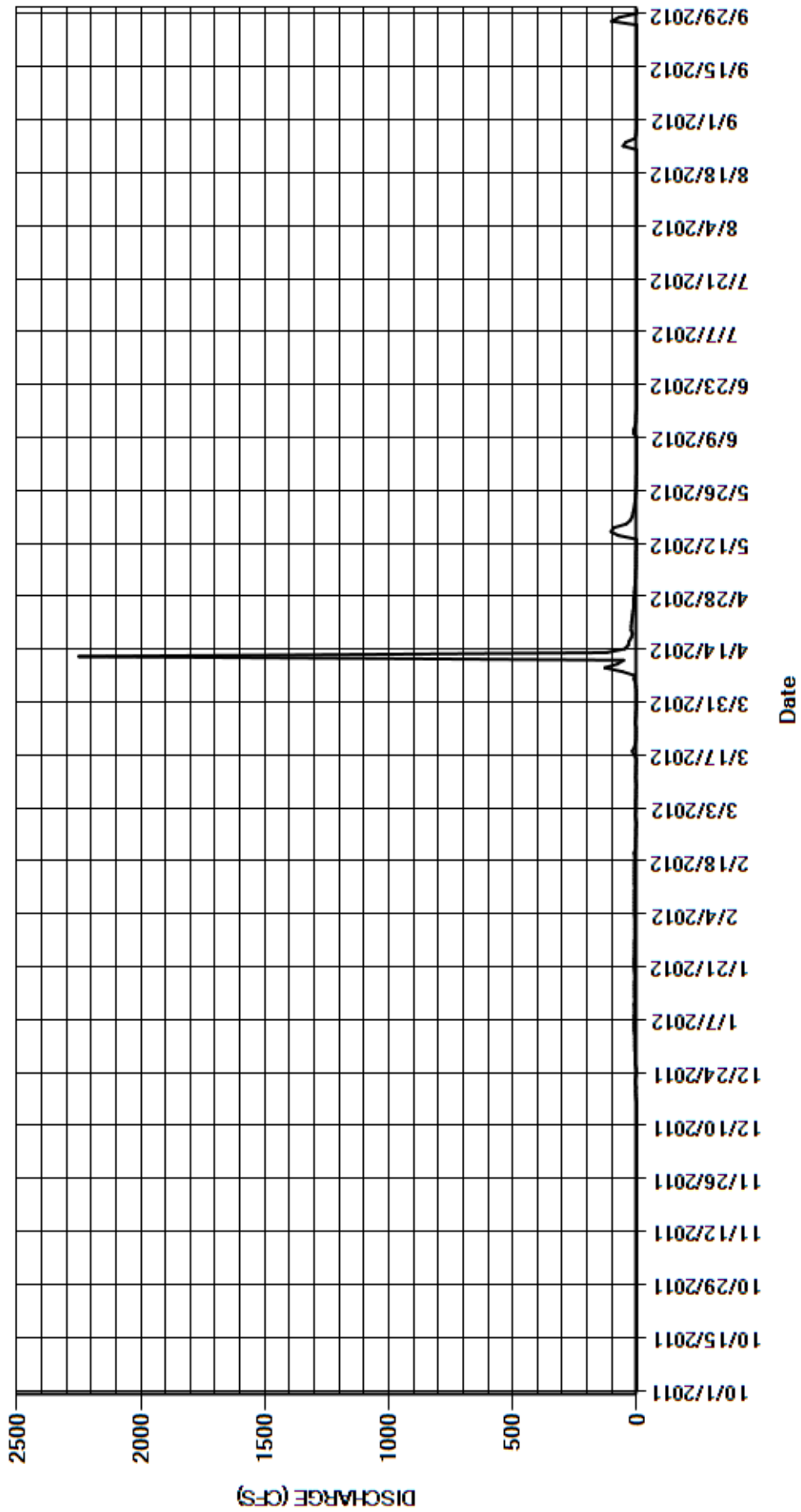
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.02	0.08	0.03	8.5	7.8	6.9	1.2	6.8	0.53	0.00	0.00	0.00
2	0.02	0.10	e0.02	8.4	7.6	4.8	1.1	6.0	0.41	0.00	0.00	0.00
3	0.02	0.08	e0.05	9.0	8.6	4.4	1.9	5.3	0.37	0.00	0.00	0.00
4	0.03	0.08	e0.04	11	10	4.5	3.6	4.4	0.32	0.00	0.00	0.00
5	0.06	0.05	e0.04	11	10	4.6	5.6	4.0	0.24	0.00	0.00	0.00
6	0.07	0.03	e0.04	12	10	3.0	11	3.3	0.10	0.00	0.00	0.00
7	0.09	0.05	e0.04	11	10	2.6	10	2.9	0.00	0.00	0.00	0.00
8	0.11	0.09	e0.04	11	9.8	2.4	60	2.8	0.00	0.00	0.00	0.00
9	0.14	0.06	e0.05	9.4	9.5	1.9	129	2.7	0.00	0.00	0.00	0.00
10	0.14	0.06	e0.07	10	9.4	3.4	78	2.6	13	0.00	0.00	0.00
11	0.14	0.06	e0.07	11	e8.5	4.7	53	2.2	12	0.00	0.00	0.00
12	0.15	0.06	e0.07	8.3	e10	3.7	2250	1.9	6.5	0.00	0.00	0.00
13	0.12	0.07	e0.07	9.3	e10	2.5	123	1.7	4.0	0.00	0.00	0.00
14	0.11	0.07	e0.08	9.1	e10	2.9	48	75	3.1	0.00	0.00	0.00
15	0.10	0.06	e0.07	9.6	10	1.8	34	104	2.5	0.00	0.00	0.00
16	0.09	0.07	e0.30	10	9.5	1.7	31	94	1.1	0.00	0.00	0.00
17	0.08	0.06	2.1	9.3	9.0	12	22	43	0.60	0.00	0.00	0.00
18	0.09	0.06	3.8	7.7	9.0	18	17	26	0.37	0.00	0.00	0.00
19	0.09	0.06	4.5	8.7	7.8	9.0	23	18	0.09	0.00	0.00	0.00
20	0.10	0.06	3.6	10	11	5.8	22	15	0.00	0.00	0.00	0.00
21	0.06	0.07	6.5	12	5.8	e3.7	21	11	0.00	0.00	0.00	0.00
22	0.06	0.07	6.3	11	4.9	3.0	19	8.8	0.00	0.00	0.00	0.00
23	0.06	0.06	4.0	11	4.3	2.4	17	6.9	0.00	0.00	0.00	0.00
24	0.06	0.07	2.3	10	4.6	2.5	15	5.2	0.00	0.00	0.00	0.00
25	0.05	0.08	2.6	10	2.8	5.8	13	4.0	0.00	0.00	55	0.00
26	0.07	0.08	5.8	9.9	4.0	5.7	12	3.4	0.00	0.00	44	0.00
27	0.06	0.06	6.8	9.7	2.2	4.2	14	2.3	0.03	0.00	6.5	102
28	0.07	0.06	6.2	8.8	1.6	3.3	11	1.6	0.00	0.00	2.8	72
29	0.08	0.06	7.0	7.6	4.3	2.1	9.4	1.1	0.00	0.00	1.4	1.4
30	0.08	0.06	7.9	7.8	---	1.8	8.5	0.89	0.00	0.01	0.22	0.00
31	0.08	---	9.0	8.3	---	1.3	---	0.64	---	0.00	0.01	---
TOTAL	2.50	1.98	79.48	300.4	222.0	136.4	3064.3	467.43	45.26	0.01	109.93	175.40
MEAN	0.081	0.066	2.56	9.69	7.66	4.40	102	15.1	1.51	0.0003	3.55	5.85
AC-FT	5.0	3.9	158	596	440	271	6080	927	90	.02	218	348
MAX	0.15	0.10	9.0	12	11	18	2250	104	13	0.01	55	102
MIN	0.02	0.03	0.02	7.6	1.6	1.3	1.1	0.64	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	3303.25	MEAN	9.05	MAX	835	MIN	0.00	AC-FT	6550
WTR YR	2012	TOTAL	4605.09	MEAN	12.6	MAX	2250	MIN	0.00	AC-FT	9130

MAX DISCH:
 MAX GH:

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

**PURGATOIRE RIVER BELOW HIGHLAND DAM NEAR LAS ANIMA
WY2012 HYDROGRAPH**



ARKANSAS RIVER BASIN
MUDDY CREEK BELOW MUDDY CR DAM NR TOONERVILLE, CO
Water Year 2012

Location.-- Lat. 37°45'46", Long. 103°14'36" (Toonerville, Colorado quadrangle, 1:24000 scale) in the SE¼ SE¼ Sec.21, T26S, R52W, Bent County on the north bridge abutment at the crossing of CR 11 and Muddy Creek.

Drainage Area and Period of Record.-- 154 sq. mi.;

Equipment.-- High data rate Sutron SatLink2 data collection platform (DCP) and shaft encoder in a steel "half shelter" mounted on top of a 24-inch corrugated metal stilling well. Shaft encoder is referenced to a drop tape from an "I" beam on the downstream side of a bridge rail. Precipitation recorded with a tipping bucket gage. No changes this water year.

Hydrologic Conditions.-- Drainage basin characteristics include rolling short-grass prairie rangelands with weeds and cacti. Livestock grazing exists in the watershed. Ephemeral or intermittent stream channels are common and these normally dry arroyos typically convey water as the result of convective storms that commonly occur during the late July through August summer monsoon. The influence of over grazing provides the largest affect to the runoff regime. No hydrologic condition changes this water year.

Gage-Height Record.-- Primary record is 15-minute satellite-monitored data with DCP log backup. Record is complete and reliable except for the following periods of missing data: Dec 20-21, Mar 11. Missing data was filled in from adjacent data without loss of accuracy, or denoted as an "a-day" (missing data) if over 16 unit values. On July 24 non-representative values were recorded from remounting the shaft encoder to a stable surface. During Apr 14 – May 3 mud in the stilling well caused the float to beach and resulting recorded gage heights were non-representative. These days were denoted as a "z-day" (zero-flow day).

Datum Corrections.-- Levels were not run this water year. Levels were last run April 8, 2005 to establish gage datum and point of zero flow. High Water Mark (HWM) survey was conducted on October 1, 2012.

Rating.-- The control at low and medium flows is the sand and mud channel along with vegetation in the channel. Control at higher stages includes the creek banks and brush lining the edges of the channel. Flows are contained by the bridge immediately upstream of the gage. Rating No. 3 dated June 17, 2010 was used for entire water year and was developed from analysis of HEC-RAS modeling and field measurements. Rating No. 3 was extended to cover high flows experienced in this water year. Twelve discharge measurements were made this water year – all with observations of zero flow, except for Msmt No. 63 on Apr 12 when 17.5 cfs was measured. The peak flow of 2530 cfs occurred at 2245 April 11, 2012 at gage height of 9.96 feet with a shift of 0.02 ft.

Discharge.-- Rating No. 3 was applied directly to the gage height record to compute discharge from the beginning of the water year until 2130 April 11, 2012, immediately before the peak flow event occurred. Shifts were distributed from 0.00 ft to 0.02 ft at the peak of the event. The shift of Msmt No. 63 (+0.02 ft) was held to the end of the water year. Gage heights less than the point of zero flow (PZF) of 1.70 ft were recorded for the following periods were: 0000 Oct 1, 2011 - 2130 Apr 11; 0000 Apr 14 – 2115 May 13; and 0900 May 14 - 2345 Sept 30, 2012. A discharge of 0.00 cfs was assigned to these periods. Flow events due to rainfall runoff were recorded at the gage for the following periods when gage heights exceeded 1.70 ft: 2145 Apr 11 - 2345 Apr 13, and 2130 May 13 - 0845 May 15, 2012. Discharge for these periods were computed with a +0.02 ft shift from Rating No. 3.

Special Computations.-- Datum corrections for the year were based on the Oct 1, 2012 survey establishing relative elevations to the Apr 11, 2012 HWM and Msmt No. 63's temporary RP. Since no datum corrections were made in the field, these corrections were applied to the gage height record for the entire water year.

Remarks.-- Overall, the record during periods of zero flow is good, but the record during periods of flow is poor due to lack of rating definition. The peak flow for the water year is also rated poor. The flashy nature and remote location of the gage make it extremely difficult to maintain an accurate stage-discharge rating and point of zero flow. Station maintained and record developed by Garrett Markus.

Recommendations.-- To establish a solid point of zero flow, the installation of a concrete structure such as a compound weir or broad crested weir would be beneficial for monitoring low flow periods, but would likely move and/or be buried by silt during large, rainfall runoff events.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

MUDDY CREEK BELOW MUDDY CR DAM NR TOONERVILLE, CO

RATING TABLE.-- MUDTOOCO003 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

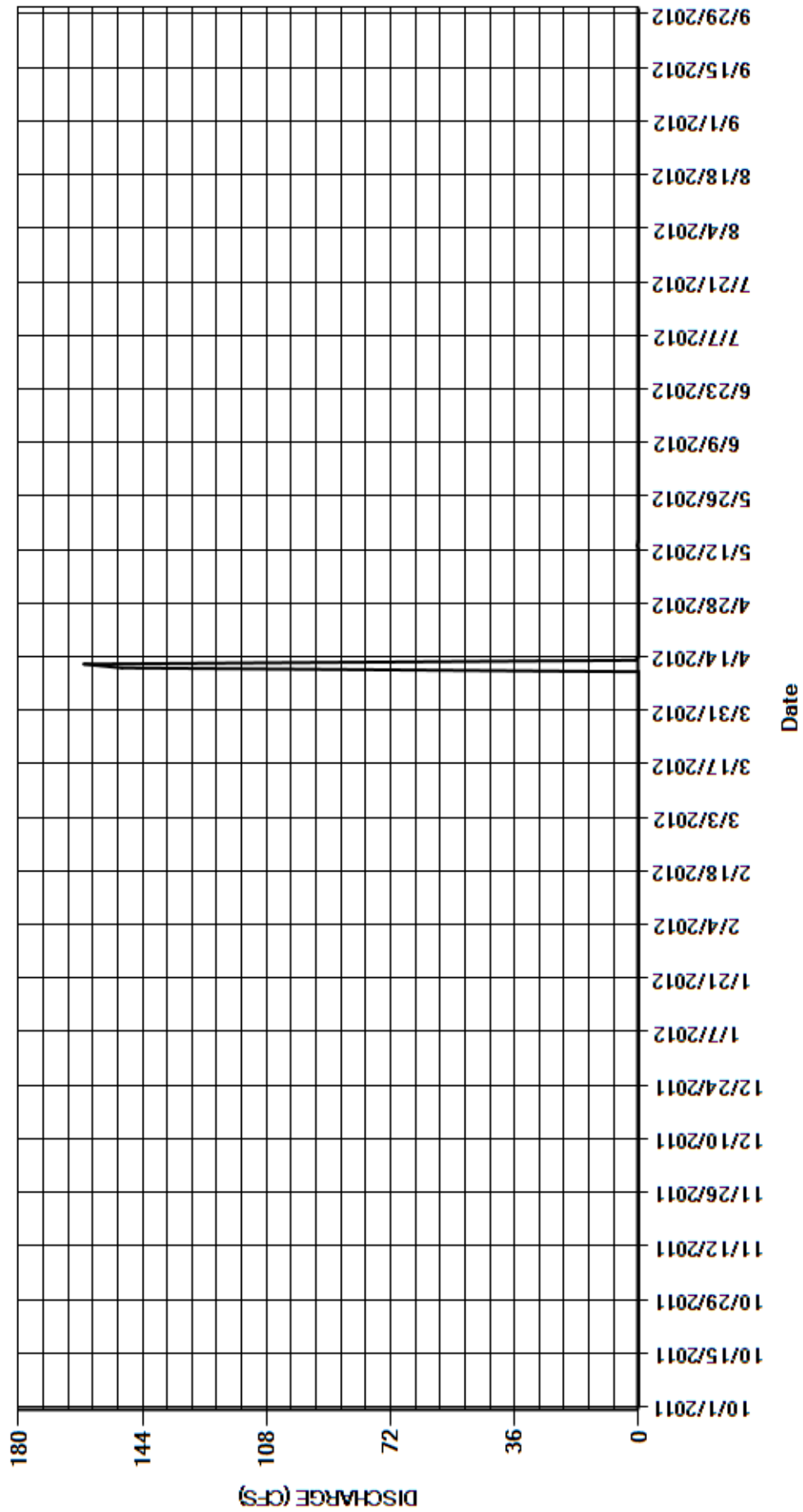
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	150	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	161	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.95	0.37	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	---	0.00	0.00	---	0.00	---	0.00	---	0.00	0.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	311.95	0.46	0.00	0.00	0.00	0.00
MEAN	0.000	0.000	0.000	0.000	0.000	0.000	10.4	0.015	0.000	0.000	0.000	0.000
AC-FT	0	0	0	0	0	0	619	0.9	0	0	0	0
MAX	0.00	0.00	0.00	0.00	0.00	0.00	161	0.37	0.00	0.00	0.00	0.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	163.68	MEAN	0.45	MAX	104	MIN	0.00	AC-FT	325
WTR YR	2012	TOTAL	312.41	MEAN	0.85	MAX	161	MIN	0.00	AC-FT	620

MAX DISCH: 2530 CFS AT 22:45 ON APR 11,2012 GH 9.96 FT SHIFT 0.02 FT (estimated)
 MAX GH: 9.96 FT AT 22:45 ON APR 11,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

MUDDY CREEK BELOW MUDDY CR DAM NR TOONERVILLE, CO
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
RULE CREEK AT HWY 101 NEAR TOONERVILLE, CO

Water Year 2012

Location.-- Lat. 37°49'12", Long. 103°10'55" (Toonerville, Colorado quadrangle, 1:24000 scale) in the NW¼ Sec.6, T26S, R51W, Bent County on the downstream side of a bridge abutment at the crossing of Highway 101 and Rule Creek approximately 920 feet below the confluence of Muddy and Rule Creek.

Drainage Area and Period of Record.-- 364 sq. mi.;

Equipment.-- High data rate Sutron SatLink DCP and Sutron Accububble mounted inside NEMA type boxes on steel posts on the north side of the Highway 101 bridge over Rule Creek. Primary reference gage is a wire weight gage on the Hwy 101 bridge over the channel on the downstream side. A crest gage captures instantaneous peaks via high water mark. On July 24, 2012, a SatLink 2 V2 replaced the SatLink and a Constant Flow Bubbler (CFB) replaced the Accububble measuring and recording platforms. No other changes were made this water year.

Hydrologic Conditions.-- The Rule Creek gaging station has a drainage basin of approximately 364 square miles. Characteristics within the basin include rolling short-grass prairie rangelands with weeds and cacti. Livestock grazing exists in the watershed. Ephemeral or intermittent stream channels are common and these normally dry arroyos typically convey water as the result of convective storms that commonly occur during the late July through August summer monsoon. The influence of over grazing provides the largest affect to the runoff regime.

Gage-Height Record.-- Primary record is 15-minute satellite-monitored CFB data with DCP backup log. Record is complete and reliable except for the following periods. Missing Data: Mar 11, 4 values due to DST; and July 24, 3 values from changing the DCP interface. Missing data was filled in from adjacent data without loss of accuracy. Ice Affect: Dec 2 – Jan 19, the gage pool was frozen. Primary stage sensor calibration to reference gage was supported by 13 site visits this water year.

Datum Corrections.-- Levels were last run on July 19, 2007. No corrections were needed or made. An abbreviated level loop was run on July 30, 2007, to shoot in the RP for a wire weight reference gage. High Water Mark (HWM) survey was conducted on October 1, 2012.

Rating.-- Control is a downstream riffle or earthen berm which creates a small pool at the gage. At higher stages, the control becomes the channel and includes the brush-lined riverbanks. Flows are contained by the bridge immediately upstream of the gage. Rating No. 2 was developed on May 17, 2010 and used up to Msmt No. 59 on April 4, 2012. Rating No. 3 was developed April 13, 2012 and was used for the remainder of the year. Converting to Rating No. 3 was necessary because each flow event during the water year exceeded Rating No. 2. Both are poorly defined due to a lack of discharge measurements. Twelve discharge measurements (Nos. 54-65) were made this water year all of which were zero flow observations except for Msmt No. 60 which measured 50.9 cfs. The peak discharge of 2060 cfs occurred at 0130 April 12, 2012 at a gage height of 11.13 ft with a shift of -0.64 ft. It exceeded the stage of Measurement No. 60 made at 1500 April 12, 2012 by 8.05 feet.

Discharge.-- Shifting control method was used for the entire water year. Shifts were prorated by time during the water year except for two rainfall runoff events between 0045 April 12 to 2145 April 19, 2012 and and 2000 Sept 27 to 1300 Oct 1, 2012. Shifts were distributed from zero flow conditions immediately before the event to a determined shift due to scour of the control at the peak and back to a PZF after no trace of flow was evident. Suitable to the nature of the control and point of zero flow variability, shifts were distributed to zero flow. After July 3, the gage pool was below noted below the PZF and a constant shift was held to maintain zero flow until the event at Sept 27.

Special Computations.-- Air temperature data was examined using Las Animas NOAA temperature data to assist with winter period ice formation on the gage pool. Discharge and precipitation data from the Muddy Creek near Toonerville gage upstream were used to assist with definition of flow periods. A survey was completed on Oct 1, 2012 to verify HWM for instrument correction.

Remarks.-- Record is poor for the entire water year, including estimated and ice affected periods, due to the lack of rating definition and an estimated point of zero flow. The peak flow for the water year is also rated poor. The flashy nature and remote location of the gage make it extremely difficult to maintain a reliable stage-discharge relationship. Station maintained and record developed by Garrett Markus.

Recommendations.-- Run levels on the control cross section to better establish a theoretical rating that covers a large range of flows including the peak of this water year.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

RULE CREEK AT HWY 101 NEAR TOONERVILLE, CO

RATING TABLE.-- RULTOOCO002 USED FROM 01-OCT-2011 TO 04-APR-2012
 RULTOOCO03 USED FROM 04-APR-2012 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

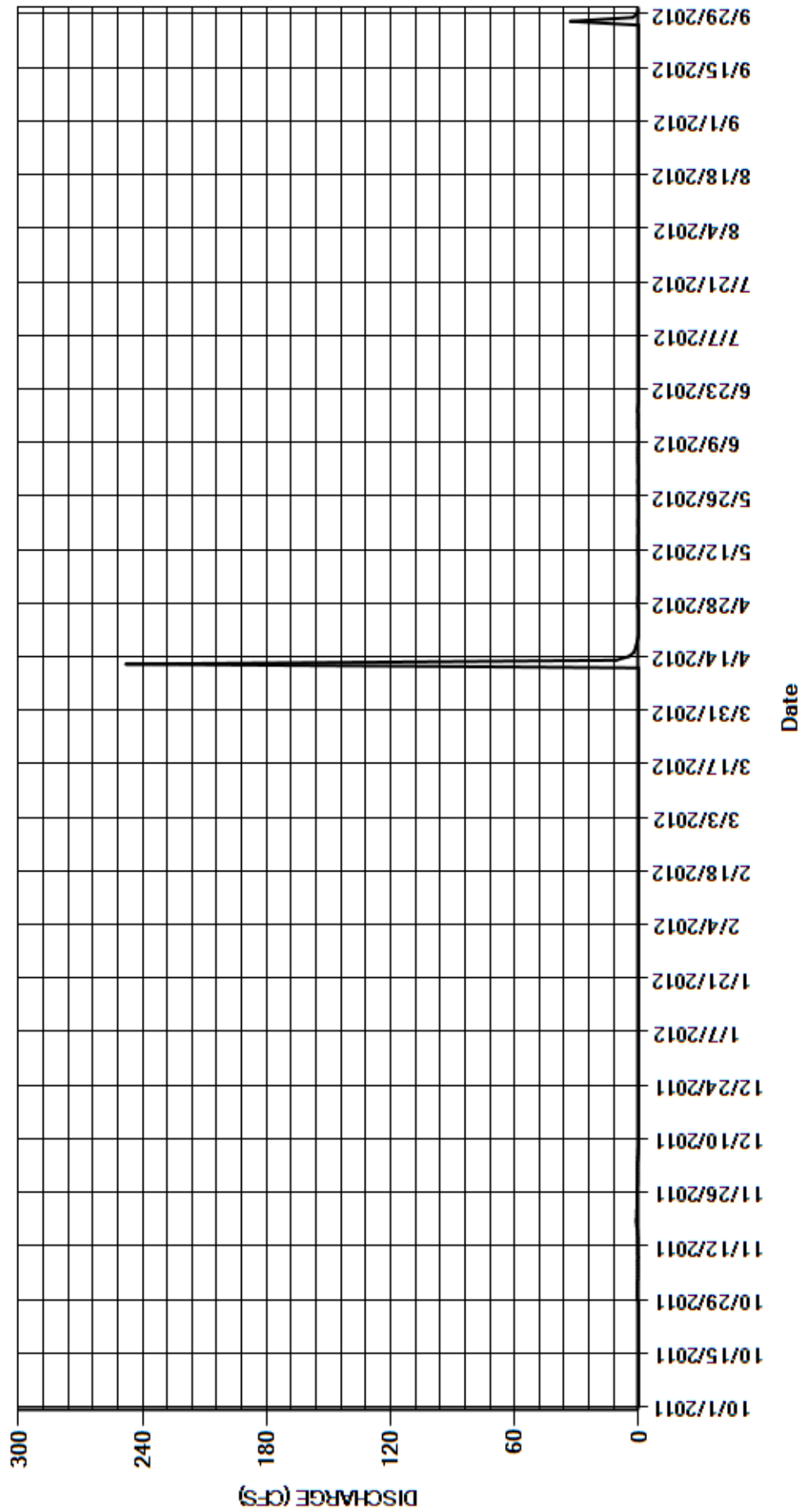
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.56	0.59	e0.00	0.00	0.00	0.00	0.01	0.00	0.02	0.00	0.00
2	0.00	0.55	e0.61	e0.00	0.00	0.01	0.00	0.06	0.00	0.08	0.00	0.00
3	0.00	0.49	e0.59	e0.00	0.00	0.00	0.00	0.01	0.07	0.03	0.00	0.00
4	0.00	0.39	e0.52	e0.00	0.00	0.00	0.03	0.01	0.19	0.00	0.00	0.00
5	0.00	0.36	e0.41	e0.00	0.00	0.00	0.02	0.03	0.28	0.00	0.00	0.00
6	0.00	0.33	e0.23	e0.00	0.00	0.08	0.01	0.01	0.23	0.00	0.00	0.00
7	0.00	0.35	e0.15	e0.00	0.00	0.10	0.00	0.02	0.23	0.00	0.00	0.00
8	0.00	0.42	e0.09	e0.00	0.00	0.02	0.00	0.02	0.12	0.00	0.00	0.00
9	0.00	0.25	e0.02	e0.00	0.00	0.03	0.00	0.02	0.08	0.00	0.00	0.00
10	0.00	0.46	e0.02	e0.00	0.00	0.00	0.01	0.06	0.01	0.00	0.00	0.00
11	0.00	0.47	e0.03	e0.00	0.00	0.00	0.02	0.15	0.00	0.00	0.00	0.00
12	0.00	0.47	e0.02	e0.00	0.00	0.00	248	0.12	0.04	0.00	0.00	0.00
13	0.00	0.51	e0.05	e0.00	0.00	0.00	11	0.15	0.25	0.00	0.00	0.00
14	0.00	0.44	e0.07	e0.00	0.00	0.00	4.7	0.12	0.32	0.00	0.00	0.00
15	0.00	0.53	e0.05	e0.00	0.00	0.00	2.4	0.12	0.19	0.00	0.00	0.00
16	0.00	0.63	e0.00	e0.00	0.00	0.00	1.7	0.11	0.13	0.00	0.00	0.00
17	0.00	0.94	e0.00	e0.00	0.00	0.00	1.1	0.05	0.39	0.00	0.00	0.00
18	0.00	1.1	e0.00	e0.00	0.00	0.00	0.65	0.13	0.29	0.00	0.00	0.00
19	0.00	1.1	e0.00	e0.00	0.00	0.00	0.18	0.16	0.12	0.00	0.00	0.00
20	0.00	0.87	e0.00	0.00	0.00	0.01	0.00	0.11	0.01	0.00	0.00	0.00
21	0.00	0.93	e0.00	0.00	0.00	0.01	0.00	0.00	0.07	0.00	0.00	0.00
22	0.00	0.84	e0.00	0.00	0.00	0.07	0.00	0.00	0.02	0.00	0.00	0.00
23	0.00	0.88	e0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.84	e0.00	0.00	0.02	0.02	0.00	0.07	0.00	0.00	0.00	0.00
25	0.00	0.77	e0.00	0.00	0.00	0.01	0.00	0.17	0.00	0.00	0.00	0.00
26	0.00	0.84	e0.00	0.00	0.01	0.00	0.05	0.21	0.00	0.00	0.00	0.00
27	0.00	0.78	e0.00	0.00	0.03	0.00	0.34	0.04	0.00	0.00	0.00	33
28	0.02	0.64	e0.00	0.00	0.01	0.00	0.32	0.05	0.00	0.00	0.00	2.9
29	0.52	0.66	e0.00	0.00	0.00	0.00	0.24	0.13	0.00	0.00	0.00	0.69
30	0.64	0.65	e0.00	0.00	---	0.00	0.09	0.16	0.00	0.00	0.00	0.27
31	0.63	---	e0.00	0.00	---	0.00	---	0.01	---	0.00	0.00	---
TOTAL	1.81	19.05	3.45	0.00	0.07	0.46	270.86	2.31	3.04	0.13	0.00	36.86
MEAN	0.058	0.64	0.11	0.000	0.002	0.015	9.03	0.075	0.10	0.004	0.000	1.23
AC-FT	3.6	38	6.8	0	0.1	0.9	537	4.6	6.0	0.3	0	73
MAX	0.64	1.1	0.61	0.00	0.03	0.10	248	0.21	0.39	0.08	0.00	33
MIN	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	343.22	MEAN	0.94	MAX	213	MIN	0.00	AC-FT	681
WTR YR	2012	TOTAL	338.04	MEAN	0.92	MAX	248	MIN	0.00	AC-FT	671

MAX DISCH: 2060 CFS AT 01:30 ON APR 12,2012 GH 11.13 FT SHIFT -0.64 FT
 MAX GH: 11.13 FT AT 01:30 ON APR 12,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

RULE CREEK AT HWY 101 NEAR TOONERVILLE, CO
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
09061500 COLUMBINE DITCH NEAR FREMONT PASS
Water Year 2012

Location.-- Lat. 39°22'25", Long. 106°13'38". Columbine ditch diverts water from tributaries of Eagle River in sec. 5, T.8 S., R. 79 W., in Colorado River basin to Chalk Creek (tributary to East Fork Arkansas River) in NW¼ sec. 9, T.8 S., R. 79 W., in Arkansas River basin.

Drainage Area and Period of Record.-- 1170 Acres; Record published continuously from 1947 through current year.

Equipment.-- Graphic water-stage recorder, satellite-monitored data collection platform high data rate DCP and shaft encoder in a 30-inch diameter metal pipe shelter and well. Shaft encoder and chart are set to outside staff gage. Control is a 6-foot steel Parshall flume.

Hydrologic Conditions.-- The Columbine Ditch is categorized a transmountain diversion structure which intercepts runoff from a drainage basin of approximately 1170 acres in the headwaters of the Eagle River basin and empties into Chalk Creek, a tributary of the east fork of the Arkansas River. The conveyance of water across the Continental Divide is accomplished through saddles which traverse the divide. The basin consists primarily of high mountain terrain, some of which is above tree line, with very little development except for the occasional low volume trail road. No hydrologic condition changes were apparent this water year.

Gage-Height Record.-- The primary record is 15-minute satellite data with chart record and DCP log as backup. The record is complete and reliable except for April 26th thru 30th when there was no logged data and estimates were created from chart data. Diversion occurred this water year from Apr 26 through Aug 7, 2012.

Datum Corrections.-- Levels were last run on July 31, 2007. The gage was found to be reading within allowable limits, so no corrections were needed/taken. The level survey did confirm the floor of the flume slopes toward the staff gage.

Rating.-- Control is a 6-foot steel Parshall flume. A standard 6 ft. Parshall flume table (COLDITCO01, dated June 22, 1971) was used this water year. One discharge measurement (No. 86) at a flow of 6.68 cfs was made this water year. The peak discharge of 28.7 cfs occurred at 1745 on May 22, 2012 at a gage height of 1.09 ft. with a shift of +0.03 ft. It exceeded Measurement 86 by 0.67 feet in stage.

Discharge.-- Measurements are made from a walkway across the flume at a position where the meter axis is even with the staff gage. Shifts were distributed by stage using a shift curve (COLDITCOVS09A) developed from current and previous water year measurements. This flume does have a considerable amount of lateral settling toward the staff gage and away from the inlet. This is the reasoning for the lower end of the shift curve as the stilling well very seldom drains and retains approximately 0.05 ft of gage height when there is no flow in the flume. Measurement 86 was adjusted by 3.09% for smoothing purposes in the variable shift curve.

Special Computations.-- Variable curve COLDITCOVS09A is considered a valid alternative for calculating flows. As noted above the flume has a considerable amount of lateral settling away from the gage house and inlet, this can be seen while measuring and when flume is empty. At 0.05 ft gage height and below there is no flow. This flume does appear to be stable from historical comments that agree with the current situation. Ice effect days were determined using chart data and air temperature data from Turquoise Lake.

Remarks.-- There was a very short run of water this year. The new owner, Aurora/Freeport-McMoRan, operates the gage differently than the previous owner. For this water year the diverted flows were used for replacement of stream depletions caused by operations associated with Climax Mine. Flow patterns through the flume this water year differ than in previous water years. Hopefully this gage will have a more constant and predictable run of water to confirm the variable curve but unfortunately the operation of this gage made it very difficult to obtain multiple measurements for this WY. Record is rated good except of days of missing log data which are fair. The instantaneous peak discharge for the year is rated good based upon the site visit and measurement 6 days prior to that peak. Station maintained and record developed by Cheston Hart.

Recommendations.-- Depending on the future of this flume it is recommended the flume be reevaluated to either reinstall the flume or pour a false bottom in the flume to level the floor. Until that time, a new rating curve should be considered which incorporates values from the shift curve which is being used throughout the year.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09061500 COLUMBINE DITCH NEAR FREMONT PASS

RATING TABLE-- COLDITCO01 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

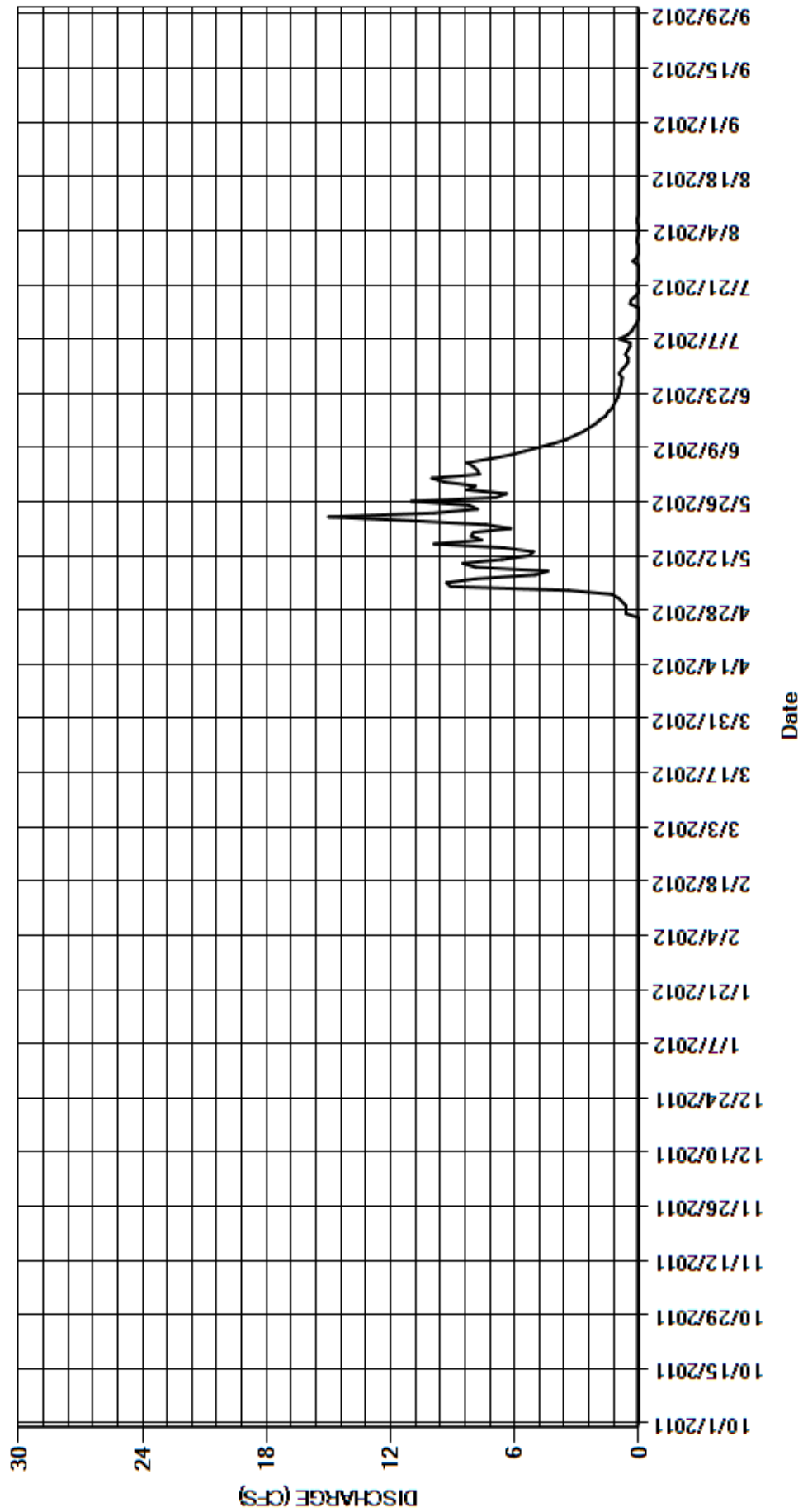
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.96	10	0.52	0.08	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.3	7.7	0.51	0.06	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.4	7.8	0.64	0.00	e0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.1	8.0	0.54	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.3	8.3	0.42	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.9	7.2	0.42	0.05	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.0	6.2	0.93	0.06	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.4	5.5	0.54	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.9	4.8	0.34	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.5	4.1	0.22	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.6	3.5	0.10	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.3	3.1	0.01	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.1	2.7	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.5	2.4	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.9	2.1	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.6	1.9	0.41	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.1	1.6	0.38	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.0	1.5	0.16	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.2	1.3	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.4	1.2	0.01	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11	1.1	0.08	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15	1.0	0.01	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.9	0.95	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.8	0.94	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.2	0.85	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	e0.00	11	0.83	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	e0.61	6.9	0.80	0.29	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	e0.61	6.4	0.94	0.09	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	e0.61	8.3	0.82	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	---	0.00	e0.79	7.9	0.64	0.00	0.00	0.00
31	0.00	---	0.00	0.00	---	0.00	---	9.4	---	0.00	0.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	2.62	230.26	99.77	6.62	0.25	0.00
MEAN	0.000	0.000	0.000	0.000	0.000	0.000	0.087	7.43	3.33	0.21	0.008	0.000
AC-FT	0	0	0	0	0	0	5.2	457	198	13	0.5	0
MAX	0.00	0.00	0.00	0.00	0.00	0.00	0.79	15	10	0.93	0.08	0.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.96	0.64	0.00	0.00	0.00

CAL YR	2011	TOTAL	116.15	MEAN	0.32	MAX	13	MIN	0.00	AC-FT	230
WTR YR	2012	TOTAL	339.52	MEAN	0.93	MAX	15	MIN	0.00	AC-FT	673

MAX DISCH: 28.7 CFS AT 17:45 ON MAY 22,2012 GH 1.09 FT SHIFT 0.03 FT
 MAX GH: 1.09 FT AT 17:45 ON MAY 22,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09061500 COLUMBINE DITCH NEAR FREMONT PASS
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
09062000 EWING DITCH AT TENNESSEE PASS
Water Year 2012

Location.-- Lat. 39°21'40", Long. 106°18'22", diverts water from Piney Creek in sec. 11, T.8 S., R.80 W., in Eagle River basin, to Thayer Gulch (tributary to Tennessee Creek) in Sec. 11, T. 8 S., R.80 W., in Arkansas River basin.

Drainage Area and Period of Record.-- N/A; 1948-present.

Equipment.-- Graphic water-stage recorder, satellite-monitored data collection platform (High data rate DCP and logger) and shaft encoder in a 30-inch diameter metal pipe shelter and well. Shaft encoder and chart are set to outside staff gage. Control is a 4-foot steel Parshall flume. No changes this water year.

Hydrologic Conditions.-- The Ewing Ditch diverts water from the headwaters of Piney Creek, a tributary of the Eagle River, over Tennessee Pass at an elevation of 10,500 feet, and into the headwaters of Tennessee Creek, a tributary of the Arkansas River. The basin consists primarily of high mountain terrain with very little development. The ditch is approximately 1.5 miles long, and intercepts runoff from a drainage area of 2,400 acres. No hydrologic condition changes were apparent this water year.

Gage-Height Record.-- Primary record is 15-minute transmitted data with DCP log and chart record as backup. The record is complete and reliable, except for Apr 19-23, 28-30, May 8, 9, 14, 28 2012 when the gage height was affected by ice. Diversion this water year occurred April 18th through Sept 30, 2012.

Datum Corrections.-- Levels were last run on July 11, 2006. The gage was found to be reading within established tolerance and no datum corrections were made.

Rating.-- Control is a 4-foot steel Parshall flume. A standard 4-ft. Parshall flume table (STD04FTPF dated June 22, 1971) was used this water year. One discharge measurement (No. 111) was made during the year of 1.23 cfs. The peak discharge of 2.27 cfs occurred at 1430 on July 7, 2012 at gage height of 0.32 ft with a shift of -0.03 ft. It exceeded the stage of Measurement 111 by 0.10 feet in stage. The peak gage height of 0.37 ft occurred at 1100 on April 28, 2012 and was affected by backwater due to ice.

Discharge.-- Measurements are made from a walkway across the flume at a position where the meter axis is even with the staff gage. Shifts were distributed by stage using shift curve EWIDITOCOV09 developed from current and previous water year measurements. Measurement 111 was discounted by 6.0% for smoothing purposes in the variable shift curve.

Special Computations.-- Flows on ice affected days were estimated using trends in good record before and after ice effect and by cutting off the daily ice spikes. There are no available gages to use for comparison.

Remarks.-- Record is considered good, except for periods of ice effect, which are estimated and poor. The instantaneous peak discharge is rated good given the related measurement and site visits. Station maintained and record developed by Cheston Hart.

Recommendations.-- Recommend measuring throughout the running water season to establish a better range in stage. A flume inspection should be performed in WY2013. A custom rating curve should be considered which incorporates the values from the shift curve which is being used throughout the year.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09062000 EWING DITCH AT TENNESSEE PASS

RATING TABLE-- STD04FTPF USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

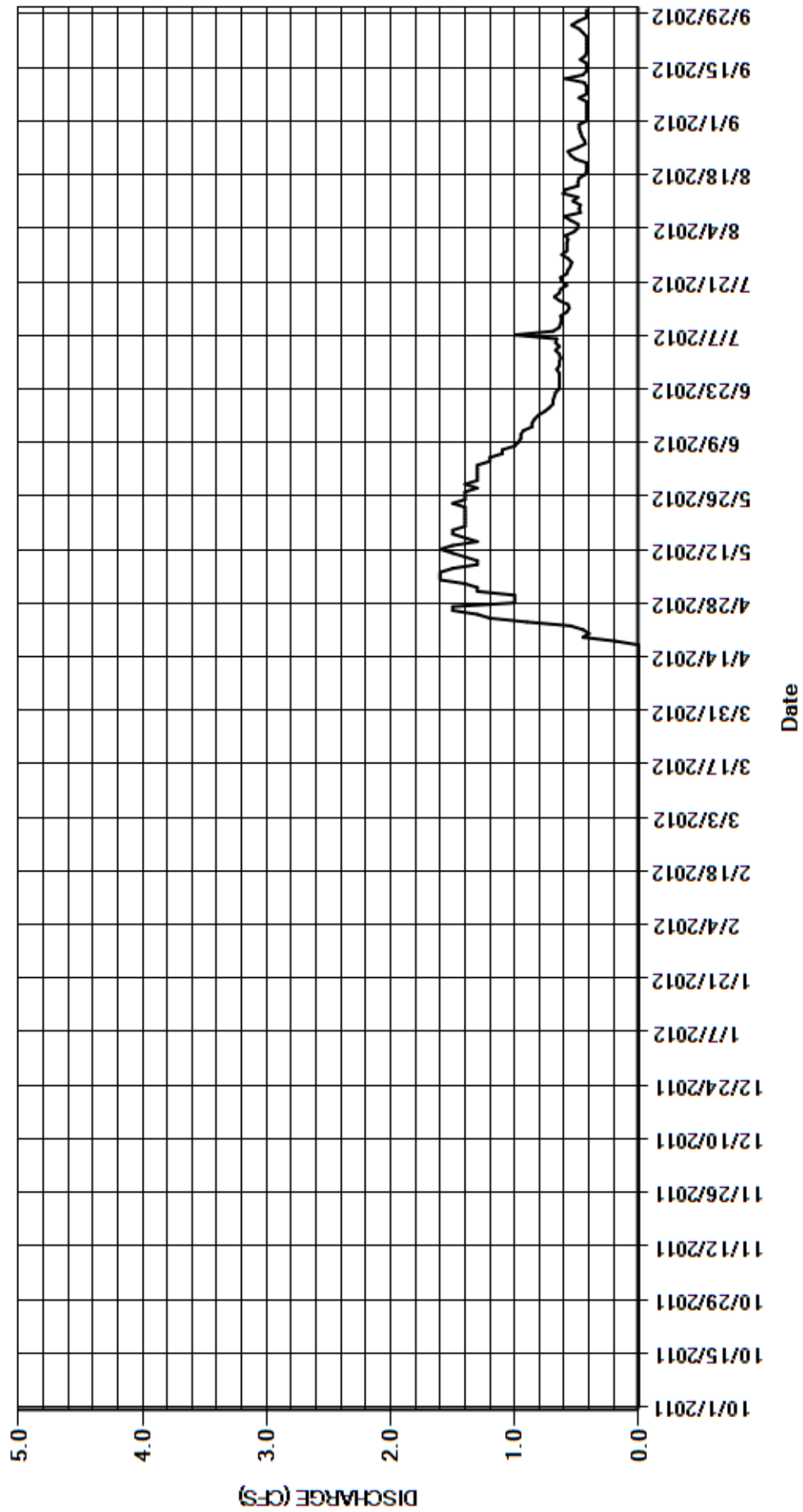
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.3	1.3	0.63	0.57	0.42
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.3	1.3	0.64	0.59	0.42
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.4	1.3	0.67	0.52	0.42
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.6	1.2	0.64	0.49	0.42
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.6	1.2	0.67	0.49	0.42
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.6	1.1	0.66	0.55	0.42
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.5	1.1	1.0	0.60	0.48
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	e1.3	1.0	0.69	0.47	0.42
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	e1.3	0.97	0.64	0.48	0.42
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.4	0.95	0.63	0.47	0.42
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.5	0.95	0.62	0.53	0.44
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.6	0.93	0.63	0.49	0.59
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.5	0.86	0.58	0.61	0.45
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	e1.3	0.86	0.56	0.59	0.42
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.4	0.84	0.57	0.49	0.42
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.5	0.81	0.64	0.49	0.42
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.5	0.76	0.68	0.48	0.47
18	0.00	0.00	0.00	0.00	0.00	0.00	0.19	1.4	0.72	0.64	0.43	0.43
19	0.00	0.00	0.00	0.00	0.00	0.00	e0.45	1.4	0.69	0.63	0.42	0.42
20	0.00	0.00	0.00	0.00	0.00	0.00	e0.40	1.4	0.69	0.58	0.42	0.42
21	0.00	0.00	0.00	0.00	0.00	0.00	e0.45	1.4	0.68	0.62	0.42	0.42
22	0.00	0.00	0.00	0.00	0.00	0.00	e0.55	1.4	0.67	0.63	0.51	0.42
23	0.00	0.00	0.00	0.00	0.00	0.00	e0.90	1.4	0.64	0.58	0.55	0.42
24	0.00	0.00	0.00	0.00	0.00	0.00	1.2	1.5	0.64	0.57	0.57	0.45
25	0.00	0.00	0.00	0.00	0.00	0.00	1.3	1.4	0.64	0.55	0.49	0.48
26	0.00	0.00	0.00	0.00	0.00	0.00	1.5	1.4	0.64	0.54	0.43	0.54
27	0.00	0.00	0.00	0.00	0.00	0.00	1.5	1.4	0.64	0.57	0.44	0.49
28	0.00	0.00	0.00	0.00	0.00	0.00	e1.0	e1.3	0.66	0.62	0.46	0.42
29	0.00	0.00	0.00	0.00	0.00	0.00	e1.0	1.4	0.64	0.58	0.47	0.42
30	0.00	0.00	0.00	0.00	---	0.00	e1.0	1.3	0.64	0.58	0.48	0.42
31	0.00	---	0.00	0.00	---	0.00	---	1.3	---	0.58	0.48	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	11.44	44.0	26.02	19.42	15.48	13.22
MEAN	0.000	0.000	0.000	0.000	0.000	0.000	0.38	1.42	0.87	0.63	0.50	0.44
AC-FT	0	0	0	0	0	0	23	87	52	39	31	26
MAX	0.00	0.00	0.00	0.00	0.00	0.00	1.5	1.6	1.3	1.0	0.61	0.59
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.3	0.64	0.54	0.42	0.42

CAL YR	2011	TOTAL	746.13	MEAN	2.04	MAX	19	MIN	0.00	AC-FT	1480
WTR YR	2012	TOTAL	129.58	MEAN	0.35	MAX	1.6	MIN	0.00	AC-FT	257

MAX DISCH: 2.27 CFS AT 14:30 ON JUL 07,2012 GH 0.32 FT SHIFT -0.03 FT
 MAX GH: 0.37 FT AT 11:00 ON APR 28,2012 (Ice affected)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09062000 EWING DITCH AT TENNESSEE PASS
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
09062500 WURTZ DITCH NEAR TENNESSEE PASS
Water Year 2012

Location.-- Lat. 39°21'15", Long. 106°21'09"; diverts water from tributaries of Eagle River in Colorado River basin to West Tennessee Creek (tributary to Tennessee Creek) in sec. 17, T.8 S., R.80 W., in Arkansas River basin.

Drainage Area and Period of Record.-- 5840 acres; 1947-present.

Equipment.-- Graphic water-stage recorder, satellite-monitored data collection platform (Sutron SatLink high data rate DCP and logger) and shaft encoder in a 30-inch diameter metal pipe shelter and well. Shaft encoder and chart are set to outside staff gage which was relocated to the correct location in WY2010. Control is a 6-foot steel Parshall flume.

Hydrologic Conditions.-- The Wurtz Ditch, in combination with the Wurtz Ditch Extension, are categorized as transmountain diversion structures which intercept runoff from a drainage basin of approximately 5840 acres in the headwaters of the Eagle River basin and empties into West Tennessee Creek, a tributary of the Arkansas River. The conveyance of water across the Continental Divide is accomplished through saddles which traverse the divide. The basin consists primarily of high mountain terrain, some of which is above tree line, with very little development except for the occasional low volume trail road. No hydrologic condition changes were apparent this water year.

Gage-Height Record.-- The primary record is 15-minute satellite data with chart record and DCP log as backup. The record is complete and reliable except Apr 18 when there was partial daily data during start up and Apr 19-22, 28-30 when the gage height was effected by ice. Diversions this water year occurred from April 18 through Aug 3 2012.

Datum Corrections.-- Levels were last run Sept 23, 2008. Some unevenness along the flume floor at the staff gage along with upstream apron elevation were noted.

Rating.-- Control is a 6-foot steel Parshall flume. A standard 6-ft. Parshall flume table (WURDITCO01 dated June 22, 1971) was used this water year. Two discharge measurements (Nos.103-104) were made during this water year. Measurements ranged in discharge from 7.13 to 7.37 cfs. These measurements cover the range of stage experienced for the water year except for lower flows of Apr 18-26, 28-30, May 1-3, 8, 9, 13, 14, 20, 21, 28-31, June 1, 3, 4, 6-30, July 1-31, Aug 1-3 2012; and higher flows of Apr 27, May 4-7, 10, 11, 15-18, 22-27, June 2 2012. The peak discharge of 13.3 cfs occurred at 0015 on May 5, 2012 at a gage height of 0.66 ft with a shift of +0.03 ft. It exceeded the stage of measurement 103, made May 7, 2012, by 0.21 feet.

Discharge.-- Measurements are made in the flume at the staff gage. Shifts were distributed using variable stage shift relationship WURDITCOVS12 which was developed by analysis of current and historical measurements. Measurements were adjusted between -2.28% to 3.33% to better fit the variable shift curve.

Special Computations.-- Hydrographic comparison was made with the upstream gage Wurtz Ditch Extension (WUREXTCO) to verify trends in flow.

Remarks.-- Record is considered good. The peak instantaneous discharge is rated good due to a hydrographic measurement two days prior with no anomalies noted. Station maintained and record developed by Cheston Hart.

Recommendations.-- A new rating curve should be considered which incorporates values from the variable shift curve being used.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09062500 WURTZ DITCH NEAR TENNESSEE PASS

RATING TABLE-- WURDITCO01 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

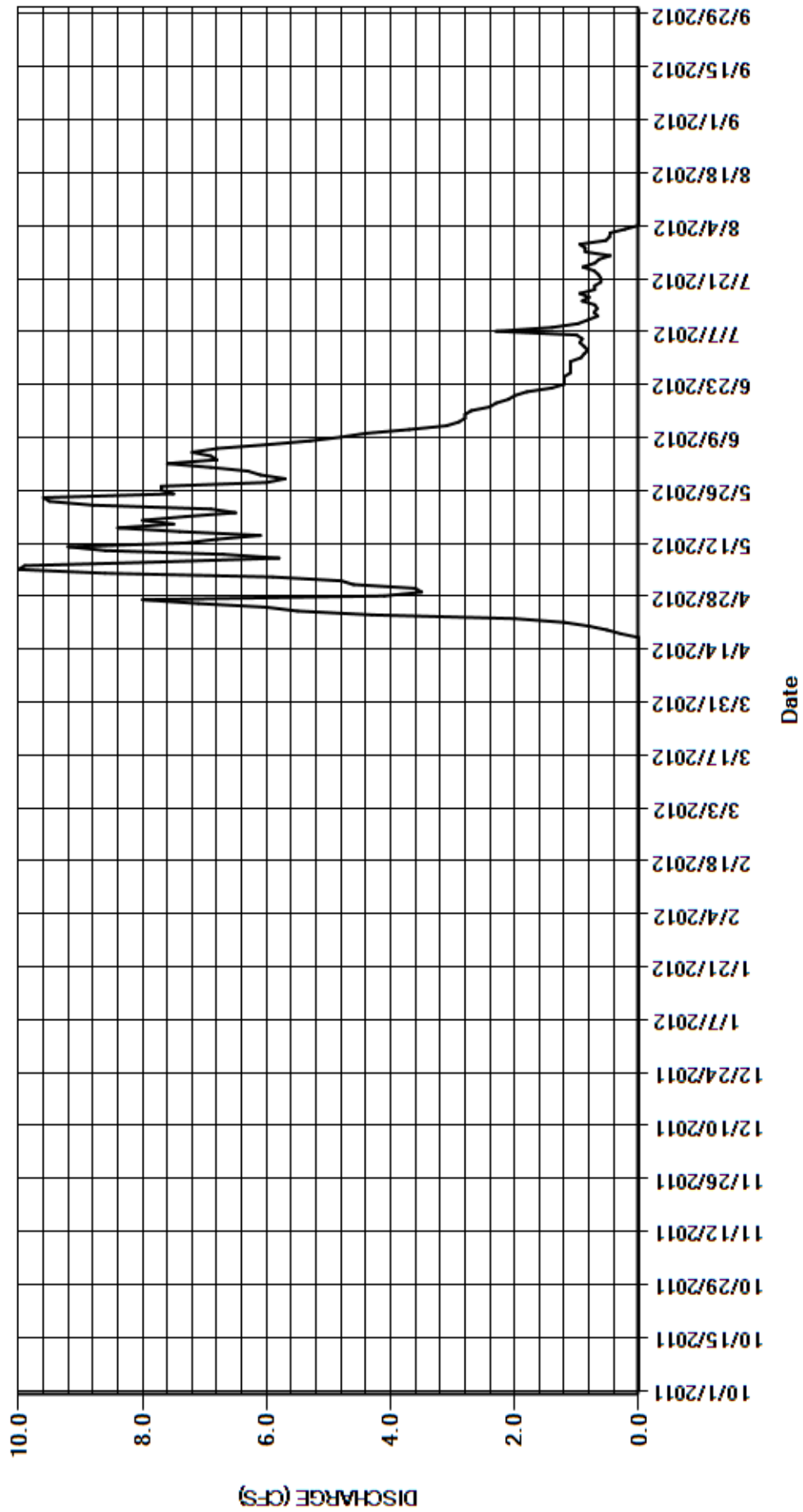
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.6	6.9	0.88	0.47	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.8	7.6	0.82	0.46	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.9	6.8	0.88	0.22	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.6	6.9	0.95	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10	7.2	0.91	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.9	6.8	1.0	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.7	6.0	2.3	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.8	5.3	1.4	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.7	4.8	0.98	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.6	4.4	0.82	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.2	3.7	0.66	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.3	3.1	0.72	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.8	2.9	0.67	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.1	2.8	0.71	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.4	2.8	0.91	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.4	2.7	0.80	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.5	2.4	0.95	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	e0.29	8.0	2.3	0.71	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	e0.51	7.3	2.1	0.71	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	e0.80	6.5	2.0	0.61	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	e1.2	6.9	1.8	0.61	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	e2.0	8.8	1.4	0.65	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	4.3	9.5	1.2	0.72	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	5.5	9.6	1.2	0.90	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	6.0	7.5	1.2	0.71	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	7.1	7.7	1.1	0.64	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	8.0	7.7	1.1	0.46	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	e4.1	6.0	1.1	0.86	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	e3.5	5.7	1.1	0.86	0.00	0.00
30	0.00	0.00	0.00	0.00	---	0.00	e3.6	6.1	0.93	0.95	0.00	0.00
31	0.00	---	0.00	0.00	---	0.00	---	6.3	---	0.53	0.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	46.90	228.9	101.63	26.28	1.15	0.00
MEAN	0.000	0.000	0.000	0.000	0.000	0.000	1.56	7.38	3.39	0.85	0.037	0.000
AC-FT	0	0	0	0	0	0	93	454	202	52	2.3	0
MAX	0.00	0.00	0.00	0.00	0.00	0.00	8.0	10	7.6	2.3	0.47	0.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.6	0.93	0.46	0.00	0.00

CAL YR	2011	TOTAL	1637.80	MEAN	4.49	MAX	56	MIN	0.00	AC-FT	3250
WTR YR	2012	TOTAL	404.86	MEAN	1.11	MAX	10	MIN	0.00	AC-FT	803

MAX DISCH: 13.3 CFS AT 00:15 ON MAY 05,2012 GH 0.66 FT SHIFT 0.03 FT
 MAX GH: 0.66 FT AT 00:15 ON MAY 05,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09062500 WURTZ DITCH NEAR TENNESSEE PASS
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN

WURTZ EXTENSION

Water Year 2012

Location.-- Lat. 39°23'41", Long. 106°21'10", sec. 32, T.7 S., R.80 W., Eagle County.

Drainage Area and Period of Record.-- 5840 acres.; N/A.

Equipment.-- Graphic water-stage recorder, A high data rate DCP satellite-monitored data collection platform and shaft encoder is installed in a 30-inch diameter metal pipe shelter and well. Shaft encoder and chart are set to outside staff gage. Control is a 6-foot, steel Parshall flume. No changes this water year.

Hydrologic Conditions.-- The Wurtz Extension Ditch, in combination with the Wurtz Ditch, are categorized as transmountain diversion structures which intercept runoff from a drainage basin of approximately 5840 acres in the headwaters of the Eagle River basin and empties into West Tennessee Creek, a tributary of the Arkansas River. The conveyance of water across the Continental Divide is accomplished through saddles which traverse the divide. The basin consists primarily of high mountain terrain, some of which is above tree line, with very little development except for the occasional low volume trail road. No hydrologic condition changes were apparent this water year.

Gage-Height Record.-- Primary record is satellite data with chart record and DCP log as backup. The record is complete and reliable. Diversion occurred from Apr 26 through June 22, 2012.

Datum Corrections.-- No levels were run this year, previous levels were run September 23, 2008. No datum corrections were necessary. Some unevenness along the flume floor and the position of the outside staff gage were noted.

Rating.-- Control is a 6-foot, steel Parshall flume. A standard, 6-ft Parshall flume rating table (WUREXDCO01 dated June 22, 1971) was used this water year. One discharge measurement (No. 35) was made this year with a discharge of 1.04 cfs at a gage height of 0.14 ft. This measurement reflects the lower end of the rating which was experienced all of the water year. The peak flow of 2.46 cfs occurred at 2300 May 4, 2012 at a gage height of 0.24 ft. and shift of 0.00 ft. It exceeded the stage of Measurement No. 35, made June 5, 2012, by 0.12 ft.

Discharge.-- Historically measurements are made in the flume at the staff gage but for measurement #35, the measurement was made on the approach apron due to measurement minimum depth issues. Shifts were distributed using variable stage-shift relationship WUREXTCOVSC010 which was developed by analysis of current and historical measurements.

Special Computations.-- No special computations were needed this water year.

Remarks.-- Overall the record is considered good. The peak is also considered good based upon the site visits and related measurement. Station maintained and record developed by Cheston Hart.

Recommendations.-- A flume inspection should be performed to confirm the staff gage location and floor elevations. Depending on the need for flume repairs or replacement, a new rating curve should be considered which incorporates values from the variable shift curve which is being used.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

WURTZ EXTENSION

RATING TABLE-- WUREXDCO01 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

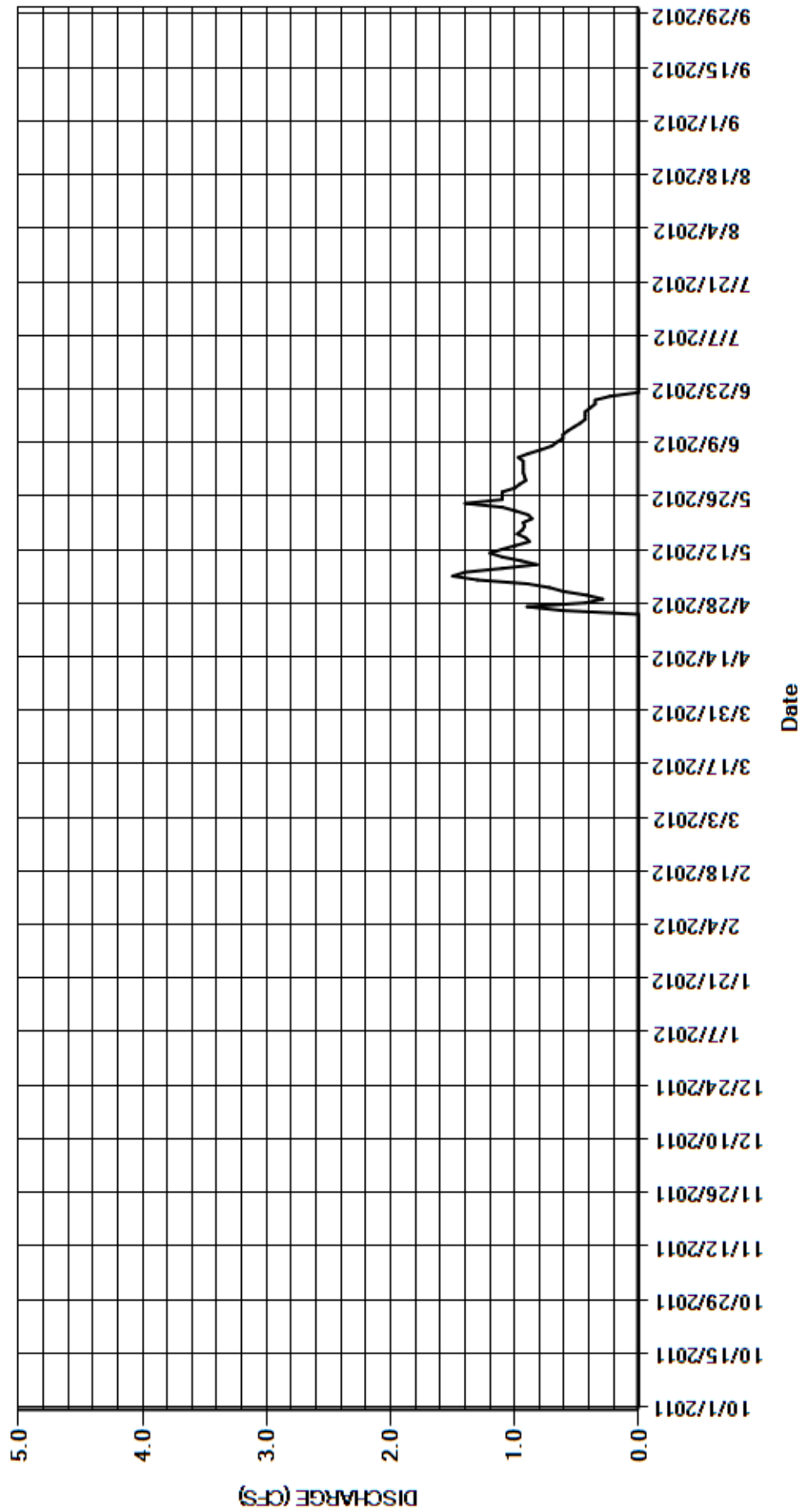
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.61	0.93	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.72	0.93	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.90	0.93	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.3	0.93	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.5	0.97	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.4	0.89	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.1	0.79	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.70	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.95	0.66	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.1	0.61	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.2	0.61	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.1	0.57	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.52	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.88	0.47	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.91	0.43	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.98	0.43	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.94	0.43	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.92	0.39	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.93	0.35	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.86	0.35	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.89	0.23	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.1	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.4	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.1	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.62	1.1	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.90	1.1	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.43	1.0	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.96	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	---	0.00	0.42	0.91	0.00	0.00	0.00	0.00
31	0.00	---	0.00	0.00	---	0.00	---	0.92	---	0.00	0.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	2.66	31.58	13.12	0.00	0.00	0.00
MEAN	0.000	0.000	0.000	0.000	0.000	0.000	0.089	1.02	0.44	0.000	0.000	0.000
AC-FT	0	0	0	0	0	0	5.3	63	26	0	0	0
MAX	0.00	0.00	0.00	0.00	0.00	0.00	0.90	1.5	0.97	0.00	0.00	0.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.61	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	521.72	MEAN	1.43	MAX	23	MIN	0.00	AC-FT	1030
WTR YR	2012	TOTAL	47.36	MEAN	0.13	MAX	1.5	MIN	0.00	AC-FT	94

MAX DISCH: 2.46 CFS AT 23:00 ON MAY 04,2012 GH 0.24 FT SHIFT 0 FT
 MAX GH: 0.24 FT AT 23:00 ON MAY 04,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

WURTZ EXTENSION
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
09063700 HOMESTAKE TUNNEL
Water Year 2012

Location.-- Lat. 39°16'52", Long. 106°25'56"; Homestake tunnel diverts water from Homestake Lake, in sec. 17, T. 8 S., R. 81 W., in Eagle River basin, to Lake Fork Creek in Arkansas River basin.

Drainage Area and Period of Record.-- N/A.; 1967-present.

Equipment.-- Graphic water-stage recorder, high-data rate satellite-monitored data collection platform (DCP) and shaft encoder in a 4 ft x 4 ft wood shelter and concrete well. Stage discharge recorder is set to inside electric tape gage and outside staff gage. Control is a 12-foot concrete Parshall flume. No changes this water year.

Hydrologic Conditions.-- The Homestake Project is categorized as a transmountain diversion structure that collects water from the headwaters of the Eagle River, northwest of Leadville. Water is diverted from several tributaries of Homestake Creek and routed to Homestake Reservoir. Diversions then pass from the reservoir through the Homestake Tunnel to Lake Fork Creek, above Turquoise Reservoir. The collection basin consists primarily of high mountain terrain, some of which is above tree line with no urban development. No hydrologic condition changes were apparent this water year. Homestake Reservoir was drained to allow repairs on the dam during 2012. Repairs will continue in 2013.

Gage-Height Record.-- The primary record is 15-minute satellite data with the stage discharge recorder used for backup purposes. The record is complete and reliable for the seasonally operated gage except for occasional missing data throughout the discharge period which was replaced with backup data or linear interpolation without loss of accuracy.

Datum Corrections.-- Levels were last run on July 11, 2006.

Rating.-- A standard 12-ft. Parshall flume rating table (HOMTUNCO01 dated June 11, 1975) was used the entire water year. Five discharge measurements (No. 123-127) were made this year with measured discharges ranging from 0 cfs to 258 cfs. Daily flows varied during the water year from zero to 262 cfs. The instantaneous peak discharge of 276 cfs occurred at 1130 on Jan 24, 2012 at a gage height of 2.91 ft and a shift of +0.12 ft. This peak exceeded the stage of the maximum Measurement No. 124 by 0.13 feet.

Discharge.-- Measurements are made from a bridge near the intake/staff gage position. Shifts were applied as defined by measurements and were distributed by stage using variable stage-shift relationship HOMTUNCOVS12 which was utilized during the water year and developed using current and past measurement data. WY2012 measurements showed shifts ranging from +0.00 to +0.12 ft. Subsequent measurements will continue to reinforce the direction of the curve.

Special Computations.-- No special computations were used this water year.

Remarks.-- Record is considered fair, due to the fact most measurements are rated fair to poor given the surging effect of flows from the tunnel and through the flume. ADCP measurements were attempted but not possible at current measurement location. The peak gage height and flow are considered fair due to the surging effect. Station maintained and record developed by Cheston Hart.

Recommendations.-- Continued research should be attempted to reduce the surge effect. A level survey should be completed in the next water year. The standard rating curve needs to be updated to reflect the use of a variable shift curve.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09063700 HOMESTAKE TUNNEL

RATING TABLE-- HONTUNCO01 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

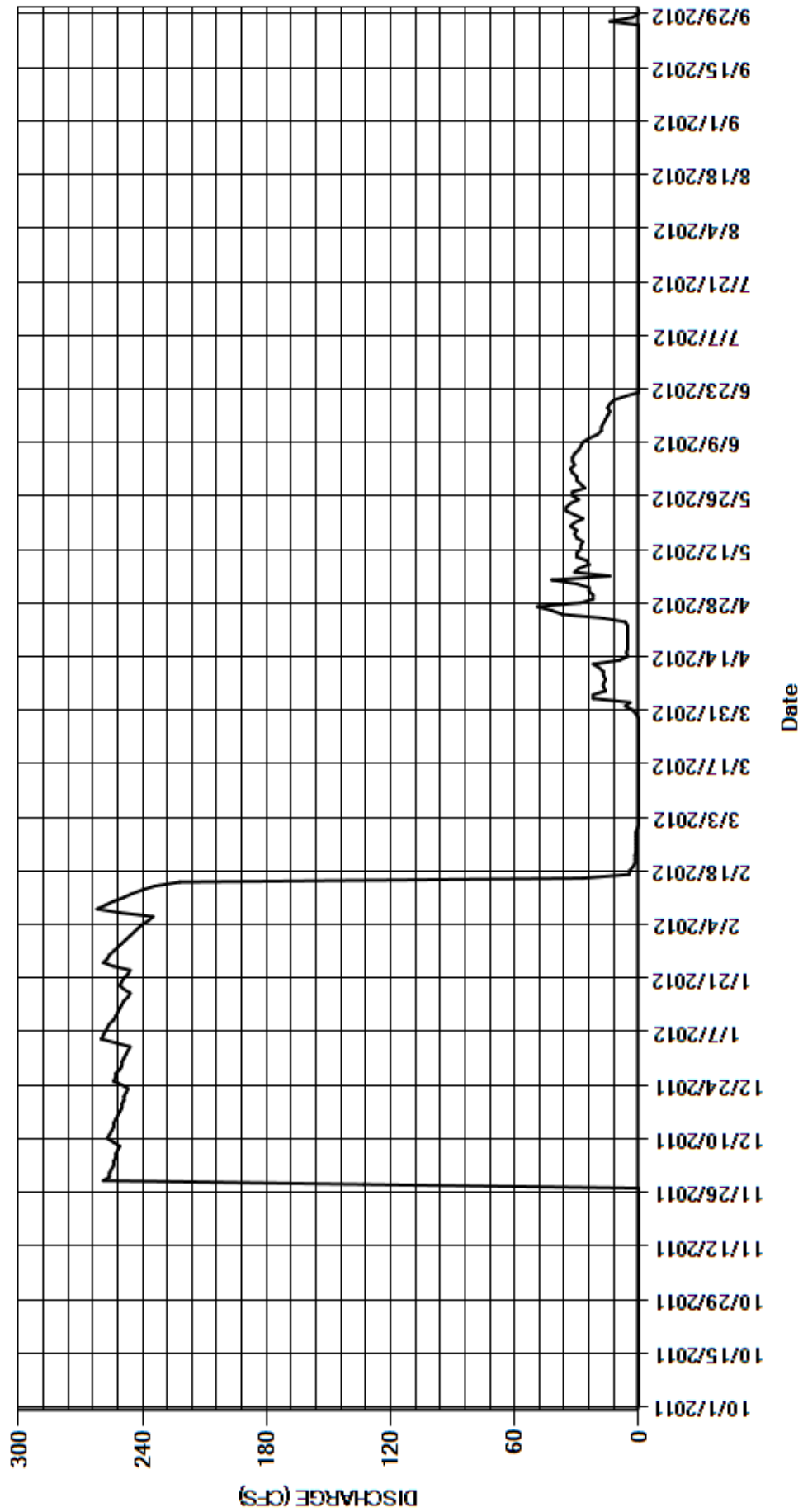
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	256	248	246	0.00	6.5	24	32	0.00	0.00	0.00
2	0.00	0.00	255	247	244	0.00	4.2	24	33	0.00	0.00	0.00
3	0.00	0.00	254	246	242	0.00	22	30	31	0.00	0.00	0.00
4	0.00	0.00	254	253	240	0.00	22	42	32	0.00	0.00	0.00
5	0.00	0.00	253	260	237	0.00	16	14	32	0.00	0.00	0.00
6	0.00	0.00	253	259	235	0.00	17	31	31	0.00	0.00	0.00
7	0.00	0.00	252	258	251	0.00	17	29	29	0.00	0.00	0.00
8	0.00	0.00	251	257	262	0.00	16	24	28	0.00	0.00	0.00
9	0.00	0.00	254	256	258	0.00	17	25	27	0.00	0.00	0.00
10	0.00	0.00	257	254	254	0.00	17	30	24	0.00	0.00	0.00
11	0.00	0.00	256	253	249	0.00	19	30	20	0.00	0.00	0.00
12	0.00	0.00	255	252	245	0.00	22	28	18	0.00	0.00	0.00
13	0.00	0.00	254	251	240	0.00	9.2	28	18	0.00	0.00	0.00
14	0.00	0.00	254	250	234	0.00	5.4	27	17	0.00	0.00	0.00
15	0.00	0.00	253	249	222	0.00	5.9	30	16	0.00	0.00	0.00
16	0.00	0.00	252	247	27	0.00	5.4	31	15	0.00	0.00	0.00
17	0.00	0.00	251	246	4.6	0.00	5.4	30	14	0.00	0.00	0.00
18	0.00	0.00	250	249	4.4	0.00	5.4	33	15	0.00	0.00	0.00
19	0.00	0.00	250	251	2.8	0.00	5.4	31	14	0.00	0.00	0.00
20	0.00	0.00	249	250	1.7	0.00	5.4	27	12	0.00	0.00	0.00
21	0.00	0.00	249	249	1.8	0.00	5.4	31	6.5	0.00	0.00	0.00
22	0.00	0.00	248	247	1.8	0.00	5.3	35	0.00	0.00	0.00	0.00
23	0.00	0.00	247	246	1.4	0.00	6.5	35	0.00	0.00	0.00	0.00
24	0.00	0.00	250	254	1.4	0.00	17	33	0.00	0.00	0.00	0.00
25	0.00	0.00	254	259	1.4	0.00	37	29	0.00	0.00	0.00	0.00
26	0.00	0.00	253	257	1.4	0.00	42	32	0.00	0.00	0.00	0.00
27	0.00	0.00	253	256	1.4	0.00	49	32	0.00	0.00	0.00	14
28	0.00	133	251	254	1.4	0.00	28	26	0.00	0.00	0.00	3.0
29	0.00	259	250	252	0.57	0.14	22	28	0.00	0.00	0.00	0.00
30	0.00	256	250	250	---	1.3	22	30	0.00	0.00	0.00	0.00
31	0.00	---	249	248	---	3.1	---	30	---	0.00	0.00	---
TOTAL	0.00	648.00	7817	7808	3712.07	4.54	477.4	909	464.50	0.00	0.00	17.00
MEAN	0.000	21.6	252	252	128	0.15	15.9	29.3	15.5	0.000	0.000	0.57
AC-FT	0	1290	15510	15490	7360	9.0	947	1800	921	0	0	34
MAX	0.00	259	257	260	262	3.1	49	42	33	0.00	0.00	14
MIN	0.00	0.00	247	246	0.57	0.00	4.2	14	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	24717.50	MEAN	67.7	MAX	269	MIN	0.00	AC-FT	49030
WTR YR	2012	TOTAL	21857.51	MEAN	59.7	MAX	262	MIN	0.00	AC-FT	43350

MAX DISCH: 276 CFS AT 11:30 ON JAN 24,2012 GH 2.91 FT SHIFT 0.12 FT
 MAX GH: 2.91 FT AT 11:30 ON JAN 24,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09063700 HOMESTAKE TUNNEL
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
09077160 CHARLES H. BOUSTEAD TUNNEL
Water Year 2012

Location.-- Lat. 39°16'40", Long. 106°25'40"; Charles H. Boustead Tunnel diverts water from the main stem and tributaries of the Fryingpan River in the Colorado River basin, to Lake Fork Creek in sec. 10, T. 9 S., R. 81 W., in the Arkansas River basin.

Drainage Area and Period of Record.-- N/A; 1972-present

Equipment.-- Stage discharge recorder (SDR) and satellite-monitored data collection platform in a 5 ft x 5 ft concrete shelter and well at a 15-foot concrete Parshall Flume. The SDR is set to inside electric tape gage. Outside staff gage used for supplemental reference gage. Bridge across concrete section at the entrance to the converging section of the flume is used for making high water cable and ADCP measurements. No changes this water year.

Hydrologic Conditions.-- The Charles H. Boustead Tunnel (a.k.a. Divide Tunnel) transports water from the Fryingpan River under the Continental Divide to the head of Turquoise Reservoir in the Arkansas River Basin. Diversions from the west slope are made from an elevation of 10,002 feet. The Boustead Tunnel is approximately 5.4 miles long, is horseshoe shaped with a diameter of 10.5 feet, has a maximum overburden of approximately 2000 feet, and a decreed capacity of 1000 cubic feet per second. The basin consists primarily of high mountain terrain, some of which is above tree line, with very little development except for the low volume trail road. No hydrologic condition changes were apparent this water year.

Gage-Height Record.-- Primary record is 15-minute satellite data with the SDR used for backup purposes. Record is complete and reliable.

Datum Corrections.-- Levels were last run on Aug 11, 2005. Elevation control was established using RM #1 (Elev 9.75) as base. No corrections were necessary.

Rating.-- Control is a 15-foot concrete Parshall Flume. A standard 15-ft. Parshall flume table (BOUTUNCO01 dated May 16, 1972) was used this water year. One discharge measurement (No. 71) was made during this year. Measurement 71 was made at a GH of 2.37 and flow of 243 cfs. The peak flow of 469 cfs occurred at 2145 May 22, 2012 at a gage height of 3.61 ft with a shift of +0.09 ft. It exceeded the stage of Meas. 71, made May 23, 2012, by 1.24 feet.

Discharge.-- Shifts were distributed by stage the entire year using shift curve BOUTUNCOVS09 which is based on a number of previous and current year measurements. Measurement 71 was discounted 5.6% to smooth distribution and fit the historical shift curve.

Special Computations.-- Datum corrections were applied from July 16 through Sept 30 due to the bypass waste gate being open during construction time. Datum corrections were estimated based on site visits and straight line theory between the times gate was open and closed. Datum correction was used to correct this because there was actual water crossing the gage along with the bypass. These values are still considered estimates considering the situation.

Remarks.-- Record is considered poor through times of estimated record of July 16 through Sept 30 2012, the rest of the record is considered good. The peak event is rated good. The Boustead Tunnel flume is located approximately 90 feet downstream of the mouth of Boustead Tunnel. The approach channel from the mouth of the tunnel to the flume is a concrete rectangular section. The channel section diverges in width from the tunnel width at the mouth to a width of approximately 25 feet over a distance of about 70 feet. This is followed by approximately 20 feet of channel having a constant 25-ft width. This constant width section ends at the flume entrance. The floor of the approach channel is flat. There are no provisions over this 90-foot reach for a deeper channel section prior to the flume entrance, nor any other channel modifications, to help still and slow the flow to the recommended tranquil flow conditions. Observations of flow conditions at higher stages over the past several years have indicated the approach velocities to the flume are too high and poorly distributed by the time flow reaches the flume entrance. This results in increasing positive shifts to the rating as stage increases. Station operated and record developed by Cheston Hart.

Recommendations.-- Use of the ADCP has been attempted in the past two years and it was found the boat could not handle flows much higher than a GH of 3 ft due to high velocity and surging. Because of the surging, measurements with the ADCP were performed using a minimum of 8 transects to help average the surge. The ADCP was found to be useful for those midrange measurements. Further testing of the ADCP in various locatins should be attempted. Due to the access and difficulty in setting up temporary cable, the ADCP was limited to testing only in flume in WY12. Downstream conditions may allow higher flow measurements to be performed using the ADCP. Additional measurements are needed to better define the variable stage shift relationship and where the transition away from the standard 15 ft PF rating occurs.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09077160 CHARLES H. BOUSTEAD TUNNEL

RATING TABLE-- BOUTUNCO01 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

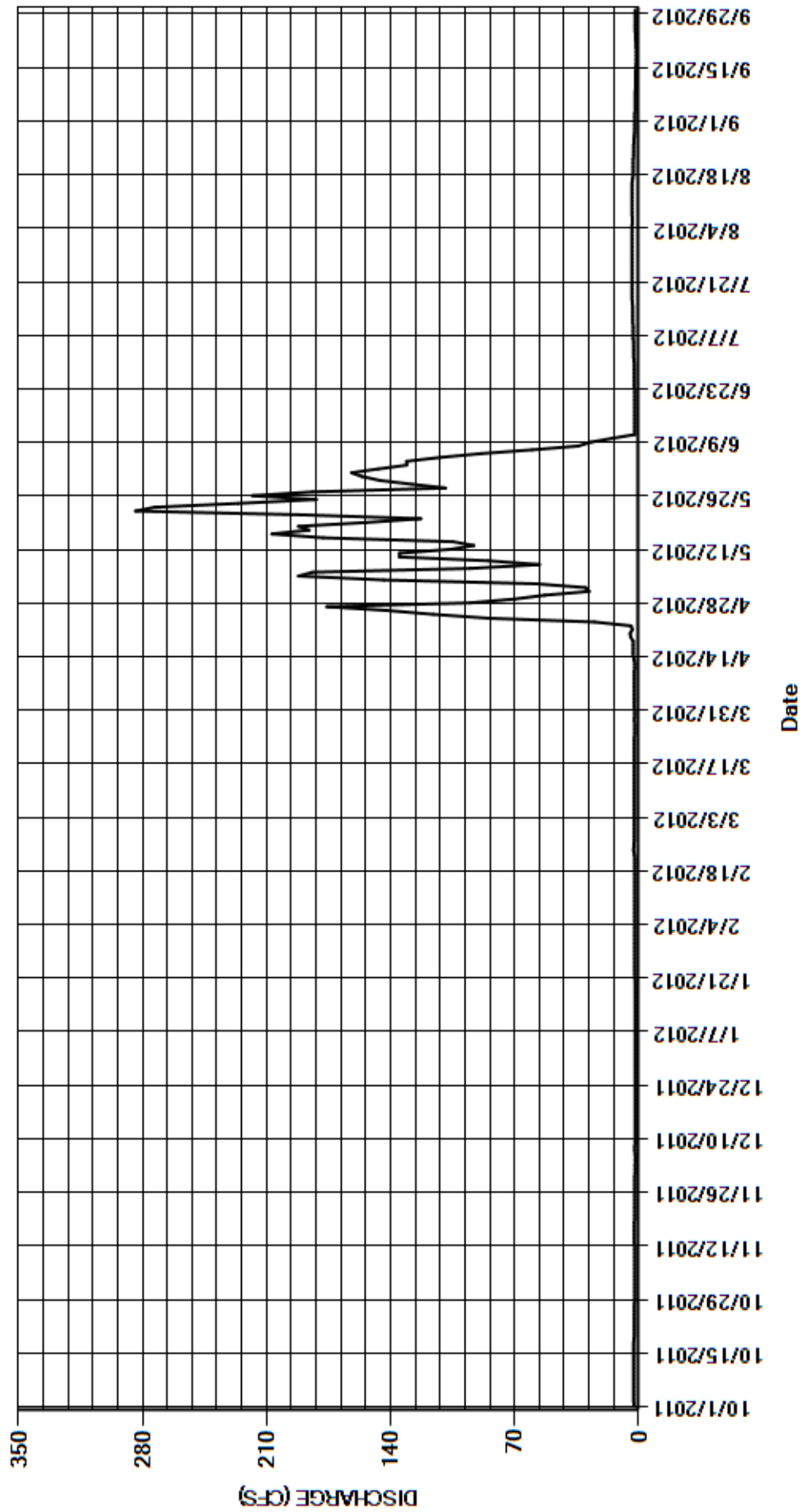
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.6	2.2	2.1	1.9	2.2	2.5	2.5	28	162	2.8	3.7	2.2
2	2.8	2.2	2.1	1.9	2.2	2.5	2.5	30	147	2.8	3.7	2.2
3	2.8	2.2	2.1	1.9	2.2	2.5	2.5	58	131	2.8	3.7	2.2
4	2.8	2.2	1.9	1.9	2.2	2.5	2.5	144	131	2.8	3.7	1.9
5	2.8	2.2	1.9	1.9	2.2	2.5	2.5	192	112	2.9	3.7	1.9
6	2.8	2.2	2.1	1.9	2.2	2.5	2.5	184	89	3.1	3.5	1.9
7	2.8	2.2	2.2	1.9	2.2	2.5	2.5	95	60	3.1	3.7	1.9
8	2.8	2.2	2.2	1.9	2.2	2.5	2.5	56	34	3.1	3.7	1.9
9	2.8	2.2	2.0	1.9	2.2	2.5	2.5	85	27	3.1	3.7	1.9
10	2.8	2.2	1.9	1.9	2.2	2.5	2.5	135	15	3.3	3.7	1.7
11	2.8	2.2	1.9	1.9	2.2	2.5	2.2	135	2.2	3.4	3.7	1.7
12	2.8	2.3	1.9	1.9	2.2	2.5	2.2	106	2.2	3.4	3.7	1.7
13	2.8	2.5	1.9	1.9	2.2	2.5	2.5	93	2.2	3.4	3.7	1.7
14	2.8	2.5	1.9	1.9	2.2	2.5	3.1	105	2.2	3.4	3.7	1.7
15	2.8	2.5	1.9	1.9	2.2	2.5	3.1	178	2.2	3.5	3.7	1.6
16	2.8	2.5	1.9	1.9	2.2	2.5	3.1	207	2.2	3.7	3.7	1.4
17	2.8	2.5	1.9	1.9	2.2	2.5	3.1	186	2.2	3.7	3.4	1.4
18	2.8	2.5	1.9	1.9	2.2	2.5	3.1	192	2.2	3.7	3.1	1.4
19	2.6	2.2	1.9	1.9	2.2	2.5	4.5	154	2.2	3.7	3.1	1.4
20	2.5	2.2	1.9	2.0	2.2	2.5	4.9	123	2.2	3.7	3.1	1.5
21	2.5	2.2	1.9	2.2	2.2	2.5	3.6	189	2.2	3.7	3.1	1.5
22	2.5	2.2	1.9	2.2	2.4	2.5	4.3	284	2.2	3.7	3.1	1.7
23	2.5	2.2	1.9	2.2	2.8	2.5	25	273	2.4	3.7	2.9	1.7
24	2.5	2.2	1.9	2.2	2.8	2.4	85	226	2.5	3.7	2.8	1.9
25	2.5	2.2	1.9	2.2	2.7	2.2	116	182	2.5	3.7	2.8	1.9
26	2.5	2.2	1.9	2.2	2.5	2.2	142	218	2.5	3.7	2.8	2.0
27	2.5	2.2	1.9	2.2	2.5	2.2	176	184	2.5	3.7	2.7	1.9
28	2.4	2.2	1.9	2.2	2.5	2.4	95	109	2.5	3.7	2.5	1.9
29	2.2	2.2	1.9	2.2	2.5	2.4	70	128	2.5	3.7	2.3	1.9
30	2.2	2.2	1.9	2.2	---	2.3	53	146	2.6	3.7	2.2	1.9
31	2.2	---	1.9	2.2	---	2.4	---	156	---	3.7	2.2	---
TOTAL	81.8	67.9	60.4	62.3	66.9	76.0	826.7	4581	954.4	106.1	101.1	53.5
MEAN	2.64	2.26	1.95	2.01	2.31	2.45	27.6	148	31.8	3.42	3.26	1.78
AC-FT	162	135	120	124	133	151	1640	9090	1890	210	201	106
MAX	2.8	2.5	2.2	2.2	2.8	2.5	176	284	162	3.7	3.7	2.2
MIN	2.2	2.2	1.9	1.9	2.2	2.2	2.2	28	2.2	2.8	2.2	1.4

CAL YR	2011	TOTAL	50331.0	MEAN	138	MAX	957	MIN	1.9	AC-FT	99830
WTR YR	2012	TOTAL	7038.1	MEAN	19.2	MAX	284	MIN	1.4	AC-FT	13960

MAX DISCH: 469 CFS AT 21:45 ON MAY 22,2012 GH 3.61 FT SHIFT 0.09 FT
 MAX GH: 3.61 FT AT 21:45 ON MAY 22,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09077160 CHARLES H. BOUSTEAD TUNNEL
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
09077500 BUSK-IVANHOE TUNNEL
Water Year 2012

Location.-- Lat. 39°14'55", Long. 106°28'14"; Water diverted from Ivanhoe Lake, tributary to Fryingpan River in sec. 13, T. 9 S., R. 82 W., in Roaring Fork River Basin, to Busk Creek (tributary to Lake Fork) in sec. 20, T. 9 S., R. 81 W., in Arkansas River Basin.

Drainage Area and Period of Record.-- N/A; 1948-present.

Equipment.-- Graphic water-stage recorder, satellite-monitored data collection platform (High data rate DCP and logger) and shaft encoder in a 3 ft x 3 ft metal shelter and well. Shaft encoder and chart recorder are set to outside staff gage. Control is a 5-foot steel Parshall flume. No changes this water year.

Hydrologic Conditions.-- The Busk-Ivanhoe Tunnel (a.k.a. the Carlton Tunnel) was originally built as a railroad tunnel. The tunnel diverts water from the headwaters of Ivanhoe Creek, a tributary of the Fryingpan River. The Tunnel is 1.3 miles long and delivers the water to Busk Creek, which is tributary to the Turquoise Reservoir of the Arkansas River Basin. The basin consists primarily of high mountain terrain, some of which is above tree line, with very little development except for the occasional low volume trail road. No hydraulic condition changes were apparent this water year.

Gage-Height Record.-- The primary record is 15-minute satellite data with chart record and DCP log as backup. Record is complete and reliable except for August 2, 3 2012 when the shaft encoder failed and had to be replaced. Data during this time was replaced using chart record with no loss in accuracy.

Datum Corrections.-- Levels were not run this year.

Rating.-- A standard 5-ft. Parshall flume table (STD05FTP09) was used the entire water year. Four discharge measurements (Nos. 112-115), ranging in discharge from 0.76 to 37.1 cfs, were made during the year. They covered the range in flows except for the lower daily flows of Oct 1-5; Nov 13-19, 26, 27; Dec 1, 2, 5, 18-31 2011; Jan 1-31; Feb 1-26; Mar 9-25; Aug 6-31 and September 1-30, 2012; and the higher mean daily flows of May 24-27, 2012. The peak discharge of 38.1 cfs occurred at 2030 on May 23, 2012 at a gage height of 1.46 ft with a shift of 0.04 ft. The peak exceeded the stage of high flow measurement 114, made May 23, 2012 by 0.02 feet.

Discharge.-- Shifting control method was used the entire year. Shifts were distributed by time from Oct 1-24 2011. Shifts were distributed by stage using variable stage shift relation BUSTUNCOVS12 from Oct 24 2011 thru Sept 30 2012. Measurements show shifts ranging from -0.03 to 0.04 ft.

Special Computations.-- No special computations were used this water year.

Remarks.-- Gage is operated during the winter months without a chart. The site is visited by Pueblo Board of Water Works staff by snow machine during the months that the gage is not accessible by vehicle. The gage remains ice free by running a 1-inch water line from the tunnel directly into the well. The flume inlet is 2-in diameter, which allows a constant flow through the inlet and helps keep the well thawed and accurate. Overall the record is considered good, except for the winter operation months of October thru April 25th and those are considered poor. The peak gage height and discharge are also considered good since a field measurement was made the same day of the peak event with no significant change in shift. Station maintained and record developed by Cheston Hart.

Recommendations.-- Approach conditions need to be improved so the Parshall flume can be operated in a more predicable manner. A complete flume inspection and levels needs to be completed as soon as possible.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09077500 BUSK-IVANHOE TUNNEL

RATING TABLE.-- STD05FTP09 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

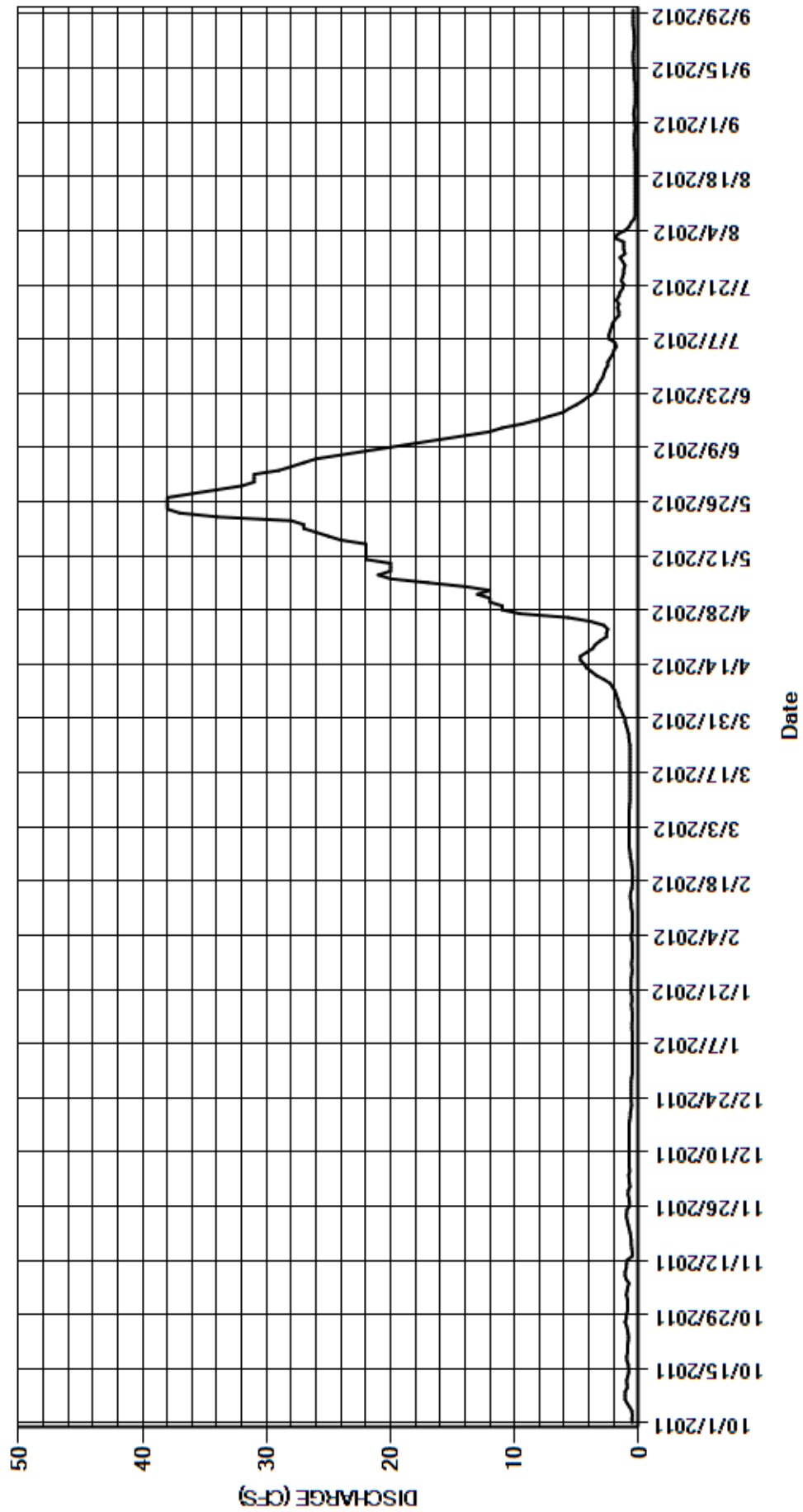
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.52	0.88	0.70	0.52	0.52	0.78	1.3	12	31	2.5	1.2	0.36
2	0.54	0.92	0.75	0.52	0.52	0.78	1.4	13	31	2.3	e1.9	0.35
3	0.52	1.0	0.78	0.52	0.59	0.78	1.6	12	29	2.1	e1.7	0.41
4	0.55	0.94	0.81	0.52	0.60	0.79	1.6	14	28	2.0	1.1	0.39
5	0.72	0.89	0.72	0.52	0.52	0.78	1.7	17	27	1.8	0.77	0.32
6	0.93	0.78	0.76	0.52	0.52	0.78	1.8	20	26	1.9	0.62	0.29
7	1.1	1.0	0.78	0.52	0.52	0.78	1.9	21	24	2.4	0.35	0.29
8	1.1	1.1	0.78	0.53	0.52	0.74	2.1	20	22	2.4	0.29	0.29
9	1.1	1.1	0.78	0.52	0.52	0.72	2.3	20	20	2.3	0.29	0.29
10	0.93	1.0	0.78	0.52	0.53	0.69	2.8	20	18	2.2	0.29	0.29
11	0.95	0.98	0.78	0.56	0.60	0.69	3.4	22	16	2.1	0.29	0.29
12	0.98	0.94	0.78	0.55	0.60	0.69	3.8	22	14	1.9	0.29	0.35
13	0.88	0.52	0.78	0.52	0.66	0.69	4.2	22	12	1.6	0.29	0.37
14	0.81	0.52	0.78	0.52	0.69	0.69	4.4	22	11	1.6	0.29	0.36
15	0.82	0.56	0.78	0.52	0.65	0.69	4.7	22	9.4	1.7	0.29	0.38
16	0.84	0.60	0.78	0.55	0.55	0.69	4.7	24	8.2	1.6	0.29	0.43
17	0.95	0.60	0.78	0.60	0.52	0.69	4.2	25	7.2	1.8	0.29	0.44
18	0.98	0.64	0.74	0.53	0.52	0.69	3.7	26	6.1	1.6	0.29	0.44
19	0.91	0.69	0.69	0.53	0.49	0.69	3.5	27	5.6	1.5	0.29	0.44
20	0.88	0.76	0.68	0.60	0.52	0.69	3.1	27	5.0	1.3	0.29	0.39
21	0.90	0.84	0.62	0.62	0.52	0.69	2.6	28	4.5	1.2	0.29	0.36
22	0.85	0.92	0.58	0.62	0.56	0.69	2.6	34	4.1	1.4	0.29	0.36
23	0.82	0.98	0.60	0.60	0.59	0.69	2.5	37	3.6	1.3	0.29	0.36
24	0.86	0.98	0.60	0.60	0.68	0.70	2.8	38	3.4	1.2	0.29	0.38
25	0.91	0.96	0.60	0.55	0.69	0.75	3.9	38	3.3	1.2	0.32	0.41
26	0.98	0.72	0.60	0.52	0.73	0.80	5.7	38	3.1	1.1	0.36	0.44
27	1.1	0.75	0.60	0.56	0.78	0.82	9.6	38	2.9	1.3	0.36	0.44
28	0.99	0.78	0.60	0.56	0.78	0.91	11	36	2.8	1.5	0.36	0.44
29	0.98	0.86	0.59	0.52	0.78	1.0	11	34	2.7	1.1	0.34	0.44
30	0.89	0.84	0.52	0.52	---	1.1	12	32	2.5	1.2	0.30	0.44
31	0.91	---	0.52	0.52	---	1.1	---	31	---	1.2	0.30	---
TOTAL	27.20	25.05	21.64	16.88	17.27	23.77	121.9	792	383.4	52.3	14.91	11.24
MEAN	0.88	0.84	0.70	0.54	0.60	0.77	4.06	25.5	12.8	1.69	0.48	0.37
AC-FT	54	50	43	33	34	47	242	1570	760	104	30	22
MAX	1.1	1.1	0.81	0.62	0.78	1.1	12	38	31	2.5	1.9	0.44
MIN	0.52	0.52	0.52	0.52	0.49	0.69	1.3	12	2.5	1.1	0.29	0.29

CAL YR	2011	TOTAL	1986.84	MEAN	5.44	MAX	50	MIN	0.52	AC-FT	3940
WTR YR	2012	TOTAL	1507.56	MEAN	4.12	MAX	38	MIN	0.29	AC-FT	2990

MAX DISCH: 38.1 CFS AT 20:30 ON MAY 23,2012 GH 1.46 FT SHIFT 0.04 FT
 MAX GH: 1.46 FT AT 20:30 ON MAY 23,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09077500 BUSK-IVANHOE TUNNEL
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
09073000 TWIN LAKES TUNNEL
Water Year 2012

Location.-- Lat. 39°04'56", Long. 106°32'24"; diverts water from tributaries of Roaring Fork River in Colorado River Basin to North Fork Lake Creek in sec. 22, T.11 S., R.82 W., in Arkansas River Basin.

Drainage Area and Period of Record.-- N/A; 1935-present.

Equipment.-- Graphic water-stage recorder, satellite-monitored data collection platform (DCP) and shaft encoder in a 5 ft x 5 ft concrete shelter and well. Shaft encoder and chart are set to inside electric tape gage. An outside staff gage is used for supplemental reference. Control is a 12-foot concrete Parshall flume. No changes this water year.

Hydrologic Conditions.-- The collection system is located in the headwaters of the Roaring Fork River. Water is diverted into Grizzly reservoir, which is located in Lincoln Gulch. Grizzly has an active capacity of 570 acre-feet, but normally fluctuates less than 400 acre-feet. From Grizzly Reservoir, the water flows under the continental divide through the Twin lakes (a.k.a. Independence pass) Tunnel into North Fork Lake Creek. The Twin lakes Tunnel is circular, concrete lined and 8.5 feet in diameter. The tunnel is about 4 miles long and has a capacity of 625 cubic feet per second. The western portal of the Twin Lakes tunnel is an elevation of 10,520 feet, the eastern portal is at 10,460 feet, and the tunnel has a maximum overburden of 2630 feet. During the winter the snow closes the road between the caretaker's house and the town of Aspen, the tunnel is then operated to allow the caretaker's family to travel thru the tunnel to Buena Vista each day. No hydrologic condition changes were apparent this water year.

Gage-Height Record.-- The primary record is 15-minute satellite data with chart record and DCP log as backup. Record is complete and reliable. Use of drain valve this year did not seem to affect gage height in the stilling well and the circulating water did help in decreasing ice effect within the well. Missing data on July 14 and August 20 were filled in using gage height trends from adjacent good record.

Datum Corrections.-- Levels were last run on 22 Oct 2007. No corrections were made.

Rating.-- Control is a 12-foot concrete Parshall flume. A standard 12-foot Parshall flume rating table (STD12FPF dated May 16, 1972) was used the entire water year. Two discharge measurements (Nos. 109-110) were made during the year. Measurements ranged in discharge from 29.4 to 231 cfs. They cover the range in stage experienced except for many lower flow days of October 1-7, 9-13, 15-31; Nov 1-30; Dec 1-31 2011; Jan 1-31; Feb 1-28; Mar 1-31; July 3, 5, 8, 14, 16-22, 24, 25, 31; Aug 1-31; Sept 1-14, 16-30 2012 and higher flow days of May 22, 23; June 2, 4 2012. The peak discharge of 374 cfs occurred at 2315 on May 21, 2012 at a gage height of 3.61 feet with a shift of 0.06 feet. Peak exceeded the Measurement 110, made May 21, 2012 by 1.07 feet.

Discharge.-- Wading measurements may be made in the flume at the staff gage (using extreme caution) up to a gage height of about 1.80 ft. High flow measurements are made with a bridge crane with the meter and weight assembly suspended at the outside staff gage position in the flume. A rigid 2-in pipe is installed at this location to act as a stay bar to reduce meter and weight movement downstream. Hose clamps on the pipe are used to control the position of the cable and reduce meter and weight lateral movement caused by the extreme turbulence in the measurement section. This measurement section is a standard 14.7 ft width. Shifting control method was used for the entire water year. Shifts occur due to excessive approach velocities and the turbulence/ waves in the flume due to the approach section entering the flume at an angle. These problems are exacerbated in the gage height range of 2.5 to 4.5 ft. Shifts were distributed by stage using the variable stage-shift relationship TWITUNCOSC11Z for the entire water year. Due to the short run off and limited operation of the tunnel made making measurements difficult this water year. The continued use of TWITUNCOSC11Z was based on historical measurements and the fact no changes were made this water year. Both WY12 measurements were discounted to fit the shift curve.

Special Computations.-- Because it is difficult to read the outside staff gage at high flows due to surging and turbulence, the stilling well gage height value is used for weighted mean gage height and water depth in the flume. During times of high flows, it appears that a drawdown effect may be lowering the gage height in the stilling well due to high velocities passing the inlet pipe. Since this is an unconfirmed phenomenon, stilling well gage height values are not adjusted.

Remarks.-- Record is considered good, except for the winter months of November through March, which is fair and days of missing data (July 14, Aug 20 2012) which are poor. The peak discharge is rated good. An ADVN was installed in the Tunnel upstream of the mouth as an additional measurement device, but up to this point has not produced reliable data. During this water year the ADVN was removed and repaired by the manufacturer. Station maintained and record developed by Cheston Hart.

Recommendations.-- Additional measurements are needed to better define shifts to the rating throughout all stages. Measurements and stage recording at the flume would benefit considerably from flow straightening and energy dissipation baffles installed upstream of the flume entrance. Levels should be run in WY2013.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09073000 TWIN LAKES TUNNEL

RATING TABLE-- STD12FTPF USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

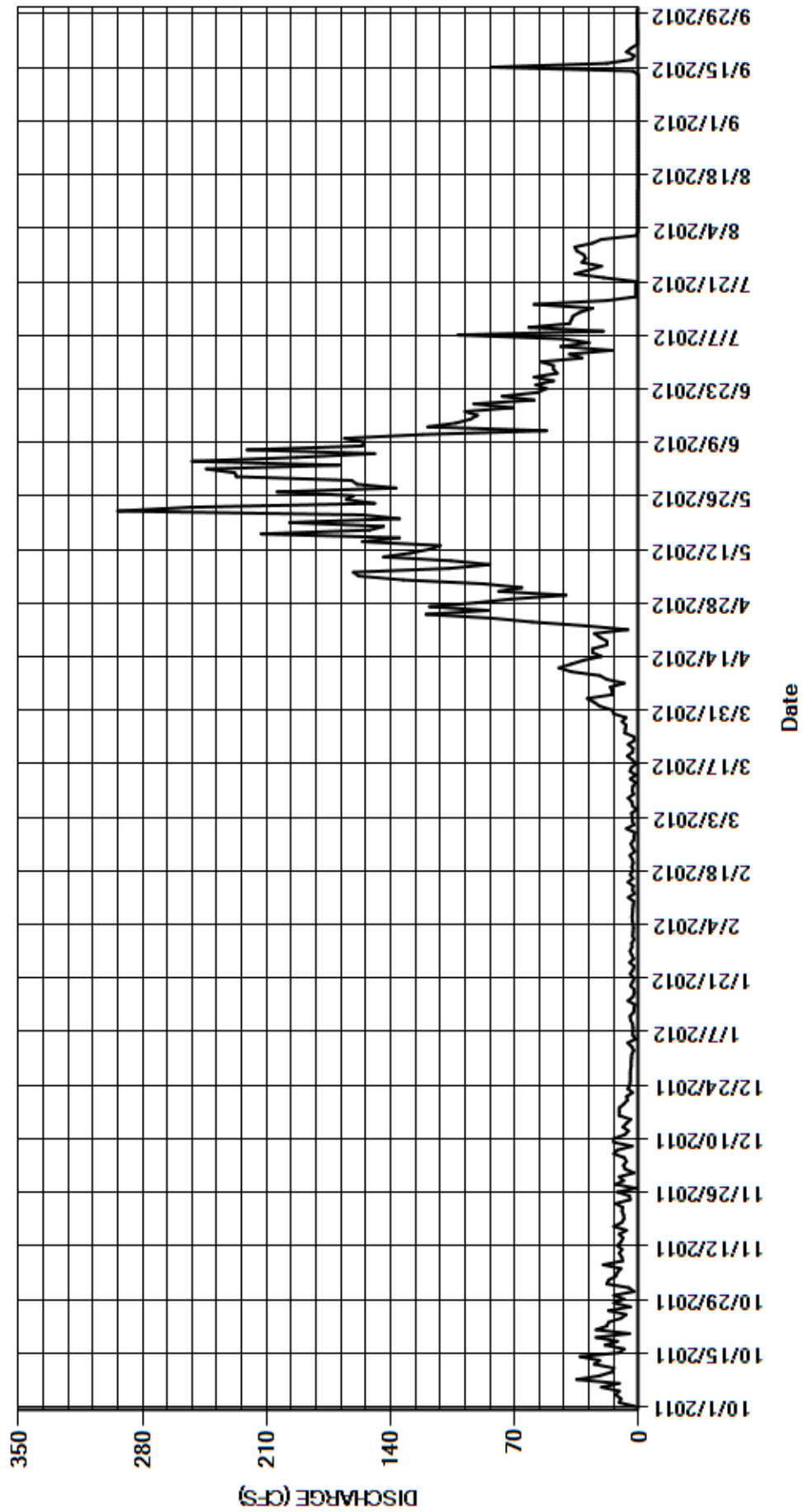
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.1	5.6	2.7	3.9	3.4	2.7	22	79	228	32	21	0.27
2	11	18	7.6	2.8	3.2	3.6	25	66	244	39	1.4	0.27
3	10	17	8.6	3.9	3.0	3.8	29	88	169	15	0.48	0.27
4	13	13	6.9	6.1	3.2	4.0	15	133	252	44	0.39	0.27
5	11	12	8.1	1.8	3.6	1.3	15	158	193	28	0.39	0.27
6	21	10	14	3.3	3.8	3.5	16	161	149	43	0.39	0.27
7	11	20	12	3.3	3.5	3.9	8.2	107	221	102	0.39	0.27
8	35	9.1	3.7	3.2	3.4	5.9	18	84	156	20	0.39	0.27
9	22	9.5	14	3.5	3.1	2.9	22	106	155	62	0.39	0.27
10	15	11	14	4.6	2.8	3.7	38	144	166	39	0.39	0.27
11	14	9.4	7.8	4.9	5.8	3.3	45	129	122	38	0.39	0.27
12	25	12	5.8	2.9	2.4	1.6	38	118	52	37	0.39	0.27
13	22	10	8.9	2.7	3.5	4.7	31	112	119	33	0.39	0.27
14	33	8.8	6.9	2.2	3.0	1.7	21	156	103	e26	0.34	3.1
15	11	11	4.4	6.0	6.0	4.9	26	135	95	59	0.27	83
16	8.2	6.8	11	3.3	3.2	4.0	26	213	91	18	0.27	18
17	19	14	11	2.5	4.8	1.4	18	152	98	1.7	0.27	4.0
18	12	9.6	11	2.7	3.2	3.7	18	144	71	1.6	0.27	2.5
19	24	8.3	8.4	4.6	3.9	6.4	22	197	93	1.6	0.27	6.9
20	5.1	8.5	6.4	3.3	3.1	3.4	25	135	59	1.6	e0.27	4.2
21	24	9.4	6.8	2.7	3.6	3.2	6.1	156	77	1.6	0.27	0.66
22	18	9.0	3.4	4.8	4.9	5.9	30	294	57	20	0.27	0.66
23	17	13	6.1	3.3	2.3	2.5	60	253	52	36	0.27	0.66
24	10	4.8	5.0	2.6	3.4	2.6	83	149	58	28	0.27	0.66
25	7.1	5.2	4.8	5.0	4.4	7.8	120	165	48	21	0.27	0.78
26	17	12	4.8	2.9	2.9	7.6	85	161	59	32	0.27	0.82
27	4.7	1.5	4.8	3.9	2.7	7.1	118	204	46	30	0.27	0.82
28	14	13	4.6	4.9	2.2	9.4	92	137	48	31	0.27	0.82
29	8.3	8.5	4.2	3.8	6.9	7.2	72	159	48	35	0.27	0.82
30	14	11	4.2	4.0	---	14	41	162	55	36	0.27	0.82
31	2.6	---	4.1	2.7	---	15	---	227	---	26	0.27	---
TOTAL	461.1	311.0	226.0	112.1	105.2	152.7	1185.3	4684	3384	938.1	31.71	132.73
MEAN	14.9	10.4	7.29	3.62	3.63	4.93	39.5	151	113	30.3	1.02	4.42
AC-FT	915	617	448	222	209	303	2350	9290	6710	1860	63	263
MAX	35	20	14	6.1	6.9	15	120	294	252	102	21	83
MIN	2.1	1.5	2.7	1.8	2.2	1.3	6.1	66	46	1.6	0.27	0.27

CAL YR	2011	TOTAL	33466.05	MEAN	91.7	MAX	621	MIN	0.52	AC-FT	66380
WTR YR	2012	TOTAL	11723.94	MEAN	32.0	MAX	294	MIN	0.27	AC-FT	23250

MAX DISCH: 374 CFS AT 23:15 ON MAY 21,2012 GH 3.61 FT SHIFT 0.06 FT
 MAX GH: 3.61 FT AT 23:15 ON MAY 21,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09073000 TWIN LAKES TUNNEL
WY2012 HYDROGRAPH



ARKANSAS RIVER BASIN
LARKSPUR DITCH AT MARSHALL PASS
Water Year 2012

Location.-- Lat. 38°23'00", Long. 106°15'00", diverts water from tributaries of Tomichi Creek between headgates (in sec. 11, T.48 N., R.6 E., and sec. 1, T.47 N., R.6 E.), and Marshall Pass, in Gunnison River Basin, to Poncha Creek (tributary to South Arkansas River) in SE¼ sec. 24, T.48 N., R.6 E., in Arkansas River Basin.

Drainage Area and Period of Record.-- N/A; 1949-present.

Equipment.-- High data rate DCP and shaft encoder with an SDR recorder in a 36-in x 36-in metal shelter and well. Shaft encoder and SDR are set to outside staff gage. Control is a 2-foot steel Parshall flume.

Hydrologic Conditions.-- The ditch was built in 1939, and diverts water from Hurry Creek, from north of the west side of Marshall Pass, approximately 3 miles west of Poncha Pass. The ditch crosses Marshall Pass at an elevation of 10,900 feet, and delivers water to Poncha Creek, a tributary of the South Arkansas River. The ditch runs approximately 1.5 miles. The basin consists primarily of high mountain terrain, most of which is above tree line with little to no development. No hydrologic condition changes were apparent this water year.

Gage-Height Record.-- The primary record is 15-minute satellite data with SDR data used for backup purposes. The record is complete and reliable except ice effected days of Oct 7-9, 12-15, 18-23 2011 and days with missing data of Oct 26, 2011 and April 23, 2012. The gage was shut down and no water diverted for the period: Oct 27 2011 to April 22 2012.

Datum Corrections.-- Levels were last run July 25, 2006. No corrections were made at that time.

Rating.-- A standard, 2 ft. Parshall flume table (STD02FTPF) was used for the entire water year. Two discharge measurements, Nos. 57-58, ranging in discharge from 0.07 to 0.08 cfs, were made during the water year. The peak discharge of 0.93 cfs occurred at 1800 Oct 4, 2011 at a gage height of 0.25 ft with a shift of 0.00 ft. It exceeded the stage of measurement No. 58 by 0.17 ft. The peak gage height of 0.54 ft occurred at 0430 on October 12, 2011 and was affected by backwater due to ice.

Discharge.-- Measurements are made from a walkway across the flume at a position where the meter axis is parallel with the staff gage and well intake. Measurements 57 and 58 were attempted by damming up the water within the ditch to increase depth. Unfortunately due to the lack of run off neither of these measurements had adequate conditions and are therefore not used in this record. Past historical measurements at this gage have shown this flume to be very stable and found to have a 0.00 shift at all flows. Discharge was computed by applying the rating directly to the gage height record with a shift of 0.00 ft for the entire year.

Special Computations.-- Ice effected days were determined using the hydrograph and temperature data from a comparable high altitude gage. Temperatures and weather conditions should be assumed to be more extreme at LARDITCO than the comparison site. Compared dates between the two sites do show the weather trends. Ice effected days were also predicted by looking at the ice spikes and evaluating the time of the spike. Estimates are made using a straight line method and comparing surrounding good day flows.

Remarks.-- Given the high elevation conditions, low flows, and difficulty making accurate discharge measurements this year, the record is rated fair. The peak event is also rated fair. Station maintained and record developed by Cheston Hart.

Recommendations.-- No recommendations.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

LARKSPUR DITCH AT MARSHALL PASS

RATING TABLE-- STD02FTPF USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

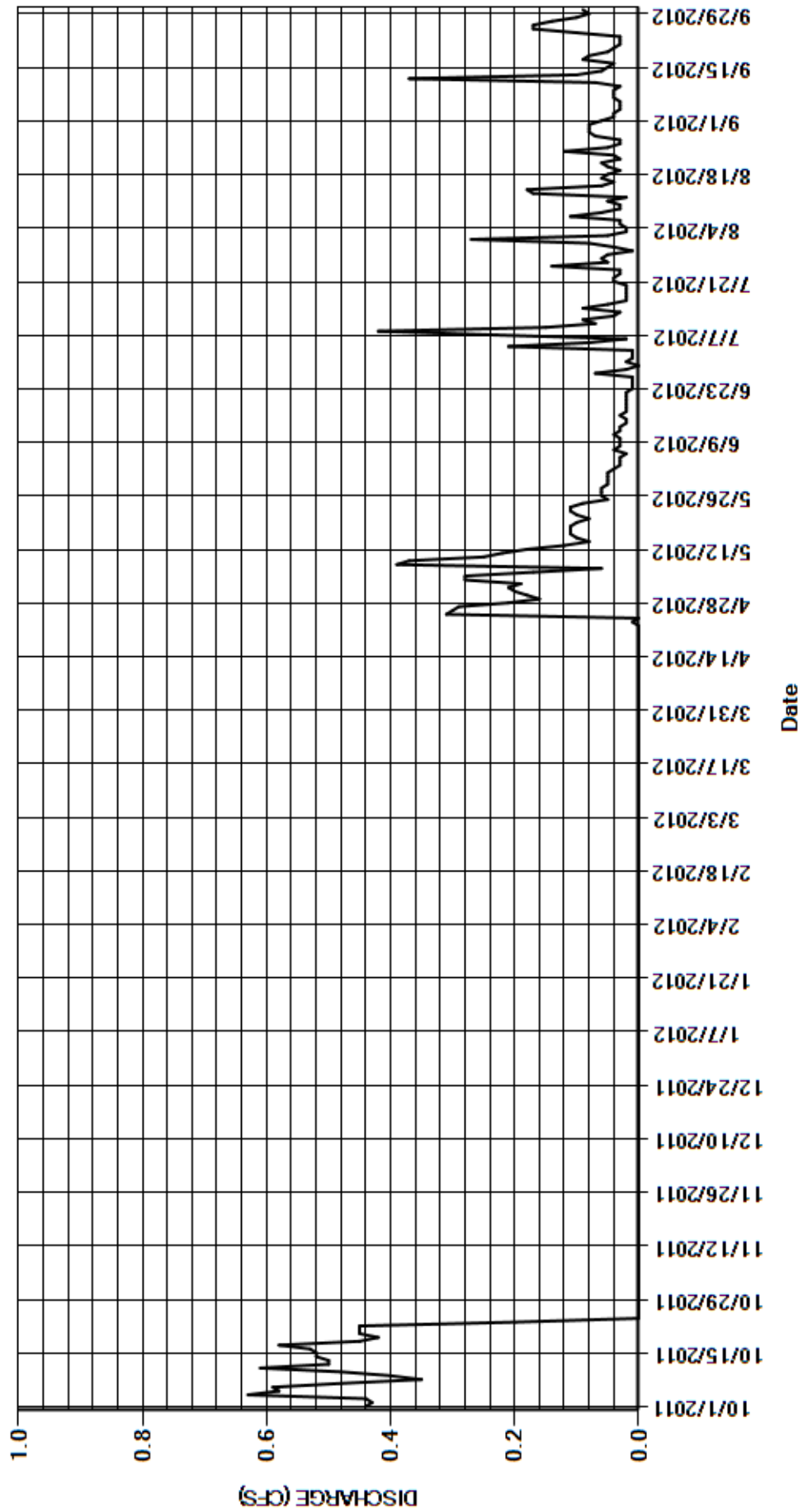
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.05	0.01	0.27	0.06
2	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.04	0.01	0.05	0.04
3	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.03	0.01	0.02	0.04
4	0.63	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.03	0.21	0.02	0.03
5	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.03	0.08	0.03	0.03
6	0.59	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.02	0.02	0.03	0.03
7	e0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.04	0.23	0.11	0.04
8	e0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.03	0.42	0.06	0.04
9	e0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.37	0.03	0.15	0.03	0.04
10	0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.03	0.07	0.03	0.03
11	0.61	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.04	0.09	0.05	0.07
12	e0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.03	0.04	0.02	0.37
13	e0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.03	0.03	0.17	0.10
14	e0.52	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.02	0.09	0.18	0.06
15	e0.52	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.02	0.05	0.06	0.05
16	0.53	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.03	0.02	0.04	0.04
17	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.02	0.02	0.06	0.09
18	e0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.02	0.02	0.05	0.08
19	e0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.02	0.02	0.03	0.05
20	e0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.02	0.02	0.05	0.04
21	e0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.02	0.04	0.06	0.03
22	e0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.02	0.04	0.03	0.03
23	e0.20	0.00	0.00	0.00	0.00	0.00	e0.01	0.11	0.01	0.03	0.04	0.03
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.01	0.03	0.12	0.10
25	0.00	0.00	0.00	0.00	0.00	0.00	0.31	0.05	0.01	0.14	0.05	0.17
26	e0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.06	0.01	0.05	0.03	0.17
27	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.06	0.07	0.06	0.03	0.14
28	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.06	0.02	0.05	0.07	0.10
29	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.05	0.00	0.01	0.08	0.08
30	0.00	0.00	0.00	0.00	---	0.00	0.18	0.05	0.02	0.04	0.08	0.09
31	0.00	---	0.00	0.00	---	0.00	---	0.05	---	0.08	0.08	---
TOTAL	11.00	0.00	0.00	0.00	0.00	0.00	1.46	4.40	0.77	2.18	2.03	2.27
MEAN	0.35	0.000	0.000	0.000	0.000	0.000	0.049	0.14	0.026	0.070	0.065	0.076
AC-FT	22	0	0	0	0	0	2.9	8.7	1.5	4.3	4.0	4.5
MAX	0.63	0.00	0.00	0.00	0.00	0.00	0.31	0.39	0.07	0.42	0.27	0.37
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.01	0.02	0.03

CAL YR	2011	TOTAL	160.99	MEAN	0.44	MAX	4.2	MIN	0.00	AC-FT	319
WTR YR	2012	TOTAL	24.11	MEAN	0.066	MAX	0.63	MIN	0.00	AC-FT	48

MAX DISCH: 0.933 CFS AT 18:00 ON OCT 04,2011 GH 0.25 FT SHIFT 0 FT
 MAX GH: 0.54 FT AT 04:30 ON OCT 12,2011 (Ice affected)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

LARKSPUR DITCH AT MARSHALL PASS
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08213500 RIO GRANDE RIVER AT THIRTY MILE BRIDGE NEAR CREEDE
Water Year 2012

Location.-- Lat 37°43'29", long 107°15'20" referenced to North American Datum of 1983 (Weminuche Pass, CO quad, scale 1:24,000), UTM Zone 13 301212 E and 4177665 N, in SW ¼ NE ¼ sec. 13, T.40 N., R.4 W., New Mexico Principal Meridian, Hinsdale County, CO, Hydrologic Unit 13010001, on right bank 70 ft downstream from bridge, 500 ft upstream from Squaw Creek, 0.7 mi downstream from Rio Grande Reservoir, and 20 mi southwest of Creede, CO.

Drainage Area and Period of Record.-- 163 mi²; Jun. 1909 to Sep. 1923, May 1925 to current year. No winter records 1910, 1926. Monthly data only for some periods.

Equipment.-- Graphic water stage recorder, data collection platform (Sutron Satlink2 with HDR GOES radio), and a float-operated Stage-Discharge Recorder in a 4 ft by 4 ft timber shelter and corrugated metal well. The primary reference gage is a drop tape from reference point on shelf. Outside gage installed on Jul 25, 2012. The cableway is located 21 feet upstream of gage.

Hydrologic Conditions.-- Flows regulated by Rio Grande Reservoir.

Gage-Height Record.-- Primary record is 15-minute transmitted data with DCP log, SDR log, and chart record as backup. Record is complete and reliable, except for Nov 1-2 when the station was isolated, and Nov 3 to Mar 29 when the station was closed for the winter. Two erroneous 15-minute values were corrected on Jul 10. There were two corrections made to the shaft encoder, which were prorated by time from previous visits, there were offsetting corrections made Jul 24 and 25; it was assumed the shaft encoder was set wrong on Jul 24 so a correction was applied between references.

Datum Corrections.-- Levels were last run to the Reference Point (RP) inside the gage on Sep 7, 2011 using B.M. No 2 as the base. The RP elevation was found outside the allowable limits, so a correction of 0.02 ft was made on that date. Two-peg test was performed on the Lietz level (SN 130869) on Jul 28, 2011 and the instrument was within allowable limits and no correction was made.

Rating.-- Control is a boulder and cobble channel. Rating No. 12, in use since Oct 1, 1994, was used again this year. The rating is well defined from 8 to 2500 cfs. Thirteen measurements (Nos. 858-870) were made this year ranging in discharge from 2.49 to 891 cfs. They cover the range of daily flows experienced, except for the higher daily flows on May 6, 7, and 17-23, 2012. The peak flow of 1020 cfs occurred at 1100 on May 6, 2012 at a gage height of 3.42 feet with a shift of +0.04 ft. It exceeded high measurement No. 864 made on May 7, 2012 at a gage height of 3.26 ft by 0.16 feet in stage.

Discharge.-- Shifting control method was used to compute the discharge record. Two variable shift curves RIOMILVS1102 (Oct 1-5) and RIOMILVS12a (Oct 5 - Sep 30) were used to distribute shift by stage. Open-water measurement shifts ranged from -0.02 to 0.08 ft; applied shifts ranged from 0 to 0.04 ft. All measurements were given full weight except for No 858, 862, 863, and 867-870, which were adjusted by as much as 7.6% to smooth shift distribution.

Special Computations.-- Discharge for periods when station was isolated and closed for the winter was estimated using simple proration between measurements at closing and opening station. There was no change in reservoir release gates during the period, so change in flow is attributed to increased reservoir elevation.

Remarks.-- Record is good except for periods of no gage-height record, which are estimated and poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.--

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

08213500 RIO GRANDE RIVER AT THIRTY MILE BRIDGE NEAR CREEDE

RATING TABLE-- RIOMILCO12 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

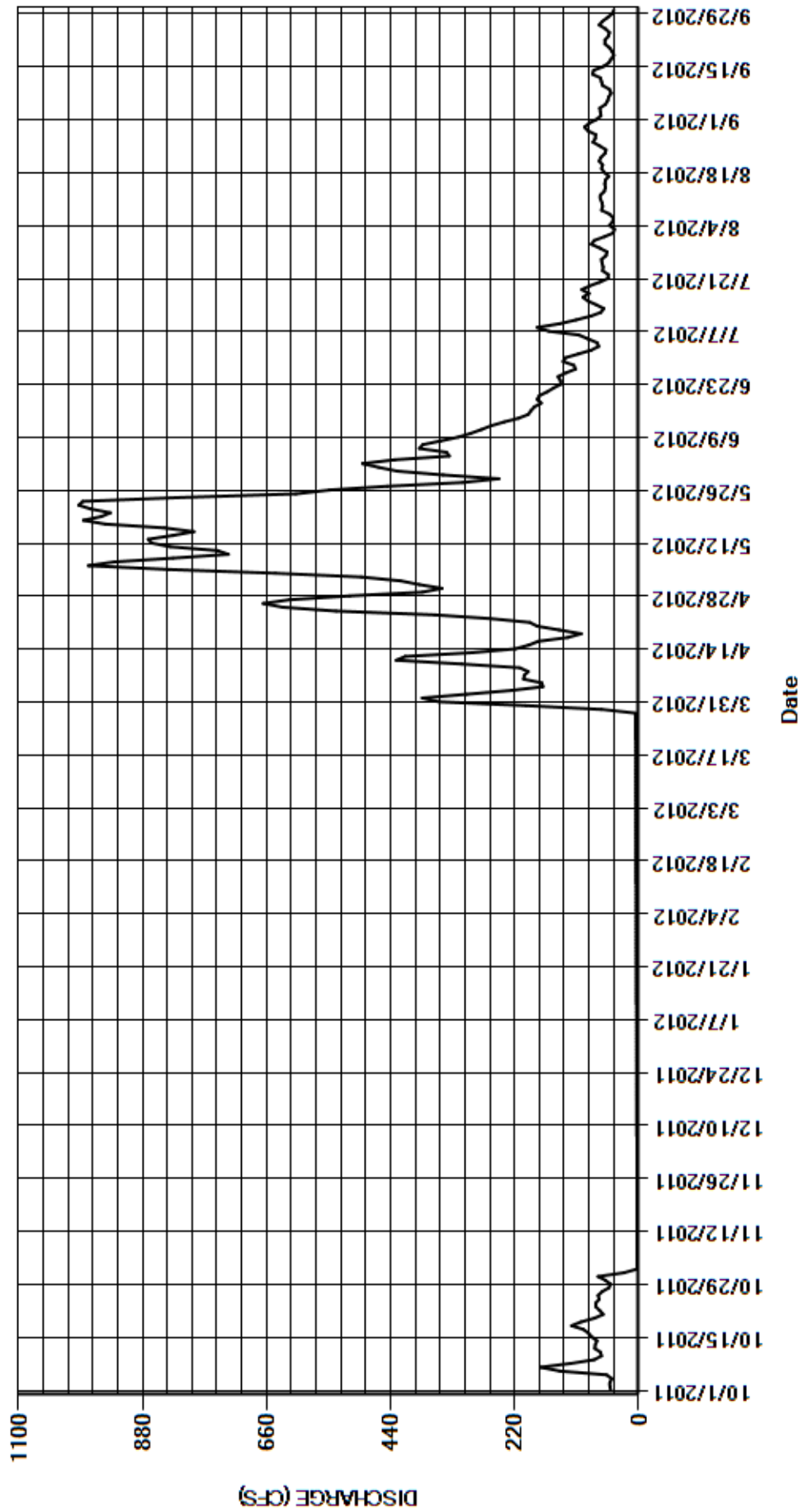
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	50	e26	e3.0	e3.7	e4.4	e4.9	384	389	461	107	61	75
2	51	e2.5	e3.1	e3.7	e4.4	e4.9	305	423	490	84	45	67
3	51	e2.5	e3.1	e3.7	e4.4	e4.9	226	492	433	71	43	68
4	48	e2.5	e3.1	e3.7	e4.4	e4.9	170	644	336	74	52	69
5	57	e2.5	e3.1	e3.7	e4.4	e4.9	172	833	341	90	46	59
6	140	e2.5	e3.1	e3.8	e4.5	e5.0	204	976	389	106	45	55
7	174	e2.6	e3.2	e3.8	e4.5	e5.0	203	930	383	159	52	53
8	121	e2.6	e3.2	e3.8	e4.5	e5.0	196	826	351	180	66	49
9	79	e2.6	e3.2	e3.8	e4.5	e5.0	211	728	320	140	64	52
10	66	e2.6	e3.2	e3.8	e4.5	e5.0	314	747	298	111	65	64
11	68	e2.6	e3.2	e3.9	e4.5	e5.1	430	831	279	85	68	66
12	78	e2.7	e3.3	e3.9	e4.6	e5.1	414	864	262	67	68	68
13	77	e2.7	e3.3	e3.9	e4.6	e5.1	295	870	239	62	61	82
14	74	e2.7	e3.3	e3.9	e4.6	e5.1	219	826	213	75	59	80
15	83	e2.7	e3.3	e3.9	e4.6	e5.1	195	789	196	90	60	63
16	89	e2.7	e3.3	e4.0	e4.6	e5.2	178	841	191	99	59	53
17	98	e2.8	e3.4	e4.0	e4.6	e5.2	126	946	185	88	53	49
18	119	e2.8	e3.4	e4.0	e4.7	e5.2	102	985	173	101	61	44
19	102	e2.8	e3.4	e4.0	e4.7	e5.2	141	953	180	87	66	47
20	78	e2.8	e3.4	e4.0	e4.7	e5.2	180	937	176	69	64	52
21	63	e2.8	e3.4	e4.2	e4.7	e5.3	193	972	162	54	70	60
22	69	e2.9	e3.5	e4.2	e4.7	e5.3	263	993	151	54	67	60
23	76	e2.9	e3.5	e4.2	e4.7	e5.3	361	986	138	64	60	54
24	76	e2.9	e3.5	e4.2	e4.8	e5.3	537	820	139	63	58	52
25	70	e2.9	e3.5	e4.2	e4.8	e5.4	631	608	143	65	69	59
26	72	e2.9	e3.5	e4.3	e4.8	e5.4	666	549	129	66	81	70
27	65	e3.0	e3.6	e4.3	e4.8	e5.4	619	446	112	58	77	64
28	53	e3.0	e3.6	e4.3	e4.8	e5.4	513	312	115	56	76	55
29	50	e3.0	e3.6	e4.3	e4.8	e66	383	248	134	69	90	47
30	59	e3.0	e3.6	e4.3	---	200	349	347	130	84	96	44
31	72	---	e3.6	e4.4	---	354	---	428	---	79	88	---
TOTAL	2428	105.5	103.5	123.9	133.6	763.8	9180	22539	7249	2657	1990	1780
MEAN	78.3	3.52	3.34	4.00	4.61	24.6	306	727	242	85.7	64.2	59.3
AC-FT	4820	209	205	246	265	1510	18210	44710	14380	5270	3950	3530
MAX	174	26	3.6	4.4	4.8	354	666	993	490	180	96	82
MIN	48	2.5	3.0	3.7	4.4	4.9	102	248	112	54	43	44

CAL YR	2011	TOTAL	72453.6	MEAN	199	MAX	1220	MIN	2.5	AC-FT	143700
WTR YR	2012	TOTAL	49053.3	MEAN	134	MAX	993	MIN	2.5	AC-FT	97300

MAX DISCH: 1020 CFS AT 11:00 ON MAY 06,2012 GH 3.42 FT SHIFT 0.04 FT
 MAX GH: 3.42 FT AT 11:00 ON MAY 06,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08213500 RIO GRANDE RIVER AT THIRTY MILE BRIDGE NEAR CREEDE
 WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08214500 NORTH CLEAR CREEK BELOW CONTINENTAL RESERVOIR
Water Year 2012

Location.-- Lat 37°53'18", long 107°12'13" referenced to North American Datum of 1983 (Slumgullion Pass, CO quad, scale 1:24,000), UTM Zone 13 306230 E and 4195705 N, in NE ¼ SW ¼ sec. 21, T.42 N., R.3 W., New Mexico Principal Meridian, Hinsdale County, CO, Hydrologic Unit 13010001, on left bank 100 ft downstream from bridge, 1,000 ft downstream from Continental Reservoir, and 15 mi west of Creede, CO.

Drainage Area and Period of Record.-- 51.7 mi². from topographic map, San Cristobal Quad; 1929 to current year.

Equipment.-- Graphic water stage recorder, data collection platform (Satlink2 with SDR), and a float-operated shaft encoder in a 4 ft by 4 ft timber shelter and concrete well. Primary reference gage is a drop tape from reference point on shelf. The secondary reference gage is an outside reference mark on the bridge with a tape and weight.

Hydrologic Conditions.-- Gage is below Continental Reservoir and all flows are regulated.

Gage-Height Record.-- Primary record is 15-minute satellite transmitted data with DCP log, SDR log, and graphic chart record as backup. Record is complete and reliable except for Nov 3 to Apr 9 when station was closed. There were no instrument calibration corrections needed or made.

Datum Corrections.-- Levels were last run to the Reference Point (RP) inside the gage on May 27, 2011 using B.M. No. 4 as base. The RP was within allowable limits and no correction was made. Two-peg test was performed on the Lietz level (SN130869) on May 27, 2011 and the instrument was within allowable limits and no adjustment was made.

Rating.-- The control is a concrete ramp flume. There is a two foot wide notch in the middle of the ramp to provide more sensitivity at very low flows. Rating No. 24-1 in use since Oct 5, 2010 was used for the entire water year. Rating No. 24-1 is well defined from 0 cfs to 300 cfs. Twelve measurements (Nos 812 - 823) were made this year ranging in discharge from 0.20 to 167 cfs. They cover the range in discharge experienced except for higher daily flow on May 23. The peak flow of 182 cfs occurred at 10:30 on May 22 at a gage height of 2.76 ft with a shift of 0.02 ft; it exceeded high measurement no. 817 (GH = 2.69 ft), made May 23, by 0.07 ft in stage.

Discharge.-- Shifting control method was used to compute the discharge record. Shifts were applied as determined by measurements and distributed by events that caused scour and plant growth in the gage pool. Open-water measurement shifts ranged from -0.01 to 0.05 ft; applied shifts ranged from 0.02 to -0.01 ft. All open water measurements were given full weight except for nos. 812, 816, 821, and 822 which were adjusted as much as 7 percent to smooth the shift trend. There was no stage record because the well was frozen Nov 3 to Apr 9 and the discharge was estimated.

Special Computations.-- Discharge for period of winter no gage-height record was estimated using two measurements and simple proration based on reservoir contents. There was no change of reservoir gates during the period.

Remarks.-- Record is good except for periods of no gage-height record, which are estimated and poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.--

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

08214500 NORTH CLEAR CREEK BELOW CONTINENTAL RESERVOIR

RATING TABLE-- NCLCONCO24-1 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

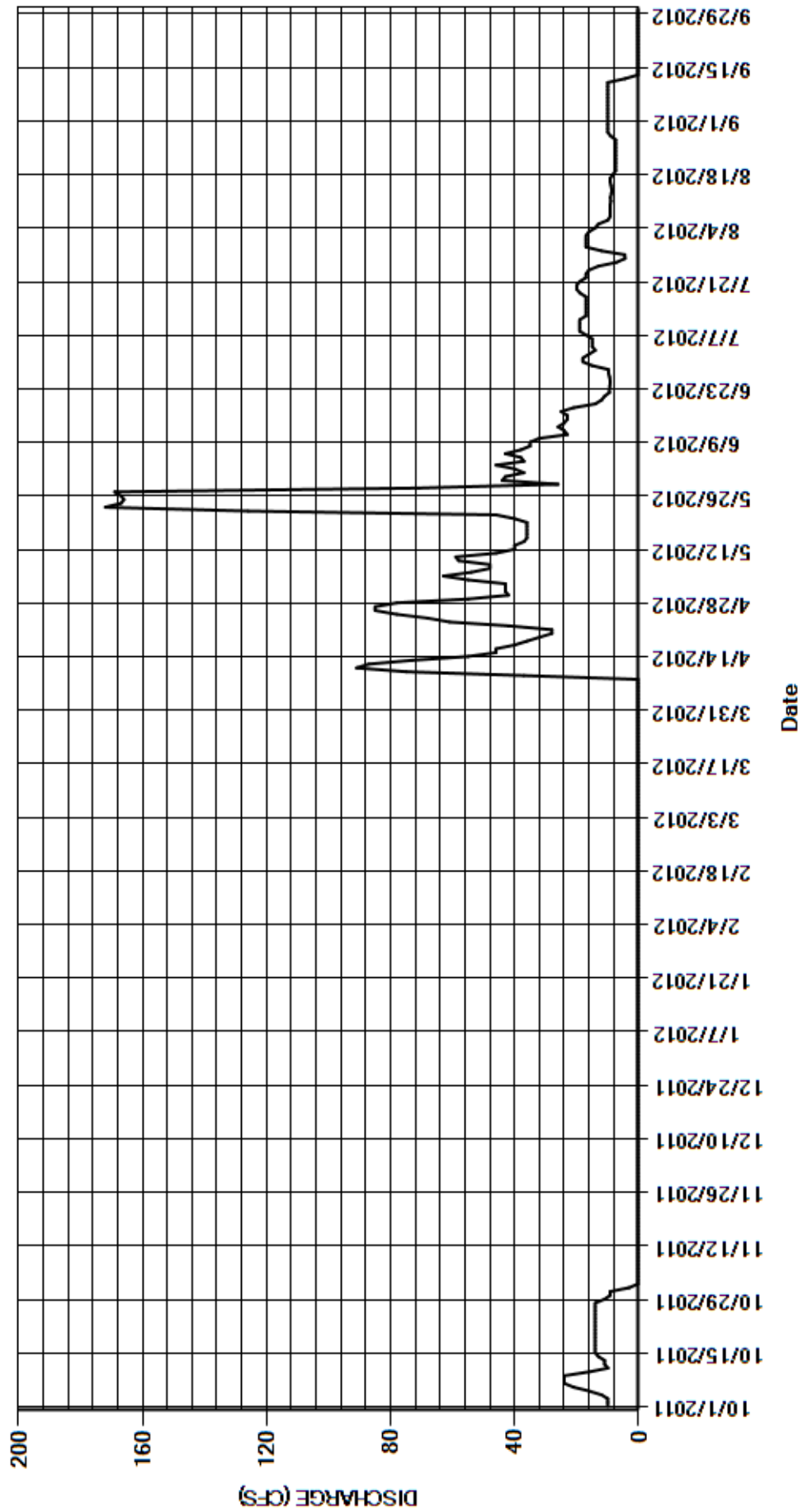
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10	3.1	e0.20	e0.20	e0.21	e0.21	e0.21	43	37	18	17	10
2	10	0.21	e0.20	e0.20	e0.21	e0.21	e0.21	43	40	16	17	10
3	10	e0.20	e0.20	e0.20	e0.21	e0.21	e0.21	43	46	14	16	10
4	12	e0.20	e0.20	e0.20	e0.21	e0.21	e0.21	55	37	15	14	10
5	16	e0.20	e0.20	e0.20	e0.21	e0.21	e0.21	63	38	15	13	10
6	21	e0.20	e0.20	e0.20	e0.21	e0.21	e0.21	54	43	15	10	10
7	24	e0.20	e0.20	e0.20	e0.21	e0.21	e0.21	48	38	17	9.2	10
8	24	e0.20	e0.20	e0.20	e0.21	e0.21	e0.21	48	35	19	9.2	10
9	24	e0.20	e0.20	e0.20	e0.21	e0.21	e37	58	35	19	9.2	10
10	16	e0.20	e0.20	e0.20	e0.21	e0.21	75	59	32	19	9.2	10
11	9.9	e0.20	e0.20	e0.20	e0.21	e0.21	91	46	23	19	9.0	10
12	11	e0.20	e0.20	e0.20	e0.21	e0.21	87	40	24	17	9.1	4.4
13	11	e0.20	e0.20	e0.20	e0.21	e0.21	73	40	26	17	8.8	0.22
14	13	e0.20	e0.20	e0.20	e0.21	e0.21	55	37	24	17	8.7	0.21
15	14	e0.20	e0.20	e0.20	e0.21	e0.21	46	36	23	17	8.9	0.21
16	14	e0.20	e0.20	e0.20	e0.21	e0.21	46	36	23	17	9.2	0.21
17	14	e0.20	e0.20	e0.20	e0.21	e0.21	40	36	25	17	9.2	0.21
18	14	e0.20	e0.20	e0.20	e0.21	e0.21	36	36	21	19	8.2	0.21
19	14	e0.20	e0.20	e0.20	e0.21	e0.21	32	36	14	20	7.4	0.21
20	14	e0.20	e0.20	e0.20	e0.21	e0.21	28	40	12	20	7.5	0.21
21	14	e0.20	e0.20	e0.20	e0.21	e0.21	28	46	11	19	7.4	0.21
22	14	e0.20	e0.20	e0.20	e0.21	e0.21	42	126	9.4	17	7.4	0.22
23	14	e0.20	e0.20	e0.20	e0.21	e0.21	61	172	9.4	17	7.4	0.22
24	14	e0.20	e0.20	e0.20	e0.21	e0.21	68	167	9.3	16	7.4	0.23
25	14	e0.20	e0.20	e0.20	e0.21	e0.21	78	166	9.2	13	7.4	0.24
26	14	e0.20	e0.20	e0.20	e0.21	e0.21	85	167	9.4	7.2	7.4	0.23
27	14	e0.20	e0.20	e0.20	e0.21	e0.21	85	169	9.7	4.4	7.4	0.23
28	14	e0.20	e0.20	e0.20	e0.21	e0.21	78	71	9.8	4.5	9.0	0.23
29	11	e0.20	e0.20	e0.20	e0.21	e0.21	55	26	15	12	10	0.23
30	9.2	e0.20	e0.20	e0.21	---	e0.21	42	44	18	17	10	0.23
31	9.2	---	e0.20	e0.21	---	e0.21	---	43	---	17	10	---
TOTAL	437.3	8.91	6.20	6.22	6.09	6.51	1269.68	2094	706.2	491.1	300.6	118.36
MEAN	14.1	0.30	0.20	0.20	0.21	0.21	42.3	67.5	23.5	15.8	9.70	3.95
AC-FT	867	18	12	12	12	13	2520	4150	1400	974	596	235
MAX	24	3.1	0.20	0.21	0.21	0.21	91	172	46	20	17	10
MIN	9.2	0.20	0.20	0.20	0.21	0.21	0.21	26	9.2	4.4	7.4	0.21

CAL YR	2011	TOTAL	9515.07	MEAN	26.1	MAX	348	MIN	0.18	AC-FT	18870
WTR YR	2012	TOTAL	5451.17	MEAN	14.9	MAX	172	MIN	0.20	AC-FT	10810

MAX DISCH: 182 CFS AT 10:30 ON MAY 22,2012 GH 2.76 FT SHIFT 0.02 FT
 MAX GH: 2.76 FT AT 10:30 ON MAY 22,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08214500 NORTH CLEAR CREEK BELOW CONTINENTAL RESERVOIR
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08217500 RIO GRANDE RIVER AT WAGON WHEEL GAP
Water Year 2012

Location.-- Lat 37°46'1", long 106°49'53" referenced to North American Datum of 1983 (Wagon Wheel Gap, CO quad, scale 1:24,000), UTM Zone 13 338693 E and 4181532 N, in NW ¼ NE ¼ sec. 35, T.41 N., R.1 E., New Mexico Principal Meridian, Mineral County, CO, Hydrologic Unit 13010001, on left bank 40 ft downstream from private bridge, 0.3 mi upstream from Goose Creek, and 0.3 mi west of Wagonwheel Gap, CO.

Drainage Area and Period of Record.-- 780 mi²; 1951 to current year.

Equipment.-- A float-operated electronic stage discharge recorder and data collection platform (Sutron Satlink2 DCP with HDR GOES radio), in a 4 ft by 4 ft timber shelter with a 4 ft diameter concrete well. The primary reference gage is a drop tape from reference point on shelf. Outside staff gage is located on bridge pier. The cableway is located 350 feet above gaging station.

Hydrologic Conditions.-- Flow is somewhat regulated by Rio Grande Reservoir and other small reservoirs. There are several small diversions above gage for livestock and domestic use. The basin is mostly undeveloped with the exception of a few minor subdivisions and the town of Creede.

Gage-Height Record.-- Primary record is 15-minute satellite transmitted data with DCP log and SDR log as backup. Secondary pressure transducer was setup to help with winter estimation. Pressure transducer data was used from Dec 4 - Mar 28. Record is complete and reliable. The stage-discharge relation was affected by ice Nov 10 - Mar 19. The pressure transducer data was corrected using comparison with the SDR before the well froze and after the well was opened, this comparison indicated a +0.04 ft correction before and a -0.10 ft correction after; this correction was prorated by time. There were three instrument corrections made to the shaft encoder, ranging from -0.01 ft to +0.01 ft. These corrections were prorated by time from previous visits.

Datum Corrections.-- Levels were run July 10, 2012 using BM No. 4 as base. The RP was within allowable limits therefore no correction was made. Two-peg test was performed on the Leitz level (SN130869) on June 11, 2012, the instrument was within allowable limits and no correction was made.

Rating.-- Low and medium water control is a wide cobble bar approximately 250 feet below the gage. High water control is the channel. Rating No. 5, in use since Oct 1, 2009, was used until Mar 28, 2012. A new rating RIOWAGCO06 was created and used for the remainder of the water year. The new rating was created because the measurements showed a need for a different offset. Nineteen measurements (No. 181 to 199) were made this year, ranging in discharge from 93.3 to 2040 cfs. They cover the range experienced except for the lower daily flows on Jan 11-16; Feb 7-19, 21, 23, and 24. The peak flow of 2160 cfs occurred at 0445 on May 23, 2012 at a gage height of 3.67 ft with a shift of 0.00 ft. The peak flow exceeded high measurement No. 193 (GH = 3.61 ft), made May 23, 2012, by 0.06 ft in stage.

Discharge.-- Shifting-control method was used to compute discharge for all open water periods prior to switching ratings on Mar 28. Discharge was computed by direct application of the rating to the gage height record for the remainder of the water year. The stage-discharge relation was affected by ice and discharge estimated Nov 10 through Mar 19. Shifts were applied as defined by measurements and distributed by time from Oct 1 to Nov 10. Open-water measurement shifts ranged from +0.01 to +0.02 ft while using rating 05 and -0.03 to +0.03 ft while using rating 06. All measurements were given full weight except Nos. 182, which was adjusted -0.7 %, and 188, 190-194, 197-199, which were adjusted as much as 5.9% to reflect the rating.

Special Computations.-- Winter estimates were determined based on streamflow measurements, hydrographic comparison with RIODELCO, RIOSFKCO, and weather records from RIOSFKCO.

Remarks.-- Record is good except for periods of ice affected record, which are estimated and poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.--

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

08217500 RIO GRANDE RIVER AT WAGON WHEEL GAP

RATING TABLE.-- RIOWAGCO05 USED FROM 01-OCT-2011 TO 28-MAR-2012
 RIOWAGCO06 USED FROM 28-MAR-2012 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

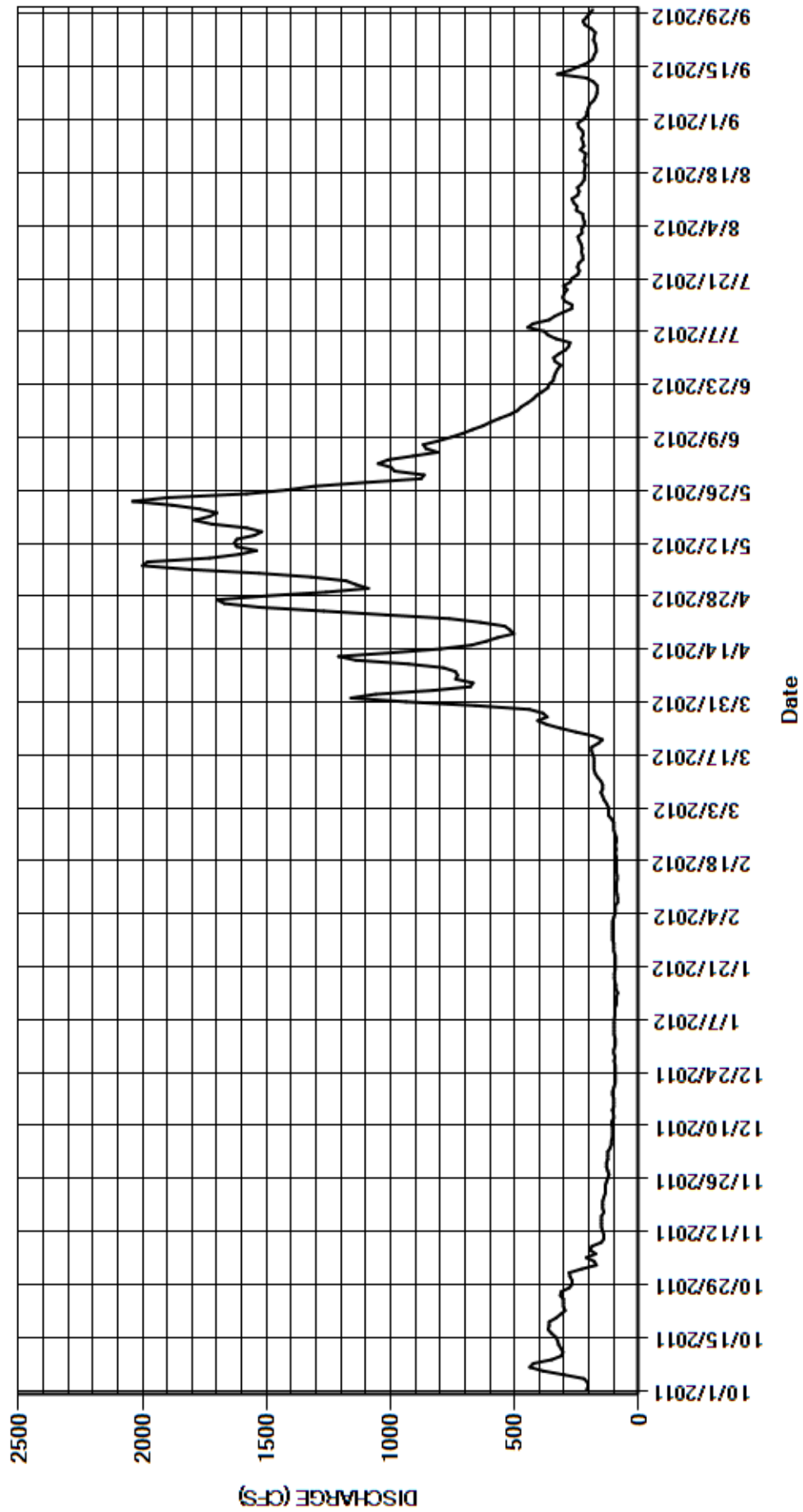
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	210	280	e125	e95	e105	e122	1160	1140	998	322	245	224
2	204	230	e125	e95	e105	e122	1060	1180	1050	296	228	210
3	206	171	e125	e99	e100	e122	829	1320	1010	282	230	208
4	221	179	e115	e99	e95	e129	678	1530	909	277	220	203
5	300	211	e110	e99	e95	e139	668	1810	811	333	219	198
6	384	173	e110	e99	e95	e145	738	2000	858	366	225	182
7	439	196	e105	e99	e85	e152	730	1980	868	381	226	173
8	425	189	e105	e96	e85	e145	739	1730	807	447	252	168
9	351	151	e105	e96	e87	e145	787	1610	755	426	248	167
10	312	e140	e108	e96	e90	e152	928	1540	709	361	262	168
11	305	e140	e108	e90	e90	e165	1140	1620	670	338	269	183
12	314	e145	e100	e90	e90	e175	1210	1630	627	305	246	212
13	323	e150	e102	e90	e87	e180	990	1620	596	270	240	328
14	327	e150	e106	e85	e87	e180	797	1550	559	269	247	278
15	335	e150	e100	e92	e90	e180	673	1520	519	300	230	241
16	352	e150	e100	e92	e90	e180	615	1580	489	306	220	205
17	365	e140	e100	e96	e90	e185	568	1720	474	300	218	185
18	361	e145	e105	e98	e90	e190	503	1790	449	289	220	180
19	361	e145	e105	e98	e90	e190	519	1730	427	303	217	171
20	334	e145	e100	e95	e95	163	540	1700	412	276	214	172
21	315	e140	e95	e95	e90	146	637	1770	389	269	221	175
22	297	e135	e95	e95	e95	184	764	1880	367	246	216	182
23	303	e135	e95	e95	e90	252	1020	2040	361	239	214	179
24	303	e135	e95	e95	e90	316	1270	1900	344	247	235	175
25	303	e130	e95	e100	e95	370	1530	1580	341	241	221	190
26	316	e125	e95	e100	e100	407	1670	1420	335	225	225	216
27	312	e120	e99	e100	e100	369	1700	1310	327	226	230	225
28	280	e125	e95	e105	e100	386	1500	1100	314	231	223	211
29	268	e130	e100	e105	e110	441	1260	877	337	228	227	198
30	269	e130	e100	e105	---	658	1090	865	343	232	242	186
31	277	---	e95	e105	---	938	---	984	---	240	246	---
TOTAL	9672	4685	3218	2999	2711	7628	28313	48026	17455	9071	7176	5993
MEAN	312	156	104	96.7	93.5	246	944	1549	582	293	231	200
AC-FT	19180	9290	6380	5950	5380	15130	56160	95260	34620	17990	14230	11890
MAX	439	280	125	105	110	938	1700	2040	1050	447	269	328
MIN	204	120	95	85	85	122	503	865	314	225	214	167

CAL YR	2011	TOTAL	176885	MEAN	485	MAX	2920	MIN	75	AC-FT	350900
WTR YR	2012	TOTAL	146947	MEAN	401	MAX	2040	MIN	85	AC-FT	291500

MAX DISCH: 2160 CFS AT 04:45 ON MAY 23,2012 GH 3.67 FT SHIFT 0 FT
 MAX GH: 3.67 FT AT 04:45 ON MAY 23,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08217500 RIO GRANDE RIVER AT WAGON WHEEL GAP
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08218500 GOOSE CREEK AT WAGONWHEEL GAP

Water Year 2012

Location.-- Lat 37°45'7", long 106°49'47" referenced to North American Datum of 1983 (Wagon Wheel Gap, CO quad, scale 1:24,000), UTM Zone 13 338810 E and 4179860 N, in SW ¼ SE ¼ sec. 35, T.41 N., R.1 E., New Mexico Principal Meridian, Mineral County, CO, Hydrologic Unit 13010001, on left bank 1/4 mi downstream from Pierce Creek, 1 mi upstream from mouth, 1 mi south of Wagon Wheel Gap, CO, and 8 3/4 mi southeast of Creede, CO.

Drainage Area and Period of Record.-- Approximately 90 mi²; June 1954 to current year.

Equipment.-- Graphic water stage recorder, data collection platform (Sutron Model Satlink Logger) and a float-operated shaft encoder in a 36-inch corrugated metal pipe shelter and concrete well. The shaft encoder float is operated in an oil cylinder. The primary reference gage is a drop tape from reference point on shelf. No outside gage. Equipment was upgraded to an SDR and the chart recorder was removed on June 20, 2012.

Hydrologic Conditions.-- Streamflow is partially regulated by upstream reservoir. Drainage area is predominantly undeveloped National Forest. Much of this year had rapidly rising and falling stage due to issues related to bringing new hydro-plant online on Humphrey's reservoir.

Gage-Height Record.-- Primary record is 15-minute transmitted data with DCP log and chart record as backup. Record is complete and reliable except for Nov 6-21 when ice in well and oil cylinder was affecting floats, and Nov 22 through Mar 28 when the station was closed for winter. The stage-discharge relation was affected by ice Nov 3-5. Three missing 15 minute values were filled by linear interpolation on Jun 20. There were three instrument corrections made to the shaft encoder; a +0.01, -0.01 and a -0.01 ft, which were prorated by time from previous visits.

Datum Corrections.-- Levels were run to the Reference Point (RP) inside the gage on Jul 10, 2012 using BM2 as base. The RP elevation was within allowable limits; therefore, no corrections were required or made. Two-peg test was performed on the Liets level(Sn130869) on Jun 11, 2012 and the instrument was within allowable limits and no correction was made.

Rating.-- Control is a rock and boulder riffle just downstream from the gage. Willows along banks influence high stages. Scour, fill, and moss and algae cycles cause shift variations. Rating No. 10-1 was used Oct 1-12, 2011. Rating No. 11 was created and used this water year beginning Oct 12, 2011. The rating is well defined from 12 to 300 cfs and considered fair from 300 to 600 cfs. Seventeen measurements (Nos. 80-96) were made this year ranging in discharge from 15.7 to 241 cfs. They cover the range of flow experienced except for lower daily flows on Jan 30, Feb 5-12, 17-20. The peak flow of 267 cfs occurred at 00:00 on May 24 at a gage height of 3.52 feet with a shift of 0.00 feet. It exceeded high measurement No. 90 (GH=3.41 ft), made May 23 by 0.11 feet in stage.

Discharge.-- Discharge was computed by direct application of the rating to the gage height record for all periods of good record except for Oct 1-12 when rating 10-1 was in use with a +0.01 shift applied; and Oct 12 to Nov 22 when rating 11 was in use with a -0.01 shift applied. Measurement shifts ranged from -0.01 to +0.03 ft. All open water measurements were given full weight except Nos. 87-96, which were adjusted as much as 4.8% to smooth shift distribution. The stage-discharge relation was affected by ice and discharge was estimated Nov 3-5. Discharge was estimated Nov 6 to Mar 28 when floats were affected by ice in well and the station was closed.

Special Computations.-- Discharge for periods of no gage-height and ice affected record was estimated using discharge measurements, air temperature record from South Fork Rio Grande River at South Fork, and hydrographic comparison with Rio Grande River near Del Norte and Rio Grande River at Wagon Wheel Gap.

Remarks.-- Record is good except for periods of no gage-height and ice affected record, which are estimated and poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.--

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

08218500 GOOSE CREEK AT WAGONWHEEL GAP

RATING TABLE-- GOOWAGCO11 USED FROM 1-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

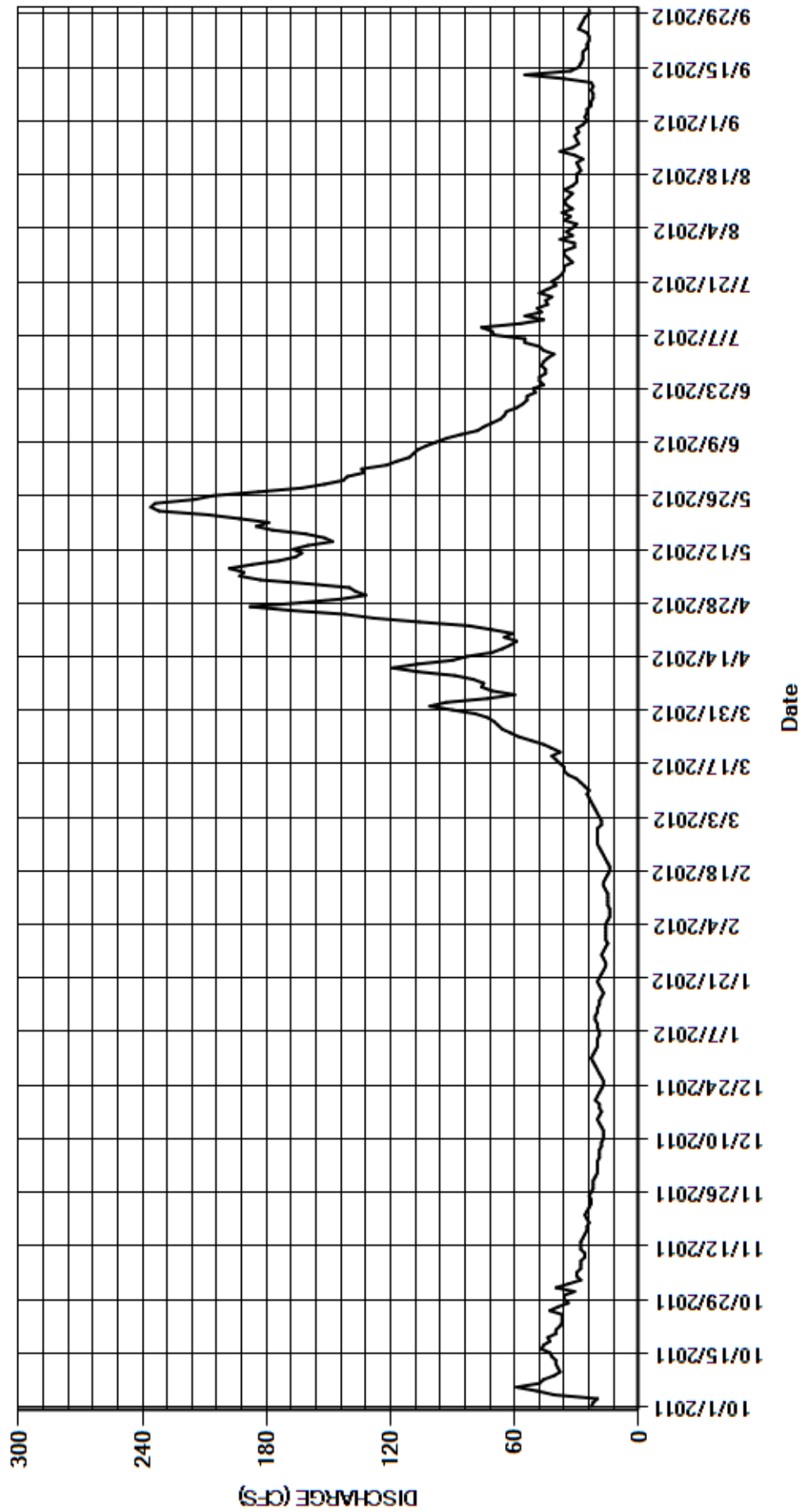
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	23	40	e20	e22	e16	e18	101	137	133	44	38	25
2	22	34	e20	e21	e16	e18	93	140	134	41	32	26
3	20	e28	e20	e20	e16	e19	73	160	122	46	35	25
4	41	e30	e20	e20	e16	e20	60	183	117	48	32	25
5	49	e30	e19	e20	e15	e21	71	193	111	55	30	23
6	59	e28	e19	e19	e14	e22	76	191	109	55	36	23
7	48	e28	e19	e19	e14	e23	75	198	107	70	33	22
8	46	e28	e18	e20	e14	e24	80	187	103	71	37	22
9	41	e26	e18	e20	e15	e25	89	174	98	76	32	23
10	38	e26	e17	e21	e15	e24	107	166	93	57	35	22
11	39	e28	e17	e21	e15	e26	119	163	86	46	36	23
12	40	e28	e17	e20	e15	e28	107	167	78	55	34	36
13	40	e28	e18	e20	e16	e30	90	160	75	47	32	55
14	42	e27	e19	e19	e17	e34	83	148	71	49	36	33
15	43	e26	e20	e19	e17	e36	71	152	67	44	32	29
16	47	e25	e19	e18	e16	e36	66	161	65	45	30	28
17	46	e25	e18	e17	e15	e38	62	177	64	42	30	27
18	43	e24	e19	e18	e14	e40	59	185	59	48	30	27
19	44	e25	e19	e19	e14	e42	65	179	56	44	28	27
20	40	e26	e21	e20	e15	e38	61	193	54	40	29	25
21	40	e25	e20	e19	e16	e42	71	208	54	42	30	25
22	38	e24	e19	e18	e17	e46	82	232	50	39	27	24
23	37	e23	e18	e17	e18	e52	106	236	51	37	31	24
24	37	e23	e17	e16	e19	e58	128	234	46	36	38	25
25	37	e24	e17	e16	e20	e62	142	215	48	36	32	29
26	43	e23	e18	e17	e20	e66	168	206	48	32	29	28
27	39	e22	e19	e18	e20	e68	188	184	45	34	30	27
28	34	e22	e20	e17	e20	e70	164	163	45	36	31	26
29	36	e22	e21	e16	e20	73	144	152	47	36	29	24
30	36	e21	e22	e15	---	79	132	143	46	31	30	24
31	31	---	e23	e16	---	90	---	141	---	31	27	---
TOTAL	1219	789	591	578	475	1268	2933	5528	2282	1413	991	802
MEAN	39.3	26.3	19.1	18.6	16.4	40.9	97.8	178	76.1	45.6	32.0	26.7
AC-FT	2420	1560	1170	1150	942	2520	5820	10960	4530	2800	1970	1590
MAX	59	40	23	22	20	90	188	236	134	76	38	55
MIN	20	21	17	15	14	18	59	137	45	31	27	22

CAL YR	2011	TOTAL	18633	MEAN	51.0	MAX	287	MIN	14	AC-FT	36960
WTR YR	2012	TOTAL	18869	MEAN	51.6	MAX	236	MIN	14	AC-FT	37430

MAX DISCH: 267 CFS AT 00:00 ON MAY 24,2012 GH 3.52 FT SHIFT 0 FT
 MAX GH: 3.52 FT AT 00:00 ON MAY 24,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08218500 GOOSE CREEK AT WAGONWHEEL GAP
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08219500 SOUTH FORK RIO GRANDE RIVER AT SOUTH FORK
Water Year 2012

Location.-- Lat 37°39'34", long 106°38'55" referenced to North American Datum of 1983 (South Fork West, CO quad, scale 1:24,000), UTM Zone 13 354589 E and 4169323 N, in NW ¼ NE ¼ sec. 3, T.39 N., R.3 E., New Mexico Principal Meridian, Rio Grande County, CO, Hydrologic Unit 13010001, on left bank near U.S. Highway 160, 0.1 mi downstream from Church Creek, 0.9 mi southwest of South Fork, CO, and 1.5 mi upstream from mouth.

Drainage Area and Period of Record.-- 216 mi² (from topographic maps); 1910-1922; 1936 to current year.

Equipment.-- Data collection platform (Satlink2), a float-operated Stage Discharge Recorder, air temperature sensor, and tipping-bucket rain gauge in a timber shelter and corrugated metal pipe well. The primary reference gage is a drop tape from reference point on shelf. No outside gage. Cableway is located 475 feet upstream.

Hydrologic Conditions.-- Transmountain diversion from Colorado River Basin through Treasure Pass Ditch and into Rio Grande Basin above station. A few small diversions for irrigation, slight regulation by Beaver Creek Reservoir (capacity, 4,760 acre-ft.), and several smaller storage reservoirs.

Gage-Height Record.-- Primary record is 15-minute satellite transmitted data with DCP log and SDR log as backup. Record is complete and reliable except for Dec 5-31; Jan 1-31; Feb 1-29; Mar 1-31; Apr 1-5 when the well and inlet was frozen. One 15-minute value was estimated Apr 13 when valve was being worked on. There were no instrument calibration corrections needed or made. The stage-discharge relation was affected by ice Nov 27-30; Dec 1-4.

Datum Corrections.-- Levels were last run to the reference point (RP) inside gage on July 10, 2012 using B.M. 7 as base. The RP elevation was found within allowable limits and no correction was made. Two-peg test was performed on the Lietz level (SN 130869) on June 11, 2012 the instrument was within allowable limits and no correction was made.

Rating.-- The control is a cobble bar at island approximately 250 ft downstream from the gage which splits the flow into two channels at medium and high flows. Shifting is caused by channel scour and fill and also vegetation and debris deposition associated with the cobble bar island. Rating No. 11 in use since Oct 1, 2007 was used again this year. The slope of the rating in log-log space indicates that section control governs the stage-discharge rating at most stages. The rating is fairly well defined from 34 to 2700 cfs. Nineteen measurements (Nos. 278-296) were made this year ranging in discharge from 27.7 to 614 cfs. The measurements cover the discharge range experienced except for higher daily flows on Apr 26, 27 and May 5-7. The peak flow of 838 cfs occurred at 0015 on Apr 27, 2012 at a gage height of 4.10 feet with a shift of 0.00 ft; it exceeded high measurement no. 288 (GH=3.67), made Apr 26, 2012 by 0.43 feet in stage.

Discharge.-- Shifting control method was used to compute the discharge record during all open water periods. Shifts were applied as defined by measurements and distributed by time Oct 1 - Apr 5 and Sep 10-30. A shift curve (RIOSFKVS12-02) was developed and used to define the stage-shift relation from Apr 5 - Sep 10. Open-water measurement shifts ranged from -0.02 feet to +0.06 feet; applied shifts ranged from 0.00 ft to +0.03 ft. All were given full weight except nos 286-292 and 295-296, which were adjusted as much as 6.1% to smooth shift distribution. The stage-discharge relation was affected by ice and discharge was estimated Nov 27-30 and Dec 1-4. The well and inlet was frozen and discharge was estimated Dec 5 -31; Jan 1-31; Feb 1-29; Mar 1-31; and Apr 1-5.

Special Computations.-- Discharge for periods of no gage-height and ice affected record was estimated using discharge measurements, comparison with flows at Rio Grande near Del Norte, Rio Grande near Wagon Wheel Gap, Goose Creek at Wagon Wheel Gap, and weather records.

Remarks.-- Record is good except for periods of no gage-height and ice affected record, which are estimated and poor. Station maintained and records developed by Div 3 hydrographic staff.

Recommendations.--

STATE OF COLORADO
DIVISION OF WATER RESOURCES
OFFICE OF STATE ENGINEER

08219500 SOUTH FORK RIO GRANDE RIVER AT SOUTH FORK

RATING TABLE-- RIOSFKCO11 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

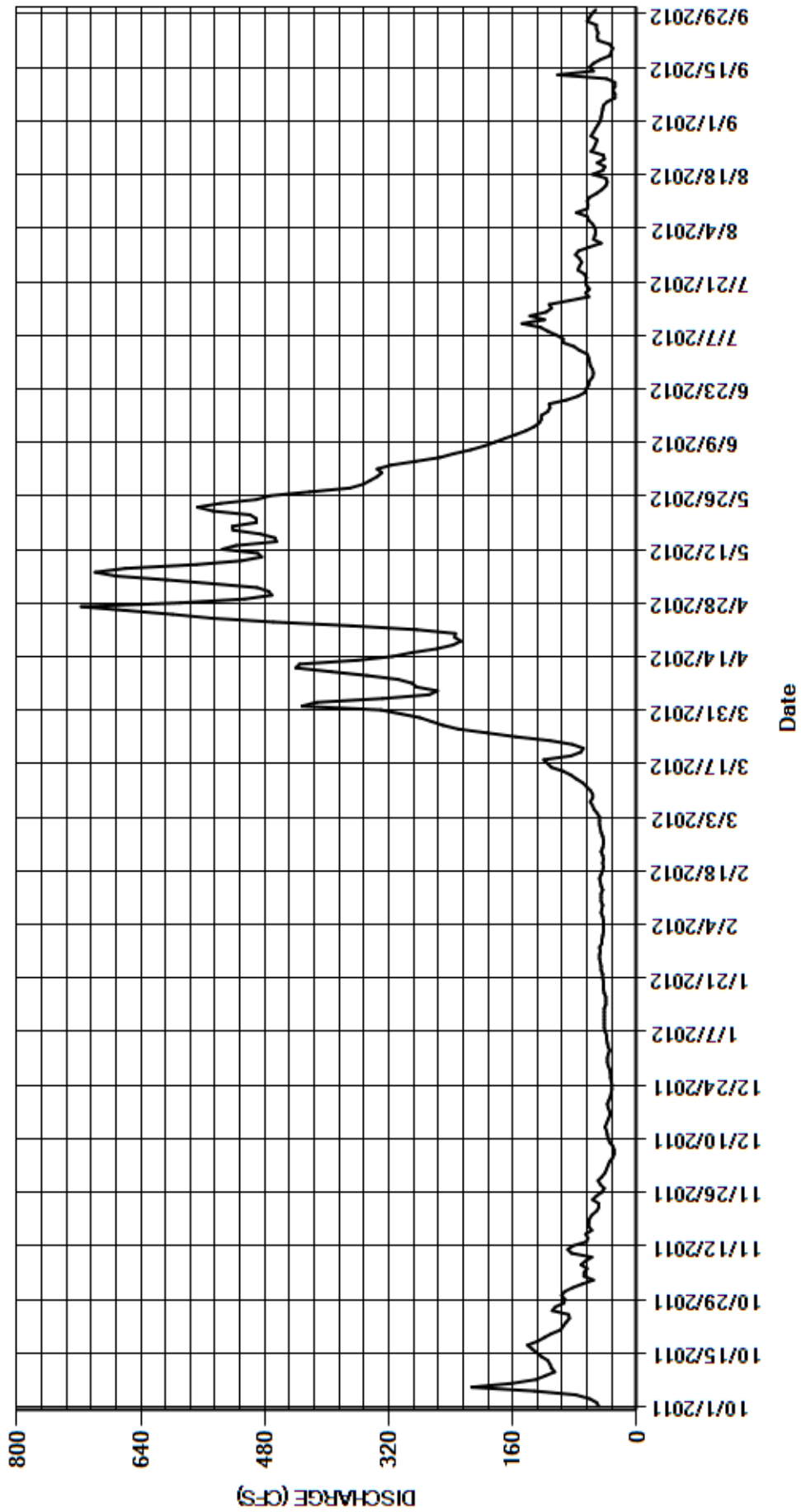
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	49	83	e41	e37	e44	e48	e432	475	329	62	56	47
2	52	70	e39	e35	e43	e48	e413	490	335	64	54	46
3	61	56	e37	e37	e43	e48	e328	546	317	74	53	45
4	79	68	e35	e38	e43	e51	e268	606	285	81	54	44
5	132	68	e31	e39	e43	e55	e257	672	254	95	57	43
6	213	64	e29	e39	e44	e57	284	699	236	95	62	38
7	161	72	e29	e41	e46	e60	290	660	214	104	64	28
8	130	66	e31	e42	e45	e57	308	568	197	115	78	28
9	118	58	e35	e42	e44	e57	348	510	183	124	64	31
10	106	84	e37	e42	e46	e60	394	484	170	148	63	28
11	110	89	e38	e42	e46	e65	440	489	156	119	64	28
12	112	82	e39	e42	e46	e70	435	535	143	138	61	39
13	115	65	e41	e42	e44	e78	361	517	133	117	52	102
14	123	63	e39	e40	e46	e85	315	465	126	110	45	56
15	129	66	e37	e40	e47	e95	290	467	123	113	40	61
16	135	58	e35	e40	e48	e110	258	486	123	87	38	56
17	141	62	e35	e42	e46	e115	237	521	115	62	40	47
18	128	62	e37	e43	e44	e120	227	522	112	66	57	35
19	119	61	e38	e43	e43	e85	235	491	113	61	44	33
20	110	58	e36	e43	e44	e72	234	491	91	65	41	31
21	98	52	e34	e44	e43	e69	284	499	76	66	51	35
22	95	49	e33	e44	e44	e83	368	547	67	65	42	50
23	91	49	e32	e46	e46	e112	469	567	65	68	43	51
24	87	57	e32	e46	e44	e156	549	537	62	76	59	50
25	88	52	e33	e47	e43	e193	599	491	61	74	55	52
26	109	45	e34	e48	e43	e230	659	473	57	71	53	52
27	105	e42	e34	e48	e44	e250	717	422	56	74	51	64
28	94	e47	e35	e47	e46	e265	589	370	57	79	59	61
29	93	e50	e37	e48	e47	e280	506	353	60	75	56	58
30	97	e45	e38	e45	---	e305	471	344	61	61	53	53
31	93	---	e38	e45	---	e330	---	335	---	46	50	---
TOTAL	3373	1843	1099	1317	1295	3709	11565	15632	4377	2655	1659	1392
MEAN	109	61.4	35.5	42.5	44.7	120	386	504	146	85.6	53.5	46.4
AC-FT	6690	3660	2180	2610	2570	7360	22940	31010	8680	5270	3290	2760
MAX	213	89	41	48	48	330	717	699	335	148	78	102
MIN	49	42	29	35	43	48	227	335	56	46	38	28

CAL YR	2011	TOTAL	62066	MEAN	170	MAX	1200	MIN	25	AC-FT	123100
WTR YR	2012	TOTAL	49916	MEAN	136	MAX	717	MIN	28	AC-FT	99010

MAX DISCH: 838 CFS AT 00:15 ON APR 27,2012 GH 4.10 FT SHIFT 0 FT
MAX GH: 4.10 FT AT 00:15 ON APR 27,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08219500 SOUTH FORK RIO GRANDE RIVER AT SOUTH FORK
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08220000 RIO GRANDE RIVER NEAR DEL NORTE, CO
Water Year 2012

Location.-- Lat 37°41'19", long 106°27'35.5" referenced to North American Datum of 1983 (Indian Head, CO quad, scale 1:24,000), UTM Zone 13 371297 E and 4172269 N, in NE ¼ NE ¼ sec. 30, T.40 N., R.5 E., New Mexico Principal Meridian, Rio Grande County, CO, Hydrologic Unit 13010001, on right bank 40 ft downstream from county road 17 (Twin Mountain) bridge, 5 mi upstream from Pinos Creek, and 6 mi west of Del Norte, CO.

Drainage Area and Period of Record.-- 1,320 mi² (furnished by State Engineer of Colorado); June 1889 to current year. Monthly discharge only for some periods.

Equipment.-- Graphic water-stage recorder, data collection platform (Sutron Model 8210 DCP with HDR GOES radio and phone modem) and a float-operated shaft encoder, air temperature sensor, water temperature sensor, and tipping bucket rain gauge in a 6 ft by 6 ft exposed aggregate building with a 4 ft diameter concrete well. The primary reference gage is a drop tape from reference point on shelf. Cableway located 1500 feet above gaging station. On Jul. 15, 2011 the new outside chain gage was functional at the station.

Hydrologic Conditions.-- Natural flow of stream affected by storage reservoirs, transmountain diversions from Colorado River Basin, diversions for irrigation and municipal use, groundwater withdrawals, return flows from irrigated areas, and flows from sewage-treatment plants. Flow regulated by Beaver Creek Reservoir since 1910, Santa Maria Reservoir since 1912, Rio Grande Reservoir since 1912, and Continental Reservoir since 1925, combined capacity, 126,100 acre-ft, and by several smaller reservoirs.

Gage-Height Record.-- Primary record is 15-minute transmitted data with DCP log and chart record as backup. Record is complete and reliable, except 3 15-minute values were filled Oct. 4 from chart record due to missing satellite transmission without loss of accuracy. The stage-discharge relation was affected by ice Nov. 9-17, and Nov. 27, 2011 through Mar. 23, 2012. Two instrument calibrations, a +0.01 and a -0.01 ft, were made to the shaft encoder and prorated from the previous visit.

Datum Corrections.-- Levels were last ran Sep. 1, 2011 to the Reference Point (RP) inside the gage using BM #6 as base. The RP elevation was within allowable limits, so no correction was made. A 0.08 ft correction was made to the cantilever gage.

Rating.-- Low water control is a wide cobble bar 250 feet below the gage. High water control is the river channel. The channel splits at control section. At gage-heights below approximately 1.00 foot, all water flows in left channel. Rating No. 4, in use since March 15, 2007, was used again this year. It is well defined from 53 to 9000 cfs. This rating was extended to 12,500 cfs using data acquired from a USGS cooperative rating curve extension project completed in 2003. Thirty measurements (Nos. 194-223) were made this year, ranging in discharge from 141 to 2650 cfs. They cover the discharge range experienced except for the lower daily flows on Dec. 6-7, 2011, Jan. 14-16, 2012 and higher daily flows on Apr. 27, May 6-7, 22-24, 2012. The peak flow of 3070 cfs occurred at 0845 on May 23, 2012 at a gage height of 3.40 feet with a shift of +0.02 ft. It exceeded high measurement No. 214 (GH = 3.12 ft), made May 8, 2012 by 0.28 ft in stage.

Discharge.-- Shifting control method was used during all periods of good record; the period Nov. 9 through 17, and Nov. 27, 2010 through Mar. 23, 2012 was estimated because the stage-discharge relation was affected by ice. Shifts were applied as defined by discharge measurements and distributed by time from Oct. 1 through Nov. 26, 2011; shift curves were developed and applied based on events and measurements Mar. 15 through Sep. 30. The shift trend for the open water period Mar. 15 through Sep. 30 indicates minor filling at the control. Open water measurement shifts ranged from -0.06 to +0.07 ft. Measurements were adjusted as much as 5.4 percent to fit the shift trend.

Special Computations.-- Discharge for periods of ice-affected record was based on discharge measurements, partial day records, weather records, and comparison with nearby stations.

Remarks.-- Record is good except for periods of ice affected record, which are poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.--

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

08220000 RIO GRANDE RIVER NEAR DEL NORTE, CO

RATING TABLE-- RIODELCO04 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

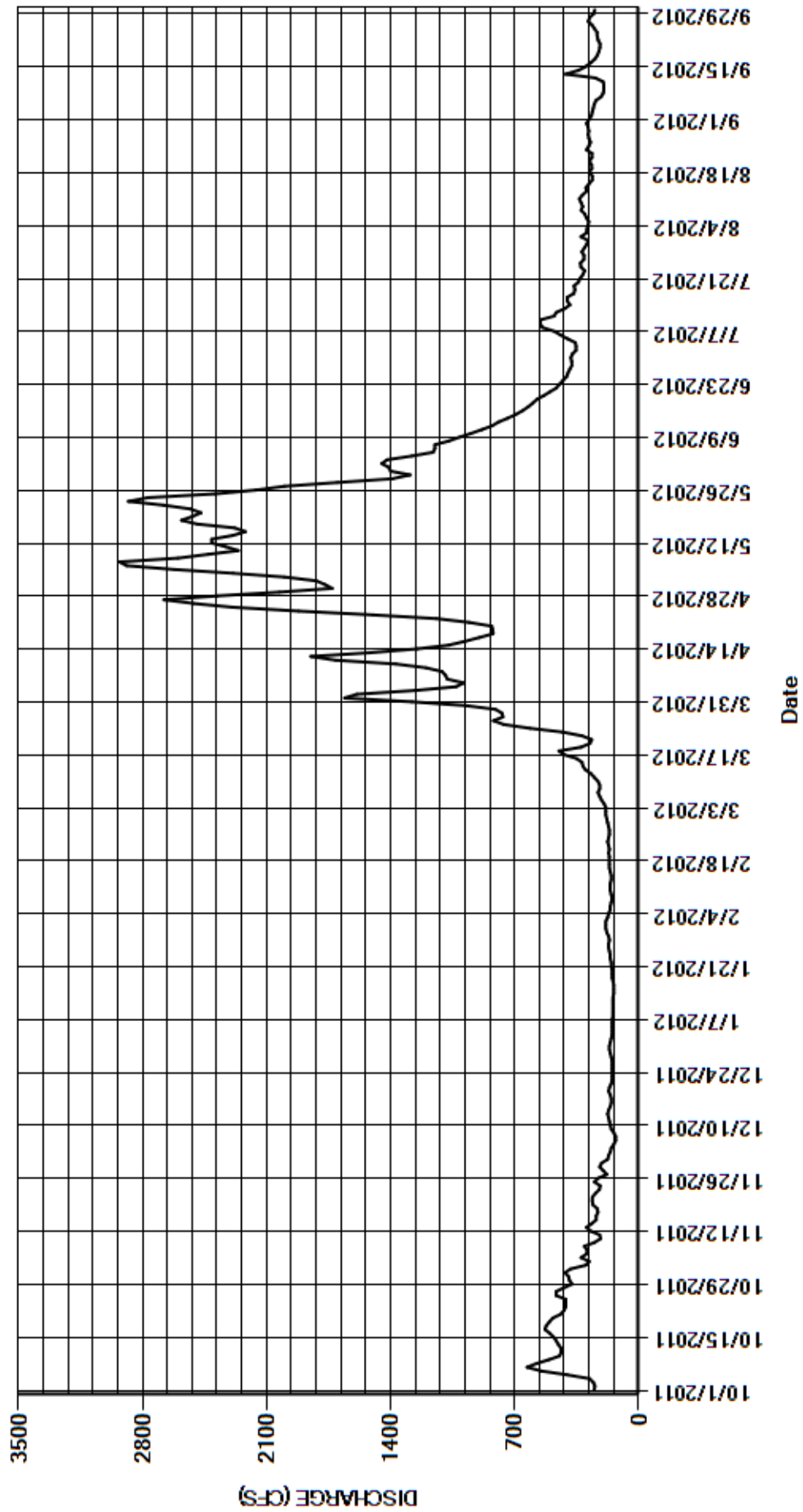
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	252	416	e175	e160	e185	e185	1660	1770	1410	374	326	280
2	247	385	e170	e155	e185	e185	1590	1820	1450	353	296	267
3	256	299	e160	e150	e175	e185	1260	2000	1420	353	292	262
4	277	279	e155	e150	e170	e195	1030	2290	1280	358	286	256
5	403	325	e140	e150	e160	e210	988	2620	1160	401	282	251
6	549	294	e130	e150	e160	e220	1080	2890	1150	441	295	242
7	630	290	e130	e150	e155	e230	1090	2930	1150	477	304	212
8	576	307	e140	e145	e150	e220	1110	2600	1070	543	325	200
9	507	e250	e155	e145	e155	e220	1200	2430	1010	556	316	196
10	446	e215	e160	e145	e160	e230	1370	2260	946	555	325	196
11	437	e220	e165	e145	e160	e250	1710	2330	884	478	335	201
12	438	e270	e170	e145	e160	e270	1850	2410	827	465	318	245
13	453	e295	e175	e145	e155	e300	1510	2410	791	417	295	413
14	465	e265	e170	e140	e155	e315	1250	2290	740	388	298	341
15	481	e240	e160	e140	e160	e320	1070	2220	694	403	280	299
16	502	e240	e155	e140	e165	e350	980	2280	655	403	262	271
17	529	e230	e155	e145	e165	e420	899	2490	624	366	261	247
18	522	235	e160	e150	e165	e450	822	2580	598	360	279	233
19	504	259	e170	e150	e165	e325	823	2520	574	365	265	225
20	485	262	e165	e150	e170	e275	830	2470	535	340	266	219
21	441	261	e155	e155	e165	e265	957	2530	500	330	278	218
22	422	244	e150	e155	e170	e320	1140	2680	465	315	264	229
23	412	222	e150	e160	e175	e430	1500	2880	447	305	263	234
24	412	217	e150	e160	e170	614	1920	2770	427	326	295	234
25	412	250	e150	e165	e165	762	2290	2390	407	329	281	249
26	467	230	e150	e170	e165	820	2510	2160	399	309	272	264
27	466	e180	e150	e170	e170	766	2680	2000	389	308	281	285
28	423	e200	e155	e165	e175	772	2380	1700	377	321	285	276
29	376	e220	e160	e170	e180	808	2030	1390	378	307	282	254
30	391	e210	e165	e180	---	976	1730	1290	383	293	286	248
31	396	---	e165	e185	---	1280	---	1400	---	285	294	---
TOTAL	13577	7810	4860	4785	4810	13168	43259	70800	23140	11824	8987	7547
MEAN	438	260	157	154	166	425	1442	2284	771	381	290	252
AC-FT	26930	15490	9640	9490	9540	26120	85800	140400	45900	23450	17830	14970
MAX	630	416	175	185	185	1280	2680	2930	1450	556	335	413
MIN	247	180	130	140	150	185	822	1290	377	285	261	196

CAL YR	2011	TOTAL	253446	MEAN	694	MAX	4140	MIN	130	AC-FT	502700
WTR YR	2012	TOTAL	214567	MEAN	586	MAX	2930	MIN	130	AC-FT	425600

MAX DISCH: 3070 CFS AT 08:45 ON MAY 23,2012 GH 3.40 FT SHIFT 0.02 FT
 MAX GH: 4.40 FT AT 08:45 ON DEC 04,2011 (Backwater from ice.)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08220000 RIO GRANDE RIVER NEAR DEL NORTE, CO
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08220500 PINOS CREEK NEAR DEL NORTE

Water Year 2012

Location.-- Lat 37°35'30", long 106°27'0" referenced to North American Datum of 1983 (Horseshoe Mountain, CO quad, scale 1:24,000), UTM Zone 13 371984 E and 4161500 N, in SW ¼ SE ¼ sec. 29, T.39 N., R.5 E., New Mexico Principal Meridian, Rio Grande County, CO, Hydrologic Unit 13010002, on left bank 200 ft downstream from Bennett Creek and 8 mi southwest of Del Norte, CO.

Drainage Area and Period of Record.-- 53 mi²; 1919 to 1924, May 1, 1936 to current year.

Equipment.-- Data collection platform (Sutron Satlink2), and a float-operated stage discharge recorder (Sutron SDR) in a 3 ft by 3 ft timber shelter and concrete well at a 12-foot rectangular concrete box control with a steel triangular ramp on each side of the concrete box at the discharge end. The primary reference gage is a drop tape from reference point on shelf. A supplemental outside staff gage is located in the concrete box.

Hydrologic Conditions.-- Drainage is composed of light development, alpine and sub-alpine conditions. Flows are affected by Fuchs Reservoir and five small diversions upstream.

Gage-Height Record.-- Primary record is 15-minute transmitted data with DCP log and SDR log as backup. Record is complete and reliable except for Nov 11-21 and Mar 19-23 when float was frozen in the well and Nov 22 to Mar 15 when the station was closed for the winter. Stage-discharge relation was affected by ice Nov 3-10. No instrument calibration corrections were needed.

Datum Corrections.-- Levels were run to the Reference Point (RP) inside the gage on July 12, 2012 using B.M. No. 3 as base. The RP elevation was within allowable limits, so no correction was made. Two-peg test was performed on the Lietz level (SN 130869) on June 11, 2012 and the instrument was within allowable limits and no adjustment was made.

Rating.-- The control is a 12 ft wide, 12 ft long, 5 ft high concrete box flume with a steel triangular ramp on each side of the concrete box at the discharge end. Minor shifting mainly occurs because of changes in approach conditions, spalling of the concrete, and movement of streambed materials through the box. Rocks, trees, and approach angle in the streambed above the gage also cause some shifting. Rating no. 15, first used Oct 4, 2007, was used again for the entire water year. Seventeen measurements (Nos. 171-187) were made this year ranging in discharge from 3.49 to 53.5 cfs. They cover the discharge range experienced except for the lower daily flows on Dec 24; Jan 12; Feb 7-10, 17 and higher daily flows on Apr 26 and 27. The peak flow of 251 cfs occurred at 1445 on Aug 7 at a gage height of 2.63 ft with a shift of 0.00 ft. It exceeded high measurement no. 180 (GH=1.41 ft), made Apr 26 by 1.22 ft in stage.

Discharge.-- Shifting control method was used to compute the discharge record during all periods of good record. From Oct 1 to Oct 12 a variable shift curve PINDELVS1103 was continued in use from WY2011. From Oct 12 until Mar 15 direct application of the rating was used. Shift curves PINDELVS12-A, PINDELVS12-E and PINDELVS12-F were developed and used to distribute shifts based on stage and time from Mar 15 until the end of the water year. Open-water measurement shifts ranged from 0.00 to 0.03 ft. Applied shifts ranged from 0.00 to 0.02 ft. All measurements were given full weight except No. 177, 179, 184, and 187; which were adjusted by as much as 5.4 percent to smooth shift trends. Discharge was estimated Nov 3-10 when the stage-discharge relation was affected by ice; Nov 11-21 and Mar 19-23 when float was froze; and Nov 22 - Mar 15 when station was closed. One cleaning correction was made on Jun 19 and this correction was taken back to Jun 4 when there was a sharp rise which is assumed to be the point when debris deposited on control.

Special Computations.-- Discharge for periods of no gage-height and ice affected record was estimated using discharge measurements and air temperature records from RIOSFKCO.

Remarks.-- Record is good except for periods of no gage-height and ice affected record, which are poor. The peak, which occurred during a precipitation event, is rated poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.-- Try to obtain more measurements above 1.50 ft gage height.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

08220500 PINOS CREEK NEAR DEL NORTE

RATING TABLE.-- PINDELCO15 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

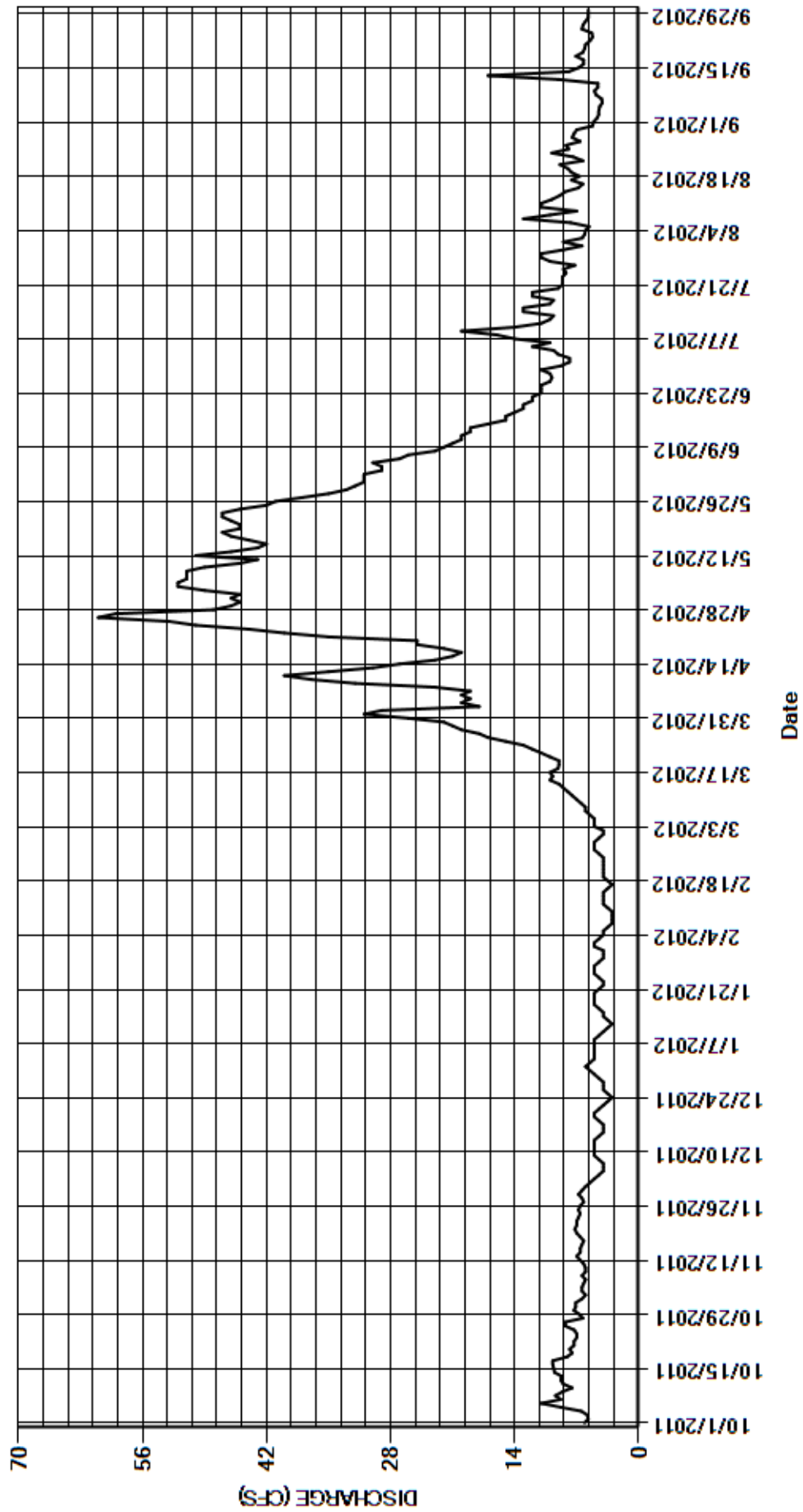
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.1	7.1	e6.0	e6.0	e5.0	e4.0	31	46	31	7.8	8.5	5.1
2	5.7	6.4	e5.5	e5.5	e5.0	e4.0	29	45	31	7.8	6.4	4.7
3	5.8	e6.0	e5.0	e5.0	e4.5	e5.0	18	49	29	9.1	6.1	4.5
4	6.5	e6.4	e4.5	e5.0	e4.0	e5.0	20	52	29	9.6	6.0	4.5
5	8.8	e6.4	e4.0	e5.0	e4.0	e5.0	19	52	30	12	5.6	4.4
6	11	e6.2	e4.0	e5.0	e3.5	e5.5	20	51	27	10	7.7	4.1
7	8.8	e6.0	e4.0	e5.0	e3.0	e6.0	19	51	26	14	13	4.2
8	9.4	e6.4	e4.5	e5.0	e3.0	e6.0	23	51	23	16	10	4.8
9	8.6	e6.0	e5.0	e4.5	e3.0	e6.5	32	49	22	20	7.0	5.0
10	7.5	e6.0	e5.0	e4.0	e3.0	e7.0	37	45	21	14	11	4.6
11	8.5	e6.2	e5.0	e3.5	e3.5	e7.5	40	43	20	11	11	4.6
12	8.8	e6.6	e5.0	e3.0	e4.0	e8.0	35	50	20	10	9.8	9.1
13	8.7	e7.0	e5.0	e3.5	e4.0	e8.5	30	46	19	9.6	8.9	17
14	9.5	e6.6	e4.5	e4.0	e4.0	e9.0	27	43	19	13	8.3	7.9
15	9.6	e6.6	e4.0	e4.0	e4.0	e10	23	42	17	13	6.8	6.8
16	9.7	e6.4	e4.0	e4.5	e3.5	9.7	21	44	15	10	6.3	6.2
17	9.7	e6.2	e4.0	e5.0	e3.0	10	20	46	15	9.6	7.6	6.2
18	8.1	e6.6	e4.5	e5.0	e3.5	9.1	22	47	14	12	6.7	7.1
19	7.5	e7.0	e5.0	e5.0	e4.0	e9.0	25	45	13	12	7.6	6.3
20	7.8	e7.2	e5.0	e5.0	e4.0	e9.0	25	45	13	9.1	8.0	6.1
21	7.3	e7.0	e4.5	e4.5	e4.0	e10	35	46	12	8.6	8.9	6.0
22	7.3	e7.0	e4.0	e4.0	e4.0	e11	40	47	12	8.6	6.3	5.5
23	7.0	e6.8	e3.5	e4.0	e4.0	e12	44	47	11	8.6	7.4	5.2
24	7.0	e6.6	e3.0	e4.5	e4.0	13	50	45	11	8.2	9.8	5.3
25	7.3	e6.8	e3.5	e5.0	e4.5	15	53	42	11	8.5	7.9	6.4
26	8.3	e6.6	e4.0	e5.0	e5.0	17	61	41	10	7.2	8.2	6.3
27	8.3	e6.2	e4.0	e5.0	e5.0	18	59	38	9.8	10	6.6	6.0
28	6.3	e6.4	e4.0	e4.5	e5.0	20	48	35	10	11	7.5	5.7
29	6.7	e6.8	e4.5	e4.0	e4.5	21	46	33	11	11	7.3	5.7
30	7.3	e6.4	e5.0	e4.0	---	22	45	32	8.8	8.5	7.0	5.7
31	7.1	---	e5.5	e4.0	---	26	---	31	---	6.4	5.2	---
TOTAL	246.0	195.9	139.0	141.0	115.5	328.8	997	1379	540.6	326.2	244.4	181.0
MEAN	7.94	6.53	4.48	4.55	3.98	10.6	33.2	44.5	18.0	10.5	7.88	6.03
AC-FT	488	389	276	280	229	652	1980	2740	1070	647	485	359
MAX	11	7.2	6.0	6.0	5.0	26	61	52	31	20	13	17
MIN	5.7	6.0	3.0	3.0	3.0	4.0	18	31	8.8	6.4	5.2	4.1

CAL YR	2011	TOTAL	5067.7	MEAN	13.9	MAX	83	MIN	3.0	AC-FT	10050
WTR YR	2012	TOTAL	4834.4	MEAN	13.2	MAX	61	MIN	3.0	AC-FT	9590

MAX DISCH: 251 CFS AT 14:45 ON AUG 07,2012 GH 2.63 FT SHIFT 0 FT
 MAX GH: 2.63 FT AT 14:45 ON AUG 07,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08220500 PINOS CREEK NEAR DEL NORTE
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08221500 RIO GRANDE RIVER AT MONTE VISTA

Water Year 2012

Location.-- Lat 37°36'34", long 106°8'56" referenced to North American Datum of 1983 (Monte Vista, CO quad, scale 1:24,000), UTM Zone 13 398597 E and 4163100 N, in NW ¼ SW ¼ sec. 19, T.39 N., R.8 E., New Mexico Principal Meridian, Rio Grande County, CO, Hydrologic Unit 13010002, on left bank 40 ft downstream from bridge on U.S. Highway 285, 2.0 mi north of Monte Vista, CO, and 12 mi downstream from San Francisco Creek.

Drainage Area and Period of Record.-- 1,590 mi²; May 1, 1926 to present.

Equipment.-- Graphic water stage recorder, data collection platform (Sutron Satlink2), a float-operated Sutron Stage Discharge Recorder (SDR), and a tipping-bucket rain gauge in a 72-inch corrugated metal shelter and well. The primary reference gage is a drop tape from reference point on shelf. Auxiliary outside cantilever gage installed on Mar. 18, 2011.

Hydrologic Conditions.-- Watershed is comprised of valley floor and steep mountain headwaters. Headwaters areas are generally undeveloped with only sparse minimally populated areas. Valley floor is highly agriculturally based and flows from watershed are diverted for irrigation, livestock watering, domestic, commercial, recharge, and groundwater withdrawals. Flow at gage also includes return flows from all uses.

Gage-Height Record.-- Primary record is 15-minute satellite transmitted data with DCP log, SDR log, and graphic chart record as backup. Record is complete and reliable except for Dec 2-18, Mar 19-22 when floats were frozen and Dec 19 - Mar 12 when station was closed. One erroneous 15-minute value was corrected each day Oct 1-3 without loss of accuracy. There was one +0.01 ft instrument calibration correction made on Apr 5, which was prorated by time from previous visit. The stage-discharge relation was affected by ice Nov 30, Dec 1, and Mar 13-15.

Datum Corrections.-- Levels were last run to the Reference Point (RP) inside the gage on Jul 28, 2011 using BM3 as base. The RP elevation was found within allowable limits and no correction was made. The outside staff gage was outside allowable limits and adjusted -0.06 ft. A two-peg test was performed on the Lietz level (SN 130869) on Jul 28, 2011 and no adjustment was required.

Rating.-- Control at most stages is small cobble riffle approximately 500 ft below gage. Low water control is a gravel and small cobble riffle 25 ft below the gage. There are two channels at gage during lower stages due to sedimentation behind bridge pier above gage. Rating No. 21-1, in use since Oct 1, 2008, was used for the entire water year. It is well defined from 16 to 5500 cfs. Fifteen measurements (nos. 282-296) were made this year, ranging in discharge from 102 to 946 cfs. The measurements cover the discharge range experienced except for the lower daily flows on Oct 8, 14-16, 18-21, 28-31; Aug 26; Sep 5-12, 20-24, 29, 30 and higher daily flows on Apr 26-28; May 5, 6, and 24. The peak flow of 1270 cfs occurred at 1100 on Apr 27, 2012 at a gage height of 4.78 ft with a shift of 0.00 ft. It exceeded high measurement No. 288 (GH = 4.40 ft), made Apr 25 by 0.38 ft in stage.

Discharge.-- Shifting-control method was used to compute discharge during all periods of reliable stage record. Shifts were applied as defined by measurements and distributed by time and events Oct 1 - Mar 22. Shift curve VS12-4 was developed and used Mar 22 - Sep 30 to distribute shifts according to stage. Open-water measurement shifts ranged from -0.05 to +0.08 ft; applied shifts ranged from -0.02 to +0.05 ft. All open water measurements were given full weight except for nos. 285-291, 293, and 294, which were adjusted as much as 6.5 percent to smooth the shift trend. Discharge was estimated Nov 30, Dec 1, Mar 13-15 when stage-discharge relation was affected by ice and Dec. 2 - Mar 13, and Mar 19-22 due to unreliable and missing stage record when floats were frozen and station was closed.

Special Computations.-- Discharge for periods of missing and unreliable gage-height and ice affected record was based on comparison with nearby gages using a river accounting sheet.

Remarks.-- Record is good except for estimated periods, which are poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.--

STATE OF COLORADO
DIVISION OF WATER RESOURCES
OFFICE OF STATE ENGINEER

08221500 RIO GRANDE RIVER AT MONTE VISTA

RATING TABLE.-- RIOMONCO21-1 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

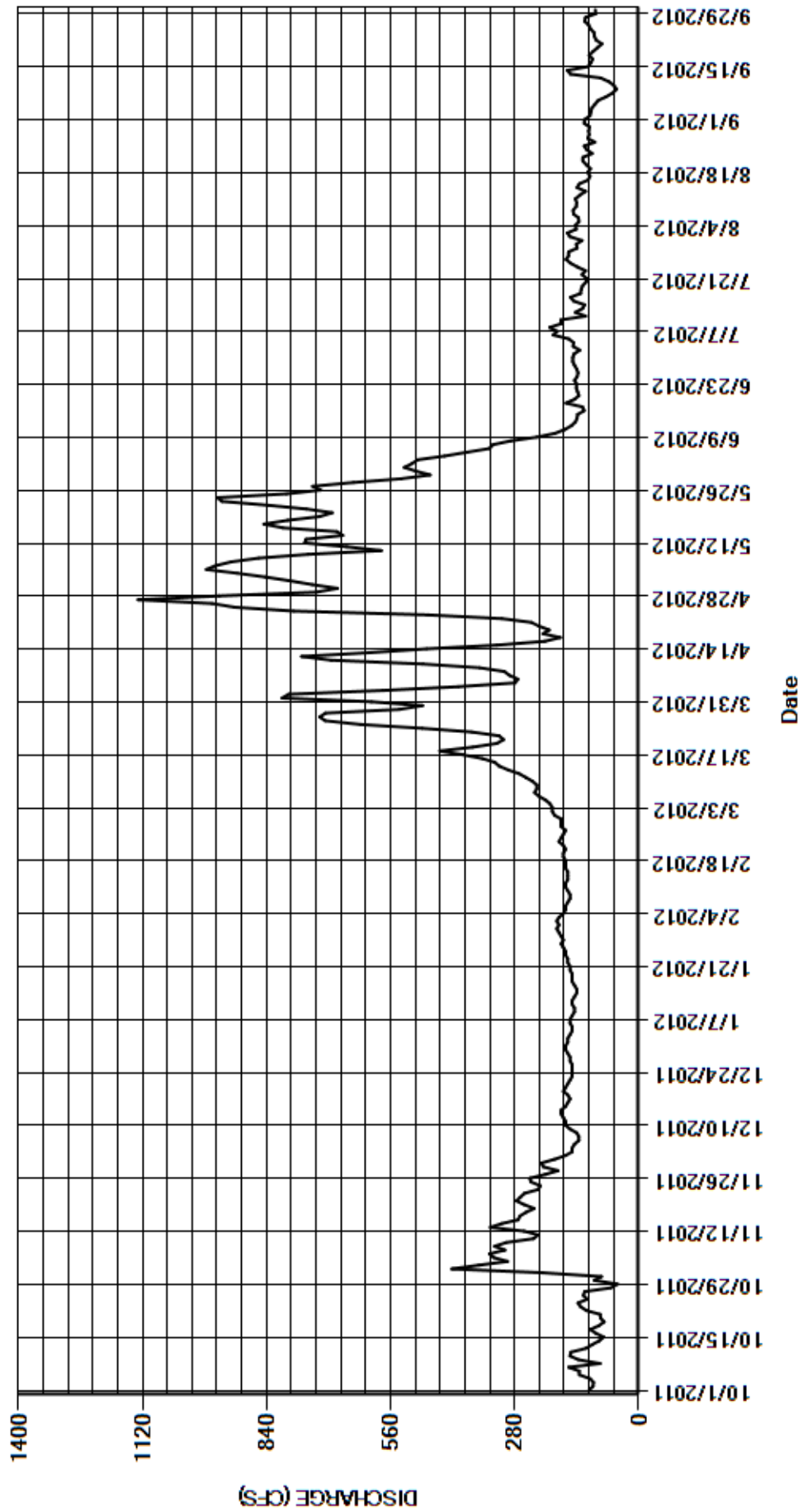
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	112	217	e190	e160	e180	e190	805	737	529	146	155	122
2	103	422	e165	e160	e185	e195	790	787	512	133	161	110
3	102	361	e150	e155	e180	e195	577	843	499	148	141	108
4	110	296	e150	e150	e170	e200	407	906	438	147	143	106
5	134	327	e145	e150	e165	e210	279	976	388	158	135	99
6	134	337	e135	e155	e165	e225	273	955	337	193	136	92
7	158	302	e135	e155	e160	e235	292	920	329	184	147	74
8	87	325	e140	e150	e155	e230	303	858	289	201	148	59
9	136	299	e155	e145	e155	e230	359	746	230	175	141	50
10	155	238	e165	e145	e160	e240	487	581	189	176	140	56
11	153	227	e165	e150	e165	e255	694	659	167	120	143	67
12	119	259	e170	e150	e165	e270	761	754	152	143	133	86
13	105	335	e175	e145	e160	e295	607	751	143	127	120	154
14	89	309	e175	e140	e160	e315	479	668	139	122	139	161
15	79	272	e165	e140	e160	e325	320	681	138	147	134	114
16	97	268	e160	e145	e165	353	212	803	123	154	114	108
17	109	254	e155	e150	e165	397	177	846	127	131	110	104
18	90	236	e160	e150	e165	449	216	792	164	130	115	112
19	78	258	e170	e150	e170	e375	202	720	145	127	109	103
20	86	276	e165	e155	e170	e320	225	692	135	119	118	93
21	87	267	e160	e155	e165	e305	242	750	138	118	126	83
22	118	258	e155	e160	e170	e315	309	838	141	128	126	96
23	131	227	e150	e160	e180	376	476	941	140	120	105	100
24	137	222	e150	e165	e175	489	779	951	145	138	117	101
25	116	243	e150	e165	e170	628	912	795	139	154	123	109
26	125	246	e150	e170	e165	708	963	718	137	164	99	113
27	122	211	e155	e175	e175	720	1130	736	140	158	115	122
28	63	182	e155	e170	e175	707	947	644	145	158	112	120
29	48	215	e160	e175	e175	540	727	536	149	139	113	97
30	100	e220	e165	e180	---	488	680	471	149	141	111	98
31	84	---	e165	e185	---	603	---	503	---	128	123	---
TOTAL	3367	8109	4905	4860	4870	11383	15630	23558	6596	4527	3952	3017
MEAN	109	270	158	157	168	367	521	760	220	146	127	101
AC-FT	6680	16080	9730	9640	9660	22580	31000	46730	13080	8980	7840	5980
MAX	158	422	190	185	185	720	1130	976	529	201	161	161
MIN	48	182	135	140	155	190	177	471	123	118	99	50

CAL YR	2011	TOTAL	112063	MEAN	307	MAX	1920	MIN	45	AC-FT	222300
WTR YR	2012	TOTAL	94774	MEAN	259	MAX	1130	MIN	48	AC-FT	188000

MAX DISCH: 1270 CFS AT 11:00 ON APR 27,2012 GH 4.78 FT SHIFT 0 FT
MAX GH: 4.78 FT AT 11:00 ON APR 27,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08221500 RIO GRANDE RIVER AT MONTE VISTA
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
RIO GRANDE RIVER AT RIO GRANDE-ALAMOSA COUNTY LINE
Water Year 2012

Location.-- Lat 37°34'23", long 106°3'27" referenced to North American Datum of 1983 (Homelake, CO quad, scale 1:24,000), UTM Zone 13 406619 E and 4158984 N, in NW ¼ NW ¼ sec. 1, T.38 N., R.8 E., New Mexico Principal Meridian, Rio Grande County, CO, Hydrologic Unit 13010002, on left bank 1 mi above bridge on county line road.

Drainage Area and Period of Record.-- 1,640 mi². ; April 1993 to present.

Equipment.-- Data collection platform (Sutron Satlink2) and a float-operated shaft encoder in a 42-inch diameter corrugated metal well and shelter. Graphic water stage recorder removed and shaft encoder replaced with a Sutron Stage Discharge Recorder (SDR) on Jul 11, 2012. The primary reference gage is a drop tape from reference point on shelf. Auxiliary outside staff gage installed Apr 26, 2011.

Hydrologic Conditions.-- Watershed is comprised of valley floor and steep mountain headwaters. Headwaters areas are generally undeveloped with only sparse minimally populated areas. Valley floor is highly agriculturally based and flows from watershed are diverted for irrigation, livestock watering, domestic, commercial, recharge, and groundwater withdrawals. Flow at gage also includes return flows from all uses.

Gage-Height Record.-- Primary record is 15-minute satellite transmitted data with DCP log and chart record as backup until Jul 11, and DCP log and SDR log as backup after Jul 11. Record is complete and reliable except for Dec 6-18 when floats were frozen and Dec 19 - Mar 12 when station was closed. One 15-minute value was filled from direct observation on Jul 11. There were no instrument calibration corrections required or made. The stage-discharge relation was affected by ice Nov. 30, Dec 1-5.

Datum Corrections.-- Levels were last run to the Reference Point (RP) inside the gage on Jul 28, 2011 using B.M. No. 4 as base. The RP elevation was found within allowable limits and no correction was made. The outside staff gage was adjusted -0.07 ft. A two-peg test was performed on the Lietz level (SN 130869) on Jul 28, 2011 and the instrument was within allowable limits and no adjustment was made.

Rating.-- The control is a compound control consisting of a gravel bar approximately 300 ft below the gage and a J-hook structure directly below the gage. Shifts have been trending more positive as the gravel bar is migrating downstream. Rating No. 09, in use since Apr 9, 2007 was used until Mar 11. Rating No. 10 was used from Mar 12 to the end of the water year. Rating No. 10 indicates section control throughout the range of the rating. It is possible that the upper end should be channel control, but measurements have not been made in this range to confirm it. This rating is well defined from 50 to 1700 cfs and poorly defined below 30 and above 2000 cfs. Sixteen measurements (No. 369-384) were made this year ranging in discharge from 57.1 to 393 cfs. These measurements cover the discharge range experienced except for lower daily flows on Oct 3, 8, 14-16, 18-21, 28, 29; Apr 7; Jun 16, 17; Jul 20, 21; Aug 17, 18; Sep 2, 3, 6-12, 21-24; and higher daily flows on Nov 2, 3; Mar 17-19, 24-29; Apr 27. The peak flow of 848 cfs occurred at 1645 on Mar 27, 2012 at a gage height of 4.87 ft with a shift of +0.05 ft. It exceeded high measurement No. 373 (GH = 3.83 ft), made Mar 19, by 1.04 ft in stage.

Discharge.-- Shifting control method was used to compute the discharge record during all open water periods. Shifts were applied as defined by measurements and distributed by time and event Oct 1-5. Shift curve (VS12-1) was used Oct 5 - Mar 11 with rating 09 and shift curve (VS12-B) was used Mar. 12 to the end of the water year with rating 10 to distribute shifts by stage. Open-water measurement shifts ranged from +0.01 to +0.05 ft on rating 09 and from -0.02 to +0.08 ft on rating 10; applied shifts ranged from +0.01 to +0.05 ft on rating 09 and -0.01 to +0.05 ft on rating 10. All open water measurements were given full weight except for Nos. 373-375, 377, 378, 380-382, and 384, which were adjusted by as much as 4.4% to smooth shift trends. High measurement No. 373 was adjusted 3.2% in order to make shift curve hydrologically sound. Discharge was estimated Nov 30; Dec 1-5 when stage-discharge relation was affected by ice; and Dec 6 - Mar 12 when floats were frozen and station was closed.

Special Computations.-- Discharge for periods of unreliable gage-height and ice affected record was estimated by comparison with nearby stations using a river accounting sheet.

Remarks.-- Record is good except for estimated periods, which are poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.--

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

RIO GRANDE RIVER AT RIO GRANDE-ALAMOSA COUNTY LINE

RATING TABLE.-- RIOLINCO09 USED FROM 01-OCT-2011 TO 11-MAR-2012
 RIOLINCO10 USED FROM 12-MAR-2012 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

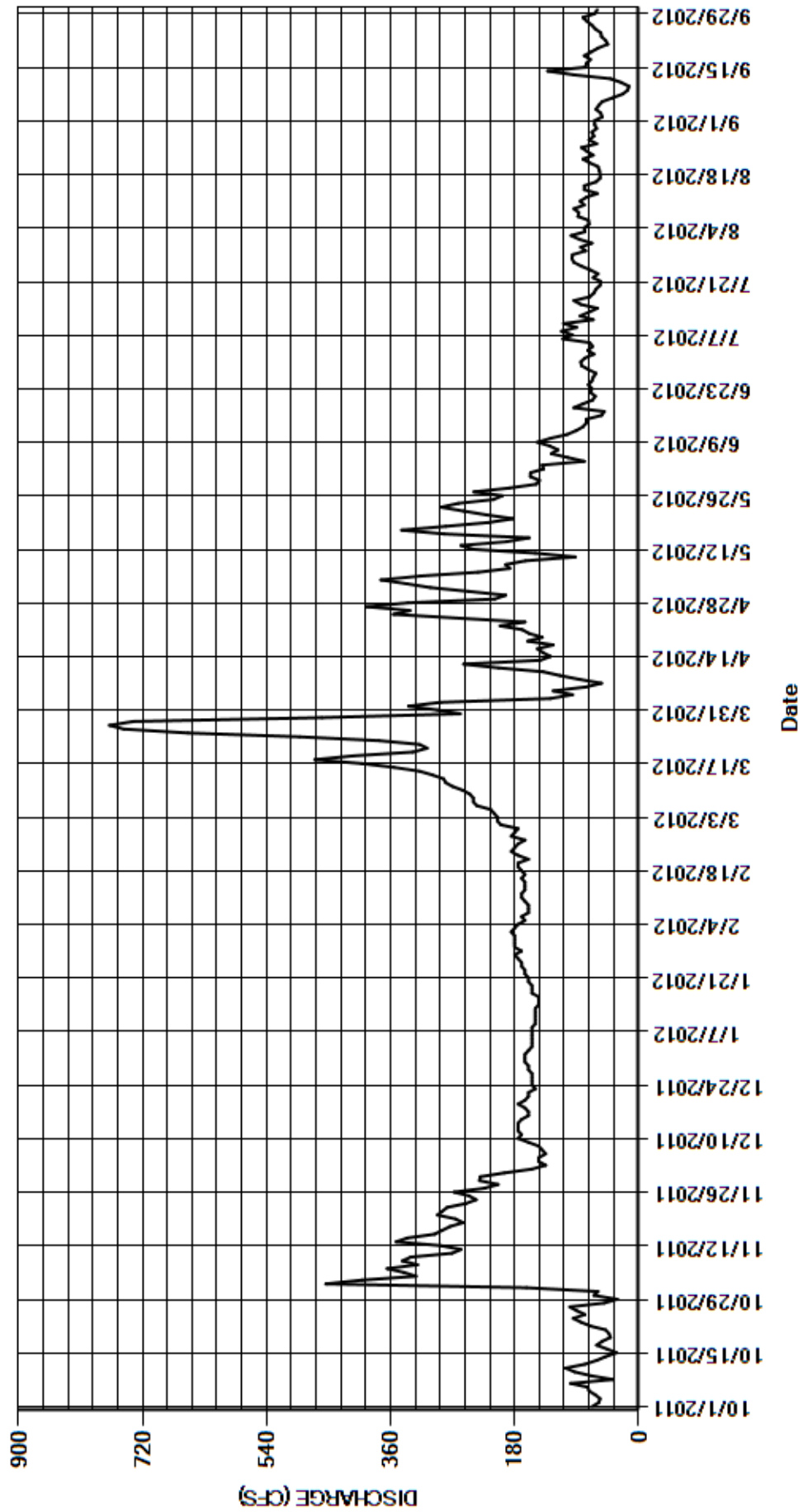
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	67	163	e195	e165	e180	e200	334	247	157	78	86	64
2	58	454	e155	e160	e185	e205	288	302	138	65	98	53
3	56	401	e135	e155	e180	e205	128	337	140	74	78	55
4	63	323	e145	e155	e175	e210	96	374	79	67	79	62
5	72	341	e145	e155	e165	e215	124	317	103	71	72	58
6	74	365	e135	e155	e170	e235	77	233	127	110	73	53
7	99	321	e140	e155	e160	e240	54	187	117	96	88	38
8	37	343	e145	e155	e160	e240	86	193	129	112	87	23
9	69	331	e160	e150	e160	e245	114	164	147	90	94	16
10	93	271	e175	e150	e165	e255	139	92	128	109	79	14
11	106	258	e170	e150	e170	e270	203	150	104	66	85	25
12	78	287	e175	e150	e170	e280	254	240	91	85	76	41
13	61	352	e175	e150	e165	283	143	258	81	72	60	94
14	48	336	e175	e145	e165	299	128	191	76	60	79	132
15	32	296	e170	e145	e165	318	139	159	76	84	79	77
16	46	285	e160	e145	e170	355	147	282	54	94	62	76
17	61	274	e160	e155	e165	402	124	344	50	71	56	70
18	53	255	e165	e155	e170	470	161	280	94	65	56	79
19	41	266	e175	e155	e175	415	140	218	81	62	57	69
20	43	292	e165	e160	e175	328	159	182	67	56	59	59
21	48	285	e160	e160	e160	307	169	221	63	55	71	45
22	70	278	e160	e165	e175	318	201	254	70	66	81	48
23	84	251	e150	e165	e185	377	165	287	68	59	66	54
24	95	236	e155	e170	e180	492	260	262	73	70	75	55
25	78	246	e155	e170	e175	654	356	211	68	83	83	63
26	90	268	e155	e175	e165	747	332	198	66	94	61	68
27	100	224	e155	e180	e185	768	395	239	62	97	72	75
28	50	204	e160	e170	e180	733	335	188	73	96	65	81
29	31	231	e160	e180	e175	460	209	149	83	77	68	64
30	65	e230	e165	e180	---	259	193	144	84	84	61	60
31	59	---	e165	e180	---	292	---	157	---	68	64	---
TOTAL	2027	8667	4960	4960	4970	11077	5653	7060	2749	2436	2270	1771
MEAN	65.4	289	160	160	171	357	188	228	91.6	78.6	73.2	59.0
AC-FT	4020	17190	9840	9840	9860	21970	11210	14000	5450	4830	4500	3510
MAX	106	454	195	180	185	768	395	374	157	112	98	132
MIN	31	163	135	145	160	200	54	92	50	55	56	14

CAL YR	2011	TOTAL	71110	MEAN	195	MAX	889	MIN	14	AC-FT	141000
WTR YR	2012	TOTAL	58600	MEAN	160	MAX	768	MIN	14	AC-FT	116200

MAX DISCH: 848 CFS AT 16:45 ON MAR 27,2012 GH 4.87 FT SHIFT 0.05 FT
 MAX GH: 4.87 FT AT 16:45 ON MAR 27,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

RIO GRANDE RIVER AT RIO GRANDE-ALAMOSA COUNTY LINE
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08223000 RIO GRANDE RIVER AT ALAMOSA

Water Year 2012

Location.-- Lat 37°28'51", long 105°52'41" referenced to North American Datum of 1983 (Alamosa West, CO quad, scale 1:24,000), UTM Zone 13 422367 E and 4148575 N, in SE ¼ NE ¼ sec. 4, T.37 N., R.10 E., New Mexico Principal Meridian, Alamosa County, CO, Hydrologic Unit 13010002, on left bank 0.3 mi northwest of Adams State College and 9 mi upstream from Alamosa Creek.

Drainage Area and Period of Record.-- 1,710 mi². ; Apr. 7, 1915 to current year.

Equipment.-- Graphic water-stage recorder, data collection platform (Sutron Model 8210 DCP with HDR GOES radio), air temperature sensor, and a float-operated shaft encoder in a 4 ft by 6 ft exposed aggregate building with a 4 ft. diameter concrete well. Primary reference gage is a drop tape from reference point on shelf. Auxilliary outside staff gage installed May 25, 2011.

Hydrologic Conditions.-- Watershed is comprised of valley floor and steep mountain headwaters. Headwaters areas are generally undeveloped with only sparse minimally populated areas. Valley floor is highly agriculturally based and flows from watershed are diverted for irrigation, livestock watering, domestic, commercial, recharge, and groundwater withdrawals. Flow at gage also includes return flows from all uses. Riparian areas in the vicinity of the gage have been modified by flood protection levees through the city of Alamosa thus water stage is affected by levees and vegetative growth within levees.

Gage-Height Record.-- Primary record is 15-minute satellite transmitted data with DCP log and chart record as backup. Record is complete and reliable except for Dec 24 through Feb 27 when floats were frozen in the well and Sep 5, 6 when inlets were plugged. The stage-discharge relation was affected by ice Nov 30; Dec 1-23; Feb 28, 29; Mar 1-6. One erroneous 15 minute value was corrected on Mar 23. There was one +0.01 ft instrument calibration correction made on May 21, which was prorated by time from the previous visit. There were two flush corrections: a -0.03 ft on Aug 13 and a -0.04 ft on Sep 6, which were prorated by time from previous inflection point.

Datum Corrections.-- Levels were last run to the Reference point (RP) inside the gage on Jun 11, 2012 using BM7 as base. The RP elevation was within allowable limits and no correction was made. Two-peg test was performed on the Lietz level (SN 130869) on Jun 11, 2012 and the instrument was within allowable limits and no correction was made.

Rating.-- The control is a sand streambed and channel. The sand movement, change in vegetation, and changes to downstream diversion structure (Westside Diversion) cause numerous shift changes. Rating No. 22D in use since Oct 1, 2005 was used for the entire water year. The upper end of curve (above 1500 cfs) was created by the USGS using step-backwater analysis method as part of a cooperative rating curve extension project. Fifteen measurements (Nos. 348-362) were made this year ranging in discharge from 27.1 to 462 cfs. They cover the discharge range experienced except for higher daily flows on Mar 25-29. The peak flow of 745 cfs occurred at 1015 on Mar 28, 2012 at a gage height of 5.17 ft with a shift of -0.55 ft. It exceeded high measurement No. 352 (GH=4.16), made Mar 19, by 1.01 ft in stage.

Discharge.-- Shifting control method was used to compute the discharge record for all open water periods. Six shift curves (VS11-3, VS12-A to VS12-E) were used to distribute shifts by stage and time. Measurement shifts ranged from -0.50 to -0.27 ft. All measurements were given full weight except Nos. 348, 350, 351, 353, 355, and 359-362, which were adjusted by as much as 4.9% to smooth shift trends. Discharge was estimated Nov 30; Dec 1-23; Feb 28, 29; Mar 1-6 when stage-discharge relation was affected by ice; Dec 24 through Feb 27 when floats were frozen; and Sep 5, 6 when inlets were plugged.

Special Computations.-- Discharge for periods of unreliable gage-height and ice-affected record was estimated by comparison with nearby stations using a river accounting sheet.

Remarks.-- Record is good, except for estimated periods, which are poor; and Mar 26-29, including the peak discharge, which should be considered fair. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.--

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

08223000 RIO GRANDE RIVER AT ALAMOSA

RATING TABLE.-- RIOALACO22D USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

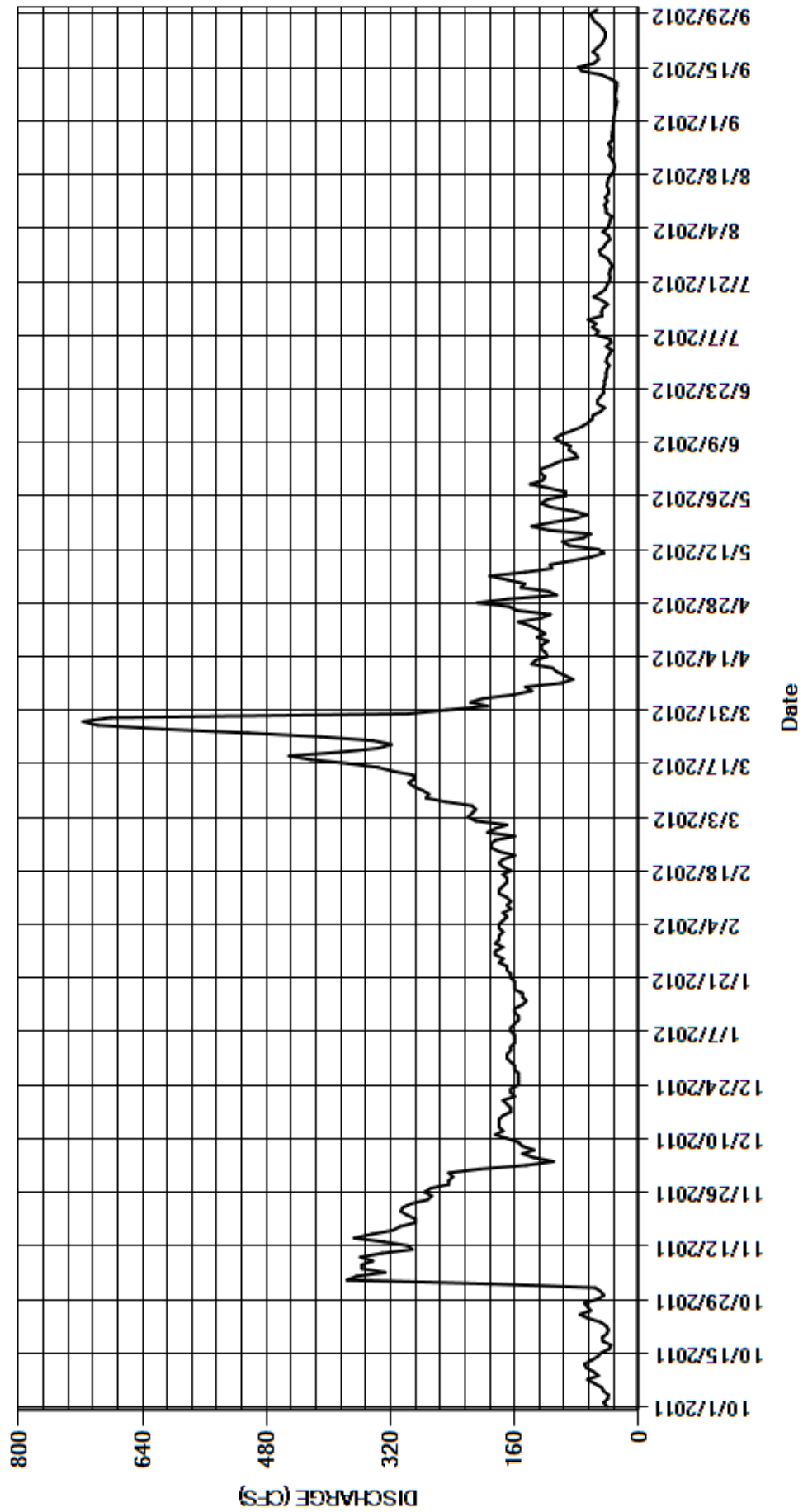
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	41	56	e245	e170	e180	e170	195	116	127	41	37	32
2	45	190	e205	e165	e175	e210	217	152	126	38	39	32
3	40	376	e145	e165	e180	e220	201	147	112	35	46	31
4	39	364	e110	e160	e180	e215	161	169	102	42	40	30
5	45	327	e135	e160	e175	e210	138	192	79	36	38	e29
6	48	357	e150	e160	e170	e215	146	146	82	37	37	e28
7	57	357	e135	e165	e175	249	100	112	90	55	35	30
8	66	343	e150	e165	e165	274	85	114	88	52	42	30
9	52	359	e155	e160	e170	271	95	86	100	60	42	29
10	58	331	e170	e155	e165	279	106	61	108	55	44	28
11	67	292	e185	e155	e170	290	111	45	100	65	40	28
12	70	298	e175	e160	e180	297	138	52	86	47	43	37
13	61	329	e180	e160	e180	289	133	90	74	48	39	48
14	53	367	e180	e150	e175	291	118	98	66	46	39	73
15	48	344	e180	e145	e170	317	120	71	60	40	41	78
16	38	317	e175	e150	e170	336	126	62	59	47	40	58
17	36	308	e165	e150	e175	375	125	116	49	58	39	52
18	46	288	e165	e160	e165	423	117	138	44	49	35	53
19	47	288	e170	e160	e175	451	131	113	53	43	32	59
20	41	299	e175	e160	e180	384	121	82	53	41	31	54
21	39	307	e160	e165	e175	336	129	66	49	38	32	48
22	42	304	e165	e165	e160	319	140	85	45	37	35	45
23	49	293	e165	e170	e180	343	155	113	46	38	38	43
24	65	272	e155	e170	e190	410	126	126	44	37	36	43
25	76	267	e155	e180	e190	504	114	118	44	34	36	46
26	62	276	e155	e175	e185	615	157	94	42	37	39	51
27	66	268	e155	e185	e160	698	167	94	42	40	34	57
28	70	245	e160	e185	e195	717	208	116	41	49	35	60
29	53	245	e160	e175	e185	681	169	140	38	51	34	62
30	45	e240	e165	e185	---	297	106	124	42	45	33	54
31	49	---	e170	e180	---	248	---	121	---	42	33	---
TOTAL	1614	8907	5115	5110	5095	10934	4155	3359	2091	1383	1164	1348
MEAN	52.1	297	165	165	176	353	138	108	69.7	44.6	37.5	44.9
AC-FT	3200	17670	10150	10140	10110	21690	8240	6660	4150	2740	2310	2670
MAX	76	376	245	185	195	717	217	192	127	65	46	78
MIN	36	56	110	145	160	170	85	45	38	34	31	28

CAL YR	2011	TOTAL	62375	MEAN	171	MAX	550	MIN	27	AC-FT	123700
WTR YR	2012	TOTAL	50275	MEAN	137	MAX	717	MIN	28	AC-FT	99720

MAX DISCH: 745 CFS AT 10:15 ON MAR 28,2012 GH 5.17 FT SHIFT -0.55 FT
 MAX GH: 5.17 FT AT 10:15 ON MAR 28,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08223000 RIO GRANDE RIVER AT ALAMOS
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
372833105455800 CLOSED BASIN PROJECT CANAL NEAR ALAMOSA
Water Year 2012

Location.-- Lat 37°28'33", long 105°46'2" referenced to North American Datum of 1983 (Alamosa East, CO quad, scale 1:24,000), UTM Zone 13 432167 E and 4147927 N, in SW ¼ SW ¼ sec. 3, T.37 N., R.11 E., New Mexico Principal Meridian, Alamosa County, CO, Hydrologic Unit 13010002, on right bank 400 ft north of State Highway 160, 5.5 mi east of Alamosa, CO.

Drainage Area and Period of Record.-- Not applicable; Sept. 23, 1987 to current year.

Equipment.-- Graphic water-stage recorder, data collection platform (Sutron Satlink) and two float-operated shaft encoders on wells Ha and Hb in 8 ft x 10 ft steel plated building with concrete stilling wells at a 12 ft concrete Parshall flume. The Bureau of Reclamation owns and operates an independent electronic data acquisition system using pressure transducers, a water quality monitor, and temperature sensor. The primary reference gage is a drop tape from reference point on shelf. There is a supplemental outside staff gage in the flume.

Hydrologic Conditions.-- Flow regulated by wells supplying water to canal and by the operation of San Luis Lake. Diversions above the gage to San Luis Lake and to the Blanca Wildlife Habitat Area.

Gage-Height Record.-- Primary record is 15-minute transmitted data with DCP log and chart record as backup. Record is complete and reliable. There were no instrument corrections made to the shaft encoder this year. One erroneous unit value was corrected on each day Feb. 15 and Aug. 1 due to hydro affecting gage-height during flume cleaning.

Datum Corrections.-- Levels were last run Sep. 1, 2011 to the Ha well and Hb well Reference Points (RP) inside the gage using BM1 as base. Elevations of both RPs were within allowable limits, so no correction was made. Two-peg tests were performed on the instrument on May 27, Jul. 28, and Sep. 26, 2011. The instrument was adjusted slightly on Sep. 26, 2011.

Rating.-- The control structure is a 12 ft concrete Parshall flume. A standard rating for a 12 ft Parshall flume has been in use since Sep. 23, 1987. Twenty-five measurements (Nos. 641-665) were made this year, ranging in discharge from 11.4 to 25.3 cfs. They cover the discharge range experienced except for the lower daily flows on Jun. 29, 30, and Sep. 1; and higher daily flows on Oct. 24 and May 28. The peak flow of 43.1 cfs occurred at 0800 on Oct. 24, 2011 at a gage height of 0.96 feet with a shift of -0.01 feet. It exceeded high measurement No. 657 (GH=0.68 ft), made May 29, 2012, by 0.28 feet in stage.

Discharge.-- Shifting control method was used for the entire year. Due to the stability of the control, high frequency of measurements, and numerous cleaning corrections, shifts were applied as defined by measurements and cleaning corrections and distributed by time. Measurement shifts ranged from -0.04 to +0.03 feet. All measurements were given full weight except numbers 645, 646, 651, 652, 661, 663, and 665, which were adjusted as much as 5.5 percent to smooth shift distribution.

Special Computations.-- All periods of potential backwater were checked and no submergence was found.

Remarks.-- Record is good. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.--

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

372833105455800 CLOSED BASIN PROJECT CANAL NEAR ALAMOSA

RATING TABLE.-- CBPALACO01 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

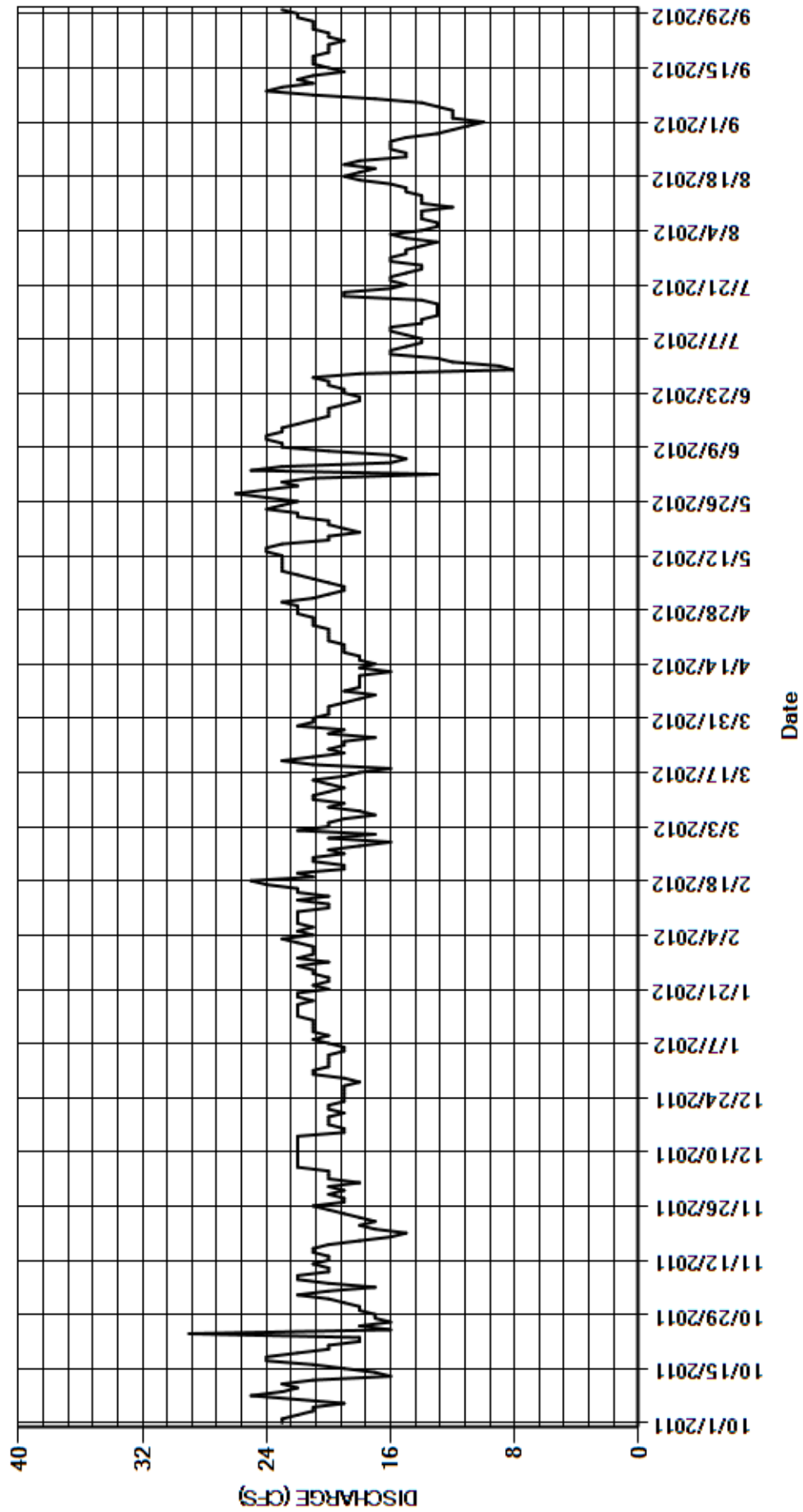
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	23	19	20	20	21	17	20	21	21	12	13	10
2	23	20	18	20	22	22	20	20	13	13	15	12
3	22	22	20	20	23	20	20	19	25	16	16	12
4	21	20	20	20	21	20	19	19	23	16	14	12
5	21	17	20	19	22	19	18	20	16	15	13	13
6	19	20	22	19	21	17	17	21	15	14	13	14
7	22	22	22	20	22	18	19	22	16	14	14	17
8	25	22	22	21	22	20	18	23	20	15	14	21
9	23	20	22	20	22	19	18	23	23	16	14	24
10	22	20	22	21	22	21	18	23	23	16	12	23
11	23	21	22	21	20	21	18	23	24	14	14	21
12	21	20	22	21	20	20	16	23	24	14	14	22
13	16	20	22	21	22	19	18	24	23	13	14	21
14	17	21	22	22	20	20	17	24	23	13	15	19
15	19	21	19	22	22	21	18	23	22	13	15	20
16	21	20	19	22	22	19	18	20	21	13	16	21
17	24	18	20	22	24	18	19	20	20	14	18	21
18	24	16	20	21	25	16	19	18	20	19	19	21
19	22	15	20	22	21	21	19	19	20	19	18	20
20	20	17	19	22	22	23	20	20	19	16	17	20
21	20	18	20	20	19	21	20	20	18	15	19	20
22	18	17	20	21	19	19	20	22	18	16	18	19
23	18	18	19	20	21	20	20	22	19	16	15	20
24	29	19	19	20	21	19	21	24	19	15	15	20
25	16	20	19	21	19	19	21	23	20	14	16	21
26	18	21	19	21	20	17	21	22	20	14	16	21
27	16	19	19	22	18	20	22	24	21	16	16	21
28	17	19	18	20	16	19	22	26	18	16	15	22
29	17	20	19	22	20	22	22	24	8.1	15	13	22
30	18	19	21	21	---	21	23	22	9.0	15	12	23
31	18	---	21	21	---	21	---	23	---	14	11	---
TOTAL	633	581	627	645	609	609	581	677	581.1	461	464	573
MEAN	20.4	19.4	20.2	20.8	21.0	19.6	19.4	21.8	19.4	14.9	15.0	19.1
AC-FT	1260	1150	1240	1280	1210	1210	1150	1340	1150	914	920	1140
MAX	29	22	22	22	25	23	23	26	25	19	19	24
MIN	16	15	18	19	16	16	16	18	8.1	12	11	10

CAL YR	2011	TOTAL	7199.0	MEAN	19.7	MAX	29	MIN	11	AC-FT	14280
WTR YR	2012	TOTAL	7041.1	MEAN	19.2	MAX	29	MIN	8.1	AC-FT	13970

MAX DISCH: 43.1 CFS AT 08:00 ON OCT 24,2011 GH 0.96 FT SHIFT -0.01 FT
 MAX GH: 0.96 FT AT 08:00 ON OCT 24,2011

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

372833105455800 CLOSED BASIN PROJECT CANAL NEAR ALAMOSA
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08224500 KERBER CREEK NEAR VILLA GROVE

Water Year 2012

Location.-- Lat 38°13'13", long 106°5'23" referenced to North American Datum of 1983 (Graveyard Gulch, CO quad, scale 1:24,000), UTM Zone 13 404622 E and 4230810 N, in SW ¼ SE ¼ sec. 21, T.46 N., R.8 E., New Mexico Principal Meridian, Saguache County, CO, Hydrologic Unit 13010003, on left bank 7 mi west of Villa Grove, CO and 5 ½ mi downstream from Bonanza, CO.

Drainage Area and Period of Record.-- Approximately 45.4 mi² (revised); June 1, 1923- September 16, 1926, May 2, 1936-September 30, 1982, October 1, 1993 -current year.

Equipment.-- Graphic water-stage recorder, data collection platform (Sutron Satlink), a float-operated shaft encoder, and tipping bucket rain gage, in a 6 ft by 6 ft exposed aggregate shelter and 48 inch concrete well. The primary reference gage is a drop tape from reference point on shelf. An outside gage was installed Aug. 4, 2011. On Apr. 25, 2012, the graphic chart recorder was removed, the DCP was replaced with a Sutron Satlink2, and the shaft encoder was replaced with an SDR.

Hydrologic Conditions.-- Station is located in a narrow high mountain valley with slender meadows and numerous homes scattered along the hill sides. Two small diversions above station for irrigation.

Gage-Height Record.-- Primary record is 15-minute transmitted data with DCP log, chart record (until Apr 25), and SDR log (after Apr 25) as backup records. Record is complete and reliable, except for Dec 7 through Feb 3 when the station was closed. The stage-discharge relation was affected by ice Nov 7-30; Dec 1-6; Feb 4-29; Mar 1-24. There were no instrument corrections made to the shaft encoder. One +0.01 ft flush correction on Apr 5 was prorated from previous inflection point.

Datum Corrections.-- Levels were last ran to the Reference Point (RP) inside the gage on Aug.30, 2011 using BM8 as base. The RP elevation was within the allowable limit and no correction was made. A -0.02 ft correction was made to the secondary cantilever gage.

Rating.-- Control is a concrete ramp flume approximately 10 feet downstream from gage. Shifting occurs mainly due to the movement of streambed materials in the gage pool and approach. At high stages the stilling well experiences drawdown as observed when the upper inlets are closed the gage height rises. Rating No. 19 was used until Oct. 19, 2011. Rating No. 20 was developed from recent measurements and used from Oct. 19, 2011 through remainder of the water year. Sixteen measurements (Nos. 151-166) were made this year ranging in discharge from 1.18 to 11.2 cfs. The measurements cover the discharge range experienced except for higher daily flows on Apr 26-28, May 5-9, 12, and the lower flows on Dec 4, 5, Jul 20-27, 29-31, Aug 4-6, 9, 17, 18, 20, 22, 27, 28, 31, and Sep 1, 2, 4-11, 22, 23. The peak flow of 15.2 cfs occurred at 0100 on Apr. 27, 2012 at a gage height of 0.75 ft with a shift of 0.00 ft. It exceeded high measurement No. 158 (GH = 0.68 ft) made Apr. 5, 2012 by 0.07 feet in stage.

Discharge.-- Shifting control method was used to compute the discharge record for all open water periods. A +0.05 ft shift was applied Oct. 1-19 with rating No. 19. Unshifted rating No. 20 was applied from Oct 19 to May 24 and Jun 27 to Sep 11. During other periods, two variable shift curves were used to define minor shifting caused from gage pool scour and fill. Open-water measurement shifts ranged from -0.01 to +0.01 ft. All measurements were given full weight except Nos. 152, 158, 159, and 165, which were adjusted as much as 7% to smooth shift trend. The stage-discharge relation was affected by ice and discharge was estimated Nov 7-30; Dec 1-6; Feb 4-29; Mar 1-24. Discharge was also estimated Dec 7 through Feb 3, when station was closed.

Special Computations.-- Discharge for periods of no gage-height and ice affected record was estimated using measurements, partial day records, trends, nearby stations, and weather records.

Remarks.-- The record is good except for periods of no gage-height and ice affected record, which are estimated and poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.--

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

08224500 KERBER CREEK NEAR VILLA GROVE

RATING TABLE.-- KERVILCO19 USED FROM 1-OCT-2011 TO 19-OCT-2011
 KERVILCO20 USED FROM 19-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.1	2.5	e1.5	e2.5	e2.5	e2.5	10	9.5	6.9	1.3	3.0	0.94
2	2.1	2.2	e1.5	e2.0	e2.5	e2.5	9.7	9.7	7.4	1.3	1.9	0.97
3	2.2	2.1	e1.2	e2.3	e2.2	e3.0	7.5	10	7.1	1.7	1.7	1.2
4	2.9	3.0	e1.0	e2.5	e2.3	e3.0	8.1	11	6.6	2.0	0.97	0.80
5	4.1	2.8	e1.0	e2.5	e2.3	e3.3	7.8	12	6.5	2.0	0.75	0.62
6	3.4	2.8	e1.5	e2.8	e2.0	e3.5	7.4	12	6.0	1.5	1.0	0.55
7	3.2	e4.4	e1.7	e3.0	e2.0	e3.3	6.9	13	5.6	4.5	1.2	0.59
8	3.2	e3.2	e2.0	e2.8	e2.0	e3.0	7.1	13	5.1	2.7	1.3	0.62
9	2.9	e3.0	e2.0	e2.5	e2.5	e3.3	7.7	12	4.7	2.5	0.80	0.68
10	3.0	e2.0	e2.0	e2.5	e3.0	e3.5	8.7	11	4.3	2.4	1.2	0.64
11	2.9	e2.2	e1.7	e2.5	e3.0	e3.5	8.9	11	3.9	2.4	2.1	0.72
12	2.9	e2.6	e2.0	e2.5	e2.7	e3.2	9.4	12	3.7	2.4	1.2	6.1
13	2.7	e3.0	e2.5	e2.0	e2.5	e3.5	8.0	11	3.3	1.9	1.5	3.3
14	2.7	e2.7	e2.7	e2.0	e2.0	e3.5	7.5	10	3.1	1.6	1.9	1.7
15	2.6	e2.5	e2.0	e2.0	e2.0	e4.0	7.0	10	3.0	1.5	1.3	1.7
16	2.5	e2.3	e1.5	e2.0	e2.0	e4.5	6.9	11	2.9	1.5	1.2	1.6
17	2.8	e2.0	e1.5	e1.5	e2.3	e4.5	6.4	11	2.7	1.5	1.1	1.3
18	2.7	e2.0	e2.0	e2.0	e2.5	e4.0	6.6	11	2.5	1.3	1.1	1.5
19	2.5	e2.5	e2.5	e2.5	e2.5	e3.5	6.8	11	2.2	1.2	1.3	1.3
20	2.4	e3.0	e2.5	e3.0	e2.5	e3.0	6.5	11	2.0	0.85	1.1	1.2
21	2.4	e3.6	e2.0	e3.0	e2.5	e3.5	7.2	11	2.1	0.72	1.3	1.2
22	2.4	e3.5	e1.7	e2.5	e3.0	e4.5	8.7	11	2.0	0.96	1.1	1.1
23	2.4	e3.5	e1.5	e2.0	e2.7	e7.5	9.1	11	1.8	0.80	1.9	1.1
24	2.2	e3.0	e1.5	e2.5	e2.5	e8.5	10	10	1.7	0.70	2.9	1.3
25	2.5	e2.5	e2.3	e3.0	e2.0	8.4	11	9.6	1.5	0.88	2.1	2.3
26	2.7	e2.0	e2.5	e2.5	e2.0	8.7	12	9.0	1.4	0.90	1.3	2.9
27	2.5	e2.2	e2.5	e2.5	e2.0	9.4	14	8.7	2.3	0.79	1.0	2.7
28	2.7	e2.5	e2.5	e2.5	e2.5	9.6	12	8.3	3.0	1.2	1.1	2.0
29	2.4	e2.0	e3.0	e2.5	e2.5	9.1	11	8.0	2.2	1.0	1.8	1.8
30	2.6	e1.7	e3.0	e2.5	---	8.5	9.8	7.6	1.6	0.77	1.4	1.6
31	2.5	---	e3.0	e2.5	---	9.4	---	7.2	---	0.98	1.1	---
TOTAL	83.1	79.3	61.8	75.4	69.0	155.2	259.7	323.6	109.1	47.75	44.62	46.03
MEAN	2.68	2.64	1.99	2.43	2.38	5.01	8.66	10.4	3.64	1.54	1.44	1.53
AC-FT	165	157	123	150	137	308	515	642	216	95	89	91
MAX	4.1	4.4	3.0	3.0	3.0	9.6	14	13	7.4	4.5	3.0	6.1
MIN	2.1	1.7	1.0	1.5	2.0	2.5	6.4	7.2	1.4	0.70	0.75	0.55

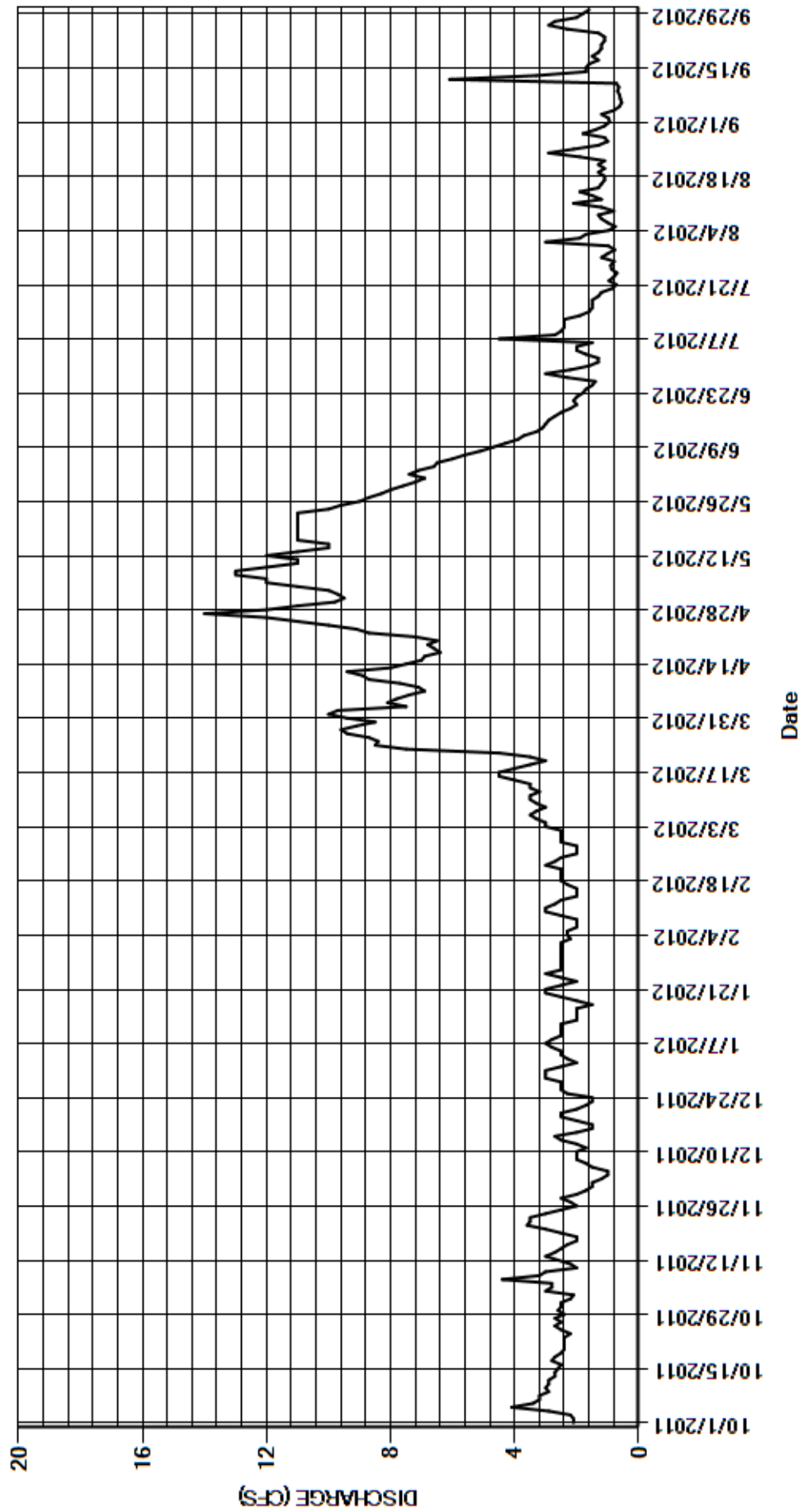
CAL YR	2011	TOTAL	2578.70	MEAN	7.06	MAX	43	MIN	1.0	AC-FT	5110
WTR YR	2012	TOTAL	1354.60	MEAN	3.70	MAX	14	MIN	0.55	AC-FT	2690

MAX DISCH: 15.2 CFS AT 01:00 ON APR 27,2012 GH 0.75 FT SHIFT 0 FT

MAX GH: 1.27 FT AT 15:00 ON FEB 29,2012 (affected by ice on control)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08224500 KERBER CREEK NEAR VILLA GROVE
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
GARNER CREEK NEAR VILLA GROVE

Water Year 2012

Location.-- Lat 38°10'23", long 105°48'35" referenced to North American Datum of 1983 (Valley View Hot Springs, CO quad, scale 1:24,000), UTM Zone 13 429079 E and 4225326 N, in SE ¼ SE ¼ sec. 1, T.45 N., R.10 E., New Mexico Principal Meridian, Saguache County, CO, Hydrologic Unit 13010003, on right bank 12 mi southeast of Villa Grove, CO.

Drainage Area and Period of Record.-- 6.4 mi²; Station was established at existing Parshall flume January 1, 1999 to current year.

Equipment.-- Data collection platform (Sutron Satlink II) and a float-operated SDR shaft encoder in a 2 foot steel culvert pipe stilling well with a small steel box-type shelter atop well at a 2-foot Parshall Flume. Primary reference gage is drop tape from reference point on gage shelf. Secondary staff gage in flume.

Hydrologic Conditions.-- Undeveloped steep alpine and subalpine terrain. There are a few diversions above gage.

Gage-Height Record.-- Primary record is 15-minute satellite transmitted stage data with DCP log and SDR log as backup. Record is complete and reliable except for Dec 6 - Mar 7, when well was frozen. The stage-discharge relation was affected by ice Nov 9-11, 17, 26, 27, Dec 1, 2, 4, 5, Mar 19-21. One missing unit value was filled using linear interpolation on Jun 26 while equipment was upgraded. Six instrument calibration corrections ranging from -0.01 ft to +0.01 ft were made to the shaft encoder. All corrections were prorated from the previous visit except for the one on Mar 21 which was prorated back to Nov 29, the last visit before the stilling well froze.

Datum Corrections.-- Levels were run to the Reference Point (RP) inside the gage on Jul 5, 2012 using B.M. No. 1 as base. The RP elevation was found to be within allowable limits, so no correction was made. Two-peg test was performed on the Lietz level (SN 130869) on Jun 11, 2012. The instrument was within allowable limits and no correction was made. A formal inspection of flume with levels was not performed.

Rating.-- The flume and well ice up during winter, and sediment movement in and above control causes minor shifting. Rating No. 1, a standard two foot Parshall flume rating, was used all year. The measurement shifts ranged from -0.14 to -0.08 ft. These shifts are due to the sloping flume floor and sediment movement in and above the control. Fifteen discharge measurements (Nos. 189-203) were made this year, ranging in discharge from 0.74 to 1.68 cfs. The range in daily mean streamflow experienced this year was 0.64 to 1.6 cfs. Measurements cover the discharge range experienced except for lower daily flows on Aug 1, 3-6, 12, 21-23. The instantaneous peak flow of 1.93 cfs occurred at 1400 on Sep 12, 2012 at a gage height of 0.51 ft with a shift of -0.11 ft. It exceeded high flow measurement 195 (GH= 0.44 ft) by 0.07 ft in stage.

Discharge.-- Shifting control method was used to compute discharge during all open water periods. Shifts were applied as defined by discharge measurements and distributed by time. All measurements were given full weight except measurements 196 and 201, which were adjusted by as much as 6.1 percent to smooth the shift distribution. The well was frozen and discharge estimated Dec 6 - Mar 7. The stage-discharge relation was affected by ice and discharge estimated Nov 9-11, 17, 26, 27, Dec 1, 2, 4, 5, Mar 19-21.

Special Computations.-- Winter streamflow record was estimated using discharge measurements, comparison with Major Creek near Villa Grove, CO, and air temperature record from SANDUNCO.

Remarks.-- Record is fair except for estimated daily discharge values, which are poor. Station maintained and record developed by Division 3 hydrographic staff.

Recommendations.-- Record quality may be improved by leveling flume and improving approach conditions.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

GARNER CREEK NEAR VILLA GROVE

RATING TABLE-- GARVILCO01 USED FROM 1-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

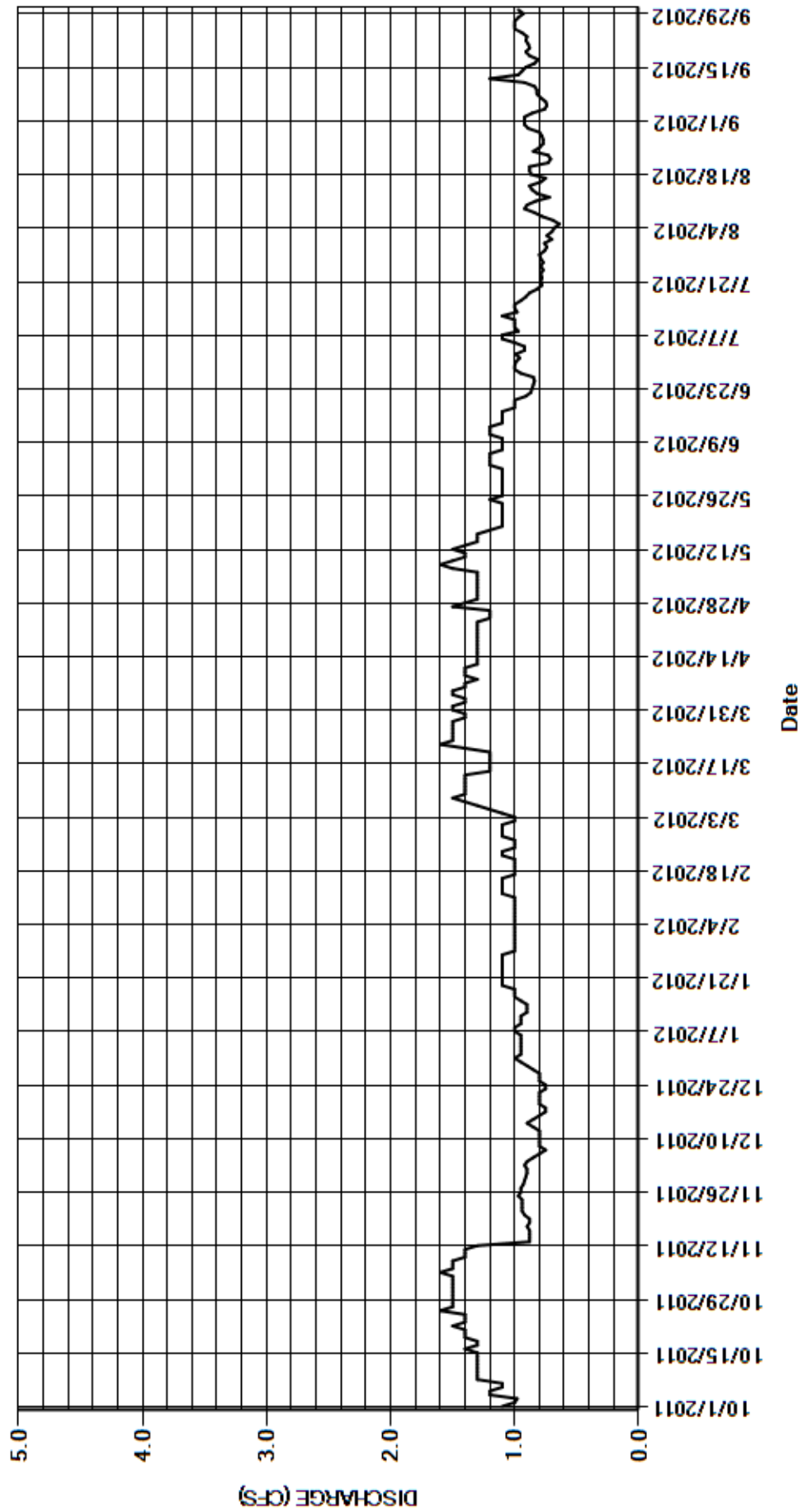
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.1	1.5	e0.90	e0.95	e1.0	e1.1	1.5	1.3	1.1	0.96	0.70	0.92
2	1.0	1.5	e0.90	e0.95	e1.0	e1.0	1.4	1.3	1.1	0.99	0.74	0.92
3	0.98	1.5	0.92	e0.95	e1.0	e1.0	1.4	1.3	1.2	0.92	0.70	0.86
4	1.2	1.5	e0.90	e0.95	e1.0	e1.1	1.5	1.3	1.2	0.92	0.68	0.76
5	1.2	1.6	e0.85	e0.95	e1.0	e1.2	1.5	1.3	1.2	1.0	0.64	0.74
6	1.1	1.5	e0.80	e0.95	e1.0	e1.3	1.4	1.3	1.2	1.1	0.69	0.75
7	1.1	1.5	e0.75	e1.0	e1.0	e1.4	1.4	1.5	1.1	1.1	0.78	0.79
8	1.3	1.5	e0.80	e1.0	e1.0	1.5	1.3	1.6	1.1	0.97	0.84	0.82
9	1.3	e1.4	e0.80	e0.95	e1.0	1.4	1.4	1.5	1.1	1.0	0.92	0.82
10	1.3	e1.4	e0.80	e0.95	e1.0	1.4	1.4	1.4	1.1	1.0	0.90	0.84
11	1.3	e1.4	e0.80	e0.95	e1.0	1.4	1.4	1.4	1.2	1.0	0.83	0.92
12	1.3	1.3	e0.80	e0.90	e1.1	1.4	1.3	1.5	1.2	1.1	0.72	1.2
13	1.3	0.88	e0.85	e0.90	e1.1	1.4	1.3	1.4	1.2	0.98	0.82	0.97
14	1.3	0.88	e0.90	e0.90	e1.1	1.4	1.3	1.3	1.1	1.0	0.86	0.94
15	1.3	0.88	e0.85	e0.95	e1.1	1.2	1.3	1.3	1.1	1.0	0.88	0.91
16	1.4	0.88	e0.80	e1.0	e1.1	1.2	1.3	1.3	1.1	0.95	0.79	0.84
17	1.3	e0.90	e0.75	e1.0	e1.0	1.2	1.3	1.2	1.1	0.91	0.75	0.81
18	1.3	0.88	e0.75	e1.0	e1.0	1.2	1.3	1.1	1.0	0.88	0.87	0.88
19	1.4	0.88	e0.80	e1.1	e1.0	e1.2	1.3	1.1	1.0	0.82	0.88	0.91
20	1.4	0.92	e0.80	e1.1	e1.0	e1.2	1.3	1.1	1.0	0.78	0.88	0.88
21	1.4	0.94	e0.80	e1.1	e1.0	e1.4	1.3	1.1	0.91	0.79	0.73	0.89
22	1.5	0.94	e0.80	e1.1	e1.1	1.6	1.3	1.1	0.87	0.78	0.71	0.91
23	1.4	0.94	e0.75	e1.1	e1.1	1.5	1.3	1.1	0.86	0.79	0.73	0.90
24	1.4	0.94	e0.75	e1.1	e1.0	1.5	1.2	1.1	0.85	0.77	0.85	0.94
25	1.4	0.97	e0.80	e1.1	e1.0	1.5	1.2	1.2	0.84	0.79	0.80	1.0
26	1.6	e0.95	e0.80	e1.1	e1.0	1.5	1.2	1.1	0.85	0.77	0.77	1.0
27	1.5	e0.95	e0.80	e1.1	e1.1	1.5	1.5	1.1	0.95	0.79	0.77	1.0
28	1.5	0.93	e0.85	e1.0	e1.1	1.5	1.4	1.1	1.0	0.80	0.78	0.97
29	1.5	0.92	e0.90	e1.0	e1.1	1.4	1.3	1.1	1.0	0.76	0.80	0.93
30	1.5	0.91	e0.95	e1.0	---	1.4	1.3	1.1	0.99	0.74	0.89	0.97
31	1.5	---	e1.0	e1.0	---	1.5	---	1.1	---	0.76	0.92	---
TOTAL	41.08	34.09	25.72	31.10	30.0	41.5	40.3	38.7	31.52	27.92	24.62	26.99
MEAN	1.33	1.14	0.83	1.00	1.03	1.34	1.34	1.25	1.05	0.90	0.79	0.90
AC-FT	81	68	51	62	60	82	80	77	63	55	49	54
MAX	1.6	1.6	1.0	1.1	1.1	1.6	1.5	1.6	1.2	1.1	0.92	1.2
MIN	0.98	0.88	0.75	0.90	1.0	1.0	1.2	1.1	0.84	0.74	0.64	0.74

CAL YR	2011	TOTAL	464.92	MEAN	1.27	MAX	1.7	MIN	0.75	AC-FT	922
WTR YR	2012	TOTAL	393.54	MEAN	1.08	MAX	1.6	MIN	0.64	AC-FT	781

MAX DISCH: 1.93 CFS AT 14:00 ON SEP 12,2012 GH 0.51 FT SHIFT -0.11 FT
 MAX GH: 0.55 FT AT 07:30 ON NOV 10,2011 (backwater from ice)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

GARNER CREEK NEAR VILLA GROVE
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
MAJOR CREEK NEAR VILLA GROVE
Water Year 2012

Location.-- Lat 38°9'27", long 105°48'33" referenced to North American Datum of 1983 (Valley View Hot Springs, CO quad, scale 1:24,000), UTM Zone 13 429113 E and 4223602 N, in SE ¼ SE ¼ sec. 12, T.45 N., R.10 E., New Mexico Principal Meridian, Saguache County, CO, Hydrologic Unit 13010003, on right bank 11 mi southeast of Villa Grove, CO.

Drainage Area and Period of Record.-- 5.0 mi².; January 1, 1999 to current year.

Equipment.-- Satellite monitored data collection platform (Sutron Satlink2) and Sutron SDR shaft encoder, in a 2-foot steel corrugated metal pipe stilling well with steel shelter atop well attached to the right edge of 2-foot Parshall flume via 1-inch intake pipe. No change during year.

Hydrologic Conditions.-- Predominantly undeveloped steep alpine and sub-alpine terrain.

Gage-Height Record.-- Primary record is 15-minute satellite transmitted stage data with electronic DCP and SDR logs as backup. Record is complete and reliable except for Dec 5 - Mar 21 when station was frozen and May 17-23 when inlets were plugged. Nine unit values were estimated on Jun 26 while the station was being worked on. Stage-discharge relation was affected by ice Nov 3, 6, 9-11,17,18, 26, 27, Dec 2-4. There were no instrument calibration corrections. One +0.05 ft flush correction was identified May 23 and prorated back to May 14 when it appeared the inlets started to plug.

Datum Corrections.-- A formal inspection with levels was not performed this year. The last formal inspection and levels were completed on Jul 24, 2008, with an assumed elevation of 0.000 at the flume staff gage (LEW) which is opposite the stilling well inlet (REW). Levels indicate that the flume floor slopes down from the LEW at the staff to the inlet by approximately 0.062 ft (Approx. 2%). The floor also slopes to the throat by 0.038 ft. Inspection included measurement of all pertinent Parshall Flume dimensions.

Rating.-- Rating MAJVILCO01, a standard two-foot Parshall flume rating, first used January 1, 1999, when the station was established, was used all year. Minor shifting results from sand and gravel movement and vegetation growth upstream and within the flume. Fifteen discharge measurements (Nos. 189-203) were made ranging in discharge between 0.43 and 0.89 cfs. Twelve open-water discharge measurements were made ranging in discharge between 0.43 and 0.86 cfs. Discharge measurements cover the range in streamflow experienced except for the lower daily flows on Jul 1, 2, 30. The peak discharge of 1.30 cfs occurred at 1400 Sep 12, 2012 at a gage height of 0.28 ft with a shift of +0.03 ft. The peak flow exceeded the peak open-water discharge measurement (no. 191) made Nov 29, 2011 by 0.06 ft in stage. The peak stage of 0.56 ft occurred 0115 Dec 3, 2011 as a result of backwater from ice.

Discharge.-- Shifting-control method was used for all computed discharges. Shifts were applied as defined by discharge measurements and distributed by time. Applied shifts ranged from +0.01 ft to +0.03 ft. All measurements were given full weight except 190, 191, 196, 198-201, which were adjusted as much as 9.8% to smooth shift distribution. Stage-discharge relation was affected by ice and discharge was estimated Nov 3, 6, 9-11,17,18, 26, 27, Dec 2-4. Discharge was estimated Dec 5 - Mar 21 when well was froze and May 17-23 when inlets were plugged.

Special Computations.-- Discharge for periods of no gage-height and ice affected record was estimated using discharge measurements and weather records.

Remarks.-- Record is fair, except for estimated periods, which are poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.-- Establish inside reference point and drop tape.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

MAJOR CREEK NEAR VILLA GROVE

RATING TABLE.-- MAJVILCO01 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

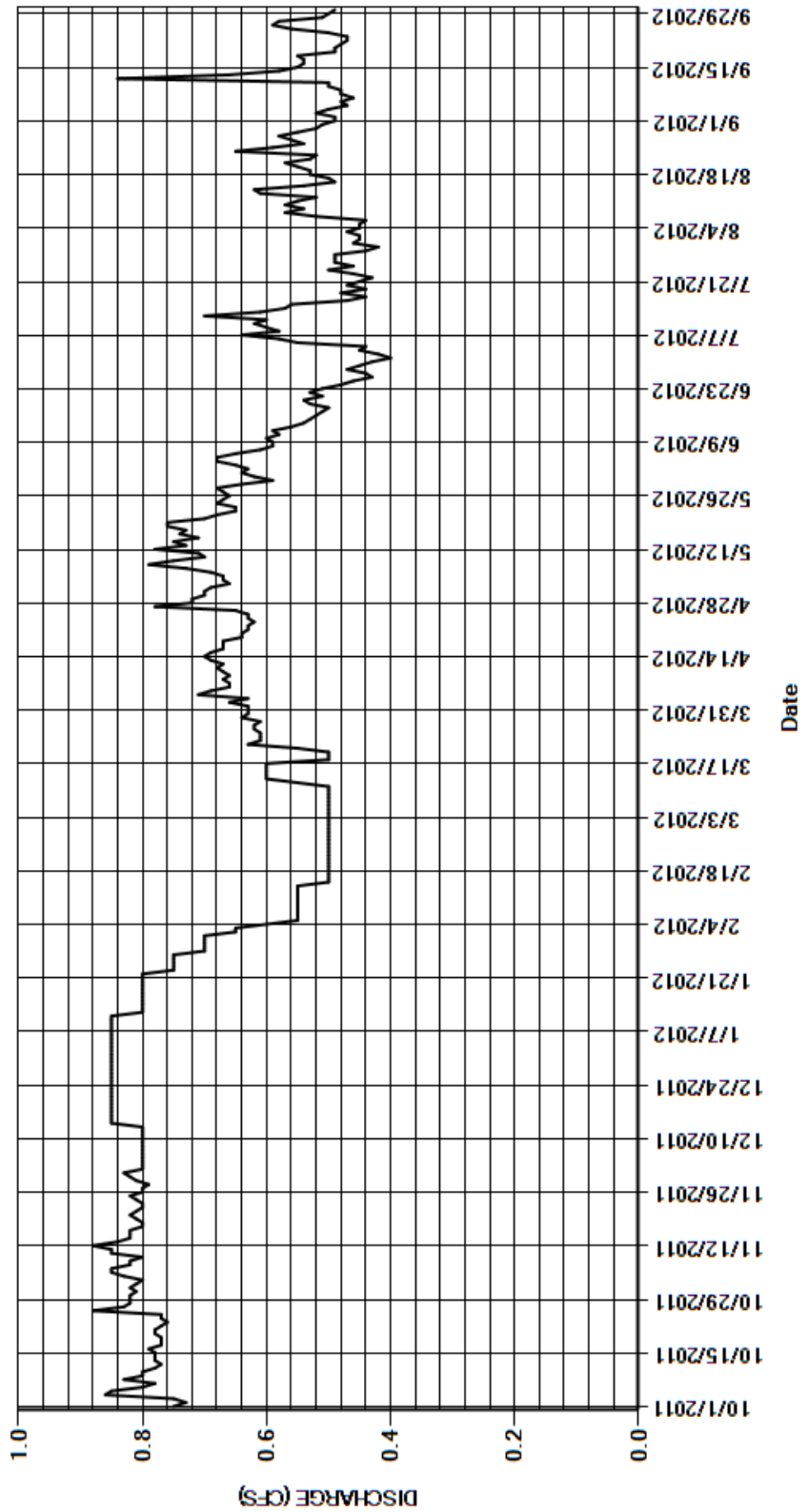
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.75	0.82	0.83	e0.85	e0.70	e0.50	0.63	0.70	0.64	0.40	0.45	0.49
2	0.73	0.81	e0.80	e0.85	e0.65	e0.50	0.66	0.69	0.63	0.42	0.45	0.49
3	0.75	e0.80	e0.80	e0.85	e0.65	e0.50	0.63	0.66	0.65	0.45	0.47	0.52
4	0.86	0.83	e0.80	e0.85	e0.60	e0.50	0.71	0.67	0.68	0.44	0.45	0.50
5	0.85	0.85	e0.80	e0.85	e0.55	e0.50	0.69	0.67	0.68	0.55	0.45	0.47
6	0.80	e0.85	e0.80	e0.85	e0.55	e0.50	0.66	0.69	0.65	0.58	0.44	0.48
7	0.78	0.82	e0.80	e0.85	e0.55	e0.50	0.66	0.73	0.61	0.64	0.52	0.46
8	0.83	0.82	e0.80	e0.85	e0.55	e0.50	0.67	0.79	0.59	0.58	0.57	0.48
9	0.80	e0.80	e0.80	e0.85	e0.55	e0.50	0.66	0.75	0.59	0.60	0.54	0.48
10	0.80	e0.85	e0.80	e0.85	e0.55	e0.50	0.67	0.70	0.60	0.62	0.57	0.50
11	0.78	e0.85	e0.80	e0.85	e0.55	e0.50	0.68	0.71	0.58	0.60	0.55	0.50
12	0.77	0.88	e0.80	e0.80	e0.55	e0.55	0.67	0.78	0.59	0.70	0.52	0.84
13	0.78	0.84	e0.80	e0.80	e0.55	e0.60	0.69	0.73	0.56	0.61	0.61	0.66
14	0.78	0.82	e0.85	e0.80	e0.55	e0.60	0.70	0.75	0.54	0.57	0.62	0.58
15	0.78	0.82	e0.85	e0.80	e0.50	e0.60	0.69	0.71	0.53	0.56	0.54	0.55
16	0.79	0.82	e0.85	e0.80	e0.50	e0.60	0.67	0.74	0.52	0.47	0.49	0.54
17	0.77	e0.80	e0.85	e0.80	e0.50	e0.60	0.67	e0.73	0.51	0.44	0.50	0.54
18	0.77	e0.80	e0.85	e0.80	e0.50	e0.50	0.67	e0.76	0.50	0.48	0.53	0.55
19	0.77	0.81	e0.85	e0.80	e0.50	e0.50	0.64	e0.76	0.53	0.44	0.53	0.49
20	0.78	0.82	e0.85	e0.80	e0.50	e0.50	0.64	e0.70	0.54	0.47	0.55	0.49
21	0.78	0.81	e0.85	e0.80	e0.50	e0.55	0.63	e0.68	0.51	0.45	0.57	0.48
22	0.77	0.80	e0.85	e0.80	e0.50	0.63	0.63	e0.65	0.53	0.43	0.53	0.47
23	0.76	0.80	e0.85	e0.75	e0.50	0.61	0.62	e0.65	0.51	0.46	0.52	0.47
24	0.77	0.81	e0.85	e0.75	e0.50	0.61	0.63	0.68	0.48	0.50	0.65	0.50
25	0.77	0.82	e0.85	e0.75	e0.50	0.61	0.63	0.67	0.46	0.46	0.59	0.56
26	0.88	e0.80	e0.85	e0.75	e0.50	0.62	0.65	0.66	0.43	0.49	0.54	0.59
27	0.83	e0.80	e0.85	e0.75	e0.50	0.62	0.78	0.67	0.44	0.49	0.56	0.58
28	0.82	0.79	e0.85	e0.70	e0.50	0.61	0.72	0.68	0.47	0.49	0.58	0.51
29	0.82	0.81	e0.85	e0.70	e0.50	0.64	0.72	0.64	0.45	0.44	0.55	0.50
30	0.82	0.82	e0.85	e0.70	---	0.63	0.70	0.59	0.43	0.42	0.52	0.49
31	0.81	---	e0.85	e0.70	---	0.63	---	0.62	---	0.46	0.51	---
TOTAL	24.55	24.57	25.73	24.70	15.60	17.31	20.07	21.61	16.43	15.71	16.47	15.76
MEAN	0.79	0.82	0.83	0.80	0.54	0.56	0.67	0.70	0.55	0.51	0.53	0.53
AC-FT	49	49	51	49	31	34	40	43	33	31	33	31
MAX	0.88	0.88	0.85	0.85	0.70	0.64	0.78	0.79	0.68	0.70	0.65	0.84
MIN	0.73	0.79	0.80	0.70	0.50	0.50	0.62	0.59	0.43	0.40	0.44	0.46

CAL YR	2011	TOTAL	272.64	MEAN	0.75	MAX	1.0	MIN	0.46	AC-FT	541
WTR YR	2012	TOTAL	238.51	MEAN	0.65	MAX	0.88	MIN	0.40	AC-FT	473

MAX DISCH: 1.3 CFS AT 14:00 ON SEP 12,2012 GH 0.28 FT SHIFT 0.03 FT
 MAX GH: 0.56 FT AT 01:15 ON DEC 03,2011 (backwater from ice)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

MAJOR CREEK NEAR VILLA GROVE
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08226700 COTTON CREEK NEAR MINERAL HOT SPRINGS

Water Year 2012

Location.-- Lat 38°7'55", long 105°47'19" referenced to North American Datum of 1983 (Valley View Hot Springs, CO quad, scale 1:24,000), UTM Zone 13 430885 E and 4220748 N, in SW ¼ SW ¼ sec. 20, T.45 N., R.11 E., New Mexico Principal Meridian, Saguache County, CO, Hydrologic Unit 13010003, on left bank 300 ft north of road, 9 mi southeast of Mineral Hot Springs.

Drainage Area and Period of Record.-- 12.8 mi² (from topographical map); Jan 1967 - Sep 1970; Intermittent monthly record from May 1971 to Nov 1981 (Accuracy unknown); Jan 1999 to current year.

Equipment.-- Data collection platform (Sutron Satlink2), and SDR shaft encoder in metal pipe shelter and well. Primary reference gage is a drop tape from reference point on shelf. An outside staff gage was installed Mar. 30, 2012.

Hydrologic Conditions.-- Predominantly undeveloped steep alpine and sub-alpine terrain.

Gage-Height Record.-- Primary record is 15-minute transmitted data with DCP and SDR log as backup. Many DCP transmissions were missing and missing data values were filled using the backup log during the period Nov 1-29, without loss of accuracy. Record is complete and reliable except for Nov 3-28 when ice in well was affecting float, and Nov 29 through Mar 21 when station was closed for the winter. One shaft encoder correction of -0.01 ft was made and prorated back to previous visit. Fifteen minute values were corrected on Apr 9, May 4, and Sep 25 due to being affected during measurements.

Datum Corrections.-- Levels were last run to the Reference Point (RP) inside the gage on Sep 12, 2011 using B.M. No. 2 as base. The gage reference point elevation was within allowable limits, therefore no correction was made. Two-peg tests were performed on the Lietz level (SN 130869) on Jul 28, 2011; the instrument was within allowable limits and no adjustment was made.

Rating.-- The control at all stages is rock piled in stream channel 10 feet below gage. Some minor shifting will occur from movement of rocks. Rating no. 04-1 first used Oct 1, 2008 was used until Oct 11. Rating no. 5-1 was developed to better fit current conditions and used from Oct 11 to the end of the water year. Eighteen discharge measurements (Nos. 200-217) were made during the year ranging in discharge from 4.04 to 20.2 cfs. They cover the range experienced except for the lower daily flows on Jan 12, 13, 30, 31; Feb 1-13, 17-19, 28; and Mar 1-3, 8, 9. The peak flow of 22.2 cfs occurred at 0000 on May 23 at a gage height of 3.13 ft with a shift of 0.00 ft. It exceeded high measurement No. 210 (GH=3.08 ft), made May 23 by 0.05 ft in stage.

Discharge.-- Shifting control method was used to compute discharge during all periods of good gage-height record. Shifts were applied as defined by measurements and distributed by time and stage using the rating and two variable shift curves 12-E and 12-F. Open-water measurement shifts ranged from -0.01 ft to 0.03 ft. All open water measurements were given full weight except for nos. 200, 206, 207, 210, and 213-217, which were adjusted as much as 7.6 percent to smooth the shift trend. Discharge was estimated Nov 3-28 when well was frozen all or parts of each day and Nov 29 - Mar 21 when station was closed. Two small cleaning corrections were identified and applied in the shifts.

Special Computations.-- Discharge for periods of unreliable and no gage-height record were estimated using discharge measurements, adjacent good record, and air temperature data from SANDUNCO. High measurement No. 210 was adjusted by 7.4% based on the check measurement No. 211 made immediately after measurement no. 210.

Remarks.-- Record is good, except for estimated periods, which are poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.-- Obtain more PZF measurements.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

08226700 COTTON CREEK NEAR MINERAL HOT SPRINGS

RATING TABLE.-- COCRMICO04-1 USED FROM 01-OCT-2011 TO 11-OCT-2011
 COCRMICO05-1 USED FROM 11-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

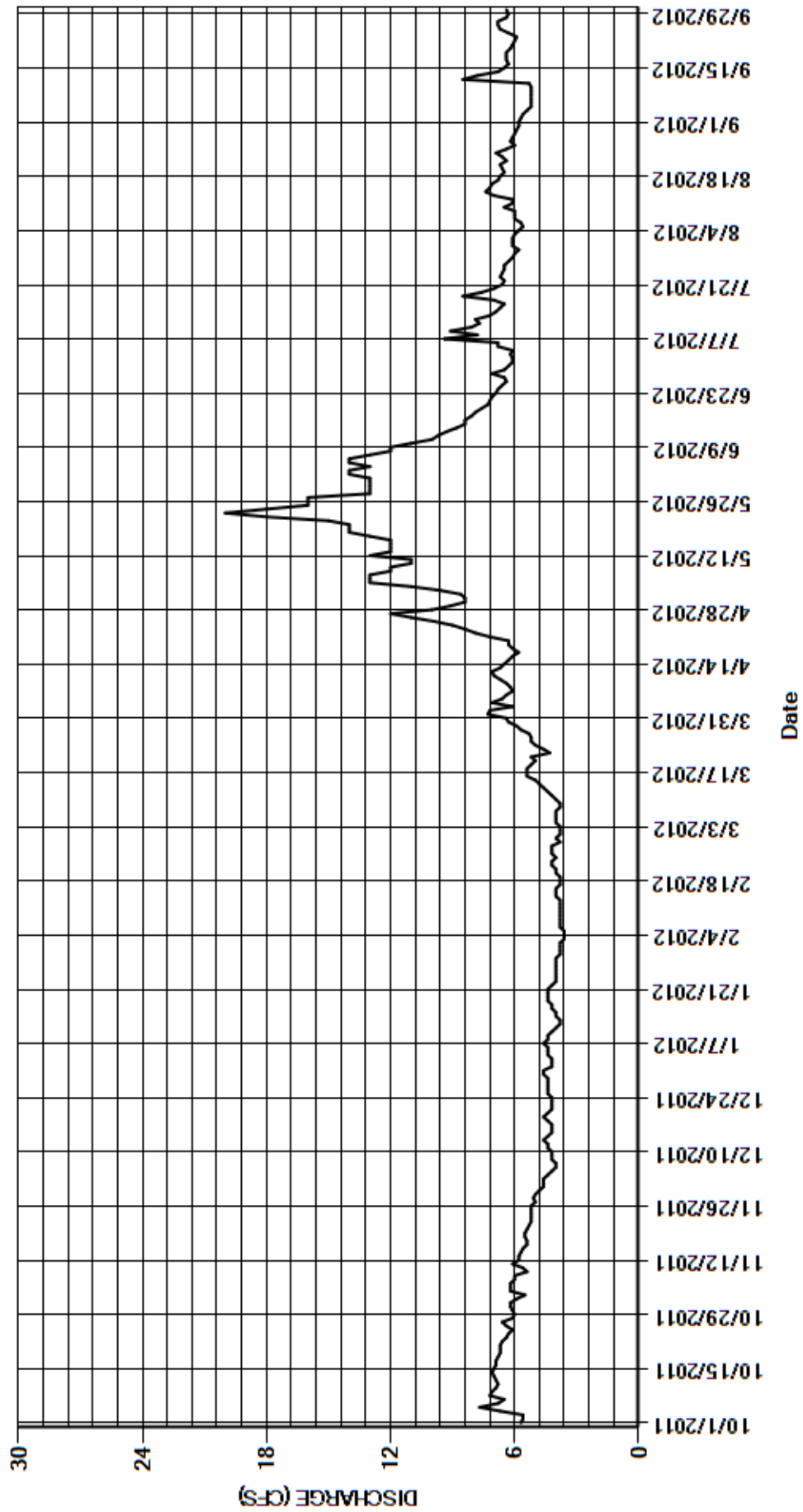
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.7	6.2	e4.6	e4.2	e3.8	e3.8	7.3	8.4	13	6.1	6.1	5.8
2	5.6	5.9	e4.6	e4.2	e3.8	e3.8	7.2	8.6	14	6.1	6.1	5.7
3	5.6	e5.5	e4.6	e4.2	e3.6	e3.8	6.1	9.6	14	6.2	6.0	5.6
4	6.7	e6.2	e4.4	e4.4	e3.6	e4.0	7.1	11	13	6.1	5.8	5.4
5	7.7	e6.2	e4.2	e4.4	e3.6	e4.0	6.6	13	14	6.8	5.6	5.2
6	6.8	e6.2	e4.0	e4.4	e3.8	e4.0	6.4	13	14	6.8	5.7	5.2
7	6.5	e6.0	e4.0	e4.6	e3.8	e4.0	6.1	13	13	9.4	6.0	5.2
8	7.2	e6.0	e4.2	e4.4	e3.8	e3.8	6.2	12	12	7.8	6.0	5.2
9	7.1	e5.4	e4.2	e4.4	e3.8	e3.8	6.4	12	12	9.1	6.0	5.2
10	6.9	e5.6	e4.2	e4.2	e3.8	e4.0	6.7	11	11	8.1	6.5	5.2
11	6.8	e6.1	e4.4	e4.0	e3.8	e4.2	7.0	11	10	7.7	6.1	5.3
12	6.9	e5.8	e4.4	e3.8	e3.8	e4.4	7.1	13	9.7	7.9	6.1	8.5
13	7.0	e5.8	e4.6	e3.8	e3.8	e4.6	6.7	12	9.3	7.2	7.0	7.8
14	7.1	e5.7	e4.4	e4.0	e4.0	e4.8	6.5	12	8.8	6.9	7.4	6.8
15	7.0	e5.6	e4.2	e4.0	e4.0	e5.0	6.3	12	8.4	6.7	7.2	6.5
16	6.9	e5.4	e4.2	e4.2	e4.0	e5.4	6.1	12	8.4	6.5	7.1	6.3
17	6.9	e5.4	e4.2	e4.2	e3.8	e5.4	5.8	13	8.1	7.0	6.8	6.4
18	6.8	e5.5	e4.4	e4.4	e3.8	e5.4	6.1	14	7.9	8.5	6.7	6.4
19	6.7	e5.5	e4.6	e4.4	e3.8	e5.2	6.3	14	7.6	7.6	6.5	6.4
20	6.7	e5.4	e4.4	e4.4	e4.0	e5.0	6.3	14	7.3	7.0	6.6	6.2
21	6.7	e5.3	e4.2	e4.4	e4.0	e5.2	7.2	15	7.2	6.6	6.7	6.1
22	6.6	e5.2	e4.2	e4.2	e4.2	4.3	7.9	18	7.1	6.5	6.4	6.0
23	6.4	e5.2	e4.2	e4.0	e4.2	4.6	8.4	20	6.9	6.7	6.6	5.9
24	6.3	e5.2	e4.2	e4.0	e4.0	5.0	9.0	18	6.8	6.6	6.9	6.3
25	6.1	e5.2	e4.4	e4.0	e4.2	5.2	9.9	16	6.6	6.5	6.4	6.7
26	6.4	e5.2	e4.4	e4.0	e4.2	5.2	11	16	6.4	6.5	6.0	6.8
27	6.6	e5.0	e4.4	e4.0	e4.2	5.3	12	16	6.5	6.3	6.2	6.8
28	6.1	e5.1	e4.4	e4.0	e3.8	5.7	10	13	7.1	6.1	6.1	6.4
29	6.0	e5.0	e4.4	e4.0	e4.0	5.9	9.1	13	6.5	6.0	6.0	6.3
30	6.1	e4.8	e4.6	e3.8	---	6.3	8.4	13	6.3	5.8	5.9	6.4
31	6.2	---	e4.6	e3.8	---	6.4	---	13	---	6.1	5.8	---
TOTAL	204.1	166.6	134.8	128.8	113.0	147.5	223.2	409.6	282.9	215.2	196.3	184.0
MEAN	6.58	5.55	4.35	4.15	3.90	4.76	7.44	13.2	9.43	6.94	6.33	6.13
AC-FT	405	330	267	255	224	293	443	812	561	427	389	365
MAX	7.7	6.2	4.6	4.6	4.2	6.4	12	20	14	9.4	7.4	8.5
MIN	5.6	4.8	4.0	3.8	3.6	3.8	5.8	8.4	6.3	5.8	5.6	5.2

CAL YR	2011	TOTAL	2621.6	MEAN	7.18	MAX	28	MIN	4.0	AC-FT	5200
WTR YR	2012	TOTAL	2406.0	MEAN	6.57	MAX	20	MIN	3.6	AC-FT	4770

MAX DISCH: 22.2 CFS AT 00:00 ON MAY 23,2012 GH 3.13 FT SHIFT 0 FT
 MAX GH: 3.13 FT AT 00:00 ON MAY 23,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08226700 COTTON CREEK NEAR MINERAL HOT SPRINGS
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
WILD CHERRY CREEK NEAR CRESTONE

Water Year 2012

Location.-- Lat 38°6'1", long 105°46'6" referenced to North American Datum of 1983 (Mirage, CO quad, scale 1:24,000), UTM Zone 13 432636 E and 4217217 N, in SE ¼ SW ¼ sec. 33, T.45 N., R.11 E., New Mexico Principal Meridian, Saguache County, CO, Hydrologic Unit 13010003, on right bank 50 ft north of right branch of trail, 12 mi southeast of Mineral Hot Springs, 8 mi northwest of Crestone, CO.

Drainage Area and Period of Record.-- 4.5 mi² from topographical map.; March 1999 to current year.

Equipment.-- Sutron Satlink2 data collection platform and a float-operated shaft encoder in a 4-foot diameter culvert pipe well and shelter. The primary reference gage is a drop tape from reference point on shelf. The secondary reference is a cantilever gage, installed May 10, 2012.

Hydrologic Conditions.-- Alpine and subalpine undeveloped National Forest.

Gage-Height Record.-- Primary record is from fifteen-minute satellite transmitted data with SDR log and DCP log as backup. Record is complete and reliable except for Nov 9-28 when there was ice in well affecting the float all or part of the day; Nov 29 through Mar 21 when station was closed for the winter; and May 8 when control was being rebuilt. There was a -0.01 ft shaft encoder correction on Apr 9, which was prorated back to the previous visit. A -0.02 ft datum correction was applied to the gage height data Jul 5 back to May 8 when construction at the gage is thought to have caused the datum change.

Datum Corrections.-- Levels were ran to the Reference Point (RP) inside the gage on Jul 5, 2012 using B.M. 1 as base. The RP was outside allowable limits and was adjusted +0.02 ft resulting in -0.02 ft datum correction being applied to gage height data back to May 8 when construction at the gage is thought to have caused the datum change. Two-peg test was performed on the Lietz level (SN 130869) on Jun 11, 2012, the instrument was within allowable limits and no adjustment was made.

Rating.-- Control at all stages was a rock weir about 6 feet below the gage until May 8 and after May 8 control is a log cross-vane structure. Rating No. 3 first used Oct 13, 2010 was used again this year until May 8 when control was changed. Rating No. 4 was developed using measurements from the 2012 water year after the control change and used May 8 through Sep 30. Rating No. 4 is poorly defined and will be revised or replaced as more measurements are made at the site. Shifting occurred due to scour, fill, movement of rocks, debris deposition, and measurement accuracy while Rating No. 3 was in use. Shifting occurs due to lack of measurement accuracy and limited control sensitivity after the control was changed May 8. Nine discharge measurements (Nos. 197 - 205) were made while Rating No. 3 was in use ranging in discharge from 0.34 to 2.03 cfs. Ten additional measurements (Nos. 206 - 215) were made while Rating No. 4 was in use ranging in discharge from 0.57 to 3.54 cfs. They cover the discharge range experienced except for the lower daily flows on Jan 12-14, 26-31; Feb 1-29; Mar 1-13; and higher daily flows on May 9-23. The peak flow of 5.64 cfs occurred at 1815 on May 12 at a gage height of 1.89 ft with a shift of +0.04 ft. The peak exceeded the stage of the highest discharge measured 3.54 cfs (GH = 1.79 ft) by 0.10 ft in stage. The peak exceeded the stage of the highest measured stage while the new control was in place, measurement no 208, GH=1.85 ft (3.50 cfs) by 0.04 ft in stage.

Discharge.-- Shifting control method was used to compute discharge during all open water periods. Shifts were applied as defined by measurements and distributed by time. Measurement shifts ranged from -0.12 to +0.05 ft while Rating No. 3 was in use, and -0.04 ft to +0.06 ft (-0.01 to 0.06 ft applied), while Rating No. 4 was in use. All were given full weight except Nos. 209, 212, 214, and 215 which were rated poor and adjusted by as much as 15.1% (0.01 ft) to smooth shift distribution.

Special Computations.-- Discharges for period of no gage-height record were estimated using discharge measurements and weather records from Sand Creek at the Great Sand Dunes National Park.

Remarks.-- Due to uncertainty in measurements and rating, record is poor. Due to poor rating definition, the peak flow data should be considered poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.-- Levels should be ran in 2013.

STATE OF COLORADO
DIVISION OF WATER RESOURCES
OFFICE OF STATE ENGINEER

WILD CHERRY CREEK NEAR CRESTONE

RATING TABLE-- CHECRECO03 USED FROM 01-OCT-2011 TO 08-MAY-2012
CHECRECO04 USED FROM 08-MAY-2012 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.79	0.89	e0.70	e0.60	e0.30	e0.30	1.1	1.9	2.4	0.68	0.89	0.64
2	0.77	0.90	e0.60	e0.50	e0.30	e0.30	1.0	1.9	2.4	0.66	0.91	0.64
3	0.78	0.88	e0.50	e0.40	e0.30	e0.20	0.66	2.1	2.4	0.66	0.87	0.65
4	1.0	1.0	e0.50	e0.40	e0.30	e0.20	0.79	2.4	2.3	0.63	0.81	0.62
5	1.2	1.0	e0.50	e0.50	e0.20	e0.30	0.85	2.6	2.4	0.76	0.78	0.59
6	1.1	0.98	e0.50	e0.50	e0.20	e0.30	0.77	2.6	2.2	0.79	0.77	0.59
7	1.0	0.99	e0.50	e0.50	e0.20	e0.30	0.70	2.5	2.1	1.2	0.79	0.59
8	1.2	0.99	e0.60	e0.50	e0.20	e0.30	0.73	e3.3	2.0	0.89	0.81	0.61
9	1.1	e0.90	e0.70	e0.50	e0.30	e0.20	0.85	3.6	1.9	1.2	0.73	0.61
10	1.1	e0.80	e0.70	e0.40	e0.30	e0.30	1.0	3.8	1.9	0.92	0.74	0.59
11	1.2	e0.80	e0.70	e0.40	e0.30	e0.30	1.2	4.0	1.8	0.94	0.72	0.60
12	1.2	e0.80	e0.70	e0.30	e0.30	e0.30	1.2	4.5	1.7	1.1	0.70	1.4
13	1.2	e0.90	e0.70	e0.30	e0.30	e0.30	0.98	4.4	1.6	0.97	0.84	1.1
14	1.2	e0.90	e0.60	e0.30	e0.30	e0.40	0.90	4.2	1.5	0.91	0.90	0.83
15	1.1	e0.90	e0.60	e0.40	e0.30	e0.40	0.87	4.0	1.4	0.84	0.77	0.78
16	1.1	e0.80	e0.50	e0.40	e0.30	e0.40	0.85	4.1	1.4	0.80	0.75	0.76
17	1.1	e0.80	e0.50	e0.40	e0.30	e0.40	0.79	4.0	1.4	0.91	0.73	0.76
18	1.1	e0.90	e0.60	e0.50	e0.30	e0.40	0.85	3.7	1.4	1.4	0.73	0.79
19	1.1	e0.90	e0.60	e0.50	e0.30	e0.30	0.94	3.7	1.3	1.1	0.72	0.85
20	1.0	e0.90	e0.60	e0.50	e0.30	e0.30	0.89	3.6	1.3	1.1	0.75	0.86
21	0.96	e0.80	e0.60	e0.50	e0.30	e0.40	1.2	3.7	1.3	1.1	0.79	0.86
22	1.0	e0.80	e0.50	e0.40	e0.30	0.37	1.6	3.7	1.2	1.1	0.75	0.86
23	0.99	e0.80	e0.40	e0.40	e0.30	0.52	1.6	3.7	1.2	1.3	0.77	0.87
24	1.0	e0.80	e0.50	e0.40	e0.30	0.65	1.5	3.5	1.1	1.3	0.88	0.93
25	0.99	e0.80	e0.60	e0.40	e0.30	0.76	1.7	3.3	1.1	1.2	0.79	1.0
26	1.2	e0.80	e0.60	e0.30	e0.30	0.66	1.8	3.2	0.97	1.2	0.72	1.2
27	1.0	e0.80	e0.70	e0.30	e0.30	0.62	1.9	3.1	0.98	1.2	0.71	1.2
28	0.97	e0.70	e0.70	e0.30	e0.30	0.73	2.0	2.9	1.1	1.1	0.71	1.1
29	0.96	e0.70	e0.70	e0.30	e0.30	0.78	1.9	2.7	0.92	1.1	0.70	1.1
30	0.97	e0.70	e0.70	e0.30	---	0.83	1.8	2.6	0.76	0.95	0.67	1.1
31	0.91	---	e0.70	e0.30	---	0.89	---	2.5	---	0.94	0.65	---
TOTAL	32.29	25.63	18.60	12.70	8.30	13.41	34.92	101.8	47.43	30.95	23.85	25.08
MEAN	1.04	0.85	0.60	0.41	0.29	0.43	1.16	3.28	1.58	1.00	0.77	0.84
AC-FT	64	51	37	25	16	27	69	202	94	61	47	50
MAX	1.2	1.0	0.70	0.60	0.30	0.89	2.0	4.5	2.4	1.4	0.91	1.4
MIN	0.77	0.70	0.40	0.30	0.20	0.20	0.66	1.9	0.76	0.63	0.65	0.59

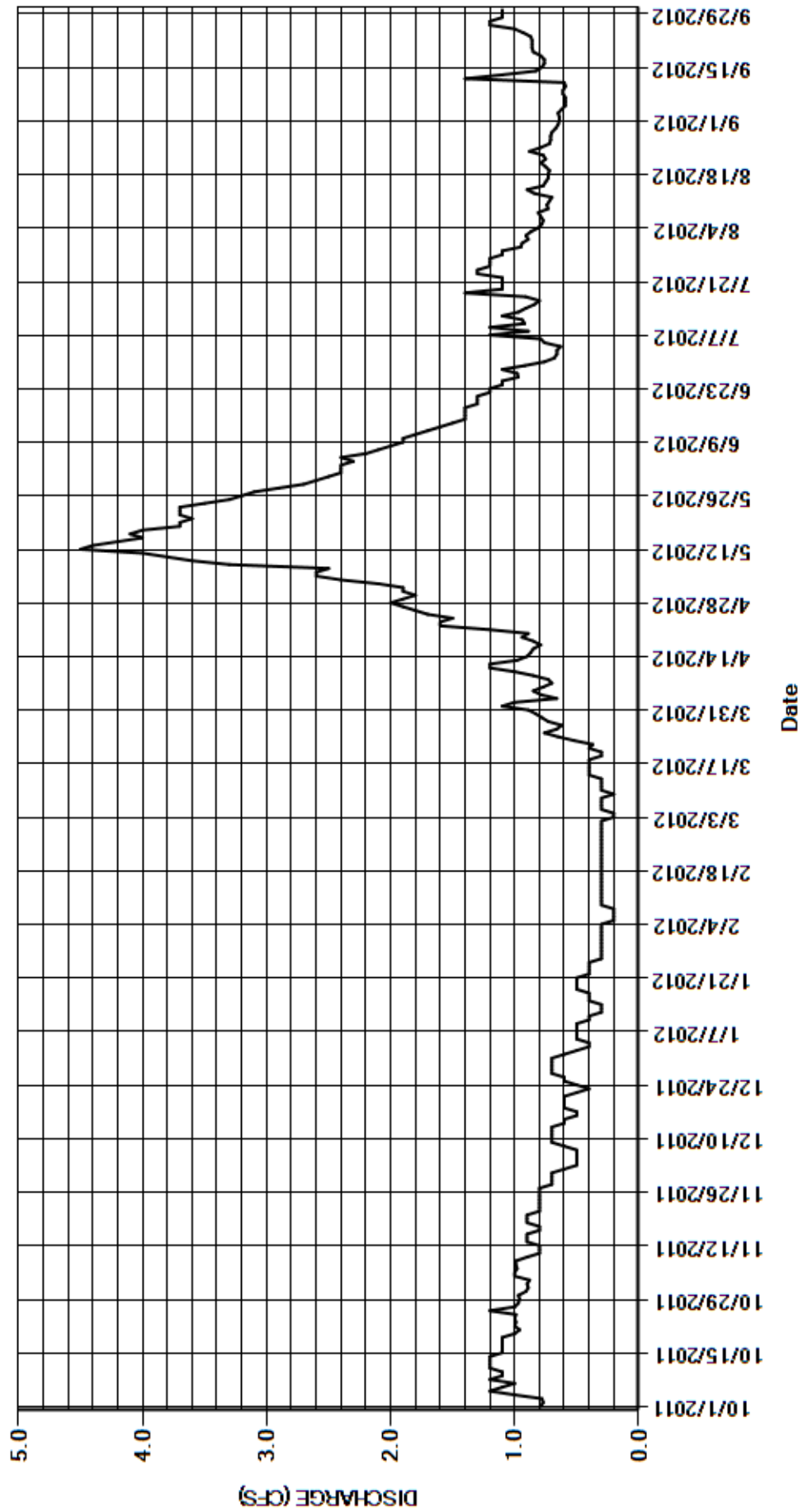
CAL YR	2011	TOTAL	367.46	MEAN	1.01	MAX	5.6	MIN	0.34	AC-FT	729
WTR YR	2012	TOTAL	374.96	MEAN	1.02	MAX	4.5	MIN	0.20	AC-FT	744

MAX DISCH: 5.64 CFS AT 18:15 ON MAY 12,2012 GH 1.89 FT SHIFT 0.04 FT (after new control)

MAX GH: 2.15 FT AT 21:30 ON MAY 04,2012 (old control)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

WILD CHERRY CREEK NEAR CRESTONE
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
RITO ALTO CREEK NEAR CRESTONE

Water Year 2012

Location.-- Lat 38°4'41", long 105°45'33" referenced to North American Datum of 1983 (Mirage, CO quad, scale 1:24,000), UTM Zone 13 433428 E and 4214738 N, in SE ¼ NE ¼ sec. 9, T.44 N., R.11 E., New Mexico Principal Meridian, Saguache County, CO, Hydrologic Unit 13010003, on right bank 300 ft east of parking area, 12 mi southeast of Mineral Hot Springs, 7 mi northwest of Crestone, CO.

Drainage Area and Period of Record.-- 10.3 mi² from topographical map; Jan 1999 to current year.

Equipment.-- Data collection platform (Satlink2), and a float-operated SDR in a 4-ft diameter culvert pipe shelter and well. The primary reference gage is a drop tape from reference point on shelf. A log cross-vane control structure was constructed on Apr 21, 2011. Outside cantilever gage installed Apr 22, 2011.

Hydrologic Conditions.-- Undeveloped steep alpine and subalpine terrain.

Gage-Height Record.-- Primary record is fifteen minute transmitted DCP data with DCP log and SDR log as backup. Record is complete and reliable, except for Nov 15-28 when well was frozen and Nov 29 to Mar 22 when station was closed. There was one shaft encoder correction, +0.01 ft on Jul 23, which was prorated by time from previous visit. Stage-discharge relation was affected by ice Nov 2-8.

Datum Corrections.-- Levels were last run to the Reference Point (RP) inside the gage on Jul 13, 2011 using B.M. No. 1 as base. The RP elevation was within allowable limits, so no correction was made or required, the outside cantilever gage was adjusted +0.04 ft. Two-peg tests were performed on the Lietz level (SN 130869) on May 27, 2011 and July 28, 2011 and no adjustments were required or made.

Rating.-- Control is a log cross-vane structure. The log cross-vane structure shows minor shifting during low flows as a result of fill and scour in the gage pool. There is also believed to be some shifting due to freeze and thaw around the control. There may also be some influence due to scour, fill, and movement of rocks directly below control. Rating no. 5 in use since Apr 21, 2011 was used for the entire water year. Rating no. 5 is well defined from 3 to 15 cfs and fairly well defined from 15 to 40 cfs. Seventeen measurements (nos. 199-215) were made ranging in discharge from 2.17 cfs to 27.2 cfs. The measurements cover the discharge range experienced except for the lower daily flows on Jan 11-14, 20-24, 27, 28; Feb 4-20, 23-25; Mar 3-7, 9-11, 17-20 and higher daily flows on May 22 and 23. The peak flow of 34 cfs occurred at 2200 on May 22 at a gage height of 3.01 ft with a shift of +0.04 ft. The peak exceeded high Measurement No. 209 (GH= 2.92 ft) made May 23 by 0.09 ft in stage.

Discharge.-- Shifting control method was used to compute the discharge for all periods of good stage record. Variable stage-shift relationships (RITCREVS12-C and RITCREVS12-D) were developed and used to distribute shifting by stage and time. RITCREVS12-C was used from Mar 22 to Apr 9 and RITCREVS12-D was used the remainder of the year. Open-water measurements shifts ranged from -0.04 to 0.06 ft; applied shifts ranged from -0.02 to 0.04 ft. All measurements were given full weight except for Nos. 205-207, 209-212, 214 and 215 which were adjusted as much as 8.2% to smooth shift trends.

Special Computations.-- Discharge for periods of no gage-height and ice affected record were estimated using discharge measurements and temperature record from Sand Creek at Great Sand Dunes National Park (SANDUNCO).

Remarks.-- Record is fair, except for estimated daily values, which are poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.-- More measurements needed above 25 cfs to define upper end of rating curve.

STATE OF COLORADO
DIVISION OF WATER RESOURCES
OFFICE OF STATE ENGINEER

RITO ALTO CREEK NEAR CRESTONE

RATING TABLE.-- RITCRECO05 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

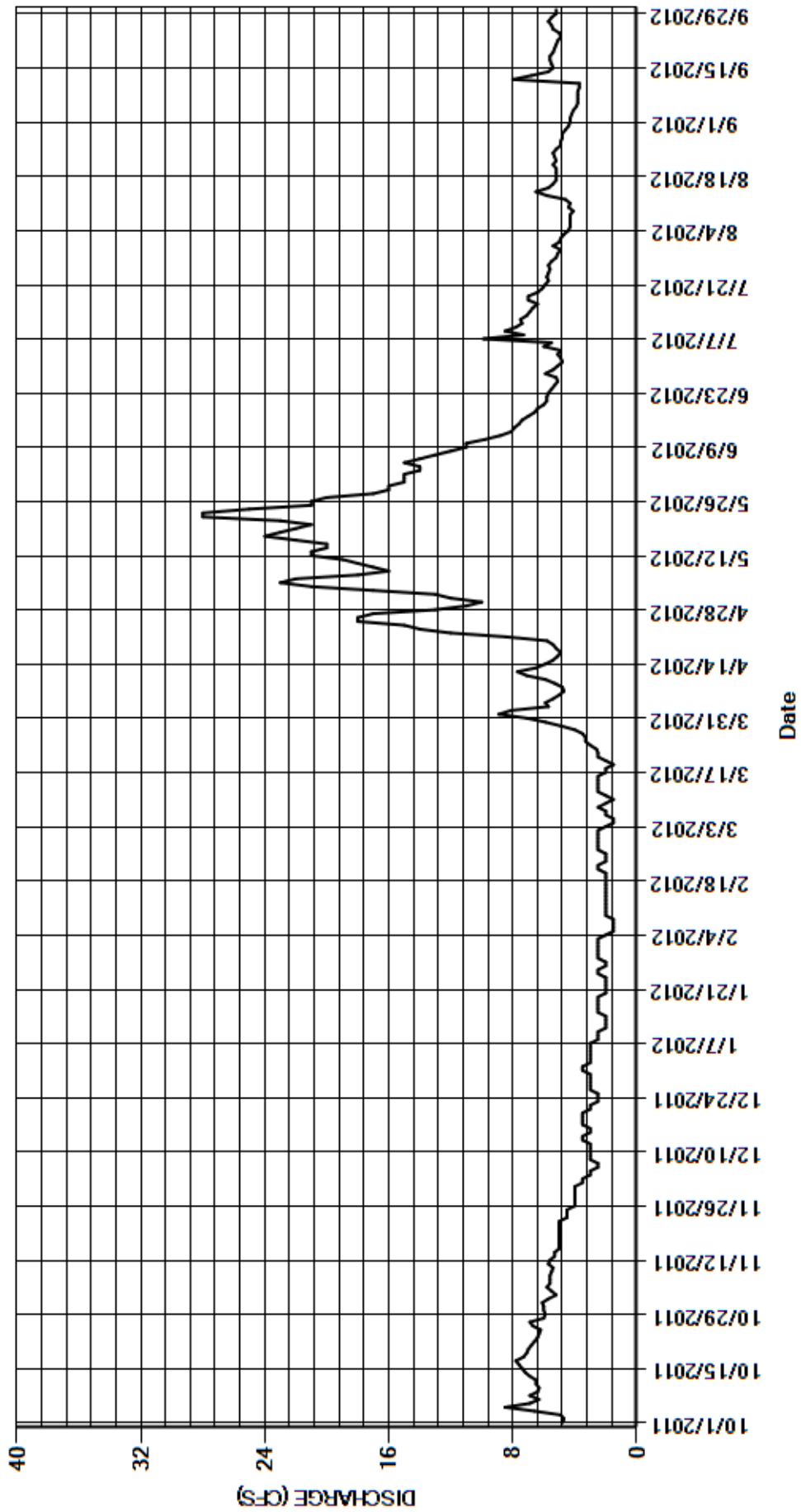
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.8	6.1	e4.0	e3.5	e2.5	e2.5	8.9	12	15	4.8	5.0	4.3
2	4.7	e5.7	e3.5	e3.0	e2.5	e2.5	8.1	13	15	4.9	4.9	4.3
3	4.9	e5.2	e3.5	e3.0	e2.5	e2.0	5.7	17	14	5.1	4.7	4.2
4	6.6	e5.5	e3.0	e3.0	e2.0	e1.5	5.9	21	14	4.9	4.4	4.1
5	8.5	e5.8	e3.0	e3.0	e1.5	e1.5	5.4	23	15	6.0	4.3	3.9
6	6.9	e5.6	e2.5	e3.0	e1.5	e2.0	5.0	22	14	5.5	4.3	3.8
7	6.3	e5.6	e2.5	e3.0	e1.5	e2.0	4.7	18	13	9.9	4.3	3.8
8	6.9	e5.6	e3.0	e2.5	e1.5	e2.5	4.8	16	12	7.3	4.3	3.8
9	6.4	5.5	e3.0	e2.5	e2.0	e2.0	5.3	17	11	8.5	4.1	3.8
10	6.3	5.4	e3.0	e2.5	e2.0	e1.5	5.9	18	11	7.8	4.4	3.7
11	6.5	5.7	e3.0	e2.0	e2.0	e2.0	7.1	19	9.8	7.4	4.3	3.7
12	6.5	5.6	e3.0	e2.0	e2.0	e2.5	7.7	21	8.8	7.5	4.6	8.0
13	6.9	5.3	e3.5	e2.0	e2.0	e2.5	6.5	21	8.1	7.1	e5.8	6.8
14	7.2	5.3	e3.5	e2.0	e2.0	e2.5	5.9	20	7.9	6.9	e6.5	5.7
15	7.4	e5.0	e3.0	e2.5	e2.0	e2.5	5.4	20	7.6	6.7	e5.7	5.4
16	7.6	e5.0	e3.0	e2.5	e2.0	e2.5	5.1	22	7.4	6.4	e5.4	5.5
17	7.8	e5.0	e3.5	e2.5	e2.0	e2.0	4.9	24	7.0	7.0	e5.2	5.6
18	7.3	e5.0	e3.5	e2.5	e2.0	e2.0	5.2	23	6.6	7.0	e5.2	5.6
19	7.1	e5.0	e3.5	e2.5	e2.0	e1.5	5.4	22	6.4	6.4	e5.2	5.4
20	7.0	e5.0	e3.5	e2.0	e2.0	e2.0	5.8	21	6.0	6.1	e5.2	5.3
21	6.8	e5.0	e3.0	e2.0	e2.5	e2.5	8.4	23	5.8	5.9	e5.4	5.2
22	6.6	e5.0	e3.0	e2.0	e2.5	e2.5	12	28	5.8	5.7	5.2	5.1
23	6.4	e4.5	e2.5	e2.0	e2.0	2.6	14	28	5.7	5.8	5.3	4.9
24	6.3	e4.5	e2.5	e2.0	e2.0	3.0	15	25	5.5	5.7	5.4	5.0
25	6.2	e4.5	e2.5	e2.5	e2.0	3.3	18	21	5.3	5.6	5.2	5.4
26	6.7	e4.0	e3.0	e2.5	e2.5	3.3	18	21	5.1	5.7	4.9	5.5
27	6.9	e4.0	e3.0	e2.0	e2.5	3.5	17	20	5.2	5.5	4.9	5.7
28	6.0	e4.0	e3.0	e2.0	e2.5	4.0	13	17	5.9	5.2	4.8	5.5
29	5.9	e4.0	e3.0	e2.5	e2.5	4.9	11	16	5.4	5.1	4.8	5.2
30	6.0	e4.0	e3.0	e2.5	---	5.9	10	16	5.1	4.9	4.6	5.2
31	6.0	---	e3.5	e2.5	---	7.1	---	15	---	5.4	4.4	---
TOTAL	203.4	151.4	96.0	76.0	60.5	84.6	255.1	620	264.4	193.7	152.7	149.4
MEAN	6.56	5.05	3.10	2.45	2.09	2.73	8.50	20.0	8.81	6.25	4.93	4.98
AC-FT	403	300	190	151	120	168	506	1230	524	384	303	296
MAX	8.5	6.1	4.0	3.5	2.5	7.1	18	28	15	9.9	6.5	8.0
MIN	4.7	4.0	2.5	2.0	1.5	1.5	4.7	12	5.1	4.8	4.1	3.7

CAL YR	2011	TOTAL	2330.4	MEAN	6.38	MAX	52	MIN	1.1	AC-FT	4620
WTR YR	2012	TOTAL	2307.2	MEAN	6.30	MAX	28	MIN	1.5	AC-FT	4580

MAX DISCH: 34 CFS AT 22:00 ON MAY 22,2012 GH 3.01 FT SHIFT 0.04 FT
MAX GH: 3.01 FT AT 22:00 ON MAY 22,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

RITO ALTO CREEK NEAR CRESTONE
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
SAN ISABEL CREEK NEAR CRESTONE

Water Year 2012

Location.-- Lat 38°2'4", long 105°43'5" referenced to North American Datum of 1983 (Rito Alto Peak, CO quad, scale 1:24,000), UTM Zone 13 436985 E and 4209879 N, in SW ¼ NW ¼ sec. 25, T.44 N., R.11 E., New Mexico Principal Meridian, Saguache County, CO, Hydrologic Unit 13010003, on left bank 200 feet northwest of trail, 3 mi northwest of Crestone, CO.

Drainage Area and Period of Record.-- 5.7 mi² (from topographical map); March 1999 to current year.

Equipment.-- Data collection platform (Sutron Satlink2 with HDR GOES radio) and a float-operated SDR in a 4-foot diameter culvert shelter and well. The primary reference gage is a drop tape from reference point on shelf. No outside gage.

Hydrologic Conditions.-- Undeveloped steep alpine and sub-alpine terrain.

Gage-Height Record.-- Primary record is 15 minute satellite transmitted data with SDR log and DCP log as backup. Record is complete and reliable except for Nov 29 - Mar 22 when station was closed for winter. The stage-discharge relation was affected by ice Nov 9-11, 17, 26-28. There were three shaft encoder corrections that changed the 15-minute values and were prorated by time from previous visit.

Datum Corrections.-- Levels were last run to the Reference Point (RP) inside the gage on July 13, 2011 using BM1 as base. The RP elevation was within allowable limits, so no correction was made or required. A two-peg test was performed on the Lietz level (SN 130869) on May 27, 2011 and no adjustment was required or made.

Rating.-- Control is a boulder/cobble weir at low and medium flows, with some bank effect at higher flows. Stream bottom is mostly rounded rocks, cobbles, and gravel. The stage-discharge relation can be affected by persons moving rocks and piling logs on control and scour caused by high flows. Rating SANCRECO04 first used May 28, 2010 was used again this water year. This rating is well defined from approximately 1.5 cfs to 10 cfs. Sixteen discharge measurements (Nos. 200-215) were made this year, ranging in discharge from 1.53 to 10.7 cfs. They cover the discharge range experienced, except for higher daily flows on May 13-17, 22, 23. The peak flow of 15.5 cfs occurred at 2145 on May 22, 2012 at a gage height of 3.93 ft with a shift of 0.00 ft. It exceeded high Measurement No. 209 (GH = 3.83 ft), made May 18, 2012, by 0.10 feet in stage.

Discharge.-- Shifting control method was used to compute discharge for all open water record. Shifts were applied as defined by measurements and were distributed by time and stage. Four three-point variable stage-shift relationships (SANCREVS12A - SANCREVS12D) were developed with low end shifts ranging from +0.01 ft to +0.05 ft and distributed by time. Open water measurement shifts ranged from +0.01 to +0.06 ft; applied shifts ranged from +0.02 ft to +0.05 ft. All measurements were given full weight except for Nos. 202, 210, 213-215 which were adjusted by as much as 7.3% to smooth shift distribution. Two cleaning corrections were noted May 4 and Apr 9 and were prorated from previous visit by time as a corrected shift. Discharge was estimated Nov 9-11, 17, 26-28 when stage-discharge relation was affected by ice and Nov 29 - Mar 22 when station was closed.

Special Computations.-- Discharge for periods of no gage-height and ice affected record was estimated using discharge measurements, hydrographic comparison with Rito Alto Creek near Crestone and temperature data from Sand Creek at Great Sand Dunes National Park (SANDUNCO).

Remarks.-- Record is fair, except for estimated periods, which are poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.-- Cover the full range of flow with measurements next year and survey the new control to build a new rating.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

SAN ISABEL CREEK NEAR CRESTONE

RATING TABLE-- SANCRECO04 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

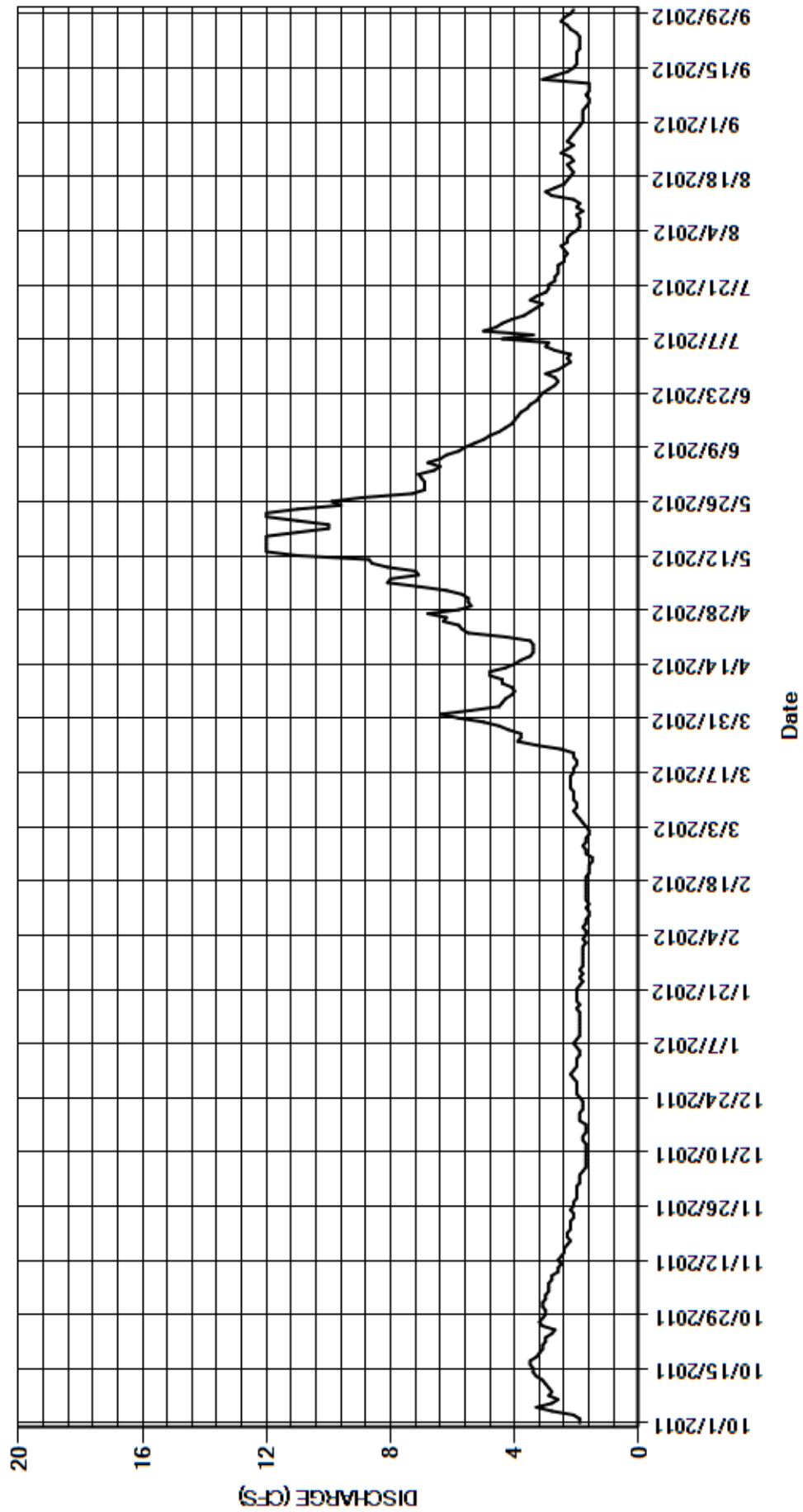
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.9	3.1	e2.0	e2.0	e1.8	e1.6	6.4	5.5	7.0	2.2	2.3	1.8
2	1.9	3.0	e1.9	e2.0	e1.7	e1.6	5.4	5.7	7.1	2.3	2.3	1.8
3	2.1	3.0	e1.9	e2.0	e1.8	e1.7	4.5	6.2	6.6	2.2	2.2	1.8
4	2.8	2.9	e1.9	e1.9	e1.7	e1.8	4.4	7.1	6.4	2.7	2.0	1.8
5	3.3	2.9	e1.8	e1.9	e1.7	e1.9	4.3	8.1	6.8	3.0	1.9	1.7
6	2.8	2.9	e1.7	e2.0	e1.8	e2.0	4.1	8.0	6.4	2.9	1.9	1.6
7	2.6	2.8	e1.7	e2.1	e1.7	e2.1	4.0	7.1	6.2	4.4	1.9	1.6
8	2.9	2.8	e1.7	e2.0	e1.7	e2.0	4.1	7.2	5.8	3.4	2.0	1.7
9	2.8	e2.6	e1.7	e1.9	e1.6	e2.0	4.4	8.1	5.6	5.0	1.8	1.6
10	2.9	e2.6	e1.7	e1.9	e1.6	e2.1	4.4	8.6	5.3	4.6	2.0	1.6
11	3.0	e2.5	e1.7	e1.9	e1.7	e2.1	4.8	8.7	5.0	4.4	1.9	1.6
12	3.1	2.6	e1.7	e1.9	e1.6	e2.1	4.8	11	4.8	4.1	2.1	3.1
13	3.3	2.5	e1.8	e1.9	e1.7	e2.2	4.3	12	4.5	3.7	2.8	2.7
14	3.4	2.4	e1.8	e1.9	e1.7	e2.2	4.0	12	4.3	3.5	3.0	2.3
15	3.4	2.4	e1.7	e1.9	e1.7	e2.2	3.8	12	4.1	3.3	2.7	2.1
16	3.5	2.3	e1.7	e2.0	e1.7	e2.2	3.5	12	4.0	3.1	2.4	2.0
17	3.5	e2.2	e1.7	e1.9	e1.7	e2.1	3.4	12	3.9	3.5	2.3	2.0
18	3.3	2.3	e1.9	e2.0	e1.7	e2.1	3.4	11	3.8	3.3	2.2	2.0
19	3.2	2.3	e1.9	e2.0	e1.7	e2.0	3.4	10	3.6	3.0	2.1	2.0
20	3.1	2.2	e1.9	e2.0	e1.6	e2.0	3.5	10	3.5	2.9	2.2	1.9
21	3.1	2.2	e1.8	e2.0	e1.6	e2.1	4.3	11	3.3	2.9	2.3	1.9
22	3.0	2.2	e1.8	e1.9	e1.6	e2.1	5.5	12	3.2	2.7	2.1	1.9
23	3.0	2.1	e1.8	e1.8	e1.5	2.5	5.7	12	3.1	2.7	2.2	1.9
24	2.8	2.1	e1.9	e1.9	e1.5	3.3	5.8	11	2.9	2.6	2.5	2.0
25	2.7	2.2	e2.0	e1.8	e1.7	3.9	6.3	9.6	2.7	2.6	2.3	2.2
26	3.1	e2.1	e2.0	e1.9	e1.7	3.8	6.2	9.9	2.6	2.6	2.1	2.3
27	3.2	e2.1	e2.0	e1.8	e1.8	3.8	6.8	8.9	2.7	2.4	2.3	2.5
28	3.1	e2.0	e2.0	e1.8	e1.7	4.2	5.8	7.3	3.0	2.4	2.2	2.4
29	3.0	e2.0	e2.1	e1.8	e1.7	4.5	5.4	6.9	2.6	2.3	2.1	2.2
30	3.0	e2.0	e2.2	e1.8	---	5.0	5.5	6.9	2.4	2.4	2.0	2.1
31	3.1	---	e2.1	e1.8	---	5.8	---	6.9	---	2.5	1.9	---
TOTAL	91.9	73.3	57.5	59.4	48.7	81.0	142.2	284.7	133.2	95.6	68.0	60.1
MEAN	2.96	2.44	1.85	1.92	1.68	2.61	4.74	9.18	4.44	3.08	2.19	2.00
AC-FT	182	145	114	118	97	161	282	565	264	190	135	119
MAX	3.5	3.1	2.2	2.1	1.8	5.8	6.8	12	7.1	5.0	3.0	3.1
MIN	1.9	2.0	1.7	1.8	1.5	1.6	3.4	5.5	2.4	2.2	1.8	1.6

CAL YR	2011	TOTAL	1085.7	MEAN	2.97	MAX	22	MIN	1.0	AC-FT	2150
WTR YR	2012	TOTAL	1195.6	MEAN	3.27	MAX	12	MIN	1.5	AC-FT	2370

MAX DISCH: 15.5 CFS AT 21:45 ON MAY 22,2012 GH 3.93 FT SHIFT 0 FT
 MAX GH: 3.93 FT AT 21:45 ON MAY 22,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

SAN ISABEL CREEK NEAR CRESTONE
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08227000 SAGUACHE CREEK NEAR SAGUACHE

Water Year 2012

Location.-- Lat 38°9'48", long 106°17'26" referenced to North American Datum of 1983 (Lake Mountain NE, CO quad, scale 1:24,000), UTM Zone 13 386931 E and 4224736 N, in SE ¼ SE ¼ sec. 10, T.45 N., R.6 E., New Mexico Principal Meridian, Saguache County, CO, Hydrologic Unit 13010004, on left bank 0.2 mi downstream from Middle Creek and 10 mi northwest of Saguache, CO.

Drainage Area and Period of Record.-- 595 mi²; Aug 1910 - Sep 1912; Jun 1914 to current year. Monthly discharge only for some periods. Water-quality data available, Apr 1993 - Sep 1995.

Equipment.-- Data collection platform (Sutron Model Satlink2 DCP with HDR GOES radio), a float-operated digital stage discharge recorder, a tipping-bucket rain gauge, and air temperature sensor in a CMP shelter and well. The primary reference gage is a drop tape from reference point on shelf. Outside gage installed Jul 20, 2012. Bank-operated cableway located 10 feet below gaging station. A water temperature sensor was installed by USGS on Apr 6, 2012.

Hydrologic Conditions.-- Gaging station is located in undeveloped irrigated ranch meadows near lower mountain ranges. Flows at gage affected by diversions for irrigation and return flows from irrigation.

Gage-Height Record.-- Primary record is 15-minute transmitted data with DCP log and SDR log as backup. Record is complete and reliable. The stage-discharge relation was affected by ice Oct 29-31, Nov. 3 - Mar 26. There was a -0.01 ft instrument correction on Nov 7, which was prorated by time from previous visit.

Datum Corrections.-- Levels were ran to the Reference Point (RP) inside the gage on Aug 14, 2012 using BM2 as base. The RP was within allowable limits, so no corrections were required or made. Two-peg test was done on Lietz level (SN130869) Aug 6, 2012 and Jun 11, 2012. The instrument was within tolerance so no adjustment was made.

Rating.-- Channel and gravel bar downstream are the low water controls. A bend in the channel approximately 100 feet downstream is the high water control. Scour, fill, and moss growth cause shifting. Rating No. 16 in use since Oct. 1, 1999 was used again this year. It is well defined from 10 to 500 cfs, but it is considered only fair outside that range. Evaluation of shifts is continuing to determine if a new rating is needed for the next water year. Fifteen measurements (Nos. 213-227) were made this year ranging in discharge from 16 to 60.5 cfs. They cover the range experienced except for the lower daily flows of Dec 4-6, 23; Jan 12-15, 17, 18, and the higher daily flows of Apr 12, 24-28; May 5-14, 16-25. The peak flow of 88.3 cfs occurred at 1630 on Apr 27, 2012 at a gage height of 1.85 ft with a shift of +0.07 ft. It exceeded high Measurement 221 made Apr 25, (GH = 1.61 ft) by 0.24 ft in stage.

Discharge.-- Shifting control method was used to compute the discharge for all periods of good record. Shifts were prorated by time Oct 1-18 and a variable stage-shift relationship: SAGSAGVS12-1 was used the remainder of the year. Measurement shifts ranged from +0.04 to +0.11 ft. All open water measurements were given full weight except for Nos. 213, 220, 222-225, and 227, which were adjusted as much as 7 percent to smooth the shift trend. The stage-discharge relation was affected by ice and discharge estimated Oct 29-31, Nov 3 through Mar 26.

Special Computations.-- Discharge for periods of ice affected record was estimated using discharge measurements, weather records, partial record days, and comparison with nearby stations.

Remarks.-- Record is good except for periods of ice-affected record, which are estimated and poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.-- A new rating would be helpful.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

08227000 SAGUACHE CREEK NEAR SAGUACHE

RATING TABLE-- SAGSAGCO16 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

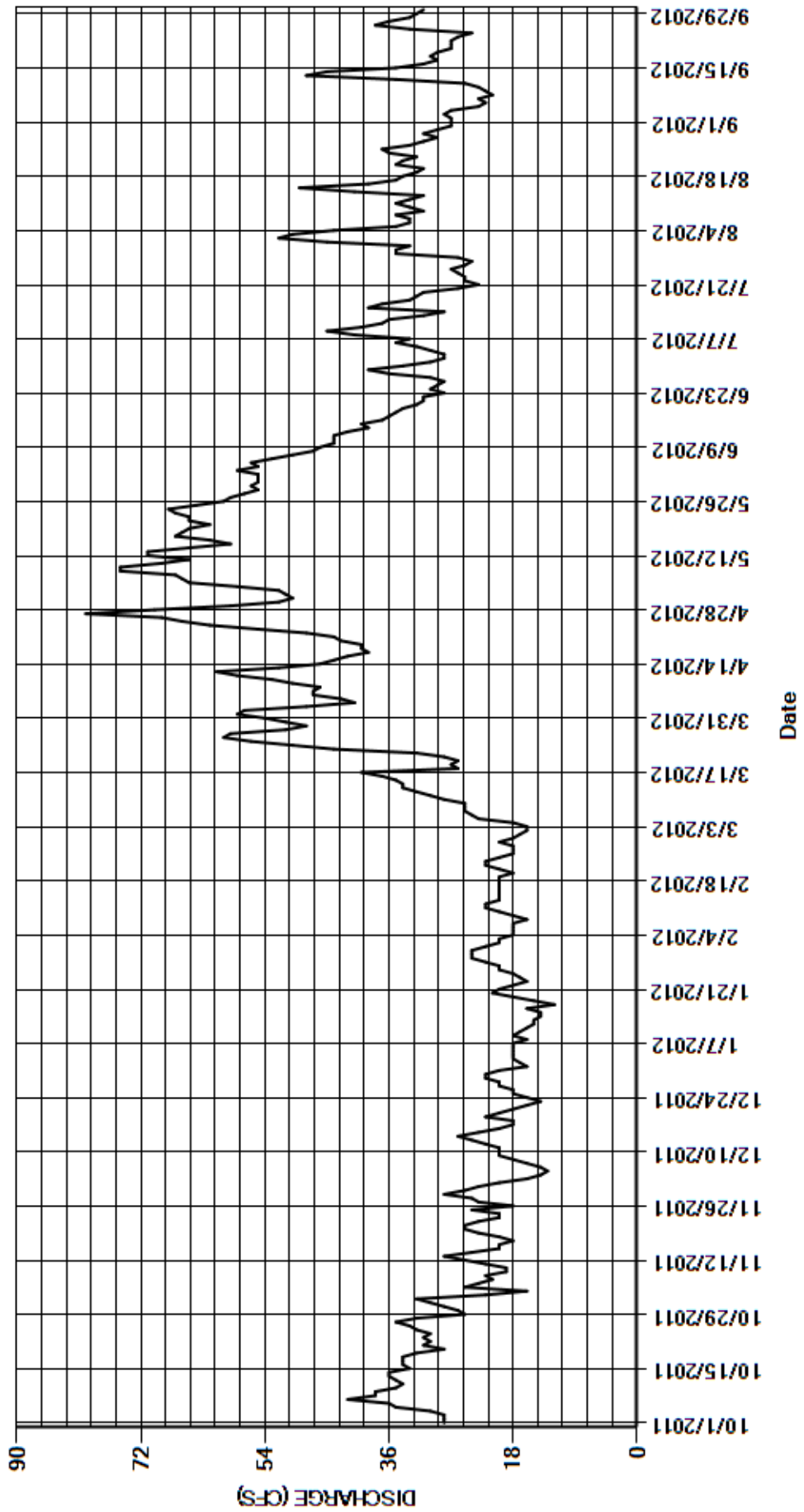
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	28	30	e23	e16	e22	e17	58	50	55	30	45	27
2	28	32	e20	e17	e20	e16	57	51	55	28	52	27
3	28	e22	e16	e18	e20	e16	48	52	58	28	50	28
4	30	e16	e14	e18	e18	e18	41	58	55	30	44	27
5	35	e25	e13	e18	e18	e23	43	65	56	32	35	23
6	36	e23	e14	e18	e18	e24	47	66	53	35	33	22
7	42	e21	e16	e18	e18	e25	47	67	50	33	33	23
8	38	e22	e18	e16	e16	e25	46	75	47	41	35	21
9	38	e19	e20	e18	e18	e25	50	75	46	45	31	22
10	35	e19	e20	e17	e20	e28	53	69	44	40	33	23
11	34	e22	e20	e16	e22	e30	58	65	44	37	35	25
12	35	e25	e22	e15	e22	e32	61	71	44	36	33	35
13	36	e28	e24	e15	e20	e34	52	71	42	31	31	48
14	36	e24	e26	e14	e20	e34	46	65	39	28	41	45
15	33	e20	e23	e14	e20	e35	44	59	40	39	49	35
16	34	e20	e20	e16	e20	e37	42	62	37	37	39	31
17	34	e18	e18	e12	e20	e40	39	67	36	33	35	29
18	34	e20	e18	e15	e20	e26	40	66	35	32	34	30
19	32	e23	e22	e18	e20	e27	40	65	34	31	32	29
20	28	e25	e20	e21	e18	e26	43	62	32	26	31	27
21	31	e25	e18	e20	e20	e28	44	65	31	23	35	27
22	30	e23	e16	e18	e22	e32	48	65	31	25	34	27
23	31	e20	e14	e16	e22	e44	55	67	28	25	32	26
24	30	e20	e16	e17	e20	e50	62	68	30	26	36	24
25	32	e24	e18	e18	e18	e56	66	64	29	27	37	33
26	33	e18	e18	e20	e18	e60	69	60	28	25	33	38
27	35	e23	e20	e20	e18	59	80	59	30	24	31	36
28	32	e24	e20	e22	e20	51	70	57	36	26	29	33
29	e25	e28	e22	e24	e18	48	59	55	39	35	31	32
30	e26	e25	e22	e24	---	51	52	56	34	35	29	31
31	e28	---	e20	e24	---	54	---	55	---	33	27	---
TOTAL	1007	684	591	553	566	1071	1560	1952	1218	976	1105	884
MEAN	32.5	22.8	19.1	17.8	19.5	34.5	52.0	63.0	40.6	31.5	35.6	29.5
AC-FT	2000	1360	1170	1100	1120	2120	3090	3870	2420	1940	2190	1750
MAX	42	32	26	24	22	60	80	75	58	45	52	48
MIN	25	16	13	12	16	16	39	50	28	23	27	21

CAL YR	2011	TOTAL	14892	MEAN	40.8	MAX	151	MIN	13	AC-FT	29540
WTR YR	2012	TOTAL	12167	MEAN	33.2	MAX	80	MIN	12	AC-FT	24130

MAX DISCH: 88.3 CFS AT 16:30 ON APR 27,2012 GH 1.85 FT SHIFT 0.07 FT
 MAX GH: 2.29 FT AT 15:45 ON MAR 09,2012 (ice affected)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08227000 SAGUACHE CREEK NEAR SAGUACHE
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08227500 CRESTONE CREEK, NORTH NEAR CRESTONE
Water Year 2012

Location.-- Lat 38°0'49", long 105°41'34" referenced to North American Datum of 1983 (Rito Alto Peak, CO quad, scale 1:24,000), UTM Zone 13 439188 E and 4207550 N, in SE ¼ SE ¼ sec. 31, T.44 N., R.12 E., New Mexico Principal Meridian, Saguache County, CO, Hydrologic Unit 13010003, on right bank in canyon, 1.5 mi northeast of Crestone, CO, and 3.2 mi upstream from South Crestone Creek.

Drainage Area and Period of Record.-- 10.7 mi²; 1936 to current year (1936 to 1947 seasonal records only).

Equipment.-- Data collection platform (Sutron Satlink2) and a float-operated shaft encoder(SDR) in a 36-inch corrugated metal shelter and 36-inch concrete well. The primary reference gage is a drop tape from reference point on shelf. No outside gage. Control is a concrete ramp flume approximately 4 feet below the gage.

Hydrologic Conditions.-- Undeveloped steep alpine and subalpine terrain.

Gage-Height Record.-- Primary record is 15-minute satellite transmitted data with DCP log and SDR log as backup. Record is complete and reliable except for Nov 8-29 when float was frozen and Nov 30 to Mar 22 when station was closed. The stage-discharge relation was affected by ice Nov 6 and 7. Three 15-minute erroneous values were corrected on Apr 25 and one missing value was filled on May 22. There was one +0.01 ft instrument calibration correction made on Apr 10 which was prorated back to the previous visit and one +0.01 ft instrument calibration correction applied during the measurement on Oct 13.

Datum Corrections.-- Levels were last run to the Reference Point (RP) inside the gage on Jul 13, 2011 using B.M. No. 6 as base. The RP was within allowable limits and no correction was made. Two-peg test was performed on the Lietz level (SN 130869) on May 27, 2011, the instrument was within allowable limits and no adjustment was made.

Rating.-- Control is a concrete ramp flume approximately 4 feet below the gage. Shifting occurs mainly due to the movement of streambed materials in and above gage pool. Rating No. 12 in use since Dec 29, 2010 was used until Nov 30. Rating No. 11 (previously used from Apr 27, 2005 to Dec 29, 2010) was used from Nov 30 to the end of the water year. Rating No. 11 is well defined from 1.0 cfs to 70 cfs. This rating was used because it better fit the measurement trend of WY2012. There were many measurements made at the lower end of the rating; these measurements show some scatter due to the poor measurement conditions at the site. Due to the scatter and poor measurement conditions the rating was given more weight and the scatter of measurements was adjusted back to the rating. Sixteen measurements (Nos. 230-245) were made this year ranging in discharge from 1.41 to 27.1 cfs. The measurements cover the range in discharge experienced except for higher daily flows on May 17, 22, 23 and lower daily flows on Feb 5-7, 18-20, 24, and 25. The peak flow of 30.9 cfs occurred at 03:30 on May 22 at a gage height of 1.34 ft with a shift of 0.00 ft; it exceeded high Measurement No. 239 (GH = 1.29 ft), made May 14, by 0.05 ft in stage.

Discharge.-- Discharge was computed by direct application of the rating to the gage height record for all open-water periods. Measurement shifts ranged from -0.02 to +0.02 ft on Rating 11 and -0.02 to +0.01 ft on Rating 12. All measurements were given full weight except for Nos. 230, 232, 236-238, and 240-245, which were adjusted as much as 8.7% back to the rating. Discharge was estimated Nov. 6 and 7 when stage-discharge relation was affected by ice; Nov 8-29 when float was frozen; and Nov 30 to Mar 22 when station was closed.

Special Computations.-- Discharge for periods of unreliable gage height and ice affected record was estimated using discharge measurements and air temperature records from MEDSANCO.

Remarks.-- Record is good, except for periods of unreliable gage height and ice affected record, which are estimated and poor. Station maintained and records developed by Div 3 hydrographic staff.

Recommendations.-- Make more measurements at the upper end of the rating to help define the curve.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

08227500 CRESTONE CREEK, NORTH NEAR CRESTONE

RATING TABLE.-- NOCRESKO12 USED FROM 01-OCT-2011 TO 30-NOV-2011
 NOCRESKO11 USED FROM 30-NOV-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

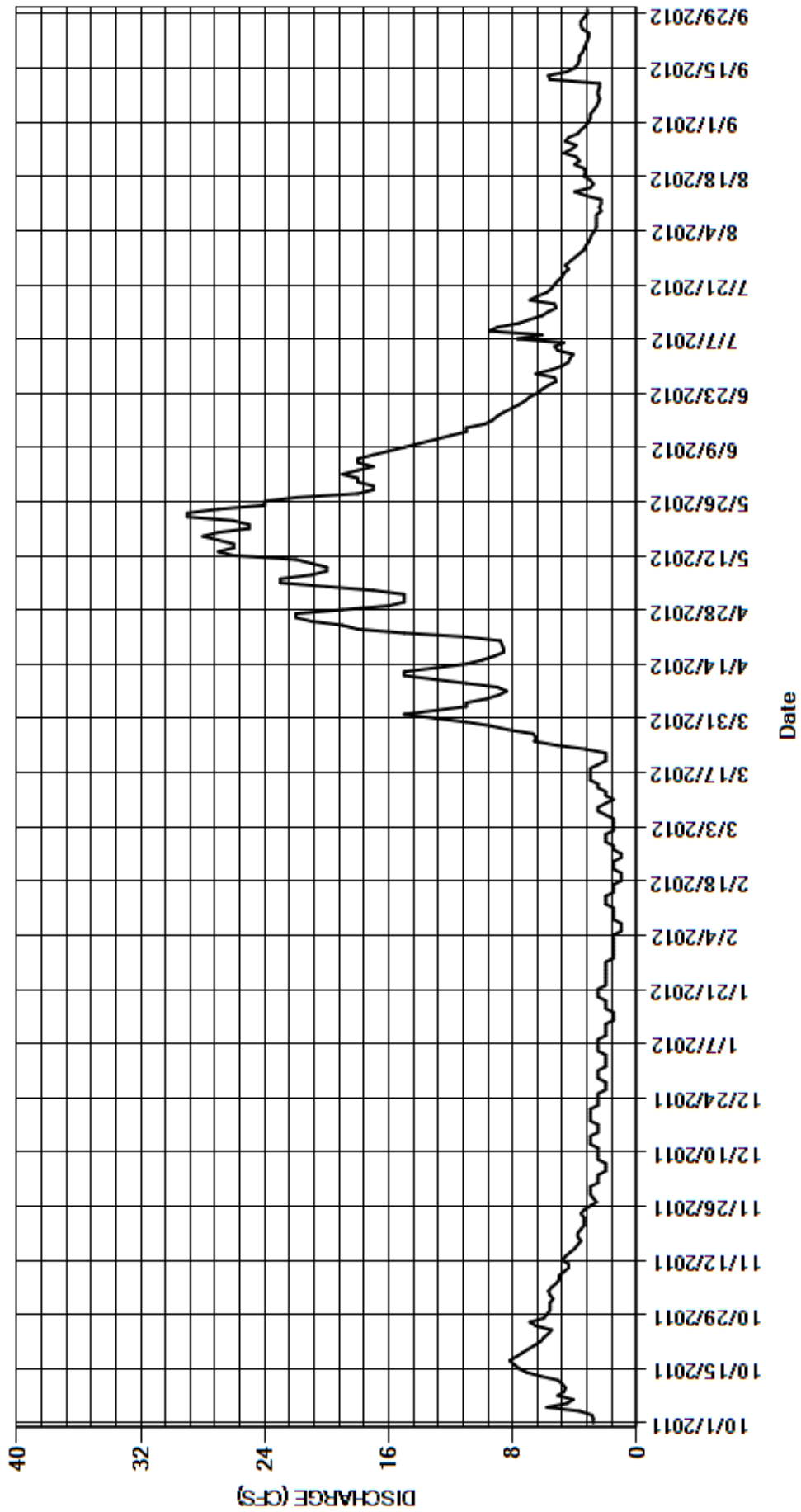
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.8	5.6	e3.0	e2.0	e1.5	e2.0	15	15	18	4.4	3.1	3.1
2	2.8	5.4	e2.5	e2.0	e1.5	e1.5	13	15	19	4.3	3.0	3.0
3	2.9	5.6	e2.5	e2.0	e1.5	e1.5	11	17	18	4.1	2.9	3.0
4	3.7	5.7	e2.5	e2.0	e1.5	e1.5	11	20	17	5.1	2.7	2.8
5	5.8	5.5	e2.0	e2.5	e1.0	e1.5	9.7	23	18	5.3	2.6	2.6
6	4.5	e5.2	e2.0	e2.5	e1.0	e2.0	8.9	23	18	4.7	2.6	2.5
7	4.1	e5.0	e2.0	e2.5	e1.0	e2.5	8.4	21	17	7.7	2.6	2.4
8	5.1	e5.0	e2.5	e2.5	e1.5	e2.5	9.0	20	16	6.1	2.6	2.5
9	4.7	e4.7	e2.5	e2.0	e1.5	e2.0	11	20	15	9.5	2.3	2.5
10	4.6	e4.4	e2.5	e2.0	e1.5	e1.5	13	21	14	9.0	2.4	2.4
11	4.8	e4.4	e2.5	e2.0	e1.5	e2.0	15	22	13	7.6	2.3	2.4
12	5.1	e4.8	e3.0	e2.0	e2.0	e2.0	15	26	12	6.9	2.3	5.6
13	6.2	e4.6	e3.0	e1.5	e2.0	e2.5	13	27	11	6.1	3.3	5.7
14	7.1	e4.3	e3.0	e1.5	e2.0	e2.5	11	26	11	5.7	4.0	4.5
15	7.6	e4.0	e2.5	e1.5	e1.5	e3.0	10	26	9.8	5.2	3.0	4.0
16	7.9	e3.8	e2.5	e2.0	e1.5	e3.0	9.2	27	9.3	5.3	2.8	3.8
17	8.2	e3.6	e2.5	e2.0	e1.5	e3.0	8.6	28	9.0	6.9	3.0	3.7
18	7.8	e3.8	e3.0	e2.0	e1.0	e3.0	8.6	27	8.6	6.4	3.4	3.7
19	7.4	e3.8	e3.0	e2.5	e1.0	e2.5	8.7	25	8.1	5.8	3.3	3.5
20	7.0	e3.6	e3.0	e2.5	e1.0	e2.0	8.8	25	7.6	5.5	3.4	3.4
21	6.6	e3.4	e3.0	e2.5	e1.5	e2.0	11	26	7.2	5.3	4.0	3.3
22	6.2	e3.4	e2.5	e2.0	e1.5	e2.0	15	29	6.9	5.1	3.7	3.2
23	6.0	e3.4	e2.5	e2.0	e1.5	3.3	18	29	6.4	4.8	3.9	3.1
24	5.7	e3.6	e2.5	e2.0	e1.0	5.2	19	27	6.1	4.7	4.7	3.1
25	5.5	e3.4	e2.5	e2.0	e1.0	6.6	21	24	5.7	4.4	4.2	3.5
26	6.5	e3.0	e2.0	e2.0	e1.5	6.5	22	24	5.2	4.6	3.9	3.6
27	6.9	e2.6	e2.0	e2.0	e1.5	6.7	22	22	5.3	4.3	4.6	3.6
28	6.0	e2.8	e2.0	e2.0	e2.0	8.3	19	18	6.5	4.0	4.4	3.4
29	5.8	e3.0	e2.5	e1.5	e2.0	9.4	16	17	5.5	3.7	3.8	3.2
30	5.6	e3.0	e2.5	e1.5	---	11	15	17	4.8	3.4	3.6	3.2
31	5.6	---	e2.5	e1.5	---	13	---	18	---	3.3	3.3	---
TOTAL	176.5	124.4	78.5	62.5	42.0	118.0	395.9	705	329.0	169.2	101.7	100.3
MEAN	5.69	4.15	2.53	2.02	1.45	3.81	13.2	22.7	11.0	5.46	3.28	3.34
AC-FT	350	247	156	124	83	234	785	1400	653	336	202	199
MAX	8.2	5.7	3.0	2.5	2.0	13	22	29	19	9.5	4.7	5.7
MIN	2.8	2.6	2.0	1.5	1.0	1.5	8.4	15	4.8	3.3	2.3	2.4

CAL YR	2011	TOTAL	2011.6	MEAN	5.51	MAX	42	MIN	1.2	AC-FT	3990
WTR YR	2012	TOTAL	2403.0	MEAN	6.57	MAX	29	MIN	1.0	AC-FT	4770

MAX DISCH: 30.9 CFS AT 03:30 ON MAY 22,2012 GH 1.34 FT SHIFT 0 FT
 MAX GH: 1.34 FT AT 03:30 ON MAY 22,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08227500 CRESTONE CREEK, NORTH NEAR CRESTONE
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
SOUTH CRESTONE CREEK NEAR CRESTONE

Water Year 2012

Location.-- Lat 37°58'60", long 105°42'8" referenced to North American Datum of 1983 (Crestone, CO quad, scale 1:24,000), UTM Zone 13 438341 E and 4204184 N, in SW ¼ SE ¼ sec. 31, T.2 N., R.1 E., Luis Maria Baca No. 4 Survey, Saguache County, CO, Hydrologic Unit 13010003, on right bank 1 mile southeast of Crestone, CO.

Drainage Area and Period of Record.-- 4.6 mi²; Jun 26, 1915 - Nov 10, 1915 (some days missing), May 1936 to Nov. 1936, Apr. 1999 to current year.

Equipment.-- Data collection platform (Sutron Satlink2) and a float-operated SDR in a 2 ft diameter corrugated culvert pipe stilling well with small steel shelter on top. A 2-inch intake pipe attaches well to a 2.5 foot Parshall flume at the REW. The primary reference gage is a staff gage also located at REW. No changes this water year.

Hydrologic Conditions.-- Predominantly undeveloped steep alpine and sub-alpine terrain with extensive losses as stream traverses sandy valley margins.

Gage-Height Record.-- Primary record is fifteen minute satellite transmitted data with DCP log and SDR log as backup. Record is complete and reliable except for Nov 30 - Mar 23 when station was closed for winter. Gage was isolated for all or part of the day Oct 1-3; Nov 3, 9, 10, 17, 26, 27; Mar 24, 25, 28; Apr 3, 7, 8, 10, 11, 13-22; Jun 25-27, 30; Jul 1-4, 29-31; Aug 1-20; and Sep 4-12. The stage-discharge relation was affected by ice Nov 4-8, 11, 15, 16, 18, 23, 24, 28, and 29. When station was opened on Mar 23 the flume was dry so the SDR was set arbitrarily to 0.03 ft. On Apr 10, a -0.02 ft calibration correction was made which was carried back to Mar 23 when the station was opened. One +0.01 ft instrument calibration correction was made on Sep 26 which was prorated back to the previous visit.

Datum Corrections.-- The last complete Parshall flume inspection was completed on Aug. 5, 2008. Levels indicate that the lateral slope of the flume floor at the staff gage is approximately 0.4% from REW, but is slightly concave with the middle being about 0.04 feet lower than at staff. Laterally, at the throat section, the flume is level. Inspection included measurement of all pertinent Parshall Flume dimensions. A partial inspection was performed on Jul 30, 2010 after the intakes were replaced. This partial inspection showed the flume to be fairly level.

Rating.-- Control is a 2.5 foot Parshall flume in good condition. Rating No. 1, a standard 2.5 foot Parshall flume rating, was used for the entire water year. The flume and well ice up during winter, and sediment deposition in and above flume can cause minor shifting. Inlets isolate at approximately 0.05 ft. Sixteen measurements (Nos. 200-215) were made this year ranging in discharge from 0 to 1.94 cfs. The measurements cover the range in discharge experienced except for higher daily flows on May 13, 14, 23, and 24. The peak flow of 2.30 cfs occurred at 0100 on May 23, 2012 at a gage height of 0.39 feet with a shift of 0.00 feet; it exceeded high Measurement No. 209 (GH = 0.35 ft) by 0.04 feet in stage.

Discharge.-- Shifting control method was used to compute discharge for all periods of good record. Shifts were applied as defined by measurements and distributed by time. Measurement shifts ranged from -0.01 to 0.00 ft. All were given full weight. There was no flow Dec 1 through Mar 24; Apr 14-21; and Aug 6, 9-12, 16, 17 (130 days).

Special Computations.-- No flow observed on four gage visits while station was closed for the winter. Periods when gage was isolated, as determined by minimum gage height less than or equal to 0.05 ft, were estimated using record during day that was good and evaluating portion that was isolated.

Remarks.-- Record is good above 1.69 cfs, fair from 0.52 to 1.68 cfs, and poor below 0.52 cfs. Estimated record is also poor. Record accuracy statement is based on analysis of the standard 2.5 ft Parshall flume rating, where 0.52 cfs is the minimum free-flow capacity and 1.68 cfs is the point where 0.01 ft change in gage height is less than 5 percent change in streamflow. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.--

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

SOUTH CRESTONE CREEK NEAR CRESTONE

RATING TABLE-- SOUCRECO01 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

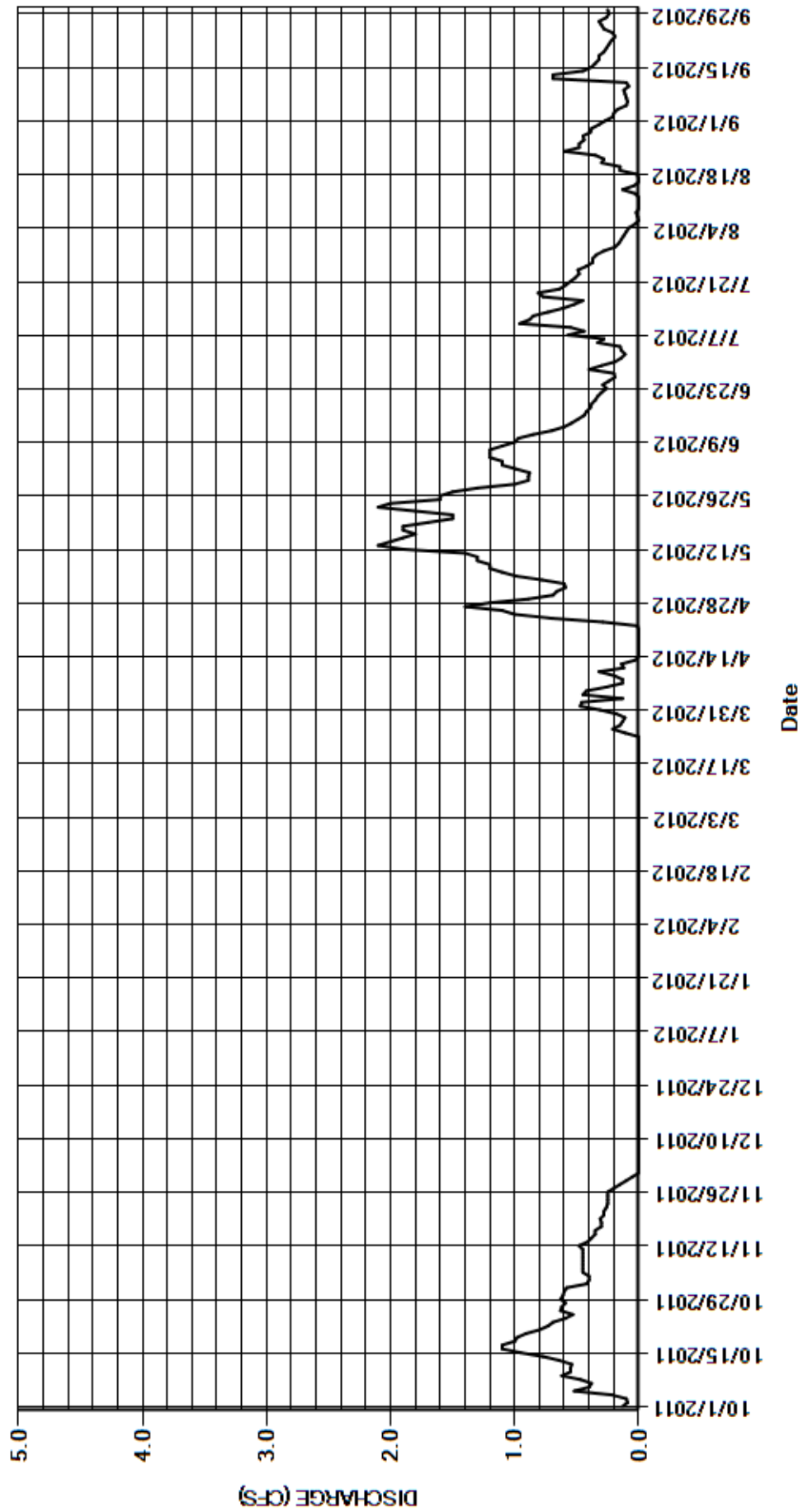
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e0.13	0.58	e0.00	e0.00	e0.00	e0.00	0.47	0.66	0.88	e0.14	e0.14	0.27
2	e0.09	0.42	e0.00	e0.00	e0.00	e0.00	0.46	0.59	0.99	e0.11	e0.12	0.21
3	e0.10	e0.40	e0.00	e0.00	e0.00	e0.00	e0.13	0.60	1.1	e0.14	e0.10	0.20
4	0.22	e0.40	e0.00	e0.00	e0.00	e0.00	0.45	0.78	1.1	e0.15	e0.08	e0.17
5	0.52	e0.45	e0.00	e0.00	e0.00	e0.00	0.42	0.99	1.2	0.33	e0.03	e0.10
6	0.40	e0.45	e0.00	e0.00	e0.00	e0.00	0.26	1.1	1.2	0.28	e0.00	e0.09
7	0.38	e0.45	e0.00	e0.00	e0.00	e0.00	e0.13	1.2	1.2	0.57	e0.01	e0.10
8	0.47	e0.45	e0.00	e0.00	e0.00	e0.00	e0.13	1.2	1.1	0.44	e0.02	e0.11
9	0.62	e0.45	e0.00	e0.00	e0.00	e0.00	0.20	1.3	1.0	0.55	e0.00	e0.12
10	0.55	e0.45	e0.00	e0.00	e0.00	e0.00	e0.32	1.3	0.97	0.96	e0.00	e0.08
11	0.55	e0.45	e0.00	e0.00	e0.00	e0.00	e0.12	1.4	0.85	0.88	e0.00	e0.10
12	0.54	0.48	e0.00	e0.00	e0.00	e0.00	0.14	1.9	0.70	0.85	e0.00	e0.69
13	0.64	0.41	e0.00	e0.00	e0.00	e0.00	e0.03	2.1	0.60	0.73	e0.03	0.69
14	0.77	0.38	e0.00	e0.00	e0.00	e0.00	e0.00	2.0	0.54	0.61	e0.13	0.45
15	0.95	e0.35	e0.00	e0.00	e0.00	e0.00	e0.00	1.9	0.49	0.52	e0.04	0.38
16	1.1	e0.35	e0.00	e0.00	e0.00	e0.00	e0.00	1.8	0.44	0.45	e0.00	0.35
17	1.1	e0.30	e0.00	e0.00	e0.00	e0.00	e0.00	1.9	0.42	0.77	e0.00	0.32
18	1.0	e0.30	e0.00	e0.00	e0.00	e0.00	e0.00	1.9	0.39	0.81	e0.01	0.32
19	0.98	0.31	e0.00	e0.00	e0.00	e0.00	e0.00	1.7	0.38	0.64	e0.15	0.28
20	0.91	0.28	e0.00	e0.00	e0.00	e0.00	e0.00	1.5	0.35	0.59	e0.15	0.26
21	0.80	0.28	e0.00	e0.00	e0.00	e0.00	e0.00	1.5	0.33	0.55	0.30	0.24
22	0.73	0.26	e0.00	e0.00	e0.00	e0.00	e0.01	1.8	0.30	0.51	0.28	0.22
23	0.69	e0.25	e0.00	e0.00	e0.00	e0.00	0.29	2.1	0.26	0.48	0.35	0.19
24	0.59	e0.25	e0.00	e0.00	e0.00	e0.00	0.71	2.0	0.29	0.49	0.60	0.21
25	0.53	0.25	e0.00	e0.00	e0.00	e0.11	1.0	1.6	e0.24	0.42	0.48	0.28
26	0.63	e0.25	e0.00	e0.00	e0.00	0.21	1.1	1.6	e0.19	0.37	0.48	0.30
27	0.62	e0.20	e0.00	e0.00	e0.00	0.15	1.4	1.5	e0.20	0.37	0.44	0.32
28	0.59	e0.15	e0.00	e0.00	e0.00	e0.13	1.2	1.3	0.40	0.34	0.45	0.26
29	0.63	e0.10	e0.00	e0.00	e0.00	0.11	0.89	1.0	0.30	e0.28	0.39	0.24
30	0.61	e0.05	e0.00	e0.00	---	0.18	0.69	0.89	e0.19	e0.19	0.38	0.25
31	0.60	---	e0.00	e0.00	---	0.31	---	0.89	---	e0.16	0.32	---
TOTAL	19.04	10.15	0.00	0.00	0.00	1.20	10.55	44.00	18.60	14.68	5.48	7.80
MEAN	0.61	0.34	0.000	0.000	0.000	0.039	0.35	1.42	0.62	0.47	0.18	0.26
AC-FT	38	20	0	0	0	2.4	21	87	37	29	11	15
MAX	1.1	0.58	0.00	0.00	0.00	0.31	1.4	2.1	1.2	0.96	0.60	0.69
MIN	0.09	0.05	0.00	0.00	0.00	0.00	0.00	0.59	0.19	0.11	0.00	0.08

CAL YR	2011	TOTAL	128.74	MEAN	0.35	MAX	3.3	MIN	0.00	AC-FT	255
WTR YR	2012	TOTAL	131.50	MEAN	0.36	MAX	2.1	MIN	0.00	AC-FT	261

MAX DISCH: 2.3 CFS AT 01:00 ON MAY 23,2012 GH 0.39 FT SHIFT 0 FT
 MAX GH: 0.44 FT AT 03:00 ON NOV 10,2011 (ice affected)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

SOUTH CRESTONE CREEK NEAR CRESTONE
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
WILLOW CREEK NEAR CRESTONE

Water Year 2012

Location.-- Lat 37°58'3", long 105°40'35" referenced to North American Datum of 1983 (Crestone, CO quad, scale 1:24,000), UTM Zone 13 440582 E and 4202428 N, in SW ¼ SW ¼ sec. 4, T.1 N., R.1 E., Luis Maria Baca No. 4 Survey, Saguache County, CO, Hydrologic Unit 13010003, on right bank 2 mi southeast of Crestone, CO.

Drainage Area and Period of Record.-- 8.0 mi²; April 1, 1999 to current year.

Equipment.-- Data collection platform (Sutron SatLink2), and a float-operated SDR in a 3-foot concrete pipe well and steel box shelter. The primary reference gage is a drop tape from reference point on shelf. No outside gage. No changes this year.

Hydrologic Conditions.-- Mostly undeveloped steep alpine and sub-alpine terrain, with minor subdivision for approximately 0.5 miles above gage.

Gage-Height Record.-- Primary record is 15-minute transmitted data with SDR and DCP logs as backup. Record is complete and reliable except for Nov 10 - 29 when well or inlets were frozen all or part of the day, Nov 30 - Mar 23 when station was closed, Apr 20-30, May 8-11 and Jun 26 - Jul 5 when inlets were plugged or partially plugged. One erroneous unit value was corrected on May 4 and 14 when the well was being worked on, one missing unit value was filled May 22 when the SDR firmware was updated, and two erroneous unit values were corrected Jul 11 when the well was being worked on. Five flush corrections were noted during the water year. The +0.31 ft correction on Apr 30 was prorated back to April 20 based on hydrographic comparison with teh Cotton Creek near Mineral Hot Springs (COCRMICO) gage for estimation purposes; the +0.03 ft correction on May 4 was prorated back to the inflection point on May 3, the +0.19 ft correction on May 11 was prorated back to May 6 based on analysis of the gage-height record for estimation purposes, the +0.02 ft correction on May 22 was prorated back to the inflection on May 21, and the +0.14 ft correction on Jul 5 was prorated back to Jul 1 based on hydrographic comparison with COCRMICO. One -0.01 ft instrument calibration correction was made Oct 13 and prorated back to the previous visit on Sep 11. The stage-discharge relation was affected by ice Nov 9.

Datum Corrections.-- Levels were last run to the Reference Point (RP) inside the gage on Jul 12, 2011 using BM1 as base. The RP elevation was within allowable limits, so no correction was made or required. Two-peg test was performed on the Lietz level (SN 130869) on May 27, 2011 and no adjustments were required or made.

Rating.-- Control is a weir made of rocks and cobbles. The last measured PZF was 2.17 ft measured on Oct 13, 2011. Bankfull stage is approximately 3.10 ft as determined by levels ran Jul 29, 2010. Shifting occurs due to the movement of streambed materials at control and in approach, especially at higher stages. An attempt to stabilize the control was made during the gage shelter replacement in WY2010 by placing boulders at the toe of the control to prevent erosion; this does not appear to have significantly affected measurement shifts. Rating No. 4 in use since Nov 30, 2010 was used for the entire water year. Rating No. 4 is well defined up to approximately 15 cfs. Sixteen measurements (Nos. 209-224) were made this year ranging in discharge from 0.32 to 8.40 cfs. Measurements cover the discharge range experienced except for higher daily flows on May 23, 24 and lower daily flows on Feb 19-24, 28, 29; and Mar 1-4. The peak flow of 10.1 cfs occurred at 0430 on May 24, 2012 at a gage height of 2.98 ft with a shift of +0.01 ft. It exceeded high Measurement No. 218 (GH = 2.90 ft) by 0.08 ft in stage.

Discharge.-- Shifting control method was used to compute discharge during all periods of reliable stage record. Shifts were applied as defined by measurements and distributed by time and events. Measurement shifts ranged from -0.05 to +0.03 ft and applied shifts ranged from -0.04 to +0.01 ft. All measurements were given full weight and applied except for Measurement Nos. 210, 216, 218, and 220, which were rated poor and adjusted as much as 10.3 percent and Measurement Nos. 217 and 219, which were rated fair and adjusted as much as 5.9 percent. High Measurement 218 was adjusted 6.6% from a +0.03 ft shift to a +0.01 ft shift based on overall measurement trend and WY2011's high flow measurements. Measurement 210 indicated a -0.05 ft shift, adjusted to -0.04 ft, with a clear control; the large negative shift is attributed to leaf build up in the control cracks that is common during this time of year. The shift proration for the cleaning correction on Oct 31 was determined by first applying the shift assuming the cleaning correction occurred Nov 3 and then moving the -0.02 ft cleaning correction back to Oct 31 which resulted in a constant -0.04 ft shift from Oct 31 to Nov 3. With the exception of Measurement 210, measurement shifts were adjusted to be within +/-0.01 ft of the rating to smooth the shift trend due to overall measurement scatter and poor site conditions for low flow streamflow measurements. The discharge was estimated Nov 10-29 when well or inlets were frozen all or part of the day, Nov 30 - Mar 23 when station was closed, and Apr 21-30, May 8-11 and Jun 26 - Jul 5 when inlets were plugged or partially plugged.

Special Computations.-- Discharge for winter periods of no gage-height and ice affected record was estimated using discharge measurements and weather records from SANDUNCO. Periods May 8-11 and June 26 to July 5 were estimated from hydrographic comparison with nearby site Cottonwood Creek near Crestone. Flush correction timing from April 21 to April 30 was estimated by hydrographic comparison with Cotton Creek near Mineral Hot Springs which shows similar diurnal patterns.

Remarks.-- Record is poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.-- Continue to monitor gage for inlets plugging to see if problem has been fixed or further work needs to be performed. Install new control.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

WILLOW CREEK NEAR CRESTONE

RATING TABLE-- WILCRECO04 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

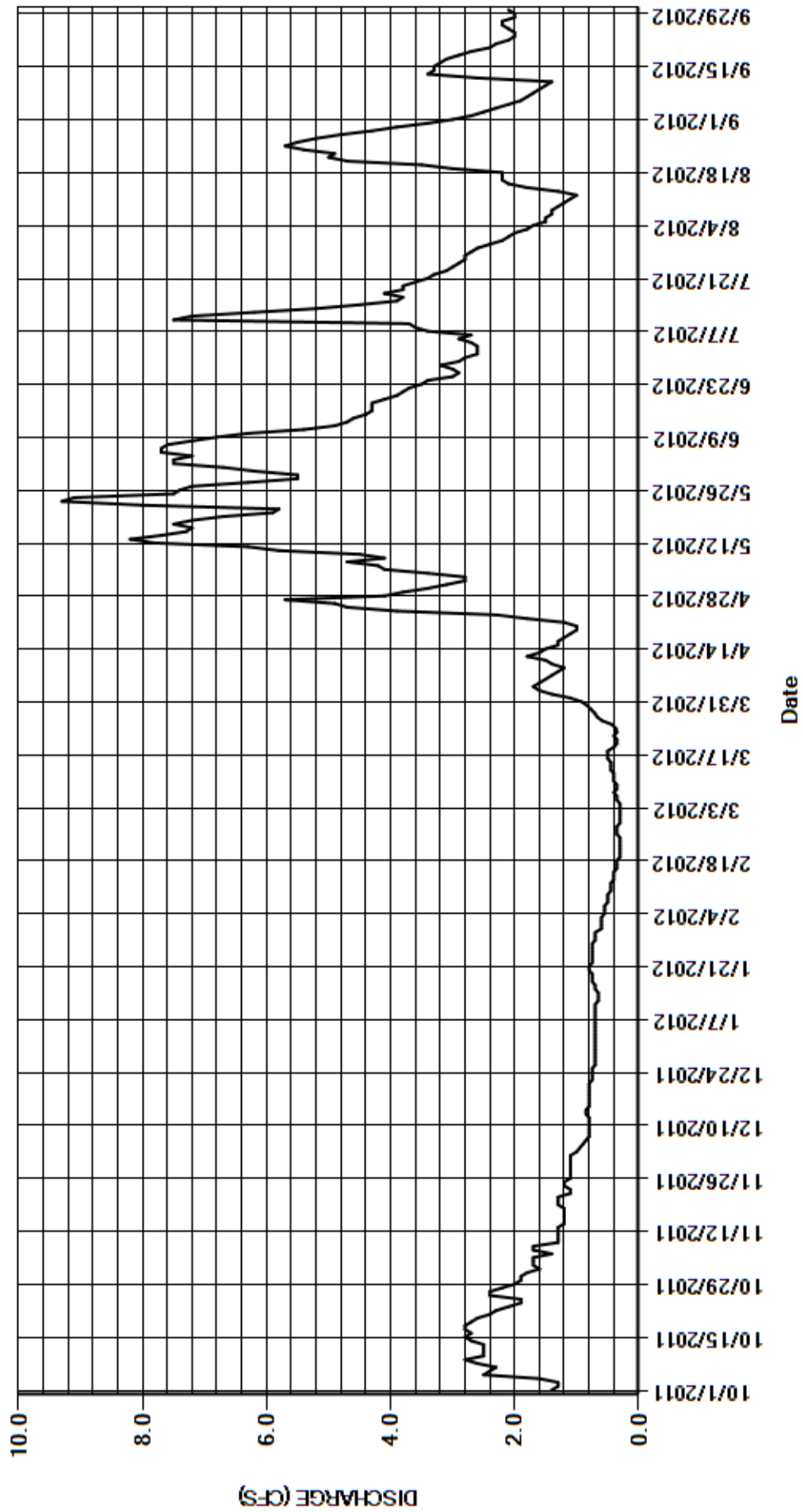
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.4	1.8	e1.1	e0.70	e0.60	e0.30	1.1	3.1	6.7	e2.6	2.1	3.0
2	1.3	1.6	e1.1	e0.70	e0.60	e0.30	1.4	2.8	7.5	e2.6	2.0	2.7
3	1.3	1.7	e1.0	e0.70	e0.60	e0.30	1.6	2.8	7.5	e2.6	1.8	2.5
4	1.6	1.7	e0.95	e0.70	e0.55	e0.30	1.7	3.4	7.2	e2.7	1.7	2.3
5	2.5	1.7	e0.90	e0.70	e0.55	e0.35	1.6	4.1	7.7	e2.9	1.5	2.1
6	2.4	1.4	e0.85	e0.70	e0.55	e0.35	1.5	4.2	7.7	2.7	1.5	1.9
7	2.3	1.7	e0.80	e0.70	e0.50	e0.40	1.4	4.7	7.6	3.4	1.4	1.8
8	2.6	1.7	e0.80	e0.70	e0.50	e0.35	1.3	e4.1	7.2	3.6	1.4	1.7
9	2.8	e1.3	e0.80	e0.70	e0.50	e0.35	1.2	e4.5	6.8	3.7	1.3	1.6
10	2.5	e1.3	e0.80	e0.70	e0.45	e0.40	1.4	e5.8	6.3	7.5	1.2	1.5
11	2.5	e1.3	e0.80	e0.70	e0.45	e0.40	1.5	e6.3	5.4	7.2	1.1	1.4
12	2.5	e1.3	e0.80	e0.65	e0.45	e0.40	1.8	7.8	4.9	6.2	1.0	2.6
13	2.5	e1.3	e0.85	e0.65	e0.40	e0.45	1.6	8.2	4.7	5.2	1.3	3.4
14	2.7	e1.2	e0.85	e0.65	e0.40	e0.45	1.5	7.7	4.6	4.5	1.8	3.3
15	2.8	e1.2	e0.80	e0.70	e0.40	e0.45	1.3	7.3	4.4	3.9	2.1	3.3
16	2.7	e1.2	e0.80	e0.70	e0.35	e0.50	1.3	7.2	4.3	3.8	2.2	3.2
17	2.8	e1.2	e0.80	e0.75	e0.35	e0.50	1.2	7.5	4.3	4.1	2.2	3.1
18	2.8	e1.2	e0.80	e0.75	e0.35	e0.50	1.1	7.2	4.3	3.8	2.2	2.9
19	2.7	e1.3	e0.80	e0.75	e0.30	e0.40	1.0	6.7	4.1	3.8	3.0	2.7
20	2.6	e1.3	e0.80	e0.80	e0.30	e0.35	e1.0	5.9	3.9	3.6	3.5	2.4
21	2.4	e1.3	e0.80	e0.80	e0.30	e0.35	e1.2	5.8	3.8	3.4	4.7	2.3
22	2.3	e1.1	e0.75	e0.75	e0.30	e0.40	e1.8	8.0	3.7	3.3	5.0	2.1
23	2.1	e1.1	e0.75	e0.75	e0.30	e0.35	e2.3	9.3	3.5	3.1	4.9	2.0
24	1.9	e1.2	e0.75	e0.75	e0.30	0.37	e3.9	9.1	3.4	3.0	5.4	2.0
25	1.9	e1.2	e0.75	e0.75	e0.35	0.43	e4.7	7.5	3.0	2.9	5.7	2.1
26	2.4	e1.1	e0.70	e0.75	e0.35	0.59	e4.9	7.4	e2.9	2.8	5.5	2.2
27	2.4	e1.1	e0.70	e0.75	e0.35	0.67	e5.7	7.2	e3.0	2.8	5.2	2.2
28	2.2	e1.1	e0.70	e0.70	e0.30	0.71	e4.1	6.3	e3.2	2.7	4.8	2.0
29	2.0	e1.1	e0.70	e0.70	e0.30	0.77	e3.8	5.5	e2.9	2.6	4.3	2.0
30	1.9	e1.1	e0.70	e0.70	---	0.83	e3.4	5.5	e2.8	2.4	3.9	2.1
31	1.9	---	e0.70	e0.60	---	0.92	---	6.2	---	2.2	3.4	---
TOTAL	70.7	39.8	25.20	22.10	12.00	14.19	63.3	189.1	149.3	111.6	89.1	70.4
MEAN	2.28	1.33	0.81	0.71	0.41	0.46	2.11	6.10	4.98	3.60	2.87	2.35
AC-FT	140	79	50	44	24	28	126	375	296	221	177	140
MAX	2.8	1.8	1.1	0.80	0.60	0.92	5.7	9.3	7.7	7.5	5.7	3.4
MIN	1.3	1.1	0.70	0.60	0.30	0.30	1.0	2.8	2.8	2.2	1.0	1.4

CAL YR	2011	TOTAL	775.85	MEAN	2.13	MAX	11	MIN	0.24	AC-FT	1540
WTR YR	2012	TOTAL	856.79	MEAN	2.34	MAX	9.3	MIN	0.30	AC-FT	1700

MAX DISCH: 10.1 CFS AT 04:30 ON MAY 24,2012 GH 2.98 FT SHIFT 0.01 FT
 MAX GH: 2.98 FT AT 04:30 ON MAY 24,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

WILLOW CREEK NEAR CRESTONE
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
SPANISH CREEK NEAR CRESTONE

Water Year 2012

Location.-- Lat 37°57'10", long 105°39'42" referenced to North American Datum of 1983 (Crestone, CO quad, scale 1:24,000), UTM Zone 13 441870 E and 4200782 N, in SE ¼ SE ¼ sec. 9, T.1 N., R.1 E., Luis Maria Baca No. 4 Survey, Saguache County, CO, Hydrologic Unit 13010003, on left bank 3.5 mi southeast of Crestone, CO.

Drainage Area and Period of Record.-- 2.4 mi². ; 1999 to current year.

Equipment.-- Data collection platform (Sutron SatLink2), and a float-operated SDR in a 2-ft culvert pipe well and small steel box shelter. The primary reference gage is a drop tape from reference point on shelf. No outside gage. No change.

Hydrologic Conditions.-- Station is located in upper foot hills of a mountain creek above housing development green belt area.

Gage-Height Record.-- Primary record is 15-minute satellite transmitted data with DCP log and SDR log as backup. Record is complete and reliable except for Nov 30 through Mar 22 when the station was closed for the winter. The stage-discharge relation was affected by ice Nov 27. On Aug 16 one fifteen minute value was corrected due to the value being affected during the measurement.

Datum Corrections.-- Levels were last run to the Reference Point (RP) inside the gage on Jul 12, 2011 using B.M. No. 1 as base. The RP was within allowable limits, so a correction was not made. Two-peg test was performed on the Lietz level (SN 130869) on May 27, 2011 and the instrument was within allowable limits and no adjustment was made.

Rating.-- The control is a rock weir approximately 3 feet below the gage. This site has rapidly changing gage heights, therefore peak flow measurements are difficult to obtain. High flow measurements since 2002 have all been less than 11.9 cfs. The highest measurement in the record, 18.1 cfs was measured on 5/20/2001. Sometime after this measurement occurred the gage pool shifted. Rating 6 was modified from Rating 5 to better reflect the WY2011 measurements, and was used from Mar 22, 2011 through the end of the 2012 WY. Flows greater than 10 cfs are considered poor due to the lack of measurements to define this portion of the rating. Sixteen measurements (Nos. 198-213) were made this year ranging in discharge from 0.38 to 4.65 cfs. They cover the discharge range experienced except for higher daily flows on Apr 24, May 11-18, 21-24, 26; Jul 10, Aug 25, and the lower daily flows on Dec 6-8, 22, 23; Jan 12, 13; Feb 4, 5, 19-21, 24, 25; Mar 1-4, 10-12, 19-21. The peak flow of 9.89 cfs occurred at 0015 on Jul 10 at a gage height of 3.44 ft with a shift of +0.01 ft. It exceeded high Measurement No. 207, made May 14 (GH=3.24 ft) by 0.20 ft in stage.

Discharge.-- Shifting control method was used compute discharge during all open water periods. Three variable stage-shift relationships were used to apply shifts by stage, SPACREVS12-D used from Oct 13 until station was closed for the winter, SPACREVS12-E used from when the gage was opened until a small event on Sep 12, and SPACREVS12-F which was prorated into on Oct 12 and then used until the first measurement in WY2013. Open water shifts ranged from -0.01 to +0.05 ft; applied shifts ranged from 0.00 to +0.05 ft. All were given full weight except No. 198, 199, 205, 206, 211, and 212 which were adjusted as much as 7.6% to smooth shift distribution. Measurement 208 was not used due to meter problems. There was one cleaning correction, -0.01 ft, which was prorated by time from previous visit as a correction to shift. Discharge was estimated Nov 27 when stage-discharge relationship was affected by ice and Nov 30 through Mar 22 when the station was closed for the winter.

Special Computations.-- Discharge for periods of no gage-height and ice affected record was estimated using discharge measurements and weather records from Sand Creek at Great Sand Dunes National Park (SANDUNCO).

Remarks.-- Record is fair except for estimated periods and flows over 10 cfs, which are poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.-- The control at this site is somewhat unstable and is subject to tampering from visitors. It could use some permanent repairs and upgrades.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

SPANISH CREEK NEAR CRESTONE

RATING TABLE-- SPACRECO06 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

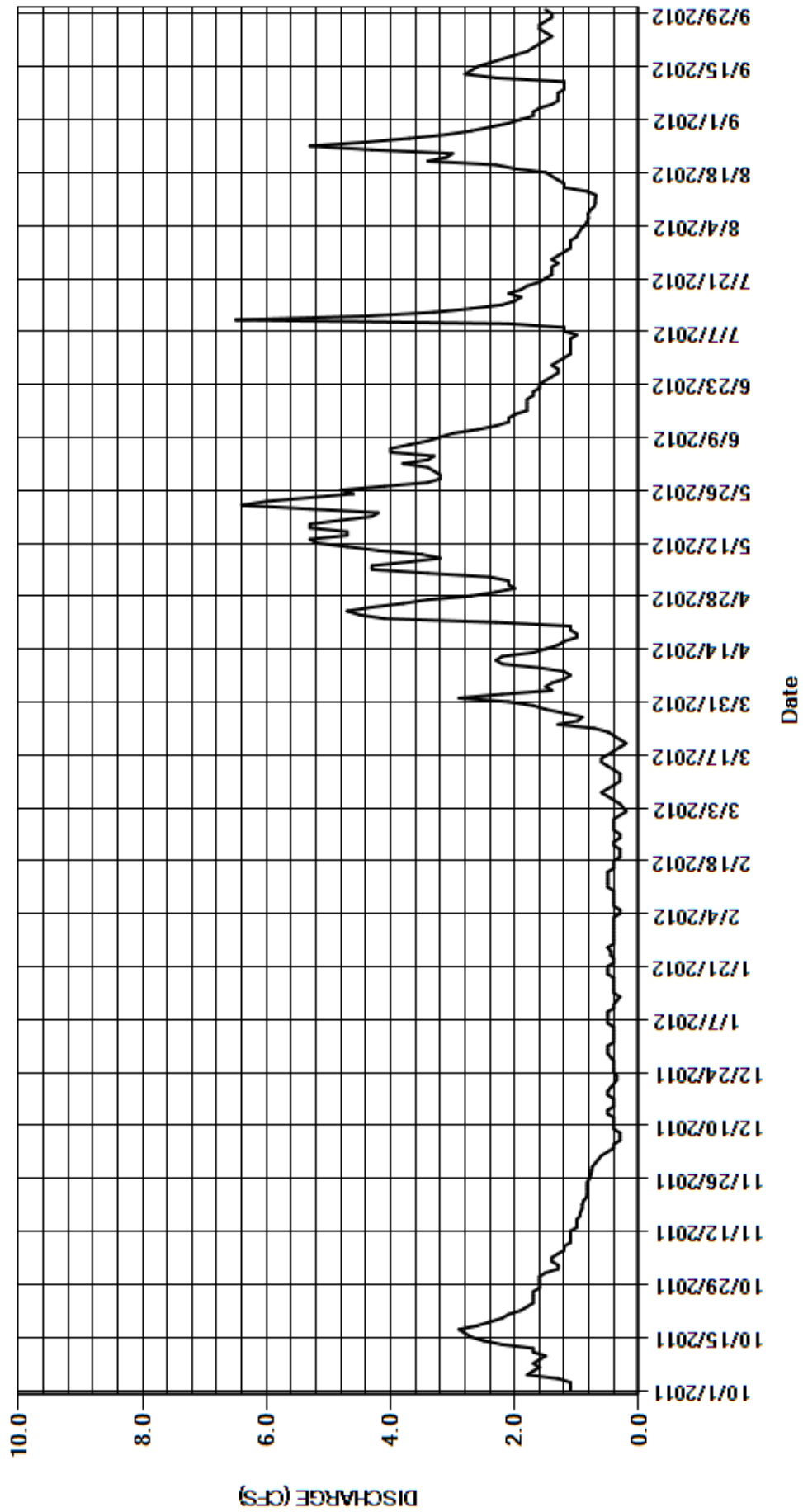
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.1	1.5	e0.65	e0.40	e0.40	e0.30	2.9	2.1	3.4	1.1	1.0	1.9
2	1.1	1.3	e0.60	e0.40	e0.40	e0.20	2.2	2.1	3.8	1.1	0.97	1.7
3	1.1	1.3	e0.50	e0.40	e0.40	e0.25	1.4	2.4	3.4	1.1	0.93	1.7
4	1.3	1.4	e0.40	e0.40	e0.30	e0.30	1.5	3.4	3.3	1.1	0.87	1.6
5	1.8	1.4	e0.40	e0.40	e0.30	e0.40	1.4	4.3	4.0	1.1	0.83	1.4
6	1.7	1.3	e0.30	e0.50	e0.40	e0.50	1.2	4.3	4.0	1.0	0.81	1.3
7	1.6	1.2	e0.30	e0.50	e0.40	e0.60	1.1	3.7	3.7	1.2	0.82	1.3
8	1.7	1.2	e0.30	e0.50	e0.40	e0.50	1.2	3.2	3.4	1.2	0.78	1.3
9	1.6	1.1	e0.40	e0.50	e0.40	e0.40	1.6	3.5	3.2	2.1	0.72	1.2
10	1.5	1.1	e0.40	e0.40	e0.40	e0.30	2.2	4.2	3.0	6.5	0.70	1.2
11	1.7	1.1	e0.40	e0.40	e0.50	e0.30	2.3	4.7	2.6	4.4	0.70	1.2
12	1.7	1.1	e0.40	e0.35	e0.50	e0.30	2.2	5.2	2.3	3.3	0.69	2.3
13	2.2	1.0	e0.50	e0.30	e0.50	e0.40	1.7	5.3	2.1	2.7	0.83	2.8
14	2.5	1.0	e0.50	e0.40	e0.50	e0.50	1.5	4.7	2.1	2.2	1.2	2.7
15	2.7	1.0	e0.40	e0.40	e0.50	e0.60	1.3	4.7	2.0	2.0	1.2	2.6
16	2.8	0.95	e0.40	e0.40	e0.40	e0.60	1.2	5.3	1.8	1.9	1.3	2.4
17	2.9	0.94	e0.40	e0.40	e0.40	e0.50	1.0	5.3	1.8	2.1	1.4	2.2
18	2.6	0.91	e0.50	e0.40	e0.40	e0.40	1.0	4.8	1.8	1.9	1.5	2.0
19	2.4	0.91	e0.50	e0.50	e0.30	e0.30	1.1	4.3	1.8	1.8	2.0	1.8
20	2.2	0.89	e0.45	e0.50	e0.30	e0.20	1.1	4.2	1.7	1.6	2.3	1.7
21	2.1	0.84	e0.40	e0.50	e0.30	e0.30	2.3	5.3	1.7	1.5	3.4	1.6
22	1.9	0.83	e0.35	e0.40	e0.40	e0.40	4.1	6.4	1.6	1.4	3.1	1.5
23	1.8	0.83	e0.35	e0.40	e0.40	0.49	4.5	6.0	1.6	1.4	3.0	1.4
24	1.7	0.83	e0.40	e0.45	e0.30	0.72	4.7	5.3	1.5	1.4	4.3	1.5
25	1.7	0.83	e0.40	e0.45	e0.30	1.3	4.3	4.6	1.4	1.3	5.3	1.6
26	1.7	0.79	e0.40	e0.50	e0.40	0.98	3.8	4.8	1.3	1.4	4.4	1.6
27	1.7	e0.77	e0.40	e0.40	e0.40	0.91	3.4	4.1	1.3	1.3	3.7	1.5
28	1.6	0.76	e0.45	e0.40	e0.40	1.2	2.7	3.4	1.4	1.2	3.1	1.4
29	1.6	0.75	e0.50	e0.40	e0.40	1.5	2.3	3.2	1.3	1.1	2.7	1.4
30	1.6	e0.70	e0.50	e0.40	---	1.7	2.0	3.2	1.2	1.1	2.4	1.5
31	1.6	---	e0.50	e0.40	---	2.1	---	3.3	---	1.1	2.1	---
TOTAL	57.2	30.53	13.35	13.15	11.40	19.45	65.2	131.3	69.5	55.6	59.05	51.3
MEAN	1.85	1.02	0.43	0.42	0.39	0.63	2.17	4.24	2.32	1.79	1.90	1.71
AC-FT	113	61	26	26	23	39	129	260	138	110	117	102
MAX	2.9	1.5	0.65	0.50	0.50	2.1	4.7	6.4	4.0	6.5	5.3	2.8
MIN	1.1	0.70	0.30	0.30	0.30	0.20	1.0	2.1	1.2	1.0	0.69	1.2

CAL YR	2011	TOTAL	512.04	MEAN	1.40	MAX	9.7	MIN	0.30	AC-FT	1020
WTR YR	2012	TOTAL	577.03	MEAN	1.58	MAX	6.5	MIN	0.20	AC-FT	1140

MAX DISCH: 9.89 CFS AT 00:15 ON JUL 10,2012 GH 3.44 FT SHIFT 0.01 FT
 MAX GH: 3.44 FT AT 00:15 ON JUL 10,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

SPANISH CREEK NEAR CRESTSTONE
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08229500 COTTONWOOD CREEK NEAR CRESTONE

Water Year 2012

Location.-- Lat 37°55'60", long 105°38'44" referenced to North American Datum of 1983 (Crestone, CO quad, scale 1:24,000), UTM Zone 13 443270 E and 4198611 N, in NE ¼ NE ¼ sec. 22, T.1 N., R.1 E., Luis Maria Baca No. 4 Survey, Saguache County, CO, Hydrologic Unit 13010003, on left bank 5 mi southeast of Crestone, CO.

Drainage Area and Period of Record.-- 7.0 sq mi (from topographical map); May 1936 - Nov. 30, 1936, 1967 - 1970, October 1998 to current year.

Equipment.-- Oct 1, 2011 to Jun 1, 2012 data collection platform (Sutron Satlink2) and a float-operated SDR in a 3 ft. by 3 ft. timber shelter and well. The primary reference gage is a drop tape from reference point on shelf. Outside cantilever staff gage installed April 28, 2011. On Jun 1, 2012 equipment was moved from the upper site to a steel shelter atop a 2 ft CMP stilling well at a modified 6 ft Parshall flume about 1/4 mile downstream. The primary reference gage is an outside staff gage on the left edge (gage side) of the flume.

Hydrologic Conditions.-- Steep undeveloped alpine and sub-alpine drainage. One minor diversion above gage for domestic use.

Gage-Height Record.-- Primary record is 15-minute satellite transmitted data with DCP log and SDR log as backup. Gage-height record is complete and reliable except for Nov 3-29 when the well was frozen at least parts of the day; and Nov 30 through Mar 22 when station was closed for the winter. Fifteen 15-minute values were missing on Jun 1 (<4hours). There was one instrument correction of -0.01 ft made to the SDR. This correction was ran straight back to previous visit where it was taken due to misreading of the staff.

Datum Corrections.-- Levels were last run July 12, 2011 to the Reference Point (RP) inside the gage using BM 3 as base. The RP was within allowable limits, and no correction was made. Two-peg test was performed on May 27, 2011 the instrument was within allowable limits so no correction was made.

Rating.-- From Oct 1 to Jun 1, the control is a cobble riffle approximately 6 feet below the gage. Rating No. 5-1 in use since Oct 1, 2008, was used for the cobble riffle. Rating No. 06 was developed and used Jun 1 to Sep 30 after station was moved to the modified 6-ft Parshall flume 1/4 mile downstream. Nineteen discharge measurements (Nos. 199-217) were made during the year ranging in discharge from 0.78 to 12.4 cfs. They cover the discharge range experienced except for lower daily flows on Feb 4, 5, 19, 20, 23-25; Mar 1-4 and higher daily flows on May 22-24, Jul 10. The peak flow of 21.9 cfs occurred at 0000 on Jul 10 at a gage height of 1.13 ft and shift of 0.00 ft. It exceeded high Measurement No. 209 (GH = 0.87 from lower site), made May 22, by 0.26 ft in stage.

Discharge.-- Shifting control method was used to compute discharge for all open-water periods. Shifts were applied as determined by measurements and distributed by events Oct 1 to Nov 3. Variable stage-shift relationships: COCRESCOV12-A and COCRESCOV12-B were developed and used to distribute shifts based on stage and time from Mar 22 to Jun 1. After moving the station to the modified flume on Jun 1, the new rating was directly applied to the gage height record to compute discharge to the end of the water year. Open water measurement shifts ranged from -0.05 to +0.04 ft; applied shifts ranged from -0.05 to +0.02 ft at the old station using Rating No. 5-1. Open water measurement shifts ranged from -0.03 to +0.01 ft at the new station using Rating No. 06. All measurements were given full weight except Nos. 208, 211, 213, 215 and 217, which were adjusted by as much as 11% to smooth shift distribution. Discharge was estimated Nov 3 - Mar 22 when well was froze and station was closed.

Special Computations.-- Discharge for periods of no gage-height and unreliable gage-height were estimated using discharge measurements and weather records from Medano Creek at Great Sand Dunes National Park (MEDSANCO).

Remarks.-- Record is fair, except for periods of no gage height or unreliable gage height, which are estimated and poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.-- Make more measurements in the upper gage height range and reassess Rating No. 6 when more measurements are available.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

08229500 COTTONWOOD CREEK NEAR CRESTONE

RATING TABLE.-- COCRESCO05-1 USED FROM 01-OCT-2011 TO 01-JUN-2012
 COCRESCO06 USED FROM 01-JUN-2012 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.4	3.4	e1.5	e1.4	e1.0	e0.70	6.6	4.6	8.4	2.3	2.4	3.9
2	3.3	3.1	e1.4	e1.3	e0.90	e0.60	5.3	4.6	9.1	2.3	2.3	3.6
3	3.3	e3.0	e1.3	e1.2	e0.80	e0.60	3.5	5.1	8.3	2.2	2.2	3.4
4	3.8	e3.0	e1.2	e1.3	e0.70	e0.70	3.4	6.7	8.4	2.4	2.1	3.2
5	5.3	e3.0	e1.1	e1.4	e0.70	e0.80	3.6	8.9	9.8	2.6	2.0	2.9
6	4.6	e3.0	e1.2	e1.4	e0.80	e0.90	2.9	9.2	9.4	2.4	2.0	2.7
7	4.4	e2.8	e1.3	e1.4	e0.80	e0.90	2.6	8.0	8.8	2.9	2.0	2.6
8	5.0	e2.6	e1.4	e1.3	e0.80	e1.0	3.3	6.5	8.2	2.9	1.9	2.5
9	5.3	e2.4	e1.5	e1.3	e0.90	e1.0	4.2	7.1	7.7	4.5	1.7	2.4
10	5.0	e2.2	e1.6	e1.2	e0.90	e1.0	5.2	9.1	7.1	13	1.7	2.3
11	4.4	e2.4	e1.7	e1.2	e0.90	e0.90	5.8	10	6.2	7.9	1.8	2.3
12	4.5	e2.5	e1.8	e1.1	e1.0	e0.90	5.4	12	5.7	6.1	1.6	4.8
13	5.5	e2.5	e1.8	e1.1	e1.0	e0.90	3.9	12	5.1	5.2	2.1	5.8
14	6.5	e2.4	e1.7	e1.2	e1.0	e0.90	3.3	10	4.9	4.5	3.5	5.3
15	6.8	e2.4	e1.7	e1.2	e0.90	e0.90	2.9	11	4.5	4.3	3.1	4.8
16	6.8	e2.3	e1.6	e1.3	e0.90	e0.90	2.6	12	4.2	4.0	3.0	4.3
17	6.5	e2.1	e1.6	e1.3	e0.80	e1.0	2.4	12	4.1	4.2	2.8	3.9
18	5.7	e2.1	e1.7	e1.4	e0.80	e1.0	2.5	12	4.0	4.0	3.0	3.6
19	5.3	e2.2	e1.8	e1.4	e0.70	e1.0	2.7	10	3.8	4.0	3.3	3.3
20	5.0	e2.3	e1.7	e1.4	e0.70	e0.90	2.9	9.3	3.5	3.6	3.9	3.1
21	4.6	e2.2	e1.6	e1.3	e0.80	e0.90	5.1	11	3.5	3.3	5.1	3.0
22	4.3	e2.1	e1.5	e1.2	e0.80	e1.0	8.0	14	3.4	3.1	4.8	2.8
23	4.1	e2.0	e1.4	e1.1	e0.70	1.3	8.6	15	3.2	3.0	5.3	2.7
24	3.9	e2.0	e1.5	e1.0	e0.60	2.3	8.8	13	3.1	3.2	10	2.7
25	3.7	e1.8	e1.4	e1.0	e0.70	3.6	8.6	12	2.9	2.9	12	3.0
26	3.7	e1.7	e1.3	e1.0	e0.80	3.2	7.9	12	2.7	3.1	9.1	2.8
27	3.8	e1.6	e1.3	e1.1	e0.80	3.2	7.1	10	2.8	3.0	7.4	2.6
28	3.6	e1.7	e1.2	e1.1	e0.80	4.1	5.5	8.0	3.0	2.9	6.4	2.5
29	3.7	e1.8	e1.2	e1.0	e0.80	4.4	4.7	7.9	2.7	2.8	5.6	2.5
30	3.6	e1.7	e1.3	e1.0	---	4.9	4.4	8.0	2.5	2.6	4.8	2.6
31	3.4	---	e1.4	e1.0	---	5.7	---	8.2	---	2.5	4.3	---
TOTAL	142.8	70.3	45.7	37.6	23.80	52.10	143.7	299.2	161.0	117.7	123.2	97.9
MEAN	4.61	2.34	1.47	1.21	0.82	1.68	4.79	9.65	5.37	3.80	3.97	3.26
AC-FT	283	139	91	75	47	103	285	593	319	233	244	194
MAX	6.8	3.4	1.8	1.4	1.0	5.7	8.8	15	9.8	13	12	5.8
MIN	3.3	1.6	1.1	1.0	0.60	0.60	2.4	4.6	2.5	2.2	1.6	2.3

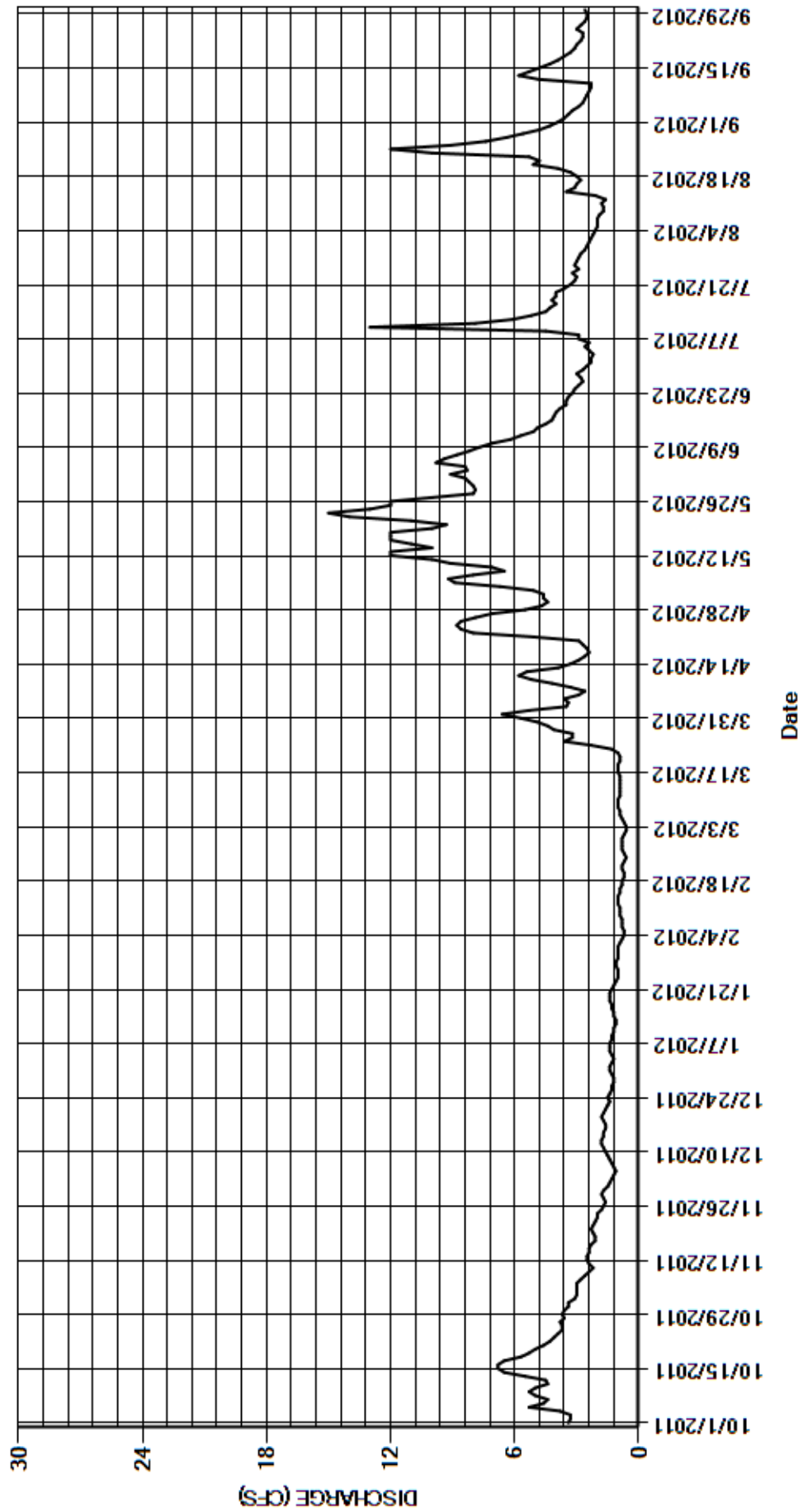
CAL YR	2011	TOTAL	1259.14	MEAN	3.45	MAX	25	MIN	0.50	AC-FT	2500
WTR YR	2012	TOTAL	1315.00	MEAN	3.59	MAX	15	MIN	0.60	AC-FT	2610

MAX DISCH: 21.9 CFS AT 00:00 ON JUL 10,2012 GH 1.13 FT SHIFT 0 FT

MAX GH: 2.33 FT AT 21:00 ON MAY 22,2012 (cobble riffle control)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08229500 COTTONWOOD CREEK NEAR CRESTONE
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
DEADMAN CREEK AT MOUTH OF CANYON NEAR CRESTONE, CO

Water Year 2012

Location.-- Lat 37°53'41", long 105°37'25" referenced to North American Datum of 1983 (Crestone Peak, CO quad, scale 1:24,000), UTM Zone 13 445160 E and 4194332 N, in SW ¼ SW ¼ sec. 36, T.1 N., R.1 E., Baca Survey, Saguache County, CO, Hydrologic Unit 13010003, on right bank 8.2 mi southeast of Crestone, CO and 21.4 mi northeast of Mosca, CO.

Drainage Area and Period of Record.-- 9.6 mi², from 10m DEM in Colorado StreamStats; May 1936 - November 1936, April 2011 to current year.

Equipment.-- Sutron Constant Flow Bubbler with Sutron Satlink2 DCP in NEMA enclosure at log cross-vane control structure. The primary reference gage is an outside cantilever gage.

Hydrologic Conditions.-- Undeveloped steep alpine and subalpine terrain.

Gage-Height Record.-- Primary record is 15-minute transmitted data with DCP log as backup. Record is complete and reliable except for Jan 3-19, 28, and 29 when ice was affecting the CFB operation; and Sep 18-20 when CFB malfunctioned during firmware upgrade and had to be replaced. Two 15-minute values were missing Oct 20 while Satlink2 was replaced and the missing values were filled by linear interpolation without loss of accuracy. Instrument corrections were not made to the CFB; observed corrections were applied by prorating between visits based on site observations. The stage-discharge relation was affected by ice Nov 10, 11, 17, 26, 27; Dec 1-31; Jan 1, 2, 20-22, 28, 29; and Mar 2,3, 9, 10, 19-21. The stage record accuracy is considered to be +/- 0.02 ft under most circumstances due to index resolution and cantilever sight distance.

Datum Corrections.-- Levels were last run to the cantilever chain gage on Jul 5, 2012 using B.M. No. 1 as base. The cantilever chain gage was outside allowable limits and a +0.11 correction was made. Two-peg test was performed on the Lietz level (SN 130869) on Jun 11, 2012 and the instrument was within allowable limits and no adjustment was made. Site conditions make it impractical to run levels to any better accuracy than 0.01 ft and the chain gage only allows corrections to be within 0.01 ft. The +0.11 ft datum correction was based on applied instrument correction after levels were ran.

Rating.-- The control is a log cross-vane structure that was installed the week of Apr 11, 2011. This structure is expected to be stable with shifting resulting from fill and scour of the material in the gage pool. The log cross-vane structure is insensitive at low flows, but was constructed this way to help reduce the potential for control failure. Rating DEDMOUCO2-1 was used until Oct 11, 2011. Rating DEDMOUCO03 was developed from streamflow Measurements 3-28 with -0.11 ft datum correction applied and was used from Oct 11, 2011 through the end of the water year. A survey of the control cross-section from July 11, 2011 was evaluated to identify breakpoints in the rating. DEDMOUCO03 is well defined from 1 cfs to 8 cfs and poorly defined outside this range. Sixteen measurements (Nos. 11-26) were made this year, ranging in discharge from 1.16 to 14.0 cfs. The measurements cover the discharge range experienced except for lower daily flows on Jan 28, 31; Feb 1, 2, 5-23, 28, 29; Mar 1,2, and 8-12 and higher daily flows May 12, 13, 16-18, 22, and 23. The peak flow of 19 cfs occurred at 2030 on May 12, 2012 at a gage height of 1.76 ft with a 0.00 ft shift. It exceeded high Measurement No. 19 made May 14 (gh = 1.67 ft) by 0.09 ft in stage. The peak stage of 1.78 ft occurred Jan 12, 2012 due to backwater from ice.

Discharge.-- Shifting control method was used to compute discharge for all open water periods. Shifts were applied as defined by discharge measurements and distributed by time. Measurement shifts ranged from -0.03 to +0.04 ft. All were given full weight except Nos. 17 and 25, which were adjusted as much as 4.9% to smooth the shift distribution. Rating 03 was drawn to fit measurement trend, winter measurements show more positive shifting which is attributed to increased velocities through the gage pool.

Special Computations.-- Discharges during ice affected periods and periods of equipment malfunction were estimated based on streamflow measurements, stage record, and adjacent good record. Since the primary reference gage is a cantilever wire weight gage, the constant flow bubbler can only be set accurately to plus or minus 0.02 ft at lower stages and more error at higher stages depending on gage pool conditions.

Remarks.-- Record is poor due to control insensitivity and primary reference accuracy. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.-- Install outside staff gage in stream.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

DEADMAN CREEK AT MOUTH OF CANYON NEAR CRESTONE, CO

RATING TABLE.-- DEDMOUCO02-1 USED FROM 01-OCT-2011 TO 11-OCT-2011
 DEDMOUCO03 USED FROM 11-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.0	4.8	e2.2	e1.8	1.0	0.97	7.6	6.5	9.3	2.1	4.1	4.9
2	2.8	4.7	e2.0	e1.9	1.1	e1.0	6.4	6.5	9.8	2.1	3.9	4.5
3	2.8	4.3	e1.9	e1.9	1.2	e1.3	4.6	7.4	9.1	2.1	3.7	4.3
4	3.6	4.4	e2.0	e1.9	1.2	1.4	3.8	9.4	8.9	2.4	3.4	3.9
5	6.4	4.3	e1.9	e1.9	1.1	1.3	3.6	11	9.5	2.5	3.2	3.6
6	5.5	4.1	e1.9	e1.9	0.97	1.2	3.2	11	9.1	2.3	3.1	3.3
7	5.4	4.1	e1.9	e1.9	0.95	1.2	2.9	11	8.7	2.8	3.2	3.2
8	6.3	4.0	e1.9	e1.8	0.89	0.98	3.4	10	8.3	2.8	3.0	3.1
9	5.4	3.6	e1.9	e1.8	0.86	e1.1	5.0	11	8.0	2.9	2.7	3.0
10	5.2	e3.6	e1.9	e1.8	0.86	e1.0	7.0	12	7.5	4.4	2.6	2.8
11	5.5	e3.5	e1.9	e1.7	0.86	1.0	7.8	12	6.8	3.5	2.4	2.8
12	5.6	3.3	e2.0	e1.6	0.86	1.1	7.2	15	6.3	3.5	2.2	5.4
13	6.1	3.1	e2.1	e1.6	0.94	1.3	5.2	16	5.7	3.3	2.7	7.3
14	7.1	3.1	e2.1	e1.6	0.97	1.4	4.4	14	5.4	3.4	5.2	6.5
15	7.8	3.1	e2.0	e1.7	0.97	1.3	3.8	14	5.2	5.3	4.2	5.6
16	8.2	3.1	e1.8	e1.8	0.97	1.4	3.3	15	4.7	4.8	3.8	5.1
17	9.0	e3.0	e2.0	e1.7	0.94	1.6	3.2	15	4.5	5.7	3.7	4.7
18	9.2	2.9	e2.0	e1.8	0.94	1.5	3.2	15	4.4	6.9	4.3	e4.4
19	8.5	2.8	e2.1	e1.8	0.92	e1.3	3.2	13	4.3	9.5	4.6	e4.0
20	8.0	2.8	e1.9	e1.8	0.89	e1.3	3.2	13	4.0	7.6	4.9	e3.8
21	7.6	2.8	e1.9	e1.8	0.90	e1.4	5.6	13	4.0	6.6	6.0	3.6
22	7.1	2.7	e1.9	e1.8	1.0	1.3	9.4	15	3.9	5.9	5.5	3.4
23	6.9	2.6	e1.8	1.7	1.1	2.3	11	15	3.7	5.9	5.5	3.4
24	6.6	2.6	e1.8	1.7	1.2	4.3	12	14	3.2	8.0	9.7	3.6
25	6.2	2.6	e1.8	1.5	1.2	5.1	12	13	2.9	6.9	12	3.7
26	6.9	e2.4	e1.8	1.5	1.2	3.6	11	13	2.8	7.0	9.8	3.6
27	6.2	e2.4	e1.8	1.3	1.2	3.3	11	11	2.8	6.8	8.4	3.6
28	5.4	2.6	e1.8	e0.95	1.1	4.3	9.1	9.9	2.9	6.4	7.3	3.3
29	5.2	2.6	e1.7	e1.2	1.1	4.5	7.5	9.4	2.7	5.7	6.5	3.3
30	5.0	2.5	e1.6	1.2	---	5.4	6.6	9.2	2.4	5.0	5.8	3.4
31	4.9	---	e1.5	1.1	---	6.5	---	9.3	---	4.5	5.2	---
TOTAL	189.4	98.4	58.8	51.45	29.39	66.65	187.2	369.6	170.8	148.6	152.6	121.1
MEAN	6.11	3.28	1.90	1.66	1.01	2.15	6.24	11.9	5.69	4.79	4.92	4.04
AC-FT	376	195	117	102	58	132	371	733	339	295	303	240
MAX	9.2	4.8	2.2	1.9	1.2	6.5	12	16	9.8	9.5	12	7.3
MIN	2.8	2.4	1.5	0.95	0.86	0.97	2.9	6.5	2.4	2.1	2.2	2.8

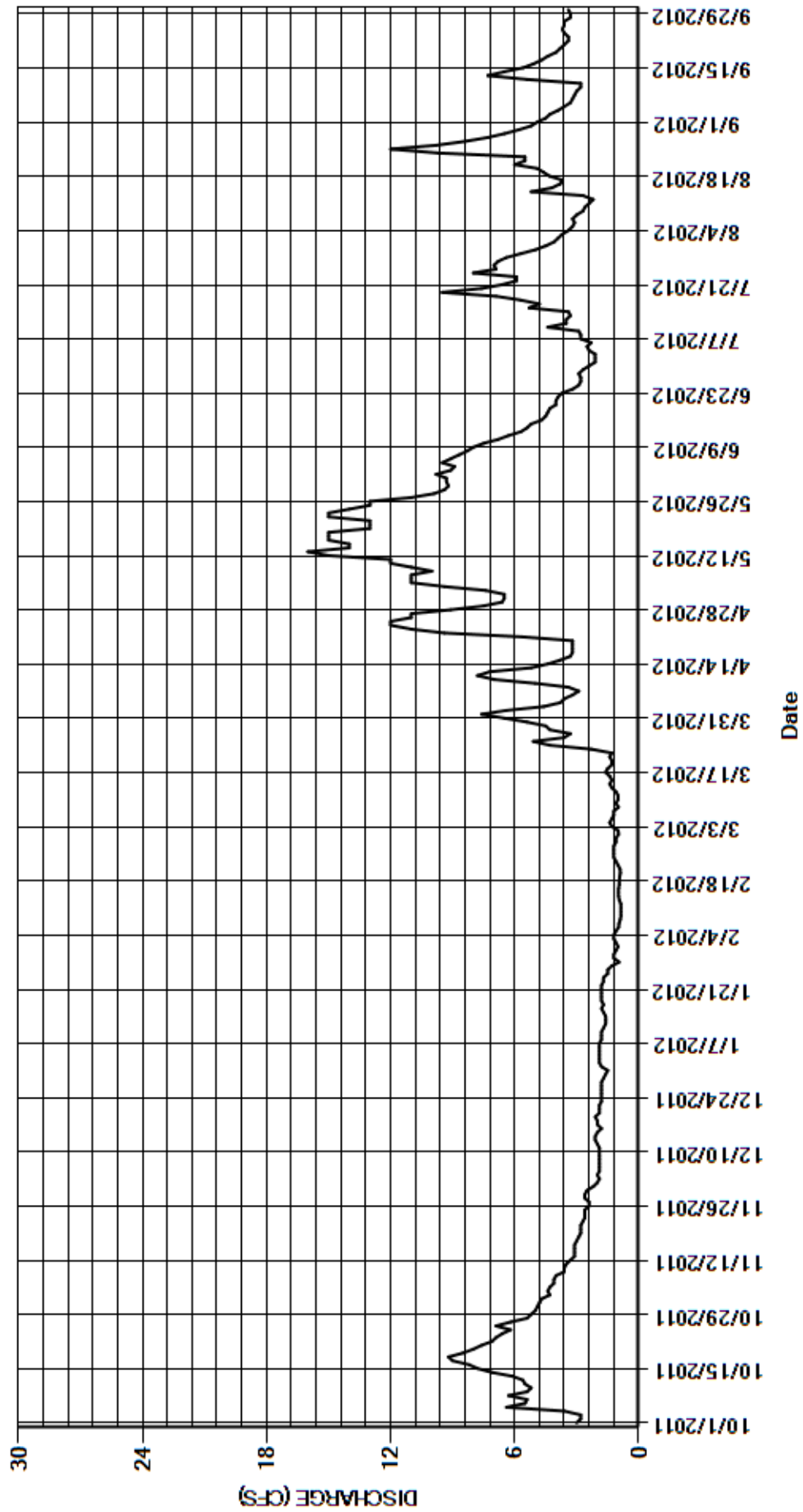
CAL YR	2011	TOTAL	1468.10	MEAN	5.34	MAX	36	MIN	1.5	AC-FT	2910
WTR YR	2012	TOTAL	1643.99	MEAN	4.49	MAX	16	MIN	0.86	AC-FT	3260

MAX DISCH: 19 CFS AT 20:30 ON MAY 12,2012 GH 1.76 FT SHIFT 0 FT

MAX GH: 1.78 FT AT 21:30 ON JAN 12,2012 (backwater from ice)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

DEADMAN CREEK AT MOUTH OF CANYON NEAR CRESTONE, CO
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
DEADMAN CREEK NEAR CRESTONE

Water Year 2012

Location.-- Lat 37°53'5", long 105°38'47" referenced to North American Datum of 1983 (Crestone, CO quad, scale 1:24,000), UTM Zone 13 443160 E and 4193222 N, in NE ¼ SE ¼ sec. 3, T.1 S., R.1 E., Baca Survey, Saguache County, CO, Hydrologic Unit 13010003, on left bank 8 mi southeast of Crestone, CO and 20.5 mi northeast of Mosca, CO.

Drainage Area and Period of Record.-- 8.4 mi²; May 1936 - November 1936, and October 1998 to current year. 1936 record not equivalent.

Equipment.-- Data collection platform (Sutron Satlink2) and a float-operated SDR in a 2-foot steel culvert pipe stilling well with a small steel box-type shelter atop of well until April 18, 2011, when DCP was removed leaving the SDR to log the water-stage. The well is connected to a non-standard 6-foot Parshall Flume in fair condition. Gage-height set from outside staff gage in the non-standard 6-foot Parshall Flume.

Hydrologic Conditions.-- Predominantly undeveloped steep alpine and sub-alpine terrain with extensive losses as stream traverses sandy valley margins.

Gage-Height Record.-- Primary record is 15-minute SDR log with DCP log as backup. Record is complete and reliable, except for Nov 3 - Mar 22 when station was closed; and Mar 23, 24; Jun 25-30; Jul 1-9; and Aug 8-13, when gage was isolated from flume for all or part of each day. One unit value was estimated from adjacent good record on Jun 12 because of a spike in logged data without loss of accuracy. A -0.03 ft correction was applied from Oct 5 to Oct 11 because branches in flume were disturbing gage height, a -0.01 ft correction was applied May 4 and prorated back to the previous visit, and a +0.13 ft correction was applied from May 4 to Jun 12 because float tape jumped splines when shelter was closed. Gage isolates at approximately 0.07 ft.

Datum Corrections.-- A formal inspection with levels was not performed this year. The Parshall flume was last inspected and levels were shot on Aug. 5, 2008.

Rating.-- Rating No. 1, a standard six foot Parshall flume rating, was used all year. Minor shifting occurs due to non-standard flume dimensions, approach velocity, and approach angle. Twelve discharge measurements, ten measurements greater than 0 cfs, (Nos. 69-80) were made during the water year because of limited access to the station. The measured discharges ranged from 0 to 4.58 cfs. The measurements cover the discharge range experienced except for higher daily flows on Apr 1, 11, 12, 22-29; May 4-31; Jun 1-7; Jul 19; and Aug 24-27. The peak flow of 14.5 cfs occurred at 2115 on May 12, 2012 at a gage height of 0.73 feet with a shift of 0.00 feet. It exceeded high Measurement No. 73 (GH = 0.36 ft), made May 4, 2012, by 0.37 feet in stage.

Discharge.-- Shifting-control method was used to compute discharge for all periods of good record. Shifts were applied as defined by measurements and distributed by time. Measurement shifts ranged from -0.01 to +0.02 feet. All were given full weight and applied except for No. 73, which was adjusted -2.8% back to the rating to smooth shift distribution. There was no flow Dec. 1, 3, 5-11, 16, 20-29, 31; Jan 1-31; Feb 1-29; and Mar 1-22 (103 days). One +0.03 ft cleaning correction was identified Oct 11 and held back to Oct 5 when it appears branches deposited in the flume.

Special Computations.-- Discharge for periods of no gage-height was estimated using site observations, temperature record from SANDUNCO and hydrographic comparison with Deadman Creek at Mouth of Canyon.

Remarks.-- Record is fair, except for periods of no gage-height, including periods when the well was isolated, May 4 - Jun 12 when float tape was off splines, and flows below 2.6 cfs, which are poor. The peak should also be considered poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.-- Inlets should be reworked to lower the point of isolation and inside reference point and drop tape should be established.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

DEADMAN CREEK NEAR CRESTONE

RATING TABLE-- DEDCRECO01 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

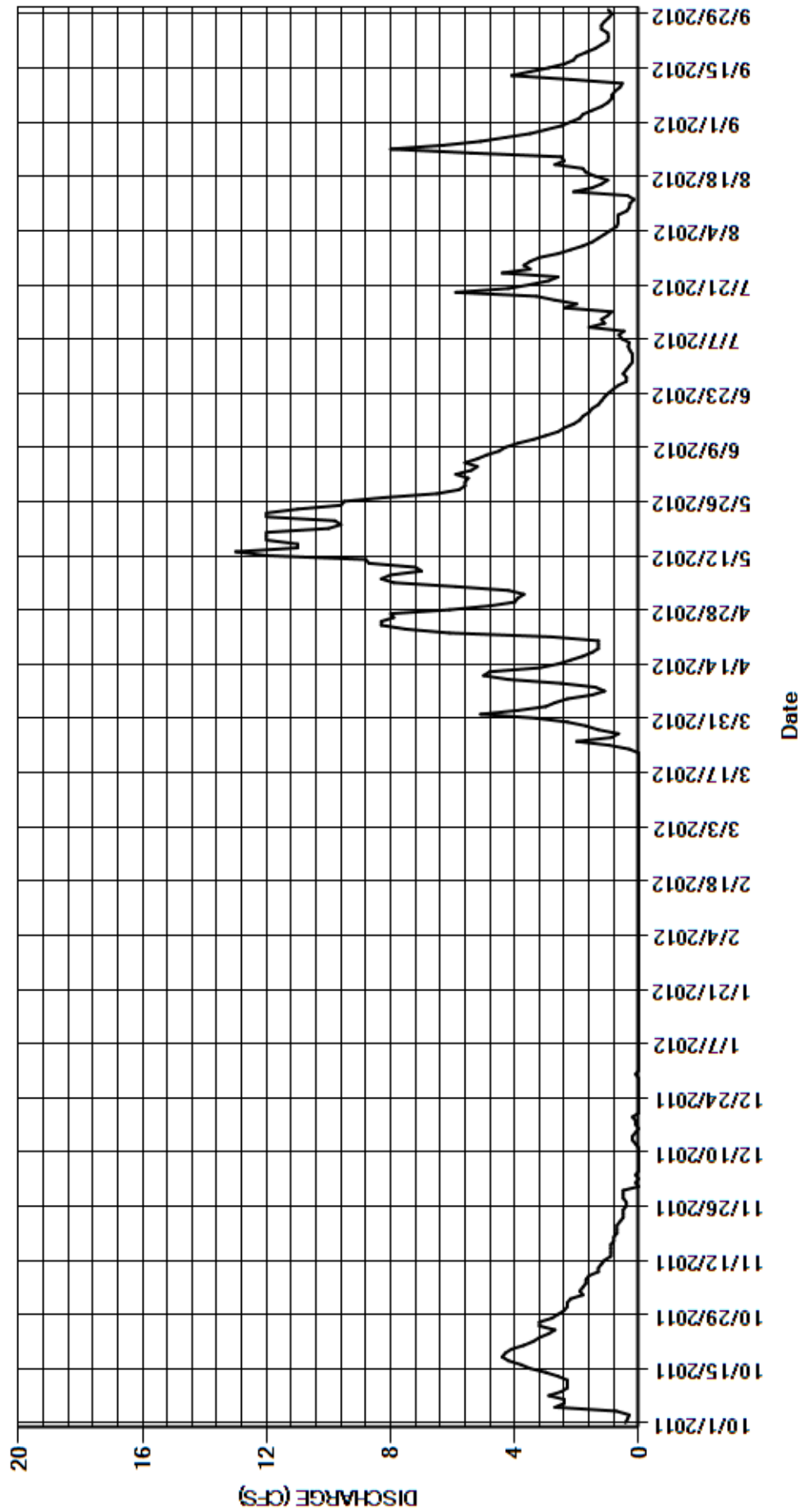
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.43	2.3	e0.00	e0.00	e0.00	e0.00	5.1	3.9	5.5	e0.20	1.5	2.2
2	0.36	2.2	e0.10	e0.00	e0.00	e0.00	3.9	3.7	5.9	e0.20	1.3	1.9
3	0.30	e1.8	e0.00	e0.00	e0.00	e0.00	3.0	4.2	5.4	e0.20	1.1	1.8
4	0.72	e1.9	e0.10	e0.00	e0.00	e0.00	2.7	5.9	5.2	e0.28	0.91	1.5
5	2.7	e1.8	e0.00	e0.00	e0.00	e0.00	2.3	7.9	5.6	e0.34	0.71	1.2
6	2.4	e1.7	e0.00	e0.00	e0.00	e0.00	1.5	8.3	5.2	e0.30	0.66	1.0
7	2.4	e1.7	e0.00	e0.00	e0.00	e0.00	1.1	8.0	4.9	e0.54	0.66	0.88
8	2.9	e1.6	e0.00	e0.00	e0.00	e0.00	1.4	7.0	4.5	e0.64	e0.66	0.86
9	2.5	e1.3	e0.00	e0.00	e0.00	e0.00	2.5	7.2	4.3	e0.47	e0.39	0.76
10	2.3	e1.3	e0.00	e0.00	e0.00	e0.00	4.2	8.7	3.9	1.6	e0.30	0.60
11	2.3	e1.2	e0.00	e0.00	e0.00	e0.00	5.0	8.8	3.4	1.1	e0.28	0.53
12	2.3	e1.1	e0.10	e0.00	e0.00	e0.00	4.8	12	3.0	1.2	e0.15	2.2
13	2.6	e0.90	e0.20	e0.00	e0.00	e0.00	3.2	13	2.6	1.0	e0.36	4.1
14	3.0	e0.90	e0.20	e0.00	e0.00	e0.00	2.6	11	2.4	0.87	2.1	3.5
15	3.5	e0.90	e0.10	e0.00	e0.00	e0.00	2.2	11	2.1	2.4	1.5	2.9
16	3.8	e0.90	e0.00	e0.00	e0.00	e0.00	1.8	12	1.9	2.0	1.2	2.4
17	4.2	e0.80	e0.10	e0.00	e0.00	e0.00	1.5	12	1.8	2.7	1.0	2.1
18	4.4	e0.80	e0.10	e0.00	e0.00	e0.00	1.3	12	1.6	3.3	1.4	2.0
19	4.3	e0.70	e0.20	e0.00	e0.00	e0.00	1.3	10	1.5	5.9	1.7	1.7
20	4.1	e0.70	e0.00	e0.00	e0.00	e0.00	1.3	9.6	1.3	4.2	1.8	1.4
21	3.7	e0.70	e0.00	e0.00	e0.00	e0.00	2.8	9.8	1.2	3.5	2.7	1.2
22	3.4	e0.60	e0.00	e0.00	e0.00	e0.00	6.1	12	1.1	2.9	2.4	1.0
23	3.2	e0.50	e0.00	e0.00	e0.00	e0.30	7.5	12	0.97	2.6	2.5	0.98
24	2.9	e0.50	e0.00	e0.00	e0.00	e0.95	8.3	11	0.82	4.4	5.4	1.0
25	2.7	e0.50	e0.00	e0.00	e0.00	2.0	8.3	9.6	e0.65	3.5	8.0	1.2
26	3.2	e0.40	e0.00	e0.00	e0.00	0.89	7.9	9.5	e0.40	3.7	6.3	1.2
27	3.2	e0.40	e0.00	e0.00	e0.00	0.65	8.0	8.2	e0.39	3.5	5.1	1.1
28	2.8	e0.50	e0.00	e0.00	e0.00	1.3	6.1	6.5	e0.50	3.2	4.3	0.96
29	2.6	e0.50	e0.00	e0.00	e0.00	1.7	4.8	5.8	e0.40	2.6	3.5	0.86
30	2.4	e0.50	e0.10	e0.00	---	2.3	4.0	5.6	e0.30	2.2	3.0	0.98
31	2.3	---	e0.00	e0.00	---	3.3	---	5.6	---	1.8	2.5	---
TOTAL	83.91	31.60	1.30	0.00	0.00	13.39	116.5	271.8	78.73	63.34	65.38	46.01
MEAN	2.71	1.05	0.042	0.000	0.000	0.43	3.88	8.77	2.62	2.04	2.11	1.53
AC-FT	166	63	2.6	0	0	27	231	539	156	126	130	91
MAX	4.4	2.3	0.20	0.00	0.00	3.3	8.3	13	5.9	5.9	8.0	4.1
MIN	0.30	0.40	0.00	0.00	0.00	0.00	1.1	3.7	0.30	0.20	0.15	0.53

CAL YR	2011	TOTAL	703.03	MEAN	1.93	MAX	25	MIN	0.00	AC-FT	1390
WTR YR	2012	TOTAL	771.96	MEAN	2.11	MAX	13	MIN	0.00	AC-FT	1530

MAX DISCH: 14.5 CFS AT 21:15 ON MAY 12,2012 GH 0.73 FT SHIFT 0 FT
 MAX GH: 0.73 FT AT 21:15 ON MAY 12,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

DEADMAN CREEK NEAR CRESTONE
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
LITTLE SPRING CREEK AT MEDANO RANCH NEAR MOSCA, CO

Water Year 2012

Location.-- Lat 37°42'46", long 105°39'1" referenced to North American Datum of 1983 (Medano Ranch, CO quad, scale 1:24,000), UTM Zone 13 442697 E and 4174153 N, in NE ¼ SW ¼ sec. 15, T.40 N., R.12 E., New Mexico Principal Meridian, Alamosa County, CO, Hydrologic Unit 13010003, on left bank 5 mi northeast of San Luis Lakes and 13 mi northeast of Mosca, CO.

Drainage Area and Period of Record.-- 0.2 mi². ; WY 2000 to current year.

Equipment.-- Float-operated Sutron SDR with SDI-12 radio bridge in a 30 inch diameter pipe stilling well and CMP extension for gage shelter at a two foot Parshall flume. The gage-height data is transmitted via radio bridge to data collection platform (Sutron Satlink2) at Big Spring Creek at Medano Ranch near Mosca. The primary reference gage is a staff gage in the 2 foot Parshall flume.

Hydrologic Conditions.-- Flow primarily due to groundwater accretions.

Gage-Height Record.-- Primary record is 15-minute transmitted data with SDR and DCP log as backup. Record is complete and reliable except for Dec 2 - Mar 7 when the well was frozen. The stage-discharge relation was affected by ice Dec 1. There were four corrections made to the shaft encoder of -0.01 ft, -0.04 ft, -0.02 ft, and -0.01 ft on Oct 6, Mar 26, Apr 18, and May 29, respectively, which were prorated by time from the previous visits.

Datum Corrections.-- A formal inspection with levels was not performed this year. The last Parshall flume inspection and levels were completed on Jul 3, 2008, with an assumed elevation of 0.000 at the flume floor adjacent to the staff gage (REW). Levels indicate that the flume floor slopes approximately 2% with the floor at the staff gage (REW) found to be 0.076 ft lower than the well inlet (LEW). The flume also slopes slightly downward toward diverging section. Inspection included measurement of all pertinent Parshall Flume dimensions.

Rating.-- A standard two-foot Parshall flume rating was used all year. Sand and moss build-up in approach and inside the flume requires occasional cleaning. Sixteen measurements (Nos. 141-156) were made this year ranging in discharge from 1.15 to 1.83 cfs. They cover the discharge range experienced except for lower daily flows on Aug 9, 12, 13, 16, 19, and the higher daily flows Mar 27-31, Apr 1-4, and May 8. The peak flow of 3.44 cfs occurred at 0200 on Jul 7 at a gage height of 0.57 ft with a shift of +0.01 ft. It exceeded high flow measurement No. 148 (gh = 0.39 ft) by 0.18 ft in stage. The peak occurred as a result of a rainfall event.

Discharge.-- Shifting control method was used to compute discharge during all periods of gage-height record. Shifts were applied as defined by measurements and distributed by time. Measurement shifts ranged from -0.03 ft to +0.01 ft; applied shifts ranged from -0.01 ft to 0.01 ft. All were given full weight except for Nos. 141-144, 147, and 156, which were adjusted by as much as 7.8% to smooth shift distribution. Discharge was estimated Dec 1 when the stage-discharge relation was affected by ice and Dec 2 - Mar 7 when float was frozen.

Special Computations.-- Discharge for periods of no gage-height and ice affected record was estimated using discharge measurements, hydrographic comparison with nearby station Big Spring Creek at Medano Ranch, and weather records.

Remarks.-- Record is good, except for estimated periods, which are poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.-- Move staff gage to same side of flume as inlet.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

LITTLE SPRING CREEK AT MEDANO RANCH NEAR MOSCA, CO

RATING TABLE-- STD02FTPF USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

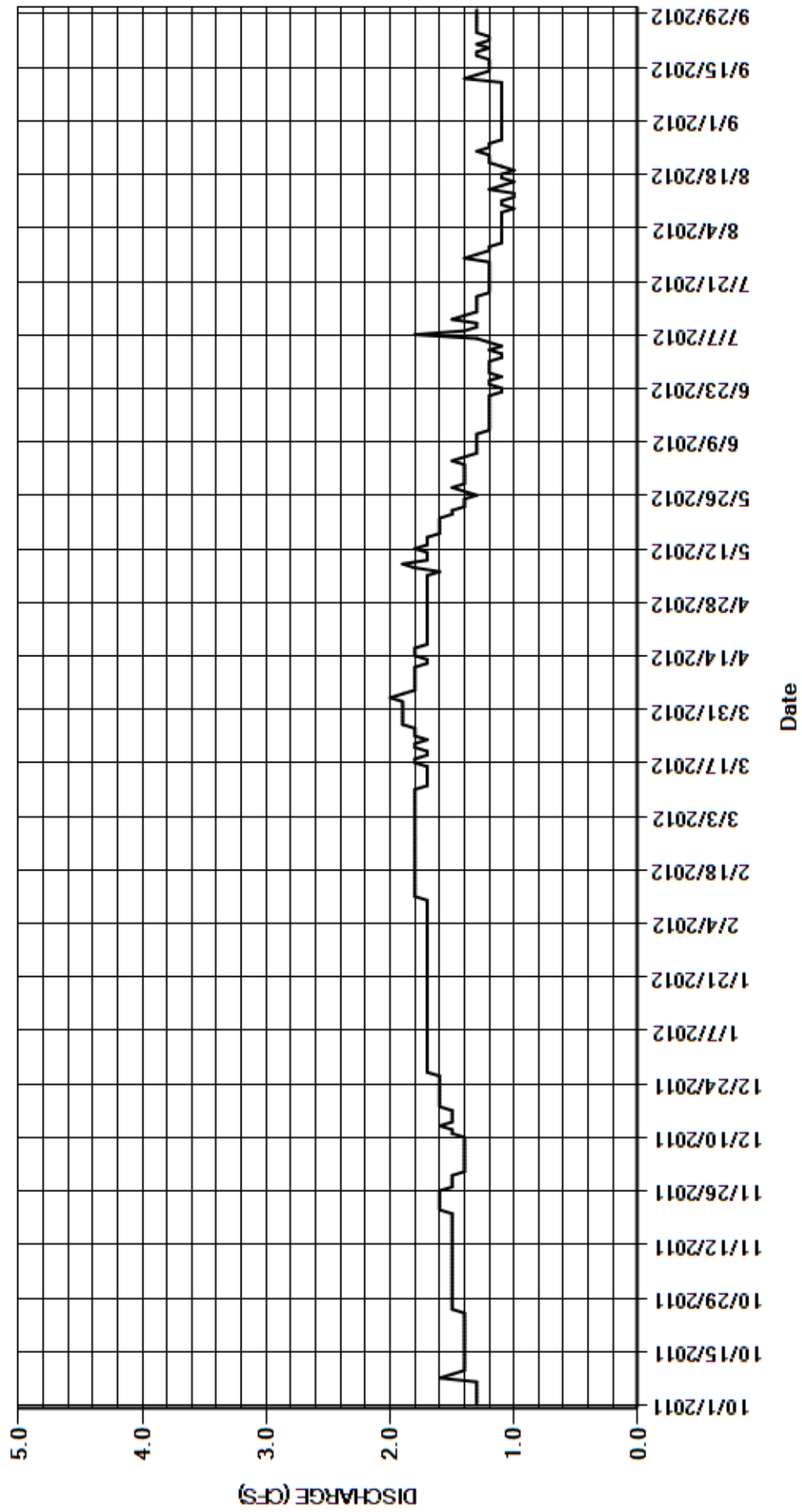
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.3	1.5	e1.4	e1.7	e1.7	e1.8	1.9	1.7	1.4	1.1	1.1	1.1
2	1.3	1.5	e1.4	e1.7	e1.7	e1.8	1.9	1.7	1.4	1.1	1.1	1.1
3	1.3	1.5	e1.4	e1.7	e1.7	e1.8	2.0	1.7	1.4	1.2	1.1	1.1
4	1.3	1.5	e1.4	e1.7	e1.7	e1.8	1.9	1.7	1.5	1.1	1.1	1.1
5	1.3	1.5	e1.4	e1.7	e1.7	e1.8	1.8	1.7	1.4	1.2	1.1	1.1
6	1.3	1.5	e1.4	e1.7	e1.7	e1.8	1.8	1.6	1.3	1.3	1.1	1.1
7	1.3	1.5	e1.4	e1.7	e1.7	e1.8	1.8	1.8	1.3	1.8	1.1	1.1
8	1.6	1.5	e1.4	e1.7	e1.7	1.8	1.8	1.9	1.3	1.4	1.1	1.1
9	1.5	1.5	e1.4	e1.7	e1.7	1.8	1.8	1.7	1.3	1.3	1.0	1.1
10	1.4	1.5	e1.4	e1.7	e1.7	1.8	1.8	1.7	1.3	1.3	1.1	1.1
11	1.4	1.5	e1.5	e1.7	e1.8	1.7	1.8	1.7	1.3	1.5	1.1	1.1
12	1.4	1.5	e1.5	e1.7	e1.8	1.7	1.7	1.8	1.2	1.4	1.0	1.4
13	1.4	1.5	e1.6	e1.7	e1.8	1.7	1.7	1.7	1.2	1.3	1.0	1.3
14	1.4	1.5	e1.5	e1.7	e1.8	1.7	1.8	1.7	1.2	1.3	1.2	1.2
15	1.4	1.5	e1.5	e1.7	e1.8	1.7	1.8	1.7	1.2	1.3	1.1	1.2
16	1.4	1.5	e1.5	e1.7	e1.8	1.7	1.8	1.6	1.2	1.3	1.0	1.2
17	1.4	1.5	e1.5	e1.7	e1.8	1.8	1.7	1.6	1.2	1.3	1.1	1.2
18	1.4	1.5	e1.6	e1.7	e1.8	1.8	1.7	1.6	1.2	1.2	1.1	1.3
19	1.4	1.5	e1.6	e1.7	e1.8	1.7	1.7	1.6	1.2	1.2	1.0	1.3
20	1.4	1.5	e1.6	e1.7	e1.8	1.7	1.7	1.6	1.2	1.2	1.1	1.2
21	1.4	1.6	e1.6	e1.7	e1.8	1.8	1.7	1.5	1.2	1.2	1.2	1.3
22	1.4	1.6	e1.6	e1.7	e1.8	1.8	1.7	1.5	1.1	1.2	1.2	1.2
23	1.4	1.6	e1.6	e1.7	e1.8	1.7	1.7	1.4	1.1	1.2	1.2	1.2
24	1.4	1.6	e1.6	e1.7	e1.8	1.8	1.7	1.4	1.2	1.2	1.3	1.3
25	1.4	1.6	e1.6	e1.7	e1.8	1.8	1.7	1.4	1.2	1.2	1.2	1.3
26	1.5	1.6	e1.6	e1.7	e1.8	1.8	1.7	1.3	1.1	1.2	1.2	1.3
27	1.5	1.5	e1.7	e1.7	e1.8	1.9	1.7	1.4	1.2	1.4	1.1	1.3
28	1.5	1.5	e1.7	e1.7	e1.8	1.9	1.7	1.5	1.2	1.3	1.1	1.3
29	1.5	1.5	e1.7	e1.7	e1.8	1.9	1.7	1.4	1.2	1.2	1.1	1.3
30	1.5	1.5	e1.7	e1.7	---	1.9	1.7	1.4	1.2	1.2	1.1	1.3
31	1.5	---	e1.7	e1.7	---	1.9	---	1.4	---	1.1	1.1	---
TOTAL	43.6	45.6	47.5	52.7	51.2	55.4	52.9	49.4	37.4	39.2	34.4	36.2
MEAN	1.41	1.52	1.53	1.70	1.77	1.79	1.76	1.59	1.25	1.26	1.11	1.21
AC-FT	86	90	94	105	102	110	105	98	74	78	68	72
MAX	1.6	1.6	1.7	1.7	1.8	1.9	2.0	1.9	1.5	1.8	1.3	1.4
MIN	1.3	1.5	1.4	1.7	1.7	1.7	1.7	1.3	1.1	1.1	1.0	1.1

CAL YR	2011	TOTAL	551.7	MEAN	1.51	MAX	1.9	MIN	1.1	AC-FT	1090
WTR YR	2012	TOTAL	545.5	MEAN	1.49	MAX	2.0	MIN	1.0	AC-FT	1080

MAX DISCH: 3.44 CFS AT 02:00 ON JUL 07,2012 GH 0.57 FT SHIFT 0.01 FT
 MAX GH: 0.60 FT AT 08:45 ON DEC 05,2011 (backwater from ice)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

LITTLE SPRING CREEK AT MEDANO RANCH NEAR MOSCA, CO
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
BIG SPRING CREEK AT MEDANO RANCH NEAR MOSCA

Water Year 2012

Location.--	Lat 37° 44' 4", long 105° 39' 49" referenced to North American Datum of 1983 (Medano Ranch, CO quad, scale 1:24,000), UTM Zone 13 441521 E and 4176551 N, in NW ¼ NE ¼ sec. 9, T.40 N., R.12 E., New Mexico Principal Meridian, Alamosa County, CO, Hydrologic Unit 13010003, on left bank ¼ mi above Los Ojos Diversion.
Drainage Area and Period of Record.--	0.3 mi ² ; 2000 to current year.
Equipment.--	Data collection platform (Sutron SatLink2), and a float-operated shaft encoder in a 30-inch diameter pipe well and CMP extension gage shelter until February 2012. The flume was modified to act as a vertical, suppressed, rectangular, submerged orifice over several days during Feb 2012. The dimensions of the orifice are 3.68 ft W by 0.55 ft H and the top crest of the orifice plate is 2.31 ft. There are two primary reference gages, one is a staff gage at LEW upstream of orifice the other is on LEW below orifice. No auxiliary gage. Gage height for Ha and Hb collected by dual orifice constant flow bubbler with satellite telemetry.
Hydrologic Conditions.--	Flow primarily due to groundwater accretions.
Gage-Height Record.--	Primary record is 15-minute transmitted data with DCP log as backup. Record is complete and reliable except for Dec 4 – Feb 24, when ice in well was affecting float movement. One 15-minute value was corrected on Mar 7 while instrumentation was worked on. Stage-discharge relation was affected by ice Dec 1, 2; Feb 25, 26; Mar 3, 4, and 9. One shaft encoder correction of -0.01 ft prior to Parshall flume being converted to a submerged orifice was prorated back to previous visit. Corrections to the dual orifice pressure transducer data were analyzed and applied as needed: some corrections were offsetting, some were prorated to previous visits, some were prorated forward to the next visit. Mean gage height record after Feb 24 is the result of subtracting recorded gage height (Hb) from the upstream recorded gage height (Ha). Hb unit values were evaluated against the physical dimensions of the submerged orifice plate and it was determined there were no periods when the orifice was not fully submerged. The top crest of the orifice plate was overtopped (Ha > 2.31 ft) Jul 11 from 18:00 to 21:30.
Datum Corrections.--	Levels have not been run at this gage.
Rating.--	The rating (BIGSPGCO03) first used May 19, 2010 was used from the Oct 1, 2011 to Feb 24, 2012. Eight discharge measurements (Nos. 133-140) were made during the period prior to the installation of submerged orifice, and ranged in discharge from 5.93 to 6.94 cfs. They cover the discharge range experienced while (BIGSPGCO03) was in use. Rating BIGSPGCO05-1, developed from measurements 141–150, was first used Feb 24, 2012 and used for the remainder of the water year. Rating 5-1 was developed to relate the head difference above and below the orifice to the flow through the orifice. Since site conditions preclude meeting the requirements for a standard submerged orifice coefficient, the coefficients calculated from 10 measurements (141-150) were analyzed to determine the best-fit relationship between head difference and the orifice coefficient. The coefficient varies with the head difference and the best fit equation developed was $C[h]=9.3891 \times h^{-(0.228)}$. This coefficient is then used in the simplified submerged orifice equation $Q = C[h] \times h^{(1/2)}$. This rating is only valid when the orifice is submerged and for the portion of the flow going through the orifice when the plate is overtopped. The orifice is not submerged when downstream head measurement Hb is at or below 0.55 ft (the top of the orifice). When flow overtops the orifice plate additional flow is added to the computed flow as calculated from the Francis equation for the standard suppressed rectangular weir $Q = 3.33 \times L \times (Ha - 2.31)^{(3/2)}$ (USBR water measurement manual equation 7-5) where L = 3.68 ft and the top of the orifice plate sits at 2.31 ft. Twelve discharge measurements (Nos. 141 -152) were made after the installation of the submerged orifice ranging in discharge from 5.51 to 7.40 cfs. They cover the discharge range experienced while (BIGSPGCO05-1) was in use. The peak flow of 9.68 cfs occurred at 1930 on Jul 11 at an upstream gage height (Ha) of 2.47 ft (Ha - Hb = 0.82 ft) with a shift of 0 ft. The maximum Ha gage-height of 2.47 ft occurred at 1930 Jul 11.
Discharge.--	Shifting control method was used to compute discharge for all periods of reliable gage-height record. Shifting is caused by continuously changing sand deposition in, above, and below the control structure. Shifts were applied as defined by measurements and distributed by time. Open-water measurement shifts ranged from 0.02 ft to 0.22 ft; applied shifts ranged from 0.02 ft to 0.12 ft during the period before the flume was converted to a submerged orifice. After the flume was converted to a submerged orifice open-water measurement shifts ranged from -0.05 ft to 0.06 ft; applied shifts ranged from -0.02 ft to 0.04 ft. Open water measurements prior to flume being converted to a submerged orifice were given full weight except for nos. 133 and 135 which were adjusted as much as 8.1 percent to smooth the shift trend. All open water measurements after the flume was converted to a submerged orifice were given full weight except for nos. 141, 142, 144-146, 150, and 152 which were adjusted as much as 4.95 percent to smooth the shift trend. Discharge for Jul 11 when flow overtopped orifice plate, including the peak, was computed as the sum of the submerged orifice flow (for Ha - Hb) and the Francis equation weir flow (for Ha - 2.31 ft). Discharge was estimated Dec 1, 2; Feb 25, 26; Mar 3, 4, and 9 when the stage-discharge relation was affected by ice and Dec 4 - Feb 24 when the well was frozen.
Special Computations.--	Discharge for periods of no gage-height and ice affected record was estimated using measurements, weather records, and hydrographic comparison with nearby station Little Spring Creek at Medano Ranch. Discharge for Jul 11 including the peak discharge was computed as the sum of the submerged orifice flow (for Ha - Hb) and the Francis equation weir flow (for Ha - 2.31 ft). ^Å

Remarks.--

Record is good except for estimated periods, which are poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.--

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

BIG SPRING CREEK AT MEDANO RANCH NEAR MOSCA

RATING TABLE.-- BIGSPGCO03 USED FROM 01-OCT-2011 TO 24-FEB-2012
 BIGSPGCO05-1 USED FROM 24-FEB-2012 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.9	5.9	e6.1	e6.1	e6.3	6.5	6.8	6.6	6.0	5.6	5.6	5.9
2	5.9	6.0	e6.1	e6.2	e6.3	6.5	6.8	6.6	6.1	5.7	5.7	5.9
3	5.9	6.0	6.1	e6.2	e6.2	e6.5	7.1	6.6	6.1	5.8	5.7	5.9
4	6.0	6.0	e6.1	e6.2	e6.2	e6.5	7.0	6.6	6.1	5.8	5.7	5.9
5	6.1	6.1	e6.1	e6.2	e6.2	6.5	6.9	6.6	6.1	6.0	5.6	5.9
6	5.9	6.1	e6.1	e6.3	e6.3	6.5	6.8	6.6	5.9	6.0	5.6	5.9
7	6.0	6.1	e6.0	e6.3	e6.3	6.5	6.9	6.9	5.9	6.5	5.7	5.8
8	6.5	6.1	e6.0	e6.3	e6.2	6.5	6.8	7.1	5.9	5.9	5.8	5.8
9	6.2	6.1	e6.0	e6.2	e6.3	e6.6	6.9	6.7	5.8	5.9	5.5	5.9
10	6.1	6.1	e6.0	e6.2	e6.2	6.5	6.9	6.7	5.8	5.9	5.5	5.9
11	5.9	6.2	e6.0	e6.1	e6.2	6.5	7.0	6.7	5.9	6.8	5.6	6.0
12	5.9	6.2	e6.0	e6.0	e6.3	6.5	6.8	7.0	5.8	6.8	5.6	6.5
13	5.9	6.2	e6.0	e6.0	e6.3	6.5	6.9	6.7	5.9	6.1	5.6	6.3
14	5.9	6.2	e6.0	e6.1	e6.3	6.4	6.9	6.6	5.8	6.1	5.9	6.0
15	5.9	6.2	e6.0	e6.2	e6.3	6.5	7.0	6.6	5.8	6.0	5.6	6.0
16	5.9	6.2	e6.0	e6.3	e6.2	6.4	6.9	6.5	5.8	6.2	5.5	5.9
17	5.9	6.2	e6.0	e6.2	e6.2	6.5	6.9	6.4	5.8	6.3	5.9	5.9
18	5.9	6.3	e6.0	e6.3	e6.2	6.4	6.8	6.4	5.7	6.1	5.8	6.0
19	5.9	6.3	e6.0	e6.3	e6.3	6.5	6.8	6.4	5.7	6.1	5.5	6.0
20	5.9	6.3	e6.0	e6.4	e6.3	6.5	6.8	6.4	5.7	5.9	5.6	5.9
21	5.9	6.3	e6.0	e6.4	e6.3	6.5	6.8	6.3	5.7	5.8	5.9	5.8
22	5.9	6.3	e6.1	e6.4	e6.4	6.5	6.8	6.2	5.6	5.8	5.9	5.8
23	5.9	6.3	e6.1	e6.3	e6.4	6.5	6.8	6.0	5.7	5.9	6.1	5.8
24	5.9	6.3	e6.1	e6.3	e6.3	6.5	6.7	6.0	5.6	5.9	6.1	5.9
25	5.9	6.4	e6.1	e6.3	e6.3	6.5	6.7	5.9	5.7	5.8	6.0	6.0
26	6.1	6.3	e6.1	e6.3	e6.3	6.4	6.7	5.7	5.6	5.9	5.9	6.0
27	6.0	6.2	e6.1	e6.3	6.3	6.5	6.9	5.8	5.7	6.6	5.9	6.0
28	5.9	6.2	e6.1	e6.3	6.4	6.6	6.7	6.0	5.8	5.9	6.0	6.0
29	5.9	6.2	e6.1	e6.3	6.5	6.6	6.7	6.0	5.7	5.8	5.9	6.0
30	5.9	6.2	e6.1	e6.3	---	6.7	6.7	6.0	5.7	5.7	5.9	5.9
31	6.0	---	e6.1	e6.3	---	6.7	---	6.0	---	5.6	5.9	---
TOTAL	184.8	185.5	187.6	193.6	182.3	201.8	205.2	198.6	174.4	186.2	178.5	178.5
MEAN	5.96	6.18	6.05	6.25	6.29	6.51	6.84	6.41	5.81	6.01	5.76	5.95
AC-FT	367	368	372	384	362	400	407	394	346	369	354	354
MAX	6.5	6.4	6.1	6.4	6.5	6.7	7.1	7.1	6.1	6.8	6.1	6.5
MIN	5.9	5.9	6.0	6.0	6.2	6.4	6.7	5.7	5.6	5.6	5.5	5.8

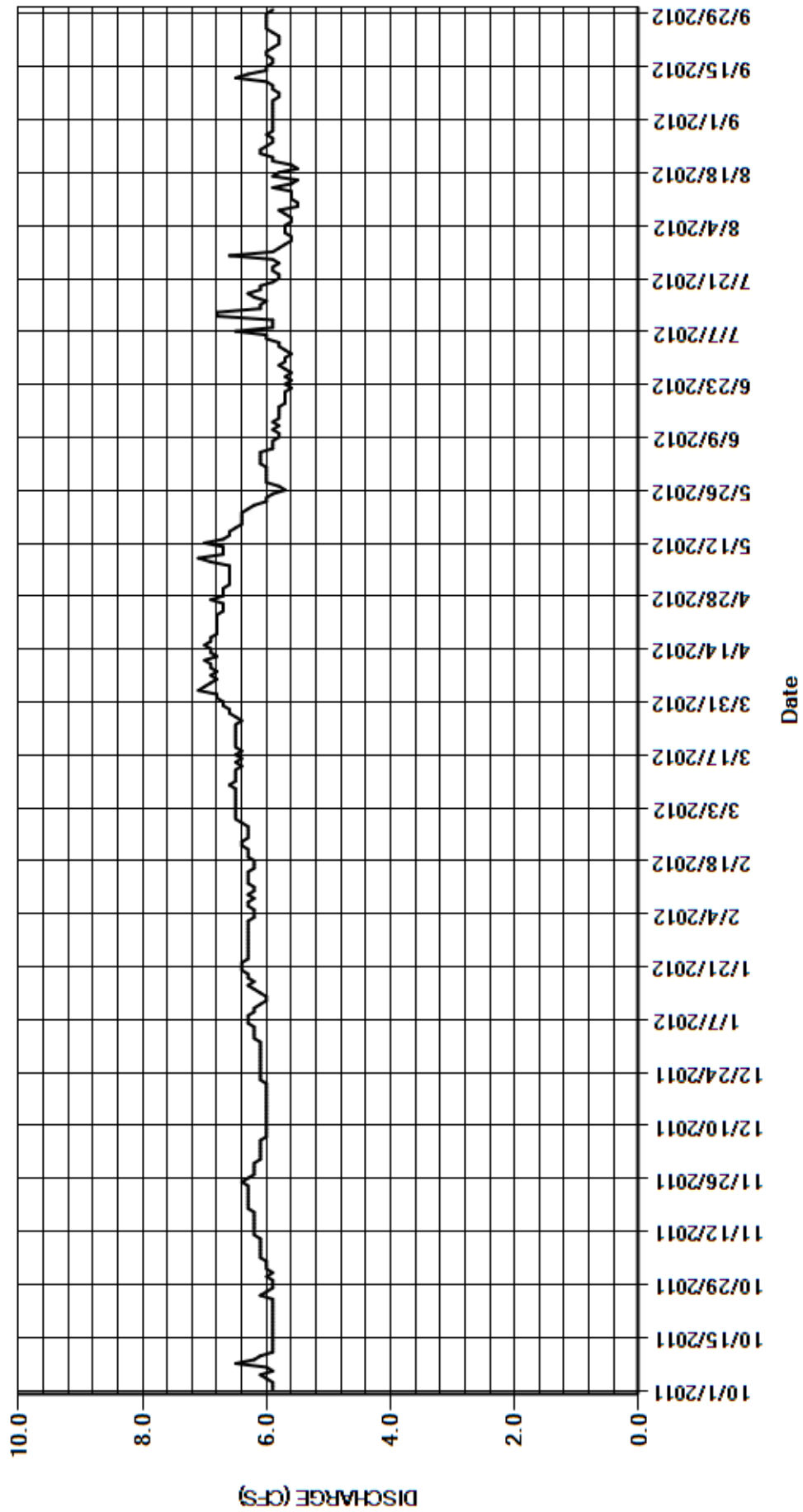
CAL YR	2011	TOTAL	2277.5	MEAN	6.24	MAX	7.7	MIN	5.1	AC-FT	4520
WTR YR	2012	TOTAL	2257.0	MEAN	6.17	MAX	7.1	MIN	5.5	AC-FT	4480

MAX DISCH: 9.68 CFS AT 19:30 ON JUL 11,2012 GH 0.82 FT SHIFT 0 FT (includes flow over orifice plate, Ha = 2.47 ft)

MAX GH: 2.47 FT AT 19:30 ON JUL 11,2012 (Ha gage height)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

**BIG SPRING CREEK AT MEDANO RANCH NEAR MOSCA
WY2012 HYDROGRAPH**



RIO GRANDE RIVER BASIN
08230500 CARNERO CREEK NEAR LA GARITA

Water Year 2012

Location.-- Lat 37° 51' 35", long 106° 19' 10" referenced to North American Datum of 1983 (Twin Mountains SE, CO quad, scale 1:24,000), UTM Zone 13 383929 E and 4191069 N, in SW ¼ NE ¼ sec. 28, T.42 N., R.6 E., New Mexico Principal Meridian, Saguache County, CO, Hydrologic Unit 13010004, on left bank 5.5 mi downstream from the North Fork and 4 mi northwest of La Garita, CO.

Drainage Area and Period of Record.-- 117 mi² (from topographic maps); 1919 to 1936 mostly partial years, 1936 to current year.

Equipment.-- A data collection platform (Sutron Satlink2), and a float-operated digital stage discharge recorder in a 42-inch diameter metal shelter and concrete well. The primary reference gage is a drop tape from reference point on shelf; a cantilever gage is the secondary reference. Chart recorder and shaft encoder removed on March 29, 2012 and replaced with stage discharge recorder.

Hydrologic Conditions.-- Gage is located in lower mountain valley meadows with small homes established in the area. There are some diversions above gage for irrigation of meadows used for grazing stock.

Gage-Height Record.-- Primary record is 15-minute transmitted data with DCP log and chart record as backup until Mar 29, then SDR log with DCP log as backup. Record is complete and reliable, except for estimated record on: Dec 3-6 when ice in well was affecting floats; Dec 7 to Mar 13 when station was closed for the winter, and Mar 14 when the inlets were closed. The stage-discharge relation was affected by ice Oct 28-31; Nov 1-30; Dec 1, 2; and Mar 15-21. One -0.02 ft trash correction on Jun 26 was prorated from Jun 5 as a corrected shift. There were no instrumentation corrections made to the shaft encoder during the year. One 15-minute unit value was filled Apr 25 while DCP was upgraded.

Datum Corrections.-- Levels were run to the reference point (RP) inside the gage and to the outside cantilever gage on Aug 14, 2012 using B.M. 1 as base. The RP was within allowable limits, so no correction was made. A two-peg test was ran on Aug 6, 2012, the instrument was within allowable limits and no adjustment was made.

Rating.-- Control is a concrete, broad-crested weir about 25 feet downstream from the gage. Stream banks affect flow at higher stages. Minor shifting occurs as a result of scour and fill in gage pool. Rating 16 in use since Oct 1, 2009 was used again this year. Rating 16 is well defined from 0.40 to 31 cfs, fairly well defined 32 to 161 cfs; and poorly defined outside those ranges. Seventeen discharge measurements (Nos. 185-201) were made during the water year ranging in discharge from 0.48 to 8.05 cfs. They covered the discharge range experienced except for the lower daily flow of Jun 26 and the higher flows on Mar 16-18, 24-31; Apr 1-2, 12; May 9, 10, 12, and 13. The peak flow of 24.8 cfs occurred at 1200 on Mar 25, 2012 at a gage height of 2.49 ft with a shift of 0.00 ft. It exceeded high Measurement No. 192 made on Mar 14, 2012 at a gage-height of 2.11 ft by 0.38 ft in stage.

Discharge.-- Shifting-control method was used to compute discharge for all periods of good record. A variable stage-shift relationship (CARLAGVS1201) was used from Oct 19 to Jun 5 and Jun 26 to the end of the water year. The -0.02 ft cleaning correction identified on Jun 26 was prorated by time back to the previous measurement on Jun 5 to simplify shift distribution with no change in computed discharge record as compared with adjusted shift curves. Shifts were distributed by time during the remaining period of good record. Measurement shifts ranged from -0.01 to +0.02 ft. All measurements were given full weight and applied except for Nos. 185, 193, 194, and 196-201, which were adjusted as much as 11% to smooth shift distribution. Record was estimated Oct 28-31; Nov 1-30; Dec 1-2; and Mar 15-21 because the stage-discharge relation was affected by ice; Dec 3-6 when float was froze; Dec 7 to Mar 13 when station was closed for the winter; and Mar 14 when the inlets were closed.

Special Computations.-- Discharge was estimated for periods of no gage-height and ice affected record using discharge measurements, hydrographic comparison with La Garita Creek near La Garita, and weather records.

Remarks.-- Record is fair, except for periods of no gage-height and ice-affected record, which are estimated and poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.--

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

08230500 CARNERO CREEK NEAR LA GARITA

RATING TABLE-- CARLAGCO16 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

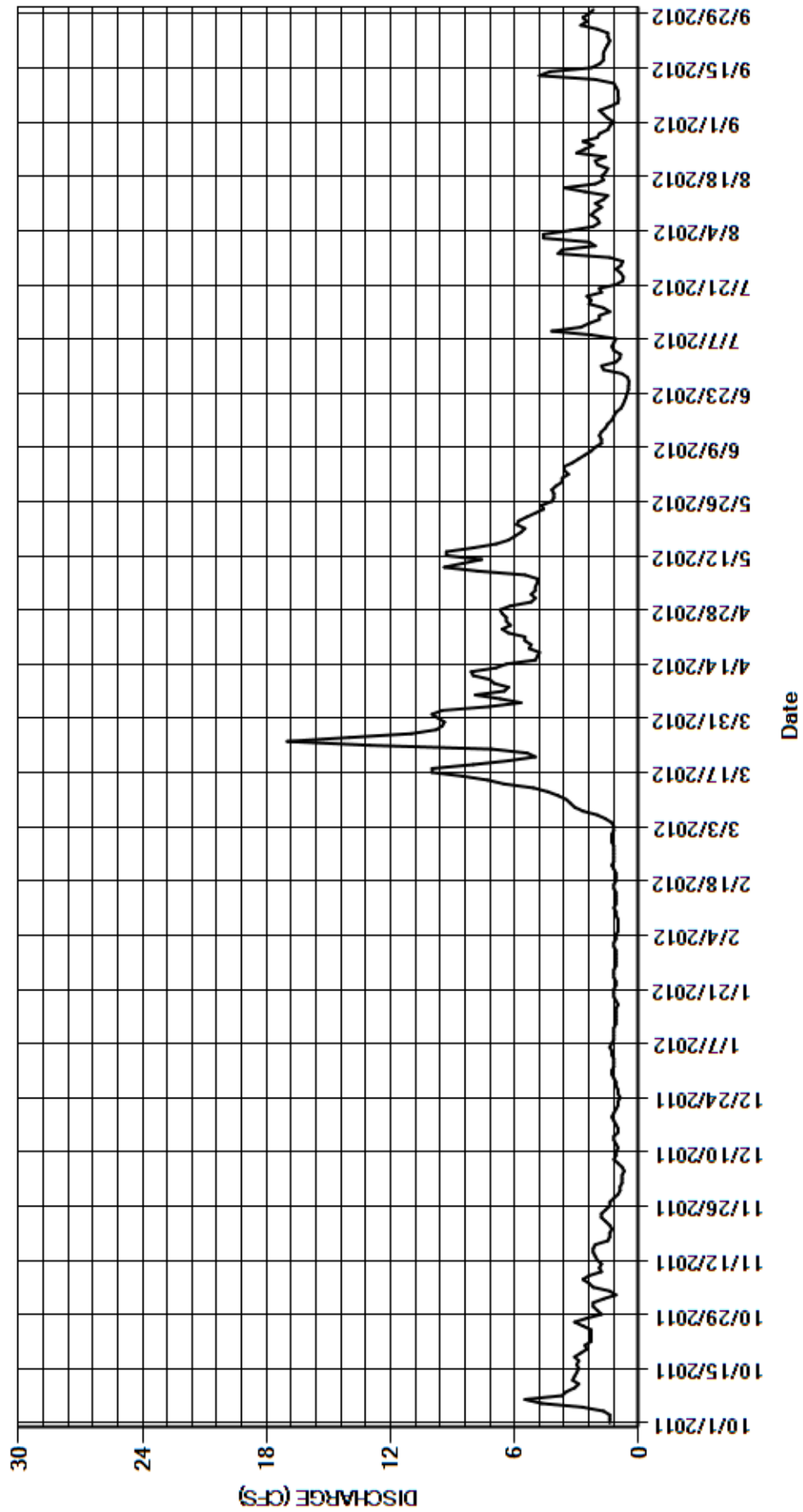
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.4	e2.2	e0.90	e1.2	e1.2	e1.3	10	5.0	3.7	1.1	2.4	1.2
2	1.4	e1.7	e0.80	e1.2	e1.2	e1.2	9.5	5.2	3.4	0.91	4.6	1.5
3	1.4	e1.1	e0.80	e1.2	e1.1	e1.2	7.2	5.0	3.6	0.88	4.6	1.7
4	1.7	e1.4	e0.80	e1.3	e1.1	e1.3	5.7	5.0	3.6	1.2	3.3	1.9
5	2.7	e2.2	e0.70	e1.3	e1.0	e1.6	6.7	4.9	3.2	1.3	2.2	1.4
6	4.7	e2.4	e0.80	e1.4	e1.0	e2.0	7.9	4.9	2.9	1.2	1.9	1.0
7	5.5	e2.7	e1.0	e1.3	e1.0	e2.7	6.5	5.5	2.6	1.1	2.0	0.98
8	3.7	e2.4	e1.2	e1.2	e1.0	e3.1	6.3	7.8	2.3	2.3	2.3	1.0
9	3.5	e1.8	e1.1	e1.2	e1.1	e3.3	7.0	9.4	2.1	4.2	2.1	1.0
10	3.1	e1.9	e1.1	e1.2	e1.1	e3.5	7.2	8.5	1.8	2.8	1.8	1.1
11	2.9	e1.8	e1.0	e1.2	e1.2	e3.9	8.0	7.6	1.8	2.4	2.1	1.2
12	3.2	e2.0	e1.1	e1.1	e1.1	e4.4	8.1	9.3	1.9	1.9	1.7	2.1
13	3.1	e2.1	e1.2	e1.1	e1.1	e5.1	6.9	9.3	1.8	1.9	1.5	4.8
14	3.0	e2.2	e1.2	e1.1	e1.1	e6.5	6.4	8.0	1.6	1.4	2.6	4.3
15	2.9	e2.2	e1.0	e1.1	e1.1	e7.3	5.0	6.9	1.5	1.7	3.6	2.3
16	3.0	e2.1	e1.0	e1.1	e1.2	e8.5	4.9	6.3	1.3	2.4	2.1	1.9
17	2.9	e1.5	e1.1	e1.0	e1.2	e10	4.8	6.0	1.2	2.3	1.7	1.7
18	3.1	e1.4	e1.2	e1.1	e1.1	e10	5.3	5.7	1.1	2.5	1.8	1.7
19	2.8	e1.4	e1.3	e1.2	e1.1	e8.0	5.2	5.5	0.87	1.8	1.6	1.7
20	2.5	e1.3	e1.2	e1.2	e1.1	e6.3	5.5	5.9	0.76	1.9	1.5	1.6
21	2.6	e1.4	e1.1	e1.2	e1.2	e5.0	5.5	5.8	0.68	1.1	2.0	1.5
22	2.3	e1.6	e1.0	e1.1	e1.3	5.4	6.3	5.4	0.61	0.77	2.1	1.4
23	2.3	e1.8	e1.0	e1.1	e1.2	7.1	6.6	5.0	0.55	0.74	1.6	1.5
24	2.3	e1.8	e0.90	e1.2	e1.2	13	6.2	4.6	0.49	0.87	3.0	1.5
25	2.3	e1.6	e1.0	e1.2	e1.2	17	6.4	4.7	0.49	1.1	2.6	2.0
26	2.7	e1.4	e1.0	e1.2	e1.2	14	6.4	4.2	0.47	0.85	2.2	2.8
27	3.1	e1.4	e1.1	e1.1	e1.2	11	6.6	4.1	0.54	0.77	2.7	2.5
28	e2.5	e1.2	e1.1	e1.1	e1.3	9.8	6.7	4.1	0.81	1.4	2.0	2.7
29	e1.8	e1.0	e1.2	e1.1	e1.3	9.5	6.2	4.2	1.7	3.9	1.9	2.4
30	e2.0	e0.90	e1.3	e1.1	---	9.4	5.2	4.0	1.8	3.7	1.5	2.2
31	e2.2	---	e1.3	e1.1	---	9.7	---	3.7	---	2.1	1.4	---
TOTAL	84.6	51.90	32.50	36.2	33.2	202.1	196.2	181.5	51.17	54.49	70.4	56.58
MEAN	2.73	1.73	1.05	1.17	1.14	6.52	6.54	5.85	1.71	1.76	2.27	1.89
AC-FT	168	103	64	72	66	401	389	360	101	108	140	112
MAX	5.5	2.7	1.3	1.4	1.3	17	10	9.4	3.7	4.2	4.6	4.8
MIN	1.4	0.90	0.70	1.0	1.0	1.2	4.8	3.7	0.47	0.74	1.4	0.98

CAL YR	2011	TOTAL	890.73	MEAN	2.44	MAX	8.1	MIN	0.41	AC-FT	1770
WTR YR	2012	TOTAL	1050.84	MEAN	2.87	MAX	17	MIN	0.47	AC-FT	2080

MAX DISCH: 24.8 CFS AT 12:00 ON MAR 25,2012 GH 2.49 FT SHIFT 0 FT
 MAX GH: 2.49 FT AT 12:00 ON MAR 25,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08230500 CARNERO CREEK NEAR LA GARITA
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08231000 LA GARITA CREEK NEAR LA GARITA

Water Year 2012

Location.-- Lat 37°48'48", long 106°19'8" referenced to North American Datum of 1983 (Twin Mountains SE, CO quad, scale 1:24,000), UTM Zone 13 383918 E and 4185927 N, in NW ¼ SE ¼ sec. 9, T.41 N., R.6 E., New Mexico Principal Meridian, Saguache County, CO, Hydrologic Unit 13010004, on left bank 4.5 mi downstream from Little La Garita Creek and 4.5 mi southwest of La Garita, CO.

Drainage Area and Period of Record.-- 61 mi²; Apr. 1, 1919 to Sept. 30, 1947 (seasonal records only most years), Oct. 1, 1947 to current year.

Equipment.-- A float-operated stage discharge recorder (SDR), data collection platform (Sutron Satlink2), and a tipping bucket rain gage in a 3 ft corrugated metal pipe shelter and concrete well. The primary reference gage is a drop tape from reference point on shelf. The secondary reference is a cantilever chain gage installed September 9, 2011.

Hydrologic Conditions.-- Drainage basin is primarily Rio Grande National Forest and is generally sub-alpine terrain. The mean basin elevation is 10,300 ft (from Stream Stats, 2009).

Gage-Height Record.-- Primary record is 15-minute satellite transmitted data with DCP log and SDR log as backup. There was a 15-minute offset in the transmitted data so DCP log was used as primary record until Jun 26 when offset problem was resolved. Record is complete and reliable. There were two instrument calibration corrections, both +0.01 ft, and were prorated by time back to the previous visit. The stage-discharge relation was affected by ice Nov. 5 - Feb 26.

Datum Corrections.-- Levels were last run to the Reference Point (RP) inside the gage on Aug 14, 2012 using BM1 as base. The RP elevation was found within allowable limits and no correction was made. Levels were last run to the secondary outside cantilever chain gage on Aug 14, 2012 using BM1 as base. The outside cantilever chain gage was found to read 0.08 ft above gage datum, and the gage was not corrected. A two-peg test was performed on the Lietz level (SN 130869) on Aug 6, 2012, and the instrument was within allowable limits and no correction was made.

Rating.-- The control is a rock weir structure approximately 30 feet downstream of the gage. Minor shifting occurs mainly due to the movement of streambed materials, especially at high stages. Rating No. 13 in use since October 1, 2009 was used again this year. Nineteen measurements (nos 259-277) were made this year ranging in discharge from 2.11 to 24 cfs. The measurements cover the discharge range experienced except for lower daily flows on Nov 26; Dec 1-6, 15-18, 21-25, 31; Jan 1, 14-18; Feb 1-8; and higher daily flow on Apr 1. The peak flow of 40.3 cfs occurred at 0045 on Mar 31 at a gage height of 2.67 ft with a shift of -0.05 ft. It exceeded high measurement no. 267 (GH= 2.42 ft), made Mar. 30, by 0.25 ft in stage. The shift for measurement no. 267 was adjusted -1.2 percent from -0.06 ft to -0.05 ft to smooth the shift trend since the measured discharge was 0.3 cfs from either rating value.

Discharge.-- Shifting control method was used to compute the discharge record for all open-water periods. Shifts were applied as defined by measurements and prorated by time Oct 1 - Feb 3. Shift curve (VS12-01) was used from Feb 3 to the end of the water year. Open-water measurement shifts ranged from -0.06 to +0.04 ft; applied shifts ranged from -0.05 to +0.02 ft. All open water measurements were given full weight except for nos. 264-267, 269-274, 276, and 277, which were adjusted as much as 7% to smooth shift trend. The stage-discharge relation was affected by ice and discharge estimated Nov 5 - Feb 26.

Special Computations.-- The shift curve (VS12-01) was left open on top and limited to a -0.05 shift due to the new control with no higher flow measurements. Discharge for periods of ice-affected record were estimated using discharge measurements, weather records and comparison with nearby stations.

Remarks.-- Record is good, except for periods of ice-affected record, which are estimated and poor. The peak flow should also be considered poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.-- Get higher flow measurements if and when conditions permit to develop new rating.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

08231000 LA GARITA CREEK NEAR LA GARITA

RATING TABLE.-- LAGLAGCO13 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

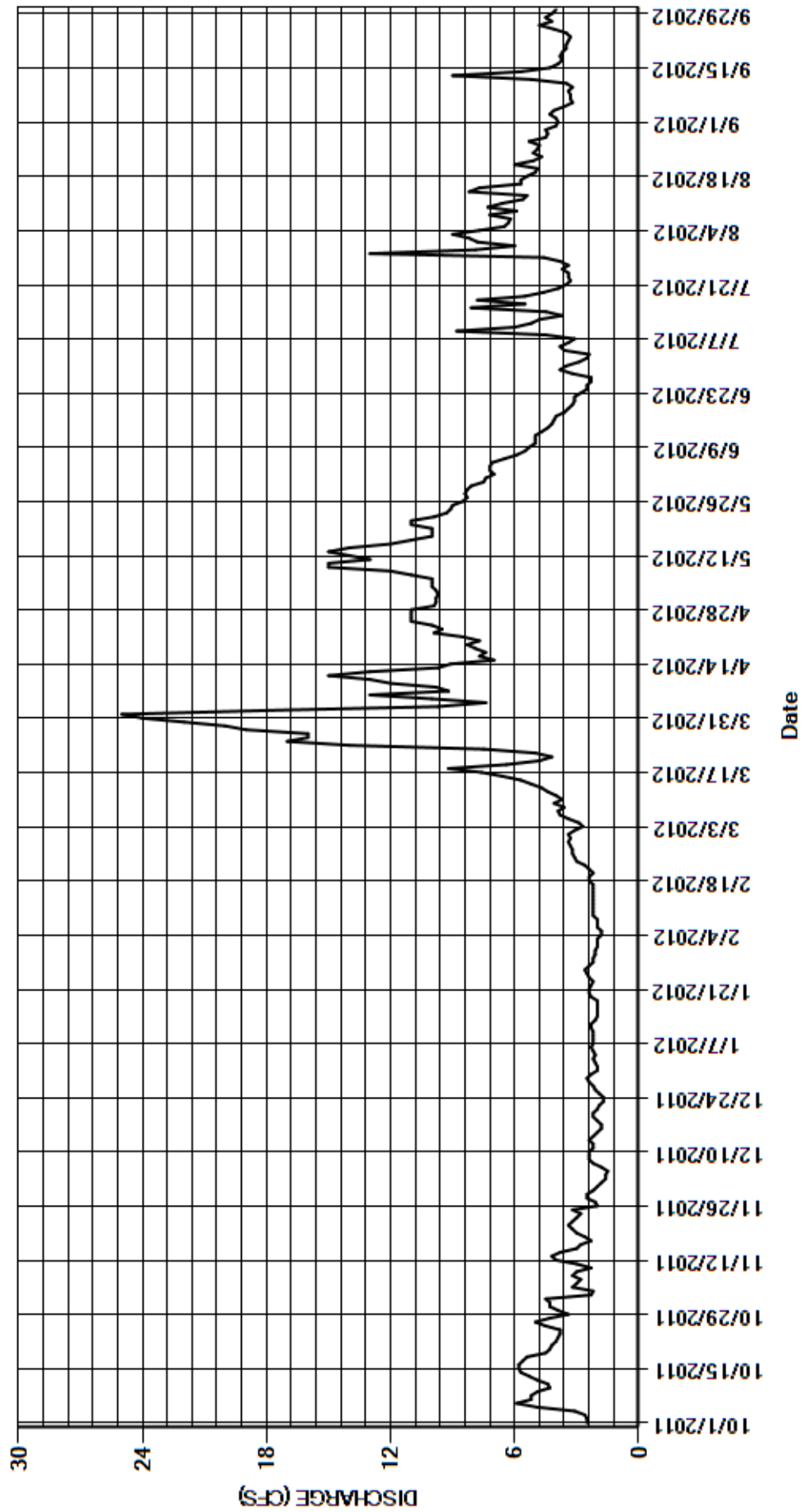
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.5	4.3	e2.0	e2.0	e2.0	3.4	25	9.8	7.4	2.9	7.8	3.9
2	2.5	4.5	e1.8	e2.1	e2.0	3.1	18	9.7	7.0	2.5	8.2	4.0
3	2.6	2.3	e1.6	e2.2	e2.0	2.7	9.7	9.8	7.2	2.4	9.0	4.3
4	3.1	2.2	e1.6	e2.1	e1.8	2.9	7.4	10	7.2	3.6	7.7	4.1
5	4.9	e3.2	e1.5	e2.2	e1.8	3.4	10	10	7.1	3.8	6.5	3.6
6	5.9	e3.0	e1.8	e2.3	e2.0	3.8	13	10	6.5	3.4	6.3	3.2
7	5.2	e2.8	e2.2	e2.2	e2.0	3.9	9.2	11	5.9	3.1	6.2	3.3
8	5.2	e3.2	e2.4	e2.2	e2.0	3.6	9.8	12	5.5	4.5	7.2	3.3
9	4.9	e3.0	e2.4	e2.2	e2.2	4.1	12	15	5.3	8.8	5.9	3.4
10	4.3	e2.3	e2.4	e2.2	e2.2	3.7	13	15	5.0	6.0	7.3	3.2
11	4.4	e3.0	e2.2	e2.3	e2.2	4.0	15	13	5.0	5.2	6.6	3.5
12	4.9	e4.0	e2.2	e2.3	e2.2	4.4	13	14	5.0	4.8	5.6	5.2
13	5.3	e4.2	e2.4	e2.1	e2.2	4.7	9.7	15	4.7	3.7	5.4	9.0
14	5.7	e3.8	e2.2	e2.0	e2.2	5.2	9.1	14	4.4	4.5	8.2	5.7
15	5.8	e3.0	e2.0	e2.0	e2.2	5.7	7.0	12	4.2	8.1	7.7	4.3
16	5.8	e2.8	e1.8	e2.0	e2.2	6.6	7.7	11	4.1	5.5	5.7	3.9
17	5.6	e2.3	e1.8	e2.0	e2.2	7.6	7.4	10	4.0	7.8	5.7	3.7
18	5.4	e2.6	e2.0	e2.0	e2.4	9.2	7.9	10	3.6	5.5	5.4	3.8
19	4.5	e3.0	e2.2	e2.3	e2.4	6.4	8.3	10	3.4	4.6	5.0	3.7
20	4.3	e3.2	e2.2	e2.4	e2.2	4.8	7.7	11	3.2	3.9	4.9	3.5
21	4.2	e3.4	e2.0	e2.4	e2.4	4.2	8.5	11	3.1	3.5	6.0	3.5
22	4.0	e3.2	e1.9	e2.3	e2.6	5.0	9.9	9.9	3.1	3.3	5.1	3.4
23	3.9	e3.0	e1.7	e2.2	e3.0	7.5	9.5	9.3	2.8	3.4	4.7	3.3
24	3.8	e2.8	e1.7	e2.4	e3.1	14	10	9.1	2.5	3.4	5.1	3.5
25	3.8	e3.2	e1.9	e2.5	e3.2	17	11	9.0	2.5	3.7	4.9	4.1
26	4.5	e2.0	e2.1	e2.6	e3.2	16	11	8.5	2.3	3.4	4.8	4.8
27	5.0	e2.1	e2.2	e2.4	3.3	16	11	8.3	2.3	3.8	5.3	4.2
28	4.3	e2.5	e2.4	e2.2	3.4	19	11	8.4	3.2	4.6	4.5	4.5
29	3.4	e2.5	e2.5	e2.2	3.3	20	9.9	8.3	3.8	13	4.4	4.2
30	3.9	e2.2	e2.3	e2.1	---	22	9.8	8.1	3.5	7.9	4.5	4.0
31	4.3	---	e2.0	e2.1	---	24	---	7.5	---	6.0	4.0	---
TOTAL	137.9	89.6	63.4	68.5	69.9	257.9	321.5	329.7	134.8	150.6	185.6	122.1
MEAN	4.45	2.99	2.05	2.21	2.41	8.32	10.7	10.6	4.49	4.86	5.99	4.07
AC-FT	274	178	126	136	139	512	638	654	267	299	368	242
MAX	5.9	4.5	2.5	2.6	3.4	24	25	15	7.4	13	9.0	9.0
MIN	2.5	2.0	1.5	2.0	1.8	2.7	7.0	7.5	2.3	2.4	4.0	3.2

CAL YR	2011	TOTAL	1500.2	MEAN	4.11	MAX	11	MIN	1.5	AC-FT	2980
WTR YR	2012	TOTAL	1931.5	MEAN	5.28	MAX	25	MIN	1.5	AC-FT	3830

MAX DISCH: 40.3 CFS AT 00:45 ON MAR 31,2012 GH 2.67 FT SHIFT -0.05 FT
 MAX GH: 2.67 FT AT 00:45 ON MAR 31,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08231000 LA GARITA CREEK NEAR LA GARITA
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08235250 ALAMOSA RIVER ABOVE WIGHTMAN FORK NEAR JASPER
Water Year 2012

Location.-- Lat 37°24'09", long 106°31'17", in SE¼SW¼ sec.35, T.37 N., R.4 E., Rio Grande Co. Hydrologic Unit 13010002, Rio Grande National Forest, on left bank 650 ft. upstream from Wightman Fork, 1.8 mi downstream from Bitter Creek, 4.1 mi west of Jasper, and 4.2 mi southeast of Summitville.

Drainage Area and Period of Record.-- 37.8 mi² ; Jul 1995 to current year, no winter record, missing some years.

Equipment.-- Shelter is 4 ft x 4 ft x 8 ft steel building. Gage-height is collected using a Sutron Accubar pressure transducer. A Hydrolab instrument collects water temperature, conductance, and pH data. A Sutron Satlink2 is used to transmit and store data. The Accubar gage-height is set using outside staff gage. This station was moved 500 feet upstream in November 2009. A bank-operated cableway was also installed at the site in the fall of 2009 to provide the means to obtain high flow measurements.

Hydrologic Conditions.-- Undeveloped subalpine and alpine forest.

Gage-Height Record.-- Primary record is 15-minute transmitted data with Satlink2 log as backup. Period of operation: Oct 1 to 30, 2011 and Apr 16 to Sep 30, 2012. Record is complete, except for Oct 30 when there was missing data and Sep 3-7, 11 when the pressure transducer orifice was out of the water (gage isolated). One 15-minute value was corrected on Sep 11, field personnel reset pressure transducer orifice. Three 15-minute values were filled on Jun 23 by linear interpolation without loss of accuracy. There were 5 instrument calibration corrections ranging from -0.01 to -0.02 ft, which were prorated back to the previous visit. A correction was noted and not made on Sep 19 so the correction was carried to the next visit when the instrument was adjusted. On Aug 26 the instrument was over adjusted by -0.01 ft so a +0.01 ft correction was carried forward to the end of the measurement where the instrument was reset. The stage-discharge relationship was affected by ice on the control Oct 29.

Datum Corrections.-- Levels are not run at this station.

Rating.-- Control is cobble channel and banks. Rating ALAWIGCO08a first used May 2, 2011 was used this year. Ten discharge measurements (nos. 70-79) were made during the water year. The measurements ranged in discharge from 8.24 to 277 cfs. Measurements covered the discharge range experienced, except for the lower daily flows on Sep 1-8, 10, 11, 22-24. The peak flow of 314 cfs occurred at 1945 on May 5 at a gage height of 5.19 ft with a shift of +0.09 ft using rating ALAWIGCO08a. It exceeded high measurement No. 73 (GH = 5.10 ft) made May 6, 2012, by 0.09 ft in stage.

Discharge.-- Shifting control method was used to compute discharge during the entire period of record. Discharge was computed by direct application of the rating to the gage height record during the period from Oct 1 to Oct 28. Shift curves (VS12-H and 12-I) were developed and used Apr 15 - May 5 and May 5 to Sep 30 respectively to distribute shifting by stage and events. Open-water measurement shifts ranged from -0.01 to 0.09 ft; applied shift ranged from 0 to 0.09 ft. All open-water measurements were given full weight except for no. 70, rated good and adjusted 4.3 percent; 76-78, rated fair and adjusted as much as 8 percent to smooth the shift trend. The stage-discharge relation was affected by ice and the flow was estimated Oct 29. There was missing data on Oct 30, due to the gage being closed part of the day, and the discharge was estimated. There was no stage record because the pressure transducer was out of the water part or all of Sep 3-7, 11 and the discharge was estimated.

Special Computations.-- Discharge for periods of estimation was based on weather records, partial stage records, and comparison with nearby stations Wightman Fork at Mouth near Jasper and Alamosa River below Ranger Creek.

Remarks.-- Due to the instability of the channel and control, the record is rated fair. Periods of estimation are rated poor. Station maintained and record developed by private consultant; record reviewed by Colorado Division of Water Resources, Division 3 personnel.

Recommendations.--

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

08235250 ALAMOSA RIVER ABOVE WIGHTMAN FORK NEAR JASPER

RATING TABLE-- ALAWIGCO08a USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

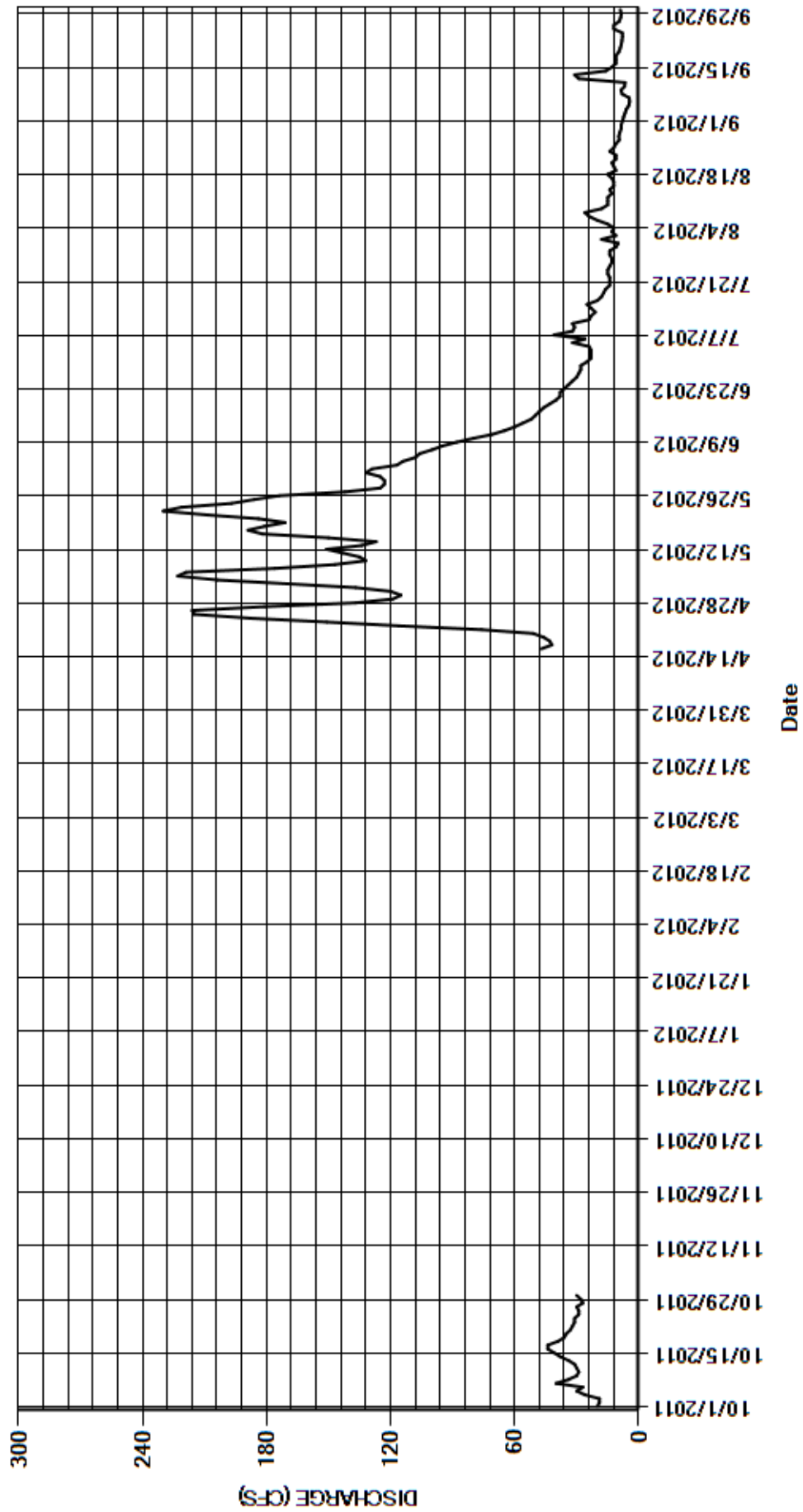
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	20	---	---	---	---	---	---	120	132	23	18	7.8
2	19	---	---	---	---	---	---	137	129	23	11	7.3
3	19	---	---	---	---	---	---	170	117	23	13	e6.6
4	26	---	---	---	---	---	---	204	114	24	12	e6.0
5	30	---	---	---	---	---	---	223	108	32	15	e4.8
6	27	---	---	---	---	---	---	219	106	26	20	e4.4
7	40	---	---	---	---	---	---	176	100	41	24	e4.6
8	34	---	---	---	---	---	---	147	95	32	26	8.0
9	30	---	---	---	---	---	---	132	88	31	18	8.6
10	29	---	---	---	---	---	---	135	80	32	15	6.8
11	30	---	---	---	---	---	---	143	71	24	15	e6.6
12	31	---	---	---	---	---	---	151	65	23	15	29
13	34	---	---	---	---	---	---	134	60	21	13	31
14	38	---	---	---	---	---	---	127	56	23	14	16
15	41	---	---	---	---	---	---	150	52	25	12	13
16	44	---	---	---	---	---	47	182	50	20	12	11
17	44	---	---	---	---	---	42	189	48	18	13	11
18	39	---	---	---	---	---	43	181	46	17	15	11
19	36	---	---	---	---	---	46	171	43	16	11	9.6
20	35	---	---	---	---	---	51	184	40	14	12	8.9
21	33	---	---	---	---	---	76	209	38	14	13	8.4
22	32	---	---	---	---	---	116	230	38	14	11	8.1
23	31	---	---	---	---	---	151	221	36	15	11	7.9
24	31	---	---	---	---	---	188	197	34	15	14	8.0
25	29	---	---	---	---	---	215	186	32	14	12	12
26	29	---	---	---	---	---	216	174	30	13	11	12
27	30	---	---	---	---	---	181	142	29	13	9.4	9.4
28	27	---	---	---	---	---	137	125	28	14	9.6	8.7
29	e28	---	---	---	---	---	119	123	28	14	9.1	8.4
30	e30	---	---	---	---	---	115	123	25	11	8.4	8.9
31	---	---	---	---	---	---	---	125	---	9.9	8.4	---
TOTAL	946	---	---	---	---	---	1743	5130	1918	634.9	420.9	303.8
MEAN	31.5	---	---	---	---	---	116	165	63.9	20.5	13.6	10.1
AC-FT	1880	---	---	---	---	---	3460	10180	3800	1260	835	603
MAX	44	---	---	---	---	---	216	230	132	41	26	31
MIN	19	---	---	---	---	---	42	120	25	9.9	8.4	4.4

CAL YR	2011	TOTAL	17700.0	MEAN	97.3	MAX	477	MIN	13	AC-FT	35110 (PARTIAL YEAR RECORD)	
WTR YR	2012	TOTAL	11096.6	MEAN	56.0	MAX	230	MIN	4.4	AC-FT	22010 (PARTIAL YEAR RECORD)	

MAX DISCH: 314 CFS AT 19:45 ON MAY 05,2012 GH 5.19 FT SHIFT 0.09 FT
 MAX GH: 5.19 FT AT 19:45 ON MAY 05,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08235250 ALAMOSA RIVER ABOVE WIGHTMAN FORK NEAR JASPER
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08235270 WIGHTMAN FORK BELOW CROPSY CREEK AT SUMMITVILLE
Water Year 2012

Location.-- Lat 37°25'45", long 106°35'4" referenced to North American Datum of 1983 (Summitville, CO quad, scale 1:24,000), UTM Zone 13 359822 E and 4143669 N, in NW ¼ NW ¼ sec. 29, T.37 N., R.4 E., New Mexico Principal Meridian, Rio Grande County, CO, Hydrologic Unit 13010002, on left bank 200 ft downstream from Cropsy Creek, and 0.25 mi east of Summitville, CO.

Drainage Area and Period of Record.-- 4.44 mi²; July 1995 to current year (seasonal records only).

Equipment.-- Sutron Accubar non-submersible pressure transducer with Sutron 8200 data collection platform in a 4-ft by 4-ft by 8-ft steel shelter until May 15 when Sutron 8200 was upgraded to Sutron Satlink2. The primary reference is outside staff gage on LEW. Sutron Accubar non-submersible pressure transducer was replaced with a new one on Apr 28, 2012 and also set to average stage over 10 seconds.

Hydrologic Conditions.-- Mainly alpine basin above 11,120 ft in elevation, with some subalpine terrain and large reclaimed open pit mine.

Gage-Height Record.-- Record is complete for period of operation from Oct 1 to Oct 30, 2011 and from Apr 29 to Sep 30, 2012, except for Oct 30 due to missing data because equipment was shut down. Record is considered unreliable Oct 1 – 30 due to large instrument corrections that vary with stage and are undefined (it appears pressure transducer malfunctioned Aug 27, 2011) and Sep 15-23 when the pressure transducer orifice was buried. There were two instrument calibration corrections ranging from -0.01 to -0.02 ft, which were prorated back to the previous visit. There was a +0.01 ft correction applied on Jul 15 during the measurement due to the pressure transducer being over corrected upon arrival at the gage. Two unit values were missing on May 13 while the DCP was upgraded. The two unit values were estimated from surrounding record and on-site observations with no loss of accuracy.

Datum Corrections.-- Levels are not run at this site.

Rating.-- Control is small, low rock and log dam. Channel is also part of the control. The control is subject to change from material moving through gage pool and control section and excavations in the channel upstream. Rating WFKCRO05-1, first used July 30, 2009, was used all year and is poorly defined. Seven measurements (nos 61-67) were made this year ranging in discharge from 0.32 to 18.4 cfs. Measurements cover the discharge range experienced except for the higher daily flows of May 2-6, and 8. The peak flow of 36.5 cfs (rated poor) occurred at 1700 on May 3, at gage-height of 5.08 ft with a shift of -0.07 ft (from WFKCROCOVS12-D). It exceeded high measurement no. 61 made Apr 28 (G.H. 4.78 ft) by 0.30 ft in stage.

Discharge.-- Shifting control method was used to compute the discharge record. Shift curves (WFKCROCOVS12- D and F) were developed and used to distribute shifts by time and stage. From Apr 28 to May 4 (second peak) VS12-D was used; from May 4 to 8 shifting prorated by time from VS12-D to VS12-F on the falling limb of the hydrograph; and from May 8 to Sep 30 VS12-F was used. The bottom ends of these shift curves were left open ended due to PZF changing as material moved through the gage pool and control section. Open-water measurement shifts ranged from -0.23 to -0.06 ft; applied shift range was the same. All open water measurements were given full weight except for nos. 63 and 65 which were adjusted as much as 6.2 percent to smooth the shift trend. The pressure transducer orifice was buried Sep 15-23 and the discharge was estimated. Gage-height record is not considered reliable Oct 1 – 30 due to large instrument corrections that vary with stage and are undefined ('a' record), it appears that the pressure transducer malfunctioned and the discharge was estimated.

Special Computations.-- Discharge for periods of missing record, buried pressure transducer orifice record, ice affected record, and period of instrument malfunction were estimated based on hydrographic comparison with Wightman Fork at Mouth near Jasper(WFKMOUCO) and air temperature data from ALATERCO.

Remarks.-- Record is fair, except estimated daily streamflow which is poor. Due to uncertainties in the upper end of the rating and variable shift curves WFKCROCOVS12-D and F, all flows greater than 20 cfs should be considered poor. The peak flow is considered poor. Station maintained and record developed by private consultant; record reviewed by Div 3 hydrographic staff.

Recommendations.-- PZF measurements at every opportunity.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

08235270 WIGHTMAN FORK BELOW CROPSY CREEK AT SUMMITVILLE

RATING TABLE.-- WFKCROCO05-1 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

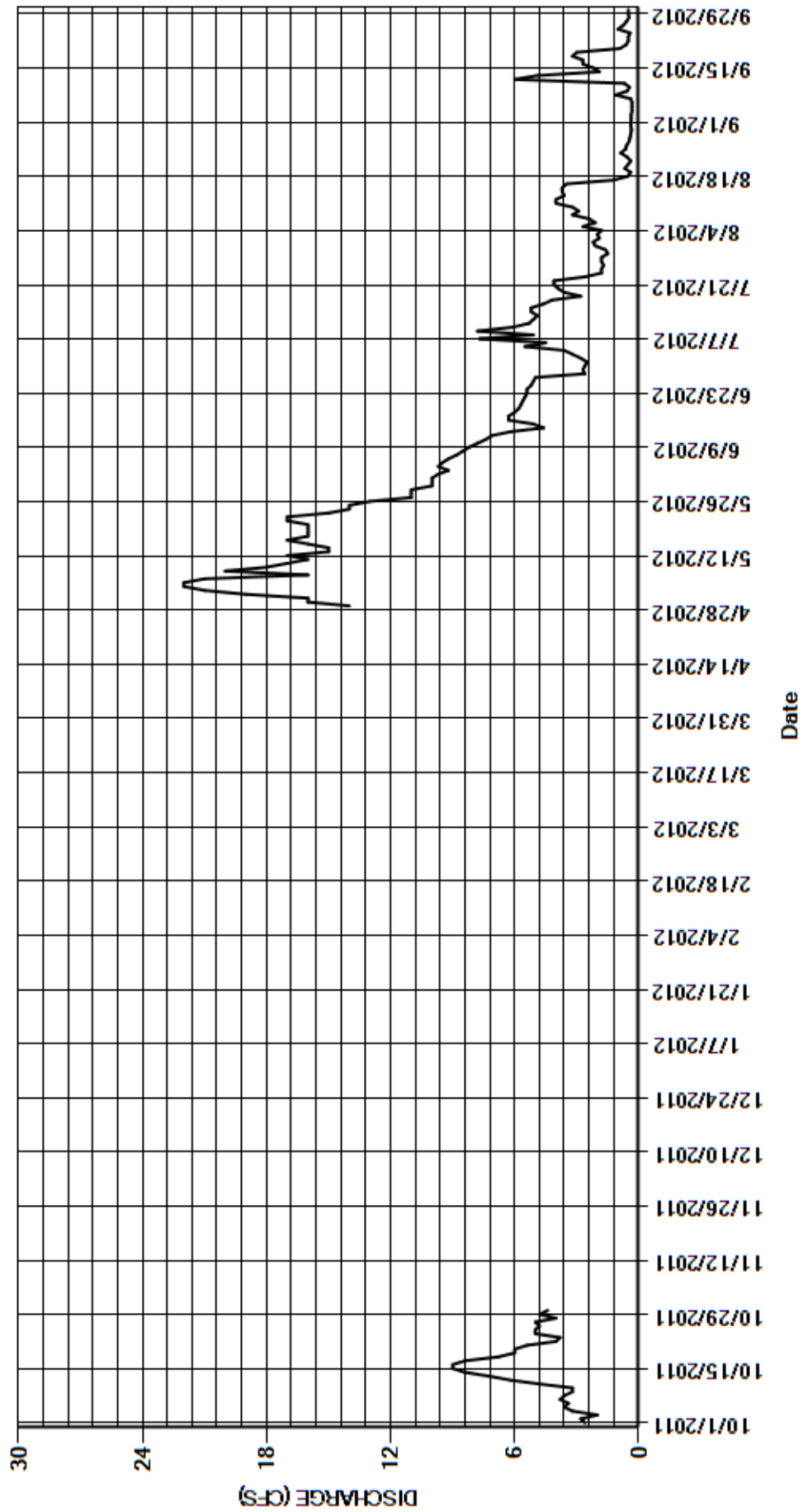
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e2.6	---	---	---	---	---	---	16	10	2.5	2.2	0.37
2	e2.8	---	---	---	---	---	---	19	9.7	2.8	1.9	0.36
3	e2.0	---	---	---	---	---	---	21	9.2	3.2	2.0	0.36
4	e3.2	---	---	---	---	---	---	22	9.7	3.6	1.8	0.32
5	e3.6	---	---	---	---	---	---	22	9.5	5.5	2.7	0.33
6	e3.4	---	---	---	---	---	---	21	9.2	4.5	2.1	0.32
7	e3.8	---	---	---	---	---	---	16	8.8	7.7	2.4	0.38
8	e3.6	---	---	---	---	---	---	20	8.5	5.1	3.2	1.1
9	e3.2	---	---	---	---	---	---	18	8.2	7.8	2.9	0.56
10	e3.2	---	---	---	---	---	---	17	7.8	6.1	3.2	0.44
11	e4.8	---	---	---	---	---	---	16	7.4	5.3	4.0	0.69
12	e6.2	---	---	---	---	---	---	17	7.1	5.1	4.0	6.0
13	e7.2	---	---	---	---	---	---	15	6.2	4.9	3.6	4.9
14	e8.4	---	---	---	---	---	---	15	4.6	5.2	3.7	1.9
15	e9.0	---	---	---	---	---	---	16	5.1	5.2	3.7	e2.2
16	e9.0	---	---	---	---	---	---	17	6.3	4.6	3.5	e2.7
17	e8.4	---	---	---	---	---	---	16	6.3	4.2	1.2	e2.7
18	e6.8	---	---	---	---	---	---	16	6.0	2.8	0.53	e3.2
19	e6.0	---	---	---	---	---	---	16	5.8	3.6	0.39	e3.0
20	e6.0	---	---	---	---	---	---	16	5.7	3.9	0.67	e0.90
21	e5.4	---	---	---	---	---	---	17	5.6	4.1	0.52	e0.60
22	e4.0	---	---	---	---	---	---	17	5.5	4.1	0.38	e0.50
23	e3.8	---	---	---	---	---	---	15	5.4	2.6	0.57	e0.50
24	e5.0	---	---	---	---	---	---	14	5.4	1.8	0.87	0.42
25	e5.0	---	---	---	---	---	---	14	5.2	1.8	0.64	1.0
26	e4.8	---	---	---	---	---	---	13	5.1	1.7	0.58	0.74
27	e5.0	---	---	---	---	---	---	11	5.0	1.8	0.47	0.59
28	e4.0	---	---	---	---	---	---	11	2.6	1.8	0.42	0.47
29	e4.8	---	---	---	---	---	14	11	2.7	1.5	0.38	0.50
30	e4.4	---	---	---	---	---	16	10	2.6	1.6	0.35	0.50
31	---	---	---	---	---	---	---	10	---	2.1	0.38	---
TOTAL	149.4	---	---	---	---	---	30	495	196.2	118.5	55.25	38.55
MEAN	4.98	---	---	---	---	---	15.0	16.0	6.54	3.82	1.78	1.28
AC-FT	296	---	---	---	---	---	60	982	389	235	110	76
MAX	9.0	---	---	---	---	---	16	22	10	7.8	4.0	6.0
MIN	2.0	---	---	---	---	---	14	10	2.6	1.5	0.35	0.32

CAL YR	2011	TOTAL	2184.10	MEAN	12.3	MAX	70	MIN	1.6	AC-FT	4330 (PARTIAL YEAR RECORD)
WTR YR	2012	TOTAL	1082.90	MEAN	5.85	MAX	22	MIN	0.32	AC-FT	2150 (PARTIAL YEAR RECORD)

MAX DISCH: 36.5 CFS AT 17:00 ON MAY 03,2012 GH 5.08 FT SHIFT -0.07 FT (rated poor)
 MAX GH: 5.08 FT AT 17:00 ON MAY 03,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08235270 WIGHTMAN FORK BELOW CROPSEY CREEK AT SUMMITVILLE
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08235290 WIGHTMAN FORK AT MOUTH NEAR JASPER
Water Year 2012

Location.-- Lat. 37°24'14", Long. 106°31'16", in SE¼SW¼ sec. 35, T.37 N., R.4 E., Rio Grande County, Hydrologic Unit 13010002, on right bank 25' downstream from bridge on Forest Development Road No. 250, about 300' upstream from confluence with Alamosa River, and 4.3 mi southwest of Jasper.

Drainage Area and Period of Record.-- 16.1 mi²; July 1995 to current year (seasonal record only).

Equipment.-- Satellite-monitored data collection platform (high data rate Sutron Satlink2) and Sutron Accubar Pressure Transducer and Hydrolab water quality sonde in 4 ft x 4 ft x 8 ft steel shelter. The primary reference gage is an outside staff gage.

Hydrologic Conditions.-- Alpine and subalpine National Forest, also large area of reclaimed open pit mine. Flows influenced by water treatment plant operations at open pit mine.

Gage-Height Record.-- Primary record is 15-minute transmitted data with Satlink2 log as backup. Record is complete and reliable for the period of operation, Oct 1-29 and Apr 16 to Sep 30, except for Apr 26-29 when the orifice line was covered with silt, which elevated gage heights during parts of the days. The stage-discharge relation was affected by ice Oct 28-29. There were seven instrument calibration corrections ranging from -0.04 ft to +0.04 ft. All instrument calibration corrections were prorated back to the previous visits.

Datum Corrections.-- Levels are not run at this gage.

Rating.-- Control is a cobble stream channel and banks. Rating no. 7-2, first used May 1, 2011, was used again this year. Ten discharge measurements (nos. 77-86) were made during the water year ranging from 1.36 to 56.3 cfs. Measurements covered the daily mean discharge range encountered except for lower daily flows on Aug 29-31; Sep 1-7, 10, 11, and 22-24 and the higher daily flows on Apr 22-27. The peak flow of 161 cfs occurred at 1800 on Apr 25, 2012 at a gage height of 4.76 feet with a shift of -0.09 feet. It exceeded high measurement No. 80, made May 6, 2012 (GH = 4.34 ft) by 0.42 feet in stage.

Discharge.-- Shifting control method was used to compute the discharge record. Shifts were applied as defined by measurements and distributed by time Oct 1-29. Shift curves (WFKMOUCOV512-E and 12G) were developed and used Apr 16 - Sep 30 to distribute shifting by stage, time, and events. Both variable shift curves were left open on the bottom end due to aggradation of the stream in and below the control section causing the negative shift trend. Open-water measurement shifts ranged from 0.00 to -0.09 ft; applied shifts ranged from 0.00 to -0.09 ft. All open water measurements were given full weight except for nos. 81, 82 and 86 which were adjusted as much as 8.8 percent to smooth the shift trend. The stage-discharge relation was affected by ice and discharge was estimated Oct 28, 29. The gage-height record was affected by silt around the pressure transducer line orifice Apr 26-29 and the discharge was estimated.

Special Computations.-- Discharge for periods of ice affected record and days when the pressure transducer line orifice was silted over were estimated using temperature records, partial day good record and good record before and after affected periods.

Remarks.-- Record is good, except for ice affected periods and periods of missing and unreliable data, which are estimated and poor. The peak for the water year is rated good. Station maintained and record developed by private consultant; record reviewed by Div 3 personnel.

Recommendations.--

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

08235290 WIGHTMAN FORK AT MOUTH NEAR JASPER

RATING TABLE.-- WFKMOUCO07-2 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

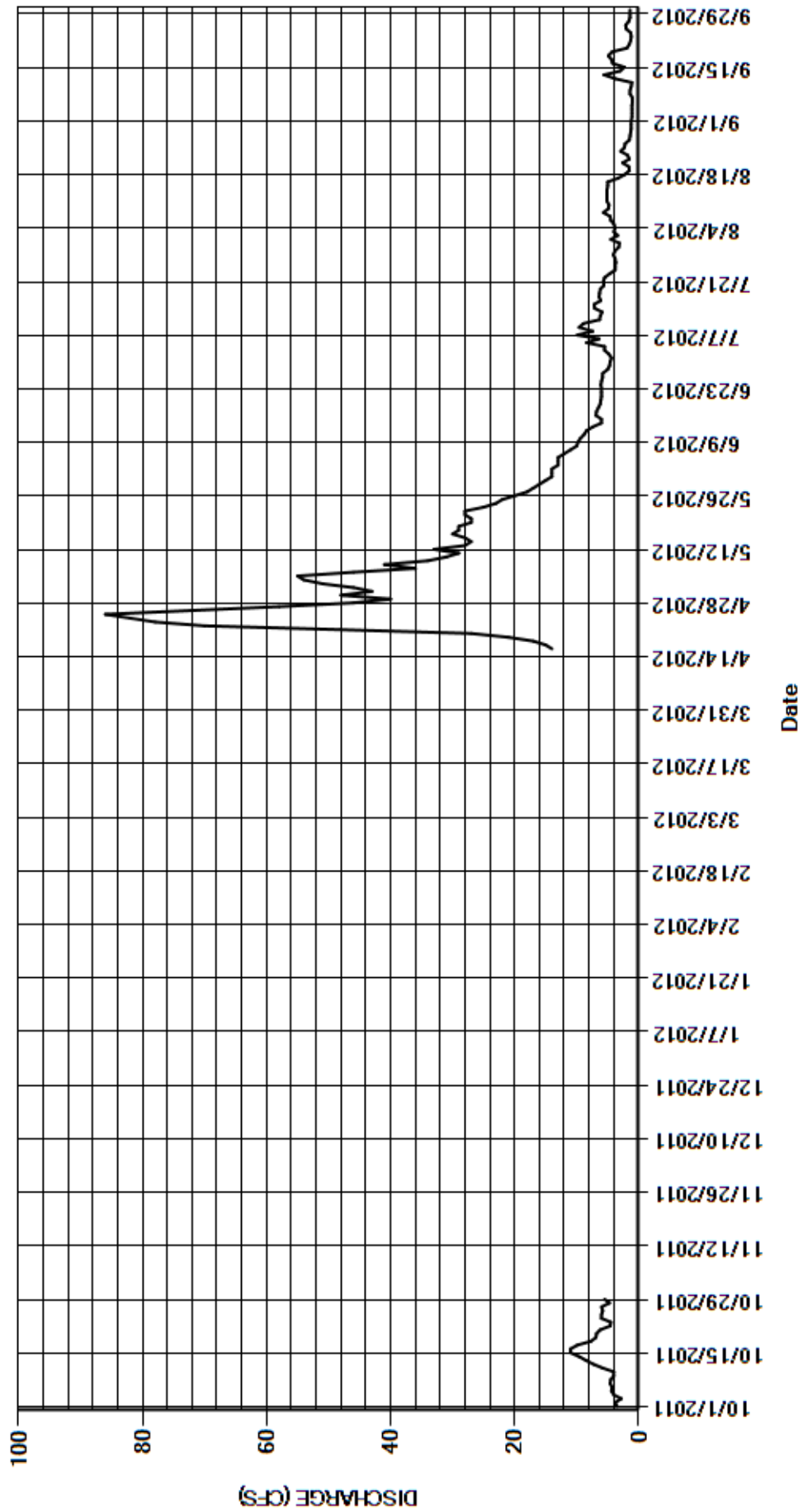
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.5	---	---	---	---	---	---	43	14	4.4	4.5	1.2
2	3.8	---	---	---	---	---	---	46	14	4.8	3.4	1.1
3	2.8	---	---	---	---	---	---	51	13	5.5	4.0	1.1
4	4.0	---	---	---	---	---	---	54	13	5.5	3.8	1.1
5	4.4	---	---	---	---	---	---	55	13	8.4	4.0	1.1
6	4.3	---	---	---	---	---	---	46	12	6.4	4.5	1.0
7	4.6	---	---	---	---	---	---	36	11	9.9	4.6	1.0
8	4.5	---	---	---	---	---	---	41	10	7.4	5.7	1.4
9	4.0	---	---	---	---	---	---	34	9.8	9.6	4.9	1.4
10	4.0	---	---	---	---	---	---	31	9.4	8.9	4.8	1.2
11	5.8	---	---	---	---	---	---	29	8.8	6.3	5.1	1.1
12	7.3	---	---	---	---	---	---	33	8.4	6.2	5.1	3.8
13	8.5	---	---	---	---	---	---	28	7.4	5.9	5.1	5.6
14	9.6	---	---	---	---	---	---	27	6.0	7.1	5.1	3.0
15	11	---	---	---	---	---	---	28	6.0	7.2	5.0	2.3
16	11	---	---	---	---	---	14	30	6.9	6.1	5.0	4.2
17	9.9	---	---	---	---	---	15	29	6.8	6.4	3.3	4.4
18	7.7	---	---	---	---	---	17	29	6.5	6.3	2.2	4.9
19	6.9	---	---	---	---	---	21	27	6.2	6.2	1.5	4.3
20	6.8	---	---	---	---	---	27	27	6.1	5.6	1.6	1.9
21	6.2	---	---	---	---	---	48	28	6.0	5.7	2.6	1.5
22	4.6	---	---	---	---	---	70	28	6.0	5.5	1.5	1.3
23	4.5	---	---	---	---	---	78	25	6.0	4.7	1.8	1.2
24	6.0	---	---	---	---	---	82	23	6.1	3.8	2.9	1.3
25	6.0	---	---	---	---	---	86	22	6.0	3.8	2.3	2.0
26	5.8	---	---	---	---	---	e72	20	5.8	3.7	2.2	2.1
27	6.0	---	---	---	---	---	e58	18	5.8	3.8	1.5	1.6
28	e4.7	---	---	---	---	---	e46	17	5.0	4.1	1.4	1.4
29	e5.5	---	---	---	---	---	e40	16	4.7	3.8	1.3	1.4
30	---	---	---	---	---	---	48	15	4.6	3.2	1.2	1.4
31	---	---	---	---	---	---	---	14	---	3.1	1.2	---
TOTAL	173.7	---	---	---	---	---	722	950	244.3	179.3	103.1	62.3
MEAN	5.99	---	---	---	---	---	48.1	30.6	8.14	5.78	3.33	2.08
AC-FT	345	---	---	---	---	---	1430	1880	485	356	204	124
MAX	11	---	---	---	---	---	86	55	14	9.9	5.7	5.6
MIN	2.8	---	---	---	---	---	14	14	4.6	3.1	1.2	1.0

CAL YR	2011	TOTAL	4495.1	MEAN	24.7	MAX	173	MIN	2.3	AC-FT	8920 (PARTIAL YEAR RECORD)
WTR YR	2012	TOTAL	2434.7	MEAN	12.4	MAX	86	MIN	1.0	AC-FT	4830 (PARTIAL YEAR RECORD)

MAX DISCH: 161 CFS AT 18:00 ON APR 25,2012 GH 4.76 FT SHIFT -0.09 FT
 MAX GH: 4.76 FT AT 18:00 ON APR 25,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08235290 WIGHTMAN FORK AT MOUTH NEAR JASPER
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
ALAMOSA RIVER BELOW RANGER CREEK NEAR JASPER

Water Year 2012

Location.-- Lat 37° 23' 23", long 106° 22' 43" referenced to North American Datum of 1983 (Jasper, CO quad, scale 1:24,000), UTM Zone 13 377962 E and 4138995 N, in SW ¼ NE ¼ sec. 11, T.36 N., R.5 E., New Mexico Principal Meridian, Conejos County, CO, Hydrologic Unit 13010002, on right bank 30 ft above Silver Lakes Road Bridge, 0.4 mi below Ranger Creek and 4 mi above Terrace Reservoir.

Drainage Area and Period of Record.-- Not determined; 2003 to current year.

Equipment.-- Shelter is 4 ft x 4 ft x 8 ft steel building equipped with Sutron Accubar to collect stream level data and Hydrolab collects water temperature, specific conductance, and pH data. Sutron Satlink2 used to transmit and store data. Outside staff gage is primary reference gage. No change.

Hydrologic Conditions.-- Undeveloped steep alpine and subalpine terrain.

Gage-Height Record.-- Primary record is 15-minute transmitted data with Satlink2 log as backup. Record is complete and reliable for the period of operation, Oct 1 to Oct 29, 2011 and Apr 16 to Sep 30, 2012, except for Apr 21- 26, 30; May 1-13 when the orifice line and PVC pipe around the orifice line were buried in silt causing gage height to be elevated part of the time and Apr 27-29 when the orifice line and PVC pipe around the orifice line were buried in silt isolating the gage. There were five pressure transducer corrections ranging from a -0.05 ft to +0.01 ft applied; all were prorated back to the last measurement or gage visit. Peak logged gage-height (4.33 ft at 1915 on Apr 25) was affected by pressure spike from orifice line being buried and therefore not used. The peak gage-height of 4.28 ft (2200 on Apr 25) was used, but due to the potential uncertainty, this value should be considered fair.

Datum Corrections.-- Levels are not run at this station.

Rating.-- Control is primarily stream channel of rock and earthen banks. Bridge on downstream side of gage is also part of the control. Channel is stable at low and medium flows, but can change at very high flows. Rating No. 5_1, first used Oct 1, 2008, was used again this year. Nine discharge measurements (nos. 78-86) were made during period of record for this water year ranging in discharge from 15.0 to 189 cfs. Measurements cover the range encountered except for the higher daily flows Apr 23-29; May 1-13, 15 - 27 and lower daily flows on Sep 2-7, 10, and 11. The peak flow of 441 cfs occurred at 2200 on Apr 25 at a gage height of 4.28 ft with a 0.00 ft shift. It exceeded high measurement No. 80 (GH=3.60 ft), made Apr 29 by 0.68 feet in stage.

Discharge.-- Shifting control method was used to compute the discharge record. Shift curves (ALARANCOVS1108,12-A,12-C,12-B) were developed and used Oct 1-8, Oct 8-30, Apr 15-25, Apr 25 - Sep 30, respectively to distribute shifting by stage and time. Open-water measurement shifts ranged from -0.04 to +0.07; applied shift ranged from -0.03 to +0.04. All open water measurements were given full weight except for nos. 78-82, and 84 which were adjusted as much as 4.8 percent to smooth the shift trend. High measurement no 80 was adjusted 3.8 percent back to the rating. The gage height was not representative of average because the pressure transducer orifice was silted over part or all of the day Apr 21-26, 30; May 1-13, and the discharge was estimated. The orifice line and PVC pipe around the orifice line were buried in silt isolating the gage Apr 27-29 ('a' record), and the discharge was estimated.

Special Computations.-- Discharge for periods of no gage-height and gage height not representative of average for day record was estimated using hydrographic comparison with Alamosa River above Terrace Reservoir gaging station and measurements.

Remarks.-- Record is good except periods of estimation which are rated poor. Station maintained and record developed by private consultant; record reviewed by Colorado Division of Water Resources, Division 3 personnel.

Recommendations.--

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

ALAMOSA RIVER BELOW RANGER CREEK NEAR JASPER

RATING TABLE-- ALARANCO05_1 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

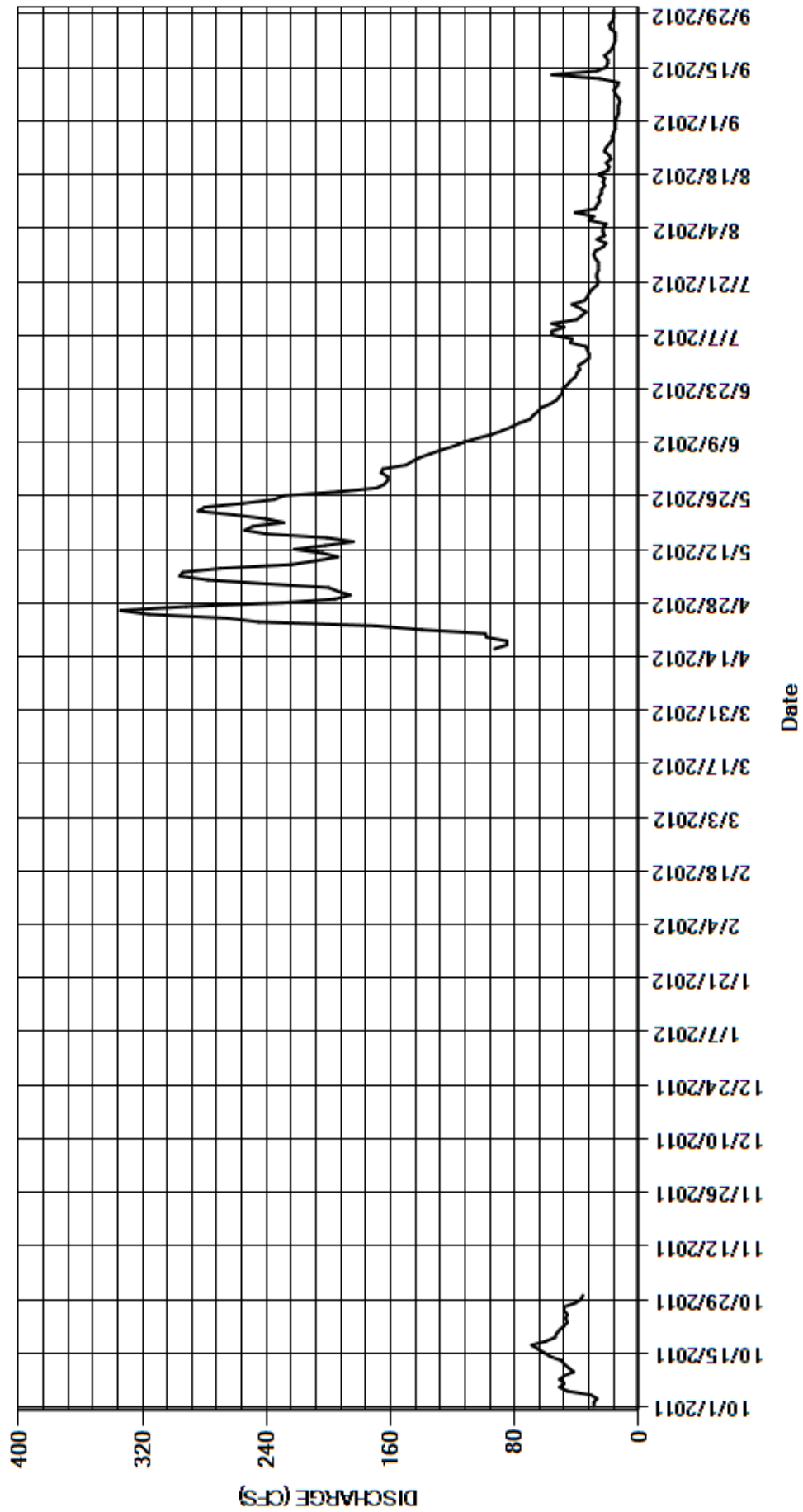
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	29	---	---	---	---	---	---	e194	166	32	27	15
2	29	---	---	---	---	---	---	e200	165	32	22	14
3	27	---	---	---	---	---	---	e240	150	33	23	13
4	31	---	---	---	---	---	---	e278	146	34	23	13
5	46	---	---	---	---	---	---	e296	141	44	21	13
6	51	---	---	---	---	---	---	e294	134	43	32	12
7	48	---	---	---	---	---	---	e270	127	56	29	13
8	51	---	---	---	---	---	---	e224	119	56	41	15
9	48	---	---	---	---	---	---	e208	113	48	28	16
10	42	---	---	---	---	---	---	e194	104	56	27	14
11	45	---	---	---	---	---	---	e204	95	40	25	13
12	48	---	---	---	---	---	---	e222	88	37	26	25
13	50	---	---	---	---	---	---	e202	82	34	24	56
14	57	---	---	---	---	---	---	184	77	38	24	27
15	61	---	---	---	---	---	---	201	70	43	22	21
16	65	---	---	---	---	---	93	240	68	35	23	20
17	69	---	---	---	---	---	85	254	65	33	22	20
18	60	---	---	---	---	---	85	249	63	32	26	22
19	54	---	---	---	---	---	98	229	57	30	20	19
20	53	---	---	---	---	---	99	241	53	27	19	17
21	51	---	---	---	---	---	e140	261	51	26	21	16
22	48	---	---	---	---	---	e170	284	49	27	18	15
23	46	---	---	---	---	---	e245	280	49	27	19	15
24	47	---	---	---	---	---	e265	255	46	26	22	15
25	46	---	---	---	---	---	e316	235	44	26	21	18
26	48	---	---	---	---	---	e334	229	41	26	19	19
27	48	---	---	---	---	---	e292	194	40	28	17	17
28	41	---	---	---	---	---	e230	169	38	29	17	16
29	37	---	---	---	---	---	e196	164	39	28	16	16
30	e36	---	---	---	---	---	e186	162	35	23	15	16
31	---	---	---	---	---	---	---	162	---	21	15	---
TOTAL	1412	---	---	---	---	---	2834	7019	2515	1070	704	541
MEAN	47.1	---	---	---	---	---	189	226	83.8	34.5	22.7	18.0
AC-FT	2800	---	---	---	---	---	5620	13920	4990	2120	1400	1070
MAX	69	---	---	---	---	---	334	296	166	56	41	56
MIN	27	---	---	---	---	---	85	162	35	21	15	12

CAL YR	2011	TOTAL	24234	MEAN	132	MAX	586	MIN	23	AC-FT	48070 (PARTIAL YEAR RECORD)
WTR YR	2012	TOTAL	16095	MEAN	81.3	MAX	334	MIN	12	AC-FT	31920 (PARTIAL YEAR RECORD)

MAX DISCH: 441 CFS AT 22:00 ON APR 25,2012 GH 4.28 FT SHIFT 0 FT (rated fair)
 MAX GH: 4.28 FT AT 22:00 ON APR 25,2012 (rated fair orifice line potentially buried.)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

ALAMOSA RIVER BELOW RANGER CREEK NEAR JASPER
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08236000 ALAMOSA RIVER ABOVE TERRACE RESERVOIR

Water Year 2012

Location.-- Lat 37° 22' 28", long 106° 19' 57" referenced to North American Datum of 1983 (Terrace Reservoir, CO quad, scale 1:24,000), UTM Zone 13 382021 E and 4137254 N, in NE ¼ NE ¼ sec. 17, T.36 N., R.6 E., New Mexico Principal Meridian, Conejos County, CO, Hydrologic Unit 13010002, on left bank 0.8 mi upstream from high-water line of Terrace Reservoir, 3.0 mi downstream from French Creek, and 15 mi northwest of Capulin.

Drainage Area and Period of Record.-- 107 mi² (from topographic maps); Sept. 29, 1911 to June 4, 1912, Apr. 25, 1914 to Sept. 30, 1927, Oct. 1, 1934 to current year.

Equipment.-- Sutron Satlink2, float-operated Sutron Stage Discharge Recorder (SDR), and air temperature sensor in a 4-ft diameter metal shelter and well. The primary reference gage is a drop tape from reference point on shelf. No outside gage. Cableway located 10 feet below gaging station.

Hydrologic Conditions.-- Undeveloped steep alpine and subalpine terrain.

Gage-Height Record.-- Primary record is 15-minute transmitted data with DCP log and SDR log as backup. Record is complete and reliable, except for Dec 5-31, Jan 1-31, Feb 1-29, Mar 1-20 when the well was frozen, and Aug 28-30, when the inlets were left closed. Stage-discharge relation was affected by ice Nov 2-30, Dec 1-4. There were two instrument corrections made to the shaft encoder, -0.02 ft and +0.01 ft; these corrections were prorated by time from previous visit.

Datum Corrections.-- Levels were last run Sep. 9, 2011 to the Reference Point (RP) inside the gage using BM #1 as base. The RP elevation was found to be within allowable limits, so a correction was not made. A two-peg test was performed on the Lietz level (SN 130869) on Sep. 26, 2011, level found to be out of tolerances and adjusted.

Rating.-- Control is a cobblestone riffle approximately fifty feet below the gage. Rating No 17 in use since Oct 1, 2004 was used again this year from Oct 1 until Mar 20. Rating No. 18 was used from Mar 20 to the end of the water year. Rating No. 17 is fairly well defined from 5 cfs to approximately 1300 cfs. Rating No. 18 is fairly well defined from 10 cfs to approximately 1300 cfs. Rating No. 18 was created because the control was slightly modified by heavy equipment in the gage pool during the fall of WY2011. Eight measurements (Nos. 217-224) were made while rating 17 was in use ranging in discharge from 12.4 to 45.1 cfs. Ten measurements were made while rating 18 was in use (Nos. 225-234) ranging in discharge from 15.5 to 238 cfs. The measurements cover the discharge range experienced except for the lower daily flows on Feb 16, 25; and the higher daily flows on Apr 11,12, 23-27; May 3-7, 17, 18, 20-24. The peak flow of 422 cfs occurred at 2230 on Apr 25 at a gage height of 2.33 ft. with a shift of 0.00 ft. The peak exceeded high measurement No. 226 (GH=1.84 ft) made on Apr 23 by 0.49 ft in stage.

Discharge.-- Shifting control method was used to compute discharge for all open water periods. Shifts were applied as defined by measurements and prorated by time. Open water measurement shifts ranged from 0.00 ft to +0.03 ft while rating No. 17 was in use and -0.03 ft to 0.02 ft while rating No. 18 was in use. All were given full weight except Nos. 226, 227, 228, and 230, which were adjusted by as much as 3% to smooth the shift trend. Measurement No 218 was rated fair and adjusted by 7%. Stilling well was frozen and discharge was estimated Dec 5-31, Jan 1-31, Feb 1-29, Mar 1-20. Inlets were left close and discharge estimated Aug 28-30. Stage-discharge relation was affected by ice and discharge estimated Nov 2-30 and Dec 1-4.

Special Computations.-- Discharge for periods of no gage-height and ice affected record were estimated using measurements, weather records, partial day record, and comparison with Terrace Reservoir gain and outflow.

Remarks.-- Record is good, except for periods of no gage-height and ice-affected record which are estimated and poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.--

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

08236000 ALAMOSA RIVER ABOVE TERRACE RESERVOIR

RATING TABLE-- ALATERCO17 USED FROM 01-OCT-2011 TO 20-MAR-2012
 ALATERCO18 USED FROM 20-MAR-2012 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

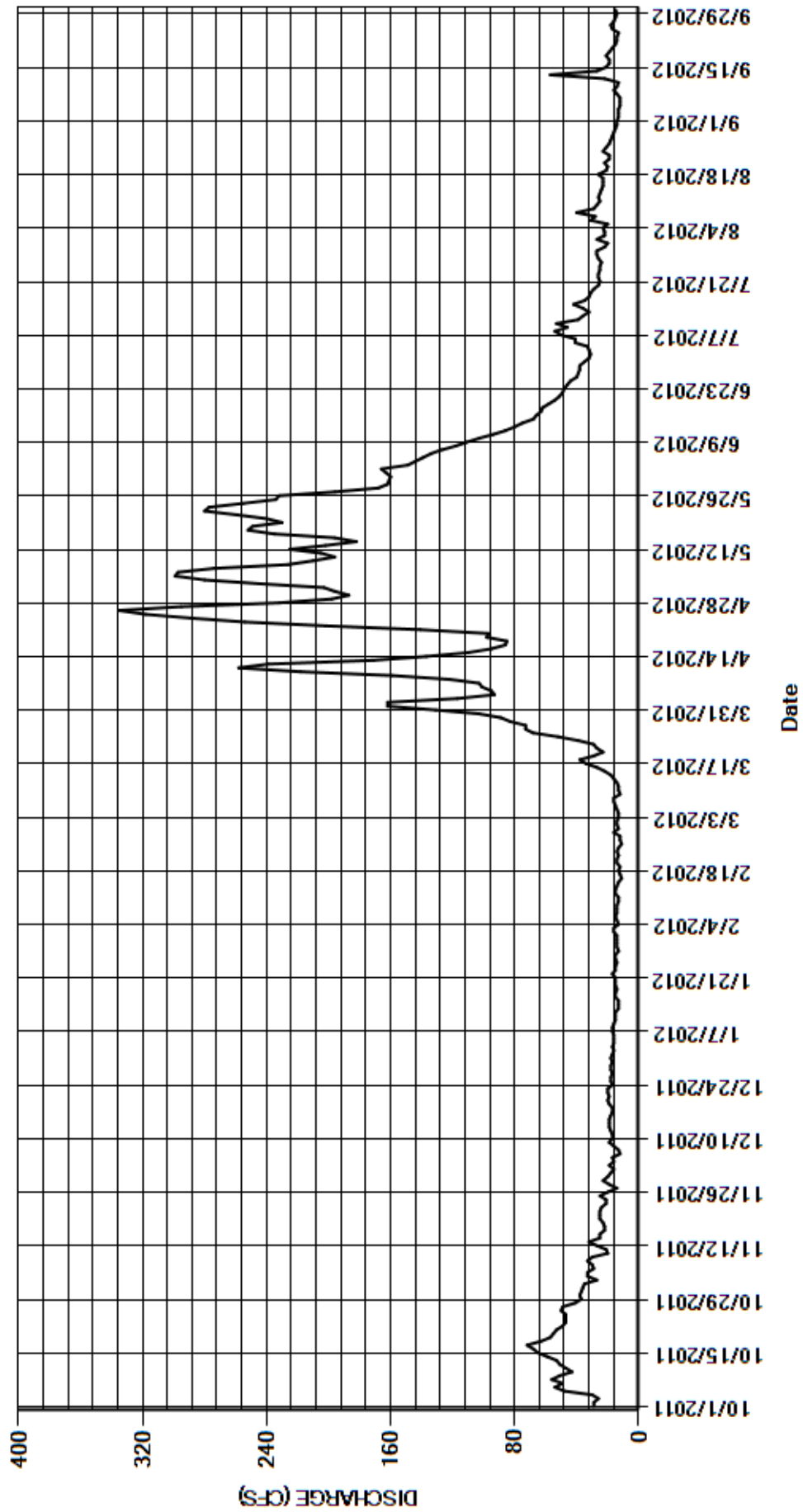
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	29	36	e18	e17	e14	e14	162	196	163	32	27	14
2	29	e35	e16	e16	e16	e14	162	203	166	31	22	13
3	26	e27	e19	e17	e16	e13	117	244	149	32	22	13
4	30	e33	e16	e16	e13	e13	93	280	144	33	23	13
5	48	e33	e17	e16	e14	e14	95	299	139	41	20	12
6	54	e29	e12	e16	e15	e15	101	297	134	41	31	12
7	49	e30	e13	e17	e14	e16	103	274	127	50	28	12
8	56	e33	e16	e17	e14	e16	122	226	118	54	40	14
9	51	e30	e19	e16	e14	e12	159	210	111	46	29	16
10	43	e20	e17	e15	e13	e13	218	196	103	53	27	14
11	47	e21	e17	e15	e13	e13	258	205	94	39	25	13
12	51	e27	e18	e15	e15	e14	239	225	86	36	26	22
13	53	e32	e19	e13	e15	e16	171	202	80	32	25	57
14	59	e25	e19	e13	e14	e18	137	182	75	36	24	27
15	65	e25	e19	e13	e13	e22	110	196	68	42	23	21
16	68	e22	e18	e15	e11	e27	95	235	66	35	23	19
17	72	e22	e17	e15	e12	e34	86	252	63	32	23	19
18	63	e23	e17	e14	e13	e38	85	249	62	31	26	21
19	57	e25	e19	e15	e12	e29	98	230	58	29	21	19
20	55	e25	e20	e15	e14	e23	97	240	54	26	20	17
21	53	e25	e19	e15	e14	27	141	259	51	25	22	15
22	49	e24	e20	e17	e13	29	202	280	49	26	19	14
23	47	e21	e20	e15	e14	39	254	277	48	26	19	14
24	47	e21	e17	e15	e13	52	288	255	46	25	23	13
25	47	e25	e18	e14	e11	68	318	234	44	25	21	17
26	50	e20	e18	e15	e12	73	335	232	40	24	19	18
27	49	e14	e17	e15	e12	73	295	196	39	26	18	16
28	41	e19	e18	e13	e16	83	232	168	38	27	e17	15
29	37	e23	e18	e14	e13	89	198	162	38	27	e16	14
30	38	e20	e17	e14	---	103	187	161	35	22	e15	15
31	37	---	e18	e14	---	131	---	160	---	20	14	---
TOTAL	1500	765	546	467	393	1141	5158	7025	2488	1024	708	519
MEAN	48.4	25.5	17.6	15.1	13.6	36.8	172	227	82.9	33.0	22.8	17.3
AC-FT	2980	1520	1080	926	780	2260	10230	13930	4930	2030	1400	1030
MAX	72	36	20	17	16	131	335	299	166	54	40	57
MIN	26	14	12	13	11	12	85	160	35	20	14	12

CAL YR	2011	TOTAL	29873	MEAN	81.8	MAX	630	MIN	12	AC-FT	59250
WTR YR	2012	TOTAL	21734	MEAN	59.4	MAX	335	MIN	11	AC-FT	43110

MAX DISCH: 422 CFS AT 22:30 ON APR 25,2012 GH 2.33 FT SHIFT 0 FT
 MAX GH: 2.33 FT AT 22:30 ON APR 25,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08236000 ALAMOSA RIVER ABOVE TERRACE RESERVOIR
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08236500 ALAMOSA RIVER BELOW TERRACE RESERVOIR

Water Year 2012

Location.-- Lat 37° 21' 14", long 106° 16' 42" referenced to North American Datum of 1983 (Terrace Reservoir, CO quad, scale 1:24,000), UTM Zone 13 386788 E and 4134887 N, in NE ¼ SE ¼ sec. 23, T.36 N., R.6 E., New Mexico Principal Meridian, Conejos County, CO, Hydrologic Unit 13010002, on left bank 0.5 mi downstream from Terrace Reservoir, 11.0 mi northwest of Capulin, CO.

Drainage Area and Period of Record.-- 116 mi², approximately (from topographic maps) ; 1909-1915, 1917-1928 (partial year records on many years), 1929 to current year.

Equipment.-- Graphic water stage recorder, data collection platform (Sutron Model Satlink Logger) and a float-operated shaft encoder in a 6-foot square concrete aggregate shelter and 3 ft diameter concrete well. The primary reference gage is a drop tape from reference point on shelf. No outside gage. A bank-operated cableway is located 100 feet downstream. No change.

Hydrologic Conditions.-- Flow at gage is completely regulated by Terrace Reservoir.

Gage-Height Record.-- Primary record is 15-minute transmitted data with DCP log and chart record as backup. Record is complete and reliable, except for Dec. 9, 2011 to Mar. 12, 2012 when the well was frozen. Four missing unit values on Mar. 21 and Jun. 29 were filled from chart with no loss in accuracy. A -0.01 ft instrument correction was made on Jun. 7 and prorated by time from previous visit.

Datum Corrections.-- Levels were run Aug. 8, 2012 to the Reference Point (RP) inside the gage using BM1 as base. The RP elevation was found to be within limits. Therefore no correction was made or required. Two-peg test was performed on the Lietz level (SN 130869) on Aug. 6, 2012, the instrument was within tolerance.

Rating.-- Control is a gravel and cobblestone riffle approximately one hundred fifty feet below the gage. Rating No. 14 was used again this year until January 11, 2012. After January 11, 2012 Rating No. 15 was used for the remainder of the water year. Rating No. 15 was developed from recent Measurements Nos.168-192 made during the 2011-2012 water years along with high flow Measurements Nos.70-71, made in 2005, No. 120, made in 2008, and No. 135 made in 2009. The gage was re-located to the current location in 1988. These measurements ranged from a gage-height of 1.90 ft with a discharge of 1.74 cfs to a gage-height of 4.70 ft with a discharge of 951 cfs. A PZF of 1.63 ft was measured on Nov. 15, 2011, when the low measurement during this period was made. This PZF measurement along with consistent positive shifts since early spring 2011 indicates control scour. Rating 15 has 6 definition points including the PZF, 2 breakpoints, and 3 offsets. The high end offset is 2.70 ft which was determined by observation of best fit. A breakpoint at 3.65 ft defines the approximate point where the control transitions from section to channel. Rating 15 was extended above high flow measurement by 0.80 ft to a streamflow of 1560 cfs, which is 64 percent greater than the highest measurement (No. 70) at this site since 1988. Seventeen measurements (Nos. 179-195) were made this year ranging in discharge from 1.74 to 260 cfs. They cover the discharge range experienced except for lower daily flows on Nov. 4-7, 2011 and higher daily flows Apr. 11, 12, 24-27, May 4-8,18, 22-25, 2012. The peak flow of 381 cfs occurred at 0145 on Apr. 27, 2012 at a gage height of 3.79 and a shift of 0.00 ft. It exceeded high measurement No. 188 (GH = 3.51), made Apr. 23, 2012, by 0.28 ft in stage.

Discharge.-- Shifting control method was used during all open water periods. Shifts were applied as defined by measurements and prorated by time from start of water year until well froze. The new unshifted rating was applied until Jul. 16 before transitioning to variable stage-shift relationship (VS12-A) by Aug. 9. VS12-A was created to define shifting in a segment of the rating and used for the remainder of the water year. Measurement shifts ranged from +0.01 to +0.05 ft on Rating No. 14 and from -0.04 to +0.04 ft on Rating No. 15. All were given full weight and applied except Nos. 179, 188-190, 192, and 194, which were adjusted as much as 7% to smooth shift distribution.

Special Computations.-- Discharge for periods of unreliable gage-height was estimated using measurements, partial day records, temperature records, and Terrace Reservoir storage elevation.

Remarks.-- Record is good except for the period of unreliable gage-height, which is estimated and poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.--

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

08236500 ALAMOSA RIVER BELOW TERRACE RESERVOIR

RATING TABLE.-- ALABELCO14 USED FROM 01-OCT-2011 TO 11-JAN-2012
 ALABELCO15 USED FROM 11-JAN-2012 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

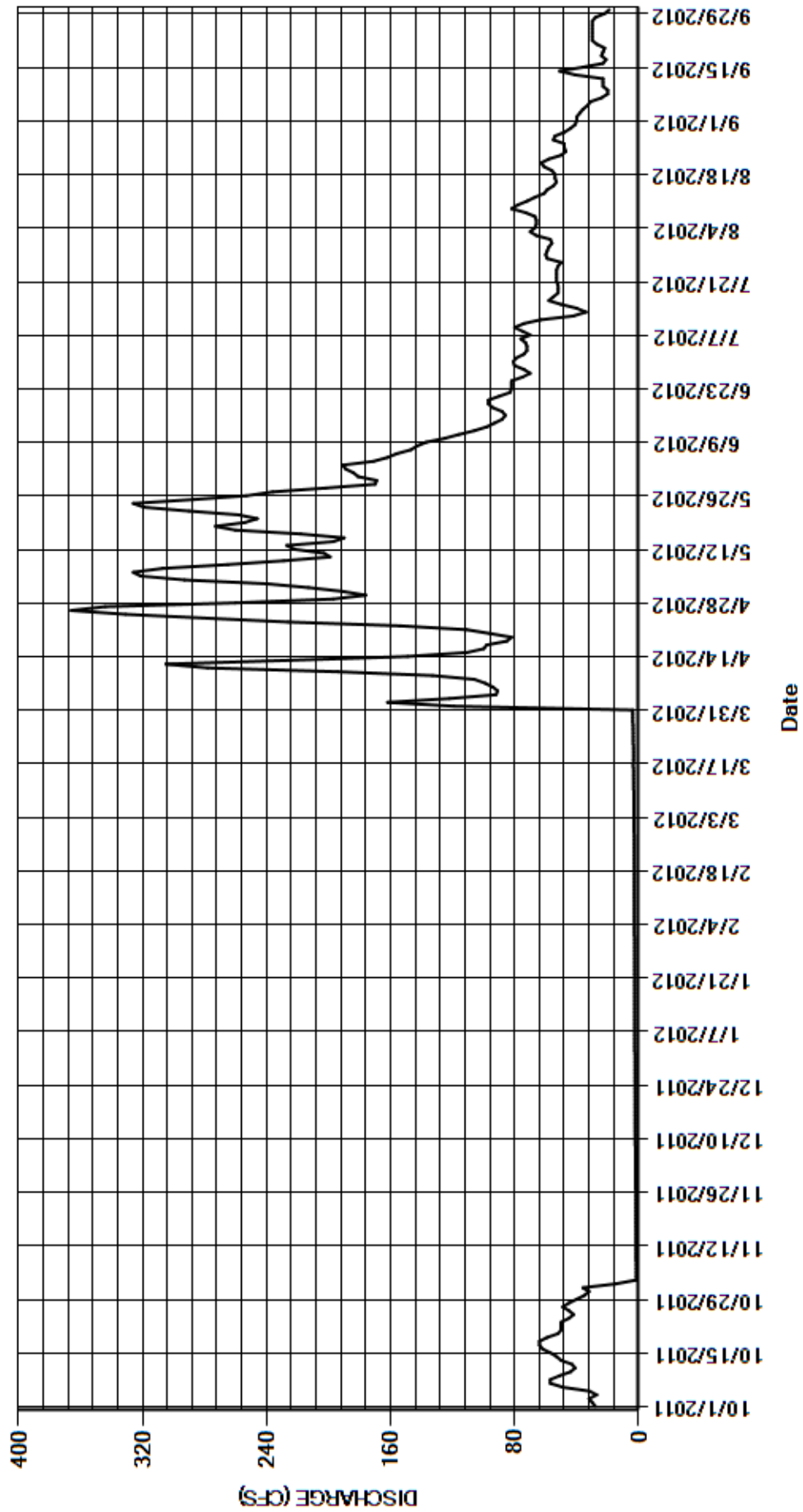
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	28	36	2.1	e2.4	e2.7	e3.0	119	191	184	79	57	40
2	30	15	2.1	e2.5	e2.7	e3.0	162	213	189	74	66	40
3	32	1.7	2.1	e2.5	e2.7	e3.0	122	240	191	72	70	38
4	27	1.6	2.1	e2.5	e2.7	e3.0	92	293	171	72	67	36
5	32	1.6	2.1	e2.5	e2.7	e3.0	91	321	162	73	66	33
6	49	1.6	2.1	e2.5	e2.7	e3.1	94	326	156	76	66	31
7	57	1.6	2.1	e2.5	e2.7	e3.1	99	307	147	70	67	24
8	57	1.7	2.2	e2.5	e2.7	e3.1	106	265	143	75	73	20
9	51	1.7	e2.2	e2.5	e2.7	e3.1	133	229	137	80	82	20
10	44	1.7	e2.2	e2.5	e2.7	e3.2	194	199	125	74	78	23
11	41	1.7	e2.2	e2.5	e2.8	e3.2	278	203	116	63	72	23
12	43	1.7	e2.3	e2.5	e2.8	e3.2	305	222	106	42	67	23
13	50	1.7	e2.3	e2.5	e2.8	3.3	225	227	98	34	61	41
14	53	1.7	e2.3	e2.5	e2.8	3.3	149	197	93	40	59	51
15	57	1.7	e2.3	e2.5	e2.8	3.3	111	190	88	50	55	36
16	62	1.7	e2.3	e2.5	e2.8	3.5	100	218	86	58	53	23
17	64	1.8	e2.3	e2.5	e2.8	3.5	98	260	88	55	54	21
18	64	1.9	e2.3	e2.5	e2.8	3.4	85	273	94	52	54	24
19	59	1.9	e2.3	e2.6	e2.8	3.3	82	254	97	52	56	23
20	52	1.9	e2.3	e2.6	e2.9	3.3	96	246	97	52	61	22
21	50	1.9	e2.3	e2.6	e2.9	3.4	111	258	90	53	63	27
22	50	1.9	e2.4	e2.6	e2.9	3.5	154	290	83	53	58	30
23	50	1.9	e2.4	e2.6	e2.9	3.5	226	319	82	53	50	30
24	45	1.9	e2.4	e2.6	e2.9	3.5	278	326	82	53	47	30
25	42	1.9	e2.4	e2.6	e2.9	3.5	331	287	82	52	48	30
26	45	1.9	e2.4	e2.6	e2.9	3.6	366	253	75	50	48	30
27	49	2.0	e2.4	e2.6	e2.9	3.7	344	236	70	59	55	30
28	45	2.1	e2.4	e2.6	e3.0	3.8	260	202	74	60	54	28
29	40	2.1	e2.4	e2.6	e3.0	3.8	197	170	80	59	48	22
30	35	2.1	e2.4	e2.6	---	3.8	176	169	81	58	44	19
31	32	---	e2.4	e2.6	---	3.9	---	181	---	56	41	---
TOTAL	1435	101.6	70.5	78.7	81.4	103.9	5184	7565	3367	1849	1840	868
MEAN	46.3	3.39	2.27	2.54	2.81	3.35	173	244	112	59.6	59.4	28.9
AC-FT	2850	202	140	156	161	206	10280	15010	6680	3670	3650	1720
MAX	64	36	2.4	2.6	3.0	3.9	366	326	191	80	82	51
MIN	27	1.6	2.1	2.4	2.7	3.0	82	169	70	34	41	19

CAL YR	2011	TOTAL	29602.7	MEAN	81.1	MAX	638	MIN	1.6	AC-FT	58720
WTR YR	2012	TOTAL	22544.1	MEAN	61.6	MAX	366	MIN	1.6	AC-FT	44720

MAX DISCH: 381 CFS AT 01:45 ON APR 27,2012 GH 3.79 FT SHIFT 0 FT
 MAX GH: 3.79 FT AT 01:45 ON APR 27,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08236500 ALAMOSA RIVER BELOW TERRACE RESERVOIR
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08238000 LAJARA CREEK AT GALLEGOS RANCH NEAR CAPULIN

Water Year 2012

Location.-- Lat 37°12'36", long 106°11'16" referenced to North American Datum of 1983 (Vicente Canyon, CO quad, scale 1:24,000), UTM Zone 13 394608 E and 4118841 N, in NW ¼ NE ¼ sec. 10, T.34 N., R.7 E., New Mexico Principal Meridian, Conejos County, CO, Hydrologic Unit 13010002, on left bank 2.7 mi downstream from Canyon Del Rancho, 7 mi southwest of Capulin, CO, and 16.5 mi downstream from La Jara Reservoir.

Drainage Area and Period of Record.-- Approximately 98 mi²; April 1916 to November 1917, April 1919 to Nov 1923, May 1936 to current year. No winter records prior to 1950 except water year 1944. Monthly discharge only for some periods.

Equipment.-- Sutron Satlink2 and float-operated SDR and a tipping-bucket rain gauge in a 42-inch diameter CMP shelter and well. The primary reference gage is a drop tape from reference point on shelf. The secondary reference is an outside cantilever staff gage.

Hydrologic Conditions.-- Basin predominately subalpine, undeveloped National Forest with flow somewhat regulated by La Jara Reservoir (capacity 14,040 acre-ft) 16 1/2 mi upstream. Small diversions above station for irrigation.

Gage-Height Record.-- Primary record is 15-minute satellite transmitted data with DCP and SDR log as backup. Record is complete and reliable except for Dec 12 through Mar 20 when the well or inlets were frozen. One erroneous value on Nov 15 was corrected by linear interpolation. The stage-discharge relation was affected by ice Nov 2-30 and Dec 1-11. A +0.02 ft flush correction was made on Apr 23 and prorated from last point of inflection in the gage height graph.

Datum Corrections.-- Levels were last run to the Reference Point (RP) inside the gage on Sep 9, 2011 using B.M. No. 1 as base. The RP was outside allowable limits and a -0.02 ft correction was made. Two-peg test was performed on the Lietz level (SN 130869) on Jul 28, 2011 and the instrument was within allowable limits and no correction was made.

Rating.-- The control is a concrete broad crested weir with a v-notch cut into its center, approximately 15 feet below the gage. Minor shifting occurs mainly due to scour and fill in and above gage pool. Rating No. 19TMP, in use since October 1, 2004, was used again this year. It is well defined from 1.7 to 142 cfs. Seventeen measurements (Nos. 176-192) were made this year ranging in discharge from 3.98 to 22.0 cfs. They cover the discharge range experienced except for lower daily flows on Dec 5, 6, 16, 22, and 23 and the higher daily flows Mar 23-29, 31; Apr 1, 2, 5, 11, and 12. The peak flow of 223 cfs occurred at 2215 on Jul 10, 2012 at a gage height of 2.60 with a shift of 0.00 feet as a result of rainfall. The peak exceeded high Measurement No. 184 (GH=1.30 feet), made Mar 30, 2012 by 1.30 feet in stage.

Discharge.-- Shifting-control method was used to compute the discharge record for all open water periods. Shifts were applied by time from Oct 1-3. Two variable stage-shift relationships (LAJCAPCOVS12-4 and LAJCAPCOVS12-5) were used to distribute shifts by stage for the rest of the year for all periods of good record. VS12-4 was used from Oct 3 to Aug 9. From Aug 9 to Aug 28 the shifts were prorated between VS12-4 and VS12-5 to adjust the low end of the curve. VS12-5 was used from Aug 28 to the end of the water year. Measured shifts range from 0.00 ft to +0.04 ft. All measurements were given full weight except for Nos. 187 and 190, which were rated fair and adjusted as much as 3.8% to fit the shift trend. Measurement No. 188 was rated poor and adjusted 6.3% to fit the shift trend. The stage-discharge relation was affected by ice and discharge estimated Nov 2-30, Dec 1-11.

Special Computations.-- Discharge for periods of no gage-height and ice affected record was estimated using discharge measurements, hydrographic comparison with Alamosa River above Terrace Reservoir, and temperature records from Alamosa River above Terrace Reservoir.

Remarks.-- Record is good, except for periods of no gage-height and ice affected record, which are estimated and poor. The peak discharge should also be considered poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.--

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

08238000 LAJARA CREEK AT GALLEGOS RANCH NEAR CAPULIN

RATING TABLE.-- LAJCAPCO19TMP USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

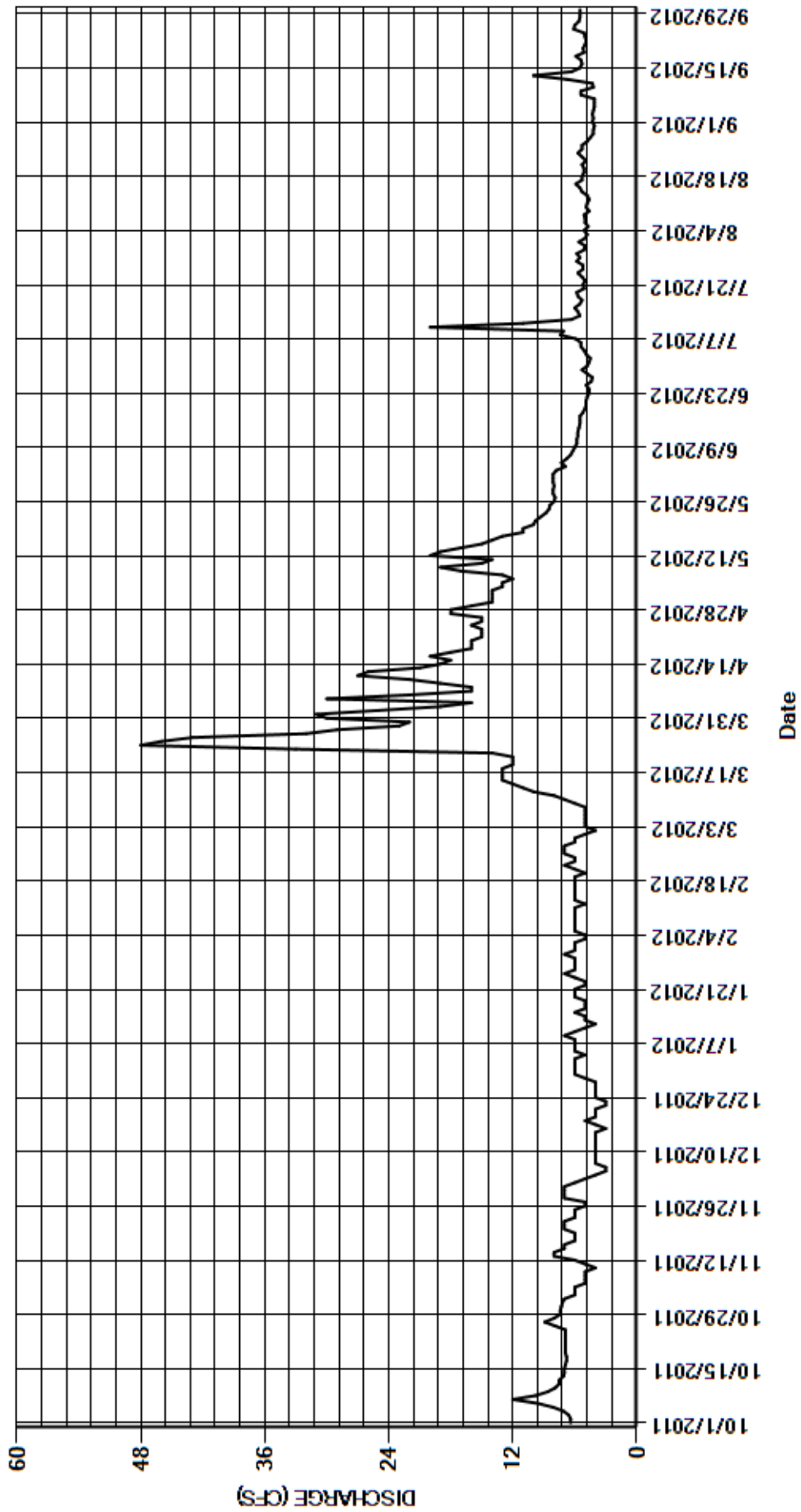
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.4	7.2	e7.0	e6.0	e6.0	e5.0	31	14	8.1	4.6	5.6	4.3
2	6.4	e7.0	e6.0	e6.0	e6.0	e4.0	25	14	8.1	4.5	5.0	4.2
3	6.6	e6.0	e5.0	e6.0	e5.0	e5.0	19	14	7.8	4.9	4.8	4.3
4	7.1	e6.0	e4.0	e5.0	e5.0	e5.0	16	13	6.9	5.1	5.1	4.2
5	8.1	e6.0	e3.0	e6.0	e6.0	e5.0	30	13	7.3	5.4	4.7	4.1
6	9.6	e5.0	e3.0	e6.0	e6.0	e5.0	22	12	6.8	5.4	5.0	4.1
7	12	e5.0	e4.0	e6.0	e6.0	e5.0	16	13	6.4	5.9	5.0	4.1
8	9.8	e5.0	e4.0	e6.0	e6.0	e5.0	16	17	6.2	7.4	5.1	5.4
9	8.6	e5.0	e4.0	e7.0	e6.0	e6.0	19	19	6.0	7.1	4.6	5.4
10	7.9	e4.0	e4.0	e6.0	e6.0	e7.0	22	15	5.8	20	4.9	4.2
11	7.5	e5.0	e4.0	e5.0	e6.0	e8.0	27	14	5.8	11	4.8	4.3
12	7.5	e6.0	e4.0	e4.0	e5.0	e10	26	20	5.7	6.3	4.6	6.7
13	7.1	e8.0	e4.0	e5.0	e6.0	e11	21	19	5.7	5.5	4.8	10
14	7.0	e8.0	e4.0	e5.0	e6.0	e12	19	17	5.6	5.7	5.3	6.3
15	7.0	e7.0	e4.0	e6.0	e6.0	e13	18	15	5.5	6.0	5.5	5.5
16	6.9	e7.0	e3.0	e5.0	e6.0	e13	20	14	5.5	5.5	5.9	5.3
17	6.8	e6.0	e4.0	e5.0	e6.0	e13	18	13	5.5	5.3	5.3	5.4
18	6.8	e6.0	e5.0	e5.0	e6.0	e13	16	11	5.2	5.7	5.3	5.9
19	6.9	e6.0	e4.0	e6.0	e6.0	e12	16	11	5.0	5.8	5.1	5.1
20	6.9	e7.0	e4.0	e6.0	e5.0	e12	16	10	4.9	5.1	5.1	5.2
21	6.9	e7.0	e4.0	e6.0	e6.0	12	15	9.8	4.9	5.2	5.3	5.0
22	6.9	e7.0	e3.0	e5.0	e7.0	14	15	9.3	4.8	5.0	4.9	4.9
23	6.9	e6.0	e3.0	e5.0	e6.0	33	15	8.8	4.6	5.3	5.3	5.0
24	6.9	e6.0	e4.0	e6.0	e6.0	48	16	8.5	4.6	5.7	5.7	5.1
25	6.9	e6.0	e4.0	e7.0	e7.0	46	15	8.4	4.9	5.2	5.3	6.1
26	7.9	e5.0	e4.0	e6.0	e7.0	43	15	8.0	4.4	5.2	5.3	6.0
27	8.9	e5.0	e4.0	e6.0	e7.0	32	18	7.9	4.3	5.8	4.8	5.6
28	8.0	e7.0	e4.0	e6.0	e6.0	29	18	8.1	4.8	5.5	4.5	5.5
29	7.4	e7.0	e5.0	e6.0	e6.0	23	16	8.1	5.3	5.8	4.2	5.5
30	7.4	e7.0	e6.0	e7.0	---	22	14	8.0	4.8	5.1	4.2	5.5
31	7.3	---	e6.0	e6.0	---	30	---	8.1	---	5.0	4.1	---
TOTAL	234.3	185.2	131.0	178.0	174.0	501.0	570	381.0	171.2	191.0	155.1	158.2
MEAN	7.56	6.17	4.23	5.74	6.00	16.2	19.0	12.3	5.71	6.16	5.00	5.27
AC-FT	465	367	260	353	345	994	1130	756	340	379	308	314
MAX	12	8.0	7.0	7.0	7.0	48	31	20	8.1	20	5.9	10
MIN	6.4	4.0	3.0	4.0	5.0	4.0	14	7.9	4.3	4.5	4.1	4.1

CAL YR	2011	TOTAL	2834.9	MEAN	7.77	MAX	23	MIN	3.0	AC-FT	5620
WTR YR	2012	TOTAL	3030.0	MEAN	8.28	MAX	48	MIN	3.0	AC-FT	6010

MAX DISCH: 223 CFS AT 22:15 ON JUL 10,2012 GH 2.60 FT SHIFT 0 FT
 MAX GH: 2.60 FT AT 22:15 ON JUL 10,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08238000 LAJARA CREEK AT GALLEGOS RANCH NEAR CAPULIN
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
SOUTH CHANNEL NORTON DRAIN DITCH NEAR LA SAUSES

Water Year 2012

Location.-- Lat 37°17'55", long 105°51'17" referenced to North American Datum of 1983 (Pikes Stockade, CO quad, scale 1:24,000), UTM Zone 13 424251 E and 4128328 N, in SW ¼ SW ¼ sec. 2, T.35 N., R.10 E., New Mexico Principal Meridian, Conejos County, CO, Hydrologic Unit 13010002, on right bank 150 ft north of road, 13 mi south of Alamosa, CO, 7 mi northwest of LaSausés, CO.

Drainage Area and Period of Record.-- Not determined; 1989 to present.

Equipment.-- Graphic water-stage recorder (removed Nov. 18, 2012), data collection platform (Sutron Satlink 2), and a float-operated shaft encoder in a steel shelter on top of 2 ft diameter CMP well at a modified 3 ft Parshall Flume. The flume was modified by inserting a steel V-ramp on Aug. 16, 2010. The primary reference gage is drop tape from a RP mounted on the shelf support frame. The RP was installed on May 5, 2011 and the tape length was changed to match the outside staff reading. The secondary reference is outside staff gage in flume.

Hydrologic Conditions.-- Manmade canal to return sub-irrigation water from fields and pastures to Rio Grande River.

Gage-Height Record.-- Primary record is 15-minute satellite transmitted data with DCP log and SDR log as backup. Record is complete and reliable except for Dec 5-15 and Mar 9 when floats were frozen and Dec 16 through Mar 6 when station was closed. One erroneous unit value (caused by hydro) was corrected on Apr 19 without loss of accuracy. There were two instrument calibration corrections, -0.01 ft and +0.01 ft, which were prorated back to previous visit. The stage-discharge relation was affected by ice Nov 3, 4, 6-12, 14-17, 19-24, 26-30; Dec 1-4 and Mar 8, 19-22.

Datum Corrections.-- The Parshall flume was last inspected with levels completed four years ago on Jul 30, 2008. The flume is in poor condition. The levels indicate considerable lateral slope away from well on REW and downward toward staff on LEW. A brass RP was installed on May 5, 2011 and the tape length was changed to match the outside staff reading.

Rating.-- Control is a 3 ft modified Parshall Flume. A steel insert was placed in the throat of the flume on August 16, 2010 to prevent the flume from isolating. Shifting is caused by the unlevel flume, and also sand and aquatic plant growth accumulating in front of and in the flume. Rating No. 02TMP was used for the entire water year and is well defined from 0 cfs to 8 cfs. Fifteen measurements (Nos. 356-370) were made this water year ranging in discharge from 0.25 to 7.45 cfs. They cover the discharge range experienced except for the higher daily flows of Nov 1; Apr 15-17, 29, May 9, 10, 14-21. The peak flow of 25.3 cfs occurred at 0900 on Nov. 1, 2011 at a gage height of 1.83 ft with a shift of 0.00 ft. It exceeded high Meas. No. 363 (GH = 0.87), made April 19, 2012, by 0.96 ft in stage.

Discharge.-- Shifting section control method was used to compute the discharge record. Variable stage-shift relationship: NORDSCCOVS12-A was used for the period coming out of ice until Apr 19. This stage-shift relation was prorated to a second stage-shift relation: NORDSCCOVS12-B on May 11 by time due to plant growth causing a more negative shift trend. VS12-B was then used the remainder of the year. Measurement shifts ranged from -0.06 to 0.01 ft.. All were given full weight and applied, except Nos. 363, 364, which are fair measurements and adjusted as much as 3.7% and Nos. 367-370, which were rated poor and adjusted by as much as 14.7% to smooth shift distribution. The stage-discharge relation was affected by ice and discharge estimated Nov 3, 4, 6-12, 14-17, 19-24, 26-30; Dec 1-4 and Mar 8, 19-22.

Special Computations.-- Discharge for periods of winter no gage-height and ice affected record was estimated using measurements, partial record days, weather records, and comparison with the station "Norton Drain near LaSausés".

Remarks.-- Record is fair, except for periods of no gage-height and ice affected record, which are estimated and poor. The peak discharge should also be considered poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.-- Gather more measurements to better define the new rating.

STATE OF COLORADO
DIVISION OF WATER RESOURCES
OFFICE OF STATE ENGINEER

SOUTH CHANNEL NORTON DRAIN DITCH NEAR LA SAUSES

RATING TABLE.-- NORDSCCO02TMP USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

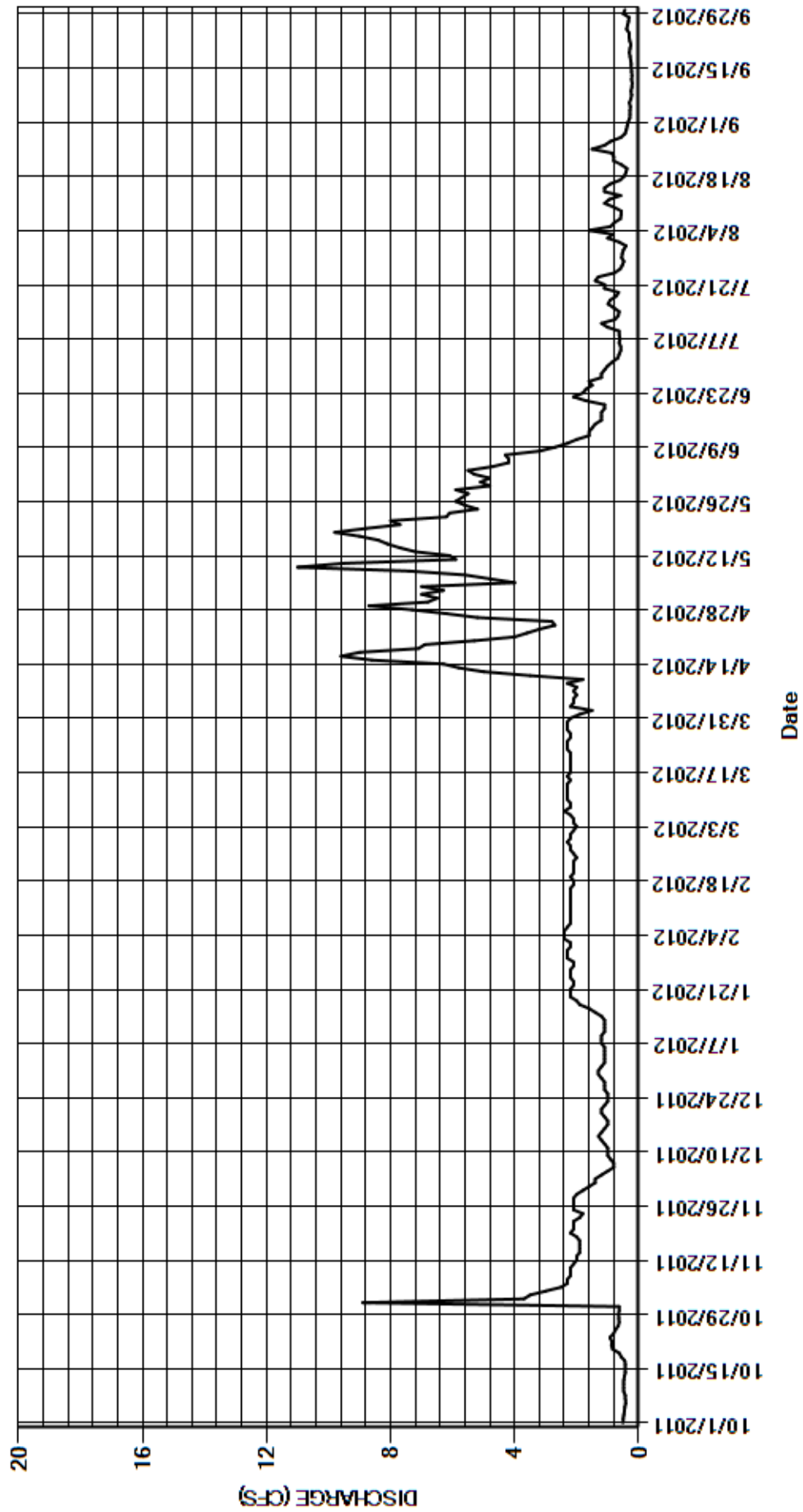
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.51	8.9	e1.6	e1.2	e2.2	e2.2	1.9	6.5	4.8	0.85	0.63	0.34
2	0.50	3.7	e1.4	e1.1	e2.2	e2.1	1.5	7.0	5.3	0.68	1.0	0.29
3	0.48	e3.5	e1.4	e1.1	e2.4	e2.0	2.2	6.3	5.5	0.63	0.83	0.28
4	0.46	e3.0	e1.2	e1.1	e2.4	e2.1	2.1	7.0	4.7	0.58	1.6	0.28
5	0.45	2.5	e1.0	e1.1	e2.4	e2.1	2.1	4.0	4.2	0.58	0.91	0.27
6	0.42	e2.3	e0.80	e1.1	e2.3	e2.2	2.0	4.8	4.2	0.63	0.79	0.30
7	0.43	e2.3	e0.80	e1.2	e2.2	2.4	2.1	5.6	4.3	0.60	0.59	0.25
8	0.43	e2.2	e0.90	e1.2	e2.2	e2.2	2.0	7.4	3.2	0.63	0.57	0.23
9	0.48	e2.2	e1.0	e1.2	e2.2	e2.2	2.3	11	2.7	0.63	0.56	0.25
10	0.48	e2.2	e1.0	e1.1	e2.2	2.3	1.8	9.5	2.3	1.0	0.80	0.22
11	0.48	e2.1	e1.0	e1.1	e2.2	2.3	3.5	5.9	2.0	1.2	1.1	0.21
12	0.48	e2.0	e1.1	e1.1	e2.2	2.3	5.0	6.1	1.6	0.76	0.95	0.23
13	0.46	2.0	e1.2	e1.1	e2.2	2.3	5.8	7.2	1.6	0.66	0.58	0.22
14	0.43	e1.9	e1.3	e1.2	e2.2	2.3	6.3	7.7	1.5	0.63	1.1	0.23
15	0.43	e1.9	e1.2	e1.4	e2.2	2.2	8.6	8.1	1.4	0.80	1.1	0.24
16	0.43	e1.9	e1.1	e1.6	e2.2	2.3	9.6	8.4	1.2	0.99	0.92	0.24
17	0.45	e1.9	e1.0	e1.9	e2.1	2.2	9.0	9.0	1.2	0.92	0.60	0.26
18	0.56	2.0	e1.0	e2.0	e2.1	2.2	7.1	9.8	1.2	0.73	0.47	0.28
19	0.63	e2.2	e1.1	e2.2	e2.2	e2.2	6.9	8.8	1.1	0.65	0.41	0.30
20	0.84	e2.1	e1.2	e2.2	e2.1	e2.2	5.3	7.7	1.1	1.1	0.38	0.28
21	0.88	e2.1	e1.2	e2.2	e2.1	e2.2	4.0	8.0	1.7	1.1	0.56	0.25
22	0.86	e2.1	e1.1	e2.1	e2.1	e2.2	3.6	6.2	2.1	1.4	0.81	0.29
23	0.93	e1.9	e1.0	e2.1	e2.1	2.3	3.2	6.1	1.8	1.3	0.80	0.31
24	0.81	e1.8	e1.0	e2.2	e2.0	2.3	2.7	5.2	1.7	0.79	0.87	0.31
25	0.75	2.1	e1.0	e2.2	e2.1	2.3	2.8	5.6	1.5	0.60	1.5	0.39
26	0.66	e2.1	e1.1	e2.2	e2.2	2.2	5.2	5.9	1.6	0.53	1.1	0.36
27	0.63	e2.1	e1.1	e2.1	e2.2	2.2	6.2	5.7	1.2	0.48	0.91	0.33
28	0.64	e2.1	e1.1	e2.1	e2.3	2.3	7.3	5.5	1.2	0.55	0.58	0.31
29	0.65	e2.0	e1.2	e2.3	e2.2	2.3	8.7	5.9	1.1	0.53	0.44	0.50
30	0.63	e1.8	e1.3	e2.3	---	2.3	6.8	4.8	1.0	0.49	0.40	0.44
31	0.63	---	e1.3	e2.3	---	2.2	---	5.1	---	0.41	0.37	---
TOTAL	17.90	72.9	34.70	51.3	63.7	69.1	137.6	211.8	70.0	23.43	24.23	8.69
MEAN	0.58	2.43	1.12	1.65	2.20	2.23	4.59	6.83	2.33	0.76	0.78	0.29
AC-FT	36	145	69	102	126	137	273	420	139	46	48	17
MAX	0.93	8.9	1.6	2.3	2.4	2.4	9.6	11	5.5	1.4	1.6	0.50
MIN	0.42	1.8	0.80	1.1	2.0	2.0	1.5	4.0	1.0	0.41	0.37	0.21

CAL YR	2011	TOTAL	748.60	MEAN	2.05	MAX	12	MIN	0.42	AC-FT	1480
WTR YR	2012	TOTAL	785.35	MEAN	2.15	MAX	11	MIN	0.21	AC-FT	1560

MAX DISCH: 25.3 CFS AT 09:00 ON NOV 01,2011 GH 1.83 FT SHIFT 0 FT
MAX GH: 1.83 FT AT 09:00 ON NOV 01,2011

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

SOUTH CHANNEL NORTON DRAIN DITCH NEAR LA SAUSES
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
NORTON DRAIN NEAR LA SAUSES

Water Year 2012

Location.-- Lat 37°20'5", long 105°46'17" referenced to North American Datum of 1983 (Pikes Stockade, CO quad, scale 1:24,000), UTM Zone 13 431659 E and 4132271 N, in NW ¼ SE ¼ sec. 28, T.36 N., R.11 E., New Mexico Principal Meridian, Conejos County, CO, Hydrologic Unit 13010002, on left bank 1.5 mi above confluence with Rio Grande River, 11 mi south of Alamosa, CO, 5 mi North of LaSausés, CO.

Drainage Area and Period of Record.-- Not determined; 1970 to present.

Equipment.-- Graphic water stage recorder, data collection platform (Sutron Satlink), and a float-operated shaft encoder in a 36-inch diameter CMP shelter and well at a modified six-foot Parshall Flume. The primary reference gage is drop tape from an inside reference point. The secondary reference is outside staff gage in flume. No changes.

Hydrologic Conditions.-- Manmade canal to return sub-irrigation water from fields and pastures to Rio Grande River.

Gage-Height Record.-- Primary record is 15-minute transmitted data with DCP log and chart record as backup. Record is complete and reliable, except for Dec. 5-15, 2011, when the well was frozen, Dec.16, 2011 to Mar. 6, 2012 when the station was closed for the winter, and Jul. 31, Aug. 1-3, 7-25, 28-31 and Sep. 1-26, 2012 when the gage was isolated. One missing unit value was filled from chart on Jun. 8, 2012 with no loss of accuracy. Stage-discharge relation was affected by ice Dec. 1-4, 2011. There were five calibration corrections ranging from -0.01 ft to +0.01 ft made to the shaft encoder. All were prorated by time from previous visit.

Datum Corrections.-- Inspection and levels were completed on the flume Jun. 22, 2012. Existing RM1 was re-established as BM1. BM2 and BM3 were established. The flume is in good condition. Two-peg test was performed on the Lietz level (SN 130869) on June 22, 2012, the instrument was within allowable limits and no correction was made. The tape length was adjusted by -0.02 feet to return RP to gage datum. The resulting correction was applied to the gage height record and mean gage height of all discharge measurements from Mar. 6, 2012 to the time of correction on Jun. 22, 2012.

Rating.-- The control is a modified six-foot Parshall Flume. Since this Parshall Flume has been modified with ramp inserts at the throat, it is not expected to perform as a Parshall flume. Rating NORDLSCO05a was used all year. Rating 05a is intended to better define the very low end of the curve. Shifting is caused by sand and moss accumulating in front of and in the flume. Seventeen measurements (Nos. 770-786) were made this year ranging in discharge from 0 to 10.8 cfs. The measurements cover the flow range experienced except for higher daily flows on Apr. 16, 17, May 9, 10, 13-21, 26, 29, 2012. The peak flow of 24.5 cfs occurred at 1745 on Nov. 1, 2011 at a gage height of 1.07 feet with a shift of -0.01 feet. It exceeded high Measurement No. 778 (GH = 0.66), made May 11, 2012 by 0.41 feet in stage.

Discharge.-- Shifting control method was used for all periods of good record. During open water periods, shifts were applied as defined by discharge measurements and distributed by time. There were three cleaning corrections ranging from -0.05 to -0.02 ft. All were accounted for in the shift and prorated from previous visit. Measurements show shifts ranged from -0.01 to +0.03 feet. All measurements were given full weight and applied except Nos. 775, 777, 778, and 779 which were adjusted as much as 6.3% to smooth shift distribution. The gage was isolated and flow estimated Jul. 31, Aug. 1-3, 7-25, 28-31 and Sep. 1-26, 2012. Stage-discharge relation was affected by ice and discharge estimated Dec. 1-4, 2011.

Special Computations.-- Discharge for periods of gage isolation, no gage-height, and ice affected record was estimated using measurements, partial record days, weather records, and comparison with the station "South Channel Norton Drain near LaSausés".

Remarks.-- Record is good, except for periods of gage isolation, no gage-height, and ice affected record, which are estimated and poor. , The peak and days on which the average flow is less than 1 cfs are rated fair. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.--

STATE OF COLORADO
DIVISION OF WATER RESOURCES
OFFICE OF STATE ENGINEER

NORTON DRAIN NEAR LA SAUSES

RATING TABLE.-- NORDLSCO05a USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

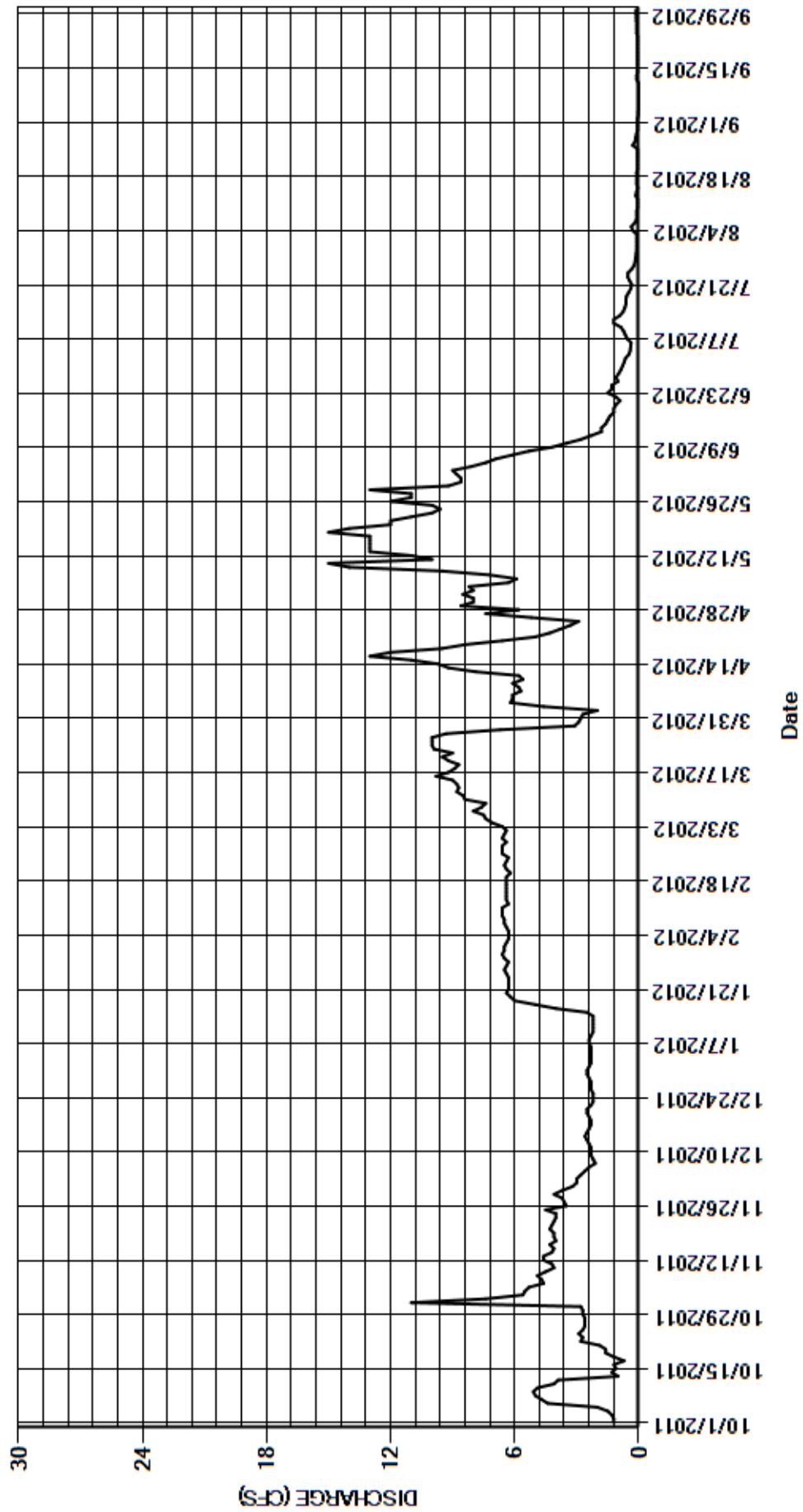
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.2	11	e3.2	e2.4	e6.5	e6.5	2.7	8.0	8.6	0.70	e0.10	e0.05
2	1.2	7.4	e3.0	e2.3	e6.4	e6.4	2.0	8.5	8.8	0.64	e0.10	e0.05
3	1.3	5.6	e3.0	e2.3	e6.3	e6.6	4.6	8.0	9.0	0.47	e0.10	e0.01
4	1.5	5.5	e2.8	e2.3	e6.3	e7.1	6.2	8.2	8.1	0.41	0.29	e0.01
5	2.0	5.3	e2.6	e2.3	e6.3	e7.4	6.1	6.3	7.4	0.39	0.36	e0.00
6	4.4	4.6	e2.4	e2.3	e6.4	e7.5	6.1	5.9	6.9	0.37	0.18	e0.00
7	4.7	4.7	e2.1	e2.4	e6.5	8.0	5.7	7.2	6.1	0.55	e0.10	e0.00
8	5.0	4.9	e2.2	e2.4	e6.5	7.6	5.8	9.5	5.3	0.65	e0.10	e0.00
9	5.1	4.5	e2.3	e2.3	e6.6	7.4	6.1	14	4.2	0.73	e0.10	e0.00
10	4.9	4.1	e2.3	e2.2	e6.6	8.4	5.6	15	3.5	0.86	e0.05	e0.00
11	4.1	4.2	e2.3	e2.2	e6.6	8.5	5.8	10	2.8	1.2	e0.05	e0.00
12	3.9	4.6	e2.4	e2.2	e6.3	8.8	7.9	11	2.3	1.2	e0.05	e0.10
13	1.0	4.6	e2.5	e2.2	e6.4	8.7	9.2	13	1.8	0.91	e0.15	e0.10
14	1.3	4.2	e2.6	e2.2	e6.4	8.8	9.7	13	1.8	0.75	e0.10	e0.05
15	1.1	4.1	e2.5	e2.5	e6.4	9.0	11	13	1.6	0.67	e0.05	e0.05
16	1.2	4.3	e2.4	e4.0	e6.4	9.8	13	13	1.5	0.62	e0.10	e0.05
17	0.71	4.0	e2.3	e5.0	e6.4	9.2	12	13	1.4	0.62	e0.10	e0.05
18	1.2	4.1	e2.3	e6.0	e6.4	8.9	9.5	15	1.2	0.59	e0.10	e0.05
19	1.6	4.1	e2.4	e6.2	e6.4	8.7	8.4	14	1.2	0.48	e0.10	e0.05
20	1.6	4.3	e2.5	e6.4	e6.2	9.2	6.6	12	1.1	0.38	e0.05	e0.05
21	1.9	4.2	e2.5	e6.3	e6.4	9.5	5.0	12	0.90	0.34	e0.05	e0.05
22	2.8	4.1	e2.3	e6.3	e6.5	9.0	4.3	11	1.1	0.44	e0.05	e0.05
23	2.7	4.0	e2.2	e6.3	e6.4	9.9	3.8	10	1.5	0.53	e0.05	e0.05
24	2.9	4.0	e2.2	e6.3	e6.3	10	3.3	9.6	1.3	0.52	e0.05	e0.10
25	2.7	4.5	e2.2	e6.4	e6.6	10	2.9	10	1.3	0.34	e0.05	e0.10
26	2.6	3.5	e2.3	e6.5	e6.6	10	5.2	12	1.0	0.22	0.29	e0.10
27	2.6	3.6	e2.3	e6.4	e6.6	9.3	7.4	11	1.1	0.17	0.17	0.11
28	2.6	3.7	e2.3	e6.3	e6.4	6.7	5.8	11	0.97	0.15	e0.15	0.11
29	2.7	4.1	e2.4	e6.5	e6.6	3.1	8.6	13	0.86	0.12	e0.10	0.13
30	2.7	3.7	e2.5	e6.6	---	2.9	8.0	9.2	0.78	0.10	e0.05	0.13
31	2.8	---	e2.5	e6.5	---	2.8	---	8.6	---	e0.10	e0.05	---
TOTAL	78.01	139.5	75.8	132.5	186.7	245.7	198.3	335.0	95.41	16.22	3.39	1.60
MEAN	2.52	4.65	2.45	4.27	6.44	7.93	6.61	10.8	3.18	0.52	0.11	0.053
AC-FT	155	277	150	263	370	487	393	664	189	32	6.7	3.2
MAX	5.1	11	3.2	6.6	6.6	10	13	15	9.0	1.2	0.36	0.13
MIN	0.71	3.5	2.1	2.2	6.2	2.8	2.0	5.9	0.78	0.10	0.05	0.00

CAL YR	2011	TOTAL	1344.29	MEAN	3.68	MAX	17	MIN	0.15	AC-FT	2670
WTR YR	2012	TOTAL	1508.13	MEAN	4.12	MAX	15	MIN	0.00	AC-FT	2990

MAX DISCH: 24.5 CFS AT 17:45 ON NOV 01,2011 GH 1.07 FT SHIFT -0.01 FT
MAX GH: 1.07 FT AT 17:45 ON NOV 01,2011

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

NORTON DRAIN NEAR LA SAUSES
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08240000 RIO GRANDE RIVER ABOVE TRINCHERA CREEK NEAR LA SAUSES
Water Year 2012

Location.-- Lat 37°18'59", long 105°44'34" referenced to North American Datum of 1983 (La Sauses, CO quad, scale 1:24,000), UTM Zone 13 434180 E and 4130242 N, in NE ¼ SE ¼ sec. 35, T.36 N., R.11 E., New Mexico Principal Meridian, Conejos County, CO, Hydrologic Unit 13010002, on right bank 0.2 mi upstream from the historical channel of Trinchera Creek, 3.2 mi north of La Sauses, CO, and 13 mi southeast of Alamosa, CO.

Drainage Area and Period of Record.-- Approximately 5,740 mi², includes 2,940 mi² in closed basin in northern part of San Luis Valley, CO; May 1936 to current year. Water quality data from 1993 to 1996.

Equipment.-- Data collection platform (Sutron Satlink2), and a float-operated Sutron Stage Discharge Recorder (SDR) in a 7 ft. by 7 ft. exposed aggregate building with 4 ft. diameter concrete well. Primary reference gage is a drop tape from reference point on shelf. Outside cantilever gage installed on Aug 10, 2012.

Hydrologic Conditions.-- Watershed is comprised of valley floor and steep mountain headwaters. Headwaters areas are generally undeveloped with only sparse minimally populated areas. Valley floor is highly agriculturally based and flows from watershed are diverted for irrigation, livestock watering, domestic, commercial, recharge, and groundwater withdrawals. Flow at gage also includes return flows from all uses.

Gage-Height Record.-- Primary record is 15-minute satellite transmitted data with DCP log and SDR log as backup. Record is complete and reliable except for Dec 6 through Mar 7 when float was frozen, and Apr 16-23 when inlets were plugging and naturally flushing. The stage-discharge relation was affected by ice Dec 1-5. There was one +0.01 ft instrument calibration correction on Mar 7, which was prorated during measurement after station opened. There was one -0.03 ft flush correction on Apr 23, which was not applied due to unreliable stage data during this period.

Datum Corrections.-- Levels were last run to the Reference Point (RP) inside the gage on Jun 22, 2012 using BM2 as base. The RP elevation was found within allowable limits and no correction was made. Two-peg test was performed on the Lietz level (SN 130869) on Jun 11, 2012 and the instrument was within allowable limits so no adjustment was made.

Rating.-- The control is a sand streambed and channel. The sand movement causes numerous shift changes. Rating No. 12 in use since Oct 1, 2006 was used again this year. Twelve measurements (Nos. 243-254) were made this year ranging in discharge from 29.4 to 605 cfs. They cover the discharge range experienced except for the lower daily flows Jun 30; Aug 8, 12, 13, 20, 25-31; Sep 1-11; and the higher daily flow of Mar 28, 29. The peak flow of 674 cfs occurred at 2330 on Mar 28, 2012 at a gage height of 4.11 ft with a shift of -0.07 ft. It exceeded high measurement No. 246 (GH = 3.91 ft.) by 0.20 ft in stage.

Discharge.-- Shifting control method was used to compute the discharge record for all open-water periods. Eight variable stage-shift relationships (VS11-1, 11-3, 12-A, 12-B, 12-C, 12-D, 12-E, 13-A) were used during the year to distribute shifts by stage and time. Measurement shifts ranged from -0.19 to +0.04 ft. All shifts were given full weight except for Nos. 243-245, 247, 250-252, which were adjusted as much as 4.9% to smooth shift trend. Discharge was estimated Dec 1-5 when stage-discharge relation was affected by ice; Dec 6 through Mar 7 when float was frozen; and Apr 16-23 when inlets were plugging and naturally flushing.

Special Computations.-- Discharge for periods of winter no gage-height and ice affected record was estimated using comparison with nearby stations with a river accounting sheet. Discharge for periods of no gage height due to inlets temporarily plugging and flushing was estimated using gage-height trend associated with gage-height at natural flushes.

Remarks.-- Record is good, except for estimated periods, which are poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.--

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

08240000 RIO GRANDE RIVER ABOVE TRINCHERA CREEK NEAR LA SAUSES

RATING TABLE.-- RIOTRICO12 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

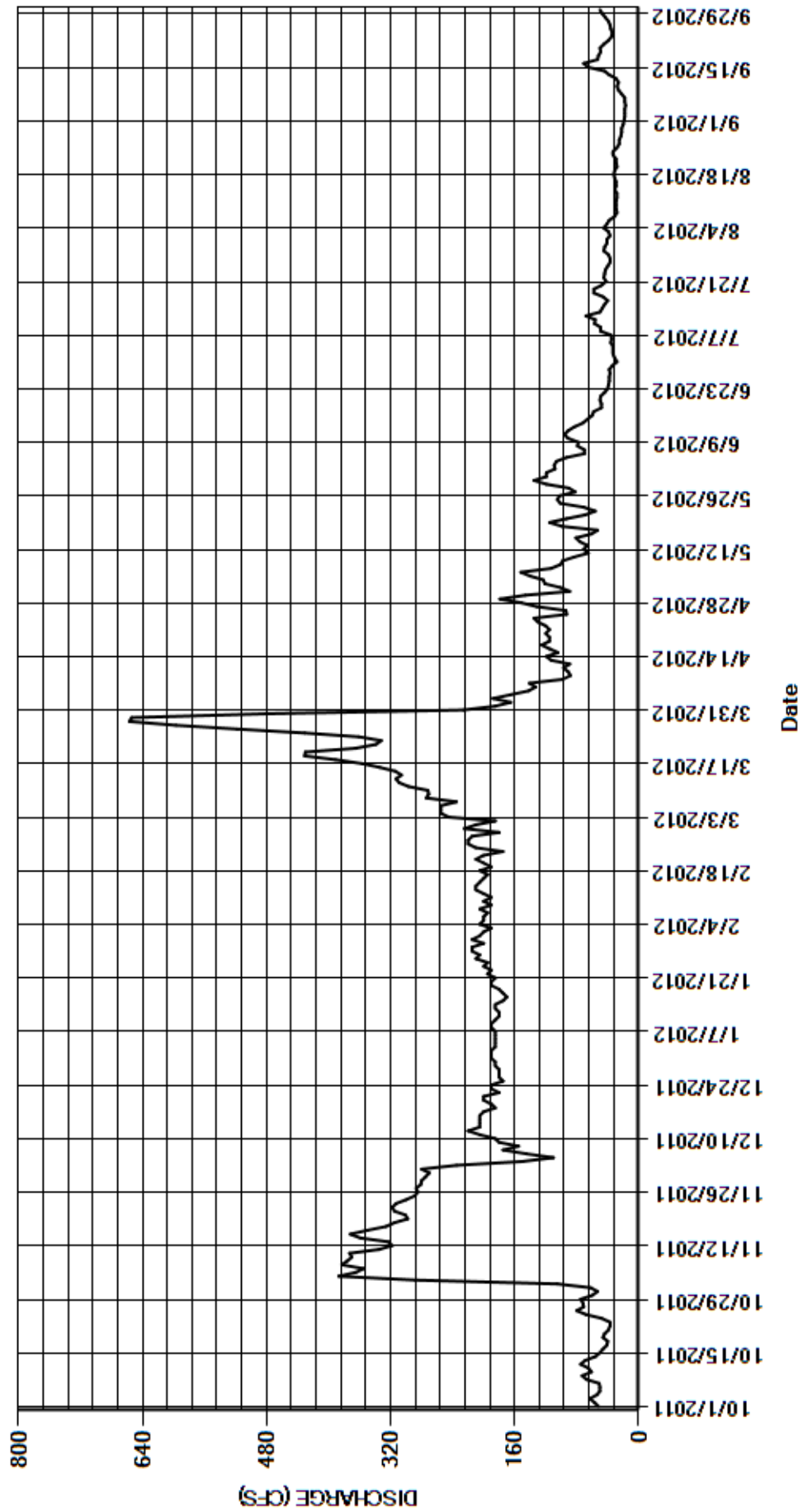
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	52	62	e270	e190	e205	e210	185	89	119	31	41	19
2	57	105	e280	e190	e200	e185	165	101	108	33	37	18
3	63	288	e235	e185	e190	e245	188	121	109	33	39	18
4	54	387	e150	e185	e205	e255	165	123	106	33	45	18
5	50	365	e110	e185	e200	e255	142	140	93	36	41	17
6	50	355	e145	e185	e200	e255	133	152	70	35	38	18
7	51	383	e175	e185	e195	e235	141	113	70	36	31	18
8	67	376	e155	e190	e205	274	98	101	79	49	28	22
9	73	370	e180	e190	e190	271	88	98	78	49	29	26
10	61	373	e185	e185	e200	272	91	83	91	57	29	28
11	65	335	e205	e180	e190	297	97	65	96	56	29	26
12	75	318	e220	e180	e200	309	89	71	91	68	28	29
13	69	323	e205	e185	e210	313	113	66	83	50	28	38
14	56	359	e205	e185	e210	306	119	76	72	47	31	44
15	50	372	e205	e175	e205	314	104	81	66	44	29	65
16	46	350	e205	e170	e200	334	e115	61	60	40	29	71
17	41	326	e200	e175	e195	357	e125	53	58	46	31	53
18	40	315	e185	e180	e205	391	e115	99	48	58	32	52
19	46	298	e190	e190	e190	431	e115	115	48	58	31	49
20	44	301	e200	e190	e200	430	e120	93	50	48	28	50
21	39	315	e200	e185	e210	365	e115	69	49	42	29	45
22	37	318	e180	e195	e200	339	e120	56	44	45	29	39
23	37	313	e190	e190	e175	332	e130	71	40	44	33	35
24	48	300	e190	e200	e210	361	135	101	39	43	33	34
25	68	289	e175	e195	e220	431	93	105	38	40	28	36
26	80	285	e180	e210	e220	518	94	102	38	37	25	37
27	71	287	e180	e205	e215	597	131	82	37	37	25	39
28	72	281	e180	e215	e180	657	151	90	38	39	23	43
29	75	280	e185	e215	e225	654	179	119	34	45	22	47
30	60	275	e185	e200	---	482	146	135	28	44	22	50
31	53	---	e190	e215	---	226	---	119	---	41	20	---
TOTAL	1750	9304	5940	5905	5850	10901	3802	2950	1980	1364	943	1084
MEAN	56.5	310	192	190	202	352	127	95.2	66.0	44.0	30.4	36.1
AC-FT	3470	18450	11780	11710	11600	21620	7540	5850	3930	2710	1870	2150
MAX	80	387	280	215	225	657	188	152	119	68	45	71
MIN	37	62	110	170	175	185	88	53	28	31	20	17

CAL YR	2011	TOTAL	64882	MEAN	178	MAX	501	MIN	33	AC-FT	128700
WTR YR	2012	TOTAL	51773	MEAN	141	MAX	657	MIN	17	AC-FT	102700

MAX DISCH: 674 CFS AT 23:30 ON MAR 28,2012 GH 4.11 FT SHIFT -0.07 FT
 MAX GH: 4.11 FT AT 23:30 ON MAR 28,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08240000 RIO GRANDE RIVER ABOVE TRINCHERA CREEK NEAR LA SAUSES
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08240500 TRINCHERA CREEK ABOVE TURNER'S RANCH
Water Year 2012

Location.-- Lat 37°22'29", long 105°17'42" referenced to North American Datum of 1983 (Ojito Peak, CO quad, scale 1:24,000), UTM Zone 13 473885 E and 4136482 N, in SW ¼ SE ¼ sec. 2, T.31 S., R.71 W., 6th Principal Meridian, Costilla County, CO, Hydrologic Unit 13010002, on right bank 0.9 mi downstream from North Fork Trinchera Creek, 1.0 mi upstream from Turners Ranch, and 8.3 mi southeast of Fort Garland, CO.

Drainage Area and Period of Record.-- 45 mi²; April 1923 to curent year. Monthly records only for some periods. 1923 to 1948 seasonal records only, some missing records estimated.

Equipment.-- Graphic water-stage recorder, data collection platform (Sutron Satlink2), and a float-operated shaft encoder in a 6 ft by 6 ft exposed aggregate shelter and 3 ft concrete well. The primary reference gage is a drop tape from reference point on shelf, secondary outside cantilever gage. A tipping bucket rain gage and air temperature sensor are also monitored by the DCP.

Hydrologic Conditions.-- Undeveloped steep alpine and subalpine terrain.

Gage-Height Record.-- Primary record is 15-minute transmitted data with DCP log and chart record as backup. Record is complete and reliable. There were no instrument corrections required or made to the shaft encoder. Stage-discharge relation was affected by ice Nov 9-11, 17, 22-24, 26-28, 30; Dec 1 - Mar 17; and Apr 3.

Datum Corrections.-- Levels were last run to the Reference Point (RP) inside the gage on Aug 3, 2011 using BM4 as base. The RP elevation was within allowable limits and no correction was made. Two-peg tests were performed on the Lietz level (SN 130869) on Jul 28, 2011 and Sep 26, 2011. The first test showed instrument was within tolerance, but a slight adjustment was made on Sep 26.

Rating.-- The control is a small rock weir approximately 10 feet below the gage. Minor shifting occurs mainly due to the movement of streambed materials in and above gage-pool. Rating No. 14, in use since Oct 1, 2006, was used until Nov 9, 2011. Rating No 15-2 was developed from recent measurements to reduce positive shifting that resulted from gage pool filling and was used from Nov 9, 2011 through the end of the water year. Seventeen measurements (Nos. 206-222) were made this year ranging in discharge from 5.68 to 65.4 cfs. They cover the discharge range experienced except for lower daily flows on Dec 5-12, 15-17, 20-27; Jan 1, 12-31, Feb 1-21, 23-25, 28, 29; Mar 1-11; and higher daily flows on May 23-26. The peak flow of 71.1 cfs occurred at 0930 on May 25 at a gage height of 4.15 ft with a shift of 0.00 ft. It exceeded high Measurement No. 216 (GH=4.10 ft) by 0.05 ft in stage.

Discharge.-- Shifting control method was used to compute the discharge record for all open water periods. Shifts were applied as determined by measurements and distributed by time and events. A +0.02 ft cleaning correction resulted from removing debris from the inlet on Jun 5 and was prorated as a correction to shift from Jun 2, when it appeared that debris began catching. Measurement shifts were +0.05 ft on Rating No. 14 and ranged from -0.01 ft to +0.02 ft on Rating No. 15-2. All measurements were given full weight except Nos. 211, 212, 215, 217, and 220-222 which were adjusted by as much as 4.8% to smooth the shift trend and No. 214, which was not used for record development. Stage-discharge relation was affected by ice and discharge estimated Nov 9-11, 17, 22-24, 26-28, 30; Dec 1 - Mar 17; and Apr 3.

Special Computations.-- Discharge for periods of ice affected record were estimated using discharge measurements, comparison with nearby station (TRIMTNCO), and weather records.

Remarks.-- Record is good, except for periods of ice affected record, which are estimated and poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.--

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

08240500 TRINCHERA CREEK ABOVE TURNER'S RANCH

RATING TABLE.-- TRITURCO14 USED FROM 01-OCT-2011 TO 09-NOV-2011
 TRITURCO15-2 USED FROM 09-NOV-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

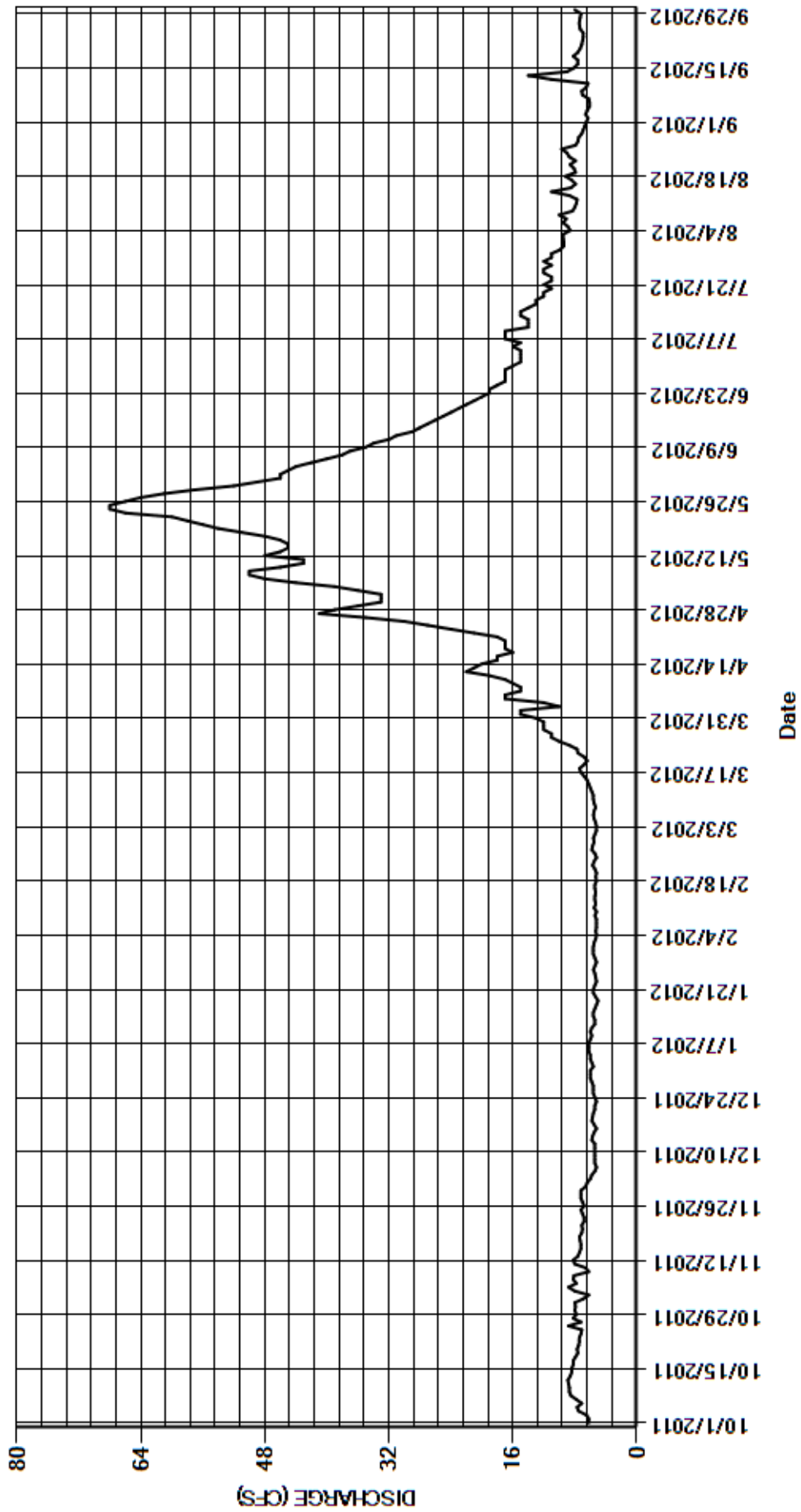
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.2	8.0	e6.6	e5.6	e5.6	e5.4	15	33	46	15	9.4	6.5
2	6.2	6.9	e6.4	e5.8	e5.5	e5.2	15	33	46	15	9.5	6.3
3	6.5	6.2	e6.0	e6.0	e5.3	e5.2	e10	36	45	15	9.5	6.6
4	7.5	8.0	e5.8	e6.0	e5.2	e5.3	12	39	44	15	8.6	6.4
5	7.7	8.8	e5.4	e6.2	e5.3	e5.5	17	44	42	16	8.9	6.1
6	7.1	7.8	e5.2	e6.2	e5.2	e5.6	17	48	40	15	9.5	6.1
7	7.8	8.2	e5.4	e6.2	e5.2	e5.5	15	50	38	17	9.1	6.2
8	8.5	8.1	e5.4	e6.0	e5.2	e5.3	15	50	37	17	10	7.0
9	8.7	e6.2	e5.4	e5.8	e5.4	e5.5	16	46	35	17	8.3	7.1
10	8.7	e6.6	e5.4	e6.0	e5.2	e5.6	17	43	34	14	8.0	6.5
11	8.8	e8.0	e5.4	e5.8	e5.5	e5.6	19	43	32	14	7.8	6.3
12	8.9	8.2	e5.4	e5.4	e5.3	e5.8	22	48	31	14	7.7	11
13	8.6	7.6	e5.8	e5.4	e5.4	e6.0	21	46	29	15	8.7	14
14	8.4	7.4	e5.7	e5.6	e5.4	e6.2	20	45	28	15	11	9.0
15	8.4	7.2	e5.5	e5.6	e5.3	e6.4	18	45	27	14	8.5	8.1
16	8.2	7.2	e5.2	e5.4	e5.4	e6.8	18	46	26	13	7.9	7.6
17	8.2	e7.3	e5.5	e5.2	e5.4	e7.2	16	48	25	13	8.4	7.6
18	7.9	7.4	e5.8	e5.0	e5.2	7.4	17	51	24	12	9.2	8.2
19	7.6	7.1	e5.7	e5.3	e5.3	6.8	17	54	23	12	7.9	7.6
20	7.7	7.0	e5.6	e5.6	e5.2	6.4	17	56	22	11	8.1	7.3
21	7.5	7.1	e5.4	e5.6	e5.4	6.8	18	58	21	12	8.6	7.1
22	7.4	e6.8	e5.4	e5.4	e5.7	7.6	21	60	20	11	7.9	7.0
23	7.4	e6.8	e5.2	e5.2	e5.5	7.7	24	66	19	11	8.7	6.9
24	7.2	e7.0	e5.4	e5.3	e5.2	8.7	27	68	19	12	9.0	6.9
25	7.1	7.2	e5.6	e5.4	e5.4	10	30	68	18	12	9.7	7.3
26	8.8	e6.8	e5.6	e5.6	e5.8	11	35	66	17	11	7.9	7.4
27	7.2	e7.0	e5.6	e5.4	e5.7	11	41	64	17	12	7.6	7.4
28	8.2	e7.2	e5.8	e5.2	e5.5	12	39	61	17	11	7.5	7.3
29	7.8	7.2	e6.0	e5.4	e5.6	12	36	57	17	11	7.1	7.2
30	8.0	e7.2	e6.0	e5.6	---	12	33	52	16	9.9	6.9	8.0
31	7.9	---	e6.0	e5.6	---	13	---	49	---	9.4	6.7	---
TOTAL	242.1	219.5	174.6	173.8	156.3	230.5	638	1573	855	411.3	263.6	224.0
MEAN	7.81	7.32	5.63	5.61	5.39	7.44	21.3	50.7	28.5	13.3	8.50	7.47
AC-FT	480	435	346	345	310	457	1270	3120	1700	816	523	444
MAX	8.9	8.8	6.6	6.2	5.8	13	41	68	46	17	11	14
MIN	6.2	6.2	5.2	5.0	5.2	5.2	10	33	16	9.4	6.7	6.1

CAL YR	2011	TOTAL	3143.8	MEAN	8.61	MAX	22	MIN	5.1	AC-FT	6240
WTR YR	2012	TOTAL	5161.7	MEAN	14.1	MAX	68	MIN	5.0	AC-FT	10240

MAX DISCH: 71.1 CFS AT 09:30 ON MAY 25,2012 GH 4.15 FT SHIFT 0 FT
 MAX GH: 4.35 FT AT 02:00 ON DEC 21,2011 (backwater from ice)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08240500 TRINCHERA CREEK ABOVE TURNER'S RANCH
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08241000 TRINCHERA CREEK ABOVE MOUNTAIN HOME RESERVOIR

Water Year 2012

Location.-- Lat 37°23'41", long 105°22'9" referenced to North American Datum of 1983 (Trinchera Ranch, CO quad, scale 1:24,000), UTM Zone 13 467324 E and 4138724 N, in NE ¼ SW ¼ sec. 31, T.30 S., R.71 W., 6th Principal Meridian, Costilla County, CO, Hydrologic Unit 13010002, on right bank 200 ft west of road, 1 1/2 miles above Mountain Home Reservoir dam, 4 miles southeast of Fort Garland, CO.

Drainage Area and Period of Record.-- Approximately 61 mi², (from State Engineers Office); May 1, 1923 to Mar. 31, 1935 - missing some winter months; Apr. 1, 1935 to present - missing water years 1957 and 1958.

Equipment.-- Graphic water-stage recorder, data collection platform (Sutron Satlink2) and a float-operated shaft encoder in a 4-ft diameter corrugated metal shelter and well at a concrete weir. The primary reference gage is a drop tape from reference point on shelf. No change.

Hydrologic Conditions.-- Drainage area is largely undeveloped, flows may be affected by a few minor developments and irrigation on the Trinchera Ranch.

Gage-Height Record.-- Primary record is 15-minute transmitted data with DCP log and chart record as backup. Record is complete and reliable except for May 19-23 when inlets were plugged. There were two instrument corrections, +0.01 ft and -0.01 ft, made to the shaft encoder Jan 5 and Aug 6 respectively, which were prorated from the previous visit. Three flush corrections, -0.02 ft, +0.07 ft, and +0.02 ft were observed on Apr 6, May 23, and Jun 5 respectively. Flush corrections were prorated back to the previous inflection point except for the +0.07 ft correction which was prorated back to the point where it appeared the inlets became plugged. Stage-discharge relation was affected by ice Dec 7-16, 22-28; Jan 1 - Mar 9. Stage-discharge relation was affected by backwater from beaver dams on Jul 23-24, 26-30; Aug 24-27, 29; Sep 8-10, 16-21, 23-28.

Datum Corrections.-- Levels were not run at the gage this year. Levels were last run to the Reference Point (RP) inside the gage on Aug 26, 2010 using B.M. No. 1 as base. The RP elevation was within allowable limits and a correction was not required or made.

Rating.-- The control is a concrete weir approximately 15 feet below the gage. Rating No. 7, in use since Oct 1, 2001, was used until Jan 5 when Rating No. 9 was put in use. Rating 9 was developed to adjust the base rating to the right to account for the trend in high water measurements plotting to the right of the rating. Rating No. 9 is well defined from 2 cfs to 120 cfs. Recent PZF measurements suggest that the concrete weir is possibly moving in addition to the gage pool filling causing the changes in the stage-discharge relationship. Nineteen measurements (Nos. 900-918) were made this year ranging in discharge from 2.50 to 46.3 cfs. They cover the discharge range experienced except for the lower daily flows on Sep 5-7, 10, 11; and the higher daily flows on May 24-27. The peak flow of 59.4 cfs occurred at 0945 on May 24, 2012 at a gage height of 0.92 ft with a shift of +0.02 ft. It exceeded high Measurement No. 910 (GH = 0.84 ft), made May 23, 2012 by 0.08 ft in stage. High Measurement No. 910 was adjusted toward the base rating from a +0.03 ft shift to a +0.02 ft shift to better fit recent historic high flow measurements. The peak stage of 1.03 ft occurred at 0815 Sep. 28, 2012 because of backwater from beaver dams.

Discharge.-- Shifting control method was used for all computed record. Shifts were applied by stage using four variable stage-shift relationships developed during the 2011 water year until Jan 5, 2012. Shifts were applied by time from Jan 5 through the end of the water year as observed by streamflow measurements. Measurement shifts ranged from 0.00 to +0.01 while using Rating No. 7 and from -0.04 to +0.03 ft while using Rating No. 9. All measurements were given full weight except Nos. 904, 910, and 911, which were adjusted as much as 7.8% to smooth shift distribution. Numerous cleaning corrections were observed due to trash on the inlets, beaver debris on control, and backwater from beaver dams. The rating is section control for the entire range and it is expected that shifting will continue to affect the stage-discharge rating for the defined section so shift curves are left open-ended. Variability in measurements made with gage-heights greater than 0.75 ft and prevalence of flush corrections suggest hydraulics around inlets may be affecting stage record. During periods of submergence in July, shifts were estimated from cleaning corrections and gage-height record to aid in estimation. Stage-discharge relation was affected by ice and discharge was estimated Dec 7-16, 22-28; Jan 1 - Mar 9. Stage-discharge relation was affected by backwater from beaver dams and discharge was estimated Jul 23, 24, 26-30; Aug 24-27, 29; Sep 8-10, 16-21, 23-28.

Special Computations.-- Discharge for periods of ice affected record was estimated using discharge measurements, hydrographic comparison with Trinchera Creek above Turner's Ranch (TRITURCO) and temperature records from Mountain Home Reservoir. The period May 19-23 was estimated by application of flush correction over gage-height record. The period Jul 23-24 and 26-30 was estimated by application of submerged shift with timing estimated from gage height record. The period Aug 24-27, 29, Sep 8-10, 16-21, 23-28 was estimated by hydrographic comparison with TRITURCO.

Remarks.-- Record is good except for flows above 20 cfs, which are fair; and during periods of ice affected record, backwater record, or when the inlets are plugged which is estimated and poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.-- Maintain clean gage pool, rework inlets to reduce flush corrections above 0.75 ft.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

08241000 TRINCHERA CREEK ABOVE MOUNTAIN HOME RESERVOIR

RATING TABLE.-- TRIMTNC07 USED FROM 01-OCT-2011 TO 05-JAN-2012
 TRIMTNC09 USED FROM 05-JAN-2012 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

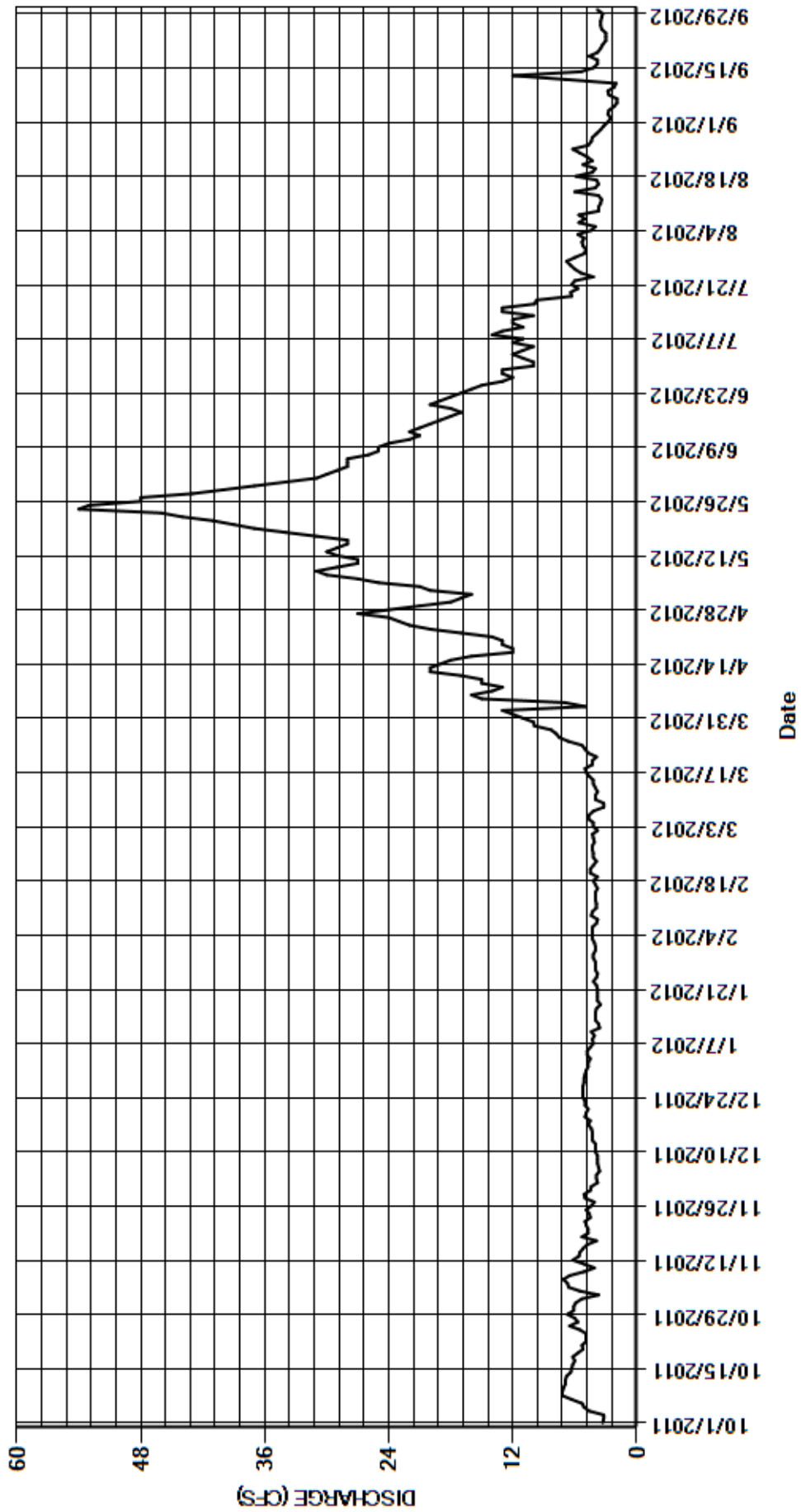
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.3	5.9	4.4	e4.7	e4.0	e4.3	12	17	31	10	5.3	2.8
2	3.2	5.3	3.8	e4.7	e4.1	e3.8	13	16	30	11	5.1	2.5
3	3.2	3.7	3.9	e4.5	e4.3	e4.2	5.0	20	29	12	5.7	2.8
4	4.6	5.5	3.9	e4.8	e4.3	e4.2	6.9	21	28	11	4.4	2.7
5	5.1	6.6	3.6	e4.8	e4.3	e4.7	15	25	28	10	4.0	2.2
6	5.3	6.7	3.7	e4.5	e4.3	e4.6	16	27	28	12	5.6	1.9
7	6.3	7.1	e3.8	e4.2	e3.9	e4.2	14	30	26	11	5.0	1.9
8	7.2	6.5	e3.8	e4.3	e3.8	e3.2	13	31	25	14	5.6	e2.7
9	7.2	5.1	e3.8	e4.1	e4.4	e3.2	15	29	25	13	3.7	e2.8
10	7.1	4.1	e4.0	e4.4	e4.3	4.0	15	27	24	11	3.7	e2.2
11	6.9	5.1	e4.0	e3.6	e3.9	4.0	17	27	22	12	3.5	2.0
12	6.9	6.2	e4.0	e3.7	e3.9	3.8	20	29	21	12	3.4	6.9
13	6.8	5.6	e4.3	e4.0	e4.0	4.0	20	30	22	10	3.7	12
14	6.4	5.5	e4.3	e4.0	e4.0	4.2	19	29	21	13	6.0	5.4
15	6.3	5.2	e4.3	e4.0	e4.0	4.2	18	28	20	13	4.0	4.2
16	6.2	4.8	e4.4	e3.9	e3.8	4.6	16	28	19	9.9	3.7	e3.8
17	6.0	3.9	4.7	e3.5	e4.0	4.9	12	31	18	9.7	3.9	e3.8
18	6.2	5.3	4.5	e3.8	e4.2	5.0	12	34	17	6.3	5.9	e4.6
19	5.7	4.7	5.0	e3.8	e3.8	4.3	13	e37	18	6.4	4.3	e3.8
20	5.2	4.7	4.9	e3.8	e4.5	4.3	13	e39	20	5.7	4.0	e3.5
21	5.3	4.9	4.7	e3.8	e4.5	3.9	14	e41	19	6.3	5.2	e3.3
22	4.9	5.0	e5.0	e3.9	e4.2	4.7	17	e44	18	6.0	4.3	3.0
23	4.9	4.5	e5.0	e4.2	e3.9	5.0	20	e46	17	e4.2	4.8	e3.0
24	4.9	4.6	e5.2	e3.9	e4.2	5.3	22	54	16	e5.4	e5.5	e3.0
25	5.5	4.9	e5.2	e3.8	e4.2	6.6	23	53	15	6.0	e6.2	e3.4
26	6.5	4.4	e5.2	e4.0	e4.3	7.5	24	48	13	e6.4	e4.7	e3.5
27	5.7	4.1	e5.2	e4.0	e4.3	7.8	27	48	12	e6.8	e4.4	e3.5
28	6.0	5.0	e5.1	e4.0	e4.1	8.3	24	43	13	e6.0	4.3	e3.4
29	6.7	5.1	5.1	e4.2	e4.2	9.9	21	40	13	e5.1	e3.9	3.3
30	6.1	4.5	5.0	e4.2	---	10	18	37	10	e4.9	3.5	3.8
31	6.1	---	4.9	e4.0	---	11	---	34	---	5.2	3.2	---
TOTAL	177.7	154.5	138.7	127.1	119.7	163.7	494.9	1043	618	275.3	140.5	107.7
MEAN	5.73	5.15	4.47	4.10	4.13	5.28	16.5	33.6	20.6	8.88	4.53	3.59
AC-FT	352	306	275	252	237	325	982	2070	1230	546	279	214
MAX	7.2	7.1	5.2	4.8	4.5	11	27	54	31	14	6.2	12
MIN	3.2	3.7	3.6	3.5	3.8	3.2	5.0	16	10	4.2	3.2	1.9

CAL YR	2011	TOTAL	1870.4	MEAN	5.12	MAX	13	MIN	1.7	AC-FT	3710
WTR YR	2012	TOTAL	3560.8	MEAN	9.73	MAX	54	MIN	1.9	AC-FT	7060

MAX DISCH: 59.4 CFS AT 09:45 ON MAY 24,2012 GH 0.92 FT SHIFT 0.02 FT
 MAX GH: 1.03 FT AT 08:15 ON SEP 28,2012 (backwater from beaver dam)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08241000 TRINCHERA CREEK ABOVE MOUNTAIN HOME RESERVOIR
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08241500 SANGRE DE CRISTO CREEK NEAR FORT GARLAND

Water Year 2012

Location.-- Lat 37°25'30", long 105°24'54" referenced to North American Datum of 1983 (Fort Garland, CO quad, scale 1:24,000), UTM Zone 13 463292 E and 4142091 N, in NE ¼ SE ¼ sec. 22, T.30 S., R.72 W., 6th Principal Meridian, Costilla County, CO, Hydrologic Unit 13010002, on left bank at ice house road bridge, 2,200 ft upstream from Garland Canal, 1.0 mi east of Fort Garland, CO, and 6.3 mi upstream from Ute Creek.

Drainage Area and Period of Record.-- 190 mi²; Feb 17, 1915 to Apr 17, 1915, Apr 1916 to Sept. 30, 1916, 1923 to 1930, 1932 to current year (partial year record only for some years).

Equipment.-- Graphic water-stage recorder, data collection platform (Sutron Satlink2) and a float-operated shaft encoder in a 48-inch diameter CMP shelter and well. The shaft encoder float is operated in an oil cylinder. The primary reference gage is a drop tape from reference point on shelf. No changes were made this year.

Hydrologic Conditions.-- Station is located in foothills of mountain canyon with moderate development of homesites in area. There are major diversions above gage for irrigation use.

Gage-Height Record.-- Primary record is fifteen minute transmitted data with DCP log and chart record as backup. Record is complete and reliable except for Dec 12-31, Jan 13-21 when it was assumed that float was affected by ice in oil cylinder. A 15 min value was corrected on each of the days Oct. 20, Jan 5, and Apr 11. One missing unit value on Jul 25 was filled from site observation without loss of accuracy. The stage-discharge relation was affected by backwater from ice Dec 3-7; Jan 12, 22-31; Feb 1-29; Mar 1-12, 19-21. Four instrument corrections were made to the shaft encoder during the year, all + or - 0.01 ft. These corrections were prorated by time from the previous gage visits.

Datum Corrections.-- Levels were last run to the RP inside the shelter on Jul 18, 2011. The RP elevation was within allowable limits, but since the RP was being remounted, it was corrected by -0.009 ft and a -0.01 correction was applied to the WY2011 record.

Rating.-- The control is a concrete weir approximately 14 feet downstream of the gage. Shifting occurs mainly due to the movement of streambed materials in and above gage pool. At higher flows the channel becomes the control and is subject to backwater from a downstream diversion structure. Rating No. 19-2 first used Oct 7, 2009 was used again this year. Rating No. 19-2 was drawn so that the upper end is the same as Rating No. 18, in use since October 1, 1979, and represents base rating conditions with minimal backwater. Seventeen measurements (Nos. 913-929) were made this year ranging in discharge from 0.23 to 70.2 cfs. They cover the discharge range experienced except for lower daily flows on Oct 1-4; Aug 10-13, 16, 17, 27-31; Sep 1-11; and higher daily flows on Apr 12-14. The peak flow of 87.7 cfs occurred at 15:15 on Apr 12 at a gage height of 2.57 ft with a shift of -0.15 ft. It exceeded high Measurement No. 921, (GH = 2.27 ft), made Apr 11, 2012, by 0.30 ft in stage.

Discharge.-- Shifting control method was used during all open-water periods to compute the discharge record. Two variable stage-shift relationships (VS12-A and VS12-B) were developed and used Oct 20 - May 11, May 15 - Jul 18, Jul 18 - Sep 30 to distribute shifts by stage, time, and events. Shifts were applied as defined by measurements and distributed by time during the remainder of the period. Open-water measurement shifts ranged from -0.07 to +0.02 ft; applied shifts ranged from -0.07 ft to -0.01 ft. All open water measurements were given full weight except for Nos. 913, 914, 916, 918, 922, which were adjusted as much as 8.1 percent (rated fair) to smooth the shift trend. Measurement Nos. 925-927 were rated poor and adjusted as much as 17.4 percent (0.01 ft) to smooth the shift trend. The stage-discharge relation was affected by ice and flow was estimated Dec 3-7; Jan 12, 22-31; Feb 1-29; Mar 1-12, 19-21. Flow was estimated Dec 12-31, Jan 13-21 when float was affected by ice in oil cylinder. There was one -0.01 ft cleaning correction on Jul 18, which was ran straight as a correction to shift for the period that trash was assumed to be on the control.

Special Computations.-- Discharge for periods of ice affected record was estimated using discharge measurements, fair record before and after the period, comparison with the nearby stations and weather records from Trinchera Creek above Turners Ranch and Ute Creek near Fort Garland.

Remarks.-- Record is fair, except for periods of no gage-height and ice affected record, which are estimated and poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.--

STATE OF COLORADO
DIVISION OF WATER RESOURCES
OFFICE OF STATE ENGINEER

08241500 SANGRE DE CRISTO CREEK NEAR FORT GARLAND

RATING TABLE-- SANFTGCO19-2 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

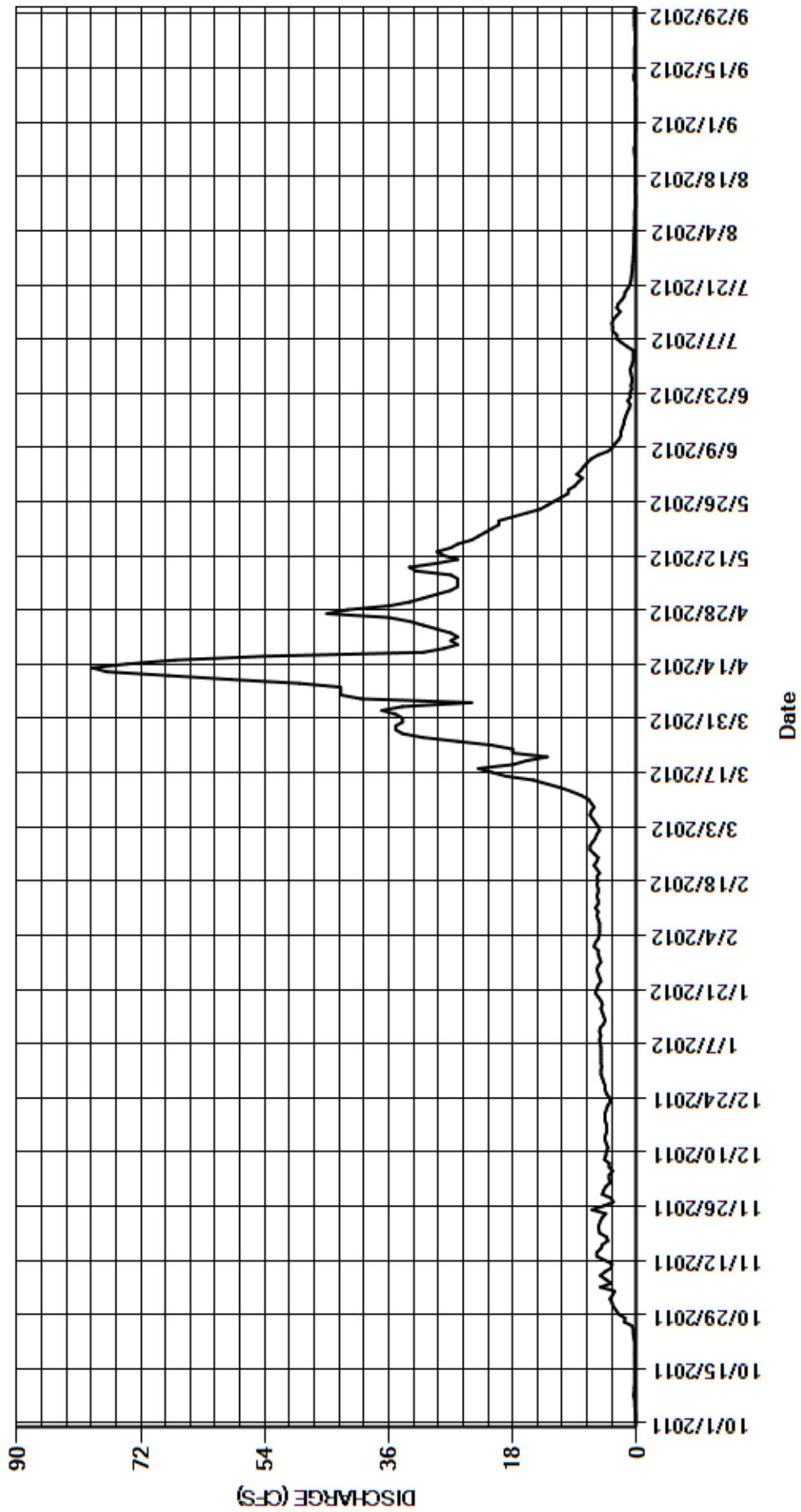
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.21	3.6	4.5	5.1	e6.2	e5.8	35	31	7.9	0.57	0.42	0.18
2	0.20	3.9	3.9	5.2	e6.0	e5.4	37	29	8.7	0.51	0.41	0.17
3	0.18	3.5	e4.0	5.2	e5.6	e5.6	34	27	8.1	0.51	0.39	0.21
4	0.22	3.2	e4.0	5.2	e5.4	e6.0	24	26	7.7	0.51	0.33	0.20
5	0.26	5.3	e3.5	5.2	e5.4	e6.4	40	26	7.2	1.4	0.33	0.18
6	0.26	3.7	e4.0	5.2	e5.4	e6.8	43	26	6.6	2.2	0.26	0.17
7	0.32	4.5	e4.0	5.3	e5.4	e6.6	43	27	5.6	2.9	0.29	0.16
8	0.48	5.3	4.7	5.4	e5.6	e6.2	43	32	4.1	2.9	0.31	0.22
9	0.37	4.6	4.5	5.2	e5.8	e6.6	49	33	3.5	3.5	0.28	0.22
10	0.35	3.7	4.4	5.4	e5.6	e7.0	59	29	3.1	3.5	0.19	0.18
11	0.30	3.6	4.2	5.3	e6.0	e8.0	68	26	2.6	3.6	0.21	0.20
12	0.30	4.7	e4.4	e4.8	e5.6	e9.4	77	28	2.3	3.4	0.18	0.40
13	0.30	5.8	e4.6	e4.6	e5.6	11	79	29	2.3	2.9	0.18	0.44
14	0.30	5.8	e4.6	e4.8	e5.8	13	74	27	2.1	2.4	0.26	0.26
15	0.30	5.2	e4.4	e5.0	e5.6	15	67	26	1.9	2.9	0.23	0.30
16	0.30	5.0	e4.4	e5.2	e5.6	19	54	24	1.8	2.7	0.20	0.28
17	0.30	4.2	e4.4	e5.0	e5.8	21	31	23	1.6	2.2	0.20	0.28
18	0.30	4.4	e4.6	e5.2	e5.6	23	28	22	1.4	1.8	0.24	0.29
19	0.33	5.4	e4.6	e5.6	e5.8	e18	26	21	1.1	1.7	0.23	0.29
20	0.30	5.5	e4.6	e6.0	e5.4	e16	27	20	0.95	1.3	0.23	0.29
21	0.30	5.5	e4.4	e5.8	e5.8	e13	26	20	1.3	0.99	0.27	0.25
22	0.32	5.3	e4.2	e5.6	e6.2	18	27	18	0.94	0.86	0.24	0.25
23	0.42	5.0	e3.8	e5.2	e5.8	18	29	16	1.0	0.78	0.26	0.24
24	0.52	4.5	e4.0	e5.4	e5.6	21	31	14	0.73	0.71	0.33	0.24
25	0.50	6.5	e4.4	e5.6	e6.2	26	33	13	0.84	0.61	0.38	0.30
26	0.67	4.8	e4.6	e5.8	e6.8	31	36	12	0.66	0.61	0.25	0.34
27	1.8	3.4	e4.6	e5.6	e6.8	34	45	11	0.73	0.55	0.21	0.33
28	1.7	3.7	e4.8	e5.2	e6.4	35	42	10	0.84	0.54	0.22	0.36
29	2.6	5.0	e5.0	e5.4	e6.0	35	36	9.9	0.97	0.48	0.22	0.35
30	3.0	4.8	e5.2	e5.6	---	34	33	9.0	0.77	0.46	0.20	0.40
31	3.4	---	e5.2	e5.6	---	34	---	8.5	---	0.43	0.20	---
TOTAL	21.11	139.4	136.5	164.7	168.8	514.8	1276	673.4	89.33	50.42	8.15	7.98
MEAN	0.68	4.65	4.40	5.31	5.82	16.6	42.5	21.7	2.98	1.63	0.26	0.27
AC-FT	42	276	271	327	335	1020	2530	1340	177	100	16	16
MAX	3.4	6.5	5.2	6.0	6.8	35	79	33	8.7	3.6	0.42	0.44
MIN	0.18	3.2	3.5	4.6	5.4	5.4	24	8.5	0.66	0.43	0.18	0.16

CAL YR	2011	TOTAL	1803.83	MEAN	4.94	MAX	22	MIN	0.12	AC-FT	3580
WTR YR	2012	TOTAL	3250.59	MEAN	8.88	MAX	79	MIN	0.16	AC-FT	6450

MAX DISCH: 87.7 CFS AT 15:15 ON APR 12,2012 GH 2.57 FT SHIFT -0.15 FT
MAX GH: 2.57 FT AT 15:15 ON APR 12,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08241500 SANGRE DE CRISTO CREEK NEAR FORT GARLAND
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08242500 UTE CREEK NEAR FORT GARLAND
Water Year 2012

Location.-- Lat 37°26'50", long 105°25'33" referenced to North American Datum of 1983 (Fort Garland, CO quad, scale 1:24,000), UTM Zone 13 462334 E and 4144571 N, in NE ¼ NW ¼ sec. 15, T.30 S., R.72 W., 6th Principal Meridian, Costilla County, CO, Hydrologic Unit 13010002, on left bank 1.5 mi north of Fort Garland, CO, and 6 mi upstream from mouth.

Drainage Area and Period of Record.-- 32 square miles, approximately.; 1916, 1923 to present.

Equipment.-- Graphic water-stage recorder, data collection platform (Sutron Satlink2), a float-operated shaft encoder, and a tipping bucket rain gage in a 4 ft CMP shelter and well. The primary reference gage is a drop tape from reference point on shelf. Graphic water stage recorder removed and shaft encoder replaced with float-operated Sutron SDR on May 3, 2012.

Hydrologic Conditions.-- The majority of the drainage above the gage is undeveloped steep alpine and subalpine terrain. There are five active irrigation diversions above the gage.

Gage-Height Record.-- Primary record is 15-minute transmitted data with DCP log and chart record as backup until May 3. After that date, DCP log and SDR log used as backup. Record is complete and reliable, except for Dec 3-6 when floats were affected by ice in well, Dec 7 through Mar 20 when the station was closed for the winter. One missing unit value on May 3 was estimated with no loss in accuracy. The stage-discharge relation was affected by ice Oct 27, 30; Nov 3, 4, 6, 10-12, 17-30; Dec 1, 2, and Mar 21, 22. There was a -0.01 ft correction made to the SDR on Jun 28. This correction was prorated by time from previous visit.

Datum Corrections.-- Levels were last ran on Aug 29, 2012 using BM1 as base. The reference point elevation was corrected -0.041 feet resulting in a datum correction of +0.041 feet. A +0.04 ft datum correction was distributed from Mar. 20, 2012, when the station was opened, to Aug 29, 2012, when the correction was made. The mean gage heights of all discharge measurements made during this period were also corrected +0.04 ft.

Rating.-- The control is a concrete broad crested weir approximately 10 feet below the gage. Shifting occurs mainly due to the scour and fill in the gage pool. Rating No. 18, created Sep 13, 2008, was used until Mar 20, 2012. Rating No. 19-1 was developed and used from Mar 20, 2012 through the end of the water year. Eighteen measurements (Nos. 255-272) were made this year ranging in discharge from 4.03 to 28.4 cfs. They cover the flow range experienced except for lower daily flows on Jan 12-15, 29; Feb 3-12; Mar 3; Jul 15; Aug 18, 19 and higher daily flows on May 12, 17, 18, 22, 23. The peak flow of 35.7 cfs occurred at 0415 on May 12, 2012 at a gage height of 2.06 feet with a shift of 0.00 feet. It exceeded high measurement No. 266 (GH = 1.98), made May 23 by 0.08 feet in stage. The max gage-height of 2.18 feet occurred at 1715 on May 14, but was caused by trash catching on control.

Discharge.-- Shifting control method was used to compute the discharge record for all open water periods. One variable stage-shift relationship, VS11-4, was used while using Rating No. 18. VS11-4 was continued from WY2011 and used from Oct 1 to Dec 7 before station was closed for winter. Rating 19-1 was used after station opened on Mar 20. Shifts during this period were defined by measurements and applied by time and events. All shifts with the new rating were within 5.6% of the rating. Shifts were manually applied for five hours on May 14, 2012 to correct unit value discharge while trash was caught on control. All measurements were given full weight except Nos. 255, 262, 264, 267, 271, and 272, which were adjusted by as much as 6% to smooth shift distribution. The stage-discharge relation was affected by ice and discharge estimated Oct 27, 30; Nov 3, 4, 6, 10-12, 17-30; Dec. 1, 2 and Mar 21, 22. Discharge was also estimated Dec 3 through Mar 20 when well was froze and station closed.

Special Computations.-- Discharge for periods of no gage-height and ice affected record was estimated using discharge measurements and weather records.

Remarks.-- Record is good, except for periods of no gage-height and ice affected record, which are estimated and rated poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.-- The gage pool at this site requires regular cleaning to enable the concrete control to be the controlling feature at lower flows.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

08242500 UTE CREEK NEAR FORT GARLAND

RATING TABLE.-- UTEFTGCO18 USED FROM 01-OCT-2011 TO 20-MAR-2012
 UTEFTGCO19-1 USED FROM 20-MAR-2012 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.5	9.8	e7.2	e4.4	e4.0	e4.4	19	17	19	5.6	5.3	5.6
2	7.0	9.4	e7.2	e4.4	e4.0	e4.2	20	16	19	5.3	5.1	5.3
3	6.9	e9.4	e7.0	e4.6	e3.8	e3.8	14	19	18	5.9	5.6	5.4
4	8.3	e9.8	e6.8	e4.8	e3.6	e4.2	16	22	18	6.0	4.9	5.3
5	13	9.7	e6.6	e4.8	e3.6	e4.6	17	23	18	5.6	5.0	4.6
6	11	e9.8	e6.4	e4.8	e3.6	e5.2	18	24	17	5.8	9.7	4.3
7	12	9.2	e6.2	e4.8	e3.6	e5.8	16	27	16	6.7	8.7	4.3
8	14	9.2	e6.0	e4.6	e3.6	e5.4	15	24	15	11	13	4.8
9	13	8.7	e6.0	e4.4	e3.6	e5.2	15	21	14	8.4	7.0	4.8
10	12	e9.0	e6.0	e4.4	e3.6	e5.6	17	21	13	8.6	7.4	4.4
11	12	e9.0	e6.0	e4.2	e3.8	e6.0	19	21	12	6.5	7.8	4.3
12	12	e9.0	e6.0	e3.8	e3.8	e6.4	21	30	12	9.0	6.9	9.6
13	12	8.4	e6.4	e3.4	e4.0	e7.2	18	27	12	8.3	6.7	19
14	12	8.2	e6.4	e3.4	e4.0	e8.0	17	24	11	7.7	10	13
15	12	9.0	e6.0	e3.6	e4.0	e8.8	16	22	11	3.4	9.3	11
16	11	8.7	e5.6	e4.0	e4.0	e9.6	16	24	10	4.1	8.4	9.5
17	12	e8.8	e5.4	e4.0	e4.0	e9.6	12	29	9.0	7.0	7.0	8.8
18	11	e8.8	e5.8	e4.0	e4.0	e8.8	9.9	29	9.1	6.8	3.3	8.9
19	11	e8.6	e5.8	e4.4	e4.0	e8.0	11	26	9.1	7.9	3.9	7.9
20	10	e7.8	e5.4	e4.6	e4.0	e7.2	11	26	8.4	6.2	5.7	7.1
21	9.7	e7.0	e5.2	e4.6	e4.0	e6.8	12	26	8.6	7.3	7.5	6.6
22	9.4	e7.0	e4.8	e4.4	e4.2	e7.2	17	29	9.5	7.1	8.2	6.2
23	9.1	e7.2	e4.4	e4.0	e4.2	7.6	18	29	8.7	6.5	6.8	5.9
24	8.8	e7.4	e4.0	e4.0	e4.0	9.6	19	26	8.2	7.9	13	5.7
25	8.6	e7.2	e4.2	e4.0	e4.0	11	21	22	7.9	7.9	13	6.6
26	11	e7.0	e4.4	e4.2	e4.2	12	23	22	7.0	8.3	11	6.9
27	e9.4	e7.0	e4.4	e4.2	e4.4	13	27	20	6.9	7.1	9.5	6.4
28	10	e7.2	e4.4	e4.0	e4.4	14	22	18	7.2	6.5	8.4	5.9
29	10	e7.4	e4.6	e3.8	e4.4	14	20	17	6.8	5.5	7.5	5.7
30	e9.7	e7.4	e4.8	e4.0	---	14	17	18	6.0	4.8	6.7	6.5
31	10	---	e4.8	e4.0	---	15	---	19	---	4.9	6.1	---
TOTAL	325.4	252.1	174.2	130.6	114.4	252.2	513.9	718	347.4	209.6	238.4	210.3
MEAN	10.5	8.40	5.62	4.21	3.94	8.14	17.1	23.2	11.6	6.76	7.69	7.01
AC-FT	645	500	346	259	227	500	1020	1420	689	416	473	417
MAX	14	9.8	7.2	4.8	4.4	15	27	30	19	11	13	19
MIN	6.9	7.0	4.0	3.4	3.6	3.8	9.9	16	6.0	3.4	3.3	4.3

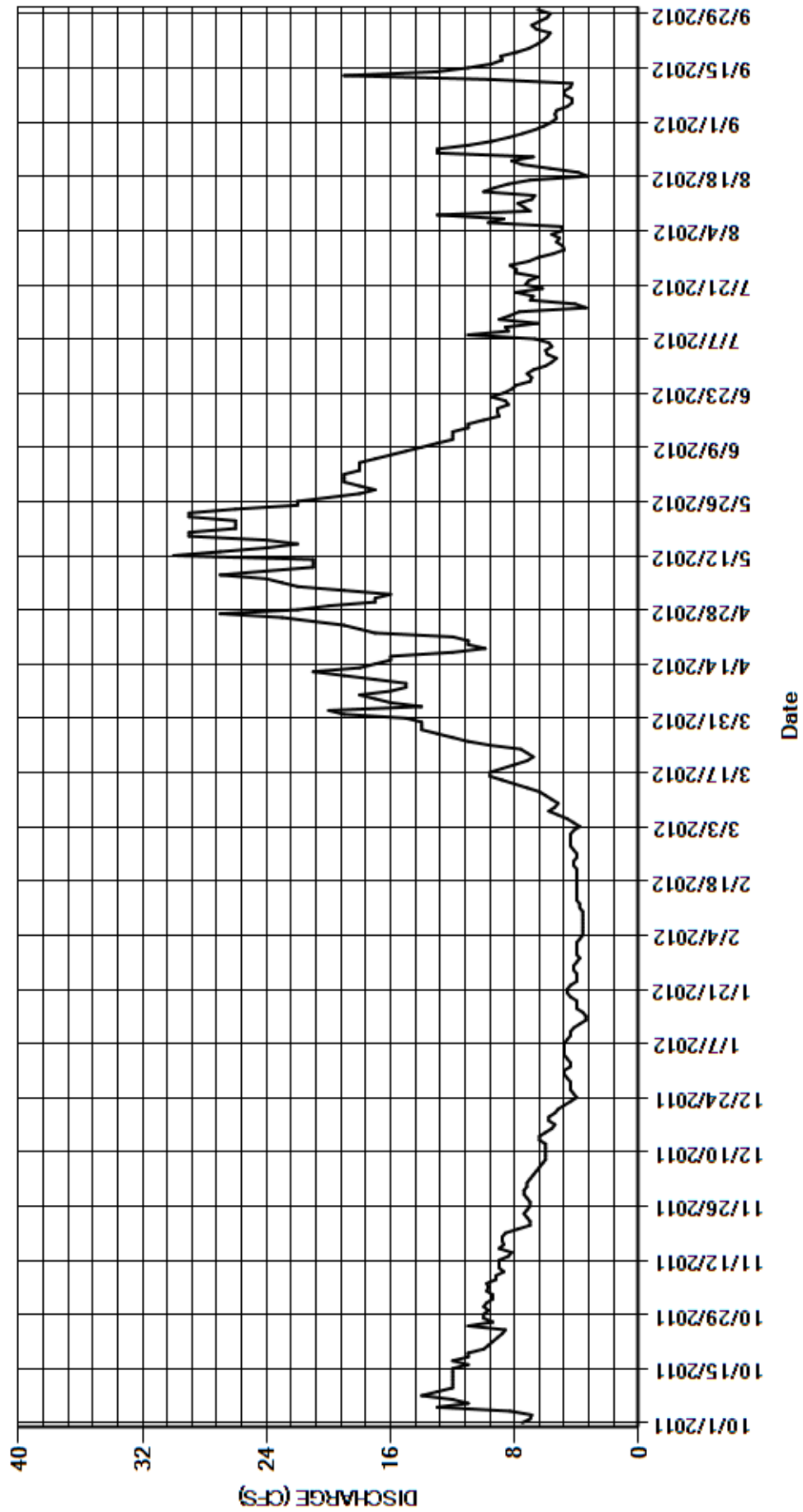
CAL YR	2011	TOTAL	3862.5	MEAN	10.6	MAX	48	MIN	3.1	AC-FT	7660
WTR YR	2012	TOTAL	3486.5	MEAN	9.53	MAX	30	MIN	3.3	AC-FT	6920

MAX DISCH: 35.7 CFS AT 04:15 ON MAY 12,2012 GH 2.06 FT SHIFT 0 FT

MAX GH: 2.18 FT AT 17:15 ON MAY 14,2012 (debris on control)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08242500 UTE CREEK NEAR FORT GARLAND
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08243500 TRINCHERA CREEK BELOW SMITH RESERVOIR
Water Year 2012

Location.-- Lat 37°23'10", long 105°33'6" referenced to North American Datum of 1983 (Blanca, CO quad, scale 1:24,000), UTM Zone 13 451172 E and 4137863 N, in NE ¼ NW ¼ sec. 4, T.31 S., R.73 W., 6th Principal Meridian, Costilla County, CO, Hydrologic Unit 13010002, on right bank 0.6 mi downstream from Smith Reservoir, and 5.0 mi southwest of Blanca, CO.

Drainage Area and Period of Record.-- 396 mi²; Oct. 1, 1928 to current year, records mostly complete.

Equipment.-- Graphic water-stage recorder, data collection platform (Sutron Satlink2) and a float-operated shaft encoder in a 42-inch diameter corrugated metal shelter and well. The shaft encoder float is operated in an oil cylinder. The primary reference gage is a drop tape from reference point on shelf. No outside gage. No change.

Hydrologic Conditions.-- Station is located below Smith Reservoir and all but the smallest flows are regulated. There are small springs located below the dam and are measured during the periods the outlet is shut off.

Gage-Height Record.-- Primary record is fifteen-minute transmitted data with DCP log and chart record as backup. Record is complete and reliable except for Dec 7 to Mar 6 when inlets were frozen. Three shaft encoder corrections and a flush correction were observed and applied. The flush correction, +0.01 ft on May 14, was applied straight back to the gate change earlier the same day. The shaft encoder corrections were prorated back to previous visits except for the +0.01 ft correction on Mar 14 which was applied straight from when the inlets thawed. The stage-discharge relationship was affected by ice Dec 1-6.

Datum Corrections.-- Levels were run to the Reference Point (RP) inside the gage Apr 6, 2012 using BM No. 5 as base. The RP elevation was within allowable limits, so a correction was not made. Two-peg test was performed on the Lietz level (SN 130869) on Apr 6, 2012 and the instrument was within allowable limits and no correction was made.

Rating.-- The control is a concrete weir approximately five feet downstream of the gage. Shifting primarily results from moss growth and the movement of streambed materials in gage pool and approach. Rating No. 12, first used Oct 1, 2009, was used again this year. Seventeen measurements (nos. 883-899) were made this year ranging in discharge from 0.06 to 32.1 cfs. The measurements cover the discharge range experienced except for lower daily flows on Sep 14 and 21 and higher daily flows on Apr 28. The peak flow of 57.4 cfs occurred at 1200 on Apr 28, 2012 at a gage height of 3.72 ft with a shift of 0.00 ft. It exceeded high measurement no. 892 (GH = 3.48 ft), made on Apr 30, 2012, by 0.24 ft in stage.

Discharge.-- Shifting control method was used to compute the discharge record during all periods of open-water. Shifts were applied by time from Oct 1 to Mar 6 and Aug 5 to Sep 30 while flows were less than 1 cfs, except for Aug 5 while flows were declining, which was 1.8 cfs. One shift curve, TRISMIVS12c, was used from Mar 7 to Aug 5, to apply shifts by stage. Measurement shifts ranged from -0.03 to +0.04 ft and all were given full weight, except for nos. 891, 892 and 896 which were adjusted as much as 6.6 percent and no. 894 adjusted -8.9 percent back to the rating. High measurement 892 was adjusted 1.9 percent back to the rating based on overall measurement shift trend to balance the measurements. One -0.03 ft cleaning correction was identified Aug 6 and prorated as a correction to shift from Aug 5 when the reservoir gates were closed.

Special Computations.-- Discharge for periods of no gage-height record was estimated using four discharge measurements, good record before and after ice periods, and weather records. Winter flows are primarily reservoir seepage and small springs. Winter measurements are poor and no single measurement is given more weight than any other.

Remarks.-- Record is good above 1 cfs, and poor less than 1cfs. Estimated daily discharges less than 1 cfs should be considered poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.--

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

08243500 TRINCHERA CREEK BELOW SMITH RESERVOIR

RATING TABLE.-- TRISMICO12 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

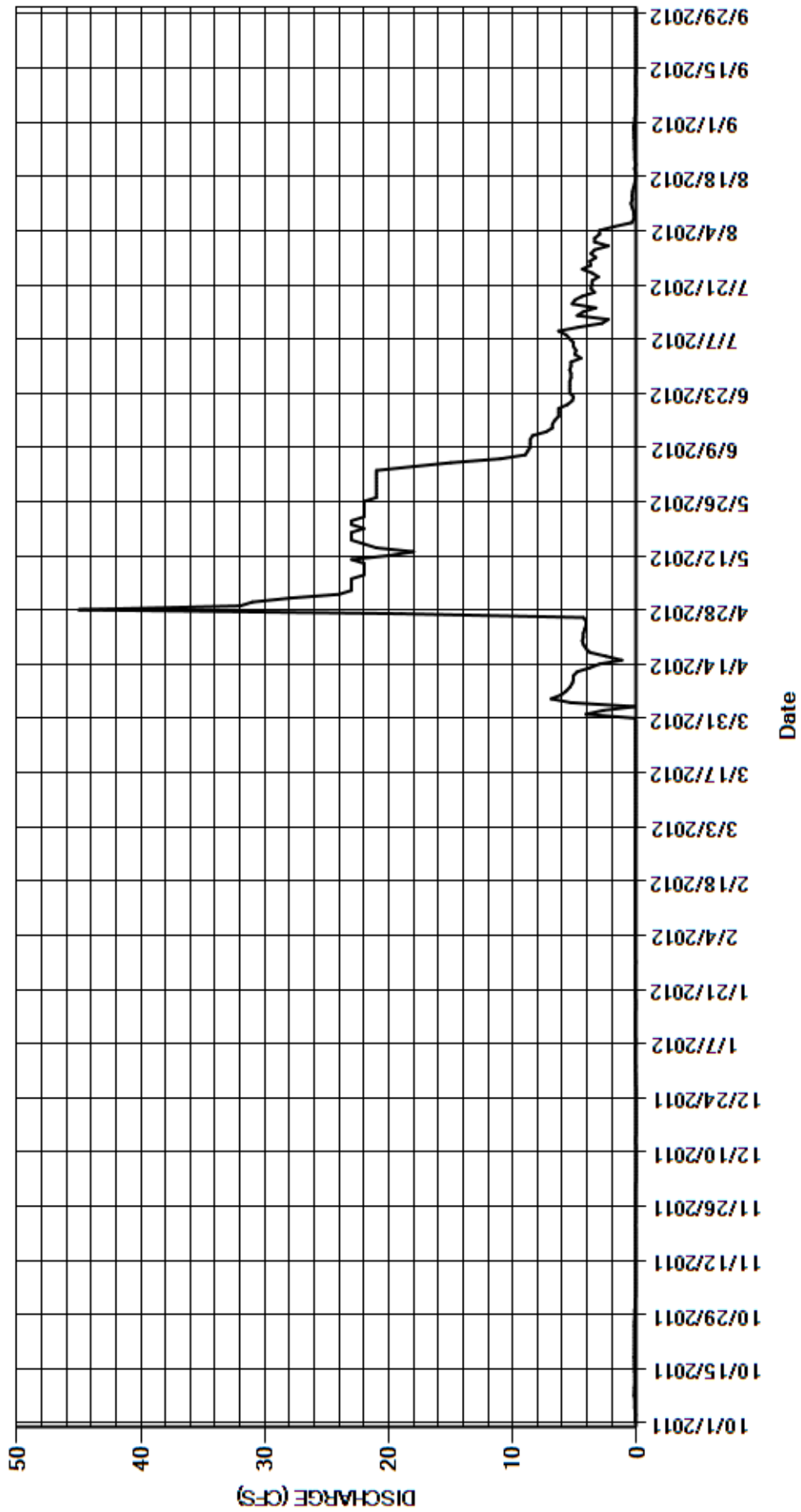
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.12	0.12	e0.08	e0.11	e0.13	e0.13	4.1	28	21	5.3	3.4	0.18
2	0.13	0.12	e0.08	e0.12	e0.12	e0.12	2.7	24	21	4.5	3.4	0.17
3	0.11	0.10	e0.07	e0.12	e0.12	e0.10	0.15	23	21	5.0	3.0	0.10
4	0.13	0.10	e0.07	e0.12	e0.12	e0.10	5.3	23	18	4.9	3.0	0.10
5	0.16	0.10	e0.06	e0.13	e0.12	e0.10	6.9	23	15	5.1	1.8	0.08
6	0.15	0.09	e0.06	e0.12	e0.12	e0.09	6.1	23	11	5.1	0.40	0.09
7	0.16	0.10	e0.07	e0.11	e0.12	0.10	5.7	22	9.0	5.4	0.22	0.09
8	0.22	0.10	e0.07	e0.11	e0.12	0.08	5.4	22	8.8	5.7	0.23	0.07
9	0.20	0.10	e0.07	e0.12	e0.12	0.09	5.2	22	8.6	6.3	0.27	0.06
10	0.19	0.11	e0.07	e0.12	e0.12	0.10	5.1	22	8.6	4.7	0.38	0.08
11	0.17	0.10	e0.07	e0.12	e0.13	0.10	5.1	23	8.6	2.8	0.46	0.09
12	0.16	0.10	e0.08	e0.12	e0.13	0.09	4.8	20	8.4	2.3	0.36	0.08
13	0.17	0.10	e0.09	e0.12	e0.13	0.10	3.8	18	7.3	4.8	0.38	0.09
14	0.18	0.10	e0.08	e0.12	e0.13	0.10	3.0	21	6.8	4.3	0.34	0.05
15	0.21	0.09	e0.07	e0.12	e0.13	0.10	1.2	22	6.8	3.3	0.27	0.06
16	0.20	0.10	e0.07	e0.11	e0.13	0.10	2.5	23	6.6	5.2	0.17	0.06
17	0.20	0.10	e0.07	e0.11	e0.13	0.10	3.8	23	6.3	5.0	0.11	0.07
18	0.22	0.10	e0.07	e0.11	e0.13	0.09	4.1	23	6.3	4.4	0.10	0.07
19	0.19	0.10	e0.07	e0.12	e0.13	0.10	4.3	22	6.3	3.4	0.10	0.07
20	0.20	0.10	e0.07	e0.12	e0.13	0.10	4.4	23	5.6	3.7	0.18	0.06
21	0.19	0.12	e0.07	e0.13	e0.14	0.10	4.3	23	5.2	3.6	0.08	0.05
22	0.18	0.10	e0.07	e0.13	e0.14	0.10	4.3	22	5.1	3.6	0.15	0.06
23	0.19	0.09	e0.07	e0.13	e0.13	0.10	4.2	22	5.4	3.1	0.16	0.07
24	0.18	0.11	e0.07	e0.12	e0.12	0.10	4.1	22	5.4	3.6	0.16	0.06
25	0.18	0.09	e0.07	e0.12	e0.13	0.11	4.1	22	5.4	4.4	0.19	0.07
26	0.21	0.10	e0.07	e0.13	e0.14	0.11	4.3	22	5.4	3.7	0.18	0.07
27	0.19	0.10	e0.08	e0.12	e0.14	0.10	19	21	5.3	3.8	0.19	0.06
28	0.17	0.10	e0.08	e0.11	e0.13	0.10	45	21	5.3	3.3	0.23	0.07
29	0.17	0.10	e0.08	e0.12	e0.14	0.11	32	21	5.4	3.7	0.23	0.06
30	0.16	0.10	e0.10	e0.13	---	0.11	31	21	5.3	3.4	0.25	0.06
31	0.13	---	e0.12	e0.14	---	0.12	---	21	---	2.3	0.25	---
TOTAL	5.42	3.04	2.32	3.73	3.72	3.15	235.95	688	264.2	129.7	20.64	2.35
MEAN	0.17	0.10	0.075	0.12	0.13	0.10	7.86	22.2	8.81	4.18	0.67	0.078
AC-FT	11	6.0	4.6	7.4	7.4	6.2	468	1360	524	257	41	4.7
MAX	0.22	0.12	0.12	0.14	0.14	0.13	45	28	21	6.3	3.4	0.18
MIN	0.11	0.09	0.06	0.11	0.12	0.08	0.15	18	5.1	2.3	0.08	0.05

CAL YR	2011	TOTAL	1115.88	MEAN	3.06	MAX	19	MIN	0.06	AC-FT	2210
WTR YR	2012	TOTAL	1362.22	MEAN	3.72	MAX	45	MIN	0.05	AC-FT	2700

MAX DISCH: 57.4 CFS AT 12:00 ON APR 28,2012 GH 3.72 FT SHIFT 0 FT
 MAX GH: 3.72 FT AT 12:00 ON APR 28,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08243500 TRINCHERA CREEK BELOW SMITH RESERVOIR
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08245000 CONEJOS RIVER BELOW PLATORO RESERVOIR
Water Year 2012

Location.-- Lat 37°21'18", long 106°32'39" referenced to North American Datum of 1983 (Platoro, CO quad, scale 1:24,000), UTM Zone 13 363240 E and 4135374 N, in SW ¼ NW ¼ sec. 22, T.36 N., R.4 E., New Mexico Principal Meridian, Conejos County, CO, Hydrologic Unit 13010005, on left bank 1,100 ft downstream from Platoro Reservoir valve house and 0.7 mi northwest of Platoro, CO.

Drainage Area and Period of Record.-- 40 mi²; May 1952 to current year.

Equipment.-- Graphic water stage recorder, data collection platform (Satlink2), float-operated shaft encoder, and air temperature sensor in a timber shelter and concrete well. The primary reference gage is a drop tape from reference point on shelf. Cableway located 150 feet below gaging station. Constant flow bubbler and outside cantilever gage were installed on Oct 12, 2011.

Hydrologic Conditions.-- Gage is below Platoro Reservoir and regulated at all stages.

Gage-Height Record.-- Primary record is 15-minute transmitted CFB data with DCP log, SDR log, and graphic chart record as backup. Record is complete and reliable except for as follows. SDR data was used Aug 12-21 due to a CFB malfunction; one unit value was entered on Oct. 3, 2011; nineteen missing unit values were estimated based on linear interpolation on Oct. 12, 2011 (no change in release during this period); one unit value on each day Sep 11 and 19 was filled from DCP shaft encoder log. There were four corrections made to the bubbler that were prorated from the previous visit. A -0.05 ft bubbler correction was made on Jan. 30, 2012 and distributed back to Nov. 16, 2011 according to field notes.

Datum Corrections.-- Levels were run to the Reference Point (RP) inside the gage, the outside cantilever gage, and the outside staff gage on Aug 8, 2012 using B.M. No. 1 as base. The RP and cantilever gage were within allowable limits and no correction was made. The outside staff gage elevation was 0.049 ft below gage datum, but was not corrected. A two-peg test was performed on the Lietz level (SN 130869) on Aug 6, 2012. The instrument was within allowable limits and no correction was made.

Rating.-- A concrete slab weir with sloping sides is the control. Rating No. 15-1 in use since Jan 1, 2011 was used again this year. Rating No. 15-1 is well defined from 7 to 825 cfs. Sixteen measurements (Nos. 893-908) were made this year ranging in discharge from 6.62 to 274 cfs. Measurements cover the discharge range experienced, except for higher daily flows on Apr 25-28, May 5-8, 22-24. The peak flow of 390 cfs occurred at 0945 on May 7, 2012 at a gage height of 2.61 ft with a shift of +0.05 ft. It exceeded high measurement No. 902 (GH = 2.26 ft) by 0.35 ft in stage.

Discharge.-- Shifting control method was used to compute the discharge record. Variable shift curve VS1105 was used from WY 2011 until Oct. 3, 2011. From Oct 3 to Nov 10 shifts were applied by events. A variable shift curve VS12-1 was used from Nov 10 until Nov 30. Shifts were prorated by time from Nov 30 - Jan 30. Variable shift curve VS12-01 was used going into high water and was prorated by time due to numerous gate changes from May 25 to Jun 7 to variable shift curve VS12-02 which was used after high water. It is assumed there was gage pool scour that caused this change in shift curves. Measured shifts ranged from -0.01 ft to +0.13 ft. All measurements were given full weight except numbers 895, 896, 898, and 900-906, which were adjusted as much as 7.9 percent to smooth the shift distribution.

Special Computations.--

Remarks.-- Record is good except for period of Dec 1 to Mar 28, which should be considered fair due to minimal number of visits. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.-- Experiment to discover cause of measurement variation at this station between ADCP and standard meters.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

08245000 CONEJOS RIVER BELOW PLATORO RESERVOIR

RATING TABLE.-- CONPLACO15-1 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

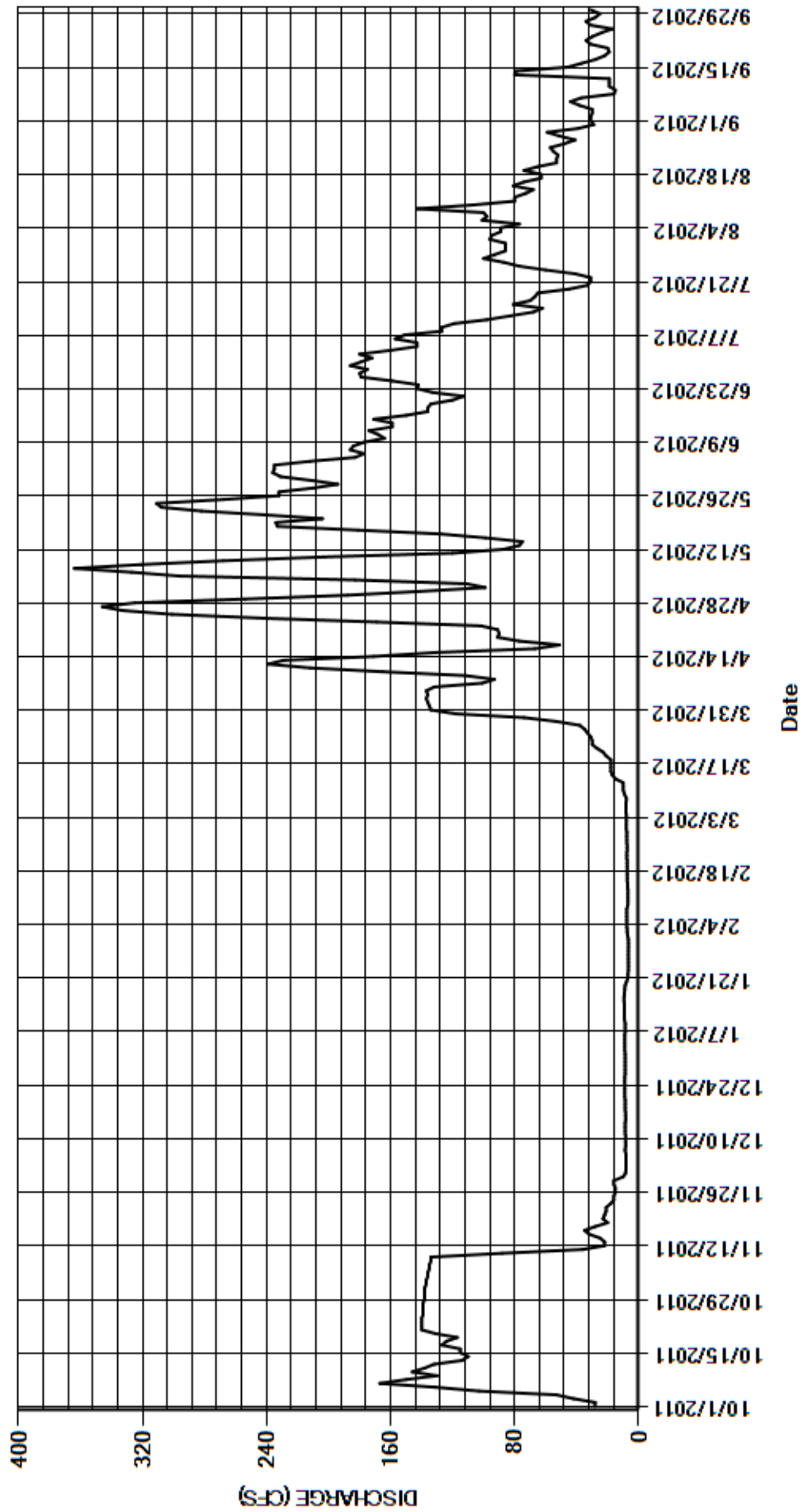
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	28	138	8.4	8.8	7.1	8.0	135	141	236	172	96	31
2	28	137	8.3	8.9	7.5	7.9	136	99	235	180	95	31
3	42	137	8.3	9.0	7.6	7.9	137	111	235	160	89	30
4	53	136	8.3	9.0	7.6	8.1	136	183	212	143	89	30
5	103	136	8.3	9.0	7.6	8.1	137	296	183	143	77	38
6	131	135	8.3	9.0	7.7	8.1	132	327	177	157	101	44
7	167	135	8.8	8.7	7.7	8.1	101	364	186	151	98	37
8	150	134	8.4	8.7	7.7	8.0	93	321	184	127	100	16
9	130	134	8.4	8.7	7.0	9.2	112	268	177	127	143	15
10	146	88	8.5	9.1	7.0	9.9	165	203	164	119	107	19
11	138	36	8.6	9.2	7.0	9.9	212	120	168	98	80	19
12	132	22	8.7	9.2	7.0	10	239	87	174	83	80	19
13	114	22	8.8	9.2	7.0	15	229	77	159	68	73	80
14	110	25	8.7	9.3	7.2	17	171	75	159	62	68	79
15	115	32	8.4	9.4	7.3	18	131	99	171	81	81	46
16	115	35	8.5	9.4	7.3	18	67	128	150	70	74	37
17	127	28	8.6	9.2	7.4	18	51	181	136	67	63	28
18	124	20	8.7	9.0	7.4	18	77	233	136	65	63	22
19	117	23	8.7	8.8	7.5	21	91	234	134	45	74	19
20	131	22	8.7	7.8	7.5	23	90	204	120	33	65	20
21	140	21	9.0	7.0	7.6	27	91	241	113	31	53	31
22	140	21	9.0	6.9	7.6	30	102	282	133	31	53	34
23	140	18	9.0	6.7	7.6	30	169	308	143	41	52	30
24	140	16	9.0	6.6	7.5	31	242	311	142	60	55	24
25	139	16	9.1	6.7	7.6	33	301	268	159	77	57	17
26	139	15	8.9	6.7	7.6	35	333	232	179	87	48	31
27	139	15	8.8	6.8	7.7	38	346	232	180	100	41	34
28	139	16	8.8	6.7	7.6	53	325	210	175	93	51	28
29	138	16	8.8	6.6	8.0	74	254	194	186	86	59	25
30	138	10	8.8	6.6	---	118	188	211	179	86	39	31
31	138	---	8.8	6.7	---	134	---	231	---	86	29	---
TOTAL	3731	1739	268.4	253.4	215.9	854.2	4993	6471	5085	2929	2253	945
MEAN	120	58.0	8.66	8.17	7.44	27.6	166	209	170	94.5	72.7	31.5
AC-FT	7400	3450	532	503	428	1690	9900	12840	10090	5810	4470	1870
MAX	167	138	9.1	9.4	8.0	134	346	364	236	180	143	80
MIN	28	10	8.3	6.6	7.0	7.9	51	75	113	31	29	15

CAL YR	2011	TOTAL	39449.4	MEAN	108	MAX	617	MIN	4.8	AC-FT	78250
WTR YR	2012	TOTAL	29737.9	MEAN	81.3	MAX	364	MIN	6.6	AC-FT	58990

MAX DISCH: 390 CFS AT 09:45 ON MAY 07,2012 GH 2.61 FT SHIFT 0.05 FT
 MAX GH: 2.61 FT AT 09:45 ON MAY 07,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08245000 CONEJOS RIVER BELOW PLATORO RESERVOIR
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08246500 CONEJOS RIVER NEAR MOGOTE

Water Year 2012

Location.-- Lat. 37°03'14", Long. 106°11'13", UTM X 394411.1, Y 4101511.0, in SE¼SE¼ sec. 34, T.33 N., R.7 E., Conejos County, Hydrologic Unit 13010005, on left bank 75 ft downstream from bridge on State Highway 174, 0.4 mi downstream from Fox Creek, 5.3 mi west of Mogote, and 10 mi west of Antonito.

Drainage Area and Period of Record.-- 282 mi²; April 1903 to October 1905, October 1911 to current year. Monthly discharge only for some periods. Records for March 1900 at site 5.5 mi upstream and May 1905 to September 1911 (some missing periods most years) at site 3.2 mi upstream not equivalent to present site due to inflow.

Equipment.-- Graphic water-stage recorder, data collection platform (Sutron Model 8210 DCP with HDR GOES radio and phone modem) and a float-operated shaft encoder, air temperature sensor, and tipping bucket rain gauge in a 5 ft diameter metal shelter and well. On-site AC-power provides electricity for heat lamp to prevent well from freezing in winter. The primary reference gage is a drop tape from reference point on shelf. Outside gage is a cantilever wire weight gage located on the upstream side of shelter, established May 26, 2011.

Hydrologic Conditions.-- Flows partially regulated by Platoro Reservoir (capacity 60,000 acre-feet) and a few other minor reservoirs. Flood irrigation of approximately 225 acres of pasture grass may have a minor impact on flows at gage, 2005 CDSS irrigated area. Drainage area is predominantly undeveloped national forest.

Gage-Height Record.-- Primary record is 15-minute transmitted stage data with electronic DCP log and chart record as backup. Record is complete and reliable. Since chart had a malfunction, five missing unit values were estimated by linear interpolation on Apr. 15, 2012 with no loss in accuracy. The stage-discharge relationship was affected by ice on the control Nov. 23, 2011 through Mar. 15, 2012, and Mar. 19-21, 2012. There were no instrument calibration corrections needed or made.

Datum Corrections.-- Levels were last ran September 27, 2011. All existing reference marks were stable and within allowable tolerance. Outside wire-weight gage was set to gage datum. No other adjustments were made. Two-peg tests were performed on the instrument on May 27, Jul. 28, and Sep. 26, 2011. The instrument was adjusted slightly on Sep. 26, 2011.

Rating.-- Low flow control is a cobblestone riffle approximately fifty feet below the gage and medium to high flows are channel control. Rating No. 13, in use since March 3, 2008, was used for the entire water year. It is well defined from 10 to 2100 cfs. The rating was extended to 9200 cfs using the high end of the results of a cooperative rating curve extension project using step-backwater analysis method with the USGS in 2002. Twenty-five measurements (Nos. 228-252) were made this year ranging in discharge from 31.0 to 971 cfs. The measurements cover the discharge range experienced except for lower daily flows on Dec. 6, 2011 and higher daily flows on Apr. 26, 27, 2012. The peak flow of 1110 cfs occurred at 0315 on Apr. 27, 2012 at a gage height of 4.13 feet with a shift of 0.00 ft. It exceeded high measurement No. 242 (GH=3.95 ft), made Apr. 27, 2012 by 0.18 feet in stage.

Discharge.-- Shifting control method was used during all periods of good record. The stage-discharge relation was affected by ice Nov. 23, 2011 through Mar. 15, 2012, and Mar. 19-21, 2012 and was estimated. Shifts were applied as defined by discharge measurements and distributed by time from Oct. 1, 2011 through Mar. 15, 2012. Variable shift curves were developed and used from Mar. 15 through Sep. 17, 2012 and the rating was used directly Sep. 17-30, 2012. Open water measurement shifts ranged from -0.04 to +0.07 ft. Measurements 229 and 230 were rated good and adjusted as much as 3.6% and measurements 239, 240, 242, 243, 245, 247-249, and 252 were rated fair and adjusted as much as 5.7% to fit the shift trend.

Special Computations.-- Discharge for periods of ice-affected record was estimated using discharge measurements, weather records, partial day record, and comparison with nearby stations.

Remarks.-- Record is good except for periods of ice-affected record, which are poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.--

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

08246500 CONEJOS RIVER NEAR MOGOTE

RATING TABLE-- CONMOGCO13 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

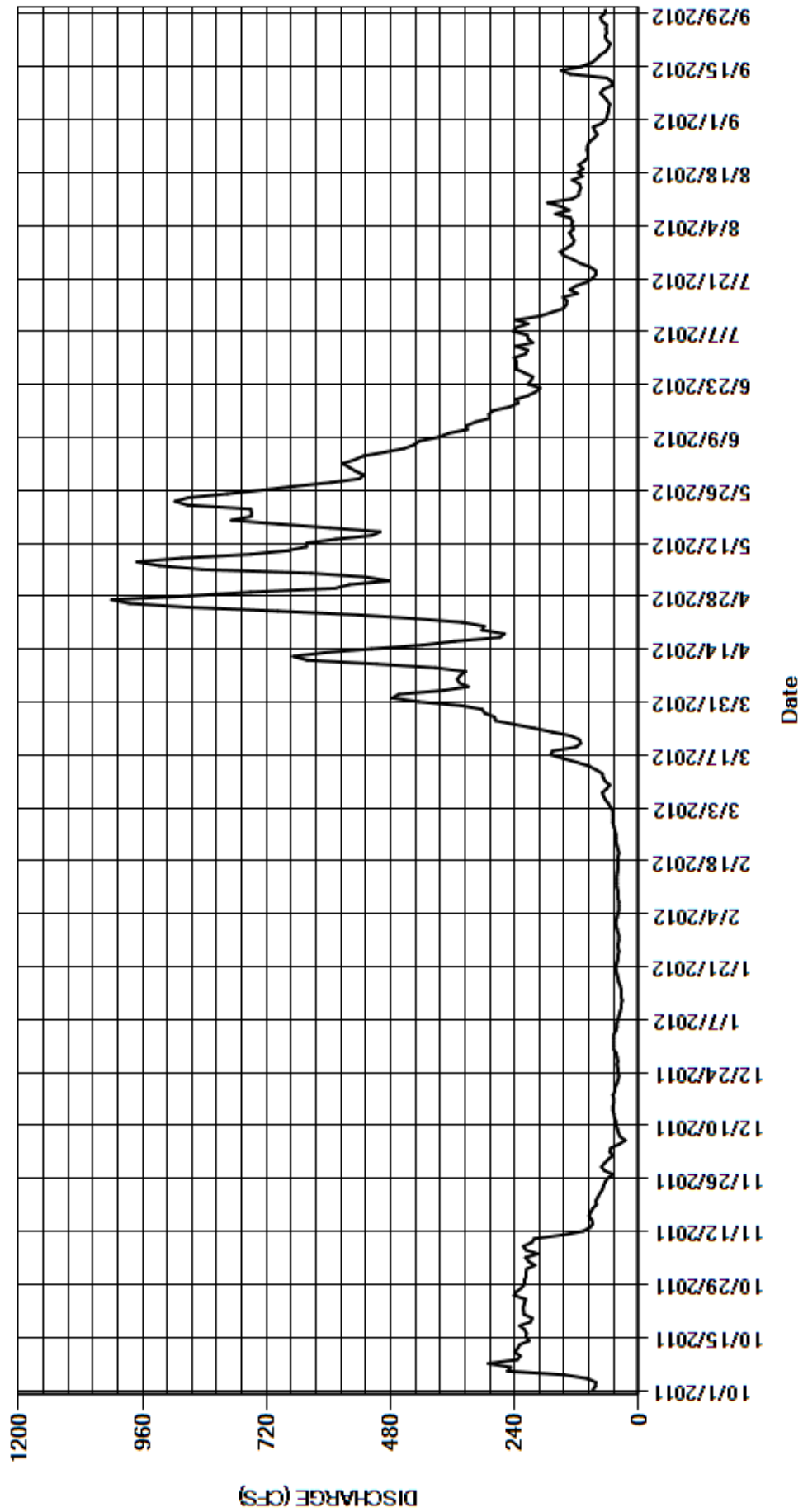
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	89	218	e59	e48	e44	e50	477	560	560	219	129	63
2	84	217	e50	e48	e44	e50	464	483	573	215	134	61
3	83	201	e56	e48	e42	e54	377	529	550	238	126	59
4	99	213	e54	e44	e40	e58	330	633	533	205	130	58
5	144	219	e38	e42	e38	e64	347	845	492	214	128	56
6	254	195	e26	e42	e38	e68	351	927	454	216	132	61
7	248	218	e36	e40	e38	e70	345	971	434	243	161	67
8	291	223	e39	e38	e40	e62	335	884	424	236	134	74
9	235	207	e41	e36	e40	e56	393	750	387	214	150	68
10	229	202	e44	e34	e40	e65	507	678	368	237	176	51
11	240	147	e44	e34	e42	e69	641	643	332	191	129	52
12	234	107	e47	e32	e42	e70	668	642	334	168	116	62
13	230	94	e48	e34	e42	e82	607	586	316	146	115	132
14	212	89	e50	e34	e42	e96	517	516	288	140	112	150
15	218	91	e50	e34	e41	e120	419	500	290	139	115	111
16	217	96	e48	e36	e40	146	356	597	282	146	128	91
17	221	93	e48	e39	e40	170	269	696	250	119	109	82
18	230	89	e50	e40	e40	167	260	788	233	133	118	75
19	209	82	e46	e42	e40	e122	303	750	237	121	107	64
20	206	83	e46	e44	e38	e112	299	749	214	100	116	59
21	222	79	e42	e44	e40	e115	341	751	199	89	105	55
22	223	75	e40	e42	e42	131	433	873	191	83	98	62
23	223	e70	e38	e40	e44	167	543	897	214	83	98	65
24	221	e68	e40	e40	e44	202	698	871	208	94	100	62
25	219	e65	e40	e38	e44	240	874	796	205	114	99	63
26	241	e60	e42	e40	e46	277	985	728	221	127	96	62
27	236	e50	e40	e40	e48	279	1020	666	237	145	87	71
28	227	e66	e42	e38	e50	298	870	595	236	152	80	74
29	221	e72	e43	e38	e50	303	751	541	236	139	85	66
30	221	e66	e48	e40	---	344	588	531	241	128	88	64
31	218	---	e48	e42	---	426	---	548	---	125	71	---
TOTAL	6445	3755	1383	1231	1219	4533	15368	21524	9739	4919	3572	2140
MEAN	208	125	44.6	39.7	42.0	146	512	694	325	159	115	71.3
AC-FT	12780	7450	2740	2440	2420	8990	30480	42690	19320	9760	7090	4240
MAX	291	223	59	48	50	426	1020	971	573	243	176	150
MIN	83	50	26	32	38	50	260	483	191	83	71	51

CAL YR	2011	TOTAL	99978	MEAN	274	MAX	1700	MIN	26	AC-FT	198300
WTR YR	2012	TOTAL	75828	MEAN	207	MAX	1020	MIN	26	AC-FT	150400

MAX DISCH: 1110 CFS AT 03:15 ON APR 27,2012 GH 4.13 FT SHIFT 0 FT
 MAX GH: 4.13 FT AT 03:15 ON APR 27,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08246500 CONEJOS RIVER NEAR MOGOTE
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08247500 SAN ANTONIO RIVER AT ORTIZ

Water Year 2012

Location.-- Lat 36°59'35", long 106°2'17" referenced to North American Datum of 1983 (Los Pinos, NM quad, scale 1:24,000), UTM Zone 13 407628 E and 4094606 N, in L1 ¼ SE ¼ sec. 24, T.32 N., R.8 E., New Mexico Principal Meridian, Rio Arriba County, NM, Hydrologic Unit 13010005, on left bank 800 ft south of Colorado-New Mexico State line, 0.4 mi southeast of Ortiz, CO, and 0.4 mi upstream from Los Pinos River.

Drainage Area and Period of Record.-- 110 mi²; April 1919 to current year (no winter record prior to 1941). Monthly data only for some periods.

Equipment.-- Graphic water-stage recorder, data collection platform (Sutron Satlink2) and a float-operated shaft encoder in a 42-inch metal pipe shelter and well. The shaft encoder float is operated in an oil cylinder. The primary reference gage is a drop tape from reference point on shelf. A cantilever staff gage was installed on May 4, 2011. Bank operated cableway installed October 2010.

Hydrologic Conditions.-- Basin is alpine and predominately subalpine terrain. Minor diversions affect flows at gage.

Gage-Height Record.-- Primary record is 15-minute transmitted data with DCP log and chart record as backup. Record is complete and reliable, except for Jan. 1 – Mar. 15, due to well, oil cylinder, and/or inlets freezing. The stage-discharge relation was affected by ice Nov. 2-11, 15-18, 21-30, Dec. 1-31, 2011 and March 16-22, 2012. Three instrument corrections were made to the shaft encoder ranging from -0.01 to +0.03 ft and were prorated by time from the previous visit. One additional correction of +0.08 ft was applied due to oil cylinder leakage which occurred from June 11-15 as identified from comparison with chart record.

Datum Corrections.-- Levels were last ran to the Reference Point (RP) inside the gage on Sept. 27, 2011 using B.M. No. 4 as base. The gage was within allowable limits, therefore no correction was required or made. Two-peg test was performed on the Lietz level (SN 130869) on Sept. 26, 2011, and a 0.0017 adjustment was made to bring level back into tolerance.

Rating.-- Control is a rock weir which is subject to settling and silting. SANORTCO 17-1 was developed and used from March 15, 2011 to March 15, 2012. A consistent positive shift trend from SANORTCO 17-1 indicated that the control had settled so SANORTCO 18-1 was developed from measurements 135 through 148 and used from March 15, 2012 to the end of the water year. The low end of SANORTCO 18-1 was drawn to best reflect conditions at the end of WY2012 which indicate more filling had occurred as a result of beaver activity on the control. SANORTCO 18-1 is well defined from 10 cfs to 250 cfs, fairly well defined from 2 cfs to 10 cfs, and poorly defined for the remainder of the range. Twenty-five measurements (Nos. 123 - 147) were made this year, ranging in discharge from 0 to 164 cfs. The measurements cover the discharge range experienced. The peak flow of 210 cfs occurred at 0515 on April 1, 2012 at a gage height of 3.13 feet with a shift of 0.00 feet. It exceeded high measurement No. 136 (GH=2.87 ft), made April 2, 2012 by 0.26 ft in stage.

Discharge.-- Shifting control method was used during all periods of good record. Periods of unreliable gage-height and periods when stage-discharge relation was affected by ice were estimated. Measured shifts ranged from -0.01 to +0.04 ft while rating SANORTCO17-1 was in use and -0.01 to +0.20 ft while SANORTCO18-1 was used. Four variable shift curves, SANORTVS12-11 to SANORTVS12-14, were developed and used from May 1, 2012 to September 28, 2012. These shift curves were used to describe the filling caused by a beaver constructing on and around the control. These 3-point shift curves return to the rating at 1.60 ft, approximately the point where the leakage through the rocks is a small portion of the total flow. All open water measurements were given full weight and applied except for Nos. 135, 137, 138, 140, and 142 which were rated fair or good and adjusted as much as 5.4% to smooth shift distribution. Measurement 143 was rated poor and adjusted 12.2% and measurement 145 (0.02 cfs) was rated poor and adjusted -80.6% to the shift trend of adjacent higher flow measurements. There was no flow Jun. 18 - Jul. 12, Jul. 23 - Jul. 26, and Sep. 6-13, 2012 (37 days).

Special Computations.-- Discharge for periods of unreliable gage-height and ice affected record was estimated using discharge measurements, weather records, partial day records, and hydrographic comparison with the station 'Los Pinos River near Ortiz'. Discharge for periods of submergence and no stable stage-discharge relationship estimated by site observations and shifts from previous rating.

Remarks.-- Record is good except for estimated daily discharges, which are poor. Periods of flow less than 2.5 cfs from Jun. 1 to Sep. 30 should be considered poor due to lack of definition in this part of rating. The peak discharge should be considered poor due to lack of high measurements defining upper end of rating. Station maintained and record developed by Div. 3 hydrographic staff.

Recommendations.-- High flow measurements are needed to define upper end of rating.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

08247500 SAN ANTONIO RIVER AT ORTIZ

RATING TABLE-- SANORTCO17-1 USED FROM 01-OCT-2011 TO 15-MAR-2012
 SANORTCO18-1 USED FROM 15-MAR-2012 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

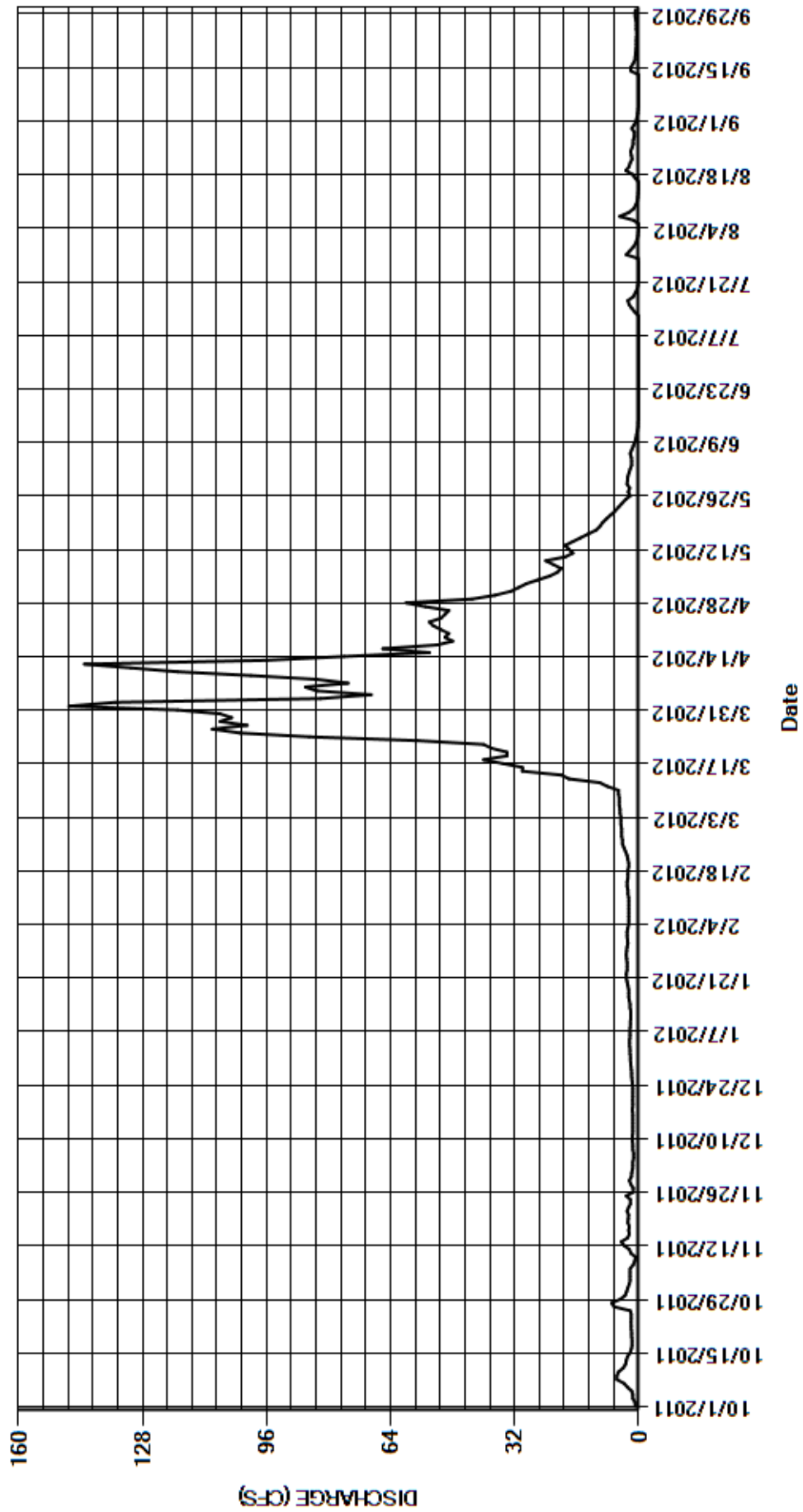
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.85	2.8	e1.8	e2.2	e3.0	e4.6	147	33	2.5	0.00	0.43	0.67
2	0.94	e2.4	e1.6	e2.2	e3.0	e4.6	135	31	2.2	0.00	0.18	0.43
3	1.5	e2.2	e1.5	e2.3	e2.8	e4.6	82	29	1.8	0.00	0.06	0.22
4	1.5	e2.2	e1.5	e2.3	e2.6	e4.8	69	26	1.8	0.00	0.02	0.10
5	1.8	e2.2	e1.3	e2.3	e2.6	e4.8	83	23	1.9	0.00	0.01	0.02
6	2.9	e2.2	e1.3	e2.2	e2.6	e5.0	86	21	2.2	0.00	1.3	0.00
7	3.8	e1.4	e1.5	e2.2	e2.6	e5.0	75	20	1.8	0.00	4.9	0.00
8	5.6	e1.0	e1.5	e2.2	e2.6	e5.0	83	22	1.4	0.00	2.6	0.00
9	5.6	e0.80	e1.6	e2.1	e2.6	e5.2	100	24	1.0	0.00	1.3	0.00
10	5.2	e2.0	e1.6	e2.1	e2.6	e5.2	119	19	0.73	0.00	0.76	0.00
11	4.0	e2.4	e1.6	e2.0	e2.6	e8.0	131	17	0.54	0.00	0.34	0.00
12	3.4	3.7	e1.5	e2.0	e2.8	e10	143	18	0.33	0.00	0.22	0.00
13	3.2	4.5	e1.5	e2.2	e2.8	e18	96	19	0.15	1.0	0.08	0.00
14	2.9	2.9	e1.5	e2.2	e3.0	e20	76	17	0.08	1.8	0.04	2.0
15	2.2	e2.4	e1.5	e2.4	e3.0	e30	54	15	0.03	2.5	0.01	2.0
16	1.9	e2.6	e1.5	e2.6	e2.8	e30	66	13	0.02	2.8	0.01	1.4
17	1.7	e2.4	e1.6	e2.6	e2.8	e35	52	11	0.01	1.4	0.91	0.92
18	1.7	e2.8	e1.6	e2.6	e2.8	e40	48	10	0.00	0.90	1.6	0.87
19	1.8	2.7	e1.5	e2.8	e2.6	e34	50	9.3	0.00	0.41	3.3	0.75
20	1.8	2.6	e1.6	e3.0	e2.6	e34	49	8.3	0.00	0.17	2.5	0.67
21	1.9	e3.0	e1.5	e3.2	e2.8	e38	51	7.2	0.00	0.03	2.2	0.66
22	1.9	e2.6	e1.5	e3.2	e3.0	e40	53	6.1	0.00	0.01	1.7	0.64
23	2.0	e2.1	e1.5	e3.0	e3.4	57	54	5.2	0.00	0.00	1.9	0.57
24	1.9	e2.1	e1.6	e3.0	e3.8	85	51	4.3	0.00	0.00	2.1	0.53
25	1.9	e3.2	e1.7	e3.0	e4.2	103	50	3.4	0.00	0.00	1.7	0.63
26	2.2	e1.4	e1.8	e3.1	e4.2	110	49	2.2	0.00	0.00	1.4	0.60
27	6.3	e1.4	e1.8	e3.2	e4.4	101	55	2.7	0.00	0.14	1.4	0.65
28	7.0	e2.0	e1.9	e3.1	e4.4	108	60	2.3	0.00	3.2	1.1	0.89
29	4.7	e2.4	e2.0	e3.0	e4.4	105	43	3.0	0.00	2.3	1.1	0.93
30	3.5	e1.9	e2.1	e2.8	---	108	37	2.9	0.00	1.4	1.8	0.85
31	3.1	---	e2.1	e2.9	---	119	---	2.8	---	0.79	1.1	---
TOTAL	90.69	70.30	50.1	80.0	89.4	1281.8	2247	427.7	18.49	18.85	38.07	17.00
MEAN	2.93	2.34	1.62	2.58	3.08	41.3	74.9	13.8	0.62	0.61	1.23	0.57
AC-FT	180	139	99	159	177	2540	4460	848	37	37	76	34
MAX	7.0	4.5	2.1	3.2	4.4	119	147	33	2.5	3.2	4.9	2.0
MIN	0.85	0.80	1.3	2.0	2.6	4.6	37	2.2	0.00	0.00	0.01	0.00

CAL YR	2011	TOTAL	3697.51	MEAN	10.1	MAX	114	MIN	0.00	AC-FT	7330
WTR YR	2012	TOTAL	4429.40	MEAN	12.1	MAX	147	MIN	0.00	AC-FT	8790

MAX DISCH: 210 CFS AT 05:15 ON APR 01,2012 GH 3.13 FT SHIFT 0 FT
 MAX GH: 3.13 FT AT 05:15 ON APR 01,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08247500 SAN ANTONIO RIVER AT ORTIZ
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08248000 LOS PINOS RIVER NEAR ORTIZ

Water Year 2012

Location.-- Lat 36°58'56", long 106°4'25" referenced to North American Datum of 1983 (Los Pinos, NM quad, scale 1:24,000), UTM Zone 13 404448 E and 4093440 N, in SW ¼ NW ¼ sec. 26, T.32 N., R.8 E., New Mexico Principal Meridian, Rio Arriba County, NM, Hydrologic Unit 13010005, on left bank 0.9 mi south of Colorado-New Mexico State line, 2.1 mi southwest of Ortiz, CO, and 2.9 mi upstream from mouth.

Drainage Area and Period of Record.-- 167 mi²; Jan. 1915 to present.

Equipment.-- Data collection platform (Sutron Satlink 2) and shaft encoder in a 42 inch metal pipe shelter and stilling well. Graphic water-stage recorder as backup. The shaft encoder float is operated in an oil cylinder. The primary reference gage is a drop tape from reference point on shelf. The supplemental outside chain gage is located 10 feet upstream from gage. Cableway located 190 feet above gaging station is condemned.

Hydrologic Conditions.-- Basin is alpine and predominately subalpine terrain. Reservoir operations at Trujillo Meadows Reservoir and irrigation diversions affect flows at gage.

Gage-Height Record.-- Primary record is 15-minute transmitted data with DCP log and chart record as backup. Record is complete and reliable except for Dec. 16, 2011 - Mar. 11, 2012 when stilling well was frozen. The stage-discharge relation was affected by ice Nov. 3-4, 6-12, 14-24, 26-28, 30, Dec. 1-15, 2011 and Mar. 12-19, 2012. One +0.01 ft instrument correction was made to the shaft encoder and prorated by time from the previous visit. One flush correction of -0.04 foot was prorated from previous inflection point.

Datum Corrections.-- Levels were run to the Reference Point (RP) inside the gage on Sep. 27, 2011, using BM #5 as base. The RP was within allowable limits, so no correction was made or required. A two-peg test was performed on the Lietz level (SN 130869) on Sep. 26, 2011, and a slight adjustment was made.

Rating.-- Control is a gravel and cobble riffle approximately 300 feet below the gage. Rating No. 16 first used Mar. 1, 2011 was used again this water year. Rating No. 16 is fairly well defined from 14 to 1210 cfs. Twenty-five measurements (Nos. 667-691) were made this year ranging in discharge from 9.43 to 480 cfs. They cover the discharge range experienced except for the lower daily flows on Sept. 1 - 7, 2012; and higher daily flows on Apr. 27, 2012. The peak flow of 642 cfs occurred at 2345 on April 10, 2012 at a gage height of 4.62 feet with a shift of 0.00 feet. It exceeded high measurement No. 682 made at a gage height of 4.17 feet on April 27, 2012 by 0.45 feet in stage. The peak shift was adjusted back to the rating based on historic measurement trend.

Discharge.-- Shifting control method was used during all periods of good record. Shifts were applied as determined by measurements and prorated by time from Oct. 1, 2011 into ice affected record. Shift curves (LOSORTVS12-01, 12-04, 12-05, 12-06, 12-07) were used from Mar. 15 through the end of the water year to apply shifts by stage. The variable shift curves tie back into the rating at 4.40 ft, 12-01 was drawn with a slight positive lower point defined by M682, the other curves have a low point drawn at 2.95 ft, which is a rating break-point. All open-water measurements were given full weight and applied except Nos. 667, 669, 679, 680, 681, 682, and 687; which were adjusted as much as 7.6% to smooth shift distribution.

Special Computations.-- Discharge for periods of winter no gage-height and ice affected record was estimated on the basis of measurements, weather records, partial day records, and comparison with the nearby station "San Antonio River at Ortiz, CO."

Remarks.-- Record is good except for periods of no gage-height and ice affected record, which are poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.-- Survey control cross-section to better define rating break-points.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

08248000 LOS PINOS RIVER NEAR ORTIZ

RATING TABLE.-- LOSORTCO16 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

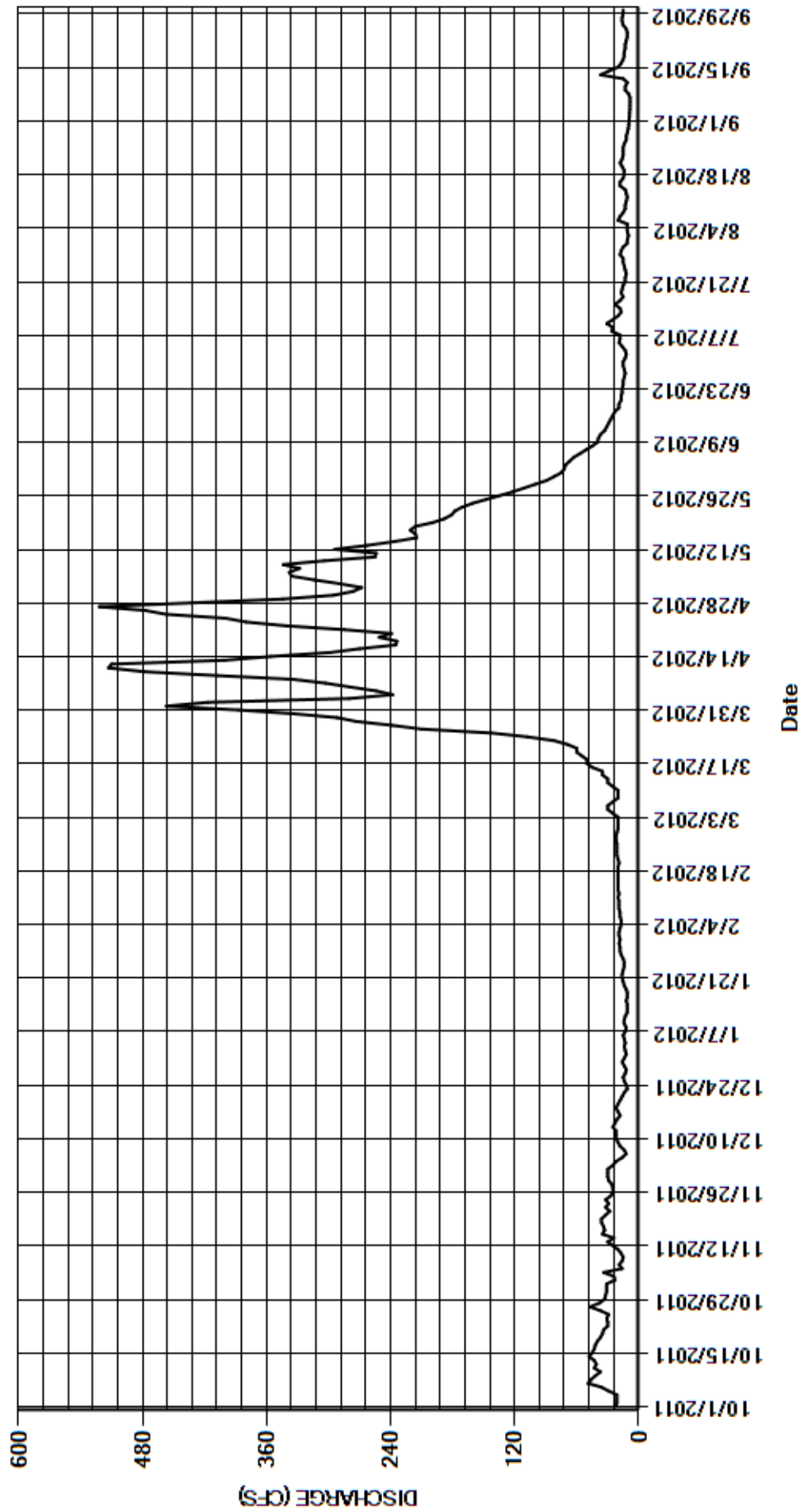
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	22	31	e30	e12	e19	e20	457	276	75	13	11	9.3
2	21	31	e30	e13	e19	e20	417	268	72	12	9.9	9.0
3	21	e23	e25	e14	e18	e20	280	289	71	13	11	8.8
4	21	e24	e22	e13	e17	e25	238	314	67	16	11	8.6
5	29	34	e16	e14	e17	e30	254	336	63	19	11	8.5
6	36	e16	e12	e15	e18	e30	279	338	57	18	20	8.3
7	49	e19	e14	e13	e18	e25	303	328	51	18	18	8.3
8	46	e16	e18	e12	e19	e20	334	344	45	26	15	9.7
9	42	e15	e20	e14	e19	e20	408	304	40	25	13	13
10	37	e17	e22	e14	e19	e20	478	255	39	31	13	13
11	43	e20	e22	e13	e20	e25	513	254	37	25	12	11
12	41	e25	e22	e11	e19	e30	510	294	33	20	11	15
13	43	30	e25	e11	e20	e30	401	263	31	17	12	37
14	48	e24	e23	e11	e20	e35	356	237	29	18	13	29
15	45	e35	e21	e12	e20	e35	299	215	27	23	18	20
16	43	e33	e18	e11	e20	e45	270	216	25	18	18	17
17	42	e34	e20	e11	e20	e50	235	221	23	15	15	15
18	40	e36	e22	e12	e20	e50	234	216	19	17	14	14
19	37	e36	e20	e14	e20	e55	251	199	19	16	14	14
20	35	e32	e18	e15	e19	60	239	188	17	15	16	13
21	34	e28	e16	e16	e20	60	285	181	17	13	18	13
22	30	e32	e14	e16	e21	69	341	178	16	13	16	12
23	30	e29	e11	e15	e21	82	380	171	16	12	15	11
24	31	e32	e12	e14	e21	108	400	161	15	13	15	11
25	29	27	e14	e14	e21	143	457	148	15	14	15	12
26	37	e25	e15	e15	e22	210	477	135	14	15	14	15
27	47	e25	e13	e17	e22	239	522	122	13	15	12	16
28	38	e26	e12	e18	e21	273	432	111	14	18	12	16
29	33	29	e14	e18	e20	292	344	100	15	17	11	15
30	32	e30	e16	e19	---	333	295	89	15	15	10	15
31	31	---	e14	e18	---	387	---	82	---	11	9.6	---
TOTAL	1113	814	571	435	570	2841	10689	6833	990	531	423.5	417.5
MEAN	35.9	27.1	18.4	14.0	19.7	91.6	356	220	33.0	17.1	13.7	13.9
AC-FT	2210	1610	1130	863	1130	5640	21200	13550	1960	1050	840	828
MAX	49	36	30	19	22	387	522	344	75	31	20	37
MIN	21	15	11	11	17	20	234	82	13	11	9.6	8.3

CAL YR	2011	TOTAL	33223.0	MEAN	91.0	MAX	736	MIN	10	AC-FT	65900
WTR YR	2012	TOTAL	26228.0	MEAN	71.7	MAX	522	MIN	8.3	AC-FT	52020

MAX DISCH: 642 CFS AT 23:45 ON APR 10,2012 GH 4.62 FT SHIFT 0 FT
 MAX GH: 4.62 FT AT 23:45 ON APR 10,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08248000 LOS PINOS RIVER NEAR ORTIZ
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08248500 SAN ANTONIO RIVER NEAR MANASSA

Water Year 2012

Location.-- Lat 37°10'38", long 105°52'40" referenced to North American Datum of 1983 (Manassa, CO quad, scale 1:24,000), UTM Zone 13 422076 E and 4114886 N, in SE ¼ NE ¼ sec. 21, T.34 N., R.10 E., New Mexico Principal Meridian, Conejos County, CO, Hydrologic Unit 13010005, on right bank 0.3 mi downstream from bridge on State Highway 142, 2.2 mi upstream from mouth, and 3.3 mi east of Manassa, CO.

Drainage Area and Period of Record.-- 348 mi²; April 1923 to current year.

Equipment.-- Graphic water-stage recorder, data collection platform (Sutron Satlink), a float-operated shaft encoder, and a tipping bucket rain gage in metal pipe shelter and concrete well. The primary reference gage is a drop tape from reference point on shelf. No outside gage. No change this water year.

Hydrologic Conditions.-- Flows at gage partially regulated by upstream irrigation diversions and return flows. Stream regularly is braided and dries up most years near gage.

Gage-Height Record.-- Primary record is 15-minute transmitted data with DCP log and chart record as backup. Record is complete and reliable, except for Dec 5 - Mar 15 when ice in well was affecting floats. The stage-discharge relation was affected by ice Nov 11, 12, 17-30; Dec. 1-4; and Mar 16-21. The stage-discharge relation was affected by backwater from beaver dam and debris Jun 12 - Jul 11. There was one shaft encoder correction; a -0.01 ft on Apr 2 that was prorated by time back to the previous visit.

Datum Corrections.-- Levels were last run to the Reference Point (RP) inside the gage on Jul 12, 2012 using BM No. 4 as base. The RP elevation was within allowable limits, so no correction was made. Two-peg tests were performed on Lietz level (SN 130869) on Jun 11, 2012 and Aug 6, 2012, and the instrument was within allowable limits and no correction was made.

Rating.-- The low flow control is a gravel riffle approximately 150 ft below gage, this feature is the control up to a stage of approximately 2.00 ft where the control transitions to channel control up to a stage of approximately 3.00 ft. From 3.00 ft to 5.02 ft the control is channel control (rating slope less than 2.0 ft.) and above 5.02 ft is transitioning to overbank flow. Rating No. 20B, in use since Oct. 1, 2009 was used again this year. Twenty-three measurements (Nos. 326-348) were made this year, ranging in discharge from 0 to 453 cfs. They cover the daily discharge range experienced this year. The peak flow of 505 cfs occurred at 1315 on Apr 2, 2012 at a gage height of 4.43 ft with a shift of +0.05 feet. It exceeded high measurement No. 336 (GH=4.21 ft), made on Apr 2, 2012 by 0.22 ft in stage. Although conditions warrant a new rating, 20B was continued in use because the low flow control was damaged during beaver dam removal and no discharge measurements have been made since to determine changes at the control because there has been no flow.

Discharge.-- Shifting control method was used to calculate discharge during all periods of open water. Shifts were applied as determined by measurements and prorated by time from Oct 1 - Dec 20 while flow was within the toe of the banks. Bank erosion is causing a stage related positive shift trend at medium and high flows. Shifts were applied by stage (SANMANVS1201) as defined by measurement shifts Mar 15 - Jun 11. The resulting shift adjusted rating includes some minor reversals, which were left and the record downgraded to fair due to the uncertainty associated with the shifts and possible increased erosion over time. The stage-discharge relation was affected by ice and estimated Nov 11, 12, 17-30; Dec. 1-4; and Mar 16 -21, and affected by backwater from beaver dam and debris Jun 12-30, and Jul 1-11. The gage-height was affected by ice in the well and discharge was estimated Dec 5 - Mar 14. During the period affected by backwater from beaver dam and debris shifts were applied as noted by measurements from stage trend to estimate beaver dam construction to estimate discharge. Measurement shifts ranged from -0.31 (beaver dam backwater) to +0.17 ft. All were given full weight except Nos. 326, 337, 338, 339, and 342, which were adjusted as much as 5.4% to smooth shift distribution. There was no flow Jul 12 through Sep 30, (81 days).

Special Computations.-- Discharge for periods of no gage-height and ice affected record was estimated using measurements, weather records, partial day records, and comparison with nearby stations. Discharge for periods affected by backwater from beaver dam estimated using shift change at dam removal prorated back to estimated construction start.

Remarks.-- Record is fair, except for periods of no gage-height, ice affected, and backwater affected record, which are estimated and poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.-- Draw new rating and evaluate possibility of bank stabilization and beaver control. Make more discharge measurements when water is present to better define stage-discharge relationship.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

08248500 SAN ANTONIO RIVER NEAR MANASSA

RATING TABLE-- SANMANCO20B USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

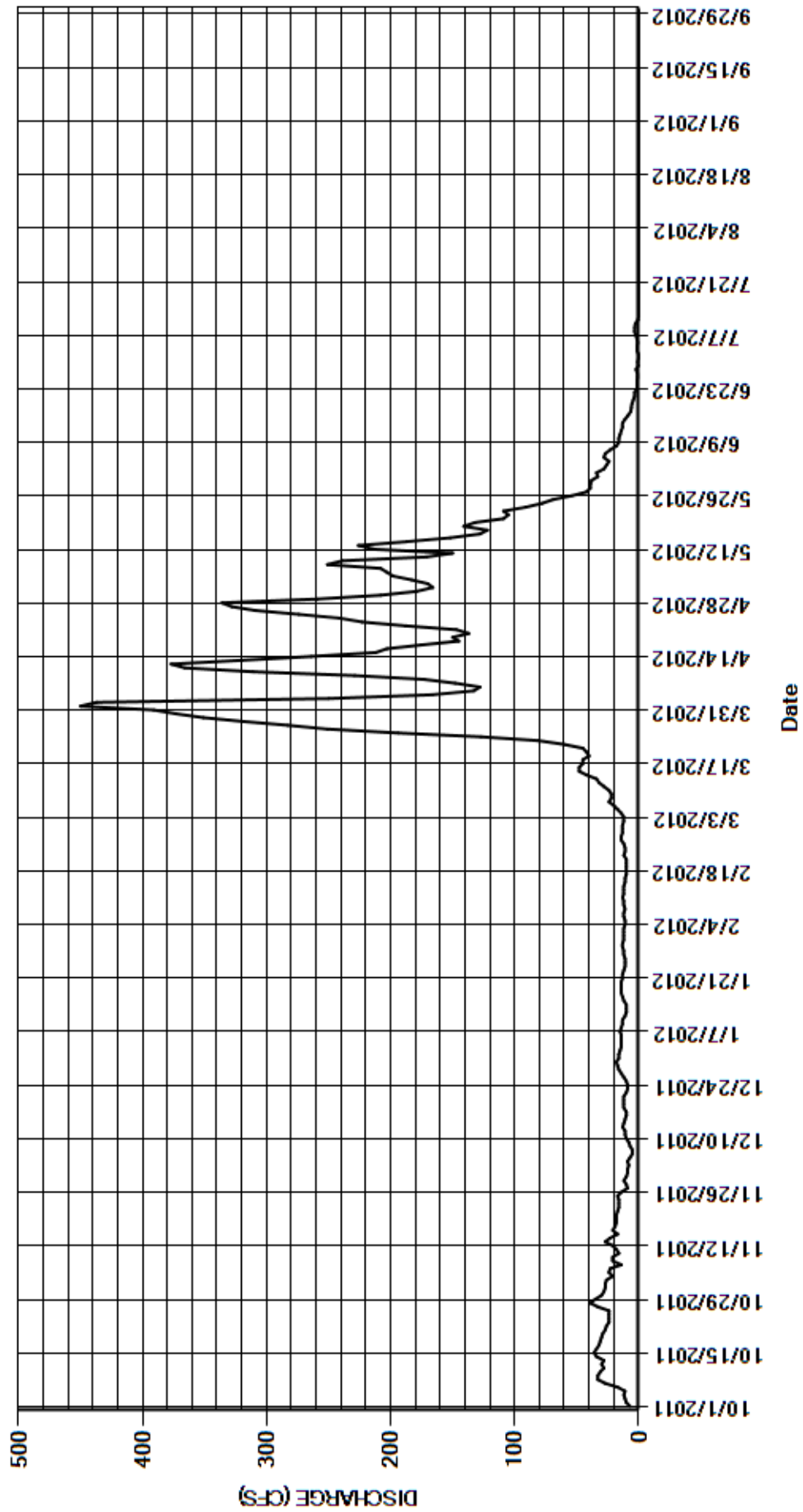
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.0	27	e9.0	e16	e12	e13	450	179	34	e0.02	0.00	0.00
2	10	27	e9.0	e15	e12	e12	437	166	28	e0.17	0.00	0.00
3	11	26	e8.0	e14	e12	e12	250	170	26	e1.5	0.00	0.00
4	12	21	e9.0	e14	e11	e14	166	183	24	e1.4	0.00	0.00
5	11	24	e7.0	e14	e11	e17	133	198	28	e0.88	0.00	0.00
6	17	23	e5.0	e14	e12	e20	128	203	27	e1.4	0.00	0.00
7	27	14	e5.0	e15	e12	e24	148	208	23	e2.5	0.00	0.00
8	33	21	e7.0	e14	e11	e22	173	251	18	e3.4	0.00	0.00
9	33	21	e8.0	e13	e12	e22	229	239	16	e3.2	0.00	0.00
10	31	16	e10	e13	e12	e24	311	171	16	e2.7	0.00	0.00
11	28	e18	e11	e11	e13	e28	366	150	15	e0.47	0.00	0.00
12	30	e21	e11	e10	e12	e32	377	213	e14	0.00	0.00	0.00
13	28	27	e13	e10	e12	e34	320	226	e13	0.00	0.00	0.00
14	34	23	e12	e10	e12	e42	264	187	e13	0.00	0.00	0.00
15	36	17	e11	e12	e11	e48	212	152	e11	0.00	0.00	0.00
16	34	21	e10	e13	e11	e48	203	128	e8.6	0.00	0.00	0.00
17	32	e19	e10	e14	e10	e45	175	122	e6.4	0.00	0.00	0.00
18	31	e18	e12	e14	e10	e45	145	141	e5.9	0.00	0.00	0.00
19	30	e18	e12	e14	e10	e40	150	132	e5.5	0.00	0.00	0.00
20	29	e18	e12	e14	e10	e42	137	109	e4.4	0.00	0.00	0.00
21	27	e17	e12	e13	e10	e45	147	105	e3.3	0.00	0.00	0.00
22	26	e16	e10	e13	e12	60	188	109	e3.3	0.00	0.00	0.00
23	24	e16	e9.0	e12	e11	81	223	91	e1.3	0.00	0.00	0.00
24	24	e16	e9.0	e11	e11	127	241	78	e1.2	0.00	0.00	0.00
25	24	e17	e10	e11	e12	194	274	69	e1.2	0.00	0.00	0.00
26	24	e14	e12	e11	e14	251	309	54	e1.1	0.00	0.00	0.00
27	33	e9.0	e14	e12	e14	283	328	42	e1.1	0.00	0.00	0.00
28	39	e10	e16	e12	e13	319	336	39	e2.2	0.00	0.00	0.00
29	35	e12	e17	e13	e13	351	259	39	e0.33	0.00	0.00	0.00
30	30	e10	e18	e13	---	373	208	38	e0.71	0.00	0.00	0.00
31	28	---	e16	e12	---	391	---	33	---	0.00	0.00	---
TOTAL	818.0	557.0	334.0	397	338	3059	7287	4225	352.54	17.64	0.00	0.00
MEAN	26.4	18.6	10.8	12.8	11.7	98.7	243	136	11.8	0.57	0.000	0.000
AC-FT	1620	1100	662	787	670	6070	14450	8380	699	35	0	0
MAX	39	27	18	16	14	391	450	251	34	3.4	0.00	0.00
MIN	7.0	9.0	5.0	10	10	12	128	33	0.33	0.00	0.00	0.00

CAL YR	2011	TOTAL	21435.61	MEAN	58.7	MAX	522	MIN	0.00	AC-FT	42520
WTR YR	2012	TOTAL	17385.18	MEAN	47.5	MAX	450	MIN	0.00	AC-FT	34480

MAX DISCH: 505 CFS AT 13:15 ON APR 02,2012 GH 4.43 FT SHIFT 0.05 FT
 MAX GH: 4.43 FT AT 13:15 ON APR 02,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08248500 SAN ANTONIO RIVER NEAR MANASSA
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
NORTH CHANNEL CONEJOS RIVER NEAR LA SAUSES

Water Year 2012

Location.-- Lat 37°18'1", long 105°44'47" referenced to North American Datum of 1983 (Lasauses, CO quad, scale 1:24,000), UTM Zone 13 433851 E and 4128445 N, in SE ¼ SE ¼ sec. 2, T.35 N., R.11 E., New Mexico Principal Meridian, Conejos County, CO, Hydrologic Unit 13010005, on left bank of main channel 125 ft downstream from bridge on State Route 158, 1.0 mi upstream from mouth, 2.1 mi north of LaSauses, CO, and 13 mi southeast of Alamosa, CO.

Drainage Area and Period of Record.-- 887 mi²; March 1921 to current year. Monthly discharge only for some periods.

Equipment.-- Graphic water stage recorder, data collection platform (Sutron Satlink Logger 2) and a float-operated SDR and air temperature sensor in a four foot square timber shelter and well. The primary reference gage is a drop tape from reference point on shelf. The cableway is located 100 feet below gaging station. Outside cantilever gage completed May 1, 2012.

Hydrologic Conditions.-- Natural flow of stream affected by diversions for irrigation, groundwater withdrawals, and return flows from irrigated areas. Flows regulated to some extent by Platoro Reservoir about 80 mi upstream since Nov. 7 1951.

Gage-Height Record.-- Primary record is 15-minute transmitted data with DCP log, SDR log, and chart record as backup. Record is complete and reliable. Two 15-minute values on October 4, 2011 were filled from chart without loss of accuracy. The stage-discharge relation was affected by ice Dec. 2, 2011 to Jan. 15, Jan. 17-19, 22-31, Feb. 1, 4-21, 24, 25, and Mar. 3, 2012. There was one small flush correction found on April 2, 2012 which was distributed by time to the previous inflection point using gage-height trend. No instrument corrections were needed.

Datum Corrections.-- Levels were last run to the Reference Point (RP) inside the gage on August 27, 2012 using B.M. No. 3 as base. The RP elevation was within allowable limits, so a correction was not made. Two-peg test was performed on the Lietz level (SN 130869) on Aug. 6, 2012, the instrument was within allowable limits and no correction was made.

Rating.-- Control is a gravel bar approximately 150 ft below the gage at medium and low flows, and channel at high flows. At low flows the water splits into two channels at the control section. The bank, willows, and high water in the Rio Grande influence gage height during very high flows. Rating No. 16, in use since Jan. 1, 2010, was used until January 3, 2012. Rating NORLASCO17-3 was developed from recent measurements to better describe the low flow conditions. Rating NORLASCO17-3 is similar to NORLASCO16 above 10 cfs. The ratings are fairly well defined from 0 to 1730 cfs. Twenty-six measurements (Nos. 297-322) were made this year ranging in discharge from 0 to 652 cfs. The measurements cover the range experienced except for higher daily flows on Apr. 1 and 2. The peak flow of 750 cfs occurred at 1715 on April 1, 2012 at a gage height of 4.79 feet with a shift of 0.00 feet. It exceeded high measurement No. 310 (GH = 4.56 ft), made April 2, 2012, by 0.23 feet in stage.

Discharge.-- Shifting control method was used during all periods of good record. Shifts were applied as defined by discharge measurements and distributed by time with respect to events. Shift were applied as measured and distributed by time and event from Oct. 1, 2011 through Jan. 3 2012. Rating NORLASCO17-3 was used directly from Jan. 3 to Apr. 2. Three shift curves (NORLASCOVS12-7 through 12-9) were developed and used from Apr.7 - Sept. 30 to better describe the shift trend with stage. Measurement shifts ranged from -0.04 ft to +0.01 ft while NORLASCO16 was in use and from -0.02 ft to +0.04 ft while NORLASCO17-3 was in use. Measurements 298, 303, 304, 305, 308, 309, 312, and 313 were adjusted as much as 5.3% to fit the rating and shift trend. The stage-discharge relation was affected by ice and discharge estimated Dec. 2, 2011 to Jan. 15, Jan. 17-19, 22-31, Feb. 1, 4-21, 24-25, and Mar. 3, 2012.

Special Computations.-- Discharge during periods of ice affected record was estimated using measurements, weather records, partial record days, and comparison with the South Channel Conejos River near LaSauses gage.

Remarks.-- Record is good except for periods of ice affected record, which are poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.-- Survey control cross-sections and note gravel riffle location during measurements to better define rating breakpoints.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

NORTH CHANNEL CONEJOS RIVER NEAR LA SAUSES

RATING TABLE.-- NORLASCO16 USED FROM 01-OCT-2011 TO 03-JAN-2012
 NORLASCO17-3 USED FROM 03-JAN-2012 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

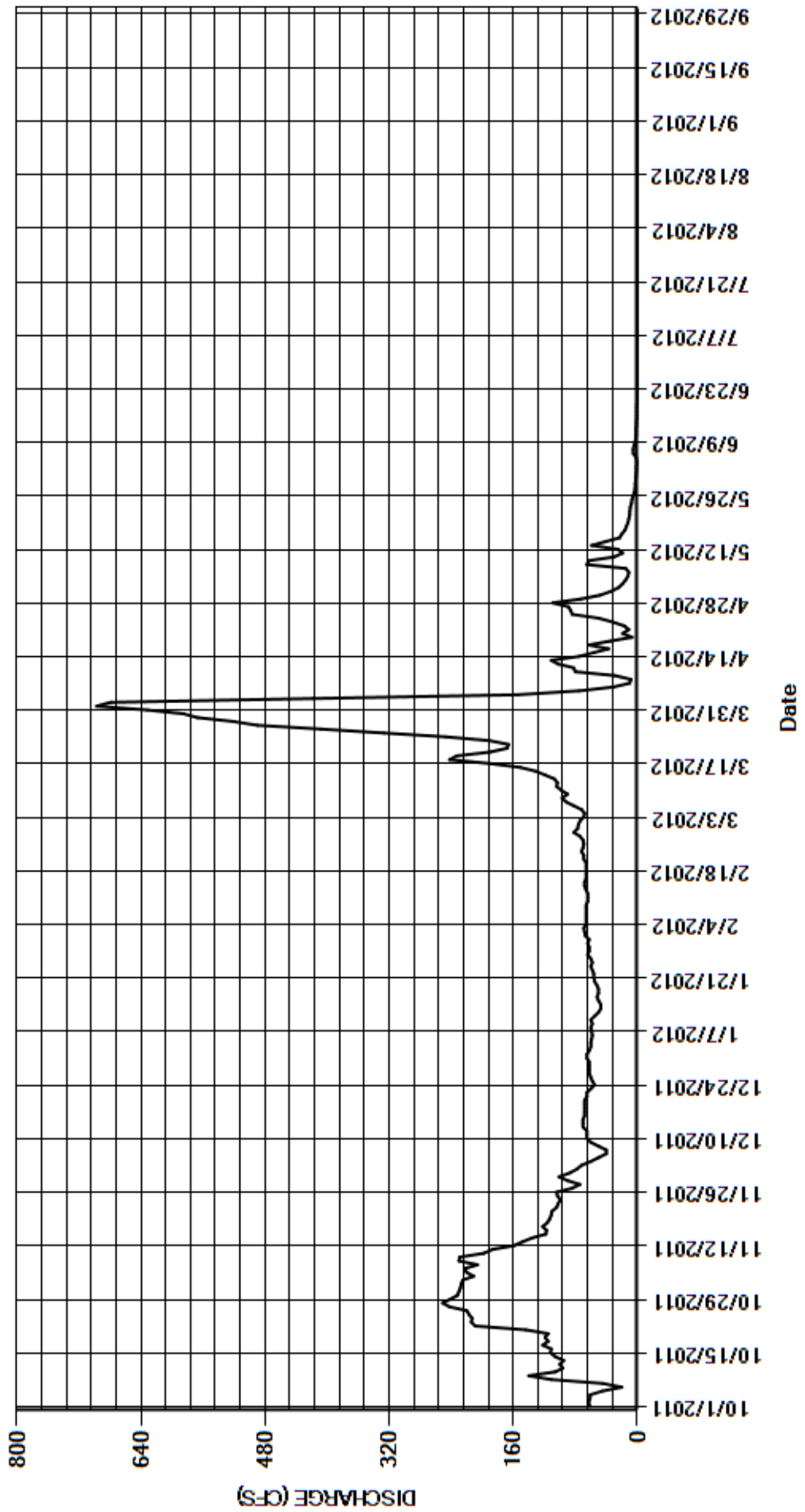
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	61	228	87	e65	e67	76	697	34	1.3	0.00	0.00	0.00
2	63	227	e78	e62	68	74	679	24	1.1	0.00	0.00	0.00
3	61	225	e72	e60	69	e69	419	19	0.81	0.00	0.00	0.00
4	61	211	e60	e60	e66	68	154	15	0.75	0.00	0.00	0.00
5	45	220	e50	e59	e66	72	75	12	1.5	0.00	0.00	0.00
6	20	223	e40	e58	e66	82	31	11	5.1	0.00	0.00	0.00
7	45	206	e40	e59	e66	92	10	15	5.4	0.00	0.00	0.00
8	111	230	e50	e60	e66	97	8.0	65	4.4	0.00	0.00	0.00
9	140	229	e60	e58	e66	90	29	63	2.9	0.00	0.00	0.00
10	106	198	e65	e60	e64	98	80	30	2.0	0.00	0.00	0.00
11	96	187	e65	e55	e64	104	82	19	1.6	0.00	0.00	0.00
12	100	159	e65	e50	e64	103	102	25	1.5	0.00	0.00	0.00
13	95	148	e70	e47	e66	107	111	59	1.3	0.00	0.00	0.00
14	106	136	e70	e47	e68	119	75	41	1.0	0.00	0.00	0.00
15	112	118	e70	e50	e68	131	56	23	0.81	0.00	0.00	0.00
16	111	117	e68	52	e66	151	37	20	0.66	0.00	0.00	0.00
17	122	122	e68	e50	e66	190	63	16	0.54	0.00	0.00	0.00
18	115	116	e68	e50	e66	242	35	14	0.39	0.00	0.00	0.00
19	119	113	e68	e52	e66	233	6.8	12	0.28	0.00	0.00	0.00
20	115	111	e68	55	e66	190	19	11	0.23	0.00	0.00	0.00
21	144	110	e65	56	e69	168	11	9.9	0.15	0.00	0.00	0.00
22	209	104	e65	e56	69	166	17	9.6	0.05	0.00	0.00	0.00
23	214	102	e60	e58	72	191	32	9.1	0.00	0.00	0.00	0.00
24	213	99	e55	e60	e70	247	50	7.6	0.00	0.00	0.00	0.00
25	217	103	e58	e58	e69	327	84	6.9	0.00	0.00	0.00	0.00
26	220	104	e60	e60	70	408	86	5.4	0.00	0.00	0.00	0.00
27	242	84	e62	e64	74	490	89	3.5	0.00	0.00	0.00	0.00
28	251	74	e62	e62	82	521	109	2.9	0.00	0.00	0.00	0.00
29	241	90	e62	e62	77	567	73	2.6	0.00	0.00	0.00	0.00
30	232	101	e62	e64	---	585	48	2.2	0.00	0.00	0.00	0.00
31	230	---	e65	e62	---	632	---	1.7	---	0.00	0.00	---
TOTAL	4217	4495	1958	1771	1976	6690	3367.8	589.4	33.77	0.00	0.00	0.00
MEAN	136	150	63.2	57.1	68.1	216	112	19.0	1.13	0.000	0.000	0.000
AC-FT	8360	8920	3880	3510	3920	13270	6680	1170	67	0	0	0
MAX	251	230	87	65	82	632	697	65	5.4	0.00	0.00	0.00
MIN	20	74	40	47	64	68	6.8	1.7	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	34029.48	MEAN	93.2	MAX	470	MIN	0.00	AC-FT	67500
WTR YR	2012	TOTAL	25097.97	MEAN	68.6	MAX	697	MIN	0.00	AC-FT	49780

MAX DISCH: 750 CFS AT 17:15 ON APR 01,2012 GH 4.79 FT SHIFT 0 FT
 MAX GH: 4.79 FT AT 17:15 ON APR 01,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

NORTH CHANNEL CONEJOS RIVER NEAR LA SAUSES
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
SOUTH CHANNEL CONEJOS RIVER NEAR LA SAUSES
Water Year 2012

Location.-- Lat 37°17'37", long 105°45'6" referenced to North American Datum of 1983 (Pikes Stockade, CO quad, scale 1:24,000), UTM Zone 13 433367 E and 4127712 N, in SE ¼ NE ¼ sec. 10, T.35 N., R.11 E., New Mexico Principal Meridian, Conejos County, CO, Hydrologic Unit 13010002, on left bank of secondary channel 0.3 mi upstream from bridge on State Route 158, 1.5 mi north of LaSausas, CO, and 13 mi southeast of Alamosa, CO.

Drainage Area and Period of Record.-- 887 mi²; March 29, 1921 to current year, at various sites close to present location.

Equipment.-- Graphic water stage recorder, data collection platform (Sutron Satlink 2) and a float-operated shaft encoder in a 42-inch metal pipe shelter and concrete well. The primary reference gage is a drop tape from reference point on shelf. No outside gage. No change this water year.

Hydrologic Conditions.-- Natural flow of stream affected by diversions for irrigation, groundwater withdrawals, and return flows from irrigated areas. Flows regulated to some extent by Platoro Reservoir about 80 mi upstream since Nov. 7, 1951.

Gage-Height Record.-- Primary record is 15-minute transmitted data with DCP log and chart record as backup. Record is complete and reliable. The stage-discharge relation was affected by ice Dec. 7, 2011 - Mar. 5, 2012. Three missing unit values were filled from chart record on Oct. 4 and four missing unit values were filled from chart on Oct. 8 without loss of accuracy. One 0.13 ft instrument correction was made October 3, 2011 as a result of oil leaking from the oil cylinder and was distributed from point prior to flow starting without loss of accuracy. Two other instrument corrections were made, +0.01 ft on March 15, 2012 and -0.01 ft on June 1, 2012, with both prorated from the previous visit.

Datum Corrections.-- Levels were last shot to the Reference Point (RP) inside the gage on September 5, 2012 using BM No. 9 as base. The gage was within allowable limits and no correction was made to the RP. BM11 elevation was established during this visit.

Rating.-- The control is a steel sheet piling weir with a low flow notch. Rating No. 9 in use from Mar. 21, 2008 was used to Jan. 3, 2012. Rating No. 10-1 was used from Jan. 3, 2012 and was developed from a shift adjusted Rating No. 9 that was smoothed at the shift transition points. Both ratings are well defined from 0 to 379 cfs. Twenty-four measurements (Nos. 457-480) were made this year ranging in discharge from 0 to 104 cfs. They cover the daily discharge range experienced this year except for higher daily flows on April 1 and 2, 2012. The peak flow of 139 cfs occurred at 1800 on April 1, 2012 at a gage height of 2.98 feet with a shift of 0.00 feet. It exceeded the high measurement M469 (GH=2.81) made April 2, 2012 by 0.17 ft in stage.

Discharge.-- Shifting control method was used during all periods of good record. There was no flow Jun. 26 - Sep. 30, 2012 (97 days). The stage-discharge relation was affected by ice and discharge estimated Dec. 7, 2011 - Mar. 5, 2012. A variable shift curve was used from Oct. 1 - 3, 2011. Open-water shifts were applied as defined by measurements and distributed by time from Oct. 3, 2011 to Jan. 3, 2012 when rating SOULASCO09 was discontinued. Open-water measurement shifts ranged from +0.02 to +0.05 during this period. Rating SOULASCO10-1 was applied directly with no shift from Jan. 3, 2012 through the end of water year. Measured shifts ranged from -0.02 to +0.01, excluding M474, while rating SOULASCO10-1 was in use. All measurements were given full weight except Nos. 457, 460, and 468-473, which were adjusted as much as 8.2% percent to smooth shift distribution and 474 which was not used. No. 474 was not used because it is suspected that channel losses and measurement error were the cause of the large negative shift rather than a control change.

Special Computations.-- Discharge for periods of no gage-height, ice affected, and backwater affected record was estimated using measurements, weather records, partial record days, and comparison with the North Channel of the Conejos River near LaSausas.

Remarks.-- Record is good except for periods of estimation, which are poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.-- Pave measuring section to reduce error caused by vegetation growth in channel.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

SOUTH CHANNEL CONEJOS RIVER NEAR LA SAUSES

RATING TABLE.-- SOULASCO09 USED FROM 01-OCT-2011 TO 03-JAN-2012
 SOULASCO10-1 USED FROM 03-JAN-2012 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

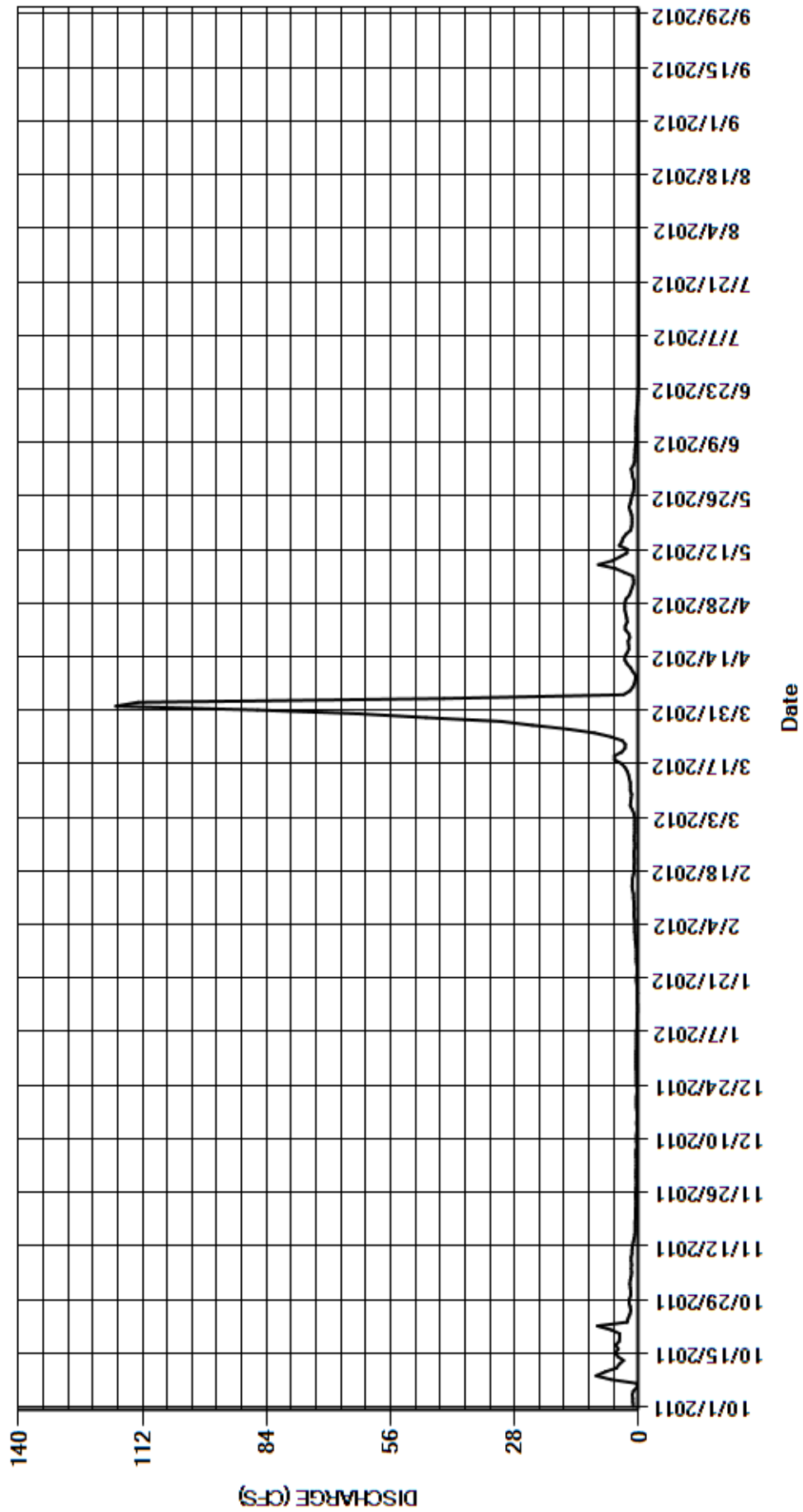
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.2	1.9	0.59	e0.60	e0.80	e0.95	118	1.8	1.5	0.00	0.00	0.00
2	1.3	2.0	0.59	e0.60	e0.90	e0.90	113	1.5	1.7	0.00	0.00	0.00
3	1.3	1.9	0.58	e0.50	e0.90	e0.95	44	1.2	1.2	0.00	0.00	0.00
4	1.5	1.7	0.57	e0.50	e0.90	e1.1	3.4	1.2	0.91	0.00	0.00	0.00
5	1.2	1.6	0.60	e0.50	e0.90	e1.5	2.0	1.3	0.90	0.00	0.00	0.00
6	0.37	1.7	0.61	e0.50	e1.1	1.9	1.3	3.3	0.85	0.00	0.00	0.00
7	0.43	1.6	e0.60	e0.50	e1.1	1.8	0.93	5.3	0.84	0.00	0.00	0.00
8	6.3	1.7	e0.40	e0.40	e1.0	1.7	0.75	9.1	0.76	0.00	0.00	0.00
9	9.6	1.7	e0.50	e0.40	e1.1	1.6	0.69	5.9	0.60	0.00	0.00	0.00
10	7.6	1.5	e0.50	e0.40	e1.1	1.9	1.3	4.3	0.61	0.00	0.00	0.00
11	5.0	1.5	e0.50	e0.40	e1.2	1.9	1.8	2.7	0.58	0.00	0.00	0.00
12	4.4	1.4	e0.40	e0.30	e1.2	1.9	2.6	2.6	0.61	0.00	0.00	0.00
13	3.4	1.2	e0.40	e0.30	e1.4	2.1	3.1	4.4	0.62	0.00	0.00	0.00
14	4.7	1.0	e0.45	e0.30	e1.5	2.3	3.1	3.8	0.57	0.00	0.00	0.00
15	5.3	0.87	e0.40	e0.40	e1.4	2.6	2.6	3.5	0.59	0.00	0.00	0.00
16	4.6	0.78	e0.40	e0.40	e1.4	3.1	2.2	2.8	0.48	0.00	0.00	0.00
17	5.2	0.77	e0.40	e0.30	e1.2	3.9	2.3	1.8	0.45	0.00	0.00	0.00
18	4.4	0.81	e0.50	e0.40	e1.0	5.5	2.4	1.6	0.36	0.00	0.00	0.00
19	4.3	0.75	e0.50	e0.40	e1.1	5.5	2.0	1.5	0.27	0.00	0.00	0.00
20	4.3	0.69	e0.50	e0.50	e1.0	3.8	2.3	1.5	0.21	0.00	0.00	0.00
21	6.2	0.69	e0.50	e0.50	e1.0	3.1	3.0	1.6	0.16	0.00	0.00	0.00
22	9.3	0.69	e0.40	e0.40	e1.1	3.0	3.0	1.9	0.11	0.00	0.00	0.00
23	2.6	0.65	e0.40	e0.40	e1.1	3.7	2.6	2.2	0.07	0.00	0.00	0.00
24	2.4	0.65	e0.50	e0.40	e0.90	6.3	2.7	1.9	0.04	0.00	0.00	0.00
25	2.0	0.73	e0.50	e0.50	e0.90	10	2.9	1.7	0.01	0.00	0.00	0.00
26	1.8	0.71	e0.50	e0.60	e1.0	16	3.1	1.5	0.00	0.00	0.00	0.00
27	1.9	0.62	e0.50	e0.50	e1.0	24	3.1	1.2	0.00	0.00	0.00	0.00
28	2.2	0.56	e0.60	e0.50	e0.90	31	3.1	1.1	0.00	0.00	0.00	0.00
29	2.1	0.55	e0.60	e0.60	e0.90	48	2.9	1.1	0.00	0.00	0.00	0.00
30	1.8	0.65	e0.60	e0.70	---	63	2.1	1.1	0.00	0.00	0.00	0.00
31	1.8	---	e0.60	e0.80	---	86	---	1.4	---	0.00	0.00	---
TOTAL	110.50	33.57	15.69	14.50	31.00	341.00	338.27	77.8	15.00	0.00	0.00	0.00
MEAN	3.56	1.12	0.51	0.47	1.07	11.0	11.3	2.51	0.50	0.000	0.000	0.000
AC-FT	219	67	31	29	61	676	671	154	30	0	0	0
MAX	9.6	2.0	0.61	0.80	1.5	86	118	9.1	1.7	0.00	0.00	0.00
MIN	0.37	0.55	0.40	0.30	0.80	0.90	0.69	1.1	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	871.55	MEAN	2.39	MAX	19	MIN	0.00	AC-FT	1730
WTR YR	2012	TOTAL	977.33	MEAN	2.67	MAX	118	MIN	0.00	AC-FT	1940

MAX DISCH: 139 CFS AT 18:00 ON APR 01,2012 GH 2.98 FT SHIFT 0 FT
 MAX GH: 2.98 FT AT 18:00 ON APR 01,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

SOUTH CHANNEL CONEJOS RIVER NEAR LA SAUSES
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08249000 COMBINED CONEJOS RIVER (NORLASCO SOULASCO)

Water Year 2012

Location.-- Lat 37°18'01", long 105°44'47", in SW¼SW¼ sec. 2, and SE¼NE¼ sec. 10 (two channels), T.35 N., R.II E., Conejos County, Hydrologic Unit 13010005, on left bank of main channel 125 ft downstream from bridge on State Highway 158 and on left bank of secondary channel 0.3 mi upstream from bridge on State Route 158, 2.1 mi north of LaSausés, and 13 mi southeast of Alamosa.

Drainage Area and Period of Record.-- 887 mi²; Mar. 1921 to present.

Equipment.-- See individual station analyses for gage equipment descriptions.

Hydrologic Conditions.-- Natural flow of stream affected by diversions for irrigation, groundwater withdrawals, and return flows from irrigated areas. Flows regulated to some extent by Platoro Reservoir about 80 mi upstream since Nov. 7, 1951.

Gage-Height Record.-- See individual station analyses.

Datum Corrections.-- See individual station analyses.

Rating.-- See individual station analyses.

Discharge.-- Daily discharges computed by summing and rounding the individual station daily discharges. A day is considered estimated when both channels are estimated or the estimated daily value for either the North or South channel is greater than 10% of the combined daily sum of both channels. The following days were considered estimated: Dec. 2-31, 2011, Jan. 1-15, 17-19, 22-31, Feb. 1, 4-21, 24, 25, Mar. 3, 2012.

Special Computations.--

Remarks.-- Record is good except for periods of estimated record, which are poor. Record developed by Division 3 Hydrographic staff.

Recommendations.--

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

08249000 COMBINED CONEJOS RIVER (NORLASCO SOULASCO)

RATING TABLE.--

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

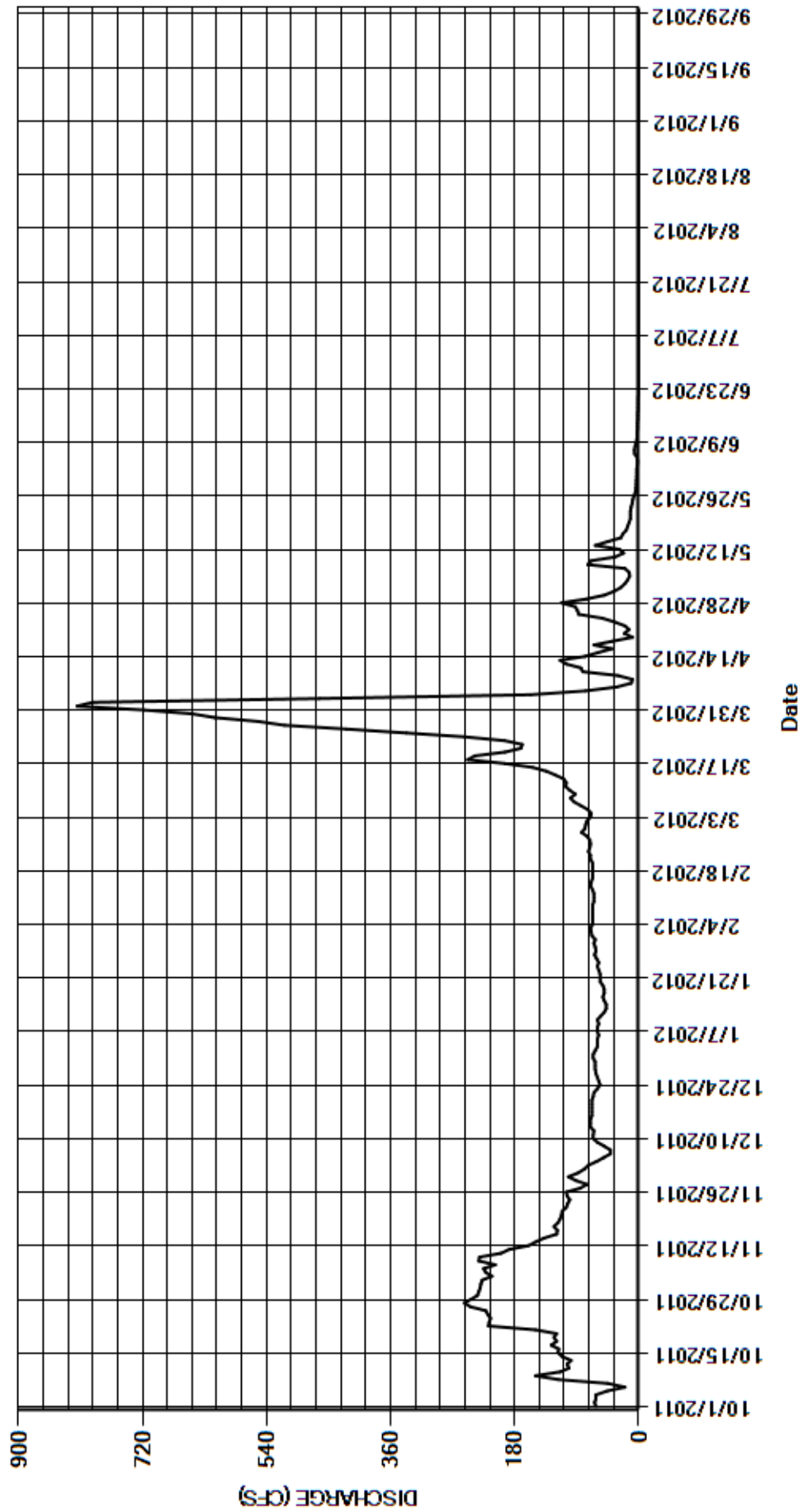
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	62	230	88	e66	e68	77	815	36	2.8	0.00	0.00	0.00
2	64	229	e79	e63	69	75	792	26	2.8	0.00	0.00	0.00
3	62	227	e73	e60	70	e70	463	20	2.0	0.00	0.00	0.00
4	62	213	e61	e60	e67	69	157	16	1.7	0.00	0.00	0.00
5	46	222	e51	e60	e67	74	77	13	2.4	0.00	0.00	0.00
6	20	225	e41	e58	e67	84	32	14	6.0	0.00	0.00	0.00
7	45	208	e41	e60	e67	94	11	20	6.2	0.00	0.00	0.00
8	117	232	e50	e60	e67	99	8.8	74	5.2	0.00	0.00	0.00
9	150	231	e60	e58	e67	92	30	69	3.5	0.00	0.00	0.00
10	114	200	e66	e60	e65	100	81	34	2.6	0.00	0.00	0.00
11	101	188	e66	e55	e65	106	84	22	2.2	0.00	0.00	0.00
12	104	160	e65	e50	e65	105	105	28	2.1	0.00	0.00	0.00
13	98	149	e70	e47	e67	109	114	63	1.9	0.00	0.00	0.00
14	111	137	e70	e47	e70	121	78	45	1.6	0.00	0.00	0.00
15	117	119	e70	e50	e69	134	59	26	1.4	0.00	0.00	0.00
16	116	118	e68	52	e67	154	39	23	1.1	0.00	0.00	0.00
17	127	123	e68	e50	e67	194	65	18	0.99	0.00	0.00	0.00
18	119	117	e68	e50	e67	248	37	16	0.75	0.00	0.00	0.00
19	123	114	e68	e52	e67	238	8.8	14	0.55	0.00	0.00	0.00
20	119	112	e68	56	e67	194	21	12	0.44	0.00	0.00	0.00
21	150	111	e66	56	e70	171	14	12	0.31	0.00	0.00	0.00
22	218	105	e65	e56	70	169	20	12	0.16	0.00	0.00	0.00
23	217	103	e60	e58	73	195	35	11	0.07	0.00	0.00	0.00
24	215	100	e56	e60	e71	253	53	9.5	0.04	0.00	0.00	0.00
25	219	104	e58	e58	e70	337	87	8.6	0.01	0.00	0.00	0.00
26	222	105	e60	e61	71	424	89	6.9	0.00	0.00	0.00	0.00
27	244	85	e62	e64	75	514	92	4.7	0.00	0.00	0.00	0.00
28	253	75	e63	e62	83	552	112	4.0	0.00	0.00	0.00	0.00
29	243	91	e63	e63	78	615	76	3.7	0.00	0.00	0.00	0.00
30	234	102	e63	e65	---	648	50	3.3	0.00	0.00	0.00	0.00
31	232	---	e66	e63	---	718	---	3.1	---	0.00	0.00	---
TOTAL	4324	4535	1973	1780	2006	7033	3705.6	667.8	48.82	0.00	0.00	0.00
MEAN	139	151	63.6	57.4	69.2	227	124	21.5	1.63	0.000	0.000	0.000
AC-FT	8580	9000	3910	3530	3980	13950	7350	1320	97	0	0	0
MAX	253	232	88	66	83	718	815	74	6.2	0.00	0.00	0.00
MIN	20	75	41	47	65	69	8.8	3.1	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	34901.98	MEAN	95.6	MAX	489	MIN	0.00	AC-FT	69230
WTR YR	2012	TOTAL	26073.22	MEAN	71.2	MAX	815	MIN	0.00	AC-FT	51720

MAX DISCH:
 MAX GH: 0.00 FT

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08249000 COMBINED CONEJOS RIVER (NORLASCO SOULASCO)
 WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08250000 CULEBRA CREEK AT SAN LUIS

Water Year 2012

Location.-- Lat 37°11'2", long 105°25'33" referenced to North American Datum of 1983 (San Luis, CO quad, scale 1:24,000), UTM Zone 13 462202 E and 4115357 N, in NE ¼ NW ¼ sec. 35, T.3 N., R.72 W., Costilla Estates Development Survey so called, Costilla County, CO, Hydrologic Unit 13010002, on left bank at bridge 1.0 mi south of San Luis, CO and 1.0 mi upstream from Rito Seco.

Drainage Area and Period of Record.-- 220 mi², approximately (from base map); 1927 to current year.

Equipment.-- Graphic water-stage recorder, data collection platform (Sutron Model Satlink2 with HDR GOES radio), and a float-operated shaft encoder in a metal shelter and concrete/timber well. The primary reference gage is a drop tape from reference point on shelf. Outside staff gage. No change.

Hydrologic Conditions.-- The majority of Culebra Creek is diverted into Sanchez Reservoir via the Sanchez Canal. The reservoir is approximately 5.6 miles above the gage. Several other small drainages feed this reservoir. Two small tributaries plus the un-diverted portion of Culebra Creek join the outflow from Sanchez Reservoir above the gage. Most of the water at this gage is regulated by the reservoir and irrigation diversions.

Gage-Height Record.-- Primary record is 15-minute transmitted data with DCP log and chart record as backup. Record is complete and reliable for the water year. There was one instrument correction of +0.003 feet made to the shaft encoder on Feb. 29, 2012. Since this correction was less than 0.01 ft, it was not taken as a correction.

Datum Corrections.-- Levels were run to the drop-tape reference point (RP) inside the gage on Apr 6, 2012 using B.M. 3 as base. The drop-tape RP was within the allowable limit, so no correction was made. A two peg test was ran on same day (Apr 6, 2012) and no adjustment to the level was required or made.

Rating.-- Control is a non-standard 12-ft concrete Parshall flume. Gravel and moss in flume and changes in approach conditions cause shifting. Rating No. 6 was used again this year until Oct 20, 2011. Rating No. 7 was developed and used from Oct. 20, 2011 through the water year. This rating was created to better fit recent measurements in the 110-125 cfs range. It is well defined from 10 to 440 cfs. Sixteen measurements (Nos. 264-279) were made this year ranging in discharge from 13.1 to 53.6 cfs. Measurements cover the range experienced except for lower daily flows on Jan 13, Apr 9 and higher daily flows on May 5, 19-23, 25-31; Jun 1-4, 8-15, 20-22, 30; Jul. 2-4, 9, 11-15. The peak flow of 99.6 cfs occurred at 0915 on May 22, 2012 at a gage height of 1.37 feet with a shift of 0 feet. It exceeded high Measurement No. 272 (GH=0.87 feet) made Apr 25, 2012 by 0.50 feet in stage.

Discharge.-- Shifting control method was used to compute discharge for all periods. New Rating No. 7 was applied directly (zero shift) from Oct. 20, 2011 to Aug. 27, 2012. Two variable stage-shift relationships were created: VS12-1 is the rating with no shift and VS12-4 defines a small negative shift trend at lower stages. VS12-1 (the rating) was prorated to VS12-4 by time from Aug. 27 to Sep. 20, 2012. Then VS12-4 was applied through the remainder of the water year. Measured shifts varied from -0.05 to +0.02 feet. Measurement No. 270 was not used for record development. All other measurements were given full weight except Nos. 264, 266, 269, 272-274, and 276-278, which were adjusted as much as 5.4% to smooth shift distribution.

Special Computations.-- During the winter the record may show a pattern of jagged peaks in the late morning hours. While this pattern does appear to be ice affected record, it has been verified by the hydrographic staff of Division 3 that this is caused by ice dams releasing water above the gage, and that this is good record.

Remarks.-- Record is good. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.--

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

08250000 CULEBRA CREEK AT SAN LUIS

RATING TABLE.-- CULSANCO06 USED FROM 01-OCT-2011 TO 20-OCT-2011
 CULSANCO07 USED FROM 20-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

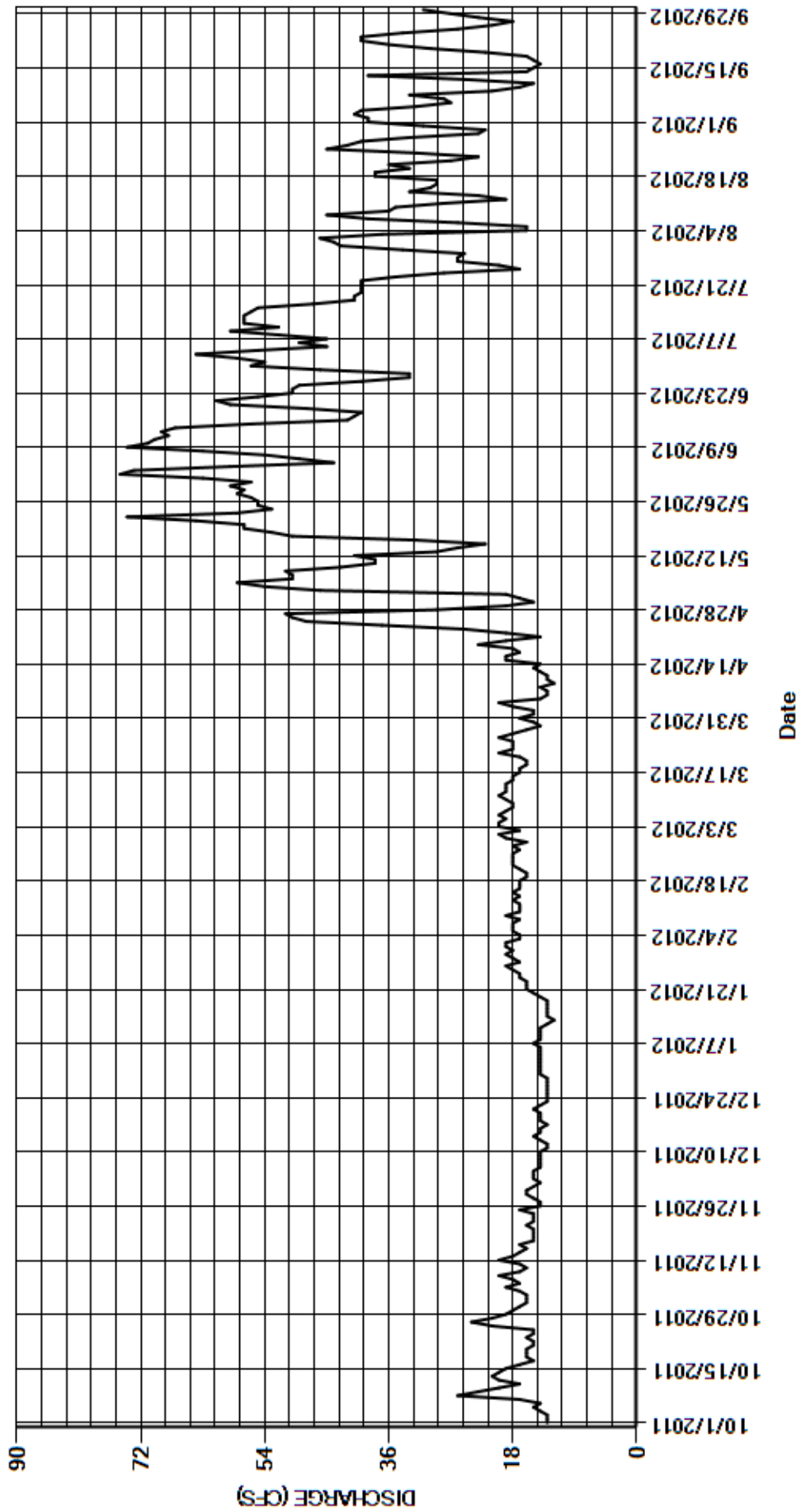
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13	16	15	14	19	20	15	17	63	54	44	39
2	13	16	14	14	19	17	15	19	75	58	46	39
3	13	16	15	14	17	20	18	46	73	64	37	41
4	14	17	15	14	17	20	20	54	59	55	16	40
5	15	19	15	14	18	19	14	58	44	45	16	32
6	14	17	14	14	18	20	13	50	49	49	26	27
7	17	18	14	15	18	19	13	50	54	45	39	28
8	26	20	14	14	17	18	14	51	63	52	45	33
9	23	17	14	14	19	18	12	43	74	59	36	21
10	20	16	14	14	17	19	13	38	71	52	35	17
11	17	17	13	14	17	20	13	38	70	57	28	15
12	20	20	13	13	17	19	14	41	68	57	19	25
13	21	18	14	12	18	19	15	29	69	57	23	39
14	20	17	15	13	17	19	14	26	67	56	33	16
15	19	16	14	13	18	18	19	22	56	55	30	15
16	17	17	14	13	17	18	19	32	42	47	29	14
17	15	15	13	13	17	17	17	50	41	41	29	15
18	16	15	14	13	17	17	18	53	40	41	38	16
19	16	15	14	14	16	16	23	57	48	40	38	22
20	16	15	14	15	16	16	19	57	59	40	33	30
21	15	16	15	16	17	17	14	64	61	40	36	36
22	15	15	14	16	18	20	19	74	55	40	27	40
23	16	15	13	16	18	18	25	58	50	35	23	40
24	15	15	13	17	18	18	37	53	50	28	32	34
25	15	17	13	17	18	18	48	55	49	17	45	26
26	21	14	13	18	17	20	50	55	40	20	42	21
27	24	14	13	19	18	18	51	56	33	26	40	18
28	21	15	13	17	16	16	29	58	33	26	33	23
29	19	16	13	18	19	14	19	57	46	25	23	27
30	18	16	14	19	---	15	15	59	56	34	22	31
31	17	---	14	18	---	17	---	56	---	43	31	---
TOTAL	541	490	430	465	508	560	625	1476	1658	1358	994	820
MEAN	17.5	16.3	13.9	15.0	17.5	18.1	20.8	47.6	55.3	43.8	32.1	27.3
AC-FT	1070	972	853	922	1010	1110	1240	2930	3290	2690	1970	1630
MAX	26	20	15	19	19	20	51	74	75	64	46	41
MIN	13	14	13	12	16	14	12	17	33	17	16	14

CAL YR	2011	TOTAL	12595	MEAN	34.5	MAX	137	MIN	12	AC-FT	24980
WTR YR	2012	TOTAL	9925	MEAN	27.1	MAX	75	MIN	12	AC-FT	19690

MAX DISCH: 99.6 CFS AT 09:15 ON MAY 22,2012 GH 1.37 FT SHIFT 0 FT
 MAX GH: 1.37 FT AT 09:15 ON MAY 22,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08250000 CULEBRA CREEK AT SAN LUIS
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
08251500 RIO GRANDE RIVER NEAR LOBATOS

Water Year 2012

Location.-- Lat 37°4'43", long 105°45'25" referenced to North American Datum of 1983 (Kiowa Hill, CO quad, scale 1:24,000), UTM Zone 13 432719 E and 4103861 N, in SE ¼ SE ¼ sec. 27, T.33 N., R.11 E., New Mexico Principal Meridian, Conejos County, CO, Hydrologic Unit 13010002, on right bank at highway bridge, 5.7 mi north of Colorado-New Mexico State line, 8 mi downstream from Culebra Creek, 11 mi east of Lobatos, CO, and 14 mi east of Antonito, CO.

Drainage Area and Period of Record.-- 7,700 mi² approximately, includes 2,940 mi² in Closed Basin in northern part of San Luis Valley, Colo; July 1899 to present.

Equipment.-- Graphic water-stage recorder, data collection platform (Sutron model Satlink 2), a float-operated Sutron SDR shaft-encoder, and a water temperature sensor in a four foot square timber shelter and cobblestone well. SDR float is operated in an oil cylinder during winter months. The primary reference gage is a drop tape from reference point on shelf. Un-readable auxiliary outside slope gage abandoned.

Hydrologic Conditions.-- Natural streamflow is affected by transmountain diversions, storage reservoirs, ground-water withdrawals, diversions for irrigation, and return flows from irrigated areas.

Gage-Height Record.-- Primary record is 15-minute transmitted data with DCP log, SDR log, and chart record as backup. Record is complete and reliable except for Jul. 23 when 4 unit values were estimated due to inlets being extended. The stage-discharge relation was affected by ice Dec. 4, 2011 through Mar. 9, 2012. A -0.01 ft instrument correction was made to the shaft encoder on Sep. 17, 2012 and prorated back to the previous visit. A +0.03 ft flush correction was noted and applied on Mar. 15, 2012 and prorated back to an inflection point the same day.

Datum Corrections.-- Levels were not run this year. Levels were last run to the Reference Point (RP) inside the gage on Jul. 1, 2010 using BM No. 2 as base. The gage was found to be reading within allowable limits, so no correction was made.

Rating.-- The control is composed of boulders and cobbles. Shifting is caused by movement of sand, silt, and gravel in the streambed, and by seasonal heavy weed and moss growth. Rating No. 3, in use since May 1, 1965, was used again this year. This rating is probably not very well defined due to the constant growth and death cycles of weeds and moss as well as heavy silt deposition due to this growth. There is only a brief period of time after ice goes out and scours the channel and before heavy aquatic growth begins that the true stage-discharge relation is not influenced by other factors. Twenty-six measurements (197-222) were made this year ranging in discharge from 15.0 to 1110 cfs. They cover the discharge range experienced except for higher daily flows on Mar. 28-30, 2012. The peak flow of 1310 cfs occurred at 0900 on March 29, 2012 at a gage height of 2.96 ft with a shift of 0.00 ft. It exceeded high measurement No. 210 with a gage height of 2.72 ft, made Mar. 27, 2012 by 0.24 ft in stage. The peak gage-height of 2.98 ft occurred on Feb. 21, 2012 at 2145 as a result of backwater from ice.

Discharge.-- Shifting control method was used during all periods of good record. The stage-discharge relation was affected by ice and discharge estimated Dec. 4, 2011 - Mar. 9, 2012. Variable shift curve RIOLOBVS12-2 was used to define the stage-shift relation for the period Mar. 7 through Apr. 2, 2012. During other open water periods, open-ended shifts were applied as defined by discharge measurements and distributed by time and events. This approach was used due to the complexity of the channel geometry, the variation of submerged and on-bank vegetative growth and die-off cycles, and the high frequency of measurements. Measurements show shifts varied from -0.04 to +0.20 feet. All measurements were given full weight and applied except Nos. 199, 200, 218, and 219, which were adjusted as much as 6.9% to smooth shift distribution.

Special Computations.-- Discharge for periods of ice-affected record was estimated using measurements, weather records, trends, and comparison with the stations Rio Grande near Cerro, New Mexico, and Rio Grande near Taos Junction Bridge, New Mexico minus the Red River near Questa, New Mexico.

Remarks.-- Due to the high frequency of measurements, the record is considered good except for periods of no gage-height and ice-affected record, which are poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.-- Install secondary reference gage.

STATE OF COLORADO
DIVISION OF WATER RESOURCES
OFFICE OF STATE ENGINEER

08251500 RIO GRANDE RIVER NEAR LOBATOS

RATING TABLE-- RIOLOBCO03 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

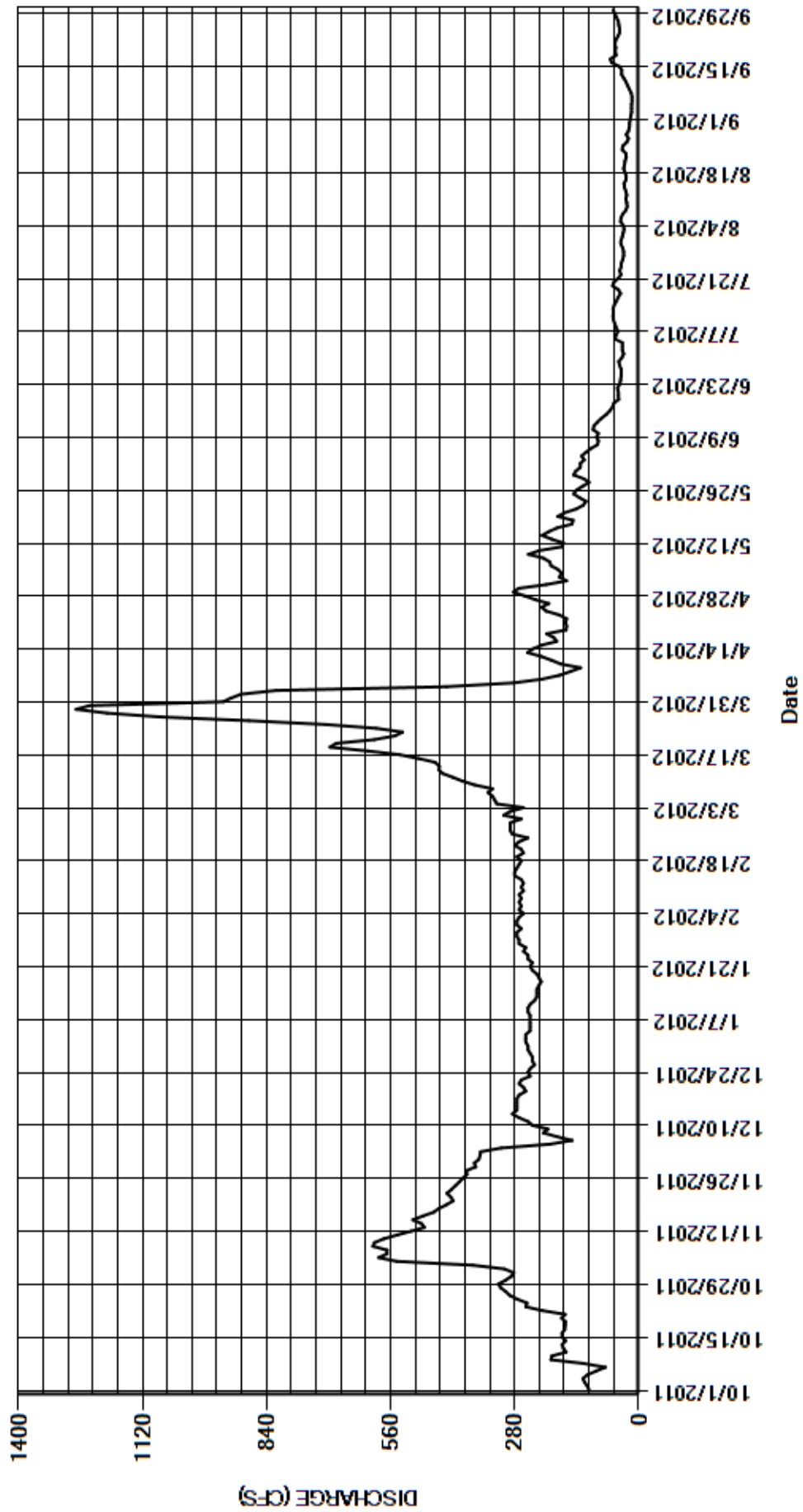
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	112	282	361	e255	e275	e305	920	209	132	34	37	19
2	116	303	358	e255	e275	e290	898	163	132	37	35	18
3	122	374	357	e255	e270	e260	818	179	123	37	33	16
4	126	546	e310	e245	e260	e320	434	174	129	37	35	16
5	116	587	e200	e245	e270	e325	282	182	119	54	41	16
6	96	568	e150	e245	e265	e330	218	198	108	51	40	15
7	75	568	e185	e245	e270	e340	179	201	93	47	36	15
8	124	600	e215	e245	e265	e330	154	215	91	51	29	17
9	198	596	e205	e250	e270	e370	131	249	95	54	26	21
10	196	575	e240	e250	e260	397	176	224	91	57	27	25
11	164	545	e250	e245	e265	419	197	173	103	58	29	29
12	170	513	e270	e235	e260	442	220	170	101	57	27	34
13	173	484	e285	e230	e265	451	251	196	93	58	29	39
14	165	490	e275	e230	e280	450	239	218	84	55	32	38
15	173	510	e275	e230	e280	460	218	203	73	50	33	43
16	173	487	e275	e225	e275	497	185	184	65	46	29	61
17	167	463	e275	e220	e270	539	192	151	59	41	28	64
18	166	451	e270	e225	e265	611	208	148	56	46	31	51
19	165	434	e255	e230	e275	697	164	183	45	59	34	53
20	174	419	e260	e240	e260	683	163	167	46	56	32	52
21	166	424	e270	e245	e265	597	165	141	46	46	31	54
22	218	433	e265	e240	e280	550	163	125	48	40	28	52
23	255	423	e245	e250	e270	533	180	119	43	43	29	47
24	252	414	e250	e250	e250	593	209	134	41	40	37	43
25	274	405	e245	e260	e285	707	219	147	40	39	36	43
26	291	397	e235	e255	e290	880	203	140	39	36	27	45
27	300	388	e240	e270	e290	1080	233	127	40	34	23	46
28	311	389	e240	e270	e290	1200	257	112	43	34	28	50
29	317	368	e245	e275	e265	1270	283	124	45	36	23	54
30	301	371	e250	e275	---	1240	271	147	38	40	21	58
31	288	---	e250	e265	---	938	---	142	---	40	21	---
TOTAL	5944	13807	8006	7655	7860	18104	8430	5245	2261	1413	947	1134
MEAN	192	460	258	247	271	584	281	169	75.4	45.6	30.5	37.8
AC-FT	11790	27390	15880	15180	15590	35910	16720	10400	4480	2800	1880	2250
MAX	317	600	361	275	290	1270	920	249	132	59	41	64
MIN	75	282	150	220	250	260	131	112	38	34	21	15

CAL YR	2011	TOTAL	100852	MEAN	276	MAX	896	MIN	51	AC-FT	200000
WTR YR	2012	TOTAL	80806	MEAN	221	MAX	1270	MIN	15	AC-FT	160300

MAX DISCH: 1310 CFS AT 09:00 ON MAR 29,2012 GH 2.96 FT SHIFT 0 FT
MAX GH: 2.98 FT AT 21:45 ON FEB 21,2012 (backwater from ice)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

08251500 RIO GRANDE RIVER NEAR LOBATOS
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
09118200 TARBELL DITCH NEAR COCHETOPA PASS
Water Year 2012

Location.-- Lat 37°59'33", long 106°47'37" referenced to North American Datum of 1983 (Halfmoon Pass, CO quad, scale 1:24,000), UTM Zone 13 342496 E and 4206511 N, in SE ¼ SE ¼ sec. 7, T.43 N., R.2 E., New Mexico Principal Meridian, Saguache County, CO, Hydrologic Unit 14020003, on left bank Tarbell ditch diverts water from Lake Fork Cochetopa Creek (tributary to Cochetopa Creek), in NW¼ sec. 18, T.43 N., R.2 E., in Gunnison River basin, to Lake Fork Creek (tributary to Middle Fork Saguache Creek) in NE¼ sec. 18, T.43 N., R.2 E., in Rio Grande basin.

Drainage Area and Period of Record.-- Drainage area not determined.; WY 1949 to present.

Equipment.-- Data collection platform (Sutron Model Satlink2) and a float-operated shaft encoder in a lumber shelter and steel culvert pipe stilling well. A Stevens F-type chart recorder is also occasionally used. One intake pipe attaches well to 2.5 foot Parshall flume.

Hydrologic Conditions.-- This is a trans-mountain diversion gage and all flow is regulated.

Gage-Height Record.-- Primary record is 15-minute transmitted data with DCP log as backup. Record is complete from May 10, 2012 when satellite telemetry was started to Sep. 19, 2012 when DCP was turned off. The record was affected by silt in well and pack rat on float from May 10 to May 16, 2012. The diversion headgate was closed on Jun. 27, 2012 but there was some flow through flume Jul. 9, 2012 due to rain. There was no flow from Oct. 1, 2012 to May 9, 2012, Jun. 28 to Jul. 8 and Jul. 10 to Sep. 30, 2012.

Datum Corrections.-- No datum corrections since levels have not been run on this flume. The flume is in fair condition. The measured depths on Measurement 40, made Jun. 6, 2011, indicate that flume floor is fairly level laterally. However both flume walls are leaning from left to right. There is also a large flat rock placed at left side of flume entrance to prevent erosion, which affects velocities at left edge of flume.

Rating.-- Rating TARBELCO01, a standard 2.5 foot Parshall flume rating, was used all year. Sediment and rock above flume cause minor shifting. One discharge measurement (No. 41) was made this year, with a discharge of 1.73 cfs. The peak flow of 3.94 cfs occurred at 0300 on May 27, 2012 at a gage height of 0.63 ft with a shift of -0.08 ft. The peak exceeded Measurement No. 41, (GH=0.40 ft) made May 10, 2012, by 0.23 ft in stage.

Discharge.-- Shifting control method was used during all periods of good record. The measured shift (-0.08 feet) was distributed through the entire period of record.

Special Computations.-- Discharge for May 10-16, 2012 was estimated due to silt and pack rat affecting float operation.

Remarks.-- Record is fair. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.-- Cleaning the approach section may reduce shifting.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09118200 TARBELL DITCH NEAR COCHETOPA PASS

RATING TABLE-- TARBELCO01 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

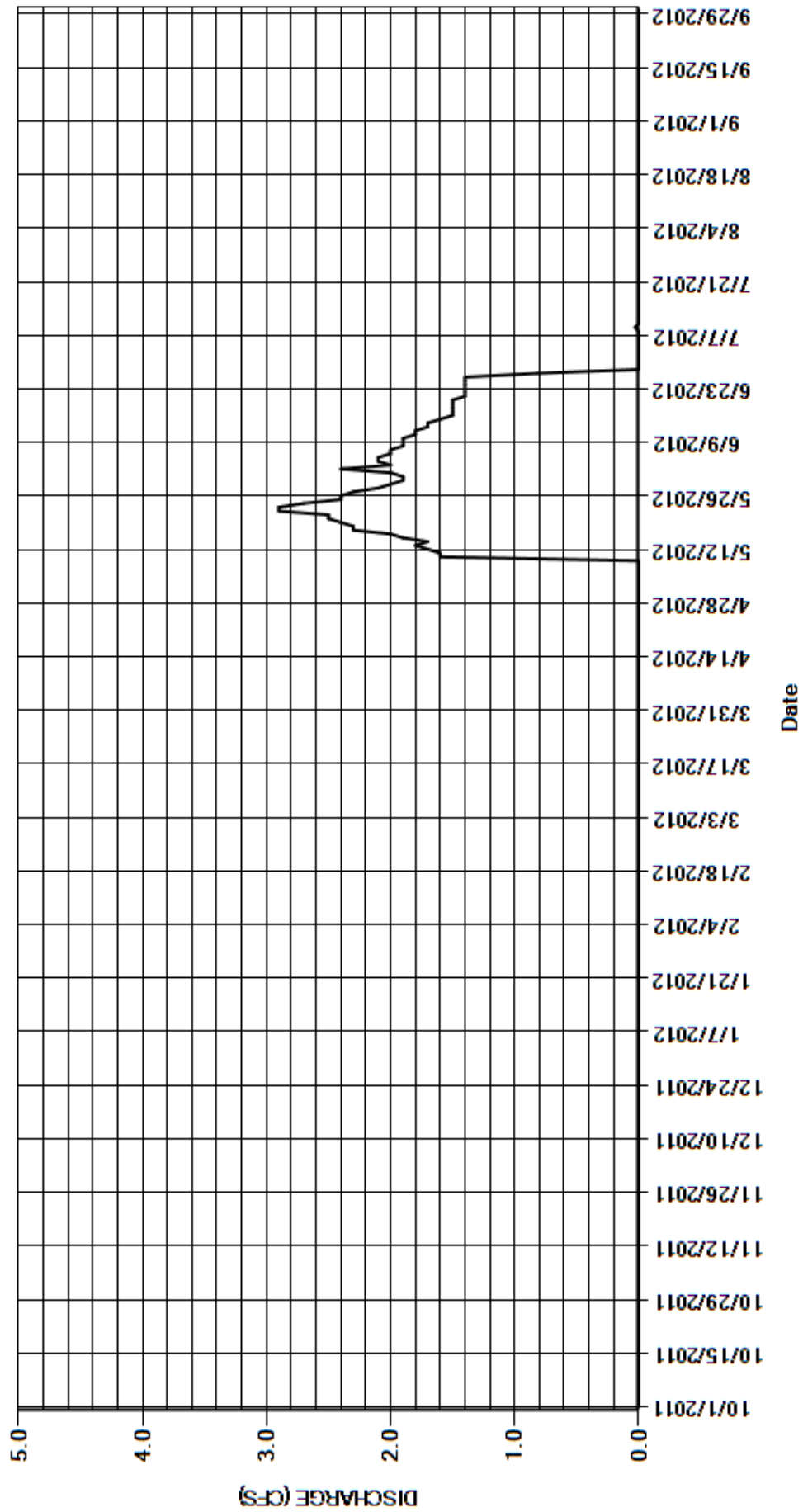
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.0	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.4	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.0	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.1	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.1	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.0	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.0	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.9	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.9	0.03	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	e1.6	1.9	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	e1.6	1.8	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	e1.7	1.8	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	e1.8	1.7	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	e1.7	1.7	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	e1.9	1.6	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	e2.0	1.5	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.3	1.5	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.3	1.5	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.4	1.5	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.5	1.5	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.5	1.4	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.9	1.4	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.9	1.4	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.7	1.4	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.4	1.4	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.4	1.4	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.3	0.82	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.1	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.0	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	---	0.00	0.00	1.9	0.00	0.00	0.00	0.00
31	0.00	---	0.00	0.00	---	0.00	---	1.9	---	0.00	0.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	47.80	45.62	0.03	0.00	0.00
MEAN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.54	1.52	0.001	0.000	0.000
AC-FT	0	0	0	0	0	0	0	95	90	.06	0	0
MAX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.9	2.4	0.03	0.00	0.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	291.15	MEAN	0.80	MAX	7.3	MIN	0.00	AC-FT	577
WTR YR	2012	TOTAL	93.45	MEAN	0.26	MAX	2.9	MIN	0.00	AC-FT	185

MAX DISCH: 3.94 CFS AT 03:00 ON MAY 27,2012 GH 0.63 FT SHIFT -0.08 FT
 MAX GH: 0.63 FT AT 03:00 ON MAY 27,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09118200 TARBELL DITCH NEAR COCHETOPA PASS
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
09121000 TABOR DITCH AT SPRING CREEK PASS, CO
Water Year 2012

Location.-- Lat 37°56'22", long 107°9'31" referenced to North American Datum of 1983 (Slumgullion Pass, CO quad, scale 1:24,000), UTM Zone 13 310324 E and 4201303 N, in NE ¼ SE ¼ sec. 35, T.43 N., R.3 W., New Mexico Principal Meridian, Hinsdale County, CO, Hydrologic Unit 13010001, on left bank Tabor ditch diverts water from tributaries of Cebolla Creek in secs. 29 and 36, T.43 N., R.3 W., in Gunnison River basin, to Big Spring Creek (tributary to North Clear Creek) in sec. 35, T.43 N., R.3 W., in Rio Grande basin.

Drainage Area and Period of Record.-- Drainage area not determined. ; 1948 to present.

Equipment.-- Data collection platform (Sutron Satlink2) and float-operated electronic stage discharge recorder in a steel shelter with stilling well. One intake pipe attaches well to 3 foot Parshall flume. Primary reference gage is staff gage in flume. Equipment owned by Colorado Division of Parks and Wildlife.

Hydrologic Conditions.-- This is a trans-mountain diversion and all flow is regulated.

Gage-Height Record.-- Primary record is 15-minute transmitted data with DCP and SDR logs as backup. The periods of diversions were Oct. 1 - 13, 2011 and Apr. 12 to Aug. 13, 2012. During these periods, record is complete and reliable except for Apr. 14-16, 19-20, 2012, when float was affected by ice in well. One missing unit value was estimated on Jun. 20. The stage discharge relation was affected by ice in the control Oct. 13, 2011, Apr. 13, 17, 22, 29, 30, May 8, 27 and 28, 2012. There were several instrument corrections made ranging from -0.04 to +0.03 feet mostly due to variable leakage from stilling well. These corrections were prorated by time from previous visit. There was no flow from Oct. 14, 2011 to Apr. 11, 2012 and Aug. 14 to Sep. 30, 2012 when the station was undergoing reconstruction.

Datum Corrections.-- Levels were not run this year. Levels were last run at the flume on July 31, 2008.

Rating.-- Rating TABDITCO01, a standard 3 foot Parshall flume rating, was used all year. Rating TABDITCO02 is the same as TABDITCO01, but Rating 1 had some strange GH-Q pairs at both the low and high ends. These were deleted and the rating was saved and named as Rating 2. Settlement of the flume throat section and siltation of the gage pool which has increased approach velocities are the likely causes of positive shifting. Seven measurements (Nos. 168-174) were made this year ranging in discharge from 0 to 2.05 cfs. Measurements cover the range experienced except for the higher daily flows on Apr. 23-27, May 3-7, 9-11, 2012. The peak flow of 7.49 cfs occurred at 0000 on Apr. 25, 2012 at a gage height of 0.67 feet with a shift of +0.07 feet. It exceeded high Measurement No. 169 (GH=0.27 ft.) made May. 7, 2012 by 0.40 ft. in stage.

Discharge.-- Shifting control method was used during all periods of good record. Discharge was estimated for periods when float was affected by ice in well and stage-discharge relation was affected by ice. A variable stage shift relationship (TABDITVS12-1) was developed using this year's measurements and the high measurement from last year, No. 162. The upper end of the shift curve was left open since the points cover the range in stage encountered and there is no indication of shifts trending back to the rating. The shift curve was used for the period Jan. 1, 2012 to the end of the water year. This year's measured shifts ranged from +0.03 to +0.07 ft. All were given full weight, except Nos. 169, 170, 171, 172 and 173 which were adjusted by as much as 12% to smooth shift distribution.

Special Computations.-- Flows during periods when the stage-discharge relation was affected by ice and when float was affected by ice in well were estimated using temperature records.

Remarks.-- Record is fair, except for periods of low flows (< 1 cfs) and estimated discharges, which are poor. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.-- The quality of this record would be greatly improved by leveling the flume, cleaning the approach pool, and resolving the leaking well/inlet issue.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09121000 TABOR DITCH AT SPRING CREEK PASS, CO

RATING TABLE-- TABDITCO01 USED FROM 01-OCT-2011 TO 05-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

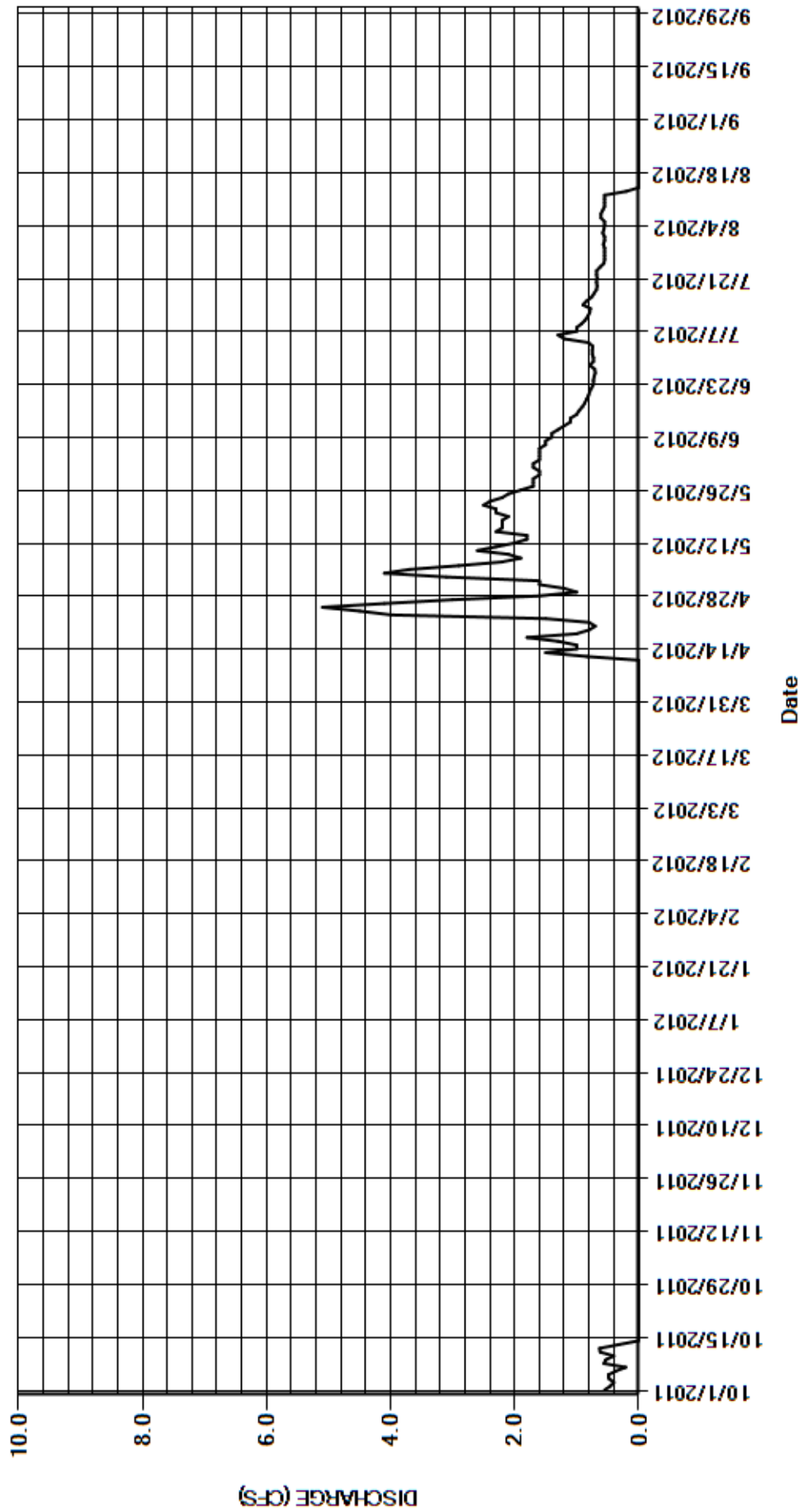
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.55	0.00	0.00	0.00	0.00	0.00	0.00	1.6	1.7	0.75	0.55	0.00
2	0.46	0.00	0.00	0.00	0.00	0.00	0.00	1.6	1.7	0.75	0.58	0.00
3	0.40	0.00	0.00	0.00	0.00	0.00	0.00	3.1	1.6	0.74	0.56	0.00
4	0.48	0.00	0.00	0.00	0.00	0.00	0.00	4.1	1.6	0.81	0.55	0.00
5	0.49	0.00	0.00	0.00	0.00	0.00	0.00	3.7	1.6	1.2	0.55	0.00
6	0.37	0.00	0.00	0.00	0.00	0.00	0.00	2.9	1.6	1.3	0.61	0.00
7	0.21	0.00	0.00	0.00	0.00	0.00	0.00	2.2	1.5	1.0	0.61	0.00
8	0.56	0.00	0.00	0.00	0.00	0.00	0.00	e1.9	1.5	1.0	0.58	0.00
9	0.53	0.00	0.00	0.00	0.00	0.00	0.00	2.1	1.4	0.92	0.55	0.00
10	0.40	0.00	0.00	0.00	0.00	0.00	0.00	2.6	1.4	0.86	0.55	0.00
11	0.62	0.00	0.00	0.00	0.00	0.00	0.00	2.3	1.3	0.82	0.55	0.00
12	0.63	0.00	0.00	0.00	0.00	0.00	e0.84	2.0	1.2	0.79	0.55	0.00
13	e0.32	0.00	0.00	0.00	0.00	0.00	e1.5	1.8	1.1	0.78	e0.20	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	e1.0	1.8	1.1	0.90	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	e1.0	2.3	1.0	0.84	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	e1.3	2.2	0.96	0.76	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	e1.8	2.2	0.91	0.72	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	e1.0	2.2	0.87	0.68	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	e0.80	2.1	0.84	0.67	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	e0.70	2.3	0.81	0.68	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	e0.80	2.3	0.79	0.67	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	e1.5	2.5	0.76	0.68	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	4.0	2.4	0.73	0.68	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	4.5	2.2	0.73	0.62	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	5.1	2.1	0.72	0.56	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	4.1	1.9	0.70	0.55	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	3.0	e1.7	0.71	0.55	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	1.6	e1.7	0.79	0.55	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	e1.0	1.7	0.73	0.55	0.00	0.00
30	0.00	0.00	0.00	0.00	---	0.00	e1.2	1.6	0.73	0.57	0.00	0.00
31	0.00	---	0.00	0.00	---	0.00	---	1.6	---	0.55	0.00	---
TOTAL	6.02	0.00	0.00	0.00	0.00	0.00	36.74	68.7	33.08	23.50	6.99	0.00
MEAN	0.19	0.000	0.000	0.000	0.000	0.000	1.22	2.22	1.10	0.76	0.23	0.000
AC-FT	12	0	0	0	0	0	73	136	66	47	14	0
MAX	0.63	0.00	0.00	0.00	0.00	0.00	5.1	4.1	1.7	1.3	0.61	0.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.6	0.70	0.55	0.00	0.00

CAL YR	2011	TOTAL	297.46	MEAN	0.81	MAX	12	MIN	0.00	AC-FT	590
WTR YR	2012	TOTAL	175.03	MEAN	0.48	MAX	5.1	MIN	0.00	AC-FT	347

MAX DISCH: 7.49 CFS AT 00:00 ON APR 25,2012 GH 0.67 FT SHIFT 0.07 FT
 MAX GH: 0.67 FT AT 00:00 ON APR 25,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09121000 TABOR DITCH AT SPRING CREEK PASS, CO
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
09341000 TREASURE PASS DITCH AT WOLF CREEK PASS

Water Year 2012

Location.-- Lat 37°28'58", long 106°47'59" referenced to North American Datum of 1983 (Wolf Creek Pass, CO quad, scale 1:24,000), UTM Zone 13 340869 E and 4149940 N, in SW ¼ NW ¼ sec. 5, T.37 N., R.2 E., New Mexico Principal Meridian, Mineral County, CO, Hydrologic Unit 13010001, on right bank. Treasure Pass Ditch diverts water tributary to Wolf Creek and the San Juan River drainage across the Continental Divide to Pass Creek and the South Fork Rio Grande River drainage.

Drainage Area and Period of Record.-- Drainage area not determined.; 1948 to present.

Equipment.-- Float-operated Stevens F-type chart recorder in small steel shelter and stilling well. F-type recorder was removed and replaced with float-operated Sutron SDR on May 9, 2012. One intake pipe attaches well to 2 foot Parshall flume. Primary reference gage is staff gage in flume. Staff gage was moved from LEW to REW (same as inlet) on May 9, 2012. New flume and stilling well installed at same location on Sep. 1, 2010.

Hydrologic Conditions.-- This is a trans-mountain diversion and all flow is regulated.

Gage-Height Record.-- Primary record is graphic F-type chart recorder with no back up from Apr. 19 to May 9, 2012. Primary record after May 9 is 15-minute SDR log data with no back-up. Record is complete and reliable from Apr. 19 to Sep. 17, 2012 except for Apr. 19, 24, 25 due to missing chart data, May 17-23 due to unreliable float operation since float tape was too long, and Jun. 19 to Sep. 12, Sep. 14-17 due to well isolating from flume during all or part of each day. Well isolates from flume at gage-height of 0.05 ft.

Datum Corrections.-- No datum corrections since levels have not been run on this flume. The flume was replaced Sep. 1, 2010 and is in good condition. There is no stilling pool above flume so approach velocity is high.

Rating.-- A standard 2 foot Parshall flume rating, was used all year. Changes in approach conditions above flume cause shifting. Two discharge measurements were made this year (Nos. 30-31) ranging in discharge from 0.36 to 2.21 cfs. The peak flow of 6.33 cfs occurred at 1530 on May 23, 2012 at a gage height of 0.83 ft with a shift of +0.03 ft. The peak flow exceeded Measurement No. 31 made May 16, 2012 (GH 0.41 ft.) by 0.42 ft in stage.

Discharge.-- Shifting control method was used during all periods of record. Shifts were applied as defined by measurements and prorated by time. Both measured shifts this water year were +0.03 ft. There was no flow Oct. 1, 2011 to Apr. 18, 2012, Jun. 23-30, Jul. 1-3, 10, 17-25, 30, 31, Aug. 1-5, 8-16, 18, 19, 21, 22, 25, 26, 28-31, Sep. 1-11, 16-30, 2012.

Special Computations.-- During the period of chart recorder use, daily mean discharge was determined by applying the shift to the daily mean gage-height or partial day mean gage-height derived from the chart. Prior to moving staff and improving approach conditions on May 9, 2012 a +0.09 ft shift was applied. This shift was calculated from the measurement made on May 9 and the difference in GH caused by moving the staff gage and improving the approach conditions.

Remarks.-- Record is poor from Apr. 19 to May 9, 2012 due to unfavorable approach conditions and from Jun. 19 to Sep. 17 due to very low flows and well isolating. Record is good from May 10 to Jun. 18, 2012 except for May 17-23, which is poor. The peak discharge should be considered fair. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.--

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09341000 TREASURE PASS DITCH AT WOLF CREEK PASS

RATING TABLE-- STD02FTPF USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

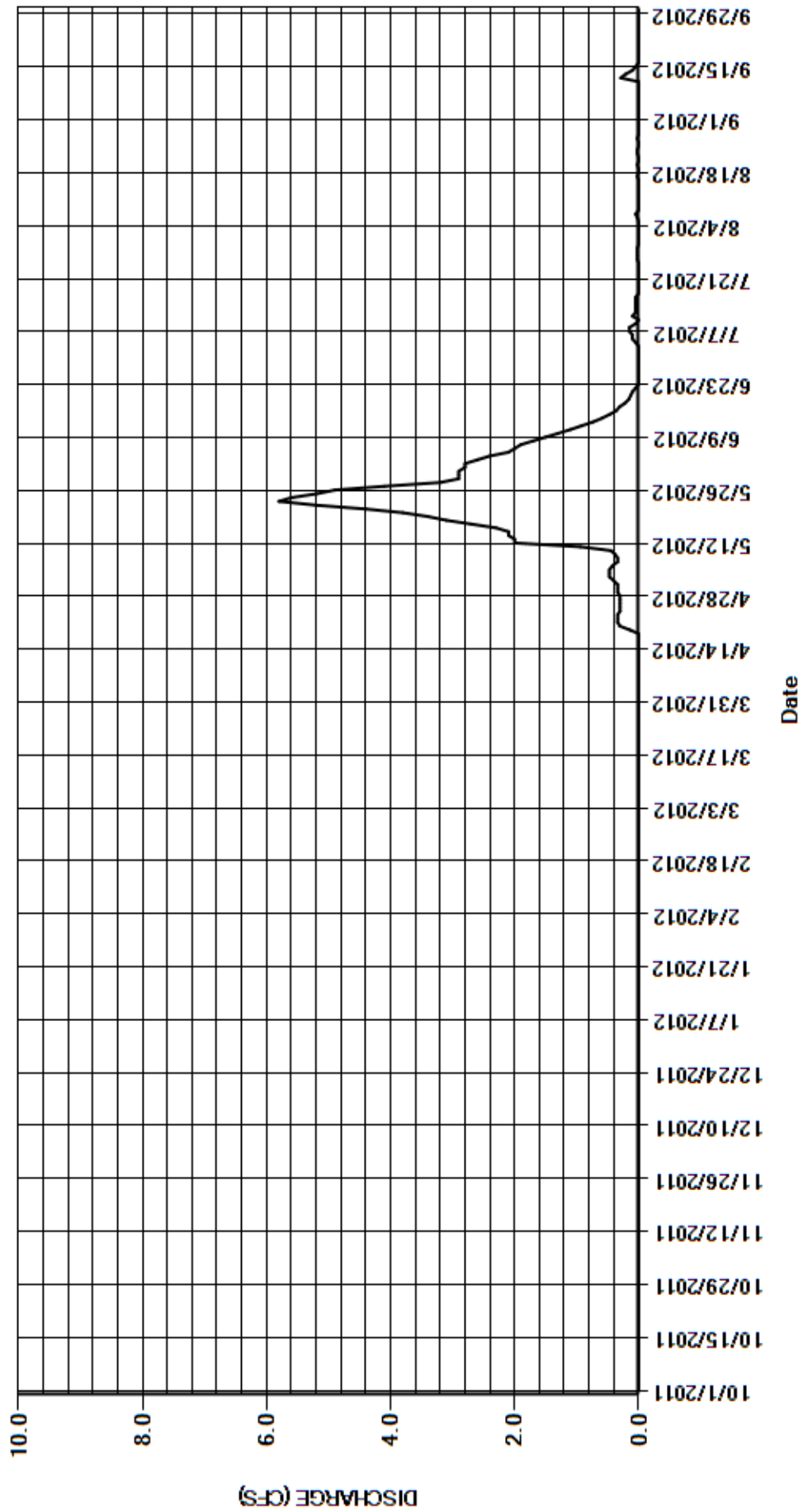
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	2.8	e0.00	e0.00	e0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40	2.8	e0.00	e0.00	e0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47	2.6	e0.00	e0.00	e0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47	2.4	e0.05	e0.00	e0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47	2.1	e0.10	e0.00	e0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42	2.0	e0.10	e0.02	e0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	1.9	e0.15	e0.05	e0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	1.7	e0.15	e0.00	e0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38	1.5	e0.05	e0.00	e0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.45	1.3	e0.00	e0.00	e0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.94	1.1	e0.10	e0.00	e0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.0	0.92	e0.05	e0.00	e0.29
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.0	0.74	e0.05	e0.00	0.21
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.1	0.59	e0.05	e0.00	e0.10
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.1	0.47	e0.05	e0.00	e0.05
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.3	0.36	e0.05	e0.00	e0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	e2.7	0.31	e0.00	e0.02	e0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	e0.00	e3.1	0.22	e0.00	e0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	e0.14	e3.4	e0.16	e0.00	e0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.30	e3.8	e0.13	e0.00	e0.02	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.34	e4.4	e0.10	e0.00	e0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.34	e5.2	e0.05	e0.00	e0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.34	e5.8	e0.00	e0.00	e0.02	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	e0.30	5.6	e0.00	e0.00	e0.02	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	e0.30	5.2	e0.00	e0.00	e0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.30	4.9	e0.00	e0.02	e0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.30	4.1	e0.00	e0.02	e0.02	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.30	3.2	e0.00	e0.02	e0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.34	2.9	e0.00	e0.02	e0.00	0.00
30	0.00	0.00	0.00	0.00	---	0.00	0.34	2.9	e0.00	e0.00	e0.00	0.00
31	0.00	---	0.00	0.00	---	0.00	---	2.9	---	e0.00	e0.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	3.64	75.62	26.25	1.03	0.17	0.65
MEAN	0.000	0.000	0.000	0.000	0.000	0.000	0.12	2.44	0.88	0.033	0.005	0.022
AC-FT	0	0	0	0	0	0	7.2	150	52	2.0	0.3	1.3
MAX	0.00	0.00	0.00	0.00	0.00	0.00	0.34	5.8	2.8	0.15	0.05	0.29
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	132.18	MEAN	0.36	MAX	7.8	MIN	0.00	AC-FT	262
WTR YR	2012	TOTAL	107.36	MEAN	0.29	MAX	5.8	MIN	0.00	AC-FT	213

MAX DISCH: 6.33 CFS AT 15:30 ON MAY 23,2012 GH 0.83 FT SHIFT 0.03 FT
 MAX GH: 0.83 FT AT 15:30 ON MAY 23,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09341000 TREASURE PASS DITCH AT WOLF CREEK PASS
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
DON LA FONT DITCH NO. 1 AT PIEDRA PASS
Water Year 2012

Location.-- Lat 37°34'9", long 107°0'17" referenced to North American Datum of 1983 (Palomino Mountain, CO quad, scale 1:24,000), UTM Zone 13 322967 E and 4159909 N, in SW ¼ SE ¼ sec. 32, T.39 N., R.1 W., New Mexico Principal Meridian, Mineral County, CO, Hydrologic Unit 14080102, on bank 17.8 mi southwest of Wagon Wheel Gap, CO.

Drainage Area and Period of Record.-- Drainage area not determined. ; 1951 to present.

Equipment.-- Float-operated Sutron SDR data logger in a CMP shelter and metal pipe stilling well. One intake pipe attaches well to 9 inch Parshall flume. Primary reference gage is a staff gage in Parshall flume. All equipment is owned and maintained by Colorado Division of Parks and Wildlife (CPW).

Hydrologic Conditions.-- This is a trans-mountain diversion and all flow is regulated.

Gage-Height Record.-- Primary record is 15-minute logged SDR data with no backup. Record is complete and reliable May 16 to Jun. 29, 2012. There was no instrument correction made to the SDR. One unit value was missing on Jun. 14, 2012 and was estimated with no loss in accuracy.

Datum Corrections.-- No datum corrections. Levels have not been run on this flume.

Rating.-- Rating STD09INPF, a standard 9 inch Parshall flume rating, was used all year. There was no measurements made this year. The peak flow of 2.93 cfs occurred at 1500 on May 22, 2012 at a gage height of 0.99 feet using last year's measured shift of -0.02 feet. It exceeded measurement No. 12 (GH=0.69) made Jun. 23, 2011 by 0.30 feet in stage.

Discharge.-- Shifting control method was used during all periods of record. The shift (-0.02 feet) from measurement No. 12 was distributed through entire period of record. There was no flow Oct. 1, 2011 to May 15, 2012 and Jun. 30 to Sep. 30, 2012.

Special Computations.-- In order for correct daily discharge values to be calculated on days that record started and stopped, 15-minute gage heights of 0 feet were added before and after the actual start and stop times to the primary stage import file.

Remarks.-- Record is fair due to no measurements during this year. Station maintained cooperatively by Colorado Parks and Wildlife and Div. 3 hydrographic staff. Record developed by Div. 3 hydrographic staff.

Recommendations.--

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

DON LA FONT DITCH NO. 1 AT PIEDRA PASS

RATING TABLE-- STD09INPF USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

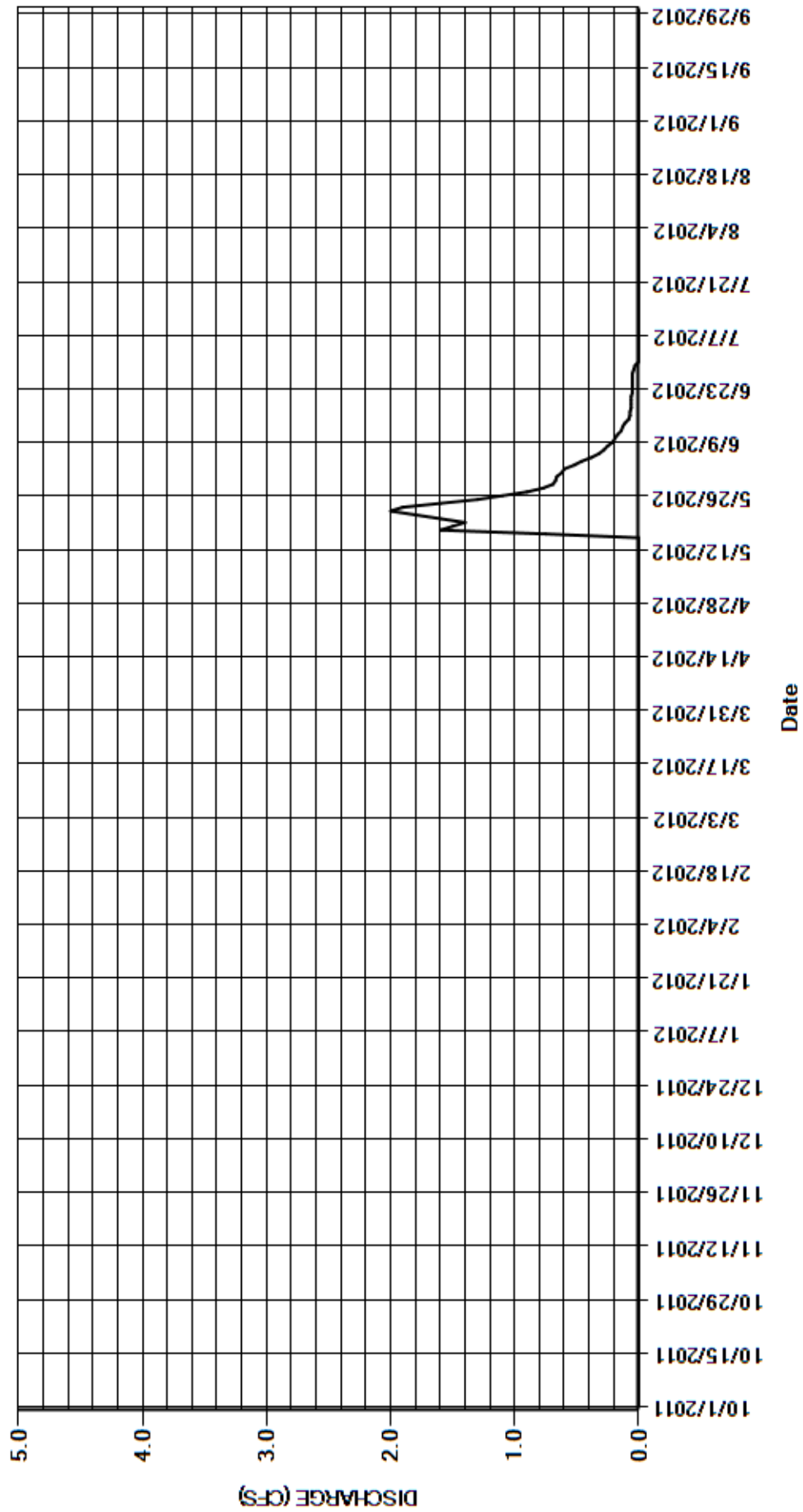
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.62	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.52	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.07	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.6	0.07	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.5	0.06	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.4	0.06	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.6	0.06	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.8	0.06	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.0	0.05	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.9	0.05	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.6	0.05	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.3	0.05	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.1	0.05	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.90	0.05	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.77	0.04	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.69	0.03	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	---	0.00	0.00	0.67	0.00	0.00	0.00	0.00
31	0.00	---	0.00	0.00	---	0.00	---	0.66	---	0.00	0.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.24	5.21	0.00	0.00	0.00
MEAN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.65	0.17	0.000	0.000	0.000
AC-FT	0	0	0	0	0	0	0	40	10	0	0	0
MAX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.0	0.62	0.00	0.00	0.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	62.20	MEAN	0.17	MAX	3.4	MIN	0.00	AC-FT	123
WTR YR	2012	TOTAL	25.45	MEAN	0.070	MAX	2.0	MIN	0.00	AC-FT	50

MAX DISCH: 2.93 CFS AT 15:00 ON MAY 22,2012 GH 0.99 FT SHIFT -0.02 FT
 MAX GH: 0.99 FT AT 15:00 ON MAY 22,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

**DON LA FONT DITCH NO. 1 AT PIEDRA PASS
WY2012 HYDROGRAPH**



RIO GRANDE RIVER BASIN
09347000 DON LA FONT DITCH NO. 2 AT PIEDRA PASS
Water Year 2012

Location.-- Lat 37°34'21", long 106°59'57" referenced to North American Datum of 1983 (South River Peak, CO quad, scale 1:24,000), UTM Zone 13 323451 E and 4160264 N, in NE ¼ SE ¼ sec. 32, T.39 N., R.1 W., New Mexico Principal Meridian, Mineral County, CO, Hydrologic Unit 13010001, on right bank 17.5 mi southwest of Wagon Wheel Gap, CO. Diversion is from tributaries of Piedra River in San Juan River Basin to Red Mountain Creek in Rio Grande River Basin.

Drainage Area and Period of Record.-- Drainage area not determined. ; 1963 to present.

Equipment.-- Data collection platform (Sutron Model 8200 DCP with GOES radio) and a float-operated Sutron SDR in a wood shelter and metal pipe stilling well. One intake pipe attaches well to 1.5 foot Parshall flume. The only reference gage is a staff gage in Parshall flume. All equipment is owned and maintained by Colorado Division of Parks and Wildlife (CPW).

Hydrologic Conditions.-- This is a trans-mountain diversion gage and all flow is regulated.

Gage-Height Record.-- The DCP was not used this year to transmit data. Primary record is 15-minute logged SDR data with no backup. Record is complete and reliable from May 16 to Jun. 21, 2012, except one missing unit value on Sep. 14 that was estimated with no loss in accuracy. A -0.05 feet instrument correction was made to the SDR on Jul. 24, 2012. This correction was prorated by time from May 30 to Jun. 14, 2012, then carried straight to Jul. 24 when correction was made.

Datum Corrections.-- No datum corrections. Levels have not been run at this flume.

Rating.-- Rating STD01HFTPF, a standard 1.5 foot Parshall flume rating, was used all year. No discharge measurements were made this year. The peak flow of 5.91 cfs occurred at 1745 on May 22, 2012 at a gage height of 0.99 feet using last year's shift of 0 feet. The peak exceeded last year's Measurement No. 18, made on Jun. 23, 2011, by 0.35 feet in stage.

Discharge.-- Shifting control method was used during entire period of record. Last year's measured shift (0 feet) from Measurement No. 18 was distributed through all record. There was no flow Oct. 1, 2011 through May 15, 2012, Jun. 27-30, Jul. 13, 14, 17-26, 30, 31, Aug. 1, 4, 10-22, 24-31, and Sep. 1-30, 2012.

Special Computations.-- In order for correct daily discharge values to be calculated on days that record started and stopped, 15-minute gage heights of 0 feet were added before and after the actual start and stop times to the primary stage import file.

Remarks.-- Record is fair due to no discharge measurements this year. Periods of estimated record should be considered poor. Station cooperatively maintained by Colorado Division of Parks and Wildlife and Div 3 hydrographic staff. Record developed by Div 3 hydrographic staff.

Recommendations.--

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09347000 DON LA FONT DITCH NO. 2 AT PIEDRA PASS

RATING TABLE-- STD01HFTPF USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

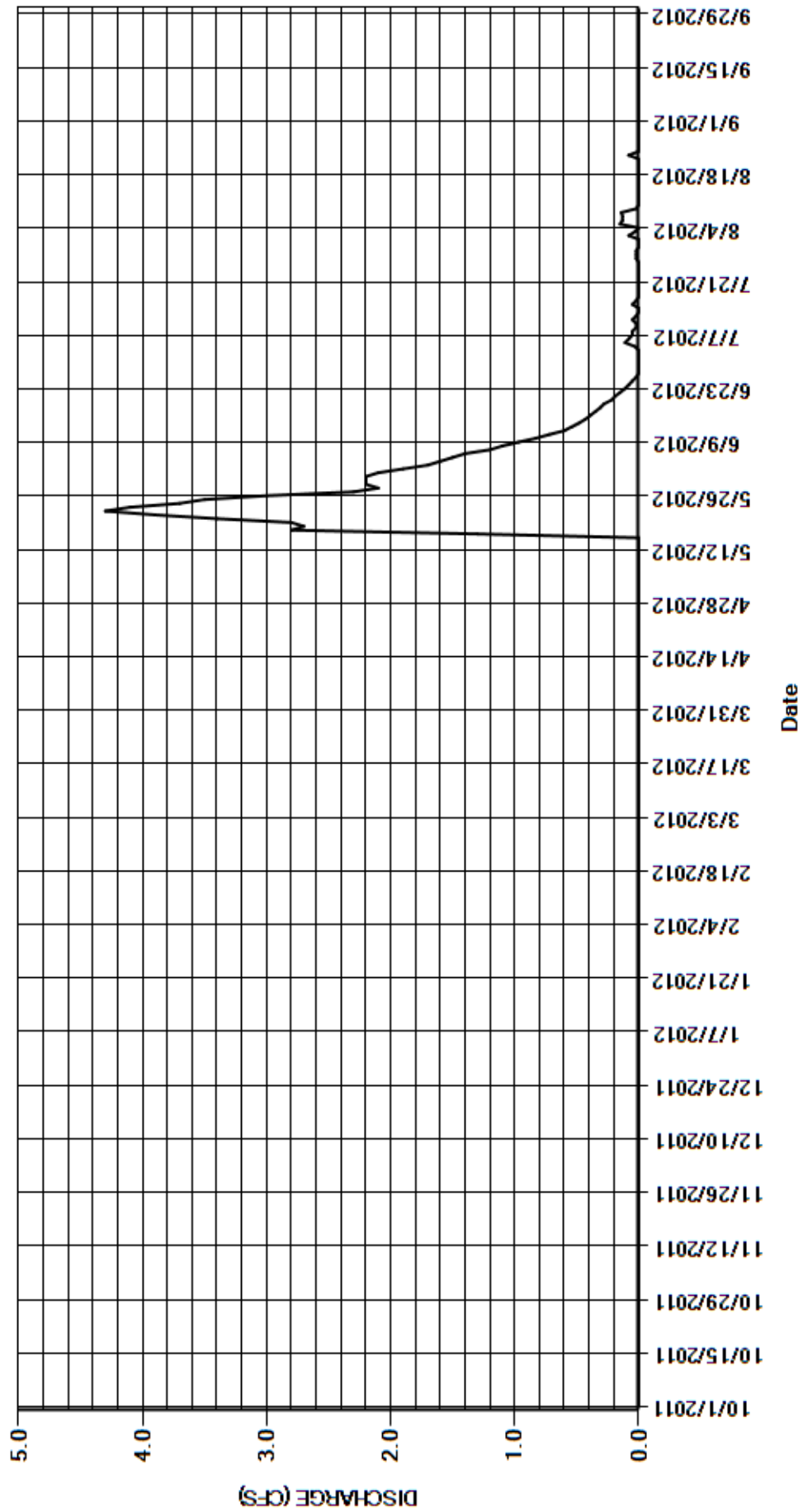
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.1	e0.00	e0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.9	e0.00	e0.08	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.7	e0.00	e0.03	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.6	e0.03	e0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.5	e0.11	e0.15	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.4	e0.08	e0.13	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.2	e0.05	e0.13	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.1	e0.05	e0.14	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.97	e0.02	e0.02	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.83	e0.02	e0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.72	e0.05	e0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60	e0.02	e0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.54	e0.00	e0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.48	e0.00	e0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43	e0.05	e0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.3	0.39	e0.02	e0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.8	0.35	e0.00	e0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.7	0.31	e0.00	e0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.8	0.28	e0.00	e0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.4	0.22	e0.00	e0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.9	0.19	e0.00	e0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.3	e0.15	e0.00	e0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.1	e0.11	e0.00	e0.08	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.7	e0.08	e0.00	e0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5	e0.05	e0.00	e0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.0	e0.02	e0.00	e0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.3	e0.00	e0.02	e0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.1	e0.00	e0.02	e0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.2	e0.00	e0.02	e0.00	0.00
30	0.00	0.00	0.00	0.00	---	0.00	0.00	2.2	e0.00	e0.00	e0.00	0.00
31	0.00	---	0.00	0.00	---	0.00	---	2.2	---	e0.00	0.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	46.50	19.22	0.56	0.76	0.00
MEAN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.50	0.64	0.018	0.025	0.000
AC-FT	0	0	0	0	0	0	0	92	38	1.1	1.5	0
MAX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.3	2.1	0.11	0.15	0.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	86.92	MEAN	0.24	MAX	5.4	MIN	0.00	AC-FT	172
WTR YR	2012	TOTAL	67.04	MEAN	0.18	MAX	4.3	MIN	0.00	AC-FT	133

MAX DISCH: 5.91 CFS AT 17:45 ON MAY 22,2012 GH 0.99 FT SHIFT 0 FT
 MAX GH: 0.99 FT AT 17:45 ON MAY 22,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09347000 DON LA FONT DITCH NO. 2 AT PIEDRA PASS
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
DON LA FONT DITCH AT PIEDRA PASS (COMBINED)

Water Year 2012

Location.-- Don La Font Ditches 1 and 2 divert water from tributaries of Piedra River between headgates in NW¼ sec. 4, T.38 N., R.1 W., and SW¼ sec. 33, T.39 N., R.1 W., and Piedra pass, in San Juan River basin, to Red Mountain Creek in sec. 33, T.39 N., R.1 W., in Rio Grande basin.

Drainage Area and Period of Record.-- N/A;

Equipment.-- Combined record is from Don La Font Ditches 1 and 2 gages. See individual station analyses for gage equipment descriptions.

Hydrologic Conditions.-- This is a combined trans-mountain diversion and all flow is regulated. Don La Font Ditches 1 and 2 divert water from tributaries of Piedra River in San Juan River Basin (Division 7) to Red Mountain Creek in Rio Grande River Basin (Division 3).

Gage-Height Record.-- See individual station analyses.

Datum Corrections.-- See individual station analyses.

Rating.-- See individual station analyses.

Discharge.-- Daily discharges computed by summing and rounding individual station daily discharges.

Special Computations.-- A day is considered estimated if the estimated portion of a daily sum is greater than 10% of the daily sum.

Remarks.-- Record is good, except for periods of flow below 1 cfs should be considered fair to poor. Record developed by Div. 3 hydrographic staff.

Recommendations.--

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

DON LA FONT DITCH AT PIEDRA PASS (COMBINED)

RATING TABLE.--

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

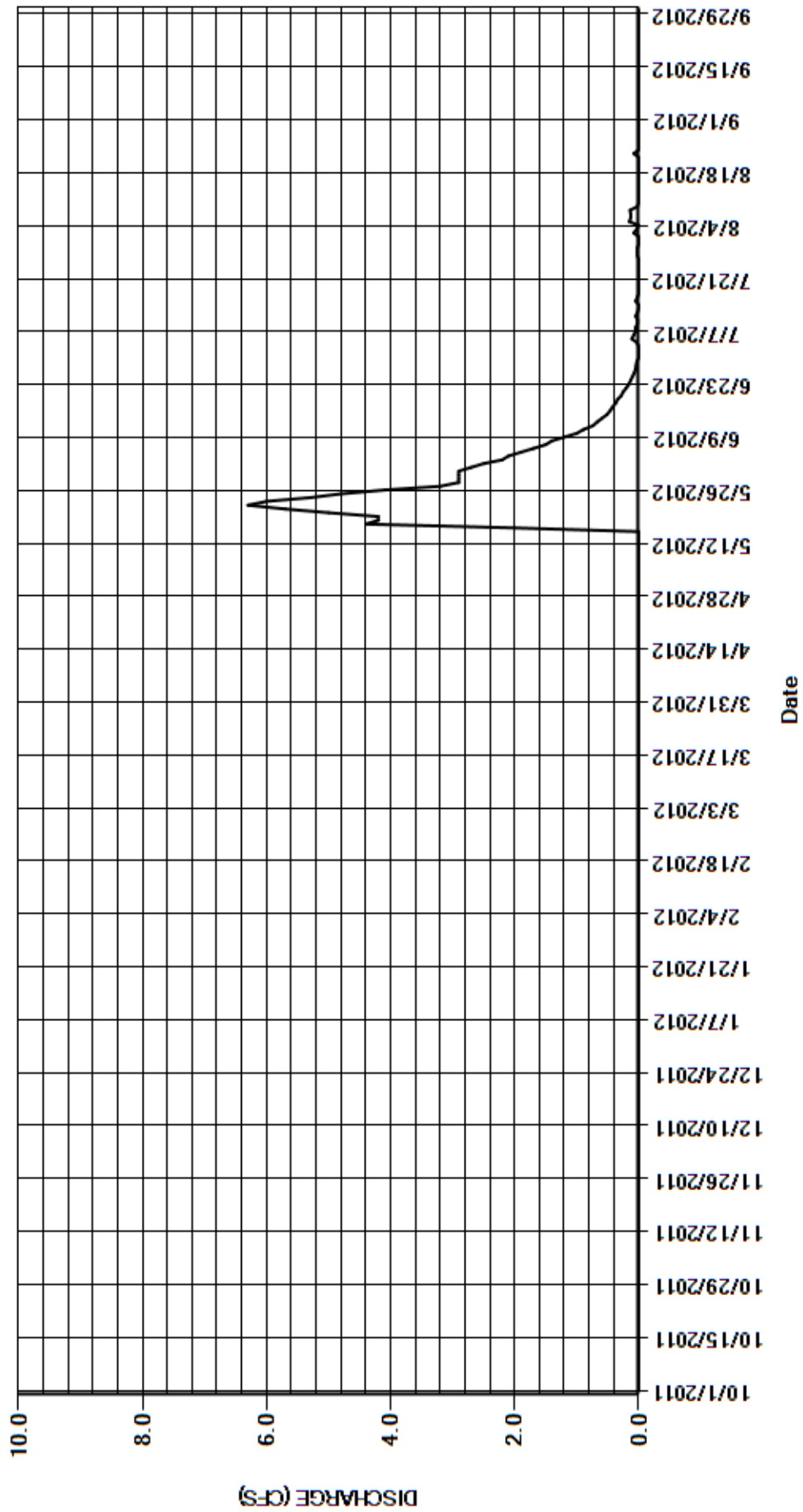
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.7	e0.00	e0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.5	e0.00	e0.08	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.2	e0.00	e0.03	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.1	e0.03	e0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.9	e0.11	e0.15	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.7	e0.08	e0.13	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.5	e0.05	e0.13	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.4	e0.05	e0.14	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.2	e0.02	e0.02	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.0	e0.02	e0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.89	e0.05	e0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.74	e0.02	e0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.67	e0.00	e0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.59	e0.00	e0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.51	e0.05	e0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.0	0.46	e0.02	e0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.4	0.42	e0.00	e0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.2	0.37	e0.00	e0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.2	0.34	e0.00	e0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.0	0.28	e0.00	e0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.7	0.25	e0.00	e0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.3	e0.20	e0.00	e0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.0	e0.16	e0.00	e0.08	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.3	e0.13	e0.00	e0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.8	e0.10	e0.00	e0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.1	e0.07	e0.00	e0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.2	0.05	e0.02	e0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.9	0.04	e0.02	e0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.9	0.03	e0.02	e0.00	0.00
30	0.00	0.00	0.00	0.00	---	0.00	0.00	2.9	e0.00	e0.00	e0.00	0.00
31	0.00	---	0.00	0.00	---	0.00	---	2.9	---	e0.00	0.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	66.80	24.50	0.56	0.76	0.00
MEAN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.15	0.82	0.018	0.025	0.000
AC-FT	0	0	0	0	0	0	0	132	49	1.1	1.5	0
MAX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.3	2.7	0.11	0.15	0.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	149.02	MEAN	0.41	MAX	8.3	MIN	0.00	AC-FT	296
WTR YR	2012	TOTAL	92.62	MEAN	0.25	MAX	6.3	MIN	0.00	AC-FT	184

MAX DISCH:
 MAX GH:

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

**DONLAFONT DITCH AT PIEDRA PASS (COMBINED)
WY2012 HYDROGRAPH**



RIO GRANDE RIVER BASIN
09348000 WILLIAM'S CREEK-SQUAW PASS DITCH AT SQUAW PASS
Water Year 2012

Location.-- Lat 37°36'0", long 107°13'4" referenced to North American Datum of 1983 (Cimarrona Peak, CO quad, scale 1:24,000), UTM Zone 13 304215 E and 4163748 N, in NE ¼ SE ¼ sec. 20, T.39 N., R.3 W., New Mexico Principal Meridian, Hinsdale County, CO, Hydrologic Unit 14080102, on right bank William's Creek-Squaw Pass ditch diverts water from William's Creek (tributary to Piedra River) in sec. 21, T.39 N., R.3 W., in San Juan River basin, to Squaw Creek in sec. 21, T.39 N., R.3 W., in Rio Grande basin.

Drainage Area and Period of Record.-- Drainage area not determined; 1948 to present.

Equipment.-- Data collection platform (Sutron 8200) with satellite telemetry and float-operated Shaft Encoder in a wood shelter with metal pipe stilling well. Data collection platform was upgraded on Sep. 6, 2012 to a Satlink 2 and SDR shaft encoder. One intake pipe attaches well to 2 foot Parshall flume. The primary reference gage is the staff gage in flume.

Hydrologic Conditions.-- This is a trans-mountain diversion gage and all flow is regulated.

Gage-Height Record.-- Primary record is 15-minute transmitted data with DCP log as backup. Record is complete and reliable from May 6, 2012 when diversion started to Sep. 16, 2012 when station was shut down for the season except for Sep. 6, 7, 2012 when equipment was being upgraded and Jul. 22-26, Jul. 30 - Sep. 16, 2012 when the well was isolated all or part of each day. There were two instrument corrections. A -0.04 ft instrument correction was made on Jun. 6, 2012, and was prorated from May 6, 2012, when station was opened. A +0.03 ft instrument correction was made on Sep. 6, 2012 when the well was isolated from the primary reference, so an offsetting -0.03 ft correction was distributed forward until the diversion was closed for the season. Well isolates from flume at gage-height of 0.03 ft.

Datum Corrections.-- No datum corrections since levels have not been run on this flume. The flume is in fair condition and the depths recorded on this year's measurement indicate that it is fairly level laterally.

Rating.-- Rating WCSDITCO02, which is not a standard Parshall Flume rating, was used all year. This rating is based on historic measurements taking into account the inherent excessive approach velocities and conditions. Minor shifting is caused by changes in approach conditions above flume and deposition. One discharge measurement (No. 33) was made this year, with a discharge of 3.75 cfs and a shift of +0.01 feet. The peak flow of 9.94 cfs occurred at 1600 on May 22, 2012 at a gage height of 0.93 feet with a shift of +0.01 ft. The peak gage height of 1.39 ft occurred on May 21, 2012 and it was assumed that it was caused by debris caught in the flume for a short period of time. The gage-height for the peak discharge exceeded measurement No. 33, made Jun. 6, 2012, by 0.43 feet in stage.

Discharge.-- Shifting control method was used during all periods of record. One 15-minute value was corrected with a -0.52 ft shift on May 21 when debris caught in the flume. For all other record a +0.01 ft shift, as determined by measurement 33 was used. There was no flow from Oct. 1, 2011 to May. 5, 2012, July 24, 25, Aug. 1-4, 11-22, 25-28, 30, 31, Sept. 1-10, 17-30, 2012.

Special Computations.--

Remarks.-- Record is good, except for periods of missing and unreliable gage-height, and periods when flow is less than 0.5 cfs, which are poor. The peak should also be considered fair. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.--

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09348000 WILLIAM'S CREEK-SQUAW PASS DITCH AT SQUAW PASS

RATING TABLE-- WCSGITCO02 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

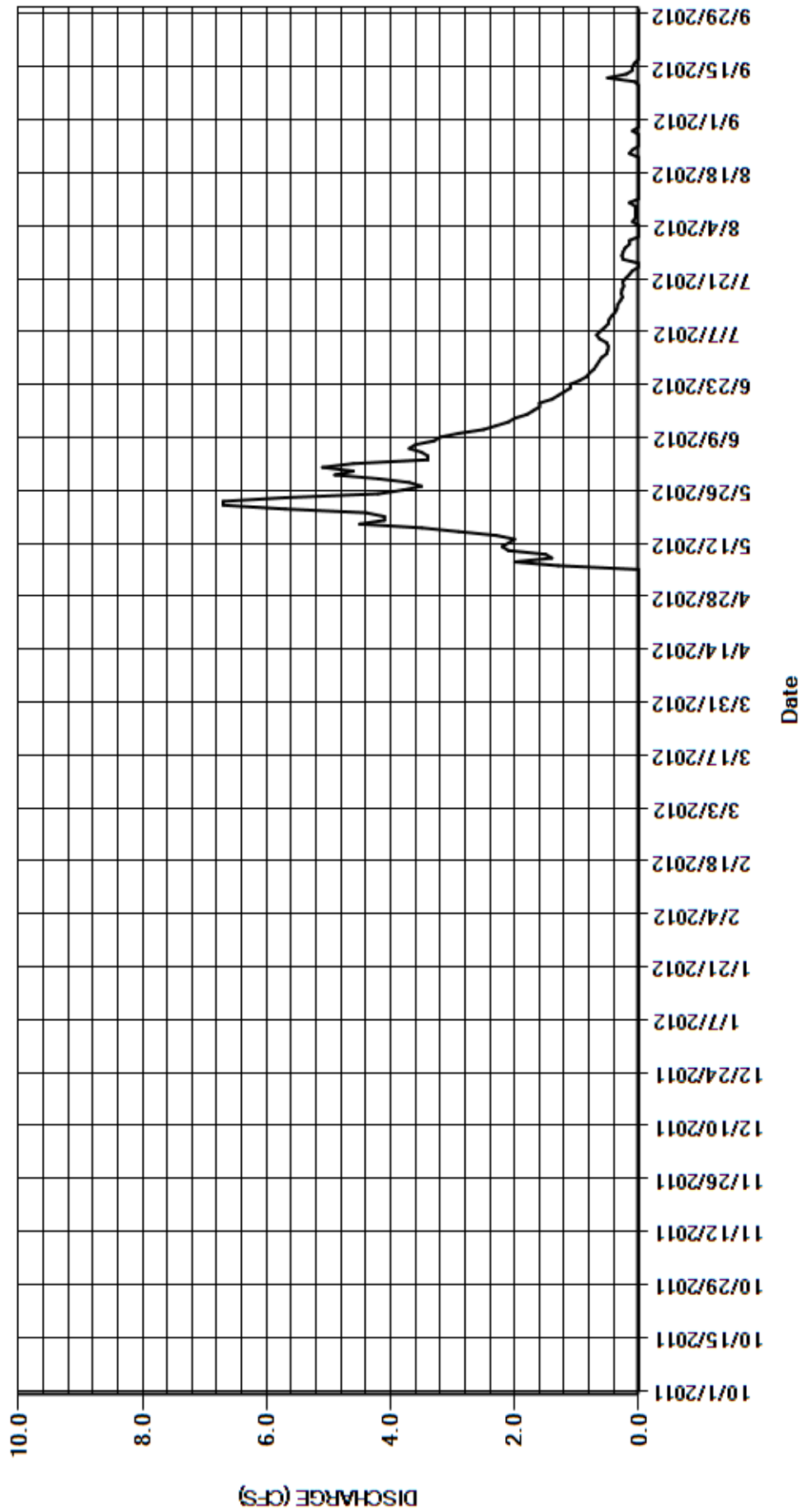
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.1	0.52	e0.00	e0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.6	0.50	e0.00	e0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.4	0.49	e0.00	e0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.4	0.52	e0.00	e0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5	0.63	e0.10	e0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	e1.3	3.7	0.68	e0.05	e0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.0	3.6	0.62	e0.05	e0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.4	3.3	0.55	e0.05	e0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.5	3.2	0.49	e0.05	e0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.1	2.9	0.48	e0.15	e0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.2	2.5	0.44	e0.00	e0.06
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.1	2.3	0.38	e0.00	e0.50
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.0	2.1	0.35	e0.00	e0.20
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.3	2.0	0.34	e0.00	e0.10
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.9	1.8	0.30	e0.00	e0.10
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5	1.7	0.26	e0.00	e0.06
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.5	1.6	0.28	e0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.1	1.6	0.27	e0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.1	1.4	0.24	e0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.4	1.3	0.26	e0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.7	1.2	0.21	e0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.7	1.1	e0.15	e0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.7	1.1	e0.10	e0.15	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.7	0.95	e0.00	e0.10	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.2	0.84	e0.00	e0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.8	0.79	e0.25	e0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.5	0.72	0.27	e0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.7	0.68	0.25	e0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.2	0.64	0.22	e0.10	0.00
30	0.00	0.00	0.00	0.00	---	0.00	0.00	4.9	0.60	e0.15	e0.00	0.00
31	0.00	---	0.00	0.00	---	0.00	---	4.6	---	e0.15	e0.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	94.10	63.62	10.35	0.80	1.02
MEAN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.04	2.12	0.33	0.026	0.034
AC-FT	0	0	0	0	0	0	0	187	126	21	1.6	2.0
MAX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.7	5.1	0.68	0.15	0.50
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60	0.00	0.00	0.00

CAL YR	2011	TOTAL	198.97	MEAN	0.55	MAX	8.0	MIN	0.00	AC-FT	395
WTR YR	2012	TOTAL	169.89	MEAN	0.46	MAX	6.7	MIN	0.00	AC-FT	337

MAX DISCH: 9.94 CFS AT 16:00 ON MAY 22,2012 GH 0.93 FT SHIFT 0.01 FT
 MAX GH: 1.39 FT AT 17:30 ON MAY 21,2012 (debris caught in flume)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09348000 WILLIAM'S CREEK-SQUAWPASS DITCH AT SQUAWPASS
WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
09351000 PINE RIVER WEMINUCHE PASS DITCH AT WEMINUCHE PASS
Water Year 2012

Location.-- Lat 37°40'43", long 107°19'4" referenced to North American Datum of 1983 (Weminuche Pass, CO quad, scale 1:24,000), UTM Zone 13 295602 E and 4172671 N, in NW ¼ SW ¼ sec. 33, T.40 N., R.4 W., New Mexico Principal Meridian, Hinsdale County, CO, Hydrologic Unit 14080101, on right bank Pine River-Weminuche Pass ditch diverts water from right bank of north fork of Los Pinos River in sec. 4, T.39 N., R.4 W., in San Juan River basin, to Weminuche Creek in sec. 33, T.40 N., R.4 W., in Rio Grande basin.

Drainage Area and Period of Record.-- Drainage area not determined. ; Water year 1948 to present.

Equipment.-- Data collection platform (Sutron Satlink2) and float-operated SDR in a wood shelter with stilling well. One intake pipe attaches well to 3 foot Parshall flume. Primary reference gage is staff gage in flume.

Hydrologic Conditions.-- This is a trans-mountain diversion and all flow is regulated.

Gage-Height Record.-- Primary record is 15-minute transmitted data with DCP and SDR logs as backup. Record is complete and reliable May 16 through May 30, 2012. The diversion was turned off on May 30, 2012 due to being out of priority. During 'no-flow' periods, the gage-height did not drop below 0.08 feet. It was assumed that a deposit of silt in the well prevented the shaft encoder float from dropping below that gage-height. There was no flow from Oct. 1, 2011 to May 15, 2012, and May 31 through Sep. 30, 2012.

Datum Corrections.-- No datum corrections since levels have not been run on this flume. The flume is in good condition, but is susceptible to submergence due to sediment deposition in ditch below flume.

Rating.-- Rating PRWDITCO04, a standard 3 foot Parshall flume rating, was used all year. Changes in approach conditions above flume and deposition below flume cause shifting. One discharge measurement (No. 59) of 9.29 cfs was made this year. The peak flow of 10.5 cfs occurred at 07:00 on May 23, 2012 at a gage height of 0.91 feet with a shift of 0.01 feet. The peak flow exceeded high Measurement No. 59 (GH = 0.84 ft) by 0.07 ft in stage.

Discharge.-- One discharge measurement made this year showed a shift of 0.01 feet .The measured 0.01 ft shift was distributed through this year's period of record.

Special Computations.--

Remarks.-- Record is good, except for periods of going into and out of flow which should be considered fair. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.-- More measurements throughout the flow range would improve the accuracy of this record.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09351000 PINE RIVER WEMINUCHE PASS DITCH AT WEMINUCHE PASS

RATING TABLE-- PRWDITCO04 USED FROM 01-OCT-2011 TO 30-MAY-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

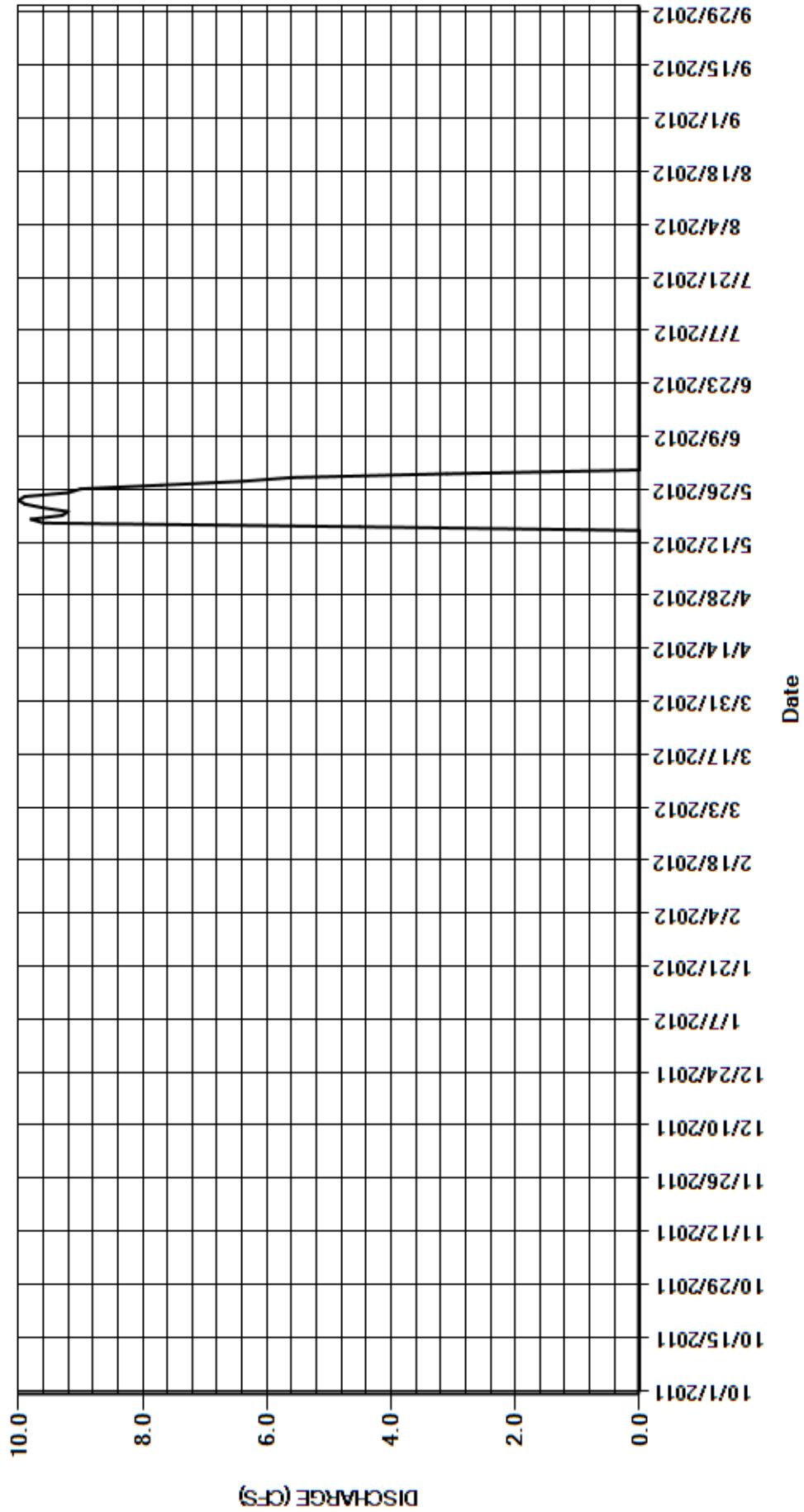
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.5	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.6	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.8	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.3	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.2	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.6	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.9	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.9	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.2	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.0	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.7	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.4	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.6	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	---	0.00	0.00	3.1	0.00	0.00	0.00	0.00
31	0.00	---	0.00	0.00	---	0.00	---	0.00	---	0.00	0.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	122.80	0.00	0.00	0.00	0.00
MEAN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.96	0.000	0.000	0.000	0.000
AC-FT	0	0	0	0	0	0	0	244	0	0	0	0
MAX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10	0.00	0.00	0.00	0.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	154.61	MEAN	0.42	MAX	9.1	MIN	0.00	AC-FT	307
WTR YR	2012	TOTAL	122.80	MEAN	0.34	MAX	10	MIN	0.00	AC-FT	244

MAX DISCH: 10.5 CFS AT 07:00 ON MAY 23,2012 GH 0.91 FT SHIFT 0.01 FT
 MAX GH: 0.91 FT AT 07:00 ON MAY 23,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09351000 PINE RIVER WEMINUCHE PASS DITCH AT WEMINUCHE PASS
 WY2012 HYDROGRAPH



RIO GRANDE RIVER BASIN
09351500 WEMINUICHE PASS DITCH AT WEMINUICHE PASS
Water Year 2012

Location.-- Lat 37°40'45", long 107°19'18" referenced to North American Datum of 1983 (Weminuche Pass, CO quad, scale 1:24,000), UTM Zone 13 295260 E and 4172755 N, in NW ¼ SW ¼ sec. 33, T.40 N., R.4 W., New Mexico Principal Meridian, Hinsdale County, CO, Hydrologic Unit 14080101, on left bank Weminuche Pass ditch diverts water from left bank of Los Pinos River in sec. 5, T.39 N., R.4 W., in San Juan River basin, to Weminuche Creek in sec. 28, T.40 N., R.4 W., in Rio Grande basin.

Drainage Area and Period of Record.-- Drainage area not determined.; 1948 to present.

Equipment.-- Data collection platform and float-operated Sutron SDR in a CMP shelter and stilling well. One intake pipe attaches well to 5 foot Parshall flume. The only reference gage is a staff gage in Parshall flume. All equipment is owned and maintained by Colorado Division of Parks and Wildlife (CPW).

Hydrologic Conditions.-- This is a trans-mountain diversion and all flow is regulated.

Gage-Height Record.-- The DCP was not used this year to transmit data. Primary record is 15-minute logged SDR data with no backup. Record is complete and reliable from May 9 - 23, 2012. The diversion was turned on May 9, 2012 and off May 23, 2012. There were no corrections to the SDR.

Datum Corrections.-- No datum corrections. Levels have not been run at this flume.

Rating.-- Rating STD05FTPF, a standard 5 foot Parshall flume rating, was used all year. Changes in approach conditions above flume cause minor shifting. There were no discharge measurements this year. Since 1997, eight measurements have been made and the shifts varied from -0.03 to -0.01 feet. The peak flow of 12.9 cfs occurred at 0245 on May 23, 2012 at a gage height of 0.79 feet with a shift of -0.03 feet.

Discharge.-- Shifting control method was used during all periods of record. The last measured shift (-0.03 feet) was distributed through all record. There was no flow from Oct. 1, 2011 to May 8, 2012 and from May 24 to Sep. 30, 2012.

Special Computations.-- In order for correct daily discharge values to be calculated on days that record started and stopped, 15-minute gage heights of 0 feet were added before and after the actual start and stop times to the primary stage import file.

Remarks.-- Record is fair due to no visits by DWR hydrographic staff. Station maintained and record developed by Div 3 hydrographic staff.

Recommendations.-- More discharge measurements would improve record quality.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09351500 WEMINUCHE PASS DITCH AT WEMINUCHE PASS

RATING TABLE-- STD05FTPF USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

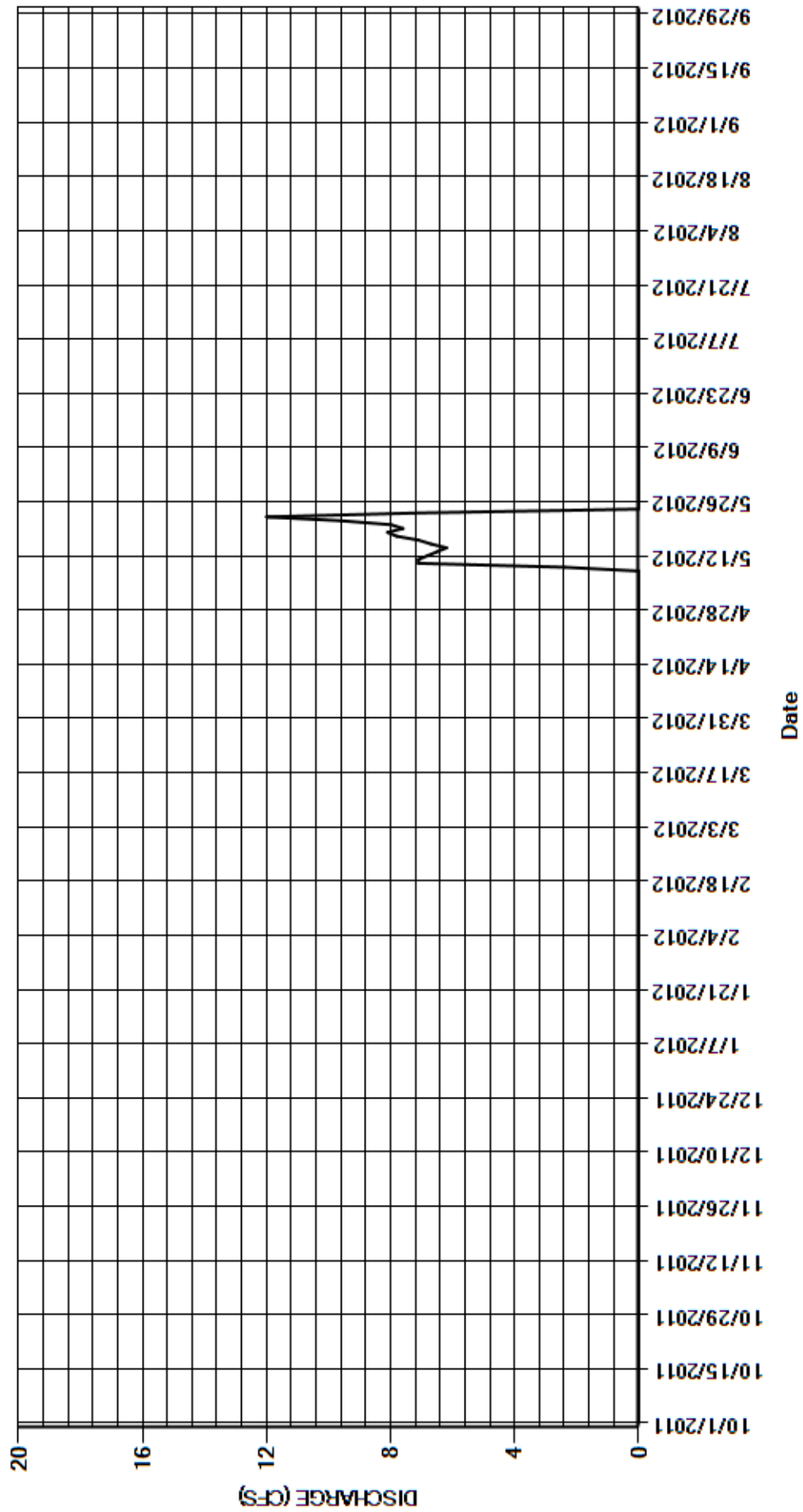
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.4	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.1	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.1	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.8	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.5	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.2	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.7	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.1	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.8	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.1	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.6	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.0	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.6	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.2	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	---	0.00	0.00	---	0.00	---	0.00	---	0.00	0.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	110.20	0.00	0.00	0.00	0.00
MEAN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.55	0.000	0.000	0.000	0.000
AC-FT	0	0	0	0	0	0	0	219	0	0	0	0
MAX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12	0.00	0.00	0.00	0.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	115.45	MEAN	0.32	MAX	38	MIN	0.00	AC-FT	229
WTR YR	2012	TOTAL	110.20	MEAN	0.30	MAX	12	MIN	0.00	AC-FT	219

MAX DISCH: 12.9 CFS AT 02:45 ON MAY 23,2012 GH 0.79 FT SHIFT -0.03 FT
 MAX GH: 0.79 FT AT 02:45 ON MAY 23,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09351500 WEMINUCHE PASS DITCH AT WEMINUCHE PASS
 WY2012 HYDROGRAPH



GUNNISON RIVER BASIN
09131490 MUDDY CREEK ABOVE PAONIA RESERVOIR
Water Year 2012

Location.-- Lat. 38°59'15", Long. 107°20'52.8", in the NE¼SW¼NW¼ sec 28, T.12 S., R.89 W. Sixth Principal Meridian, in Gunnison County, Hydrologic Unit 14020004, on the right bank 750 ft. downstream from county bridge and 1,400 ft. upstream from high water line of Paonia Reservoir. (296554 Easting, 4314310 Northing)

Drainage Area and Period of Record.-- 238 square miles. (USGS Stream Stats). ; Published by the Colorado Division of Water Resources, Office of the State Engineer since 1991.

Equipment.-- A Sutron Satlink 2 High Data Rate DCP along with a Sutron Stage Discharge Recorder (SDR) and a Sutron Constant Flow Bubbler (CFB). The SDR and CFB store data and are used for backup purposes. The primary reference gage is a steel drop tape. The station is also equipped with an air temperature sensor. There were no changes this year.

Hydrologic Conditions.-- The basin is composed of conifer and aspen forest to open sagebrush hillsides. There is about 3,000 acres under irrigation diversion and return flows for mountain grass hay up stream. A very large land slide continues to encroach from the east about four miles upstream. This process is more active in the spring and during high ground water conditions.

Gage-Height Record.-- The primary record is the 15-minute satellite data with SDR download data as backup. The record is complete and reliable, except for periods when ice affected the stage-discharge relationship: Nov 27-29; Dec 1, 2, 5-12, 16-31, 2011; Jan 1-31; Feb 1, 2, 4-8, 10, 17-21, 24-27; and Mar 3, 2012. There were two primary sensor calibration corrections and four flush corrections this year. The SDR was corrected on Mar 15 and, Apr 17, 2012. These were both 0.02 ft. The flush corrections were made on Mar 21, Apr 17, May 9 and Aug 1, 2012. These ranged from -0.03 to 0.05 ft.

Datum Corrections.-- Levels were not run this year. Levels were last run to the adjustable RP, located inside the gage shelter, on August 28, 2007, using the RP as the base.

Rating.-- The stream bed is composed of medium to large sized cobble. During spring runoff the channel is fairly stable at the gage. There is an encroaching shelf of cobble moving downstream from above. The left bank is flat at the gage and then pinches into a steep cliff about 50 feet downstream. The right bank is flat brush and mixed conifer. The channel will overtop the right bank at high water. When this happens, water has been up to a foot deep around the gage house. During low flows in the range of 10 to 20 cfs an irregular medium cobble riffle is a section control about 10 to 20 feet below the gage. During medium flows the channel is the control. During high flows the channel is the control with some influence by the brush on the right side and the constriction of the cliff on the left side. During extremely high flows, the brush on the right, the cliff on the left and a large boulder on the left have a greater influence on the stage-discharge relationship. Heavy sediments are deposited in the gage pool when the velocities drop. The slope of the channel doesn't allow the sediment to completely bury the cobble, but it does significantly smooth the stream bed. Rating MUDAPRC08B was used the entire water year. There were 13 measurements (Nos. 397 – 409) made this year, ranging in discharge from 10.3 to 125 cfs. They cover the range in stage experienced, except the lower daily flows of Jan 5, 6, 16,17; Jul 1-5, 11-13, 18, 19; Sep 10, 21-23, 2012 and the higher daily flows of Mar 14-18, and Mar 23 - May 8, 2012. The instantaneous peak flow of 410 cfs occurred at 2030 on Mar 17, 2012 at a gage height of 6.66 ft. with a shift of +0.06 ft. It exceeded the stage of measurement No. 402 made Apr 29, 2012 by 0.73 ft.

Discharge.-- Shifting control method was used during the entire water year. Shifting is caused mainly by erosion and deposition of silt in gage pool above and on the control. Shifts were distributed by time with consideration given to changes in stage. Shifts were distributed by time from 0000 on Oct 1, 2011 to the end of the water year at 2345 hrs on Sep 30, 2012. All measurements were given full weight and applied directly except Nos. 401, and 406 which were discounted from -5.5% to 4.94% to smooth shift distribution. Measurement 398 and 399 were not used because the stage-discharge relationship was affected by ice.

Special Computations.-- Discharge during ice-affected periods were estimated using partial day record, adjacent good days, and temperatures data collected at this site. The ice period of Muddy Creek above Paonia Reservoir was compared to the calculated inflow and whenever the raw value was greater than the calculated value, that period was evaluated. A spreadsheet was used to calculate the inflow into Paonia Reservoir and was compared to the flows recorded at the gage. The flows were calculated using the change in storage for Paonia Reservoir minus the outflow released from the reservoir. The outflow released from the reservoir was recorded by the Muddy Creek below Paonia Reservoir (MUDBPRCO). The gage height trace was used as a hydrograph in these comparisons and evaluation. Two ice measurements , 398 and 399 were made during the ice affected period and the flow obtained was used to some degree.

Remarks.-- The record is rated good, except for the periods when the stage-discharge relationship was affected by ice, which was estimated and should be considered poor. Gage maintained and operated by Gerald M. Thrush, Stephen W. Tuck, Paul A. Schmucker and Luke M. Reschke. The record was developed by Gerald M. Thrush.

Recommendations.-- A bank operated cableway would produce much higher quality high water measurements than the bridge site.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09131490 MUDDY CREEK ABOVE PAONIA RESERVOIR

RATING TABLE.-- MUDAPRCO08B USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

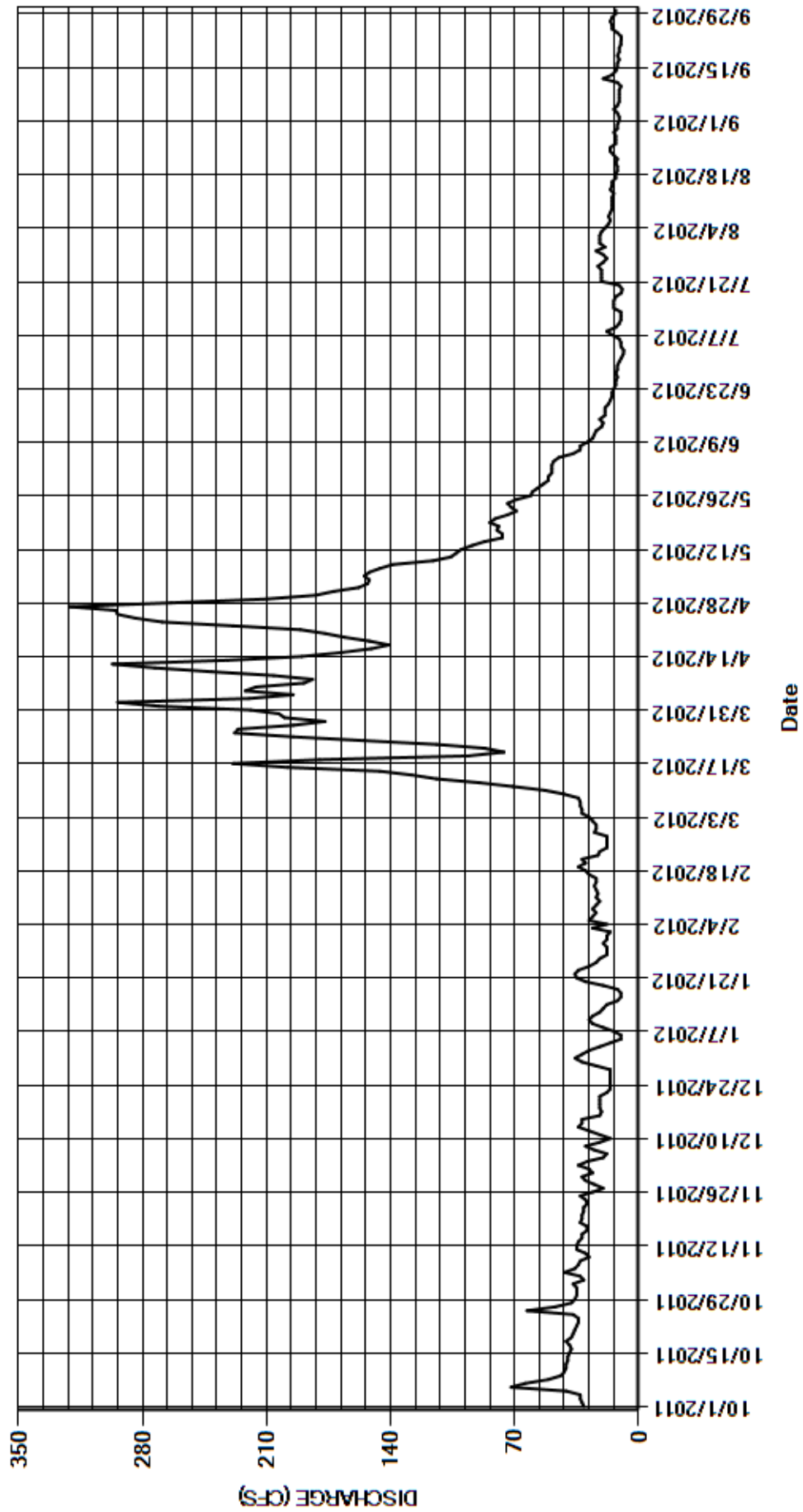
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	31	35	e26	e32	e18	24	271	172	49	9.8	22	11
2	32	37	e28	e28	e16	26	294	158	49	8.7	22	11
3	33	31	34	e22	26	e28	220	153	49	8.4	21	12
4	33	33	29	e16	e18	32	195	152	48	10	19	14
5	41	42	e20	e10	e28	32	222	155	45	10	17	12
6	72	36	e18	e10	e26	33	216	152	37	11	16	11
7	64	34	e25	e14	e24	33	189	146	33	15	17	11
8	51	33	e30	e20	e26	34	184	139	33	18	16	11
9	44	28	e22	e26	24	42	206	116	29	13	15	11
10	42	30	e16	e28	e22	53	241	106	26	11	15	10
11	41	35	e22	e26	24	71	273	103	25	10	15	12
12	41	35	e28	e22	23	90	297	100	24	10	15	20
13	40	34	34	e20	24	114	232	94	21	10	14	15
14	40	32	32	e18	25	128	190	87	20	14	16	13
15	39	32	32	e12	24	146	168	77	22	14	15	12
16	38	29	e22	e10	24	198	151	77	19	14	15	12
17	39	29	e21	e10	e28	229	141	80	19	13	13	11
18	41	33	e22	e12	e30	180	152	79	19	9.8	13	12
19	38	32	e22	e20	e34	96	166	84	17	9.3	12	11
20	37	32	e22	e30	e30	76	177	81	16	11	12	11
21	36	31	e22	e35	e32	87	191	74	15	21	13	10
22	35	31	e18	e36	23	114	229	69	15	21	12	10
23	34	29	e16	e34	22	155	269	72	14	21	14	9.9
24	34	30	e16	e28	e18	195	284	74	13	21	16	12
25	37	33	e16	e24	e18	228	294	69	13	23	16	15
26	63	26	e16	e22	e18	226	295	61	12	20	13	15
27	47	e20	e16	e18	e18	195	321	60	13	18	13	16
28	38	e25	e16	e18	25	177	264	57	12	20	13	15
29	36	e30	e24	e18	24	200	210	54	12	24	14	13
30	35	32	e32	e20	---	203	182	51	11	19	12	13
31	35	---	e36	e18	---	219	---	51	---	22	12	---
TOTAL	1267	949	733	657	692	3664	6724	3003	730	460.0	468	371.9
MEAN	40.9	31.6	23.6	21.2	23.9	118	224	96.9	24.3	14.8	15.1	12.4
AC-FT	2510	1880	1450	1300	1370	7270	13340	5960	1450	912	928	738
MAX	72	42	36	36	34	229	321	172	49	24	22	20
MIN	31	20	16	10	16	24	141	51	11	8.4	12	9.9

CAL YR	2011	TOTAL	68411.0	MEAN	187	MAX	1360	MIN	16	AC-FT	135700
WTR YR	2012	TOTAL	19718.9	MEAN	53.9	MAX	321	MIN	8.4	AC-FT	39110

MAX DISCH: 410 CFS AT 20:30 ON MAR 17,2012 GH 6.66 FT SHIFT 0.06 FT
 MAX GH: 6.66 FT AT 20:30 ON MAR 17,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09131490 MUDDY CREEK ABOVE PAONIA RESERVOIR
WY2012 HYDROGRAPH



GUNNISON RIVER BASIN
09131500 MUDDY CREEK BELOW PAONIA RESERVOIR
Water Year 2012

Location.-- Lat. 38°56'26", Long. 107°21'24" in the SE¼NW¼NE¼ sec. 8, T.13 S., R. 89 W. (in Gunnison County), Hydrologic Unit 14020004, on the right hand bank, about 100 feet above county bridge and about 1100 feet below Paonia Reservoir outlet.

Drainage Area and Period of Record.-- The drainage area is 257 square miles. ; Preliminary electronic data started on Sep 19, 1985. These data were telemetered to Denver. The first year that the record was published was Water Year 1992. It has been published continuously since that time.

Equipment.-- Graphic water-stage recorder and Stage Discharge Recorder on separate floats in a 42-inch CMP shelter and well. Satellite telemetry equipment is housed in a NEMA box attached to the outside of the CMP shelter. The primary reference gage is steel drop tape referenced to an adjustable reference point inside the gage house. The secondary reference gage is a bank-operated cantilever outside chain gage located just upstream of the station. No changes this water year.

Hydrologic Conditions.-- The control is a concrete ramp flume. Flows are completely controlled by Paonia Reservoir until the reservoir spills.

Gage-Height Record.-- The primary record is the 15-minute satellite data from the SDR with the DCP log, chart record and SDR log used for backup purposes. The record is complete and reliable, except when the stage-discharge relation was affected by ice build up on the control on Dec 6-8, 24-27 2011; Jan 1-3, 9-13, 2012. There was one stage discharge recorder correction, and one flush correction. The SDR instrument calibration correction was made as follows: +0.02 ft. at 0845 on Jan. 20, 2012. The control was cleaned this same day about 0915 with a correction of -0.02 ft which was distributed as a flush correction.

Datum Corrections.-- No levels were run this water year. Levels were last run on August 28, 2007.

Rating.-- During higher flows approaching 800 cfs the banks neck down and the county road bridge piers act as a compound control. The rating table MUDBPRCO09A in use since Oct. 1, 2005, was used for all of water year 2012. Fourteen discharge measurements were made during water year 2012 (Nos. 376 to No. 389). Measurements ranged from 3.31 cfs to 184 cfs. They cover the range in stage except for lower daily flows on Nov 12; Dec 7, 12, 13, and 31, 2011; Jan 1, 2, 9-12, 21-24; Feb 6, 9, 18-21; and Mar 4, 6-8, 2012 and the higher daily flows on: Mar 17-19, 23-30; Jul 13-19, 23-27; and Aug 3, 2012. The peak discharge of 510 cfs occurred at 0845 on Apr 28, 2012 at gage height of 5.42 ft with a shift of +0.06 ft. It exceeded high measurement No. 387 made on Aug 1, 2012 by 0.84 ft in stage.

Discharge.-- Shifting section control method was used. Shifts were distributed by time from 0000 on Oct 1, 2011 to 2345 on Sep 30, 2012. Open water measurements showed shifts ranging from +0.01 to +0.08 ft. All measurements were given full weight and applied directly except measurements 379, 381, 382 and 386 which were discounted from -3% and 5% to smooth shift distribution. The shift for measurements 377 (ice) and 378 (meter connection problem) were not used.

Special Computations.-- The ice days were estimated from adjacent good days assuming that the gate settings remained constant and air temperature data from the sensor at Muddy Creek above Paonia Reservoir. The stage hydrograph was used to evaluate trends.

Remarks.-- The record is good, except the period when ice on the control affected the stage discharge relationship. Record when ice affected the stage discharge relationship should be considered poor. The peak instantaneous flow should be considered good. Gage operated by Stephen Tuck, Paul A. Schmucker and Jerry Thrush. Record developed by Jerry Thrush.

Recommendations.-- Levels should be run.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09131500 MUDDY CREEK BELOW PAONIA RESERVOIR

RATING TABLE.-- MUDBPRCO09A USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

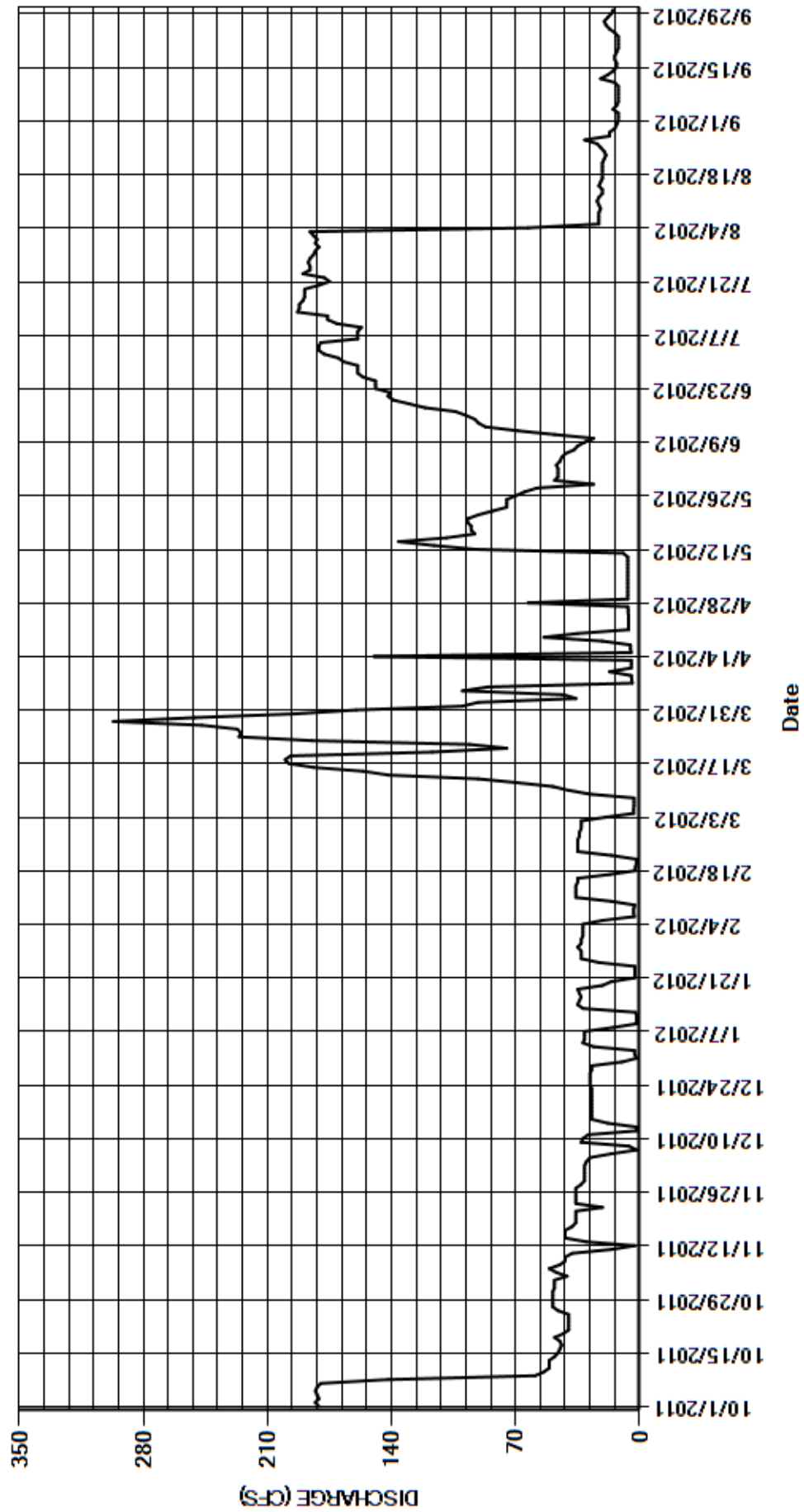
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	181	48	31	e2.8	32	33	100	6.7	46	170	182	12
2	183	48	31	e2.8	32	33	91	6.7	46	178	184	12
3	181	48	31	e26	32	19	36	6.7	47	181	186	12
4	182	41	30	32	32	3.3	43	6.7	45	181	63	15
5	183	47	28	31	21	3.4	100	6.7	44	180	23	13
6	182	51	e16	31	3.1	3.2	86	6.7	42	159	23	12
7	180	45	e1.7	31	3.4	3.2	4.2	6.7	37	159	23	12
8	142	42	e6.0	15	3.4	3.2	4.5	6.7	35	159	23	12
9	59	42	33	e1.7	2.7	28	4.7	6.7	31	157	22	12
10	54	38	32	e1.7	16	40	17	6.7	26	171	23	12
11	51	16	29	e1.7	36	49	4.7	9.3	48	176	24	14
12	51	2.7	1.7	e2.3	36	69	4.7	93	69	176	23	22
13	51	30	1.7	32	36	91	4.7	116	87	193	21	18
14	48	42	18	35	36	142	150	136	91	192	21	15
15	46	42	27	34	35	156	4.8	109	93	192	23	13
16	45	42	27	33	35	184	5.2	93	98	190	22	13
17	44	38	27	34	17	198	5.2	95	104	189	21	14
18	45	36	27	35	2.5	200	21	95	121	189	21	14
19	48	36	27	21	2.3	197	54	97	130	189	21	13
20	43	36	27	16	1.9	117	35	97	139	181	21	12
21	40	36	27	2.7	1.7	75	6.2	91	142	175	21	12
22	40	21	27	2.7	16	96	6.2	83	141	178	20	12
23	40	36	27	2.7	35	185	6.2	75	149	190	19	12
24	40	36	e28	2.7	35	226	6.3	75	149	186	20	14
25	40	36	e28	23	35	225	6.4	75	149	186	22	17
26	46	36	e28	33	35	227	6.5	70	156	187	24	19
27	49	36	e28	33	34	247	6.7	65	159	186	31	20
28	49	33	27	33	34	297	63	58	159	184	17	18
29	49	31	27	35	33	251	6.7	26	159	183	17	16
30	49	31	10	33	---	194	6.7	48	167	181	14	15
31	49	---	1.7	33	---	160	---	46	---	183	13	---
TOTAL	2490	1102.7	710.8	652.8	674.0	3755.3	896.6	1719.3	2909	5581	1188	427
MEAN	80.3	36.8	22.9	21.1	23.2	121	29.9	55.5	97.0	180	38.3	14.2
AC-FT	4940	2190	1410	1290	1340	7450	1780	3410	5770	11070	2360	847
MAX	183	51	33	35	36	297	150	136	167	193	186	22
MIN	40	2.7	1.7	1.7	1.7	3.2	4.2	6.7	26	157	13	12

CAL YR	2011	TOTAL	76027.5	MEAN	208	MAX	1040	MIN	1.7	AC-FT	150800
WTR YR	2012	TOTAL	22106.5	MEAN	60.4	MAX	297	MIN	1.7	AC-FT	43850

MAX DISCH: 510 CFS AT 08:45 ON APR 28,2012 GH 5.42 FT SHIFT 0.06 FT
 MAX GH: 5.42 FT AT 08:45 ON APR 28,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09131500 MUDDY CREEK BELOW PAONIA RESERVOIR
WY2012 HYDROGRAPH



GUNNISON RIVER BASIN

ABC LATERAL

Water Year 2012

Location.-- Lat. 38°29'06", Long. 107°44'59", in NE¼NE¼ sec. 27, T.49 N., R.8 W., Montrose County, on left bank of canal 270 ft. below takeout from South Canal, such takeout being 1700 ft. below the west portal of the Gunnison Tunnel.

Drainage Area and Period of Record.-- N/A. ; Published by the Colorado Division of Water Resources, Office of the State Engineer from October of 1990 to the present.

Equipment.-- Sutron Satlink 2 HDR data collection platform with Stage Discharge Recorder (SDR) in a 36 in. diameter CMP shelter and a 24 in CMP stilling well. The SDR operates from a float and is set to an inside drop tape referenced to an adjustable RP on the instrument shelf. The control is a broad crested concrete structure about 12 feet below the gage. A wooden bridge at the gage is used to make flow measurements. An air temperature sensor was installed on Jul. 11, 2012. No other changes this water year.

Hydrologic Conditions.-- The AB and C Drop aka the AB Lateral Canal combined with the South Canal account for the total diversion through the Gunnison Tunnel. Generally there is very little ice effect due to the warm properties of the water. At times snow will blow onto the control and this probably has some effect, but this is barely distinguishable on the GH trace and has been ignored. The AB Lateral is a man made structure and 100% controlled. The control is a concrete broad crested weir. Two gates are set below the control. One gate dumps into Cedar Creek; the other controls the AB Lateral through a concrete flume. At times these gates can cause the control to become 100% submerged.

Gage-Height Record.-- The primary record is 15-minute satellite data with SDR log and DCP log as backup. The record is complete and reliable. The gage was visited on 12 separate occasions to verify the instrument remained calibrated to the primary reference. The SDR was adjusted 3 times (Oct. 29, 2011 and twice on Aug. 06, 2012). The corrections ranged from -0.01 to 0.01 ft. SDR corrections were distributed by time between visits and measurements where appropriate. Moss was removed from the control on Mar. 06, 2012. The corrections were distributed by time through the record within the GH Correction function using the Instrument Calibration and Flush Correction types.

Datum Corrections.-- Levels were last run on Aug. 15, 2006 using bench mark No. 1 (BM#1) as the base. No corrections were made as the RP and drop tape were found to be within the allowable tolerances.

Rating.-- The canal is concrete lined above and below the control section. The left side is a smooth trapezoidal shape. The right side is a smooth trapezoidal shape with a square step at the bottom. The concrete has been repaired in places and this has broken off in places. The control is a broad crested concrete structure about 12 ft. below the intake. Rating ABCLATCO02 in use since Nov. 1, 2008, was used for the entire Water Year. The rating is well defined to 230 cfs. Ten discharge measurements (Nos. 330-339) were made this year ranging in discharge from 0.00 cfs to 117 cfs. These measurements cover the range in stage experienced except higher daily flows seen on Oct. 1-20, 2011. The peak instantaneous flow of 130 cfs occurred at 0200 on Oct. 01, 2011 at a gage height of 3.11 ft. with a shift of +0.07 ft. It exceeded Measurement No. 330, made Oct. 20, 2011 by 0.10 ft. in stage.

Discharge.-- Shifting control method was used during all periods of record. Shifts were distributed by stage from 0000 Oct. 1, 2011 to 1030 May 17, 2012 using two variable stage-shift relationships: ABCLATCO12vs1a was applied from 00:00 on Oct. 01, 2011 to 14:15 on Nov. 03, 2011; and, ABCLATCOvs12b was applied from 14:30 on Nov. 03, 2011 to 10:30 on May 17, 2012. During the remainder of the water year shifts were distributed by time as defined by measurements. Measurements showed shifts varying between -0.08 and +0.07 feet. All were given full weight and applied directly.

Special Computations.-- There were no special computations needed or employed.

Remarks.-- The record is good, except for periods when the flow was reduced during the winter which should be rated fair. The period of fair record is Nov. 02, 2011 through Mar. 20, 2012. The peak instantaneous flow should be considered good. Station maintained and record developed by Gerald M. Thrush.

Recommendations.-- A flush riser needs to be installed.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

ABC LATERAL

RATING TABLE-- ABCLATCO02 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

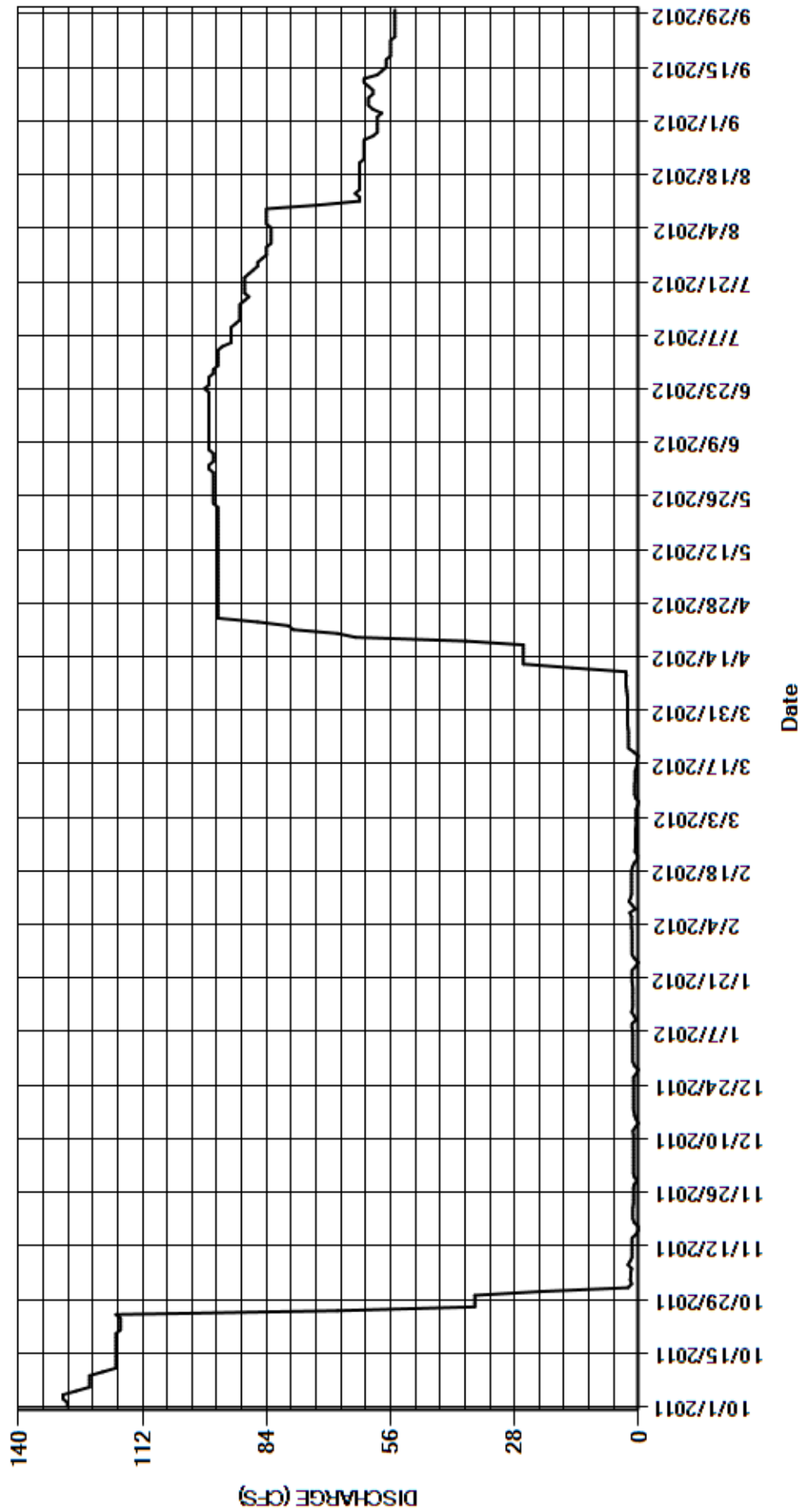
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	129	2.4	1.2	1.3	1.5	0.55	2.5	95	96	95	83	59
2	129	1.6	1.2	1.3	1.5	0.60	2.5	95	97	95	83	59
3	130	1.9	1.2	1.3	1.6	0.60	2.5	95	97	95	83	58
4	130	1.8	1.2	1.3	1.6	0.60	2.6	95	96	94	83	60
5	127	1.8	1.2	1.3	1.6	0.60	2.7	95	96	92	84	61
6	124	1.6	1.2	1.3	1.6	0.21	2.8	95	96	92	84	61
7	124	2.4	1.2	1.4	2.0	0.00	2.9	95	97	92	84	61
8	124	1.9	1.2	1.5	0.76	0.70	2.9	95	97	92	84	60
9	124	1.5	1.2	1.5	1.5	0.92	2.8	95	97	92	84	60
10	121	1.5	1.2	0.65	2.2	0.92	2.9	95	97	91	72	61
11	118	1.5	1.2	1.0	1.8	0.92	15	95	97	90	63	62
12	118	1.5	1.3	1.6	1.6	0.87	26	95	97	90	63	62
13	118	1.5	0.75	1.4	1.6	0.81	26	95	97	90	64	59
14	118	1.5	0.06	1.3	1.6	0.81	26	95	97	90	63	58
15	118	0.56	0.59	1.3	1.6	0.81	26	95	97	90	63	57
16	118	0.10	0.92	1.4	1.6	0.51	26	95	97	89	63	57
17	118	0.12	1.1	1.3	1.6	0.34	26	95	97	88	63	57
18	118	0.99	1.2	1.3	1.6	0.34	39	95	97	89	63	56
19	118	1.3	1.2	1.4	1.4	0.14	64	95	97	89	63	56
20	118	1.3	1.2	1.5	1.0	1.1	68	95	97	89	63	56
21	117	1.3	1.2	1.5	0.33	2.3	78	95	97	89	63	56
22	117	1.3	1.2	1.5	0.28	2.3	79	95	97	89	62	56
23	117	1.2	1.2	1.5	0.84	2.3	86	95	98	88	62	55
24	117	1.2	1.2	0.66	0.75	2.3	95	96	97	87	62	55
25	118	1.2	1.2	0.10	0.70	2.3	95	96	97	86	62	55
26	68	1.2	1.2	0.90	0.70	2.4	95	96	97	86	62	55
27	37	1.2	0.51	1.5	0.70	2.5	95	96	96	85	62	55
28	37	1.0	0.07	1.5	0.70	2.5	95	96	96	84	60	55
29	37	0.36	0.94	1.5	0.70	2.5	95	96	95	84	59	55
30	37	1.0	1.3	1.5	---	2.5	95	96	95	84	59	55
31	22	---	1.3	1.5	---	2.5	---	96	---	83	59	---
TOTAL	3266	39.73	32.84	40.01	36.96	38.75	1277.1	2953	2901	2769	2127	1732
MEAN	105	1.32	1.06	1.29	1.27	1.25	42.6	95.3	96.7	89.3	68.6	57.7
AC-FT	6480	79	65	79	73	77	2530	5860	5750	5490	4220	3440
MAX	130	2.4	1.3	1.6	2.2	2.5	95	96	98	95	84	62
MIN	22	0.10	0.06	0.10	0.28	0.00	2.5	95	95	83	59	55

CAL YR	2011	TOTAL	20947.90	MEAN	57.4	MAX	138	MIN	0.06	AC-FT	41550
WTR YR	2012	TOTAL	17213.39	MEAN	47.0	MAX	130	MIN	0.00	AC-FT	34140

MAX DISCH: 130 CFS AT 02:00 ON OCT 01,2011 GH 3.11 FT SHIFT 0.07 FT
 MAX GH: 3.11 FT AT 02:00 ON OCT 01,2011

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

ABC LATERAL
WY2012 HYDROGRAPH



GUNNISON RIVER BASIN
SOUTH CANAL NEAR MONTROSE
Water Year 2012

Location.-- Lat. 38°28' 58.3", Long. 107°45' 24.3", in SW¼NE¼ sec 27, T.49 N., R.8 W., Montrose County, on right bank of canal approximately 3600 ft. below the west portal of the Gunnison Tunnel.

Drainage Area and Period of Record.-- N/A; Published by the Colorado Division of Water Resources, Office of the State Engineer from October of 1990 to the present.

Equipment.-- Sutron Stage Discharge Recorder (SDR) connected to a Sutron Satlink 2 DCP in a 42-inch diameter CMP shelter and well. The primary reference is a steel drop tape referenced to an adjustable brass nut mounted on the wood instrument shelf. The SDR operates from a float. No changes this water year.

Hydrologic Conditions.-- A manmade structure which is a 100% controlled diversion. Winter and spring the natural gravel bar and two step concrete drop structure act as the main control for the gage. As late spring proceeds into summer and fall the willow / salt cedar along the banks and moss growth within the channel drown out the control. Large negative shifts occur as a result of the aquatic and terrestrial growth.

Gage-Height Record.-- The primary record is the 15-minute satellite data with SDR and DCP log data as backup. The record is complete and reliable, except the period 1545 Aug 24 to 0815 Oct. 5, 2011, when the float tape wheel ratio and direction were inadvertently changed due to an SDR upgrade on Aug 24, 2011. This apparently reset the SDR configuration back to the default values of an 18 inch wheel and clockwise counts up; the wrong way. This wasn't discovered and corrected until Oct. 5, 2011 when a major gate change tracked up instead of down. On Oct. 5, 2011 the SDR correction of +0.05 ft was made at taped stage of 3.40. The +0.05 ft correction was absorbed into the correction formulae described below, so it wasn't included with the instrument corrections. There are periods, just after the fall shut down and after the 9 winter runs when there is a small amount of water observed below the level of the inlets. These trailing off values are below the 5% threshold of the total mean winter values and have been ignored as miniscule bank storage. There was one SDR calibration of 0.01 ft made on May 16, 2012.

Datum Corrections.-- Levels were not run this water year. Levels were last run on Aug. 15, 2006, using BM No.1 as a base. BM 1, 2 and 3 were adjusted by -0.33 ft. due to the difference in the assumed RP elevation (21.00 ft.) and the actual tape length (20.67 ft). The RP elevation was set to the tape length. BM 2 was found to be reading 0.03 ft. high and was adjusted to an elevation of 11.504 ft. No corrections were made to gage heights, measurements or charts.

Rating.-- Control is a transition above a two step concrete drop structure. The low water control is natural gravel bar about 100 feet below the gage. Intermediate and high water control is the concrete transition structure located approximately 4,000 feet below the gage. Rating No. 171 was used from Oct. 1, 2011 through Nov. 6, 2011. Rating No. 18 was used from Nov. 7, 2011 through the end of water year 2012. It was developed from measurements 417 - 422 which were the least impacted by moss on the control. Thirteen discharge measurements (Nos. 415 - 427) were made during the water year ranging in discharge from 61.0 to 1050 cfs. An observation of zero flow was made on Nov. 3, 2011. Measurements and an observation of zero flow cover the range in stage experienced. The peak flow of 1050 cfs occurred at 2145 on Apr. 17, 2012 at a gage height of 3.39 ft with a shift of 0.00 ft. It did not exceed the maximum flow of measurement No. 422, made Apr 18, 2012. The highest recorded stage (3.77 ft. at 0630 on Oct. 1, 2011) exceeded the stage of Measurement No. 422, made on Apr 18, 2012 by 0.38 ft. in stage.

Discharge.-- Shifting control method was used during all periods of record. Shifts were distributed using two variable stage-shift relationships associated with Rating 171. The variable shifts were applied from 0000 Oct. 1, 2011 to Nov. 6, 2011. Shifts were distributed by time from 0000 Nov. 7, 2011 to 1245 Apr. 18, 2012 and from 1200 Aug. 28, 2012 through the end of water year 2012. These are associated with Rating 18. Five additional variable stage-shift relationships associated with Rating 18 were used from 1300 Apr. 18, 2012 to 1145 Aug. 28, 2012. Measurements show unadjusted shifts varying from -0.72 ft to +0.01 ft. All were given full weight and applied directly except for measurement numbers 419, 420 which were discounted from -5.33% to 2.11% to smooth shift distribution. Nine winter tunnel runs were made this water year.

Special Computations.-- The raw SDR data recorded during the period when the wheel size and direction were incorrect were corrected using the formula: $[-0.66667 \times (\text{Raw Value} - \text{Base Value}) + \text{Base Value}]$. The base value is a known gage height reading (3.78) at 0815 Oct 5, 2011. This correction was applied from 0000 10/01/2011 to the field correction on 10/05/2011. Raw values from the SDR were corrected in a spreadsheet and then imported. During the accelerated moss growth shifts were calculated to project the same, steady discharge at the same head gate setting.

Remarks.-- The record is good, except the period when the wheel ratio and reversal of the tape wheel took place from Oct. 1, 2011 to the correction on Oct. 5, 2011 which is fair, and the period from Jul. 10 through Aug. 28, 2012 when moss growth and head gate changes took place. Several of these events were not captured by measurements therefore this record is rated as fair. The peak instantaneous peak flow is rated good. Station maintained and record developed by Gerald M. Thrush.

Recommendations.-- The large gage pool makes the moss growth compound the negative shifts which are seen. The condition of a very large gage pool and a virtual channel control even without the aquatic growth makes the gage height much less sensitive to changes in the flow regimen. It has been suggested using an ADVM upstream. The site is concrete lined, is fairly close to the exit of the West Portal of the Gunnison Tunnel, has fairly high velocities which would minimize moss accumulation. The expense for the equipment and to relocate the gage would be high. The new site would need a bank operated cableway to use for conventional and ADCP measurements. These benefits would be far reaching. The time spent on frequent measurements to account for moss growth could be directed to other gages and projects. Confidence in the flow through the Gunnison Tunnel would be tremendously improved. The gage at the AB Lateral would still have to be operated.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

SOUTH CANAL NEAR MONTROSE

RATING TABLE.-- SOUCANCO171 USED FROM 01-OCT-2011 TO 06-NOV-2011
 SOUCANCO18 USED FROM 07-NOV-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

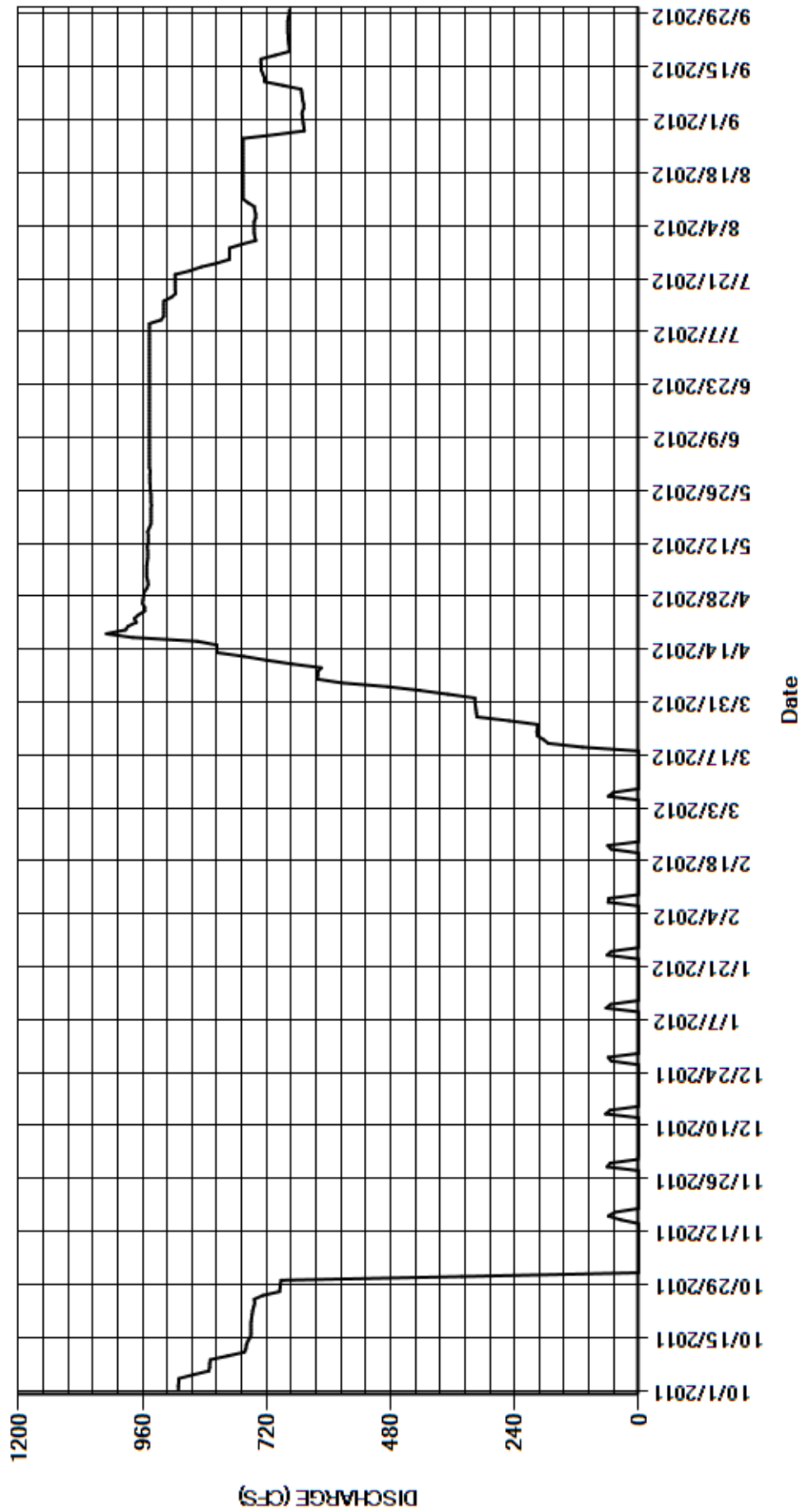
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	891	0.00	1.3	0.00	0.00	0.00	317	949	947	947	743	650
2	891	0.00	0.00	0.00	0.00	0.00	369	950	947	947	744	651
3	890	0.00	0.00	0.00	0.00	0.00	423	952	947	947	744	651
4	890	0.00	0.00	0.00	0.00	0.00	486	952	947	947	744	648
5	863	0.00	0.00	0.00	0.00	0.00	575	952	947	947	744	648
6	832	0.00	0.00	0.00	0.00	59	622	952	947	947	741	650
7	830	0.00	0.00	0.00	59	49	621	951	947	947	741	651
8	830	0.00	0.00	0.00	58	0.00	621	950	947	947	743	652
9	829	0.00	0.00	0.00	0.00	0.00	614	950	947	947	744	653
10	795	0.00	0.00	63	0.00	0.00	671	950	947	924	756	688
11	763	0.00	0.00	54	0.00	0.00	720	951	947	919	766	724
12	760	0.00	0.00	0.00	0.00	0.00	764	949	947	919	766	724
13	759	0.00	64	0.00	0.00	0.00	816	949	947	919	766	727
14	756	0.00	55	0.00	0.00	0.00	816	949	947	919	766	730
15	751	35	0.00	0.00	0.00	0.00	816	950	947	919	766	730
16	750	59	0.00	0.00	0.00	0.00	854	947	947	904	766	731
17	750	46	0.00	0.00	0.00	0.00	979	944	947	896	766	731
18	750	0.00	0.00	0.00	0.00	0.00	1030	944	947	897	766	703
19	750	0.00	0.00	0.00	0.00	109	993	944	947	897	766	676
20	749	0.00	0.00	0.00	0.00	175	988	944	947	897	766	676
21	748	0.00	0.00	0.00	53	184	972	944	947	897	766	677
22	747	0.00	0.00	0.00	60	196	976	943	947	897	766	678
23	745	0.00	0.00	0.00	0.00	197	968	944	947	868	766	678
24	743	0.00	0.00	61	0.00	196	956	944	947	847	766	679
25	744	0.00	0.00	53	0.00	196	956	944	947	816	766	679
26	727	0.00	0.00	0.00	0.00	251	960	945	947	792	766	679
27	695	0.00	53	0.00	0.00	313	959	945	947	792	766	679
28	694	0.00	59	0.00	0.00	314	958	946	947	792	702	678
29	693	61	0.00	0.00	0.00	315	957	946	947	792	647	676
30	692	55	0.00	0.00	---	316	952	946	947	768	648	676
31	342	---	0.00	0.00	---	317	---	945	---	741	649	---
TOTAL	23649	256.00	232.30	231.00	230.00	3187.00	23709	29371	28410	27535	23112	20473
MEAN	763	8.53	7.49	7.45	7.93	103	790	947	947	888	746	682
AC-FT	46910	508	461	458	456	6320	47030	58260	56350	54620	45840	40610
MAX	891	61	64	63	60	317	1030	952	947	947	766	731
MIN	342	0.00	0.00	0.00	0.00	0.00	317	943	947	741	647	648

CAL YR	2011	TOTAL	183230.30	MEAN	502	MAX	979	MIN	0.00	AC-FT	363400
WTR YR	2012	TOTAL	180395.30	MEAN	493	MAX	1030	MIN	0.00	AC-FT	357800

MAX DISCH: 1050 CFS AT 21:45 ON APR 17,2012 GH 3.39 FT SHIFT 0 FT
 MAX GH: 3.77 FT AT 06:30 ON OCT 01,2011

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

SOUTH CANAL NEAR MONTROSE
 WY2012 HYDROGRAPH



GUNNISON RIVER BASIN
UNCOMPAHGRE RIVER UPSTREAM OF SOUTH CANAL

Water Year 2012

Location.-- Lat 38°21'29", Long 107° 47'32.5", in the SE¼NW¼ of section 6, T.47 N., R.8 W, NMPM, Montrose County, Hydrologic Unit 14020006, on the left bank 1.98 mi. down-stream from the Uncompahgre River at Colona (a USGS stream gage) and about 5,000 feet up-stream of where the South Canal releases into the Uncompahgre River. It is 1.2 mi. down-stream of the confluence with Beaton Creek, on private land, southeast of the end of Vernal Road.

Drainage Area and Period of Record.-- Approximately 476 square miles of drainage.; Provisional electronic data began transmitting on May 18th, 2010. Published from October 1, 2010 to the present.

Equipment.-- Sutron SatLink 2 DCP with a Sutron Accubar Constant Flow Bubble Gage (CFB) in a 48" corrugated metal pipe bolted to a 6" thick concrete pad. The primary reference is an outside horizontal cantilever chain gage installed on May 30, 2012. The control is a large boulder drop structure approximately 30 feet down-stream of the gage. No other changes this water year.

Hydrologic Conditions.-- The Uncompahgre River begins in high mountain terrain near Hurricane Peak at an elevation of 13,447 feet and drops to 6,220 feet at the gage. The gage is located approximately 8.5 miles downstream of Ridgway Reservoir. Warm water released from reservoir minimizes ice at the gage. The amount of flow at this gage is mainly comprised of water released from Ridgway Reservoir; however, there are several small tributaries and diversion structures between the reservoir and the gage.

Gage-Height Record.-- Primary record is 15-minute satellite CFB data with DCP log data used for backup purposes. There was one 15 minute value missing on Jun. 14, 2012 at 1630 that was lost during a firmware upgrade. This value was filled in using good data before and after the missing data. Two instrument corrections were made to the CFB during water year 2012 and were distributed by time. These occurred as follows: -0.01 ft on Jul. 9, 2012, +0.01 ft on Aug. 30, 2012. The record is complete and reliable except for the following days when ice on the control or in the gage pool affected the stage discharge relationship: Dec. 24, 25, 2011; Jan. 9, 12-14, 2012.

Datum Corrections.-- Levels were not run this water year. Levels were last run on Mar. 24, 2010. They were used to establish the elevation of the datum and benchmarks.

Rating.-- The control is a large boulder drop structure approximately 30 feet downstream of the gage. Rating No. 01 in used since Oct. 1, 2010 was used for the entire water year. It is fairly well defined from 27 to 700 cfs. Flows above 700 cfs were estimated from the Uncompahgre at Colona gage (a USGS gage). Ten measurements were made this water year (Nos. 017-026) ranging in discharge from 55.4 cfs to 227 cfs. They cover the range in stage experienced except for lower daily flows on Sep. 24, 27-30, 2012 and higher daily flows on May 10-17, 22, 23, Aug. 2, 6-24, 29-31, and Sep. 1-3 in 2012. The peak instantaneous flow of 399 cfs occurred at 1315 on May 1, 2012 at a gage height of 4.37 ft. with a shift of -0.22 ft. It exceeded the stage of Measurement No. 26, made August 30, 2012 by 0.49 feet in stage.

Discharge.-- Shifting control method was used during all periods of record. Shifts were distributed by time and stage. Shifts were distributed by time from 0000 on Oct. 1, 2011 to 1415 on Nov. 9, 2011. Shifts were distributed by stage using variable stage-shift relationship (UNCUPSCOVS12A) applied for the remaining part of water year 2012. Measurements show unadjusted shifts varying from -0.22 ft. to -0.10 ft. All were applied directly and given full weight except for measurements no. 18, 20, 21, 22, 24 and 25 which were discounted from -7% to +5% to smooth shift distribution.

Special Computations.-- There is no bridge or cableway to make high flow measurements at this gage. Measurements above 400 cfs are not safe to wade. High flows are estimated using the USGS stream gage Uncompahgre at Colona located approximately 2 miles upstream. The PZF was approximately 0.10 ft in October 2011 (see remarks in Meas. No. 017). The PZF was measured at 0.15 ft on Dec. 10, 2012 (during a Gage Visit). With very little high water during water year 2012 and two similar PZF measurements, it is believed that there were no physical changes to the control during water year 2012. Discharge for the days when ice affected the stage was estimated on the basis of partial days of good record, good gage data before and after ice affected data and water temperature data collected at the UNCCOLCO gage.

Remarks.-- The record is rated fair, except for flows that exceed 700 cfs and the periods when ice affected the stage-discharge relationship are rated poor. The instantaneous peak flow is rated fair. Gage operated and maintained by Luke Reschke and Jerry Thrush. Record developed by Luke Reschke and Jerry Thrush.

Recommendations.-- Levels will be run before high water. Completion of the cantilever gage will improve the primary reference gage. The rating curve needs to be evaluated due to the suspected change in the control and new rating needs to be developed.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

UNCOMPAHGRE RIVER UPSTREAM OF SOUTH CANAL

RATING TABLE.-- UNCUPSCO01 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

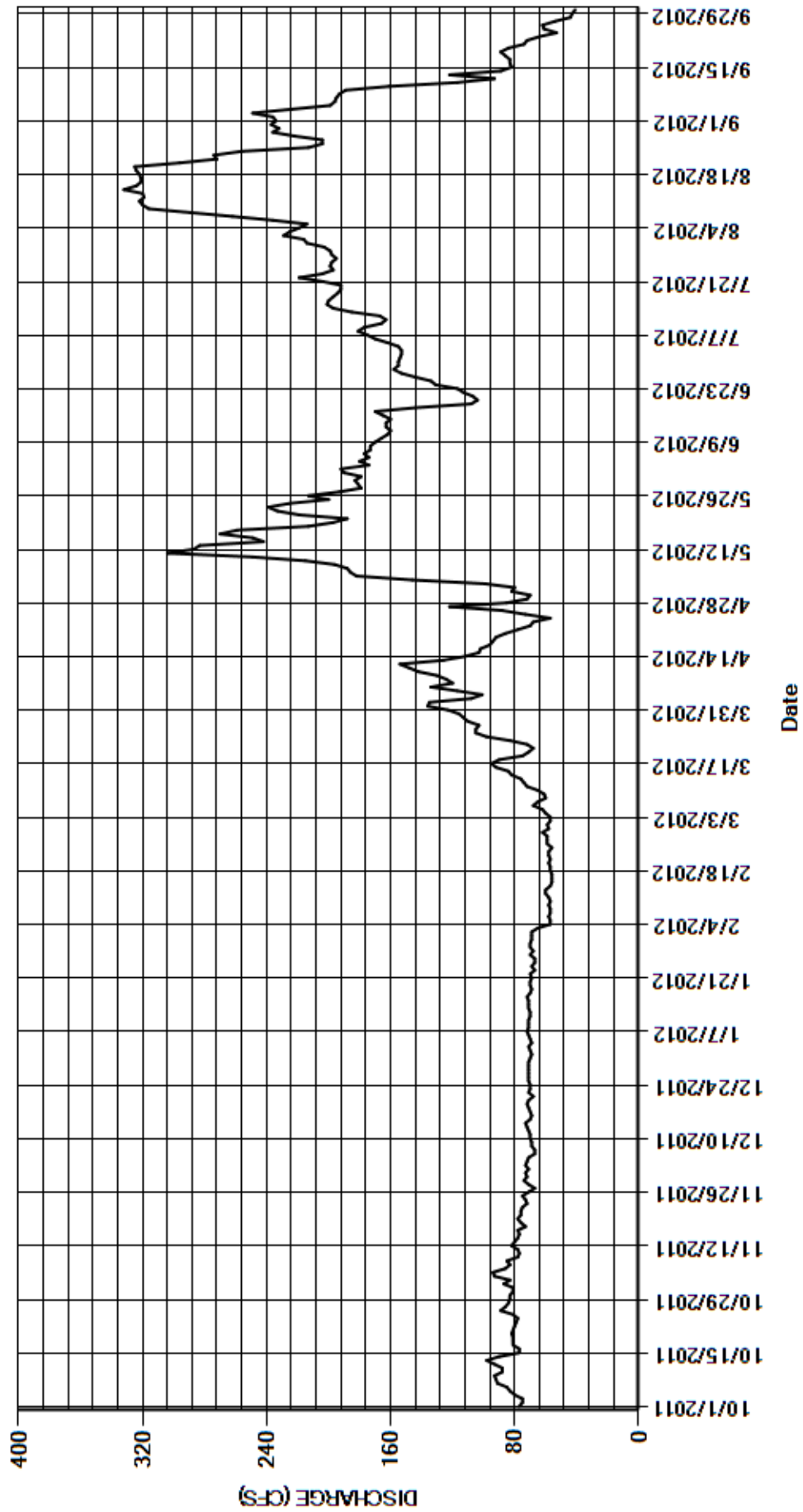
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	77	81	73	69	69	59	136	82	190	154	216	234
2	75	87	71	70	69	57	135	80	192	153	229	236
3	75	83	73	71	65	57	108	99	174	153	225	249
4	80	93	72	69	57	60	101	146	180	155	219	224
5	83	94	71	70	57	62	117	182	174	162	214	199
6	85	86	67	71	58	68	134	186	177	170	236	196
7	91	83	67	72	57	65	120	188	173	175	262	195
8	92	85	69	71	57	60	124	196	173	181	289	193
9	93	78	69	e71	58	61	130	215	170	177	316	189
10	88	77	70	71	57	65	142	249	166	166	320	161
11	88	78	70	70	58	72	148	304	162	163	322	117
12	93	82	71	e70	60	74	154	287	160	167	319	93
13	98	80	72	e71	60	76	126	283	163	185	320	122
14	90	78	73	e71	57	82	112	242	163	197	332	89
15	77	77	70	71	56	84	103	249	160	201	324	82
16	77	78	69	72	56	92	102	270	165	200	321	83
17	81	73	70	70	56	95	96	259	170	197	321	83
18	81	76	71	69	57	90	94	213	144	194	322	86
19	81	78	72	70	57	75	92	197	108	192	324	89
20	82	76	71	70	58	71	86	188	104	192	325	84
21	81	76	68	69	57	68	78	219	107	204	296	74
22	80	75	71	70	58	72	70	233	113	219	272	72
23	79	72	70	67	58	83	68	239	117	204	274	64
24	78	73	e70	69	56	98	57	225	131	197	256	53
25	81	75	e71	67	59	105	73	200	134	199	213	61
26	89	71	71	67	59	105	88	213	144	198	204	62
27	86	67	71	70	59	103	122	193	153	195	204	54
28	84	71	71	68	62	110	85	179	158	198	222	44
29	83	74	71	70	58	113	72	181	155	199	236	43
30	83	72	71	70	---	116	70	183	155	203	232	41
31	81	---	70	69	---	123	---	179	---	214	237	---
TOTAL	2592	2349	2186	2165	1705	2521	3143	6359	4635	5764	8402	3572
MEAN	83.6	78.3	70.5	69.8	58.8	81.3	105	205	154	186	271	119
AC-FT	5140	4660	4340	4290	3380	5000	6230	12610	9190	11430	16670	7090
MAX	98	94	73	72	69	123	154	304	192	219	332	249
MIN	75	67	67	67	56	57	57	80	104	153	204	41

CAL YR	2011	TOTAL	106962	MEAN	293	MAX	1010	MIN	59	AC-FT	212200
WTR YR	2012	TOTAL	45393	MEAN	124	MAX	332	MIN	41	AC-FT	90040

MAX DISCH: 399 CFS AT 13:15 ON MAY 01,2012 GH 4.37 FT SHIFT -0.22 FT
 MAX GH: 4.37 FT AT 13:15 ON MAY 01,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

UNCOMPAHGRE RIVER UPSTREAM OF SOUTH CANAL
WY2012 HYDROGRAPH



GUNNISON RIVER BASIN
UNCOMPAHGRE RIVER AT UNCOMPAHGRE ROAD BRIDGE
Water Year 2012

Location.-- Lat. 38°22'40.6"; Long. 107°48'36.5', in the NE¼ NW¼ of section 36, T. 48 N, R. 9 W., NMPM, Montrose County, CO, Hydrologic Unit 14020006, on the right bank on the downstream side of the Uncompahgre Road Bridge, approximately 4,000 ft. downstream of confluence with the South Canal and 7.8 mi. south of Montrose.

Drainage Area and Period of Record.-- Approximately 480 square miles of drainage. ; May 25, 2011 through present

Equipment.-- A Campbell Scientific Radar Water-Level Sensor gage (model CS476-L) mounted on the downstream side of the bridge, near the left bank. The DCP is a Sutron SatLink Logger 2 mounted in a 24" X 18" X 10" (approximately) NEMA box, bolted to a welded steel bracket, which is bolted to two I-beams on the down-stream, right bank wing-wall of the bridge. The primary reference is a wire-weight gage mounted on the downstream side of the bridge, near the radar unit. No other changes this water year.

Hydrologic Conditions.-- The control is a cobble riffle approximately 150 feet downstream of the gage. The flows at this gage primarily consist of water released from Ridgway Reservoir and trans-basin water from the Gunnison Tunnel through the South Canal. There are several small tributaries and diversions between the reservoir and the gage.

Gage-Height Record.-- Primary record is 15-minute radar data downloaded from satellite telemetry with DCP download data for backup purposes. The gage was visited on 15 separate occasions to verify the instruments remained calibrated to the primary reference gage. There were 2 fifteen minute values missing in the primary record on September 6, 2012 (0930 & 0945) that were estimated using the average GH for the day (3.83). Three instrument corrections were made to the radar sensor during 2012 and they were distributed by time. The record is complete and reliable, except for the following days when the stage discharge relationship was affected by ice on the control: Dec. 24, 25, 2011; Jan. 9, 12-15, 17, 28, 29, 2012.

Datum Corrections.-- Levels were last run on Apr. 27, 2011. This is the first set of levels at this gage and they were used to establish the elevation of the datum and the relative elevations of BM No.1 and BM No.2, as well as the elevation of the check bar in the wire-weight gage.

Rating.-- The control is a cobble riffle located approximately 150-ft. downstream of the gage. Rating 02, dated July 28, 2011, in use since May 25, 2011 was used for the entire period of record. The control is split into two separate channels by a small island. All water is contained to a single channel up to approximate stage of 3.10 ft. then the water will begin to fill the left side of the channel. Ten discharge measurements (Nos. 7-16) were made during the water year ranging in discharge from 65.8 to 902 cfs. Measurements cover the range in stage experienced except for the higher average daily flows of May 10-18, 21-24, 26, and June 1-2, 2012. The instantaneous peak flow of 1,050 cfs occurred at 0730 on May 22, 2012 at a gage height of 4.43 ft. with a shift of 0.01 ft. It exceeded the stage of measurement no. 14 made on June 14, 2012 by 0.16 feet.

Discharge.-- Shifting control method was used for the entire water year. Shifts were applied as defined by measurements and were distributed by time and stage. Shifts were distributed by stage using UNCBRGCO02VS01 from October 1, 2011 through November 21, 2011. Shifts were distributed by time from November 21, 2011 through January 23, 2012. Shifts were distributed by stage using variable shift curve UNCBRGCO02VS02 from January 23, 2012 to the peak on May 22, 2012. Shifts were distributed by stage using variable shift curve UNCBRGCOVS12B from the peak on May 22, 2012 to the end of the water year. Open water measurements showed unadjusted shifts varying from -0.15 to 0.13 ft. Shifts were applied directly and given full weight except measurement Nos. 7, 11, 12, and 16 which were discounted from -5% to +6% to smooth shift distribution.

Special Computations.-- Discharge for periods of ice-affected record was estimated on the basis of good record before and after ice, water temperature records from UNCCOLCO, by cutting off ice peaks on electronic chart record and partial days of good record.

Remarks.-- Record good, except for periods when ice affected the stage-discharge relationship. Record during these periods should be considered poor. The peak instantaneous flow should be considered good. Station maintained and record developed by Gerald M. Thrush and Luke Reschke.

Recommendations.-- A new rating is planned for WY2013, as is a new set of levels. Also, a current PZF needs to be determined.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

UNCOMPAHGRE RIVER AT UNCOMPAHGRE ROAD BRIDGE

RATING TABLE.-- UNCBRGCO2 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

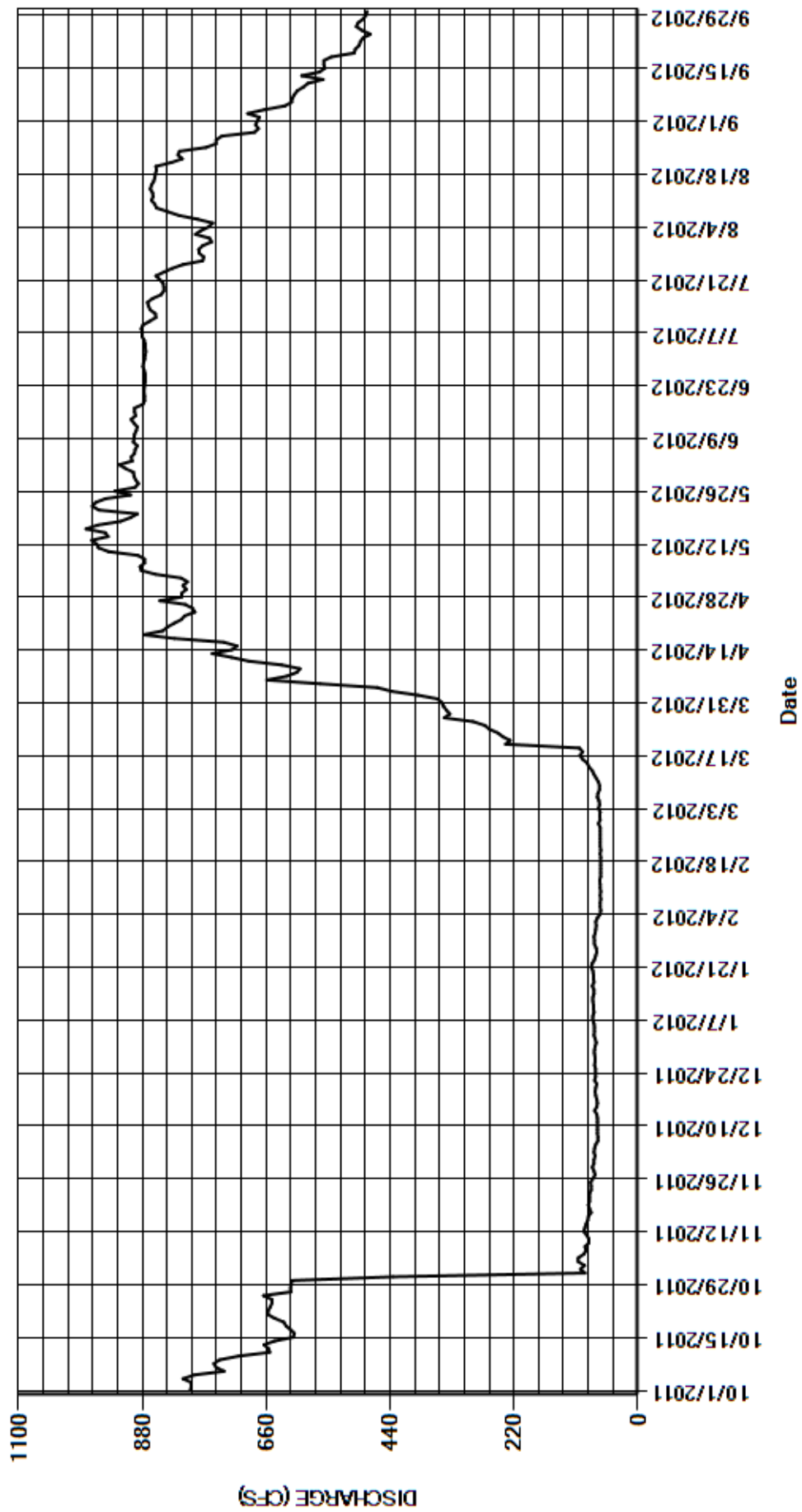
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	795	94	78	74	74	68	356	808	910	875	761	676
2	793	102	76	76	75	67	391	800	921	874	786	672
3	793	95	78	78	72	70	437	811	898	875	776	693
4	808	106	77	77	67	68	463	857	900	875	762	663
5	788	106	75	77	66	69	564	882	894	877	755	627
6	735	96	71	78	67	72	659	884	893	881	782	615
7	749	92	71	80	67	71	624	876	889	880	815	614
8	753	94	72	80	66	68	606	876	896	882	835	610
9	743	87	72	e78	67	68	600	888	895	879	855	605
10	709	87	72	79	66	70	633	940	894	867	858	594
11	654	91	72	79	67	74	691	958	891	856	864	586
12	656	96	72	e80	67	78	722	961	889	857	861	559
13	664	94	73	e80	68	81	756	970	895	866	862	597
14	645	92	77	e78	66	87	721	941	900	869	866	565
15	612	89	73	e78	66	90	712	946	892	871	864	556
16	610	88	72	81	66	98	735	980	894	862	860	558
17	617	83	73	e78	66	103	823	960	894	847	858	558
18	625	86	75	79	66	98	878	919	879	842	857	544
19	629	88	76	79	66	104	844	901	876	842	855	504
20	645	86	75	80	67	235	836	889	876	843	856	502
21	657	86	73	83	66	227	824	957	877	849	829	495
22	657	86	77	81	67	240	811	969	877	856	809	493
23	653	83	75	77	67	249	805	963	876	842	817	488
24	650	83	e75	75	67	264	787	946	875	827	814	475
25	650	84	e75	73	67	272	791	901	875	808	767	490
26	665	80	77	74	67	293	804	929	875	773	749	500
27	616	76	76	77	67	344	849	893	877	771	749	497
28	617	78	76	e77	70	334	810	887	879	779	739	488
29	616	81	77	e78	67	340	810	892	878	780	681	483
30	614	78	77	76	---	345	802	895	876	773	674	481
31	435	---	76	75	---	348	---	896	---	757	679	---
TOTAL	20853	2667	2314	2415	1957	4995	21144	28175	26641	26135	24895	16788
MEAN	673	88.9	74.6	77.9	67.5	161	705	909	888	843	803	560
AC-FT	41360	5290	4590	4790	3880	9910	41940	55890	52840	51840	49380	33300
MAX	808	106	78	83	75	348	878	980	921	882	866	693
MIN	435	76	71	73	66	67	356	800	875	757	674	475

CAL YR	2011	TOTAL	191406	MEAN	866	MAX	1990	MIN	71	AC-FT	379700
WTR YR	2012	TOTAL	178979	MEAN	489	MAX	980	MIN	66	AC-FT	355000

MAX DISCH: 1050 CFS AT 07:30 ON MAY 22,2012 GH 4.43 FT SHIFT 0.01 FT
 MAX GH: 4.43 FT AT 07:30 ON MAY 22,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

**UNCOMPAHGRE RIVER AT UNCOMPAHGRE ROAD BRIDGE
WY2012 HYDROGRAPH**



GUNNISON RIVER BASIN
UNCOMPAGRE RIVER NEAR OLATHE
Water Year 2012

Location.-- Lat. 38°36'05", Long. 107°58'58", SW¼SW¼ of NW¼ sec. 15, T.50 N., R. 10W, NMPM, and about 3,100 ft. above the S. H. 348 bridge and about 5,100 ft below the East Canal headgate and diversion structure, both stream distance. The gage is on the right bank and in Montrose County.

Drainage Area and Period of Record.-- Approximately 817 square miles or 522,880 acres in the drainage area from a project and calculations supplied from Division VII. Published by the Colorado Division of Water Resources, Office of the State Engineer since 1993.; Preliminary data is available from the gage installation March of 1991. Published data is available since WY 1993.

Equipment.-- A Sutron SatLink Logger 2 with a stage discharge recorder (SDR) in a 48-in spiral corrugated metal shelter and stilling well. The SDR is activated by a float in the stilling well. The primary reference gage is a steel drop tape referenced to an adjustable RP located in the gage on the instrument shelf. An air temperature sensor was installed on Jul 11, 2012. No other changes this water year.

Hydrologic Conditions.-- The control is the natural streambed with a somewhat stable cobble channel. There is very little ice in winter as the releases from Ridgway Reservoir and the geothermal water from the upper Uncompahgre River in the Ouray area, help to keep the River at this point virtually free of ice. The Uncompahgre River is controlled by releases from Ridgway Reservoir and imported water through the Gunnison Tunnel during periods of low flow. The canals of the Uncompahgre Project affect the amount of discharge at this gage. The East Canal is immediately upstream, and the Ironstone Canal is above that. The automatic gates on the Ironstone cause the gage height to be very uneven as the gates seek their set level. Moss growth at low flows can change the control in just a few days.

Gage-Height Record.-- The primary record is the 15 minute electronic SDR data from satellite telemetry with the SDR logger data as backup. This record is complete and reliable except when the float tape slipped off the SDR pulley wheel during the period from about 0700 Nov 1, 2011 (a sharp GH rise) to 1115 Nov 7, 2011 when it was discovered and corrected. The stilling well was frozen from Dec 6-12, 2011. The stage-discharge relationship was affected by ice on the control on Dec 24-27, 2011; Jan 12-15, 2012. Five minor instrument corrections in the range of -0.02 ft to +0.03 ft resulting from calibration of the SDR to the inside drop tape were distributed by time. One flush correction was observed. There was a period from Mar 31, 2012 to Apr 13, 2012 when oil escaped from under the cylinder during low flow.

Datum Corrections.-- Levels were not run this water year. Levels were last run on August 29, 2007, using BM No. 1 as base.

Rating.-- The control is a natural cobble channel. Rating UNCOLACO8 was developed and put into use February 14, 2010. The highest measurement at that time in the range of 1200 cfs was used to help better define the higher range of the rating. The mid range is similar to previous ratings, 8A and 8B. Discharge Measurements Nos. 250-258 were made during water year 2012. Measurements ranged from 0.74 cfs to 233 cfs, which covered the range in stage, except the lower daily flows of Apr 16, 20-22, 25; Jun 27; Jul 4, 12, 27; Aug 8, 2012, and the higher daily flows of Nov 1-16, 2011 and Mar 20, 21, 2012. The instantaneous peak flow of 351 cfs occurred at 1315 on Nov 01, 2011, at a gage height of 3.73 ft with a shift of -0.16 ft. The peak exceeded the stage of the high measurement No. 250 made Nov 10, 2011 by 0.30 ft.

Discharge.-- A shifting control method was used during all periods of record. Shifts were distributed by time from 0000 Oct 1, 2011 to 1015 Nov 10, 2011. Shifts were distributed by stage using four variable stage-shift relationships: UNCOLACOvs12aa, based on Msmts 250-252 (applied from 1030 Nov 10, 2011 to 1515 Feb 10, 2012); UNCOLACOvs12bb, based on Msmts 252-255 (applied from 1531 Feb 10, 2012 to 1045 Jun 4, 2012); shifts were then prorated from UNCOLACOvs12bb to UNCOLAVs12c from 1100 Jun 4, 2012 to 1415 Jul 9, 2012; then UNCOLAVs12c (based on Msmts 256 and 257) was applied from 1430 Jul 9, 2012 to 1500 Jul 27, 2012; and, shifts were then prorated from UNCOLAVs12c to UNCOLAVs13a from 1515 Jul 27, 2012 to 1700 Sep 10, 2012; then UNCOLAVs13a (based on Msmts 258, 259) was applied from 1715 Sep 10, 2012 to 2345 Sep 30, 2012. Measurements made in water year 2012 showed a range in computed shifts from -0.44 ft to -0.06 ft. All measurements were given full weight and applied directly except No. 250 which was discounted -7.91% for smoothing purposes.

Special Computations.-- Discharge for periods when the stage-discharge relation was affected by ice were estimated using good adjacent days and comparing the pattern on the electronically generated chart. Evaluation also included high and low temperature data obtained from the Montrose 2 weather station about 10 miles away. The period when the stilling well froze was estimated using the values from partial good days and the trend from the gage height trace. The period when the float tape moved off the SDR wheel was estimated using the bottom of a downward spike as an event beginning and distributed to the full correction at the top of that event. Then the full correction was carried to the correction during the relative smooth trace. The rule of thumb is to not adjust the highest measurement's shift. This was done because of the fair rating under the conditions and the overall trend.

Remarks.-- The record is rated fair, except periods when the stage-discharge relation was affected by ice on the control, and when the well was frozen, which were estimated and should be considered poor. The period when the tape slipped on the SDR wheel should be considered fair. The period when the oil cylinder wasn't reading properly should be considered fair. Station maintained by Luke Reschke and Gerald Thrush. Record developed by Gerald M. Thrush.

Recommendations.-- The installation of an outside gage would help determine if and when there was drawdown. The rating curve needs to be evaluated at the lower end; there appears to have been fill in the low water control. Meter notes and gage visits need to note more detail about control / moss conditions. Levels need to be run in WY13.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

UNCOMPAGRE RIVER NEAR OLATHE

RATING TABLE.-- UNCOLACO8 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

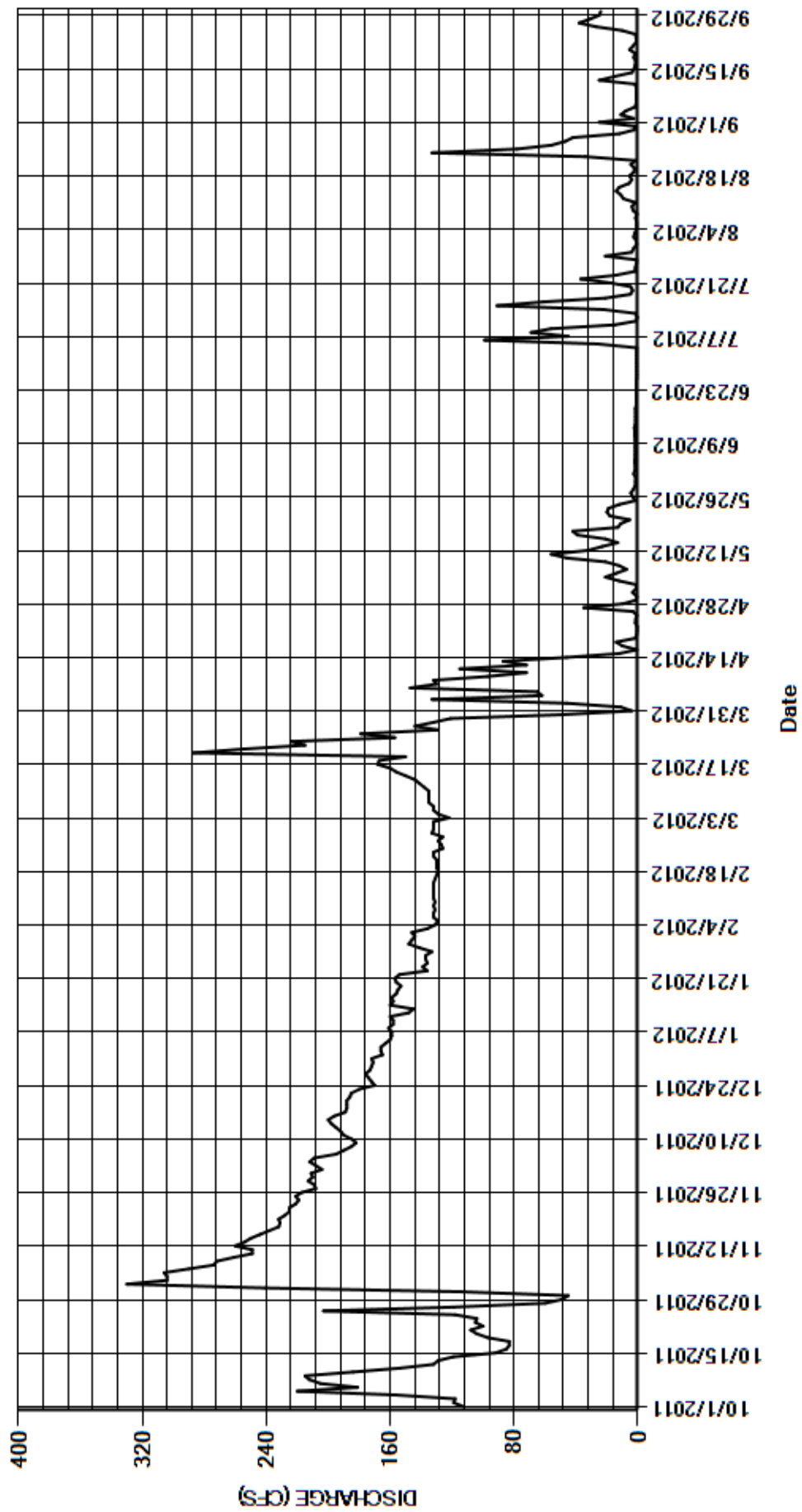
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	113	241	211	165	144	132	11	3.5	2.7	0.87	1.0	25
2	119	330	204	166	146	132	46	1.2	1.8	0.87	2.7	2.7
3	118	304	208	166	136	122	133	0.89	1.7	0.78	2.0	11
4	156	304	212	163	131	129	62	12	2.1	0.71	0.85	7.7
5	220	306	209	160	129	132	65	21	1.9	26	0.86	1.8
6	181	290	e195	159	132	132	147	14	1.8	99	0.88	1.1
7	205	274	e190	159	132	135	130	7.3	1.7	45	1.5	1.1
8	212	272	e185	161	131	135	132	12	1.8	69	0.61	1.0
9	215	261	e182	158	132	135	97	21	1.8	56	3.2	1.0
10	184	249	e185	158	131	135	72	46	1.8	15	3.8	1.0
11	154	249	e190	160	132	138	115	56	2.0	1.0	1.6	1.9
12	132	260	e192	e148	132	141	72	32	2.0	0.48	9.4	25
13	129	254	195	e145	132	144	87	23	2.3	1.6	11	15
14	119	250	198	e160	132	150	46	13	1.7	22	14	3.9
15	92	244	200	e158	132	156	12	21	1.5	91	12	2.4
16	85	238	196	159	131	160	0.66	39	1.5	61	5.7	1.7
17	83	232	189	156	130	168	10	42	1.5	21	3.9	1.4
18	83	231	188	155	129	167	14	13	1.7	4.8	5.4	2.7
19	97	232	188	153	130	150	1.6	11	1.0	3.4	2.5	1.7
20	104	228	188	156	130	287	0.73	5.3	1.1	4.7	2.2	5.4
21	108	225	186	157	130	255	0.62	18	0.96	18	4.6	3.0
22	100	225	185	154	132	215	0.50	20	1.2	37	1.4	1.1
23	105	221	180	136	132	224	1.6	19	1.1	14	34	1.2
24	104	219	e170	139	126	157	1.4	12	1.1	1.8	133	1.2
25	118	221	e172	136	127	179	0.62	1.8	1.2	1.6	78	10
26	203	217	e174	137	129	129	3.2	3.2	0.80	0.93	56	27
27	119	208	e176	137	126	144	35	4.6	0.72	0.73	47	38
28	60	209	173	133	133	132	9.8	2.8	0.78	21	42	31
29	49	213	172	141	132	121	1.0	1.7	0.83	4.0	12	25
30	45	210	171	148	---	49	0.78	1.6	0.84	2.7	2.4	24
31	114	---	172	146	---	4.0	---	1.4	---	0.85	1.9	---
TOTAL	3926	7417	5836	4729	3821	4589.0	1308.51	480.29	44.93	626.82	497.40	276.0
MEAN	127	247	188	153	132	148	43.6	15.5	1.50	20.2	16.0	9.20
AC-FT	7790	14710	11580	9380	7580	9100	2600	953	89	1240	987	547
MAX	220	330	212	166	146	287	147	56	2.7	99	133	38
MIN	45	208	170	133	126	4.0	0.50	0.89	0.72	0.48	0.61	1.0

CAL YR	2011	TOTAL	79187.30	MEAN	217	MAX	863	MIN	1.3	AC-FT	157100
WTR YR	2012	TOTAL	33551.95	MEAN	91.7	MAX	330	MIN	0.48	AC-FT	66550

MAX DISCH: 351 CFS AT 13:15 ON NOV 01,2011 GH 3.73 FT SHIFT -0.16 FT
 MAX GH: 3.73 FT AT 13:15 ON NOV 01,2011

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

UNCOMPAHGRE RIVER NEAR OLATHE
WY2012 HYDROGRAPH



GUNNISON RIVER BASIN
REDLANDS CANAL NEAR GRAND JUNCTION

Water Year 2012

Location.--	Lat. 39°02'52.93", Long. 108°34'33.16", in the NE¼ NW¼NE¼ Sec 27, T1S, R1W, Ute Meridian, Mesa County, Hydrologic Unit 14020005, on the right bank just downstream of and attached to an old bridge. The canal distance to the head gate is about 1.76 miles and the distance to the power plant is about 1.74 miles.
Drainage Area and Period of Record.--	N/A. ; Published stream flow record by the Colorado Division of Water Resources, Office of the State Engineer since 1991. The 50 years of record used to calculate the mean daily flow seen on the web site were hand entered into the satellite monitoring system from old hand worked flow sheets. Some of these were derived from a correlation from power generation data / records.
Equipment.--	A Sutron SatLink 2 DCP, Acoustic Doppler Velocity Meter (ADVM) in a cooperative agreement with the USBR and a Sutron Constant Flow Bubbler (CFB) set to an outside staff gage. The Channel Master (CM) ADVM has the ability to give instantaneous flow readings. It produces the primary discharge record. The Channel Master and AccuBubble are connected to the DCP via SDI-12 with a terminal block. The following data is transmitted to the GOES satellite: GAGE_HT (CFB), DISCHRG2 (ADVM), and GAGE_HT2 [ADVM Vertical Beam (VB)]. Discharge reported on the DWR website is calculated from a conventional rating table. This value is less accurate than the onsite flow data because there is no unique stage-discharge relationship. In absence of ADVM, discharge is estimated using the stage-discharge relationship from the bubbler.
Hydrologic Conditions.--	The Redlands Canal is a channel carved into the sandstone cliffs with a hard sedimentary bed rock bottom. The channel bottom is relatively flat with vertical walls along the side. Water in the canal is for power generation and irrigation. Penstock gates and the turbine at the Redlands Water and Power Canal Company downstream of the gage control the flow in the canal and thus there is no unique stage-discharge relationship. The extended shut down period in November 2011 was to install new plastic screens in front of the penstock and irrigation pumps. These are less conductive than the old steel grates so cold doesn't play as large a factor in forming ice.
Gage-Height Record.--	ADVM COMPUTED RECORD: Discharge calculated from data provided by the ADVM was used from Oct. 1, 2011 to Sept. 30, 2012. The record is complete, reliable and good except for Jan. 15, 2012 when 28 unit values (15 min.) were found to be too low. This was confirmed by comparing the CFB values to the ADVM vertical beam values.
Datum Corrections.--	Levels were not run during Water Year 2012. New bench marks were established and staff gages set at this site on Mar. 24, 2005 in and with cooperation from the USGS. Levels were last run on Mar. 24, 2006 by the USBR in cooperation with the development of the index velocity rating for the CM.
Rating.--	The rectangular channel was carved into the sandstone cliffs with a hard sedimentary bed rock bottom. The channel bottom is relatively flat with vertical walls along the side. No control exists at the gage. A conventional stage-discharge rating is used for the auxiliary CFB, but this is only used in cases of malfunction or for backup. The conventional stage-discharge rating was not used this water year. An ADVM rated to an index velocity is used to determine the discharge at the gage. The index velocity coefficient 0.87, in use since Nov. 12, 2010, was used until Oct. 31, 2011. An index velocity coefficient 0.84 was applied to the record from Nov. 1, 2011 until the end of the water year. Two discharge measurements and one observation of 0 flow (Nos. 328-330) were made this year, ranging in discharge from 0 to 820 cfs. The observation of 0 flow was made on Mar. 13, 2012. The peak instantaneous flow of 980 cfs occurred at 0545 on Oct. 05, 2011 at a gage height of 7.70 ft. The peak instantaneous gage height occurred at 0715 on Oct. 05, 2011 at a gage height of 7.73 ft.
Discharge.--	The discharge record for WY12 has been developed from the on-site computed flow from the Channel Master ADVM. Stage-discharge values using the CFB and shifts derived from measurements were not used.
Special Computations.--	On Nov. 12, 2010, an index velocity coefficient of 0.87 should have been entered into the Channel Master but an incorrect coefficient of 0.90 was inadvertently entered. A correction factor of 0.97 ($0.90 \times 0.97 = 0.87$) was applied to the discharge record for the period Oct. 1, 2011 to Oct. 31, 2011. At 09:00 on May 25, 2012, a new index velocity coefficient of 0.84 was entered into the Channel Master. The 0.84 index velocity coefficient was applied to the discharge record from Nov. 1, 2011 until the end of the water year. A correction factor of 0.93 ($0.90 \times 0.93 = 0.84$) was applied to the discharge record for the period Nov. 1, 2011 to 09:00 on May 25, 2012. No corrections were necessary after the 0.84 index velocity coefficient was entered into the Channel Master. There were 28 values on Jan. 1 2012 when the flow dropped dramatically. These unit values were evaluated by comparing the vertical beam to the CFB. The VB was about half that of the CFB. This indicates a probable obstruction above the VB. Sometimes a chunk of anchor ice will carry stream bed material up with it whenever it releases. The two stage values were used in a spreadsheet to generate a factor to multiply the value for flow for each of the 15 minute unit values. Then the total 96 values were used to calculate a mean which was then edited into the mean daily discharge. This factor of depth was a plausible method because the general shape of the cross section is rectangular.
Remarks.--	The record is rated good, except for Jan. 15, 2012 when ADVM was reading incorrectly and should be considered poor. The shoulder days occurred on Oct. 31, 2011, Nov. 18, 2011 and Mar. 4, 7, 11 and 23, 2012, and should be considered fair. The peak instantaneous flow should be considered good. The station maintained and record developed by Gerald M. Thrush .
Recommendations.--	The data needs to be downloaded frequently because the number of logged parameters has increased and several of them are being logged on a 5 minute interval.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

REDLANDS CANAL NEAR GRAND JUNCTION

RATING TABLE-- STCONVERT USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

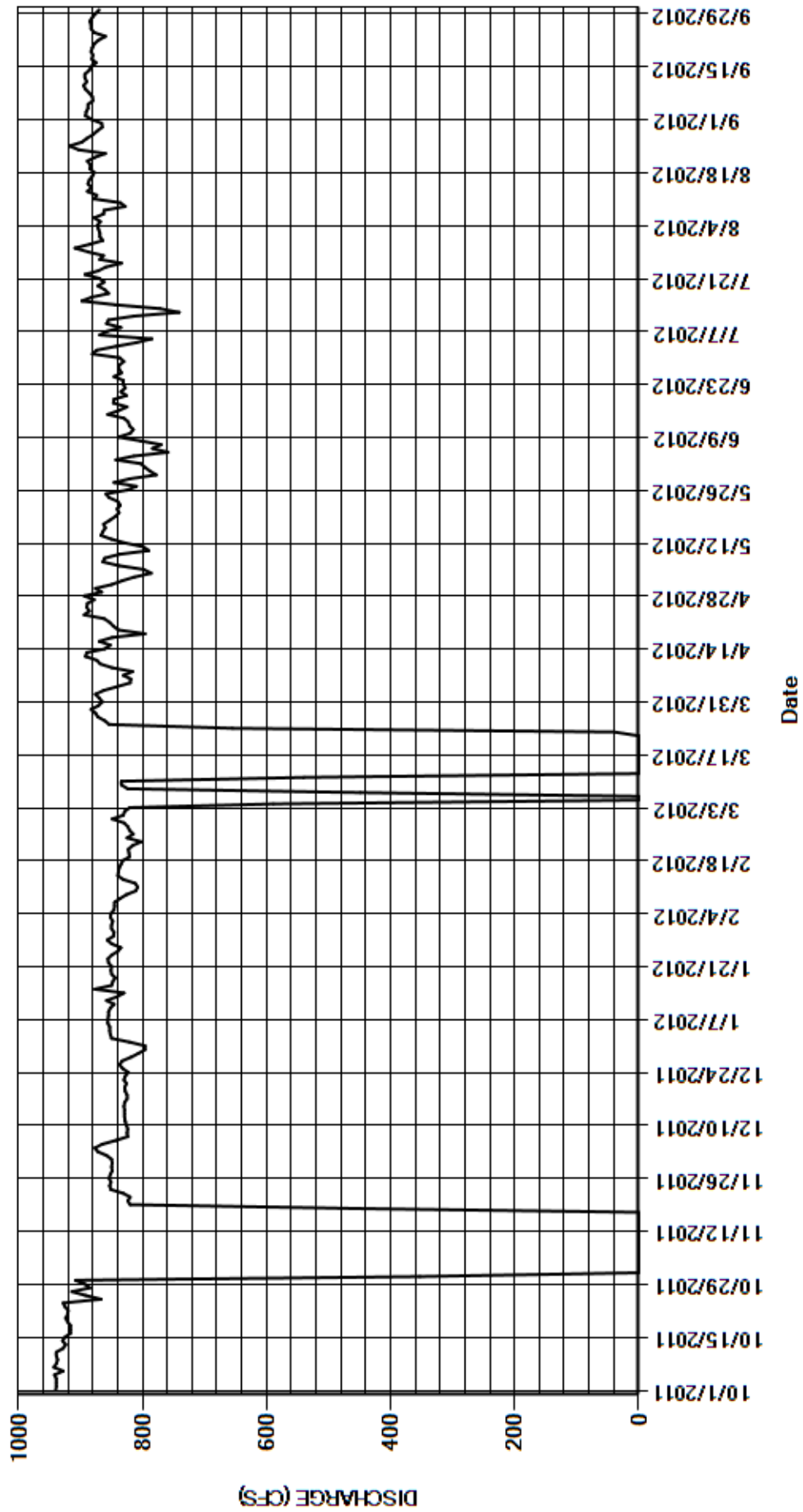
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	940	0.00	850	821	850	831	870	850	796	881	869	882
2	939	0.00	858	850	848	829	876	833	803	874	869	892
3	939	0.00	872	852	852	821	863	813	843	843	871	891
4	939	0.00	877	853	851	589	841	786	814	810	873	888
5	942	0.00	865	853	846	0.00	820	798	759	785	868	888
6	928	0.00	843	856	845	0.00	819	838	784	869	878	880
7	943	0.00	824	856	845	449	831	864	770	857	863	881
8	939	0.00	825	855	836	824	816	861	803	835	862	886
9	937	0.00	824	855	826	834	849	838	839	858	828	892
10	939	0.00	826	852	811	834	868	790	820	855	836	895
11	939	0.00	828	846	808	540	874	799	815	814	878	890
12	928	0.00	829	858	812	0.00	892	828	821	741	874	893
13	924	0.00	829	841	831	0.00	890	850	823	772	889	893
14	929	0.00	829	830	840	0.00	861	867	830	844	882	886
15	925	0.00	830	877	839	0.00	852	864	856	898	888	883
16	916	0.00	829	850	838	0.00	870	860	839	882	886	875
17	916	0.00	825	848	835	0.00	849	863	825	855	881	882
18	916	459	825	844	832	0.00	796	853	847	861	878	880
19	921	820	828	850	821	0.00	839	844	846	872	885	883
20	924	824	829	851	822	0.00	847	838	826	862	884	881
21	921	820	826	850	823	0.00	853	841	835	870	889	878
22	920	831	830	855	816	0.00	862	836	828	893	877	871
23	925	851	828	856	802	39	894	840	831	871	860	860
24	928	853	823	850	825	655	886	854	831	859	903	878
25	867	851	832	840	815	854	890	859	846	834	918	883
26	892	854	837	835	821	861	889	825	834	869	898	883
27	914	852	833	850	824	872	878	810	838	863	890	885
28	885	849	819	857	830	876	894	846	838	888	880	881
29	893	850	807	847	849	883	866	820	830	909	873	876
30	908	849	796	846	---	871	876	778	837	885	865	870
31	353	---	796	850	---	865	---	788	---	864	866	---
TOTAL	28029	10563.00	25772	26334	24093	13327.00	25811	25834	24707	26473	27161	26486
MEAN	904	352	831	849	831	430	860	833	824	854	876	883
AC-FT	55600	20950	51120	52230	47790	26430	51200	51240	49010	52510	53870	52530
MAX	943	854	877	877	852	883	894	867	856	909	918	895
MIN	353	0.00	796	821	802	0.00	796	778	759	741	828	860

CAL YR	2011	TOTAL	300495.00	MEAN	823	MAX	975	MIN	0.00	AC-FT	596000
WTR YR	2012	TOTAL	284590.00	MEAN	778	MAX	943	MIN	0.00	AC-FT	564500

MAX DISCH: 980 CFS AT 05:45 ON OCT 05,2011 GH 7.70 FT SHIFT 0 FT (GH from ADVN Vertical Beam)
 MAX GH: 7.73 FT AT 07:15 ON OCT 05,2011 (From ADVN Vertical Beam)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

REDLANDS CANAL NEAR GRAND JUNCTION
WY2012 HYDROGRAPH



GUNNISON RIVER BASIN
GUNNISON RIVER BELOW REDLANDS DIVERSION DAM

Water Year 2012

Location.-- Lat. 39°02'17 " , Long. 108°34'13", in SW¼SW¼ sec 26, T.1 S., R.1 W., Ute Meridian, Mesa County, Hydrologic Unit 14020005, on the right bank of the Gunnison River just upstream of the Department of Energy Compound, about 1.6 miles above the mouth and the Colorado River, and about 0.78 miles below the Redlands Canal Diversion Dam.

Drainage Area and Period of Record.-- The drainage area is approximately 8,020 square miles.; Published by the Colorado Division of Water Resources, Office of the State Engineer since 2003. Preliminary data starts in 1995. Published data from 2003 to present.

Equipment.-- A Sutron Satlink 2 Logger high data rate DCP and a Sutron Constant Flow Bubbler (CFB). The shelter is a 48-inch CMP culvert on a concrete pad. The primary reference is an outside cantilever chain gage which can be used at low gage readings if the bank is trenched. It is used up to gage height 13.00 ft. The secondary reference gage is a section of staff gage that is carried to and placed at the top of the brass nut at the end of the orifice line. Gage height of the brass nut is 0.46 ft. This is used to calibrate the CFB at extremely low flows and is more accurate under these circumstances than the cantilever because the cantilever is 60+ ft. downstream. There is an air temperature sensor. No other changes this water year.

Hydrologic Conditions.-- The control is the natural streambed with a somewhat stable cobble channel. There is very little ice in winter except for the coldest times in the year and this is not as apparent especially during higher flows around 1000 cfs. The Redlands Canal Diversion Dam is 0.78 miles upstream and diverts water in the range of 700 to 800 cfs all year for power generation, and during irrigation season it diverts an additional 60 cfs. Reservoirs upstream include Taylor Park Reservoir, Blue Mesa Reservoir, Morrow Point Reservoir, Crystal Reservoir, Paonia Reservoir, Silver Jack Reservoir, Crawford Reservoir and Ridgway Reservoir. The higher discharges probably starting around 10,000 cfs and flood flows around the range of 18,000 cfs may experience back water from the Colorado River.

Gage-Height Record.-- The primary record is the 15-minute bubbler data from satellite telemetry with DCP download data used for backup purposes. The record is complete and reliable except for the following days when ice affected the stage discharge relationship: Dec. 25-27, 2011; Jan. 13-18, 2012; and when the bubbler gave incorrect readings: Apr. 19, 20; Jun. 7, 13, 14, 18, 25 -29, 2012; and Jul. 3, 5, 12, 2012. The gage was visited on 18 separate occasions this water year to verify the instruments remained calibrated to the primary reference gage. The bubbler was adjusted 14 times this water year. The instrument corrections ranged from -0.04 ft. to +0.03 ft. All corrections made were distributed by time back to the last known matching readings.

Datum Corrections.-- Levels were last run on Mar 25, 2010 and a datum correction of -0.28 ft. was made based on BM No. 2. Levels were previously run in 2002.

Rating.-- The control is the natural streambed with a somewhat stable cobble channel. At high flows in the range of 18,000 cfs and above, backwater from the Colorado River may affect the control. Rating GUNREDCO04 in use since October 1, 2004, was used the entire Water Year. Nine discharge measurements (Nos. 146-154) were made during water year 2012, ranging in discharge from 73.9 cfs to 862 cfs. Measurements cover the range in stage experienced, except the lower mean daily flow on Jul. 13, 2012; and the higher mean daily flows on Oct 1-31; Nov 1-18, 30; Dec 1-31, 2011; Jan 1, 6-9; Mar 5, 6, 12-23, 26-31; Apr 1-13, 27, 28, 2012. The peak instantaneous flow of 2450 cfs occurred at 1230 Nov 1, 2011 at a gage height of 3.79 ft. with a shift of 0.22 ft. It exceeded measurement No. 147, made Jan. 10, 2012 by 1.47 feet in stage.

Discharge.-- Shifting control method was used during all periods of record. Four variable stage-shift relationships were used to distribute shifts throughout the entire water year. The variable shift curves were GUNREDvs12a, GUNREDvs12b, GUNREDvs12dd and GUNREDvs13aa. Measurements show unadjusted shifts varying from 0.25 ft. to 0.32 ft. All were given full weight and applied directly except No. 150, which were discounted 0.61% to smooth shift distribution.

Special Computations.-- The ice effect this year was more severe compared to a normal year when anchor ice is typically present. During the lower flows and cold temperatures the river was frozen over above and below the gage. The shore ice did have effect on the stage. The ice periods were estimated using adjacent good record days, a graph of 15 min. data and from temperatures taken at the gage. During the period when there were sensor problems, the gage height was estimated graphically using trends in the gage height plots on the monthly chart and making appropriate corrections during drastic spikes.

Remarks.-- The record is rated as good except when the stage-discharge relationship was affected by ice which should be considered poor. Station maintained and record developed by Gerald M. Thrush.

Recommendations.-- A few higher measurements would extend the upper end of the rating curve. These are difficult because the high water measurements have to be made from a boat owned and operated by the Bureau of Reclamation. Scheduling difficulties, also, leads to missing high water opportunities. The use of ADCP measurements has allowed high water measurements that could not have been made at these flows by conventional methods. Levels need to be verified.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

GUNNISON RIVER BELOW REDLANDS DIVERSION DAM

RATING TABLE-- GUNREDCO04 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

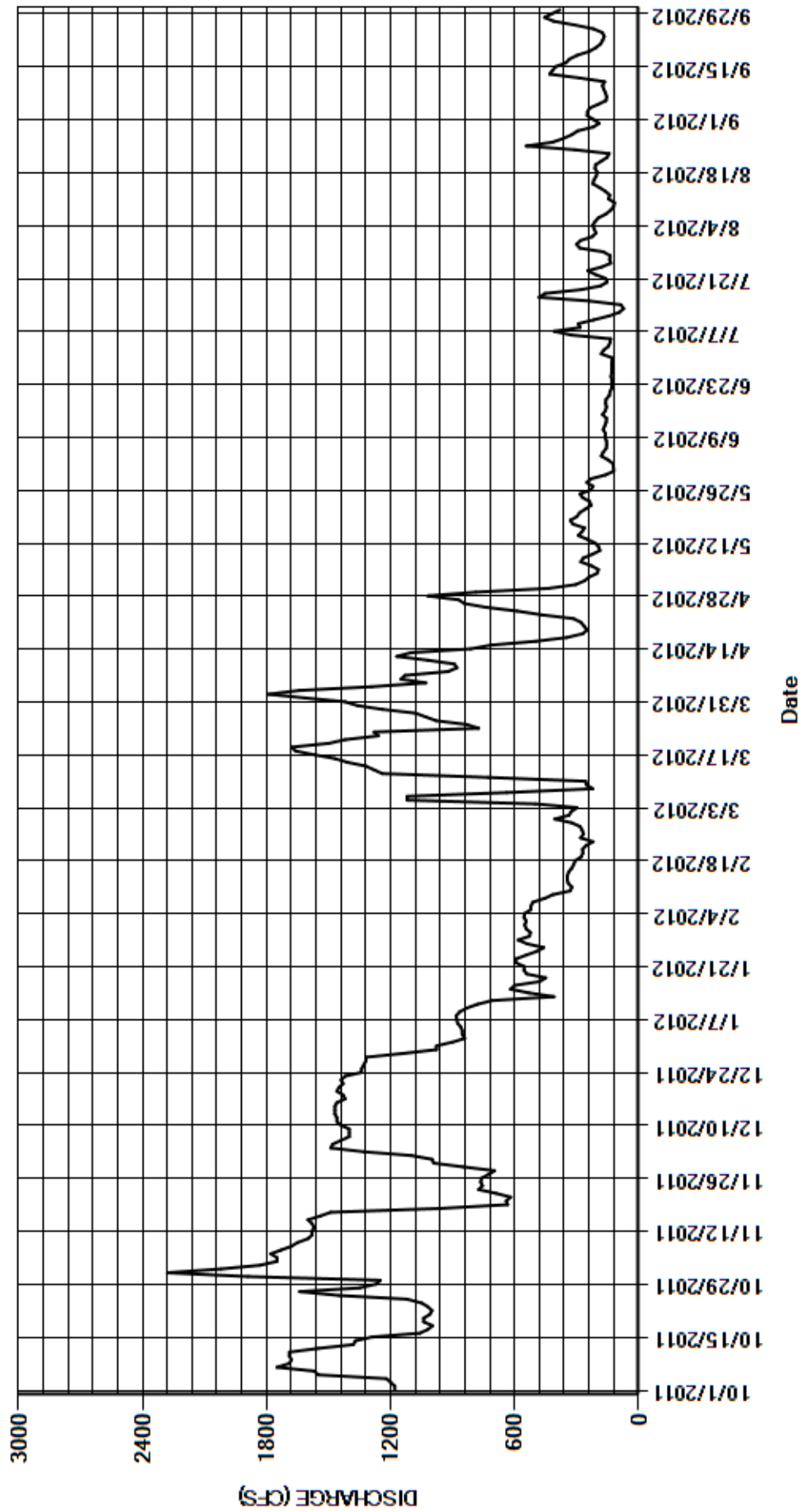
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1180	2280	999	900	551	337	1610	305	122	181	225	219
2	1180	2020	1100	841	544	326	1790	262	124	170	206	249
3	1200	1830	1330	853	555	298	1640	240	149	147	215	248
4	1220	1750	1490	853	552	500	1290	201	181	139	223	238
5	1550	1750	1480	861	523	1120	1030	195	172	136	211	197
6	1570	1780	1440	876	521	1120	1150	230	157	326	195	158
7	1750	1730	1400	881	512	638	1130	280	155	409	159	155
8	1690	1680	1400	882	455	222	922	269	156	283	136	160
9	1680	1650	1400	866	415	252	879	225	163	293	121	169
10	1690	1600	1440	832	332	257	892	188	161	218	117	175
11	1690	1580	1460	780	323	728	1020	194	172	146	146	165
12	1550	1580	1460	708	341	1240	1170	211	164	94	140	287
13	1380	1570	1470	e410	346	1280	1100	250	157	73	161	431
14	1370	1580	1470	e530	345	1320	813	293	156	86	189	417
15	1290	1600	1470	e620	339	1410	715	274	175	238	222	401
16	1060	1540	1460	e600	324	1470	498	262	161	482	217	352
17	1020	1490	1420	e480	314	1570	348	318	156	452	206	335
18	997	962	1430	e450	307	1660	271	331	160	279	200	297
19	1040	634	1460	541	278	1680	250	298	158	184	211	240
20	1040	641	1450	555	270	1500	264	286	142	153	209	207
21	1010	619	1430	554	272	1420	279	257	139	160	181	184
22	1000	690	1440	594	254	1260	315	230	130	209	153	174
23	1020	774	1420	594	221	1280	469	238	130	247	143	167
24	1050	756	1340	544	281	774	588	271	129	179	308	176
25	1120	764	e1340	494	267	832	740	284	134	135	544	220
26	1450	761	e1330	459	273	980	843	232	131	141	417	310
27	1640	726	e1320	540	283	1030	872	221	130	138	364	411
28	1350	697	1320	583	324	1080	1020	251	131	171	323	455
29	1270	850	1140	528	406	1240	788	230	129	285	295	419
30	1250	992	978	524	---	1360	436	160	129	301	220	381
31	1890	---	978	545	---	1420	---	121	---	281	191	---
TOTAL	41197	38876	42065	20278	10728	31604	25132	7607	4453	6736	6848	7997
MEAN	1329	1296	1357	654	370	1019	838	245	148	217	221	267
AC-FT	81710	77110	83440	40220	21280	62690	49850	15090	8830	13360	13580	15860
MAX	1890	2280	1490	900	555	1680	1790	331	181	482	544	455
MIN	997	619	978	410	221	222	250	121	122	73	117	155

CAL YR	2011	TOTAL	898182	MEAN	2461	MAX	12400	MIN	232	AC-FT	1782000
WTR YR	2012	TOTAL	243521	MEAN	665	MAX	2280	MIN	73	AC-FT	483000

MAX DISCH: 2450 CFS AT 12:30 ON NOV 01,2011 GH 3.79 FT SHIFT 0.22 FT
 MAX GH: 3.79 FT AT 12:30 ON NOV 01,2011

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

GUNNISON RIVER BELOW REDLANDS DIVERSION DAM
WY2012 HYDROGRAPH



BLUE RIVER BASIN
BLUE RIVER AT HIGHWAY 9 BRIDGE BELOW BRECKENRIDGE
Water Year 2012

Location.-- Lat 39° 32' 25", long 106° 02' 25" in SE¼ of SW¼ of sec 7, T6S, R77W, Hydrologic Unit 14010004, in Summit County. Located on right bank 25 ft. above Highway 9 Bridge, 3 1/2 miles north of Breckenridge and 2 1/4 miles south of Dillon Reservoir(Blue River Arm).

Drainage Area and Period of Record.-- 80.8 sq mi; Satellite telemetry began Nov 25, 1996. Published streamflow record Oct 1, 1996 to present.

Equipment.-- A Sutron constant flow bubbler (CFB) and shaft encoder (SE) and Sutron SatLink2 data collection platform (DCP) in precast concrete building. The CFB is backup sensor for the SE. The SE and CFB are set by drop tape to an adjustable reference point (RP) in edge of equipment shelf. Outside staff gage, near right bank adjacent to intake pipes, serves as a backup RP. Station has AC power that allows use of a stock tank heater and space heater to prevent water from freezing in stilling well and intake pipes. The SatLink2 was replaced on Jan 25 2012. No other changes this year.

Hydrologic Conditions.-- Transmountain diversions above the station occur through the Continental-Hoosier Tunnel and the Boreas Pass Ditch.

Gage-Height Record.-- The primary record is 15-minute satellite-transmitted CFB gage height data from October 1, 2011 through January 26, 2012, and SE gage height data from January 27, 2012 through September 30, 2012. The record is complete and reliable, except for a period of missing data on December 5-6, 2011. Several instrument corrections were applied during the period of record.

Datum Corrections.-- Levels were last run on September 24, 2012 using RM 1 as base. The channel was excavated on on September 15, 2011, which lowered the control. The lower control caused negative gage heights at low flows. The datum of the gage was lowered by 1.00 feet (in the published record only) on Oct 6 2011 to correct this issue. The gage was otherwise found to read correct and no additional adjustments were made to the inside RP.

Rating.-- Low water control is rock and cobble riffle at the gage house. High water control is three 8 ft diameter culverts 25 ft below gage house under Highway 9. Channel is often mossy during the winter. Rating No. 11 was used until Oct 6, 2011, through measurement no. 146. Rating No. 12 (developed March 29, 2013 using measurements 146-165) was used for the remainder of Water Year 2012. Sixteen discharge measurements (Nos. 146-161) made during WY2012 and Measurement 162 made subsequently were used for analysis. The measurements ranged from 15.5 to 79.1 cfs, which covers the range of discharge experienced except for the lower daily flows of Feb 27 and March 8 and the higher daily flows of July 31 and Aug 1, 2012. The peak discharge of 95 cfs occurred at 1900 on Jul 31, 2012 at a gage height of 1.79 ft with a shift of 0.0 ft. It exceeded the stage of high Measurement No. 159 made Aug 3, 2012 by 0.13 ft.

Discharge.-- Shifting control method was used. Shifts were distributed by time for the entire water year. Measurements made during the period of record indicate raw shifts ranging from -0.06 ft to +0.05 ft. All measurements were discounted from -7% to +8% to smooth the shift distribution.

Special Computations.-- Average daily discharge was compared with downstream BLUNDICO gage operated by USGS for trend comparison.

Remarks.-- Record is rated good except for December 5-6, which were estimated and poor. The peak instantaneous flow is rated good. Station was maintained by and record was developed by Jana Miller.

Recommendations.-- Run levels in WY2013 to further define the low flow control cross section and PZF.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

BLUE RIVER AT HIGHWAY 9 BRIDGE BELOW BRECKENRIDGE

RATING TABLE.-- BLUNINCO11 USED FROM 01-OCT-2011 TO 06-OCT-2011
 BLUNINCO12 USED FROM 06-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

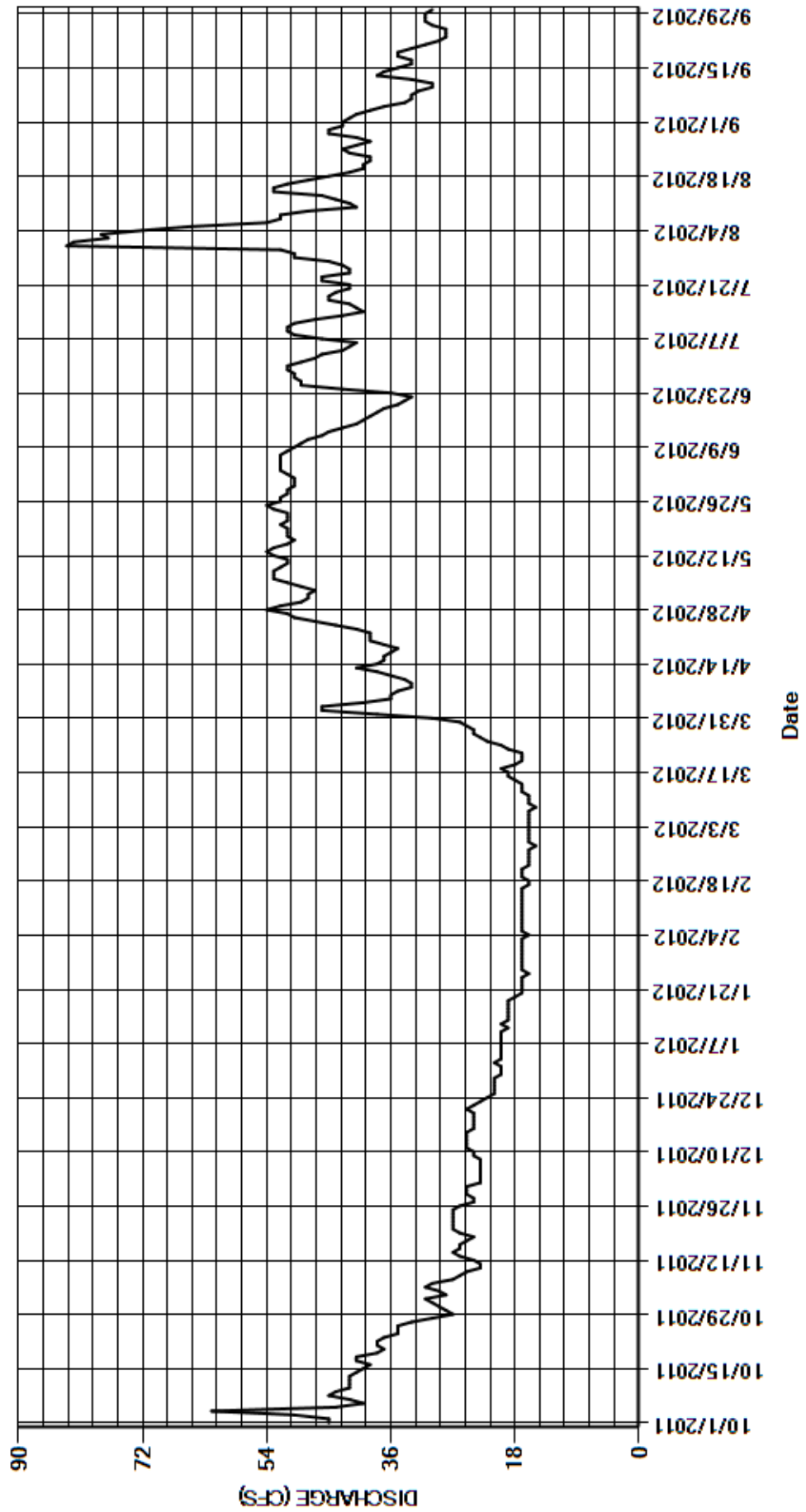
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	45	30	25	20	17	16	38	48	50	49	82	43
2	45	31	23	21	17	16	46	48	51	47	77	42
3	50	28	23	20	17	16	46	47	52	46	78	41
4	62	29	23	20	16	16	40	49	52	43	72	39
5	44	31	e23	20	17	16	36	51	52	42	65	37
6	40	30	e23	20	17	16	36	53	52	41	54	34
7	42	27	23	20	17	16	35	53	52	46	52	33
8	45	26	23	20	17	15	33	53	51	50	52	33
9	44	25	24	20	17	16	33	52	50	51	48	32
10	42	23	24	20	17	16	34	51	49	51	41	30
11	42	23	25	19	17	16	36	51	48	50	42	30
12	42	24	25	20	17	17	38	53	46	47	44	33
13	42	26	25	19	17	17	41	54	45	43	46	38
14	41	27	25	19	17	17	38	53	43	40	53	37
15	40	26	25	19	17	18	37	51	41	41	53	35
16	39	26	24	19	17	19	37	50	40	42	51	33
17	41	25	24	19	16	19	36	51	39	45	48	33
18	41	24	24	19	16	20	35	51	38	45	45	35
19	38	26	24	18	17	18	37	51	37	44	42	35
20	37	27	24	17	17	17	39	52	35	42	40	33
21	38	27	25	17	17	17	39	51	34	42	40	31
22	38	27	24	17	16	17	39	51	33	46	39	29
23	37	27	23	17	16	19	41	51	36	46	39	28
24	35	27	22	17	16	20	44	53	43	42	42	28
25	35	27	21	16	16	22	47	54	49	42	43	28
26	35	26	21	17	16	23	50	52	49	43	41	30
27	33	24	21	17	15	24	51	52	50	45	39	31
28	30	24	21	17	16	24	54	51	50	50	41	31
29	27	25	21	17	16	25	52	51	51	50	45	31
30	28	25	20	17	---	26	49	50	51	52	45	30
31	29	---	20	17	---	30	---	50	---	83	43	---
TOTAL	1227	793	718	575	481	584	1217	1588	1369	1446	1542	1003
MEAN	39.6	26.4	23.2	18.5	16.6	18.8	40.6	51.2	45.6	46.6	49.7	33.4
AC-FT	2430	1570	1420	1140	954	1160	2410	3150	2720	2870	3060	1990
MAX	62	31	25	21	17	30	54	54	52	83	82	43
MIN	27	23	20	16	15	15	33	47	33	40	39	28

CAL YR	2011	TOTAL	39569	MEAN	108	MAX	816	MIN	18	AC-FT	78490
WTR YR	2012	TOTAL	12543	MEAN	34.3	MAX	83	MIN	15	AC-FT	24880

MAX DISCH: 95 CFS AT 19:00 ON JUL 31,2012 GH 1.79 FT SHIFT 0 FT
 MAX GH: 1.79 FT AT 19:00 ON JUL 31,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

BLUE RIVER AT HIGHWAY 9 BRIDGE BELOW BRECKENRIDGE
WY2012 HYDROGRAPH



BLUE RIVER BASIN
SNAKE RIVER AT KEYSTONE SKI AREA
Water Year 2012

Location.-- Lat 39°36'24", long 105°57'06", in NE1/4 NE1/4 Sec. 24, T5S, R77W in Summit County. Located on left bank of Snake River just below Keystone Ski Area snowmaking diversion, 0.5 mi below confluence with North Fork of Snake River, 1.5 mi above confluence with Keystone Gulch, and 3.2 mi upstream of Snake River Arm of Dillon Reservoir.

Drainage Area and Period of Record.-- The drainage area above the gage is 59.5 square miles. ; Partial year (winter) record published with data from Oct 1, 2005 to present.

Equipment.-- Sutron constant flow bubbler (CFB) sensor and Sutron SatLink 2 data collection platform (DCP) housed in the Keystone Ski Area snowmaking pumphouse. The CFB is calibrated to a staff gage located above rock weir control and below Keystone diversion dam.

Hydrologic Conditions.-- Drainage basin is the Snake River and North Fork of the Snake River. Record includes water pumped from Montezuma shaft of Roberts Tunnel that is not always diverted for snowmaking at Keystone Ski Area. Banks between the dam and control are steep and velocity is generally slow in reach below diversion. Channel below the control is composed of cobble and is relatively straight to the measurement section. There is one channel at all stages.

Gage-Height Record.-- The primary record is 15-minute satellite-transmitted data. The DCP log is used as a backup. The record is complete and reliable for the six month period of operation (Oct 1, 2011 – Mar 31, 2012) except for December 5-12 and 23-29, 2011, when the CFB was either fully or partially blocked and record was estimated. During the period of December 12-14, and 30, 2011 through January 3, 2012 the CFB was very unstable and numerous large gage height corrections were made during the time period. Several other minor instrument calibration corrections were made to the CFB sensor during the period of record.

Datum Corrections.-- Levels were not run during the period of record.

Rating.-- Control is a W-weir rock structure approximately 70 ft downstream of the Keystone snowmaking diversion point and 20 ft downstream of AccuBubble orifice pipe. Rating No. 12 was used for all of Water Year 2012. High flows in WY2011 resulted in movement of a few of the large boulders forming the W-weir. Large positive shifts have been measured since then. Eight measurements (Nos. 35–42) made during the period of record, were used for analysis. Measurements range in discharge from 15.7 to 38.6 cfs, which covered the range of flows experienced during the period of record except for the higher daily flow of Oct 17, 2011 and the lower daily flows of Dec 5-6, 8, 23, 26-28, 2011, Jan. 1, 8-9, 11-18, 21-31, Feb 1, 3-29 and March 1-22, 2012. The peak discharge of 57.4 cfs occurred at 20:00 on March 31, 2012 at a gage height of 2.03 ft with a shift of +0.23 ft. The peak gage height exceeded high Measurement 35 by 0.12 ft in stage.

Discharge.-- A shifting control method was used for WY2012. Shifts were applied using one variable stage-shift relationship, SNAKEYCO12B, for the entire period of record. Measurements 35, 36, 39, 41, 42 and 43 were discounted between -3% and +5% to smooth application of shifts. Measurement No. 38 was not used because the mean gage height was undetermined. Raw shifts ranged from +0.22 to +0.33 ft.

Special Computations.-- Discharges during period of bad gage height record on December 5-12 and 23-29, 2011 were estimated by previous days and months of SNAKEYCO data. The base flow was calculated using the snowmaking pumping data provided by Keystone Ski Area to get a more stable flow to estimate the missing data. The pumping was then subtracted out to get the estimated gage height data. The data was also compared to temperature and precipitation data.

Remarks.-- Record is rated as good, except for days of estimated daily discharge which are considered poor. Gage operated and record developed by Jana Miller.

Recommendations.-- A new rating needs to be developed after measurements are made after the rock in the control is put back in place. Consider construction of a cantilever gage to replace staff gage. Also, if extreme cold temperatures continue to affect the gage, then the possibility of installing a radar stage sensor should be considered.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

SNAKE RIVER AT KEYSTONE SKI AREA

RATING TABLE.-- SNAKEYCO12 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

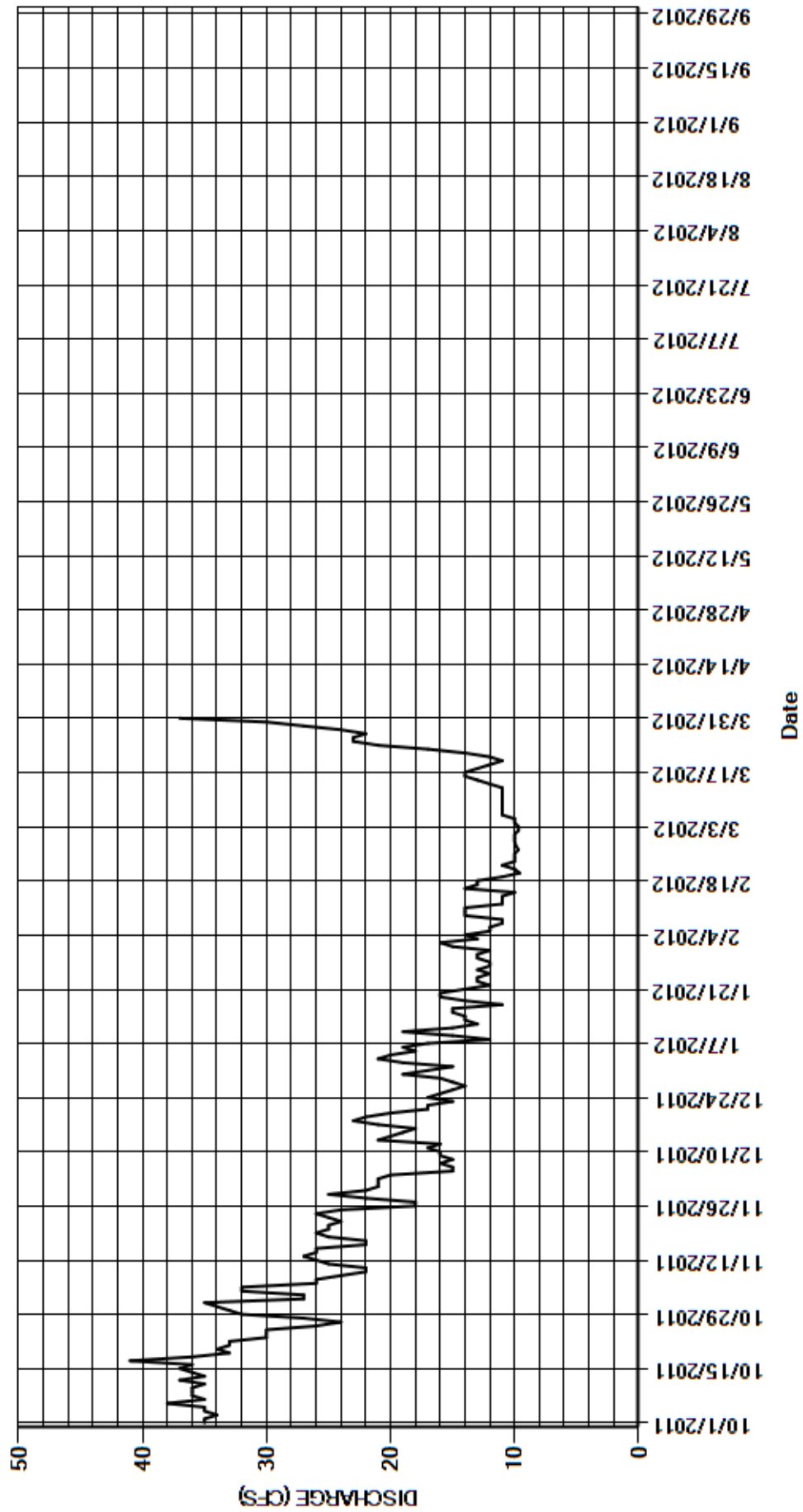
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	35	35	21	15	15	10	---	---	---	---	---	---
2	35	27	21	19	16	9.7	---	---	---	---	---	---
3	34	27	21	21	13	9.7	---	---	---	---	---	---
4	35	32	20	20	14	10	---	---	---	---	---	---
5	35	32	e15	18	12	10	---	---	---	---	---	---
6	38	26	e15	19	12	11	---	---	---	---	---	---
7	35	26	e16	17	11	11	---	---	---	---	---	---
8	36	24	e15	12	11	11	---	---	---	---	---	---
9	36	22	e16	15	14	11	---	---	---	---	---	---
10	36	22	e16	19	14	11	---	---	---	---	---	---
11	35	25	e17	15	14	11	---	---	---	---	---	---
12	37	26	e16	13	11	11	---	---	---	---	---	---
13	35	27	21	14	11	11	---	---	---	---	---	---
14	36	26	20	14	11	12	---	---	---	---	---	---
15	37	26	19	15	10	13	---	---	---	---	---	---
16	36	22	18	15	14	14	---	---	---	---	---	---
17	41	22	21	11	13	14	---	---	---	---	---	---
18	36	25	23	14	13	13	---	---	---	---	---	---
19	33	26	22	16	11	12	---	---	---	---	---	---
20	34	25	20	16	9.6	11	---	---	---	---	---	---
21	33	25	17	14	10	12	---	---	---	---	---	---
22	33	24	17	12	11	14	---	---	---	---	---	---
23	30	25	e15	13	10	17	---	---	---	---	---	---
24	30	26	e17	13	10	21	---	---	---	---	---	---
25	30	24	e16	12	10	23	---	---	---	---	---	---
26	26	18	e15	13	9.7	23	---	---	---	---	---	---
27	24	18	e14	12	9.9	22	---	---	---	---	---	---
28	27	22	e15	12	10	24	---	---	---	---	---	---
29	32	25	e16	13	10	27	---	---	---	---	---	---
30	33	22	19	13	---	30	---	---	---	---	---	---
31	34	---	17	12	---	37	---	---	---	---	---	---
TOTAL	1047	752	551	457	340.2	476.4	---	---	---	---	---	---
MEAN	33.8	25.1	17.8	14.7	11.7	15.4	---	---	---	---	---	---
AC-FT	2080	1490	1090	906	675	945	---	---	---	---	---	---
MAX	41	35	23	21	16	37	---	---	---	---	---	---
MIN	24	18	14	11	9.6	9.7	---	---	---	---	---	---

CAL YR	2011	TOTAL	3389.3	MEAN	18.6	MAX	41	MIN	9.4	AC-FT	6720 (PARTIAL YEAR RECORD)
WTR YR	2012	TOTAL	3623.6	MEAN	19.8	MAX	41	MIN	9.6	AC-FT	7190 (PARTIAL YEAR RECORD)

MAX DISCH: 57.4 CFS AT 20:00 ON MAR 31,2012 GH 2.03 FT SHIFT 0.23 FT
 MAX GH: 2.03 FT AT 20:00 ON MAR 31,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

Snake River at Keystone Ski Area
WY2012 Hydrograph



ROARING FORK RIVER BASIN
ROARING FORK RIVER BELOW MAROON CREEK NEAR ASPEN

Water Year 2012

Location.-- Lat. 39°13'30", Long. 106°51'20", NW ¼ of SW¼ of Sec. 35, T.9 S., R.85 W. in Pitkin County, Hydrologic Unit 14010004, CO. Gage located on left bank at Aspen Consolidated Sanitation Plant, 0.8 mi downstream from confluence with Maroon Creek.

Drainage Area and Period of Record.-- 289 sq. mi.; Published record November 1988 to present.

Equipment.-- Gage is equipped with a Sutron shaft encoder and Sutron SatLink2 data collection platform (DCP) housed in precast concrete building with floor dimensions of about 4.5 ft by 6.5 ft. Building is constructed over a 12 ft deep well constructed with 4 ft diameter precast concrete rings. A Sutron Stage Discharge Recorder (SDR) was installed on July 5, 2012 to replace the Stevens A-71 graphic water-stage. The SDR and shaft encoder have separate floats and are set by drop tape from an adjustable reference point in edge of equipment shelf. Well is connected to stream by two 2" intake pipes with outside risers for flushing. An A-frame cableway with sit-down cable car is located 500 ft. upstream of the gage. No other changes this water year.

Hydrologic Conditions.-- Upstream transmountain diversions occur through Hunter Tunnel (part of Frypan-Arkansas system) and Twin Lakes Tunnel. Building is equipped with AC power that allows use of a space heater and a stock tank heater, which help keep the well and intakes from freezing. Anchor ice often forms in the riffle control during cold weather and causes a backwater effect.

Gage-Height Record.-- Primary record is 15-minute satellite-transmitted shaft encoder data. with SDR or chart data used for backup. The record is complete and reliable for Water Year 2012, except for December 6-12, 23-28, 2011 and January 13-16, 18, 2012 when the stage-discharge relationship was affected by anchor ice in the riffle control. Three instrument corrections of +/- 0.01 and no flush corrections were made during Water Year 2012. Chart record was used to fill in missing data on Jan. 12, 21, 2012. Chart data was used to fill in missing and erroneous data caused by the malfunction of the GOES West satellite on Mar. 21, 22, 2012.

Datum Corrections.-- Levels were run on Aug. 1, 2012 using RM2 as a base. The gage was found to read correct and the R.P. was not adjusted.

Rating.-- Channel is composed of cobble throughout and is straight from 400 ft above to 100 ft below the gage. Banks are steep on right bank and medium on left bank. The low flow control is a rock and cobble riffle about 80 ft below the gage. High flow control is 15 ft diameter boulder about 100 ft downstream of gage. During rising high flows of Water Year 2011, cobbles and boulders were deposited in the control and channel cross-section. This changed hydrologic conditions in the reach of the river adjacent to the gage and resulted in large shifts with respect to Rating 6. Rating No. 7 was developed for Water Year 2012 and was put into affect starting 10:00 October 4, 2011 with Measurement 222a. Nineteen measurements (Nos. 222-240) were made during WY2012. Measurements ranged from 96.1 to 571 cfs, which covered the range in stage experienced during the year except for the lower daily flows on February 16-18, 22, 24, 26-27, 29, and March 1, 4-10, 2012 and the higher daily flows of June 2-8, 2012. The peak discharge of 726 cfs occurred at 0130 on June 2, 2012 at a gage height of 4.18 ft with a shift of 0 ft. The peak gage height exceeded high measurement No. 234 by 0.17 ft in stage.

Discharge.-- Shifting control method used for WY2012. Shifts were distributed by time from Oct 1, 2011 through Sep 30, 2012. Discharge measurements made this water year were used to develop Rating No. 7 which resulted in shifts ranging from -0.05 to +0.03 ft. Measurement No. 222 utilized Rating No. 6, and therefore had a shift of 0.10. Measurement 222a is a copy of measurement 222, although it utilizes Rating No. 7 with a +0.02 shift discounted by 4.8% to 0. Measurements 223, 225-238, 240 were discounted between -6.0% and +5.5% to smooth the shift distribution.

Special Computations.-- Discharge estimates for ice-affected days were based on straight-line pro-ration from adjacent days with good electronic gage height data. As a general check, a hydrographic comparison was made to upstream gage on the Roaring Fork River near Aspen (operated by USGS in non-winter months). Three major tributaries are located between the gages, however, flow trends at the two gages were reasonably consistent during Water Year 2012.

Remarks.-- Record is good, except during periods of ice-affected control when record is rated as fair. The peak instantaneous peak discharge is considered good. Gage operated and maintained by Jana Miller and record developed by Jana Miller.

Recommendations.-- Cableway is due for inspection.

STATE OF COLORADO
DIVISION OF WATER RESOURCES
OFFICE OF STATE ENGINEER

ROARING FORK RIVER BELOW MAROON CREEK NEAR ASPEN

RATING TABLE.-- ROABMCCO06 USED FROM 01-OCT-2011 TO 04-OCT-2011
ROABMCCO07 USED FROM 04-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

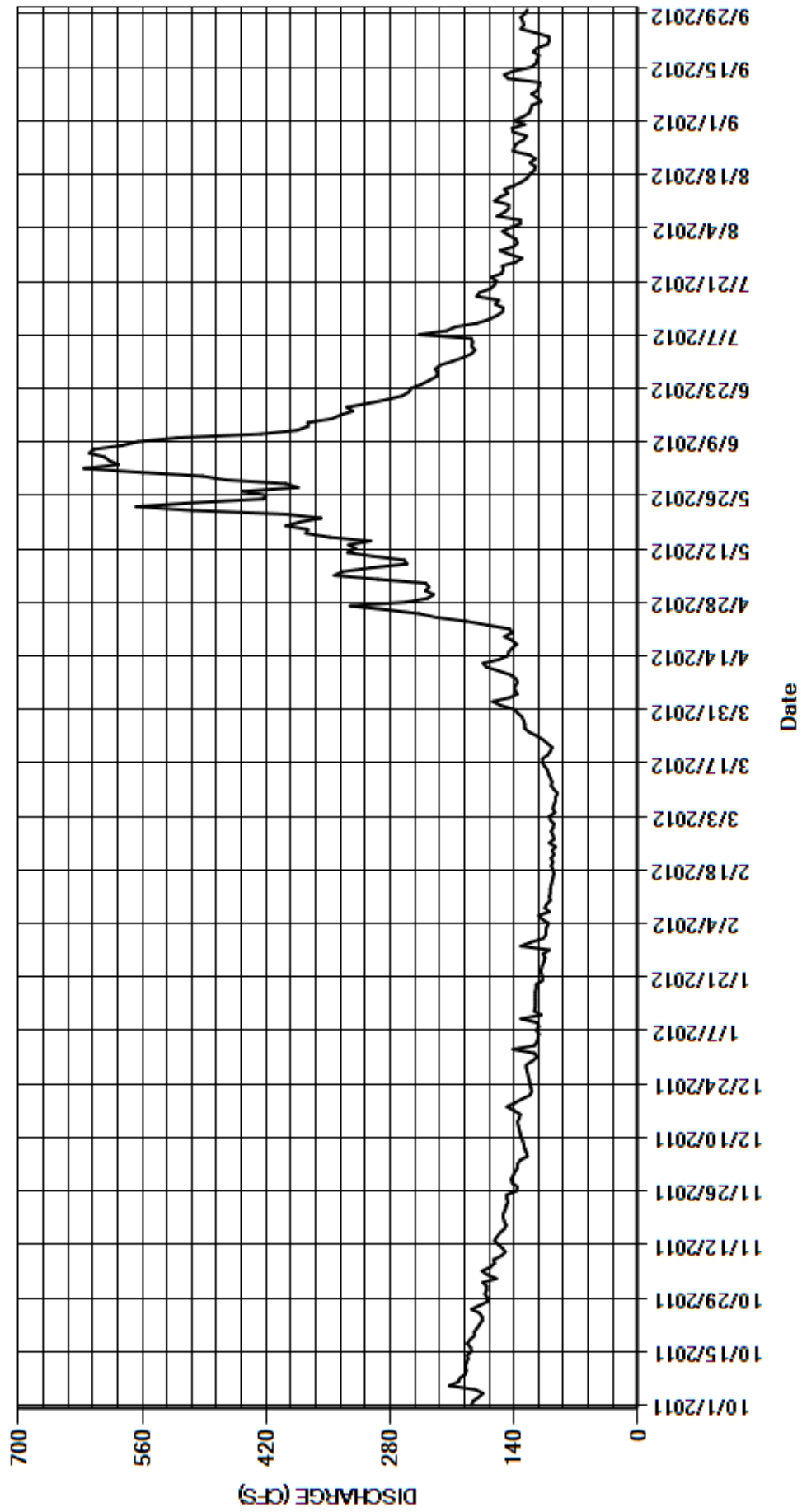
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	188	171	139	117	104	95	155	240	564	198	138	140
2	186	175	136	141	104	99	164	236	626	188	146	130
3	180	160	136	117	103	100	145	240	587	184	153	123
4	175	170	133	114	101	94	136	294	597	188	144	121
5	184	176	125	113	108	96	139	343	603	187	133	120
6	213	167	e126	112	112	95	139	334	620	188	133	109
7	203	162	e128	115	100	93	136	302	615	247	159	114
8	201	163	e129	112	105	93	138	261	583	216	151	120
9	195	154	e130	114	103	91	144	264	565	207	146	113
10	194	150	e132	132	99	95	157	299	521	182	146	112
11	195	153	e133	109	100	98	171	328	426	168	162	111
12	194	158	e134	117	99	97	175	319	385	159	156	147
13	192	162	135	e116	99	99	157	327	373	153	147	151
14	193	159	136	e116	98	101	147	302	373	152	151	140
15	188	156	134	e116	97	102	146	348	346	161	140	120
16	189	151	133	e116	96	105	142	375	336	157	131	115
17	193	149	140	116	95	108	137	373	322	182	125	114
18	190	151	148	e115	96	108	142	398	329	179	122	112
19	185	152	139	115	98	102	151	382	305	167	117	118
20	185	152	131	108	96	99	142	358	284	162	116	114
21	182	150	122	108	98	97	145	398	266	160	122	102
22	179	149	120	109	95	102	170	504	259	166	116	100
23	176	147	e121	109	97	107	194	567	256	154	122	101
24	176	148	e122	108	93	114	228	504	245	152	141	116
25	179	148	e123	106	100	123	247	423	236	153	140	132
26	188	137	e124	105	95	128	284	420	228	138	137	129
27	179	136	e125	107	96	128	325	447	226	131	129	130
28	170	142	e126	100	98	129	262	384	229	145	126	132
29	170	143	126	132	96	131	238	398	224	156	141	128
30	173	141	119	121	---	136	231	466	210	141	142	125
31	171	---	114	107	---	140	---	492	---	136	128	---
TOTAL	5766	4632	4019	3543	2881	3305	5287	11326	11739	5257	4260	3639
MEAN	186	154	130	114	99.3	107	176	365	391	170	137	121
AC-FT	11440	9190	7970	7030	5710	6560	10490	22470	23280	10430	8450	7220
MAX	213	176	148	141	112	140	325	567	626	247	162	151
MIN	170	136	114	100	93	91	136	236	210	131	116	100

CAL YR	2011	TOTAL	148973	MEAN	408	MAX	2310	MIN	92	AC-FT	295500
WTR YR	2012	TOTAL	65654	MEAN	179	MAX	626	MIN	91	AC-FT	130200

MAX DISCH: 726 CFS AT 01:30 ON JUN 02,2012 GH 4.18 FT SHIFT 0 FT
MAX GH: 4.18 FT AT 01:30 ON JUN 02,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

ROARING FORK RIVER BELOW MAROON CREEK NEAR ASPEN
WY2012 HYDROGRAPH



ROARING FORK RIVER BASIN
ROARING FORK RIVER AB FRYINGPAN RIVER NR BASALT

Water Year 2012

Location.-- Lat 39°21'40", Long 107°01'44" in SW 1/4 of NE 1/4 of Sec. 18, T8S, R86W in Pitkin County, Hydrologic Unit 14010004. Located on left bank of Roaring Fork River, just below Highway 82 bridge, 0.5 mi. above confluence with Fryingpan River, and 2.5 mi above confluence with Sopris Creek.

Drainage Area and Period of Record.-- Drainage area is 511 square miles.; Published streamflow record 2006 to present

Equipment.-- Sutron Constant Flow Bubbler (CFB) sensor and Sutron SatLink 2 data collection platform (DCP) housed in 2 ft rectangular steel shelter. The primary reference is an outside cantilever chain gage that is adjacent to the shelter.

Hydrologic Conditions.-- Drainage basin is upper reach of Roaring Fork Valley. Transmountain diversions from several tributaries at the upper end of the basin occur seasonally. Confluence with Fryingpan River is about ½ mi. downstream. The gage is operated from Apr 1 through Sep 30.

Gage-Height Record.-- The primary record is 15-minute CFB data downloaded from satellite telemetry with DCP download data for backup purposes. The record is complete and reliable for the period of record (Apr 1 – Sep 30, 2012). Calibration corrections to the CFB sensor were made throughout the period of record.

Datum Corrections.-- Levels were run on August 1, 2012 using RM 1 as a base. The outside cantilever gage was found to read -0.07 ft low. The cantilever gage was corrected -0.07 ft on Aug. 8, 2012 and the correction was applied in the record from 1000 on Mar. 30, 2012 until 1145 on Aug. 8, 2012.

Rating.-- Control is cobble and boulder channel. Left side of channel at gage is a steep bank and subject to cobble deposition since June 2010. Right side of channel slopes gently to a cobble bar with moderate willow growth. At higher stages, flow rises above the cobbles and willows on right bank. Minor algae growth occurs. Rating No. 6 in use since June 5, 2010 was used for the entire water year. Thirteen discharge measurements (Nos. 29-41) were made this water year, ranging in discharge from 125 to 739 cfs. Measurements cover the range in stage experienced during the period of record except for the lower daily flows on July 13-14, 27, 30-31; August 5-6, 16-23, 27-28, 31; September 2-11, and 15-30, 2012 and the higher daily flows of June 2, 2012. The peak discharge of 888 cfs occurred at 0400 on June 2, 2012 at a gage height of 2.38 ft with a shift of +0.23 ft. It exceeded the stage of Measurement No. 35 by 0.20 ft. in stage.

Discharge.-- Shifting control method was used for the entire period of record in water year 2012. Shifts were applied as defined by measurements and were distributed using a stage shift relationship. One variable shift curve (ROAFRYCOVS3a) was developed and used during the entire period of record. Measurements showed shifts for water year 2012 ranged from +0.08 to +0.32 ft. All measurements were given full weight and applied directly except for Measurement Nos. 30, 32, 34, and 38-41, which were discounted between -3.0% to +2.3 % to smooth shift distribution.

Special Computations.-- The left side of the channel where the gage operates developed a large rock bar that created a small channel separate from the main channel. Although still connected to the main stream above and below, it was considerably lower in stage than the main channel, which explains the large shifts from the current rating. There were numerous gage height corrections throughout the water year made to the bubbler.

Remarks.-- Record is rated as good. The peak instantaneous flow should be considered good. Gaging station operated, maintained and record developed by Jana Miller.

Recommendations.-- Channel dynamics since June 2010 have resulted in cobble deposition in the left side of the channel at the gage cross section. This trend is problematic to gage operation and discharge measurements. It is being discussed with CWCB to move the gage to a more appropriate location and possibly shortening the duration of the measurements to a critical three month flow time of year and discontinuing the record.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

ROARING FORK RIVER AB FRYINGPAN RIVER NR BASALT

RATING TABLE-- ROAFRYCO06 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

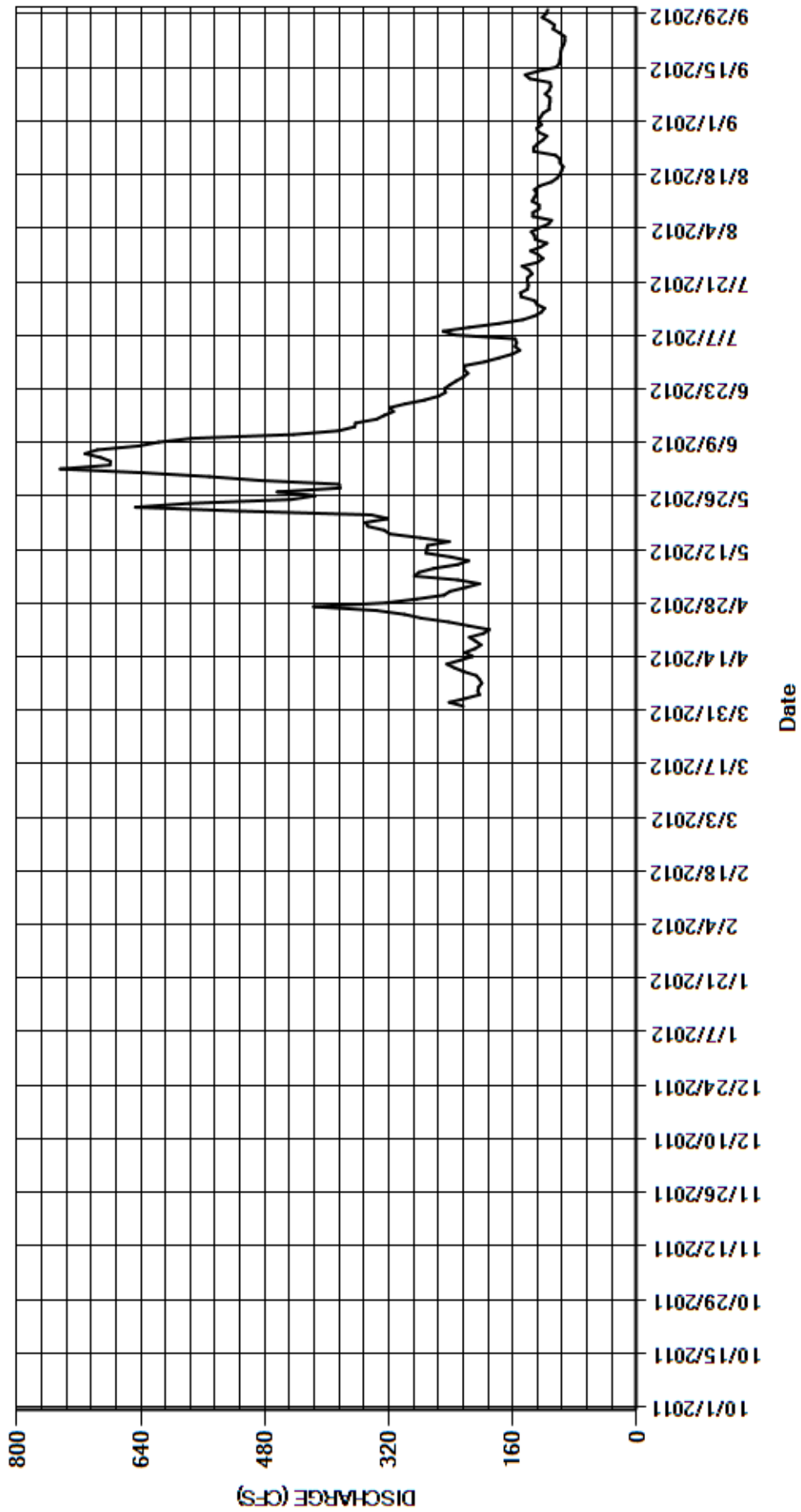
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	224	241	637	178	131	127
2	---	---	---	---	---	---	242	221	744	161	132	124
3	---	---	---	---	---	---	221	203	680	151	136	121
4	---	---	---	---	---	---	203	231	679	157	126	113
5	---	---	---	---	---	---	205	287	692	155	114	113
6	---	---	---	---	---	---	204	281	712	157	110	112
7	---	---	---	---	---	---	200	262	696	235	134	112
8	---	---	---	---	---	---	203	231	643	250	134	118
9	---	---	---	---	---	---	207	217	617	216	126	113
10	---	---	---	---	---	---	223	240	574	178	126	111
11	---	---	---	---	---	---	235	272	443	147	135	112
12	---	---	---	---	---	---	245	271	384	132	132	138
13	---	---	---	---	---	---	228	270	364	123	129	144
14	---	---	---	---	---	---	212	242	363	119	132	127
15	---	---	---	---	---	---	222	279	336	129	125	104
16	---	---	---	---	---	---	209	319	326	132	110	100
17	---	---	---	---	---	---	201	326	314	149	103	99
18	---	---	---	---	---	---	208	347	319	150	99	98
19	---	---	---	---	---	---	216	350	299	141	97	98
20	---	---	---	---	---	---	198	321	274	140	95	97
21	---	---	---	---	---	---	190	343	256	141	99	94
22	---	---	---	---	---	---	217	512	247	141	99	93
23	---	---	---	---	---	---	243	647	248	135	105	93
24	---	---	---	---	---	---	278	578	241	139	133	100
25	---	---	---	---	---	---	300	446	233	148	133	108
26	---	---	---	---	---	---	336	415	224	128	128	106
27	---	---	---	---	---	---	417	464	218	121	121	113
28	---	---	---	---	---	---	323	383	223	127	116	122
29	---	---	---	---	---	---	284	384	222	137	127	117
30	---	---	---	---	---	---	249	487	196	124	129	115
31	---	---	---	---	---	---	---	552	---	116	123	---
TOTAL	---	---	---	---	---	---	7143	10622	12404	4657	3739	3342
MEAN	---	---	---	---	---	---	238	343	413	150	121	111
AC-FT	---	---	---	---	---	---	14170	21070	24600	9240	7420	6630
MAX	---	---	---	---	---	---	417	647	744	250	136	144
MIN	---	---	---	---	---	---	190	203	196	116	95	93

CAL YR	2011	TOTAL	202079	MEAN	1104	MAX	3890	MIN	165	AC-FT	400800 (PARTIAL YEAR RECORD)
WTR YR	2012	TOTAL	41907	MEAN	229	MAX	744	MIN	93	AC-FT	83120 (PARTIAL YEAR RECORD)

MAX DISCH: 888 CFS AT 04:00 ON JUN 02,2012 GH 2.38 FT SHIFT 0.23 FT
 MAX GH: 2.38 FT AT 04:00 ON JUN 02,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

ROARING FORK RIVER AB FRYING PAN RIVER NR BASALT
 WY2012 HYDROGRAPH



ROARING FORK RIVER BASIN
09077200 FRYINGPAN RIVER NEAR IVANHOE LAKE

Water Year 2012

Location.-- Lat. 39° 14' 42", Long. 106° 31' 50", unsurveyed in Pitkin County, Hydrologic Unit 14010004. Located on left bank 100 ft downstream from diversion dam, 2 mi southwest of Ivanhoe Lake, and 9.1 mi southeast of Norrie, CO.

Drainage Area and Period of Record.-- 18.7 sq mi. from topographic map.;

Equipment.-- Sutron Model SDR-0001-4 stage discharge recorder in 3'-0" square doghouse style metal-clad shelter on 24-inch diameter corrugated metal stilling well located directly in stream. SDR is set by drop tape to an inside reference point on edge of equipment shelf. The SDR is hardwired to Chapman control house where a SatLink2 data collection platform (DCP) provides satellite transmission. No changes this water year.

Hydrologic Conditions.-- Drainage basin is National Forest land, primarily wilderness area. Diversion dam is just upstream of gage. Diverted water and discharge from Fryingpan-Arkansas collection tunnels (north and south tunnels converge above station) flow into Charles H. Boustead Tunnel, which carries water transmountain to the Arkansas River basin (since May 16, 1972). Well and control freeze during winter months.

Gage-Height Record.-- The primary record is 15-minute data downloaded from the SDR. Satellite transmitted data is used as backup when available. The record is complete and reliable for water year 2012, except for periods when stilling well and control were frozen (Oct 27, 2011- Mar 28, 2012) and SDR float was beached (Aug 17 - 23, 2012). A single instrument correction was applied in late August associated with the beached float condition.

Datum Corrections.-- Levels were run on Jul. 12, 2012 to the drop tape index (RP_DT) using RM 2 as a base. The RP_DT index was found to be -0.018 ft. low. The drop tape length (TL_DT) was found to be reading correct. No corrections were made since the RP_DT index and TL_DT were found to be within the accepted error tolerance.

Rating.-- Channel is composed of boulders and cobbles. Control is a 9.8 ft wide rectangular concrete weir. Rating No. 9, developed in water year 2011, was used throughout all of water year 2012. Eight discharge measurements (Nos. 388-395) made during water year 2012, and No. 396 made subsequently, was used for analysis. Measurements ranged from 11.0 cfs to 45.2 cfs which covered the range in stage experienced during the year except for the lower daily flows on Oct 28, Nov 3, 6-30, and Dec 1-24, 28-31, 2011; Jan 1-31; Feb 1-29; Mar 1-30; and Apr 3, 4, 7, 2012; and the higher daily flows of May 30, 31, and Jun 1, 2, 8-11, 2012. The peak discharge of 59.2 cfs occurred at 0900 on Jun. 10, 2012 at a gage height of 1.73 ft with a shift of 0.02 ft. The peak gage height exceeded high Measurement No. 392 by 0.19 ft. in stage.

Discharge.-- Shifting control method was used during the entire water year. Shifts were applied as defined by measurements and were distributed by time and stage. Shifts were distributed by time from 0000 on Oct. 1, 2011 until 1130 on Oct. 5, 2011. Shifts were distributed by stage utilizing variable shift curve FRYIVLCOVS12 the remaining part of water year 2012. Measurements showed unadjusted shifts ranged from 0.00 ft to +0.04 ft. Measurements Nos. 392, 393 and 394 were discounted from -2% to +6% to smooth shift distribution.

Special Computations.-- Average daily discharges for periods of frozen well (Oct 27, 2011 – Mar 28, 2012) and beached SDR float (Aug 17-23, 2012) were estimated from hydrographic comparison with the downstream gage on the Fryingpan River near Thomasville gage (FRYTHOCO). Diversions associated with the Fryingpan-Arkansas project were not occurring during the estimated periods of record, which allows reasonable estimates of discharge using this method.

Remarks.-- Record is good, except for periods when the well was frozen and when silt in the stilling well did not allow the float to operate correctly should be considered poor. The peak instantaneous flow should be considered good. Gaging station operated, maintained and record developed by Craig Bruner.

Recommendations.-- Gage requires independent data collection platform and transmission equipment due to unreliable transmissions common to all index gages associated with the upper Fryingpan-Arkansas collection system.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09077200 FRYINGPAN RIVER NEAR IVANHOE LAKE

RATING TABLE.-- FRYIVLCO09 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

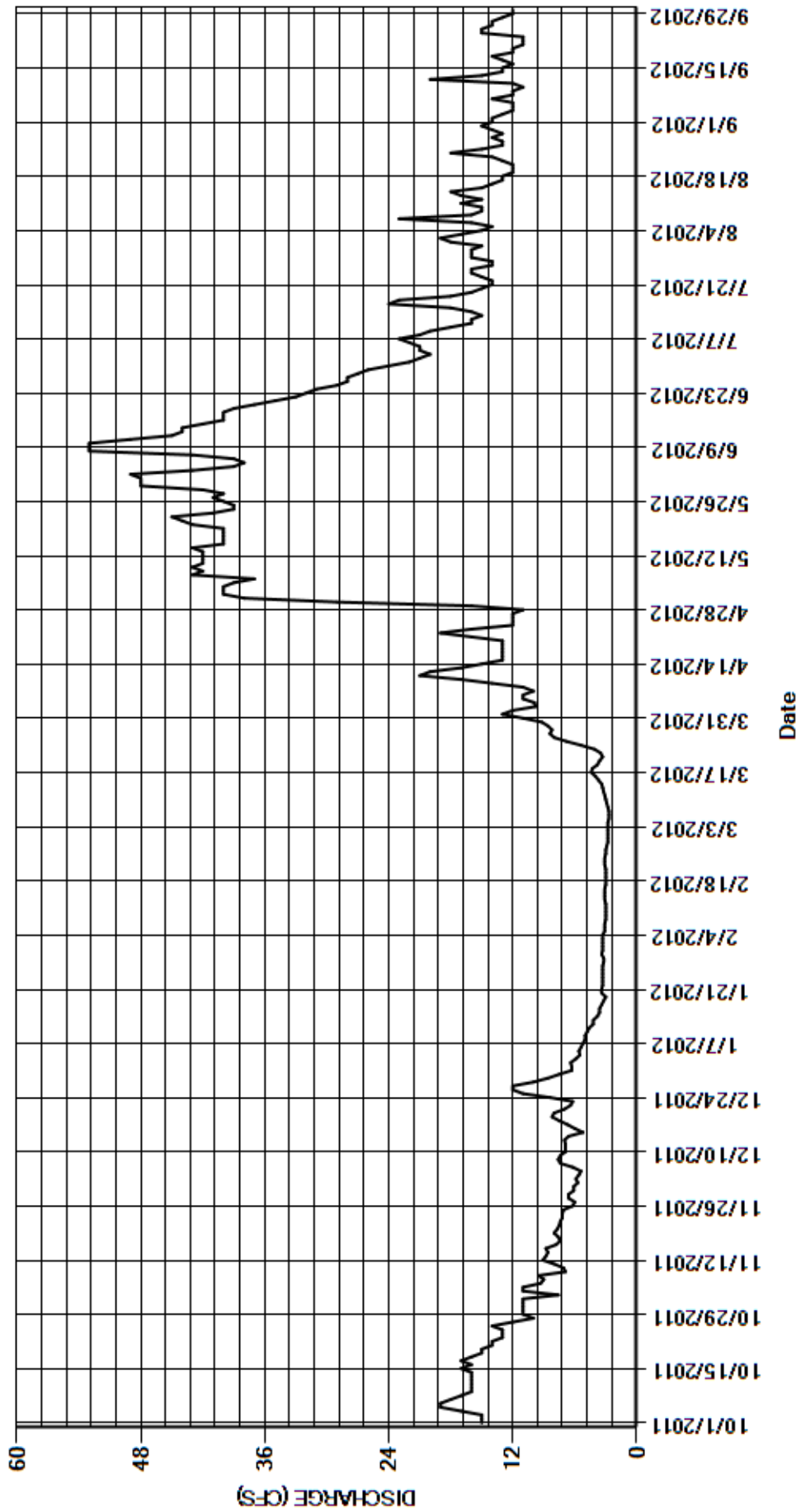
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15	e11	e6.1	e6.3	e3.3	e2.8	13	38	48	22	18	14
2	15	e11	e5.7	e6.4	e3.3	e2.8	12	40	49	21	19	14
3	15	e7.6	e5.9	e5.9	e3.3	e2.8	9.8	40	43	20	17	13
4	17	e11	e5.6	e5.5	e3.3	e2.8	9.9	40	39	21	15	12
5	19	e11	e5.4	e5.6	e3.1	e2.7	11	39	38	21	14	12
6	19	e9.3	e6.2	e5.4	e3.1	e2.7	11	37	39	22	16	12
7	18	e9.0	e7.4	e5.2	e3.1	e2.7	10	43	43	23	23	14
8	17	e9.5	e7.6	e5.0	e3.0	e2.8	11	42	53	21	16	12
9	16	e6.9	e7.4	e5.0	e3.0	e2.9	14	43	53	20	15	12
10	16	e7.1	e6.9	e4.8	e3.0	e3.0	17	42	53	18	15	11
11	16	e8.0	e6.9	e4.6	e3.0	e3.1	21	42	49	16	17	12
12	16	e9.1	e6.9	e4.2	e3.0	e3.2	20	42	45	16	15	20
13	16	e8.8	e7.0	e4.2	e3.1	e3.3	17	42	44	15	17	15
14	16	e8.6	e6.6	e3.8	e3.1	e3.4	15	43	44	16	18	13
15	17	e8.8	e5.2	e3.6	e3.1	e3.7	13	40	42	18	15	13
16	16	e7.8	e6.0	e3.6	e3.1	e4.0	13	40	40	24	14	12
17	17	e7.4	e6.7	e3.4	e3.0	e4.4	13	40	40	23	e13	13
18	16	e7.6	e7.5	e3.2	e3.0	e4.3	13	40	40	18	e13	14
19	15	e8.0	e8.2	e3.0	e3.0	e3.8	13	40	39	16	e12	12
20	15	e7.7	e8.0	e3.4	e3.0	e3.6	13	43	37	15	e12	12
21	14	e7.5	e7.0	e3.4	e3.0	e3.3	16	44	35	14	e12	11
22	14	e7.4	e6.4	e3.3	e3.1	e3.5	19	45	33	14	e13	11
23	13	e7.2	e6.2	e3.3	e3.1	e4.1	16	41	32	15	e14	11
24	13	e7.2	e8.4	e3.3	e3.1	e5.4	12	39	31	16	18	15
25	13	e7.1	e11	e3.3	e3.0	e6.8	12	39	29	16	15	15
26	14	e6.2	e12	e3.3	e3.0	e8.0	12	40	28	14	13	14
27	e12	e6.0	e12	e3.3	e2.9	e8.4	12	41	28	14	13	14
28	e10	e6.6	e10	e3.2	e2.8	e8.2	11	40	27	16	14	13
29	e11	e6.6	e8.6	e3.2	e2.8	8.6	16	42	26	16	13	12
30	e11	e6.1	e7.5	e3.4	---	9.2	29	48	24	16	14	12
31	e11	---	e6.3	e3.3	---	11	---	48	---	15	15	---
TOTAL	463	243.1	228.6	128.4	88.7	141.3	424.7	1283	1171	552	468	390
MEAN	14.9	8.10	7.37	4.14	3.06	4.56	14.2	41.4	39.0	17.8	15.1	13.0
AC-FT	918	482	453	255	176	280	842	2540	2320	1090	928	774
MAX	19	11	12	6.4	3.3	11	29	48	53	24	23	20
MIN	10	6.0	5.2	3.0	2.8	2.7	9.8	37	24	14	12	11

CAL YR	2011	TOTAL	4411.9	MEAN	12.1	MAX	49	MIN	2.3	AC-FT	8750
WTR YR	2012	TOTAL	5581.8	MEAN	15.3	MAX	53	MIN	2.7	AC-FT	11070

MAX DISCH: 59.2 CFS AT 09:00 ON JUN 10,2012 GH 1.73 FT SHIFT 0.02 FT
 MAX GH: 1.73 FT AT 09:00 ON JUN 10,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09077200 FRYINGPAN RIVER NEAR IVANHOE LAKE
WY2012 HYDROGRAPH



ROARING FORK RIVER BASIN
09077610 IVANHOE CREEK NEAR NAST

Water Year 2012

Location.-- Lat. 39°17'13", Long. 106°33'31", unsurveyed, Pitkin County, Hydrologic Unit 14010004, on left bank 60 ft upstream from culvert under Nast Tunnel, 300 ft downstream from diversion dam, 2.3 mi east of Nast, and 5.8 mi southeast of Norrie, CO.

Drainage Area and Period of Record.-- Drainage area is 9.43 mi². ;

Equipment.-- Sutron Model SDR-001-4 stage discharge recorder (SDR) housed in a 3'-0" square metal-clad shelter on 24" diameter corrugated metal well located directly in stream. The SDR is hard-wired to Chapman Control House and configured to transmit gage height via 4-20 mA output. SDR is set by drop tape to inside reference point. The SDR was replaced by the USBR with an equivalent Sutron Model SDR-0001-4 on May 21, 2012. No other changes this water year.

Hydrologic Conditions.-- Basin is USFS land with several seasonal roads. Transmountain diversions occur just upstream of station and are diverted to Arkansas River Basin through Charles H. Boustead Tunnel.

Gage-Height Record.-- The primary record is 15-minute data downloaded from the SDR. Satellite transmitted data is used for comparison/verification when available. Intermittent missing 15-min stage values were prorated between adjacent good gage height data. The record is complete and reliable for Water Year 2012, except periods where SDR float was beached on sediment accumulation in the well (Oct 1-4, 2011 and Jun 30, Jul 1-6, 10-12, 2012); stilling well and control were frozen (Oct 28, 2011 - Apr 5, 2012 and Apr 16-17, 2012); and gage height data was unavailable (May 11, 17-21, 2012). Three minor instrument corrections were made during water year 2012.

Datum Corrections.-- Levels were run Jul 12, 2012 using RM 3 as a base. The RP index was found to be 0.004 ft. high. The drop tape length was found to be reading correct. No corrections were made since the RP index and drop tape length were found to be within the allowable error tolerances.

Rating.-- Low water control is 120 degree v-notch weir approximately 30 ft below gage. Rating No. 4, in use since October 1, 1996, was used for the entire water year. Seven discharge measurements (Nos. 246-252) made during Water Year 2012, and No. 253 made subsequently, were used for analysis. Measurements ranged from 0.54 to 3.55 cfs, which covered the range experienced during the year except for lower daily flows on Jul 26-27, 30-31; Aug 1-6, 19-23; Sep 6, 10-11, 22-23, 2012; and higher daily flows on Mar 24-31, Apr 1-23, 30, May 1-9, and Jun 3-12, 2012. The peak discharge of 17.2 cfs occurred at 2345 on Apr 11, 2012 at a gage height of 1.48 ft with a shift of 0.01 ft. The peak gage height exceeded high Measurement 249 by 0.54 feet in stage.

Discharge.-- Shifting control method was used during the entire water year. Shifts were applied as defined by measurements and were distributed by time and stage. Shifts were distributed by time from 0000 on Oct. 1 until 1430 on Oct 5, 2011 to transition from variable shift curve IVCRNACOV2011 (in use at the end of water year 2011) to variable shift curve IVCRNACOV2012. Shifts were distributed by stage utilizing variable shift curve IVCRNACOV2012 from 1445 on Oct. 5 until the floats froze in the stilling well on Oct. 28, 2011. Shifts were distributed by time during the winter. Shifts were distributed by stage using variable shift curve IVCRNACOV2012B from the spring thaw on Apr. 6, 2012 to the end of water year 2012. Measurements showed shifts ranged from -0.03 ft to 0.00 ft. Shifts were applied directly and given full weight except for Measurement Nos. 246, 248, and 250 which were discounted from -5% to 4% to smooth shift distribution. The shift for Measurement No. 247 was not used because the control was affected by ice.

Special Computations.-- Average daily discharge for periods of beached SDR float (Oct 1-4, 2011 and Jun 30, Jul 1-6, 10-12, 2012), frozen well (Oct 28, 2011 - Apr 5, 2012 and Apr 16-17, 2012), and no gage height data (May 11, 17-21, 2012) were estimated from point in time measurements and hydrographic comparison with the downstream gage on the Fryingpan River near Thomasville (FRYTHOCO). Diversions associated with the Fryingpan-Arkansas project were not occurring during the beached SDR float and frozen well estimated periods of record, which allows reasonable estimates of discharge using this method. Analysis of diversion data for the period of no gage height data in May, revealed constant diversion flows making estimation with the FRYTHOCO gage a reasonable comparison.

Remarks.-- Record is good except for periods of beached SDR float, frozen well, and unavailable gage height data, which are estimated and should be considered poor. The peak instantaneous flow should be considered fair. Station maintained and record developed by Craig Bruner.

Recommendations.-- Gage requires independent data collection platform and transmission equipment due to unreliable transmissions common to all index gages associated with the Fryingpan-Arkansas collection system. An adjustable R.P. needs to be installed in the equipment shelter. Obtain measurements in the 5 - 50 range (if present) to verify stage-discharge relationship.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09077610 IVANHOE CREEK NEAR NAST

RATING TABLE-- IVCNACO04 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

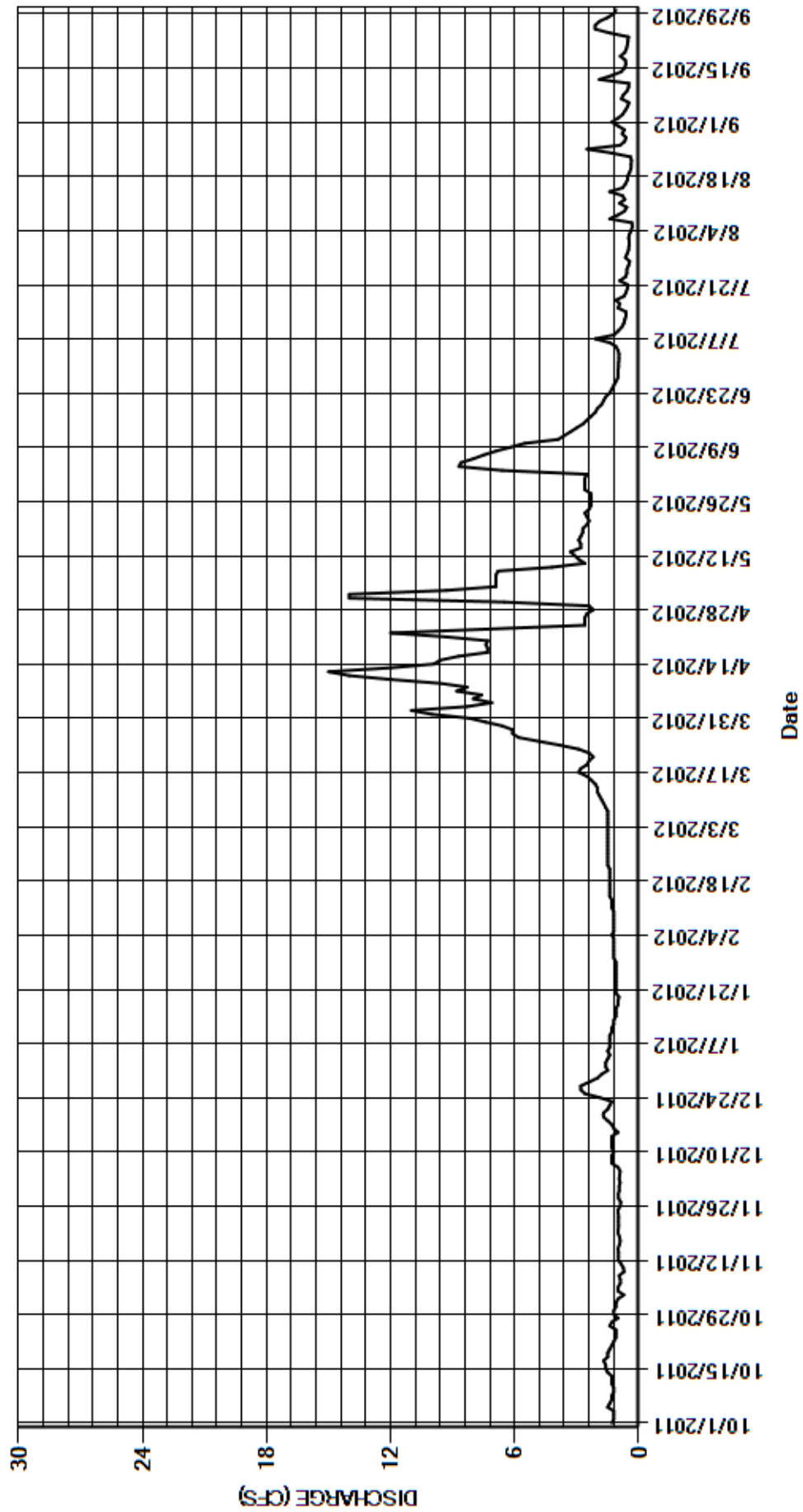
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e1.3	e1.1	e0.95	e1.6	e1.2	e1.5	e10	14	2.6	e0.97	0.45	1.3
2	e1.2	e1.0	e0.90	e1.6	e1.2	e1.5	e11	14	2.5	e0.95	0.49	1.0
3	e1.2	e0.72	e0.94	e1.5	e1.2	e1.5	e8.3	9.3	6.6	e0.95	0.45	0.77
4	e1.2	e1.0	e0.92	e1.4	e1.3	e1.5	e7.1	6.9	8.7	e1.0	0.36	0.65
5	1.5	e1.0	e0.90	e1.5	e1.2	e1.5	e8.0	6.9	8.6	e1.1	0.31	0.54
6	1.4	e0.89	e1.0	e1.4	e1.2	e1.5	7.6	6.9	8.0	e1.4	0.33	0.47
7	1.3	e0.89	e1.3	e1.4	e1.2	e1.5	8.8	6.9	7.5	2.1	1.4	0.84
8	1.3	e0.95	e1.3	e1.4	e1.2	e1.6	8.3	6.8	6.9	1.2	1.0	0.74
9	1.2	e0.71	e1.3	e1.4	e1.2	e1.7	9.6	4.2	6.2	1.0	0.68	0.57
10	1.2	e0.74	e1.2	e1.3	e1.2	e1.8	12	2.6	5.5	e0.82	0.58	0.49
11	1.3	e0.85	e1.3	e1.3	e1.3	e1.9	14	e2.9	3.9	e0.72	0.93	0.47
12	1.3	e0.99	e1.3	e1.2	e1.3	e2.0	15	3.1	3.6	e0.67	0.67	1.9
13	1.3	e0.98	e1.3	e1.2	e1.3	e2.0	12	3.3	3.3	0.61	0.79	1.3
14	1.5	e0.98	e1.3	e1.1	e1.4	e2.1	9.9	2.8	3.0	0.62	1.4	0.84
15	1.6	e1.0	e1.0	e1.1	e1.4	e2.3	9.6	2.8	2.7	1.0	0.78	0.68
16	1.6	e0.93	e1.2	e1.1	e1.4	e2.5	e8.7	2.9	2.5	0.91	0.64	0.62
17	1.7	e0.89	e1.3	e1.0	e1.4	e2.9	e7.3	e2.8	2.3	1.1	0.55	0.65
18	1.5	e0.93	e1.5	e1.0	e1.4	e2.8	7.3	e2.7	2.1	0.71	0.54	0.89
19	1.5	e1.0	e1.7	e0.96	e1.4	e2.5	7.4	e2.7	2.0	0.61	0.44	0.67
20	1.4	e0.99	e1.7	e1.1	e1.4	e2.4	7.3	e2.5	1.8	0.55	0.37	0.59
21	1.3	e0.97	e1.5	e1.1	e1.4	e2.2	9.3	e2.4	1.7	0.54	0.37	0.55
22	1.2	e0.99	e1.4	e1.1	e1.5	e2.4	12	2.5	1.6	0.92	0.35	0.52
23	1.1	e0.97	e1.3	e1.1	e1.5	e2.9	7.4	2.6	1.4	0.64	0.39	0.50
24	1.1	e0.99	e1.9	e1.1	e1.5	e3.8	2.6	2.4	1.3	0.57	1.3	1.4
25	1.1	e1.0	e2.6	e1.1	e1.5	e4.8	2.6	2.3	1.2	0.57	2.5	2.1
26	1.4	e0.89	e2.8	e1.1	e1.5	e5.8	2.6	2.3	1.1	0.49	0.90	2.1
27	1.3	e0.87	e2.8	e1.1	e1.5	e6.1	2.5	2.3	1.0	0.44	0.68	1.9
28	e1.0	e0.98	e2.4	e1.1	e1.5	e6.1	2.2	2.3	1.0	0.64	0.61	1.5
29	e1.2	e0.99	e2.0	e1.2	e1.5	e6.6	2.4	2.6	1.0	0.56	0.80	1.2
30	e1.2	e0.94	e1.8	e1.2	---	e7.4	6.5	2.6	e0.97	0.49	0.69	1.1
31	e1.1	---	e1.5	e1.2	---	e8.2	---	2.6	---	0.47	1.0	---
TOTAL	40.5	28.13	46.31	37.96	39.2	95.3	239.3	133.9	102.57	25.32	22.75	28.85
MEAN	1.31	0.94	1.49	1.22	1.35	3.07	7.98	4.32	3.42	0.82	0.73	0.96
AC-FT	80	56	92	75	78	189	475	266	203	50	45	57
MAX	1.7	1.1	2.8	1.6	1.5	8.2	15	14	8.7	2.1	2.5	2.1
MIN	1.0	0.71	0.90	0.96	1.2	1.5	2.2	2.3	0.97	0.44	0.31	0.47

CAL YR	2011	TOTAL	1608.50	MEAN	4.41	MAX	72	MIN	0.71	AC-FT	3190
WTR YR	2012	TOTAL	840.09	MEAN	2.30	MAX	15	MIN	0.31	AC-FT	1670

MAX DISCH: 17.2 CFS AT 23:45 ON APR 11,2012 GH 1.48 FT SHIFT 0.01 FT
 MAX GH: 1.48 FT AT 23:45 ON APR 11,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09077610 IVANHOE CREEK NEAR NAST
WY2012 HYDROGRAPH



ROARING FORK RIVER BASIN

09077800 SOUTH FORK FRYINGPAN RIVER AT UPPER STATION NEAR NORRIE

Water Year 2012

Location.-- Lat. 39°14'20", Long. 106°35'24", unsurveyed, Pitkin County, Hydrologic Unit 14010004, on right bank 300 ft downstream from diversion dam, 5.2 mi upstream from mouth, and 7.2 mi southeast of Norrie, CO.

Drainage Area and Period of Record.-- 11.5 mi²; Oct. 1, 1963 to present.

Equipment.-- Sutron Model SDR-0001-4 stage discharge recorder (SDR) on rectangular platform with removable steel cover on 12-in diameter corrugated metal well located directly in stream. The SDR is hard-wired to Chapman Control House and configured to transmit 4-20 mA gage height via satellite. SDR is set by drop tape to a reference point (1/4 in brass bolt) on outside of downstream side of shelter previously used for a graphic recorder. No other changes this water year.

Hydrologic Conditions.-- Drainage Basin is National Forest land, primarily wilderness area. Transmountain diversions occur just upstream of station and are diverted to Arkansas River Basin through Charles H. Boustead Tunnel.

Gage-Height Record.-- The primary record is 15-minute logged gage height data downloaded from the SDR. Satellite transmitted data was used as backup when available. The record is complete and reliable for the water year, except for the periods of frozen well (Oct 26, 2011 through Mar 29, 2012) and no gage height data (May 24, 26-28 and Jul 1-20, 2012). Checks between the primary and available periods of backup records generally agree to within +/- 0.02 ft. Three instrument corrections were applied during the period of record.

Datum Corrections.-- Levels were run on Jul. 19, 2012 to the drop tape index using RM2 as base. The drop tape index was found to be reading 0.004 ft high. The drop tap length was found to be reading correct. No corrections were made since the RP index elevation and tape length were found to be within the allowable error tolerances.

Rating.-- Control is 6.2 ft wide concrete weir with a 6 ft concrete apron above the crest. Rating No. 9 (used since May 2, 2005) was used for the entire water year. The rating is reasonably well-defined from 5 to 115 cfs. Seven discharge measurements (Nos. 353-359) made during water year 2012, and No. 360 made subsequently, were used for analysis. Measurements ranged from 6.02 to 27.1 cfs which covered the range in stage experienced during the year except for lower daily flows on Oct. 28; Nov 3, 7, 9-30; Dec 1-24, 29-31, 2011; Jan 1-31; Feb 1-29; Mar 1-25; Apr 20, 28; Aug 5, 21, 22; and Sep 3-6, 8-11, 14-16, 19-23, 29-30, 2012; and the higher daily flows of May 22-23, 28-31 and Jun 1-11, 2012. The peak discharge of 46.6 cfs occurred at 1800 on Jun 8, 2012 at a gage height of 3.16 ft. and a shift of +0.05 ft. It exceeded the stage of Measurement No. 355 by 0.55 ft in stage.

Discharge.-- Shifting control method was used for the entire water year. Shifts were applied as defined by measurements and were distributed by time and stage. Variable shift curve FRYSFUCO_VS2011 in use at the end of water year 2011, continued until the period of frozen well (0000 on Oct. 26, 2011). Shifts were distributed by time holding a 0 shift throughout the winter period (Oct. 26, 2011 to Mar. 29, 2012). Variable shift curve FRYSFUCO_VS2012 was used during the summer period (Mar. 30, 2012 to Aug. 20, 2012). Shifts were then distributed by time to the end of the water year. Open-water measurements showed unadjusted shifts varying between +0.01 ft to +0.08 ft. Shifts were applied directly and given full weight except for measurements 353, 355, 356, 358 and 359 were discounted -5% to +4%. The shift for measurement no. 354 was not used because the stage was affected by ice.

Special Computations.-- Average daily discharge for periods of frozen well (Oct 26, 2011 - Mar 29, 2012) and no gage height data (Jul 1-20, 2012) were estimated from point in time measurements and hydrographic comparison with downstream gage on Fryingpan River near Thomasville (FRYTHOCO). Diversions associated with the Fryingpan-Arkansas Project were not occurring during the estimated periods of record, which allows reasonable estimates of discharge using this method. Periods of no gage height data during operation of the Fryingpan-Arkansas collection system (May 24, 26-28) were estimated using adjacent days with good average daily discharge.

Remarks.-- Record is rated fair due to numerous periods of no backup stage data. Periods of no gage height record are rated poor. Gage is operated and record developed by Craig Bruner.

Recommendations.-- Gage requires independent data collection platform and transmission equipment due to unreliable transmissions common to all index gages associated with the Fryingpan-Arkansas collection system. Accompany USBR personnel to gage via diversion tunnel access in early April to improve/extend period of good record. Avalanche danger typically limits vehicle access until June. Monitor diversions for intermediate stage flow measurement opportunity.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09077800 SOUTH FORK FRYINGPAN RIVER AT UPPER STATION NEAR NORRIE

RATING TABLE-- FRYSFUCO09 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

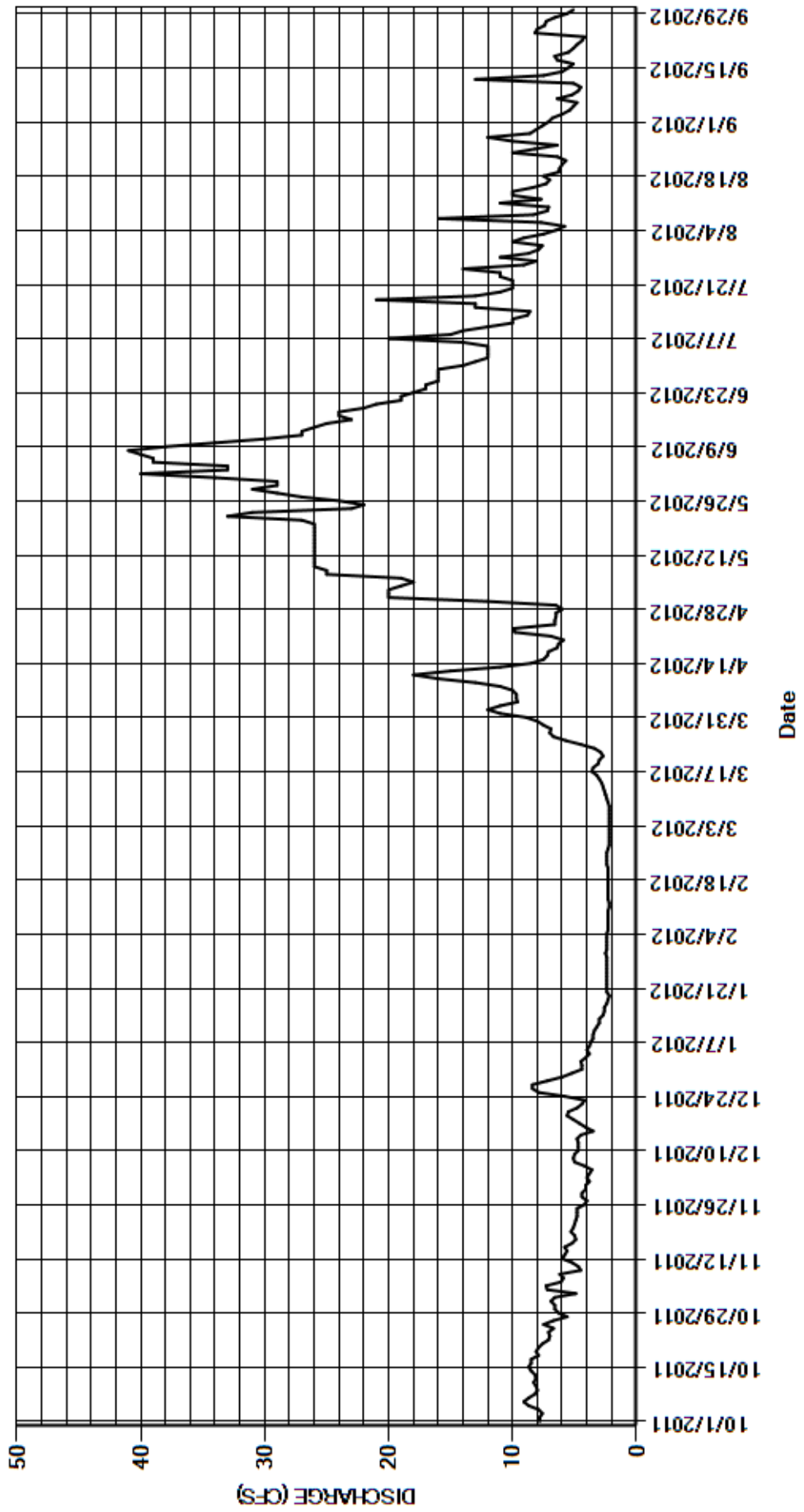
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.8	e6.9	e4.1	e4.4	e2.4	e2.2	11	20	34	e13	10	7.1
2	7.8	e6.6	e3.8	e4.5	e2.4	e2.2	12	20	40	e12	9.1	6.8
3	7.6	e4.9	e4.0	e4.1	e2.4	e2.2	11	20	33	e12	7.5	6.0
4	7.9	e7.2	e3.8	e3.8	e2.4	e2.2	9.6	19	33	e12	6.5	5.4
5	8.7	e7.3	e3.6	e4.0	e2.3	e2.2	9.7	18	39	e12	5.8	5.1
6	9.1	e6.1	e4.2	e3.8	e2.3	e2.2	9.7	19	39	e14	7.7	4.8
7	8.7	e5.9	e5.0	e3.7	e2.3	e2.2	10	25	40	e20	16	6.4
8	8.2	e6.2	e5.1	e3.5	e2.3	e2.2	11	25	41	e15	8.3	5.2
9	8.0	e4.5	e5.0	e3.5	e2.3	e2.3	13	26	38	e14	7.2	4.7
10	8.1	e4.7	e4.7	e3.4	e2.3	e2.4	16	26	34	e12	7.1	4.5
11	8.3	e5.2	e4.7	e3.2	e2.2	e2.5	18	26	30	e10	11	5.1
12	8.1	e6.0	e4.7	e3.0	e2.2	e2.6	15	26	27	e10	7.7	13
13	8.2	e5.8	e4.8	e3.0	e2.3	e2.7	11	26	27	e8.8	10	7.5
14	8.5	e5.6	e4.5	e2.7	e2.3	e2.8	8.5	26	26	e8.6	10	6.0
15	8.7	e5.8	e3.5	e2.6	e2.3	e3.0	7.5	26	25	e13	8.4	5.5
16	8.5	e5.2	e4.1	e2.6	e2.3	e3.2	7.2	26	23	e13	7.3	5.1
17	8.5	e4.9	e4.6	e2.4	e2.3	e3.6	7.1	26	24	e21	7.0	6.4
18	7.9	e5.0	e5.1	e2.3	e2.3	e3.5	6.4	26	24	e13	7.5	6.6
19	8.1	e5.3	e5.6	e2.2	e2.3	e3.1	6.3	26	22	e11	6.3	5.5
20	7.9	e5.1	e5.5	e2.4	e2.3	e3.0	5.9	26	21	e10	6.2	5.1
21	7.6	e5.0	e4.8	e2.4	e2.3	e2.7	6.9	27	19	10	6.0	4.8
22	7.1	e4.9	e4.4	e2.4	e2.4	e2.9	9.8	33	19	10	5.7	4.4
23	7.0	e4.8	e4.2	e2.4	e2.4	e3.4	9.9	31	18	11	6.4	4.2
24	7.1	e4.8	e5.8	e2.4	e2.4	e4.5	6.6	e23	17	11	10	8.2
25	6.7	e4.8	e7.9	e2.4	e2.4	e5.7	6.6	22	17	14	8.2	8.0
26	e7.5	e4.2	e8.4	e2.4	e2.3	e6.7	6.5	e24	16	9.1	6.4	7.4
27	e6.7	e4.0	e8.4	e2.4	e2.2	e7.0	6.5	e27	16	8.1	10	7.3
28	e5.6	e4.4	e7.2	e2.4	e2.2	e6.9	6.0	e29	16	11	12	6.6
29	e6.3	e4.4	e6.0	e2.4	e2.2	e7.5	6.5	31	16	8.7	8.6	5.6
30	e6.6	e4.1	e5.2	e2.5	---	8.0	12	29	14	7.9	8.1	5.1
31	e6.6	---	e4.4	e2.4	---	8.9	---	29	---	7.6	7.6	---
TOTAL	239.4	159.6	157.1	91.6	67.0	116.5	283.2	783	788	362.8	255.6	183.4
MEAN	7.72	5.32	5.07	2.95	2.31	3.76	9.44	25.3	26.3	11.7	8.25	6.11
AC-FT	475	317	312	182	133	231	562	1550	1560	720	507	364
MAX	9.1	7.3	8.4	4.5	2.4	8.9	18	33	41	21	16	13
MIN	5.6	4.0	3.5	2.2	2.2	2.2	5.9	18	14	7.6	5.7	4.2

CAL YR	2011	TOTAL	3146.0	MEAN	8.62	MAX	77	MIN	2.7	AC-FT	6240
WTR YR	2012	TOTAL	3487.2	MEAN	9.53	MAX	41	MIN	2.2	AC-FT	6920

MAX DISCH: 46.6 CFS AT 18:00 ON JUN 08,2012 GH 3.16 FT SHIFT 0.05 FT
 MAX GH: 3.16 FT AT 18:00 ON JUN 08,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09077800 SOUTH FORK FRYINGPAN RIVER AT UPPER STATION NEAR NORRIE
WY2012 HYDROGRAPH



ROARING FORK RIVER BASIN
09077945 CHAPMAN GULCH NEAR NAST

Water Year 2012

Location.-- Lat. 39°15'51", long. 106°37'54", in NW 1/4 of SE 1/4 of Sec. 14, T8S, R83W in Pitkin County, on right bank 700 ft downstream from Chapman diversion tunnel, 3.3 mi upstream from confluence with Fryngpan River, and 4.3 mi southeast of Norrie, CO.

Drainage Area and Period of Record.-- Approximately 6 mi² from topographic map. ;

Equipment.-- Sutron model SDR-0001-4 stage discharge recorder in 3 ft. square metal-clad shelter on a 24 inch diameter corrugated metal well located directly in stream. SDR is set by drop tape to an adjustable reference point on edge of equipment shelf opening to the well. SDR is hard-wired to Chapman Control House and configured to transmit gage height via 4-20 mA output. No changes this water year.

Hydrologic Conditions.-- Basin is almost entirely roadless National Forest land. Chapman Diversion for Fryngpan-Arkansas Project is just upstream of gaging station. Hunter Tunnel discharges above the diversion. During winter, ground water seepage from the tunnel flows into the stream and keeps control and gaging station free of ice.

Gage-Height Record.-- The primary record is 15-minute SDR Log data with SDR satellite-transmitted stage data used for backup. Satellite transmitted data was limited throughout WY2012, but used for comparison when available. Periods of malfunctioning SDR were estimated. The record is complete and reliable for Water Year 2012 except for Apr 27-29 and May 2, 8, 13, 22, 24-28, 2012 when stage data was not logged or transmitted due to SDR malfunction and/or DCP transmission malfunctions. Minor instrument corrections were applied during the period of record.

Datum Corrections.-- Levels were run on Jul 12, 2012 to the drop tape index (RP_DT) using RM 5 as a base. The gage was found to read 0.005 ft high. The drop tape length (TL_DT) was not measured. No corrections were made since the RP_DT was found to be within the allowable error tolerance.

Rating.-- Low water control is 120-degree (v-notch) weir approximately 12 ft below gage. High water control is the channel banks. Rating No. 8 was used for the entire water year 2012. Ten discharge measurements (Nos. 390-399) made during WY 2012, and No. 400 made subsequently were used for analysis. Bypass gate on the diversion dam was set to facilitate a constant flow condition for Measurement 396. Measurements ranged from 1.27 to 20.7 cfs and cover the range of flow experienced during the year except for higher daily flows on May 16-31 and Jun 1-10, 2012; and lower daily flow on Mar 20. The peak instantaneous flow of 70.5 cfs occurred at 1830 on Jul 16, 2012 at a gage height of 3.49 ft with a shift of 0.00 ft. Peak gage height exceeded high flow Measurement 396 by 0.91 ft in stage.

Discharge.-- Shifting control method was used for the entire water year. Shifts were applied as defined by measurements and were distributed by time and stage. The time distribution of shifts in use at the end of water year 2011, continued until 1330 on Jan. 26, 2012. Shifts were distributed by stage utilizing variable shift curve CHAGULCOVS12A from 1345 on Jan. 26, 2012 until 1045 on Sep. 17, 2012. Shifts were distributed by time from 1100 on Sep. 17, 2012 through the end of the water year. Measurement shifts ranged from -0.06 ft to +0.06 ft. Measurement 391 was discounted -7% to smooth the shift distribution. Measurements 393 through 398 were discounted -4% to +7% to develop the variable stage-shift relationship CHAGULCOVS12A.

Special Computations.-- Daily discharge for Apr. 27-30 and May 2, 8, 13, 22, 24-28 (erroneous or missing GH data) were estimated by correcting short periods of erroneous GH data (May 22 and 25), or using straight line interpolation of adjacent good 15-minute GH data or adjacent average daily flows. Intermittent discharge of water diverted from other stream basins in the collection system makes it difficult to estimate gage height from comparison with FRYTHOCO when the Fry-Ark system is operating.

Remarks.-- Record is rated good, except estimated periods are rated fair. The peak instantaneous flow should be considered good. Gaging station operated and record developed by Craig Bruner.

Recommendations.-- Station to be upgraded with independent DCP/transmission equipment during WY2013.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09077945 CHAPMAN GULCH NEAR NAST

RATING TABLE.-- CHAGULCO08 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

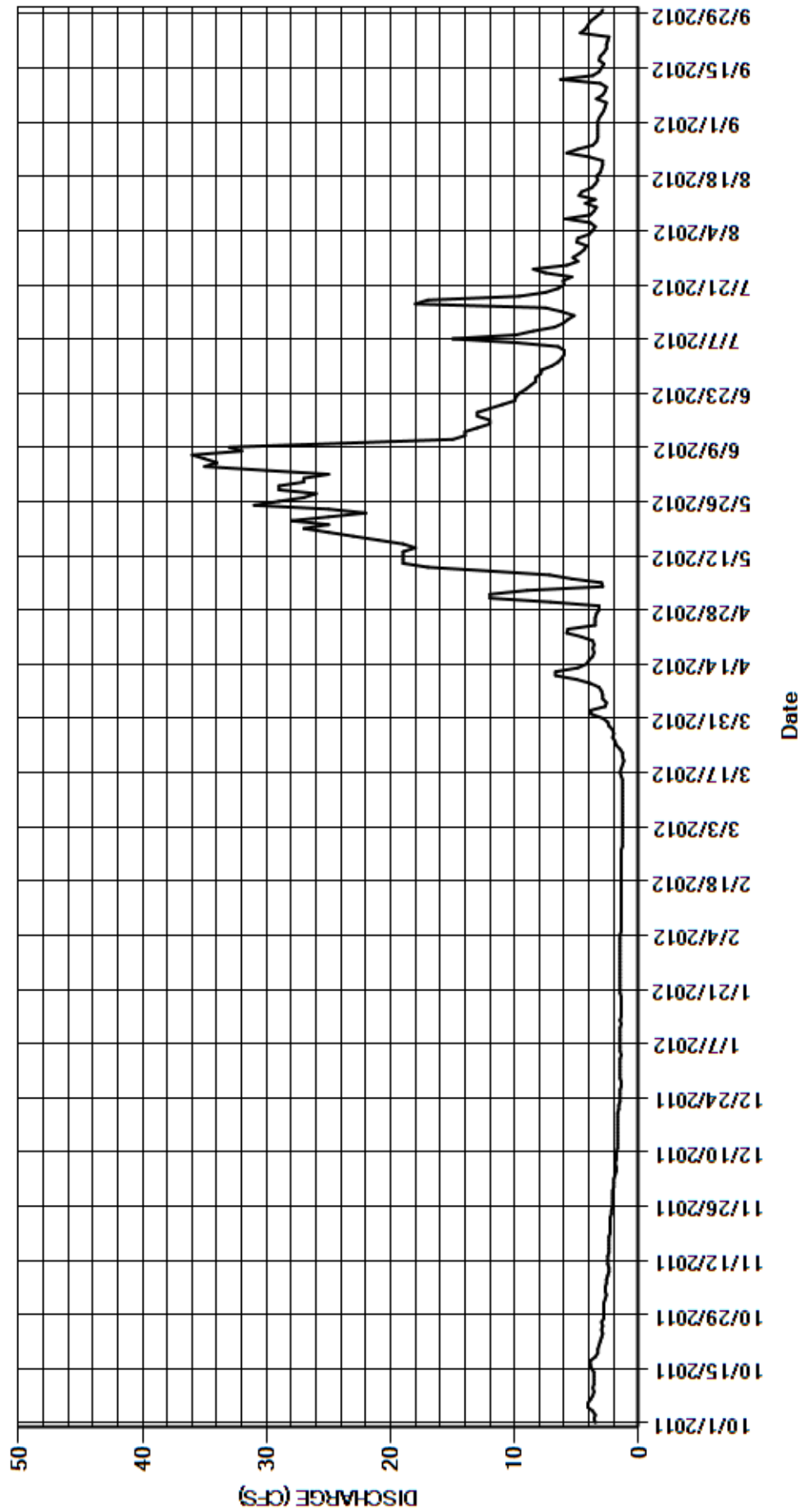
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.5	2.8	2.0	1.5	1.5	1.3	3.8	12	27	6.5	5.0	3.3
2	3.6	2.7	2.0	1.5	1.5	1.3	3.9	e12	25	6.2	4.9	3.2
3	3.5	2.6	2.0	1.5	1.5	1.3	2.7	9.0	30	6.0	4.0	3.0
4	3.7	2.7	1.9	1.4	1.5	1.3	2.6	2.9	35	6.0	3.7	2.8
5	4.1	2.7	1.8	1.5	1.4	1.3	2.9	3.0	34	6.5	3.5	2.7
6	4.1	2.6	1.8	1.5	1.4	1.3	2.9	5.4	35	9.9	3.9	2.6
7	3.9	2.6	1.9	1.5	1.4	1.3	3.0	7.2	36	15	5.9	3.4
8	3.7	2.5	1.8	1.5	1.4	1.3	3.2	e12	32	9.9	3.9	2.9
9	3.6	2.4	1.8	1.5	1.4	1.3	3.9	17	33	8.5	3.6	2.7
10	3.7	2.4	1.8	1.5	1.4	1.3	5.0	19	24	6.8	3.4	2.6
11	3.6	2.5	1.7	1.5	1.4	1.3	6.7	19	15	6.1	4.3	3.1
12	3.6	2.5	1.7	1.4	1.4	1.3	6.7	19	14	5.7	3.5	6.3
13	3.6	2.5	1.7	1.5	1.4	1.3	4.9	e19	14	5.2	4.8	3.7
14	3.6	2.4	1.7	1.4	1.4	1.3	4.2	18	13	6.2	4.6	3.2
15	3.8	2.4	1.7	1.4	1.4	1.3	4.0	19	12	7.5	3.8	3.0
16	3.9	2.4	1.7	1.4	1.4	1.4	3.7	21	12	18	3.5	2.8
17	3.9	2.4	1.7	1.4	1.4	1.5	3.6	23	13	17	3.3	3.2
18	3.5	2.4	1.7	1.4	1.4	1.4	3.7	25	13	9.6	3.4	3.1
19	3.3	2.3	1.7	1.4	1.4	1.3	3.6	27	12	7.5	3.1	2.8
20	3.3	2.3	1.7	1.5	1.4	1.2	3.7	25	11	6.5	3.0	2.6
21	3.2	2.3	1.6	1.5	1.4	1.3	4.6	28	10	6.0	2.9	2.6
22	3.1	2.3	1.6	1.5	1.4	1.3	5.8	e25	9.9	6.1	2.9	2.5
23	3.0	2.3	1.5	1.5	1.4	1.5	5.7	22	9.6	5.4	4.0	2.4
24	2.9	2.2	1.5	1.5	1.4	1.8	3.5	e25	9.1	7.5	5.8	4.7
25	3.0	2.2	1.5	1.5	1.4	1.9	3.5	e31	8.7	8.5	4.9	4.3
26	2.9	2.1	1.5	1.5	1.4	2.1	3.5	e29	8.3	5.8	3.7	4.1
27	3.0	2.1	1.4	1.5	1.3	2.0	e3.4	e27	8.3	4.9	3.4	3.9
28	2.8	2.1	1.4	1.5	1.3	2.1	e3.2	e26	7.9	5.3	3.3	3.5
29	2.8	2.1	1.5	1.5	1.3	2.4	e3.2	29	7.8	4.8	3.3	3.1
30	2.8	2.1	1.5	1.5	---	2.5	7.1	29	7.0	4.4	3.3	2.9
31	2.8	---	1.5	1.5	---	2.9	---	27	---	4.2	3.3	---
TOTAL	105.8	71.9	52.3	45.7	40.7	48.1	122.2	612.5	526.6	233.5	119.9	97.0
MEAN	3.41	2.40	1.69	1.47	1.40	1.55	4.07	19.8	17.6	7.53	3.87	3.23
AC-FT	210	143	104	91	81	95	242	1210	1040	463	238	192
MAX	4.1	2.8	2.0	1.5	1.5	2.9	7.1	31	36	18	5.9	6.3
MIN	2.8	2.1	1.4	1.4	1.3	1.2	2.6	2.9	7.0	4.2	2.9	2.4

CAL YR	2011	TOTAL	1426.5	MEAN	3.91	MAX	27	MIN	1.4	AC-FT	2830
WTR YR	2012	TOTAL	2076.2	MEAN	5.67	MAX	36	MIN	1.2	AC-FT	4120

MAX DISCH: 70.5 CFS AT 18:30 ON JUL 16,2012 GH 3.49 FT SHIFT 0 FT
 MAX GH: 3.49 FT AT 18:30 ON JUL 16,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09077945 CHAPMAN GULCH NEAR NAST
WY2012 HYDROGRAPH



ROARING FORK RIVER BASIN
09078500 NORTH FORK FRYINGPAN RIVER NEAR NORRIE
Water Year 2012

Location.-- Lat. 39°20'34", Long. 106°39'55", in SE¼ of NW¼ of Sec. 21, T8S, R83W in Pitkin County (Hydrologic Unit 14010004). Located on left bank of North Fork of Fryingpan River, 800 ft upstream from bridge on county road, 0.4 mi upstream of confluence with Fryingpan River, 0.5 mi downstream from Last Chance Creek, and 1.3 mi northwest of Norrie, CO.

Drainage Area and Period of Record.-- 42 mi²;

Equipment.-- Sutron Model 56-0540 shaft encoder (SE) and Sutron SatLink2 data collection platform housed in a 42-in diameter corrugated metal shelter and stilling well. A Stevens A-35 graphic water-stage recorder is also located inside shelter. An air temperature sensor is mounted on exterior of the shelter. Shaft encoder and graphic recorder are equipped with separate floats and set by drop tape to an adjustable reference point on edge of recorder shelf. On April 20, 2012, the graphic water-stage recorder was removed and a Sutron SDR-0001-01 stage discharge recorder (SDR) was installed in the existing shelter/stilling well. The stage discharge recorder is also set by drop tape to the adjustable reference point on edge of equipment shelf in shelter. No other changes this water year.

Hydrologic Conditions.-- Basin is primarily USFS land. Diversions for the Fryingpan-Arkansas Project occur in several tributaries upstream of the station. Well and intakes are frozen in winter.

Gage-Height Record.-- The primary record is 15-minute satellite-transmitted shaft encoder data with water-stage recorder and SDR data used for backup. The record is complete and reliable for Water Year 2012, except for the period of Nov 8, 2011 through Apr 9, 2012 when the well was frozen. The stage was backwater ice-affected on Nov 3 and 7, 2011. Water-stage recorder data was used on Oct 25-26, 2011 and Apr 19, 2012 to fill in missing data due to DCP/transmission malfunctions. Checks between the primary and backup records generally agreed to within +/- 0.02 ft. Three minor instrument corrections were applied during the period of record.

Datum Corrections.-- Levels were run Jul 19, 2012 to the drop tape index (RP_DT) using RM3 as a base. The drop tape index was found to read -0.010 ft low. The drop tape length (TL_DT) was not measured. No corrections were made since the RP_DT was found to be within the allowable error tolerance.

Rating.-- Control is channel at lower stages and large boulder 50 feet downstream of gage at higher stages. Rating 11 in use since May 16, 2010, was used for the entire period of record. The rating is well defined from 1 to 1000 cfs. Eight discharge measurements (Nos.825-832) made during water year 2012, and No. 833 made subsequently, were used for analysis. Measurements ranged from 4.48 to 46.1 cfs, which covered the range experienced during the year except for the lower daily flows on Jan 14-31, Feb 1-2, 5-8, Aug 5-6, 19-24, 27-28, and Sep 1-11, 15-23 2012, and the higher daily flows of Apr 11-12, 22-28, May 3-7, 9-12, 15-16, 18-19, 22-27, and Jun 1-11, 2012. The peak discharge of 112 cfs occurred at 0045 on Jun 5, 2012 at a gage height of 3.70 ft and a shift of 0.00 ft. The peak gage height exceeded high Measurement No. 830 by 0.60 ft in stage.

Discharge.-- Shifting control method was used for the entire water year. Shifts were applied as defined by measurements and were distributed by time and stage. Shift distribution by time through the end of water year 2011, continued until the period of frozen well beginning Nov 8, 2011. Shifts were distributed by time for the first 4 hours following the period of frozen well, 0000-0400 on Apr 10, 2012 to transition into variable shift curve FRYNFNCOVS12, which was used through the end of the water year. Measurement showed shifts ranged from -0.02 to +0.07 ft. Measurements 829-832 were discounted from +2% to +7%. The shifts for Measurements 826 - 828 were not used because the stage was affected by ice.

Special Computations.-- Average daily discharge for period of ice-affected gage height and frozen well were estimated by proration between adjacent days of good record, point in time measurements, and hydrographic comparison with average daily discharge from the Fryingpan near Thomasville (FRYTHOCO) gage

Remarks.-- Record is rated good, except for periods when gage height was ice affected and stilling well was frozen, which are estimated and rated poor. The peak instantaneous flow should be considered good. Station maintained and record developed by Craig Bruner.

Recommendations.-- A further analysis of potential break-points between gage heights of 2.15 and 3.20 ft. is required. Levels should be run again in water year 2013.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09078500 NORTH FORK FRYINGPAN RIVER NEAR NORRIE

RATING TABLE.-- FRYNFNCO11 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

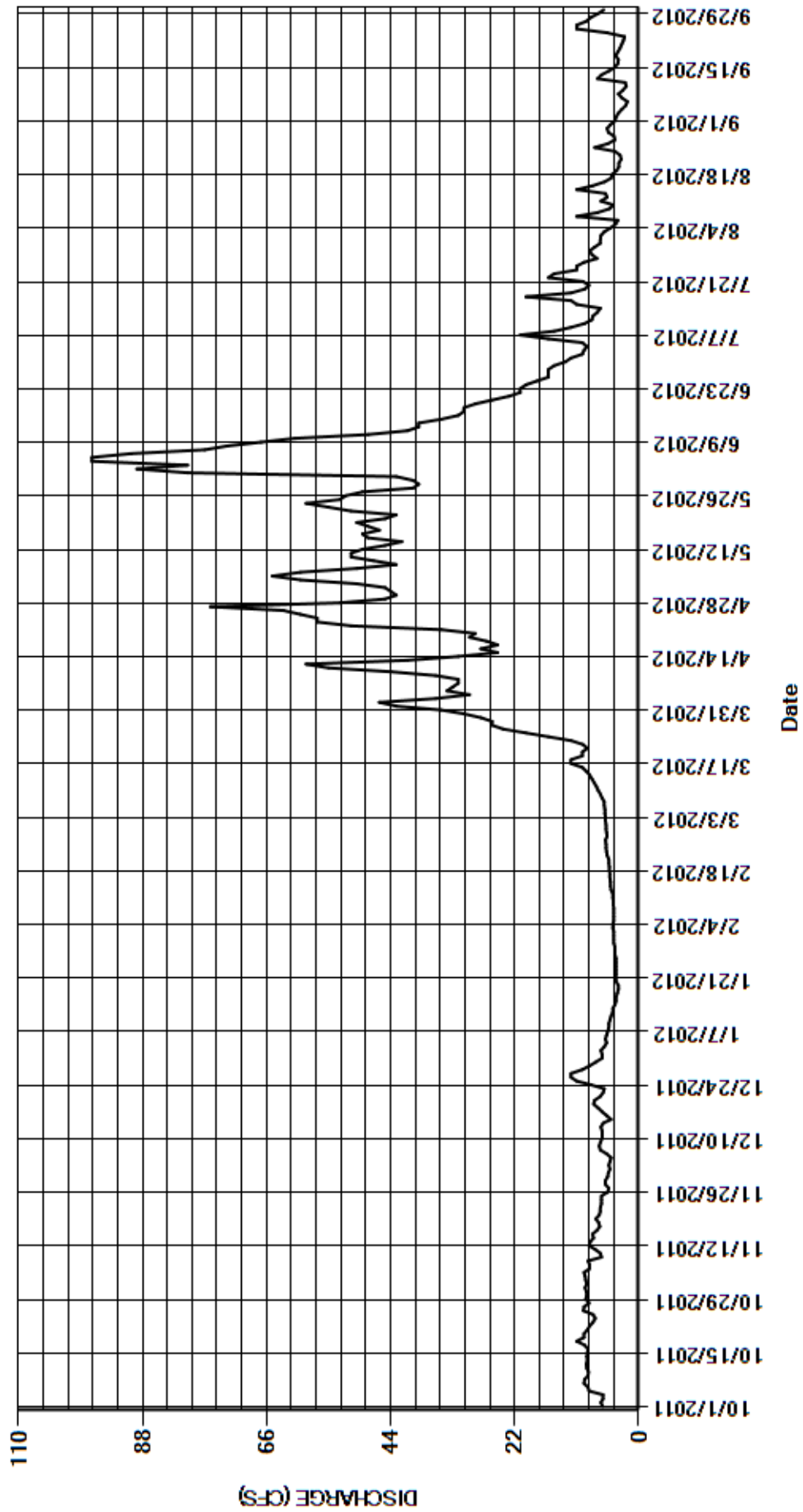
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.4	9.5	e5.4	e6.5	e4.4	e5.8	e43	44	80	12	6.8	4.2
2	6.7	9.2	e5.1	e6.7	e4.4	e5.9	e46	45	89	10	6.7	4.0
3	6.3	e9.4	e5.3	e6.1	e4.6	e5.9	e36	50	80	9.7	6.1	3.6
4	6.3	9.5	e5.1	e5.7	e4.6	e6.0	e30	60	97	9.2	5.0	3.0
5	8.8	9.7	e4.9	e5.9	e4.4	e6.0	e34	65	97	10	4.1	2.3
6	9.0	8.7	e5.7	e5.7	e4.4	e6.1	e33	60	90	16	3.7	2.0
7	9.7	e8.7	e6.8	e5.5	e4.4	e6.1	e32	50	77	21	11	3.0
8	9.6	e9.0	e7.0	e5.3	e4.4	e6.5	e32	43	73	15	7.3	3.6
9	9.0	e6.6	e6.8	e5.3	e4.5	e6.8	e36	47	67	12	5.2	2.8
10	8.9	e6.8	e6.5	e5.1	e4.5	e7.2	44	51	61	9.6	4.5	2.2
11	9.2	e7.7	e6.5	e4.9	e4.6	e7.5	55	51	48	8.3	6.7	2.4
12	9.3	e8.8	e6.5	e4.6	e4.6	e7.9	59	49	41	8.1	5.6	7.3
13	9.1	e8.6	e6.7	e4.6	e4.9	e8.3	41	45	39	7.3	5.9	6.6
14	9.2	e8.0	e6.3	e4.2	e5.0	e8.7	32	42	39	6.8	11	5.3
15	9.1	e8.2	e4.9	e4.0	e5.0	e9.3	25	48	35	11	8.2	4.2
16	9.0	e7.4	e5.7	e4.0	e5.1	e10	28	49	32	12	6.1	3.7
17	9.6	e6.9	e6.5	e3.8	e5.1	e12	25	46	31	20	4.9	3.6
18	11	e7.1	e7.2	e3.6	e5.2	e12	27	48	31	12	4.7	4.1
19	9.7	e7.6	e8.0	e3.6	e5.2	e10	30	50	29	9.6	3.9	3.7
20	9.7	e7.0	e7.8	e4.0	e5.3	e10	29	45	26	8.8	3.5	3.3
21	9.1	e6.8	e6.8	e4.0	e5.3	e9.1	35	43	23	9.9	3.5	3.0
22	8.7	e6.8	e6.3	e4.0	e5.6	e9.9	51	51	21	16	3.1	2.7
23	8.1	e6.6	e6.1	e4.0	e5.7	e12	57	55	21	15	3.3	2.5
24	7.7	e6.6	e8.4	e4.0	e5.8	e16	57	59	20	11	4.2	5.6
25	8.1	e6.6	e11	e4.0	e5.8	e20	60	53	18	11	7.8	11
26	9.8	e5.5	e12	e4.0	e5.9	e24	63	52	16	9.7	5.5	11
27	9.7	e5.3	e12	e4.2	e5.6	e26	76	49	16	7.4	4.2	9.3
28	8.8	e5.9	e10	e4.2	e5.7	e26	53	40	16	8.3	4.4	8.5
29	9.4	e5.9	e8.7	e4.2	e5.8	e28	45	39	15	8.7	5.4	7.2
30	9.2	e5.5	e7.6	e4.4	---	e31	43	40	13	7.8	5.6	6.2
31	9.3	---	e6.5	e4.4	---	e35	---	43	---	6.8	5.0	---
TOTAL	273.5	225.9	220.1	144.5	145.8	395.0	1257	1512	1341	340.0	172.9	141.9
MEAN	8.82	7.53	7.10	4.66	5.03	12.7	41.9	48.8	44.7	11.0	5.58	4.73
AC-FT	542	448	437	287	289	783	2490	3000	2660	674	343	281
MAX	11	9.7	12	6.7	5.9	35	76	65	97	21	11	11
MIN	6.3	5.3	4.9	3.6	4.4	5.8	25	39	13	6.8	3.1	2.0

CAL YR	2011	TOTAL	16940.8	MEAN	46.4	MAX	283	MIN	4.9	AC-FT	33600
WTR YR	2012	TOTAL	6169.6	MEAN	16.9	MAX	97	MIN	2.0	AC-FT	12240

MAX DISCH: 112 CFS AT 00:45 ON JUN 05,2012 GH 3.70 FT SHIFT 0 FT
 MAX GH: 3.70 FT AT 00:45 ON JUN 05,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09078500 NORTH FORK FRYINGPAN RIVER NEAR NORRIE
WY2012 HYDROGRAPH



ROARING FORK RIVER BASIN
09078600 FRYINGPAN RIVER NEAR THOMASVILLE

Water Year 2012

Location.-- Lat. 39°20'41", Long. 106°40'23", in NW¼NW¼ sec. 21, T.8 S., R.83 W., Pitkin County, Hydrologic Unit 14010004, on right bank 400 ft upstream from private bridge, 400 ft downstream from mouth of North Fork Fryingpan River, 1.6 mi southeast of Thomasville, CO, and 1.7 mi northwest of Norrie, CO.

Drainage Area and Period of Record.-- 134 mi². ; Gage established Oct 1, 1975. Colorado Division of Water Resources began operation of the gage in water year 1977. Published streamflow record from Oct 1, 1975 to present.

Equipment.-- Sutron SE8500 shaft encoder and Stevens graphic water-stage recorder in 42" diameter corrugated metal shelter and stilling well. A Sutron SatLink2 data collection platform (DCP) is installed in box mounted on exterior of shelter. Recorder and shaft encoder have separate floats and are set by drop tape to an adjustable reference point on edge of equipment shelf in shelter. Stilling well is connected to stream by two, 2-in diameter intake pipes with a standard outside flush tank. On Oct 19, 2011 the shaft encoder and graphic water-stage recorder were removed and a Sutron Stage Discharge Recorder (SDR) and Sutron Constant Flow Bubbler (CFB) were installed in the existing metal shelter/stilling well. The Sutron SatLink was removed and replaced with a Sutron SatLink2 data collection platform (DCP) in the existing exterior-mounted box on the same day. Stage Discharge Recorder and CFB are set by drop tape to an adjustable reference point on edge of equipment shelf in shelter. No other changes this water year.

Hydrologic Conditions.-- Drainage basin is almost entirely National Forest land. Transmountain diversions above gage occur through Boustead Tunnel and through Busk-Ivanhoe Tunnel.

Gage-Height Record.-- The primary record is 15-minute satellite-transmitted stage discharge recorder GH data with constant flow bubbler (CFB) used for backup. The record is complete and reliable, except for the period Dec. 16-18, 2011 and Jan. 3 through Mar. 17, 2012 when the stilling well was dry and the CFB orifice was isolated from the channel by surface-to-channel bottom ice formation. Data downloaded from the SDR was used on Mar 21-23, 2012 to overwrite erroneous data and fill in missing data caused by the malfunction of the GOES West satellite. Checks between the primary and backup records generally agreed to within +/- 0.02 ft. Several instrument corrections were applied during the period of record.

Datum Corrections.-- Levels were run on Aug 15, 2012 to the drop tape index (RP) using RM2 as a base. The drop tape index was found to be reading 0.018 ft. low. The drop tape length was found to be reading 0.01 ft. short. No corrections were made since the RP elevation and tape length were found to be within the allowable error tolerances.

Rating.-- Control is a 100 ft long concrete weir. Rating No. 3 (developed Nov 18, 2008) was used for the entire water year. The rating is well defined from 20 to 1000 cfs. Ten discharge measurements (Nos. 422-431) made during WY 2012, and No. 432 made subsequently, were used for analysis. Measurements ranged from 18.4 to 175 cfs, which covered the range experienced during the year except for the lower daily flows on Jan 19; and higher daily flows on May 23-24, Jun 1-10, 2012. The peak discharge of 251 cfs occurred at 0015 on Jun 5, 2012 at a gage height of 2.81 ft with a shift of -0.03 ft. The peak gage height exceeded high Measurement No. 428 by 0.21 ft in stage.

Discharge.-- Shifting control method was used for the entire water year. Shifts were applied as defined by measurements and were distributed by time and stage. The variable shift curve FRYTHOCOVS2012 in use at the end of water year 2011, continued until 1630 Oct. 12, 2011. Shifts were distributed by time from 1645 Oct. 12, 2011 until 1530 Nov. 18, 2011. Shifts were distributed by stage utilizing variable shift curve FRYTHOCOVS2012a from 1545 Nov. 18, 2011 until the end of the water year. Measurements showed shifts ranged from -0.04 to +0.01 ft. Measurements 423, 427, 429, 430 and 431 were discounted from -3% to +4%. The shifts for measurements 424, 425, and 426 were not used because the stage was affected by ice.

Special Computations.-- Daily discharge for Dec 16-18 (bad GH data), and Jan 3 - Mar 17, 2012 (well and secondary sensor isolated from channel) was estimated by hydrographic comparison with average daily discharge from the Chapman Gulch near Nast (CHAGULCO) gage and point-in-time flow measurements.

Remarks.-- Record is rated good, except for periods of bad GH data, and when well and secondary sensor were isolated from the channel, which are rated poor. The peak instantaneous flow should be considered good. Gage operated and record developed by Craig Bruner.

Recommendations.-- Levels should be run again in water year 2013.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09078600 FRYINGPAN RIVER NEAR THOMASVILLE

RATING TABLE-- FRYTHOCO03 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

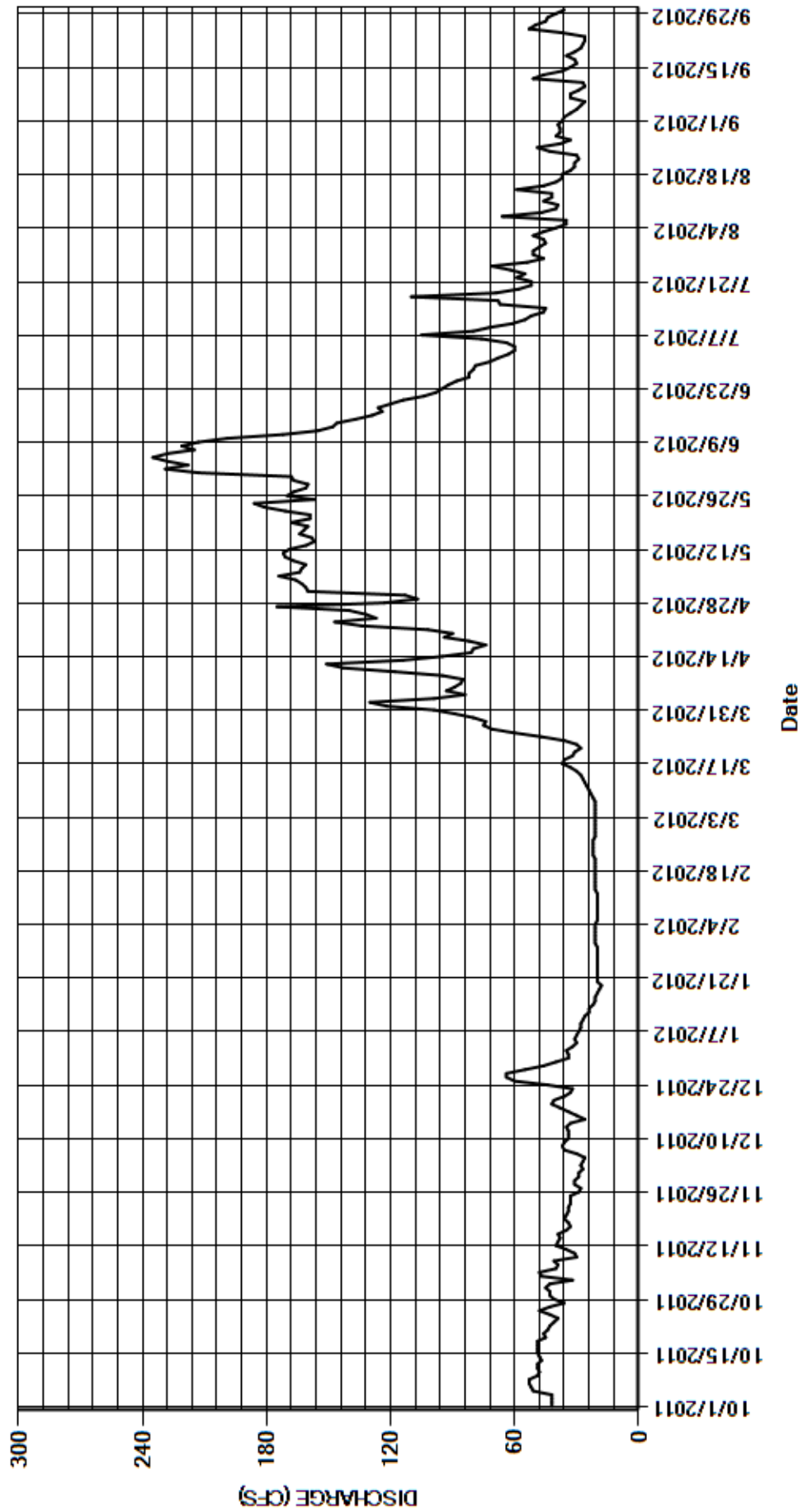
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	42	45	29	34	e21	e21	122	160	213	68	46	37
2	42	43	27	35	e21	e21	130	161	229	63	51	36
3	42	32	28	e32	e21	e21	99	163	218	60	46	33
4	42	47	27	e30	e21	e21	84	166	228	60	40	30
5	51	48	26	e31	e20	e21	93	174	235	64	35	28
6	52	40	30	e30	e20	e21	89	164	228	76	35	26
7	53	39	36	e29	e20	e21	86	163	215	105	66	33
8	53	41	37	e28	e20	e22	85	161	221	80	47	33
9	49	30	36	e28	e20	e23	95	167	213	72	40	29
10	48	31	34	e27	e20	e24	118	171	199	61	39	26
11	49	35	34	e26	e20	e25	143	172	172	55	46	27
12	49	40	34	e24	e20	e26	151	169	155	52	42	51
13	47	39	35	e24	e21	e27	114	161	148	46	42	46
14	48	38	33	e22	e21	e28	95	157	146	45	59	37
15	49	39	26	e21	e21	e30	81	158	137	67	46	33
16	49	35	e30	e21	e21	e33	80	164	129	68	40	30
17	49	33	e34	e20	e21	e37	74	162	124	110	37	31
18	49	34	e38	e19	e21	36	82	160	126	69	37	35
19	45	36	42	e18	e21	32	94	168	120	58	33	31
20	46	35	41	e20	e21	31	90	159	114	52	31	28
21	44	34	36	e20	e21	28	102	159	104	52	31	27
22	43	34	33	e20	e22	30	134	171	98	59	29	26
23	41	33	32	e20	e22	36	147	181	95	55	30	26
24	39	33	44	e20	e22	47	127	186	92	62	43	37
25	43	33	60	e20	e22	60	132	157	88	71	49	53
26	48	29	64	e20	e22	71	140	170	82	54	38	50
27	43	28	64	e20	e21	75	175	167	82	46	33	45
28	36	31	55	e20	e21	74	123	161	80	51	40	44
29	41	31	46	e20	e21	80	107	160	79	51	38	40
30	43	29	40	e21	---	89	113	167	72	48	38	36
31	43	---	34	e21	---	99	---	168	---	45	39	---
TOTAL	1418	1075	1165	741	606	1210	3305	5127	4442	1925	1266	1044
MEAN	45.7	35.8	37.6	23.9	20.9	39.0	110	165	148	62.1	40.8	34.8
AC-FT	2810	2130	2310	1470	1200	2400	6560	10170	8810	3820	2510	2070
MAX	53	48	64	35	22	99	175	186	235	110	66	53
MIN	36	28	26	18	20	21	74	157	72	45	29	26

CAL YR	2011	TOTAL	52383	MEAN	144	MAX	908	MIN	24	AC-FT	103900
WTR YR	2012	TOTAL	23324	MEAN	63.7	MAX	235	MIN	18	AC-FT	46260

MAX DISCH: 251 CFS AT 00:15 ON JUN 05,2012 GH 2.81 FT SHIFT -0.03 FT
 MAX GH: 2.81 FT AT 00:15 ON JUN 05,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09078600 FRYINGPAN RIVER NEAR THOMASVILLE
WY2012 HYDROGRAPH



ROARING FORK RIVER BASIN
09080100 FRYINGPAN RIVER AT MEREDITH
Water Year 2012

Location.-- Lat. 39°21'45", Long. 106°43'55", in SE¼SE¼ sec. 11, T.8 S., R.84 W., Eagle County, Hydrologic Unit 14010004, on left bank at Meredith, CO, 0.1 mi downstream from Waterbury Creek, 0.7 mi downstream from Jakeman Gulch.

Drainage Area and Period of Record.-- 191 mi²; Record available from Oct. 1, 1910 – Jan. 31, 1915; Oct. 1, 1966 – present.

Equipment.-- Sutron Model 56-0540 shaft encoder and Stevens graphic water-stage recorder housed in a standard 42" diameter corrugated metal shelter and stilling well. A Sutron SatLink2 data collection platform (DCP) is also installed in the shelter. Well is connected to stream by two 2-inch intake pipes with an outside standard flushing tank. An air temperature sensor is mounted on the antennae mast. Shaft encoder and recorder are equipped with separate floats, and referenced by drop tape to an adjustable reference point mounted on the edge of the equipment shelf. On May 1, 2012, the graphic water-stage recorder was removed and a Sutron Stage Discharge Recorder (SDR) was installed in the existing metal shelter/stilling well. The Stage Discharge Recorder also has a separate float and is set by drop tape to the adjustable reference point. No other changes this water year.

Hydrologic Conditions.-- Transmountain diversions above station occur through the Boustead and Busk-Ivanhoe Tunnels.

Gage-Height Record.-- The primary record is 15 minute satellite-transmitted shaft encoder data with partial water year chart record and partial water year SDR log used for backup purposes. Logged data downloaded from the DCP was used on October 25-26, 2011 to fill in short periods of missing data. The record is complete and reliable for Water Year 2012, except for the periods of Nov. 27-29, 2011 when the stage was affected by ice, and Dec 2, 2011 through Apr 20, 2012 when the well was frozen. Checks between the primary and backup records generally agreed to within +/- 0.02 ft. Several shaft encoder corrections were applied during the period of record.

Datum Corrections.-- Levels were run on July 12, 2012 to the RP index using RM4 as base. The drop tape index was found to be 0.022 feet high. This was traced to a disturbance to the equipment shelf during well pumping operations on May 1, 2012. A -0.02 ft correction was made to the adjustable RP and a corresponding +0.02 ft datum correction was applied to the gage height record and the MGH of measurements made during the period from the time of the disturbance through the time of the RP correction.

Rating.-- Low water control is a riffle approximately 80 ft. below the gage house. High water control is the bank of the channel. Rating 4 (in use since October 1, 1984), was used for the entire water year. The rating is well defined from 25 to 1,700 cfs. Seven discharge measurements (Nos. 443-449) made during water year 2012, and No. 450 made subsequently were used for analysis. Measurements ranged from 42.2 to 186 cfs, which covered the range experienced during the year except for the lower daily flows of Jan 14-31, Feb 1-29, Mar 1-12, Aug 20, 22, 23, and Sep 4-6, 9-11, 16, 17, 19-23, 2012; and the higher daily flows of Apr 12, 27, May 1-31, Jun 1-14, 2012. The peak discharge of 284 cfs occurred at 0515 on Jun 2, 2012 at a gage height of 2.85 ft with a shift of 0.00 ft. The peak gage height exceeded high Measurement No. 447 by 0.28 ft. in stage.

Discharge.-- Shifting control method was used during the entire water year. Shifts were applied as defined by measurements and were distributed by time and stage. The variable shift curve FRYMERCOS11A in use at the end of water year 2011, continued until 1100 Oct. 3, 2011. Shifts were distributed by time from 1115 Oct. 3 until 2345 Dec. 1, 2011 (well frozen). FRYMERCOS11A was again applied following the period of frozen well from 0000 Apr. 21 until 1300 Jul 9, 2012, when significant shift scatter at stages below 1.95 ft necessitated shift application by time through the end of water year 2012. Measurements showed shifts ranging from -0.03 to +0.05 ft. Measurements 443, 444, and 446-450 were discounted from -5% to +3% to smooth shift distribution. The shift for measurement 445 was not used because the stage was affected by ice.

Special Computations.-- Daily discharge for Dec. 2, 2011 through Apr 20, 2012 (frozen well) was estimated by hydrographic comparison with average daily discharge from the Fryingpan River near Thomasville gage (FRYTHOCO), and point in time flow measurements.

Remarks.-- Record is rated good except for periods of frozen well which are estimated and considered poor. Station maintained and record developed by Craig Bruner

Recommendations.-- Measurements at stages above 3.50 ft. including at least one measurement at a GH above 4.30 are needed to verify stage-discharge relationship. Additional measurements at stages below 1.95 are also required for further analysis of possible stage-shift relationship.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09080100 FRYINGPAN RIVER AT MEREDITH

RATING TABLE-- FRYMERCO04 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

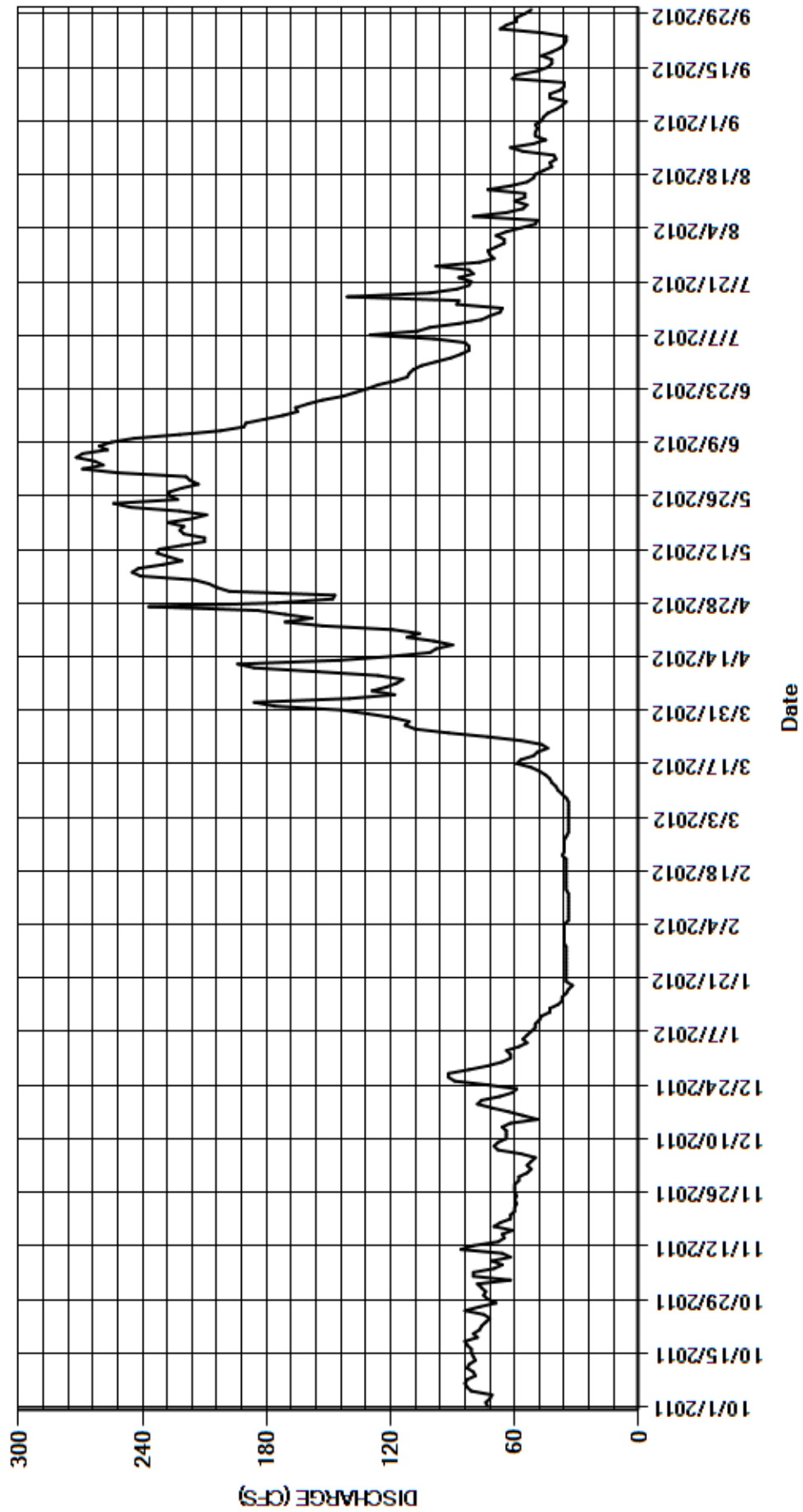
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	73	76	54	e62	e36	e34	e176	198	252	91	65	47
2	74	78	e52	e64	e36	e34	e186	204	269	86	69	46
3	72	62	e54	e58	e36	e34	e140	208	259	82	64	44
4	71	80	e52	e54	e36	e34	e118	215	263	82	57	40
5	81	80	e50	e56	e34	e34	e129	241	272	84	50	37
6	83	70	e57	e54	e34	e34	e122	245	269	99	49	35
7	84	66	e68	e52	e34	e34	e117	242	257	130	80	43
8	83	71	e70	e50	e34	e35	e114	230	261	107	64	43
9	79	62	e68	e50	e34	e37	e126	221	255	101	56	38
10	80	66	e64	e48	e34	e39	e155	227	244	87	54	36
11	83	86	e64	e47	e34	e40	e186	233	222	76	60	36
12	82	80	e64	e43	e34	e42	e194	232	202	72	55	61
13	79	68	e66	e43	e35	e43	e145	221	191	67	55	59
14	80	65	e62	e39	e35	e45	e120	210	190	66	73	49
15	81	66	e49	e37	e35	e48	e101	210	181	88	62	44
16	81	61	e56	e37	e35	e52	e98	220	172	87	54	42
17	83	70	e63	e35	e35	e59	e90	222	165	141	51	42
18	84	67	e71	e34	e35	e57	e99	220	166	101	50	47
19	78	62	e78	e32	e35	e51	e112	228	160	88	46	42
20	80	62	e76	e35	e35	e49	e106	216	153	82	42	38
21	77	60	e67	e35	e35	e44	119	209	143	81	43	36
22	76	60	e61	e35	e37	e47	153	222	137	87	40	35
23	74	59	e59	e35	e36	e57	171	246	131	80	41	35
24	72	60	e73	e35	e36	e73	158	254	126	82	56	47
25	75	59	e89	e35	e36	e92	171	223	118	98	62	67
26	84	60	e92	e35	e36	e108	184	227	112	77	51	64
27	77	e60	e92	e35	e35	e113	237	227	111	70	45	59
28	69	e60	e82	e35	e34	e111	175	221	109	72	50	59
29	73	e58	e73	e35	e34	e119	148	213	105	73	50	55
30	75	58	e66	e36	---	e131	147	217	98	69	49	52
31	74	---	e62	e36	---	e144	---	219	---	65	50	---
TOTAL	2417	1992	2054	1317	1015	1874	4297	6921	5593	2671	1693	1378
MEAN	78.0	66.4	66.3	42.5	35.0	60.5	143	223	186	86.2	54.6	45.9
AC-FT	4790	3950	4070	2610	2010	3720	8520	13730	11090	5300	3360	2730
MAX	84	86	92	64	37	144	237	254	272	141	80	67
MIN	69	58	49	32	34	34	90	198	98	65	40	35

CAL YR	2011	TOTAL	79369	MEAN	217	MAX	1390	MIN	36	AC-FT	157400
WTR YR	2012	TOTAL	33222	MEAN	90.8	MAX	272	MIN	32	AC-FT	65900

MAX DISCH: 284 CFS AT 05:15 ON JUN 02,2012 GH 2.85 FT SHIFT 0 FT
 MAX GH: 2.85 FT AT 05:15 ON JUN 02,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09080100 FRYINGPAN RIVER AT MEREDITH
WY2012 HYDROGRAPH



ROARING FORK RIVER BASIN
09080300 ROCKY FORK CREEK NEAR MEREDITH

Water Year 2012

Location.-- Lat. 39°21'42", Long. 106°49'12", in NW¼NW¼ Sec. 18, T.8 S., R.84 W., Pitkin County, Hydrologic Unit 14010004 on right bank at upstream end of flume constructed to carry Rocky Fork Creek across spillway to auxiliary outlet of Ruedi Dam on Fryingpan River and 4.6 mi west of Meredith, CO.

Drainage Area and Period of Record.-- 12.3 mi². ; Published streamflow record Oct. 1, 1968 to present.

Equipment.-- Stevens A-35 graphic water-stage recorder and SDI shaft encoder (USBR-owned) housed in a 42-in diameter corrugated metal shelter and stilling well in stream on right bank upstream of concrete weir control. Shaft encoder is hard-wired to data collection platform (DCP) located in control house on top of Ruedi Reservoir Dam. Recorder and shaft encoder have separate floats and are set by drop tape to an adjustable reference point on edge of equipment shelf. Shelter is equipped with an outside staff gage that is used as a secondary reference. On Oct. 20, 2011, the chart recorder was removed and replaced with a Sutron Constant Flow Bubbler (CFB), enabled on Nov. 10, 2011 when bubbler line was installed. On June 21, 2012, the Design Analysis shaft encoder was replaced with a Sutron Stage Discharge Recorder (SDR). Stage Discharge Recorder and CFB are set by drop tape to the adjustable reference point on edge of equipment shelf in shelter. No other changes this water year.

Hydrologic Conditions.-- Basin is entirely USFS land and there is no development or roads except for trailhead parking ¼ mile above station. There are no diversions above station. Discharge from gage is subtracted from downstream USGS gage FRYRUDCO to calculate Ruedi Reservoir releases.

Gage-Height Record.-- The primary record is 15-minute satellite-transmitted shaft encoder and stage discharge recorder data. Except for the period Oct. 1-19, 2011, no backup record was available due to malfunction of back up sensor(s). The record is complete and reliable, except for Oct 16-20, 2011 when the stage discharge relationship was backwater-affected from beaver dams; and Dec 5, 2011 to Mar 7, 2012 when the well was frozen; Mar 21-23 when data were missing due to malfunction of the GOES West satellite, and Jul 28 through Aug 2, 2012 when there was a un-explained drop in stage. Checks between the primary and backup records generally agreed within +/- 0.02 ft. A -0.03 GH correction found Aug 15, 2012 was applied back to a sensor error, reset by the water commissioner on Aug 2, 2012.

Datum Corrections.-- Levels were run on Aug 15, 2012 to the drop tape index (RP_DT) using RM2 as a base. The drop tape index was found to be reading high. The drop tape length was found to be correct. No corrections were made since the RP elevation and tape length were found to be within the allowable error tolerances.

Rating.-- Control is a 38 ft. wide v-notch, sharp crested weir adjacent to gage house. Rating 2 was used for the entire period of record and has been in place since Nov 11, 2004. Nine discharge measurements (Nos.102 - 110) made during WY 2012, and No. 111 made subsequently, were used for analysis. Measurements ranged from 1.65 to 10.9 cfs and covered the range in stage experienced during the year except for the higher daily flows on May 6-8, 20, 23-29, 2012. The peak discharge of 12.2 cfs occurred at 1245 on May 25, 2012 at a gage height of 0.75 ft with a shift of 0.02 ft. The peak gage height exceeded high Measurement No. 107 by 0.04 ft in stage.

Discharge.-- Shifting section control method was used. Shifts were applied as defined by measurements and were distributed by time for the entire water year. Measurement shifts ranged from -0.03 ft. to +0.03 ft. Measurements 106 and 108 were discounted -4% and +3%, respectively. Measurements Nos.103 and 104 were made during the period of no gage height when the well was frozen and the shifts were not used in the record.

Special Computations.-- Daily discharge for Oct 16-20, 2011 (backwater from beaver dams) and Mar 21-23, Jul 30-31, and Aug 1-2, 2012 (erroneous or missing data) were estimated using straight line interpolation of adjacent good average daily flows. Daily discharge for period of frozen well was estimated by hydrographic comparison with average daily discharge from Fryingpan River below Ruedi Reservoir (FRYRUDCO), and point-in-time flow measurements. Insufficient information was available to factor in variable releases for Ruedi Reservoir.

Remarks.-- Record is rated as good, except for estimated periods which are poor. Station maintained and record developed by Craig Bruner.

Recommendations.-- Upper end of stage-discharge rating RFCMRCO02 should be revised after high flow measurements (if present) in WY2013.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09080300 ROCKY FORK CREEK NEAR MEREDITH

RATING TABLE-- RFCMERC002 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

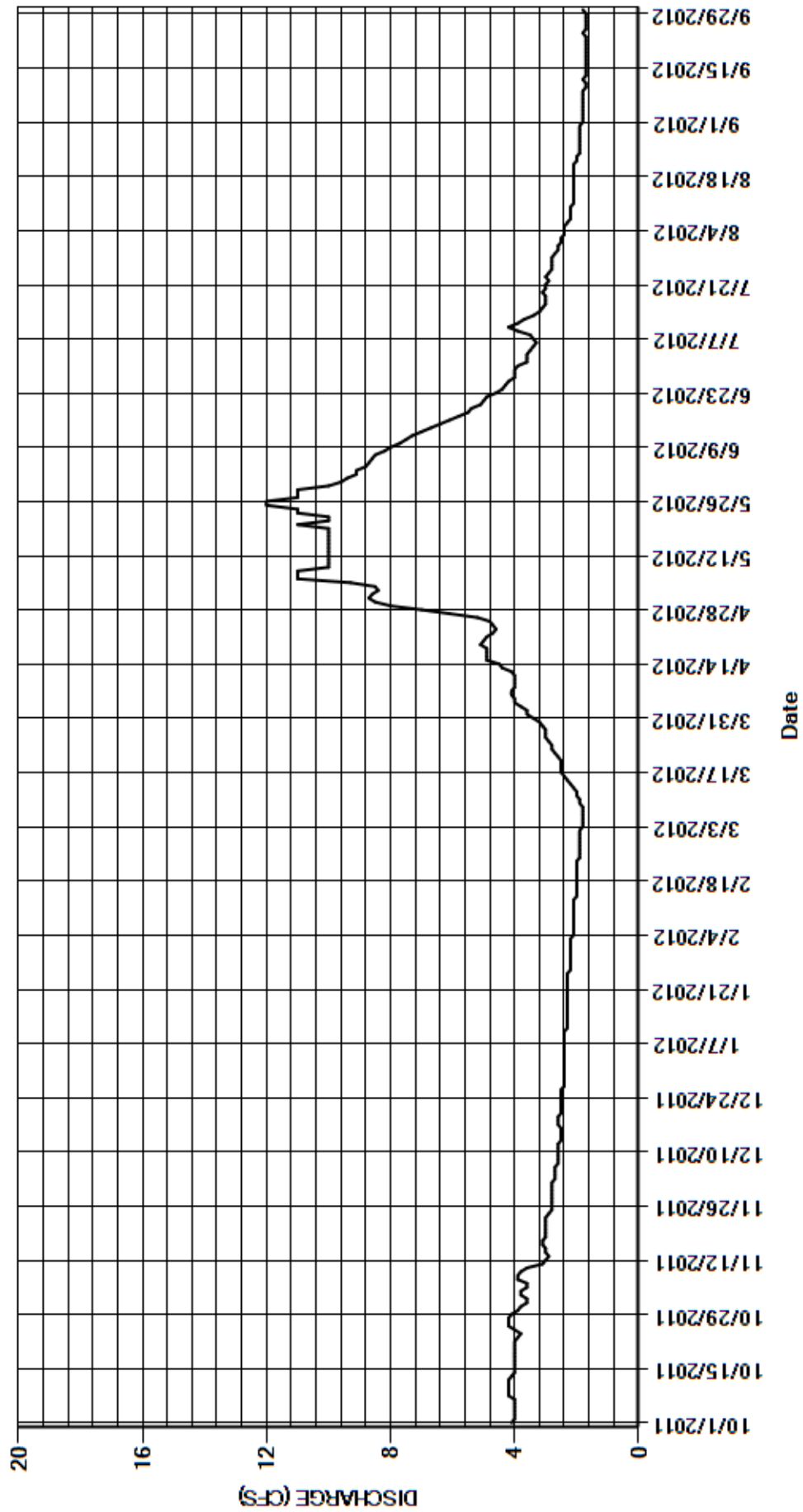
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.1	3.6	2.8	e2.4	e2.2	e1.9	3.6	8.7	9.4	3.6	e2.5	1.8
2	4.0	3.6	2.8	e2.4	e2.2	e1.9	3.6	8.6	9.1	3.6	e2.5	1.8
3	4.0	3.8	2.7	e2.4	e2.2	e1.8	3.8	8.4	9.1	3.6	2.4	1.8
4	4.0	3.8	2.7	e2.4	e2.1	e1.8	4.0	8.5	8.8	3.5	2.4	1.8
5	4.0	3.6	e2.7	e2.4	e2.1	e1.8	4.0	9.3	8.7	3.4	2.4	1.8
6	4.0	3.6	e2.7	e2.4	e2.1	e1.8	4.1	11	8.6	3.3	2.3	1.8
7	4.0	3.9	e2.6	e2.4	e2.1	e1.8	4.1	11	8.5	3.4	2.2	1.8
8	4.2	3.9	e2.6	e2.4	e2.1	1.8	4.0	11	8.2	3.5	2.2	1.8
9	4.2	3.8	e2.6	e2.4	e2.1	1.9	4.0	10	8.0	3.9	2.2	1.8
10	4.2	3.6	e2.6	e2.4	e2.1	1.9	4.0	10	7.7	4.2	2.2	1.7
11	4.2	3.1	e2.6	e2.3	e2.1	2.0	4.0	10	7.5	3.9	2.1	1.7
12	4.2	3.0	e2.6	e2.3	e2.1	2.0	4.1	10	7.3	3.7	2.1	1.8
13	4.1	2.9	e2.5	e2.3	e2.1	2.1	4.4	10	7.0	3.4	2.1	1.7
14	4.0	3.0	e2.5	e2.3	e2.0	2.2	4.5	10	6.7	3.2	2.1	1.7
15	4.0	3.0	e2.5	e2.3	e2.0	2.3	4.9	10	6.4	3.1	2.1	1.7
16	e4.0	3.1	e2.5	e2.3	e2.0	2.4	4.9	10	6.1	3.0	2.1	1.7
17	e4.0	3.1	e2.6	e2.3	e2.0	2.5	4.9	10	5.8	3.0	2.1	1.7
18	e4.0	3.0	e2.6	e2.3	e2.0	2.5	4.9	10	5.5	3.0	2.1	1.7
19	e4.0	3.0	e2.6	e2.3	e2.0	2.5	5.1	10	5.4	3.1	2.1	1.7
20	e4.0	3.0	e2.5	e2.3	e2.0	2.5	5.0	11	5.1	3.0	2.1	1.7
21	4.0	3.0	e2.5	e2.3	e2.0	e2.6	4.9	10	5.0	3.0	2.1	1.7
22	4.0	3.0	e2.5	e2.3	e2.0	e2.7	4.7	10	4.9	2.9	2.0	1.7
23	3.9	3.0	e2.5	e2.3	e2.0	e2.8	4.6	11	4.6	3.0	2.0	1.7
24	3.8	2.9	e2.5	e2.3	e1.9	2.8	4.7	11	4.4	2.9	1.9	1.8
25	4.0	2.8	e2.5	e2.3	e1.9	2.9	4.8	12	4.3	2.8	1.9	1.7
26	4.2	2.8	e2.5	e2.2	e1.9	3.0	5.2	12	4.2	2.8	1.9	1.7
27	4.2	2.8	e2.4	e2.2	e1.9	3.0	6.1	11	4.0	2.8	1.9	1.7
28	4.2	2.8	e2.4	e2.2	e1.9	3.0	7.0	11	4.0	2.8	1.9	1.7
29	4.1	2.8	e2.4	e2.2	e1.9	3.1	8.0	11	4.0	2.7	1.9	1.7
30	3.9	2.8	e2.4	e2.2	---	3.2	8.5	10	3.9	e2.6	1.9	1.8
31	3.8	---	e2.4	e2.2	---	3.4	---	9.6	---	e2.6	1.9	---
TOTAL	125.3	96.1	79.3	71.7	59.0	73.9	144.4	316.1	192.2	99.3	65.6	52.2
MEAN	4.04	3.20	2.56	2.31	2.03	2.38	4.81	10.2	6.41	3.20	2.12	1.74
AC-FT	249	191	157	142	117	147	286	627	381	197	130	104
MAX	4.2	3.9	2.8	2.4	2.2	3.4	8.5	12	9.4	4.2	2.5	1.8
MIN	3.8	2.8	2.4	2.2	1.9	1.8	3.6	8.4	3.9	2.6	1.9	1.7

CAL YR	2011	TOTAL	4964.5	MEAN	13.6	MAX	91	MIN	1.8	AC-FT	9850
WTR YR	2012	TOTAL	1375.1	MEAN	3.76	MAX	12	MIN	1.7	AC-FT	2730

MAX DISCH: 12.2 CFS AT 12:45 ON MAY 25,2012 GH 0.75 FT SHIFT 0.02 FT
 MAX GH: 0.75 FT AT 12:45 ON MAY 25,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09080300 ROCKY FORK CREEK NEAR MEREDITH
WY2012 HYDROGRAPH



ROARING FORK RIVER BASIN
CRYSTAL RIVER AT DOW FISH HATCHERY AB CARBONDALE
Water Year 2012

Location.-- Lat 39°22'38", Long 107°12'17" in SW 1/4 of NE 1/4 of Sec. 10, T8S, R88W in Garfield County. Located on right bank of Crystal River, at upstream side of County Road 118 Bridge, and 0.75 mi. below confluence with Prince Creek.

Drainage Area and Period of Record.-- The drainage area above the gage is 340 sq. mi. ; Oct 2006 to present. Seasonal operation April-September only.

Equipment.-- Sutron Constant Flow Bubbler (CFB) sensor and Sutron SatLink 2 data collection platform (DCP) housed in 2 ft rectangular steel shelter. The CFB orifice pipe is below the upstream side of County Road 118 bridge. Primary reference gage is a wire weight gage on the upstream side of the bridge.

Hydrologic Conditions.-- Drainage basin is the Crystal River basin. The stream banks are moderate to steep sloping with exposed boulders along the lower portions. Control is rock and cobble channel at all stages, with bridge abutment walls becoming part of the control at higher stages. Seasonal diversions occur upstream and downstream of station.

Gage-Height Record.-- The primary record is 15-minute CFB data downloaded from satellite telemetry with DCP downloaded data used as backup. The partial year record is complete and reliable for the 6-month period of operation from April 1, 2012 to September 30, 2012. The gage was visited on 14 separate occasions this water year to verify the instrument remained calibrated to the primary reference gage. The constant flow bubbler was adjusted 4 times during the period of record. The CFB was blocked April 16 14:15 through April 17 13:30 and gage height during the period was estimated using the instrument correction found at 13:30 April 17.

Datum Corrections.-- Levels were last run on August 1, 2012. Using RM 2 as a base, the wire weight gage was found to read within allowable tolerances and no adjustments were made.

Rating.-- Rating No. 6, in use since Oct. 1, 2008, was used for the entire period of record (Apr 1 – Sep 30). Twelve discharge measurements (Nos. 36-47) made during WY 2012, and No. 48 made after the period of record, were used for analysis. The measurements ranged in discharge from 5.3 cfs to 795 cfs and cover the range of discharge experienced during the period of record, except for the the higher daily flows on May 23, and Jun 1-6. The peak instantaneous flow of 1040 cfs occurred at 01:15 Jun. 2, 2012 at a gage height of 5.91 ft with a shift of +0.08 ft. It exceeded the stage of measurement No. 41 made June 6, 2012 by 0.33 feet in stage.

Discharge.-- Shifting control method was used for WY 2012. Shifts were distributed by stage for the 2012 period of record utilizing shift curve CRYDOWCO2012a as defined by measurement nos. 36-48.. Open water measurements show shifts varying from +0.07 to +0.17 ft. Shifts were applied directly and given full weight except for measurement Nos. 36, 37, 39, 40, 42, and 44 which were discounted from -2% to +4% to smooth shift distribution.

Special Computations.-- No special computations were done this water year.

Remarks.-- Record is rated good for the period of record, except for the period from April 16 14:15 through April 17 13:30, 2012, which is rated fair due to the estimated record. Instantaneous peak flow is rated good. Gaging station operated and maintained by Jana Miller and record developed by Jana Miller.

Recommendations.-- Use Total Station to survey cross-section of channel at gage and better define potential break-points in stage-discharge rating. A new rating should be developed before WY2013.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

CRYSTAL RIVER AT DOW FISH HATCHERY AB CARBONDALE

RATING TABLE-- CRYDOWCO06 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

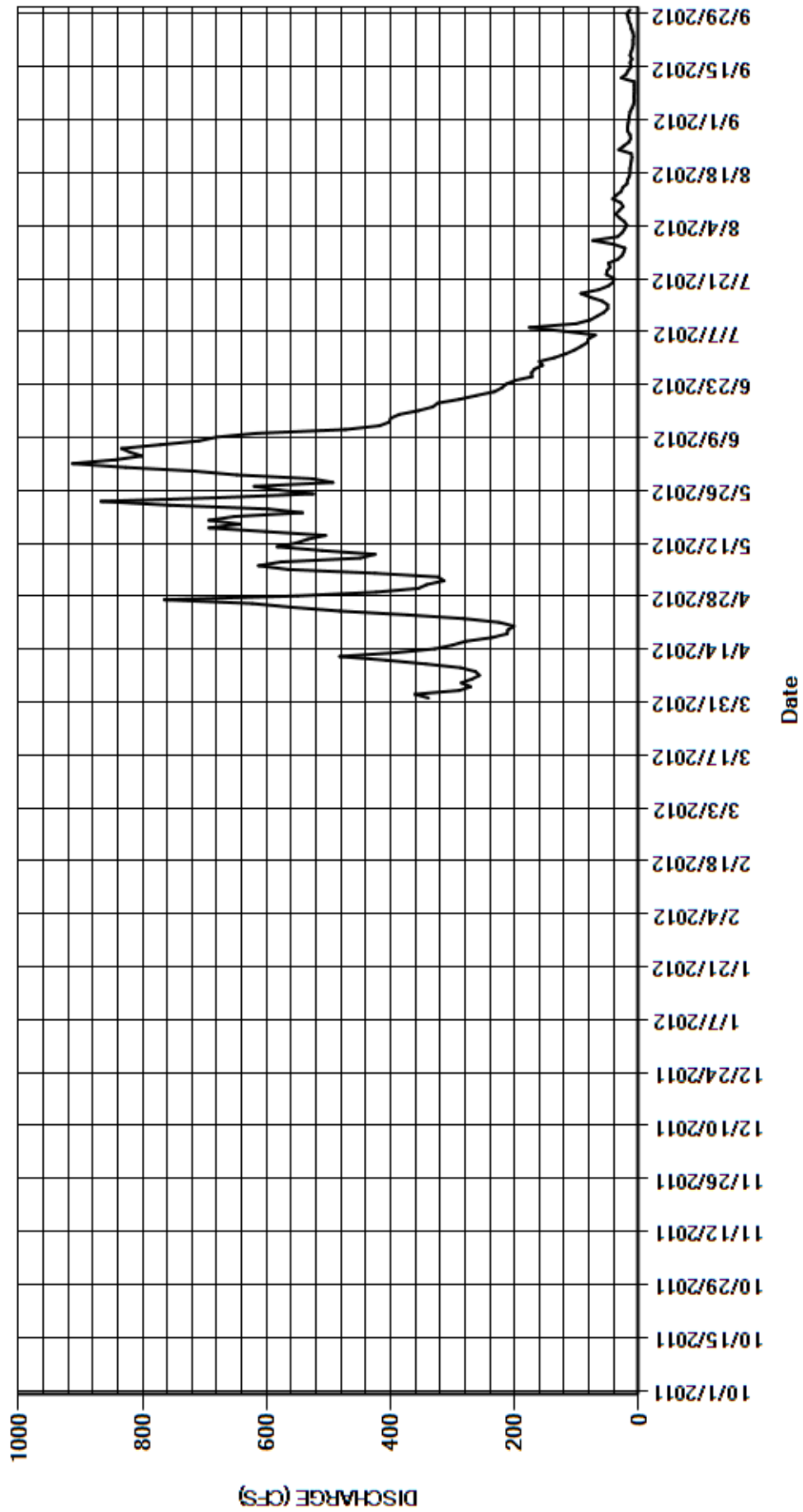
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	339	342	827	118	34	16
2	---	---	---	---	---	---	361	314	913	104	27	15
3	---	---	---	---	---	---	289	323	844	93	23	14
4	---	---	---	---	---	---	271	425	801	83	19	11
5	---	---	---	---	---	---	286	565	820	81	23	8.3
6	---	---	---	---	---	---	269	613	834	70	31	7.3
7	---	---	---	---	---	---	257	576	771	120	37	7.7
8	---	---	---	---	---	---	263	449	709	176	31	7.2
9	---	---	---	---	---	---	287	425	681	101	25	7.1
10	---	---	---	---	---	---	343	510	617	78	29	7.3
11	---	---	---	---	---	---	407	583	473	67	42	7.2
12	---	---	---	---	---	---	482	552	418	56	36	28
13	---	---	---	---	---	---	391	534	402	50	28	20
14	---	---	---	---	---	---	329	505	400	50	26	17
15	---	---	---	---	---	---	300	601	386	59	19	12
16	---	---	---	---	---	---	279	693	355	78	18	14
17	---	---	---	---	---	---	236	643	332	93	15	11
18	---	---	---	---	---	---	212	693	324	64	14	14
19	---	---	---	---	---	---	211	652	289	49	14	12
20	---	---	---	---	---	---	201	542	262	41	13	9.9
21	---	---	---	---	---	---	225	597	233	40	12	8.9
22	---	---	---	---	---	---	282	756	221	52	11	9.1
23	---	---	---	---	---	---	373	867	214	51	12	8.3
24	---	---	---	---	---	---	482	677	199	46	32	9.2
25	---	---	---	---	---	---	560	525	172	49	24	12
26	---	---	---	---	---	---	623	579	173	34	16	13
27	---	---	---	---	---	---	765	620	168	27	13	16
28	---	---	---	---	---	---	550	493	155	24	14	17
29	---	---	---	---	---	---	423	526	160	22	18	19
30	---	---	---	---	---	---	355	648	136	40	18	14
31	---	---	---	---	---	---	---	716	---	74	17	---
TOTAL	---	---	---	---	---	---	10651	17544	13289	2090	691	372.5
MEAN	---	---	---	---	---	---	355	566	443	67.4	22.3	12.4
AC-FT	---	---	---	---	---	---	21130	34800	26360	4150	1370	739
MAX	---	---	---	---	---	---	765	867	913	176	42	28
MIN	---	---	---	---	---	---	201	314	136	22	11	7.1

CAL YR	2011	TOTAL	180631.0	MEAN	987	MAX	3930	MIN	72	AC-FT	358300 (PARTIAL YEAR RECORD)
WTR YR	2012	TOTAL	44637.5	MEAN	244	MAX	913	MIN	7.1	AC-FT	88540 (PARTIAL YEAR RECORD)

MAX DISCH: 1040 CFS AT 01:15 ON JUN 02,2012 GH 5.91 FT SHIFT 0.08 FT
 MAX GH: 5.91 FT AT 01:15 ON JUN 02,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

CRYSTAL RIVER AT DOW FISH HATCHERY AB CARBONDALE
WY2012 HYDROGRAPH



09089500 WEST DIVIDE CREEK NEAR RAVEN

Water Year 2012

Location.-- Lat 39°19'52", Long 107°34'46" in NE1/4 SW1/4 Sec. 29, T8S, R91W, Hydrologic Unit 14010004 in Mesa County. Station is on left bank about 5 ft downstream of private road bridge, 0.8 mi upstream of Brook Creek, 8 mi south of Raven, and 16 mi south of Silt.

Drainage Area and Period of Record.-- Approximately 64.6 sq mi. ; Published by the USGS Oct. 1, 1954 to Oct. 1999. Partial year (Apr - Sep) record published by the USGS Apr 2000 to Oct. 2005. Partial year (Apr - Sep) record published by Colorado Division of Water Resources Apr. 1, 2006 to present.

Equipment.-- Sutron constant flow bubbler (CFB) sensor in corrugated metal shelter on 42-in diameter stilling well. Data collection platform (DCP) is a Sutron SatLink 2 in external box. The CFB is referenced to an outside cantilever chain gage. A Sutron Model 0001-1 stage discharge recorder (SDR) provides backup data when the well intake pipes are not isolated from the stream during low stages. The SDR is set by drop tape from an inside reference point on the equipment shelf.

Hydrologic Conditions.-- Streambed is composed of boulders, cobble, and gravel. Banks are moderately steep and not usually subject to overflow. The left abutment of bridge adjacent to gage constricts flow into the right side of the channel immediately above gage. Record includes water imported from Thompson Creek (Roaring Fork Basin), Clear Fork Creek (Muddy Creek Basin), and Owens Creek (Plateau Creek Basin).

Gage-Height Record.-- The primary record is 15-minute satellite telemetry data from the CFB with SDR data used as backup. Data from the constant flow bubbler was used for the entire partial year record. Checks between the primary and backup record generally agreed with less pronounced variation of the backup record from slower stage change well response. One instrument calibration correction was applied during the period of record.

Datum Corrections.-- Levels were run to the inside and outside reference points (RPs) on Apr 21, 2010 using RM 4 as a base. The inside RP was found to read correct and no adjustments were made. The outside RP was found to read 0.02 ft. high and was corrected.

Rating.-- The control for low and medium stages is a boulder and cobble riffle 15 ft downstream. Control for higher stages is the channel with boulders having some effect. Rating No. 16 was used for the entire period of record (Apr 1-Sep 30). Five discharge measurements (Nos. 37 -41) made during water year 2012, and No. 42 made subsequently, were used for analysis. Measurements ranged from 0.82 to 73.6 cfs and cover the range of stage experienced except for the lower daily flows on Jun 23-26, 28, July 1-7, 10-25, 27-30, Aug 5-31, and Sep 2-11, 14-30 2012; and higher daily flows of April 23-30; and May 1-11, 19, 2012. The peak discharge of 160 cfs occurred at 0130 on Apr 27, 2012 at a gage height of 3.18 ft. with a shift of +0.08 ft. The peak exceeded Measurement No. 39 by 0.64 feet in stage.

Discharge.-- Shifting control method was used during water year 2012. The shifts were applied as defined by measurements and were distributed by stage using variable shift curve WSDRAVCOVS12A for the entire six month period. Measurements showed shifts ranging from -0.25 ft to +0.15 ft. Measurements were applied directly and given full weight except for Measurements nos. 37, 39, 40 and 41 were discounted from -5 to +9 percent.

Special Computations.-- None.

Remarks.-- Record is rated as good, with the exception of average daily flows below 0.82 cfs which are rated fair. The peak instantaneous flow should be considered good. Station maintained and record developed by Craig Bruner.

Recommendations.-- Construct new cantilever gage, install rain gage and run levels.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09089500 WEST DIVIDE CREEK NEAR RAVEN

RATING TABLE-- WSDRAVCO16 USED FROM 01-APR-2012 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

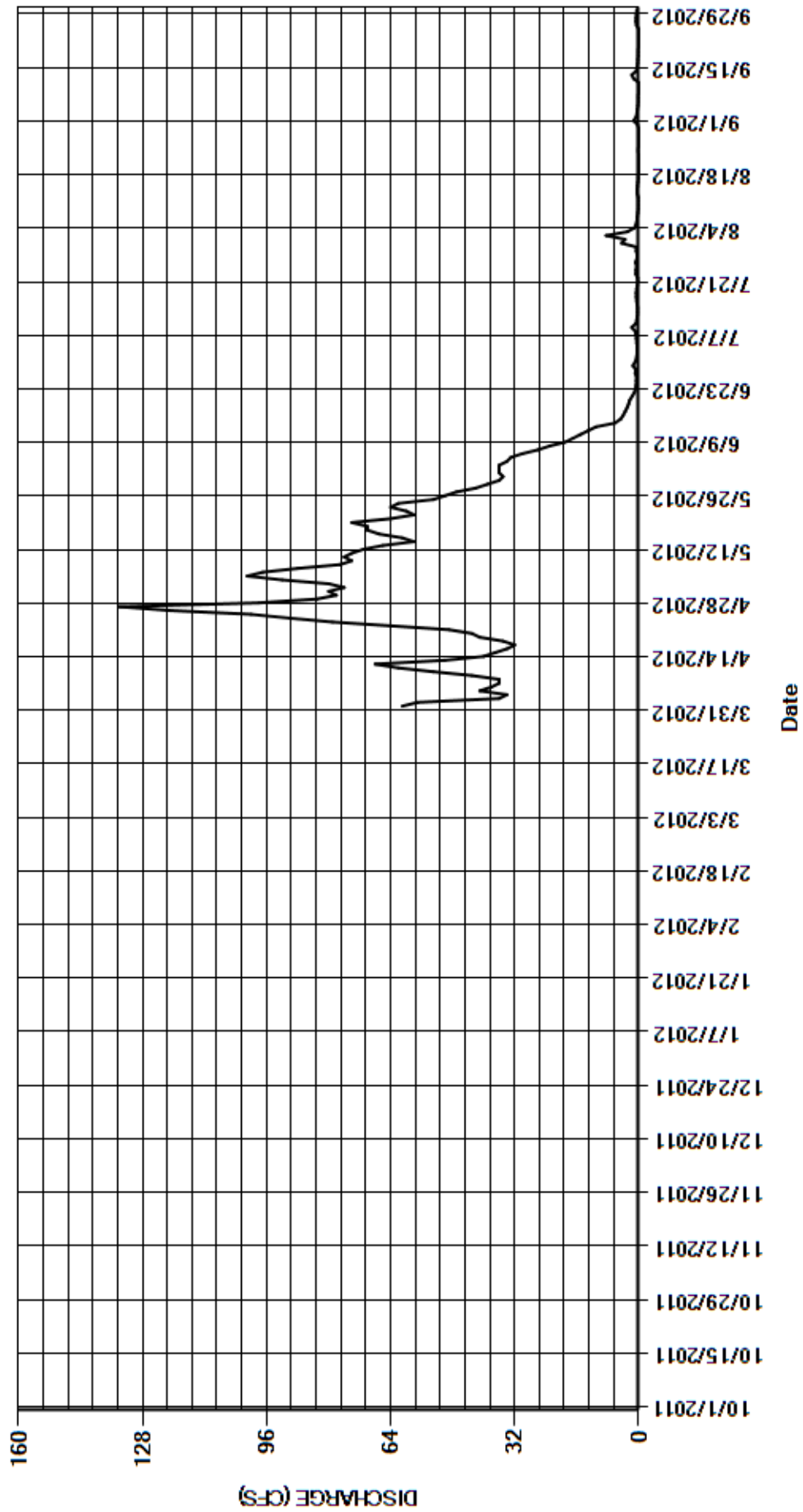
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	61	80	36	0.57	3.5	1.3
2	---	---	---	---	---	---	57	76	36	0.46	8.4	0.67
3	---	---	---	---	---	---	36	80	36	0.40	2.9	0.46
4	---	---	---	---	---	---	34	92	34	0.42	1.1	0.33
5	---	---	---	---	---	---	41	101	33	0.51	0.63	0.19
6	---	---	---	---	---	---	38	97	30	0.60	0.45	0.10
7	---	---	---	---	---	---	36	88	26	0.74	0.37	0.10
8	---	---	---	---	---	---	36	77	23	0.88	0.21	0.07
9	---	---	---	---	---	---	43	74	19	1.8	0.12	0.04
10	---	---	---	---	---	---	53	76	17	0.73	0.10	0.01
11	---	---	---	---	---	---	62	74	15	0.49	0.10	0.00
12	---	---	---	---	---	---	68	71	13	0.37	0.13	1.3
13	---	---	---	---	---	---	50	66	11	0.31	0.41	1.8
14	---	---	---	---	---	---	40	58	6.1	0.30	0.40	0.61
15	---	---	---	---	---	---	37	61	4.7	0.41	0.34	0.39
16	---	---	---	---	---	---	34	67	4.0	0.54	0.19	0.26
17	---	---	---	---	---	---	32	70	3.5	0.60	0.10	0.20
18	---	---	---	---	---	---	35	70	3.0	0.63	0.07	0.13
19	---	---	---	---	---	---	41	74	2.6	0.52	0.04	0.08
20	---	---	---	---	---	---	43	64	2.3	0.34	0.01	0.06
21	---	---	---	---	---	---	49	58	1.7	0.24	0.00	0.03
22	---	---	---	---	---	---	64	60	1.1	0.30	0.00	0.01
23	---	---	---	---	---	---	79	64	0.80	0.79	0.01	0.00
24	---	---	---	---	---	---	90	62	0.68	0.75	0.10	0.00
25	---	---	---	---	---	---	100	53	0.62	0.52	0.07	0.01
26	---	---	---	---	---	---	121	50	0.56	0.84	0.03	0.60
27	---	---	---	---	---	---	134	47	0.90	0.45	0.00	0.74
28	---	---	---	---	---	---	98	42	0.75	0.39	0.00	0.69
29	---	---	---	---	---	---	83	39	1.5	0.66	0.00	0.59
30	---	---	---	---	---	---	78	36	0.91	0.62	0.00	0.51
31	---	---	---	---	---	---	---	35	---	4.4	0.29	---
TOTAL	---	---	---	---	---	---	1773	2062	364.72	21.58	20.07	11.28
MEAN	---	---	---	---	---	---	59.1	66.5	12.2	0.70	0.65	0.38
AC-FT	---	---	---	---	---	---	3520	4090	723	43	40	22
MAX	---	---	---	---	---	---	134	101	36	4.4	8.4	1.8
MIN	---	---	---	---	---	---	32	35	0.56	0.24	0.00	0.00

CAL YR	2011	TOTAL	18967.90	MEAN	104	MAX	644	MIN	1.5	AC-FT	37620 (PARTIAL YEAR RECORD)
WTR YR	2012	TOTAL	4252.65	MEAN	23.2	MAX	134	MIN	0.00	AC-FT	8440 (PARTIAL YEAR RECORD)

MAX DISCH: 160 CFS AT 01:30 ON APR 27,2012 GH 3.18 FT SHIFT 0.08 FT
 MAX GH: 3.18 FT AT 01:30 ON APR 27,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09089500 WEST DIVIDE CREEK NEAR RAVEN
 WY2012 HYDROGRAPH



NORTH PLATTE RIVER BASIN
MICHIGAN RIVER NEAR MEADOW CREEK RESERVOIR

Water Year 2012

Location.-- Lat. 40°36'48", Long. 106°05'05", (Gould, Colorado Quadrangle, 1955), SE1/4 of the SE1/4 in Section 36 T8N, R78W in Jackson County. Under bridge on County Road 30 about 700 feet upstream of its confluence with Peterson Creek.

Drainage Area and Period of Record.-- Approximately 99 sq. mi.; Record kept from 1999 to present.

Equipment.-- Sutron shaft encoder (SDI12) housed in 18-inch diameter corrugated metal pipe stilling well with two 2-inch intakes. The shaft encoder is connected via cable to a Sutron high data rate (HDR) data collection platform (DCP) with satellite telemetry. The DCP is located in a gray NEMA box on the same side of the river but on the upstream side of the bridge. The outside staff, with a range of 0.00 to 6.66 feet, is the primary reference gage. It is located on the right bridge abutment just to the left of the stilling well. No other changes this water year.

Hydrologic Conditions.-- The basin consists of moderate terrain near the gage station, but originates in steep mountainous terrain on the Continental Divide near Thunder Mountain. In the vicinity of the gage station, the channel slope is moderate and has moderate sinuosity. The bed material ranges from silt up to small rock approximately 6-inches in diameter. Meadow Creek Reservoir and several major diversions, located upstream of the gage, can impact flow at the gage.

Gage-Height Record.-- Primary record is 15-minute shaft encoder data from satellite telemetry with the DCP log as backup. Continuous gage height records were kept from October 1 to October 31, 2011 and April 13 to September 30, 2012. Record was not kept during the winter period. The record is complete and reliable except for the following dates: October 1-21, 2011 (backwater from beaver dam); October 31, 2011 (shut-down), April 13, 2012 (start-up), July 2-11, 2012 (backwater from beaver dam) and August 10-23, 2012 (backwater from beaver dam). No gage height calibration corrections were necessary during WY 2012.

Datum Corrections.-- Levels were not run this water year. Levels were last run on August 25, 2010 using RM1 as base.

Rating.-- Rating No. 07A, was used during WY 2012. It is well defined to 1,060 cfs, 142% of the historical highest measurement made in water year 2011. Seven measurements (numbers 99 through 105), ranging in discharge from 10.1 cfs to 44.6 cfs, were made this water year. Measurements covered the range in stage, except for the lower mean daily flows on August 10-30 and September 1-6, 19-25, and 30, 2012; and higher daily flows on April 25-30, May 1-8, 11-12, 16-17, 19-20, 23-25, 27-28, June 2-7 and July 7-9, 25, 2012. The instantaneous peak flow of 172 cfs occurred at 0830 on April 27, 2012 at a gage height of 2.41 feet and a shift of -0.24 feet. It exceeded the stage of measurement No. 101, made on May 29, 2012 by 0.58 ft. in stage. The minimum daily flow of 6.5 cfs occurred on August 19, 2012.

Discharge.-- Shifting control method was applied throughout water year 2012. Shifts were distributed by time for the entire water year. Open-water measurements showed shifts varying between -0.20 and -0.27 feet. Shifts were applied directly and given full weight, except for measurements 100, 101 and 102 which were discounted from -4% to 4% to smooth shift distribution.

Special Computations.-- Discharge was estimated for shut-down and start-up days based on actual partial day record, discharge measurements, and record from adjacent days. Discharge for the periods when a beaver dam caused backwater at the gage was estimated using the calculated discharge from a shift adjustment based on gage height differences due to the beaver dam.

Remarks.-- The record is good, except for the following dates: October 31, 2011 (shut-down), April 13, 2012 (start-up), which is considered fair to poor, October 1-21, 2011, July 2-11, August 10-23, 2012 (beaver activity), which is considered poor. The peak instantaneous flow is rated good. Station maintained and record developed by Dan Meyer.

Recommendations.-- The effects of changes to the control should be evaluated during WY 2013 to determine potential revisions to the rating curve. Levels should be run in WY2013.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

MICHIGAN RIVER NEAR MEADOW CREEK RESERVOIR

RATING TABLE.-- MICMERCO07A USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

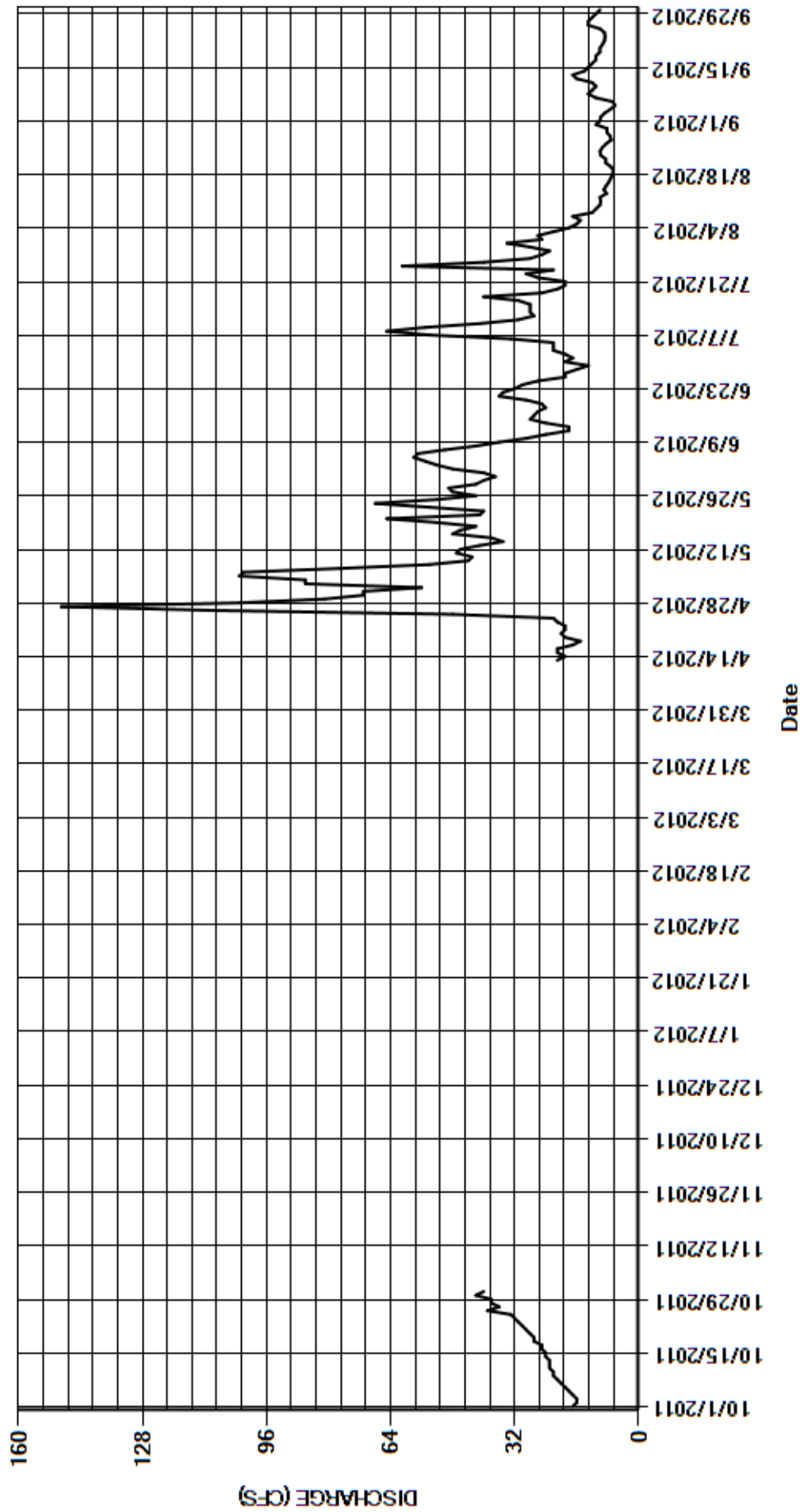
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e17	---	---	---	---	---	---	71	40	17	25	10
2	e16	---	---	---	---	---	---	56	48	e19	26	9.8
3	e16	---	---	---	---	---	---	86	52	e22	22	8.8
4	e17	---	---	---	---	---	---	86	55	e22	18	7.3
5	e18	---	---	---	---	---	---	103	58	e22	16	6.1
6	e19	---	---	---	---	---	---	102	57	e33	15	6.7
7	e20	---	---	---	---	---	---	77	50	e54	17	11
8	e21	---	---	---	---	---	---	54	42	e65	12	13
9	e22	---	---	---	---	---	---	44	36	e55	11	12
10	e22	---	---	---	---	---	---	43	29	e41	e10	11
11	e23	---	---	---	---	---	---	47	24	e31	e9.8	12
12	e23	---	---	---	---	---	---	46	18	27	e10	16
13	e23	---	---	---	---	---	e21	41	18	28	e8.3	17
14	e24	---	---	---	---	---	19	35	24	28	e9.0	14
15	e24	---	---	---	---	---	21	38	28	28	e8.4	13
16	e25	---	---	---	---	---	21	48	27	31	e7.7	12
17	e25	---	---	---	---	---	17	46	26	40	e7.2	11
18	e27	---	---	---	---	---	15	42	24	25	e6.8	11
19	e27	---	---	---	---	---	19	52	25	21	e6.5	10
20	e28	---	---	---	---	---	20	65	29	19	e7.2	10
21	e29	---	---	---	---	---	19	41	36	19	e8.5	9.3
22	30	---	---	---	---	---	19	40	35	26	e8.5	8.8
23	31	---	---	---	---	---	21	54	32	29	e9.8	8.7
24	32	---	---	---	---	---	22	68	30	22	10	8.8
25	33	---	---	---	---	---	48	52	26	61	9.4	9.9
26	39	---	---	---	---	---	109	42	19	40	8.4	13
27	36	---	---	---	---	---	149	48	19	28	7.1	13
28	38	---	---	---	---	---	103	49	16	25	7.4	12
29	38	---	---	---	---	---	81	42	13	23	8.2	11
30	42	---	---	---	---	---	71	40	19	28	8.2	10
31	e40	---	---	---	---	---	---	37	---	34	11	---
TOTAL	825	---	---	---	---	---	795	1695	955	963	349.4	326.2
MEAN	26.6	---	---	---	---	---	44.2	54.7	31.8	31.1	11.3	10.9
AC-FT	1640	---	---	---	---	---	1580	3360	1890	1910	693	647
MAX	42	---	---	---	---	---	149	103	58	65	26	17
MIN	16	---	---	---	---	---	15	35	13	17	6.5	6.1

CAL YR	2011	TOTAL	51792.0	MEAN	254	MAX	761	MIN	16	AC-FT	102700 (PARTIAL YEAR RECORD)
WTR YR	2012	TOTAL	5908.6	MEAN	29.3	MAX	149	MIN	6.1	AC-FT	11720 (PARTIAL YEAR RECORD)

MAX DISCH: 172 CFS AT 08:30 ON APR 27,2012 GH 2.41 FT SHIFT -0.24 FT
 MAX GH: 2.41 FT AT 08:30 ON APR 27,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

**MICHIGAN RIVER NEAR MEADOW CREEK RESERVOIR
WY2012 HYDROGRAPH**



NORTH PLATTE RIVER BASIN
06617100 MICHIGAN RIVER AT WALDEN, CO.

Water Year 2012

Location.-- Lat. 40°44'27", Long. 106°16'54", (Walden, Colorado Quadrangle, 1955), NE1/4 of the NE1/4 in Section 21 T9N, R79W in Jackson County, Hydrologic Unit 10180001, on the left bank just upstream of the Highway 125 Bridge on Jackson County property at Town of Walden Water Treatment Facility and 2.1 miles upstream of the confluence of Illinois River.

Drainage Area and Period of Record.-- Approximately 182 sq. mi.; Records kept by USGS from May 1904 to October 1905 and May 1923 to October 1947. Records kept by the Town of Walden from 1916 to 2002. Record kept by State Engineer's Office from May 2002 to present.

Equipment.-- The equipment at this site consists of a Sutron shaft encoder (SE) Model SE5600-0531 and high data rate Satlink 2 Data Collection Platform (DCP) with satellite telemetry housed in a structure mounted on top of a 24-inch diameter corrugated metal pipe stilling well with two two-inch diameter inlet pipes with flush risers. An electric drop tape is the primary reference gage. A Constant Flow Bubbler (CFB) was installed October 17, 2011 approximately 100 feet upstream of the existing gage as a temporary gage to be used during bridge replacement construction in 2012-2013. A staff gage was installed at the temporary gage on July 16, 2012. The CFB and SE were operated concurrently until July 16, 2012. The SE was decommissioned on July 16, 2012 and the CFB became the primary gage.

Hydrologic Conditions.-- The basin consists of moderate terrain near the gage station, but originates in steep mountainous terrain on the Continental Divide near Thunder Mountain. In the vicinity of the gage station, the channel slope is mild and has moderate sinuosity. The channel is composed of small rock, gravel, and sand. Flow is affected by upstream reservoir releases, diversions, and the Walden Water Treatment Plant.

Gage-Height Record.-- Primary record is 15-minute shaft encoder (SE) transmitted data with DCP log as backup. Due to bridge replacement construction the stilling well gage (SE) was decommissioned on July 16, 2012 and a temporary CFB gage was used as the primary gage through September 30, 2012. Continuous gage height records were kept from October 1, 2011 to October 31, 2011 and April 13, 2012 through September 30, 2012. Record was not kept during the winter period. The gage was visited on 12 separate occasions this water year to verify the instruments remained calibrated to the primary reference gage. Three instrument calibrations were necessary this water year; +0.02 on May 10, 2012, -0.03 ft on July 16, 2012 and -0.02 ft on August 23, 2012. The record is complete and reliable except for the following dates: October 4-31, 2011 (backwater effect from beaver dam); April 13-25, 2012 (lower intake blocked); and September 9-30, 2012 (backwater effect from in-stream construction activities related to bridge replacement).

Datum Corrections.-- A staff gage was installed at the temporary gage on July 16, 2012. The staff gage was set using the water surface elevation at the abandoned gage - 0.50 ft. Levels were run on July 19 and July 27, 2012 to tie-in a temporary staff gage to an existing BM1. Levels were last run (on the now abandoned gage) on August 25, 2010.

Rating.-- The control at extreme high discharges is the Highway 125 Bridge. For lower flows, the control is a natural rock riffle located just downstream of the bridge. Rating No. 13, dated November 25, 2009, was used the entire period of record for water year 2012. It is well defined to flows of 273 cfs, 150% of the historical highest discharge measurement made in water year 2005. Eight measurements (number 94 through 98 associated with the now decommissioned gage and numbers 1 through 3 associated with the temporary gage) were made this water year, ranging in discharge from 3.2 cfs to 100 cfs. These measurements covered the range in stage except for lower daily flows on July 20 and 21, August 15-31, and September 1-9 and 20-21, 2012. The instantaneous peak flow of 115 cfs occurred at 2330 on April 27, 2012 at a gage height of 1.73 feet and a shift of -0.04 ft. It exceeded Measurement No. 96, made on April 27, 2012 by approximately 0.09 ft. in stage. The instantaneous maximum gage height of 1.94 ft occurred at 0100 on October 29, 2011 and was caused by backwater from a beaver dam. The minimum daily flow of 0 cfs occurred on several days in September 2012.

Discharge.-- Shifting control method was applied throughout the period of record. Shifts were applied as defined by measurements and were distributed by time. Discharge measurements showed shifts ranging between -0.58 and 0.10 feet. A shift of -0.02 was assumed for measurement No. 95 as there was no gage height due to a plugged intake to the stilling well. That shift was based on previous shifts at similar flow and also the shift of measurement No. 93. All measurements were given full weight and shifts were applied directly.

Special Computations.-- The station is closed during the winter months and discharge is not estimated during this period. Discharge was estimated October 4-31, 2011 from the daily calculated discharge with a shift applied that accounts for backwater effect caused by a beaver dam. Discharge was estimated April 13, 2012 from the discharge on subsequent days of good data. Discharge from September 9-30, 2012 was estimated by mimicking the hydrograph from the upstream station MICMERC0 and accounting for increased flow resulting from precipitation.

Remarks.-- The record is good October 1-3, 2011 and April 26 to July 15, 2012. The partial record day when the station was started in the spring and the days until April 25 when the lower intake was not in contact with the stilling well should be considered poor. The period affected by backwater from a beaver dam from October 4-31, 2011 was estimated and should be considered poor. The period July 16 - September 8, 2012 when the CFB was the primary gage should be considered poor to fair due to poor correlation between the stilling well gage and the CFB (temporary gage) during the overlapping time of operation prior to the decommissioning of the original gage station. The record from September 9-30, 2012 was estimated and should be considered poor due to backwater effect from construction activities in the bypass channel. Station maintained and record developed by Dan Meyer.

Recommendations.-- CDOT is currently replacing the bridge over the Michigan River at this station with construction to be completed by summer 2013. A temporary gaging station was installed in October 2011 approximately 100 ft. upstream from the current station and will be used until a permanent gage is installed. Installation of a permanent gage should be completed as soon as possible following construction and a new rating developed.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06617100 MICHIGAN RIVER AT WALDEN, CO.

RATING TABLE-- MICWLDCO13 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

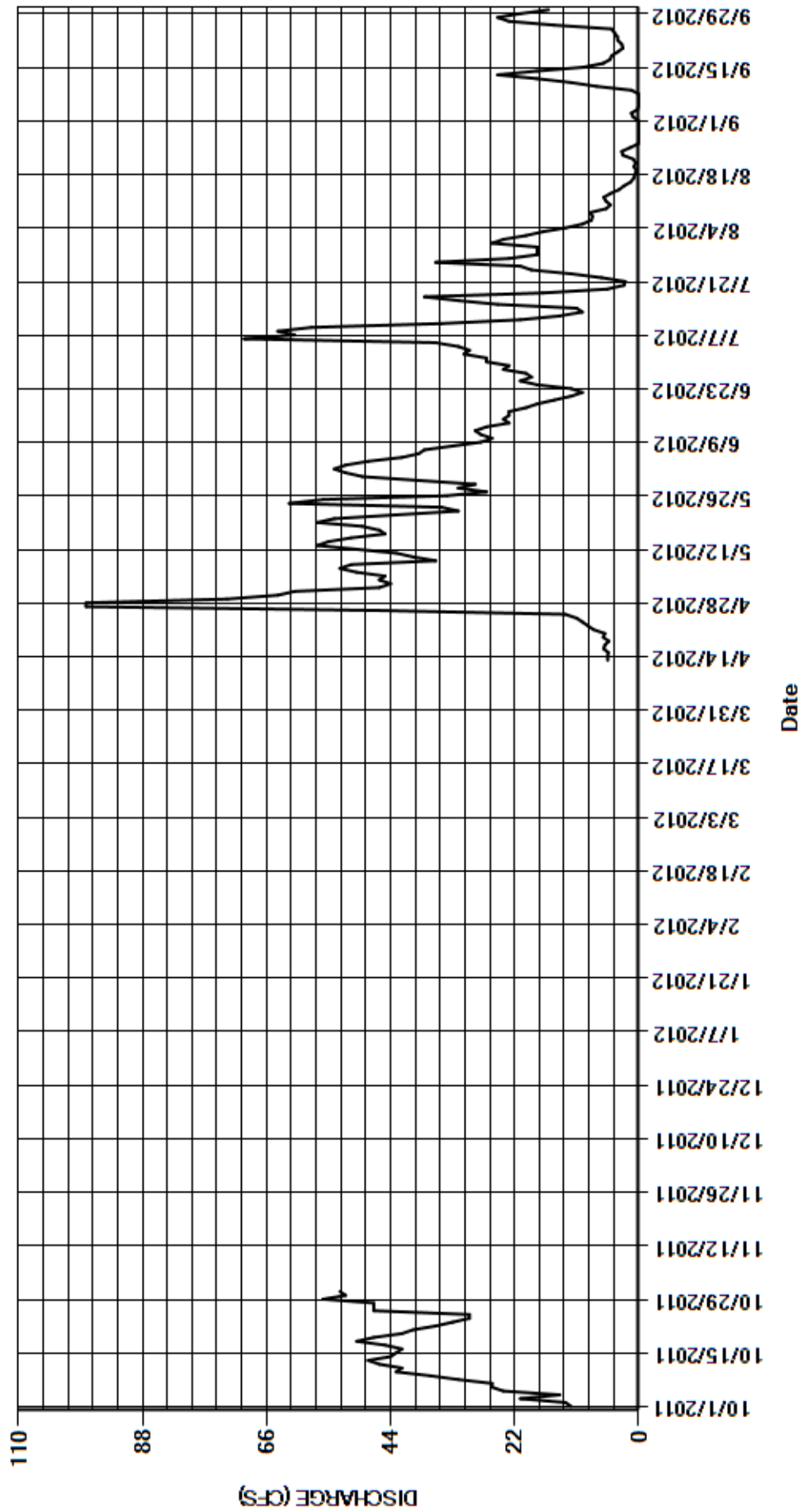
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	12	---	---	---	---	---	---	61	52	27	24	0.04
2	13	---	---	---	---	---	---	46	54	31	20	0.98
3	21	---	---	---	---	---	---	44	52	30	17	1.3
4	e14	---	---	---	---	---	---	46	48	32	13	0.17
5	e24	---	---	---	---	---	---	45	42	36	10	0.00
6	e26	---	---	---	---	---	---	50	39	70	8.4	0.00
7	e26	---	---	---	---	---	---	53	38	61	8.2	0.00
8	e32	---	---	---	---	---	---	51	33	64	8.6	0.00
9	e37	---	---	---	---	---	---	36	28	58	5.8	e1.3
10	e43	---	---	---	---	---	---	40	26	35	5.0	e7.5
11	e42	---	---	---	---	---	---	43	28	21	5.8	e12
12	e46	---	---	---	---	---	---	50	29	14	6.2	e18
13	e48	---	---	---	---	---	e5.5	57	27	10	5.0	e25
14	e44	---	---	---	---	---	e5.5	55	23	11	3.5	e18
15	e43	---	---	---	---	---	e5.4	51	24	25	2.6	e9.8
16	e42	---	---	---	---	---	e6.2	45	23	32	1.4	e6.3
17	e45	---	---	---	---	---	e6.0	46	23	38	0.90	e5.1
18	e50	---	---	---	---	---	e5.3	49	20	17	0.65	e4.8
19	e47	---	---	---	---	---	e6.3	57	18	5.6	0.39	e3.7
20	e42	---	---	---	---	---	e6.0	54	15	2.6	0.84	e2.8
21	e40	---	---	---	---	---	e8.0	43	12	2.4	0.53	e3.0
22	e36	---	---	---	---	---	e9.0	32	10	6.6	0.99	e3.7
23	e33	---	---	---	---	---	e10	35	12	12	2.8	e3.8
24	e30	---	---	---	---	---	e11	62	18	19	3.0	e4.3
25	e30	---	---	---	---	---	e13	56	21	21	1.5	e4.8
26	e47	---	---	---	---	---	46	34	19	36	0.07	e15
27	e47	---	---	---	---	---	98	27	20	23	0.00	e23
28	e47	---	---	---	---	---	98	32	24	18	0.00	e25
29	e56	---	---	---	---	---	73	29	23	18	0.00	e21
30	e52	---	---	---	---	---	64	39	27	18	0.00	e16
31	e53	---	---	---	---	---	---	49	---	26	0.00	---
TOTAL	1168	---	---	---	---	---	476.2	1417	828	820.2	156.17	236.39
MEAN	37.7	---	---	---	---	---	26.5	45.7	27.6	26.5	5.04	7.88
AC-FT	2320	---	---	---	---	---	945	2810	1640	1630	310	469
MAX	56	---	---	---	---	---	98	62	54	70	24	25
MIN	12	---	---	---	---	---	5.3	27	10	2.4	0.00	0.00

CAL YR	2011	TOTAL	60958.00	MEAN	323	MAX	975	MIN	12	AC-FT	120900
WTR YR	2012	TOTAL	5101.96	MEAN	25.3	MAX	98	MIN	0.00	AC-FT	10120

MAX DISCH: 115 CFS AT 23:30 ON APR 27,2012 GH 1.73 FT SHIFT -0.04 FT
 MAX GH: 1.94 FT AT 01:00 ON OCT 29,2011 (Backwater from beaver dam)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06617100 MICHIGAN RIVER AT WALDEN, CO.
WY2012 HYDROGRAPH



NORTH PLATTE RIVER BASIN
06617500 ILLINOIS RIVER NEAR RAND

Water Year 2012

Location.-- Lat. 40°27'45", Long. 106°10'30", (Rand Quadrangle, 1956), in SW1/4 of the NE1/4 of Section 29, T6N, R78W in Jackson County, Hydrologic Unit 10180001, on right upstream bridge abutment on Jackson County Road 27.

Drainage Area and Period of Record.-- Approximately 70.6 sq. mi. (from topographic maps).; Hydrographic measurements taken in 1981 and 1985, but no records were kept. Records kept from 1987 to present. Records published in 1995 and 2002 through the present by Colorado Division of Water Resources.

Equipment.-- Sutron shaft encoder (SDI12) housed in 18-inch diameter corrugated metal pipe stilling well with two 2-inch intakes located on the upstream side of the right bridge abutment. The shaft encoder is connected via cable to a Sutron high data rate (HDR) data collection platform (DCP) with satellite telemetry. The DCP is located 30 feet north of the stilling well in a NEMA box. Primary reference is an outside staff gage, with a range of 0.00 to 4.33 feet, located on the bridge abutment just to the left of the well.

Hydrologic Conditions.-- The basin consists of moderate terrain near the gage station, but originates in steep mountainous terrain up at the Continental Divide. In the vicinity of the gage station, the channel slope is moderate, but has a high sinuosity. The bed material ranges from silt up to small rock approximately 4-inches in diameter.

Gage-Height Record.-- Primary record is 15-minute shaft encoder data from satellite telemetry with the DCP log as backup. Continuous record was kept from October 1 to October 31, 2011 and April 13 to September 30, 2012. The gage station is closed during the winter months, typically November through mid-April. The station was visited eight times during water year 2012 to ensure instruments remained calibrated to the primary reference gage. There were no corrections made to the shaft encoder this water year. A +0.10 ft and -0.08 ft correction on Oct. 31, 2011 was not applied in record as the stilling well gage height was affected by ice. Record is complete and reliable except for the following: October 26-30 (ice affected), October 31, 2011 (partial day record - station shut down for season and ice affected) and April 13, 2012 (partial day record - station opened for season).

Datum Corrections.-- Levels were not run during water year 2012. Levels were last run on August 25, 2010.

Rating.-- The stilling well is located upstream of the bridge at the right abutment. The channel is straight for at least 100-feet upstream to 50-feet downstream of the bridge. A small tributary joins the Illinois River just upstream of the gage station. The bridge, at times, may act as control. Otherwise, the natural channel acts as the control. Rating No. 8 in use since Apr. 21, 2010 was applied from October 1 - 31, 2011. The rating was revised following water year 2012 and the new rating (No.9) was applied from April 13 - September 30, 2012. Seven measurements (numbered 124 through 130), ranging in discharge from 3.22 cfs to 36.6 cfs, were made this water year. These measurements covered the range in stage except for lower daily flows on August 27, September 6-7, 10-11, and 20-24, 2012 and higher daily flows on April 26-30, May 2-27, and June 2-6, 2012. The instantaneous peak flow of 66.1 cfs occurred at 1330 on April 27, 2012 at a gage height of 2.13 feet with a shift of 0.00 ft. It exceeded the stage of Measurement No. 126, made on May 29, 2012 by 0.36 ft. in stage.

Discharge.-- Shifting control method was applied throughout the period of record. Shifts were applied as defined by measurements and distributed by time. Open-water measurements showed shifts ranging between -0.02 and +0.02 feet. Shifts were applied directly and given full weight with the exception of Measurement No. 125 which was adjusted -5.41% to smooth shift distribution. The shift for Measurement No. 124 was not used because the stage-discharge relationship was affected by ice on the control.

Special Computations.-- Discharge values were estimated for October 26-30 (ice affected), October 31, 2011 (station shut-down) and April 13, 2012 (station opening) from the partial day record and consideration of previous or subsequent days of good record.

Remarks.-- The record is good, except for the periods affected by ice on the control which were estimated and are rated as poor. The day the station was closed and open were partial day record and were estimated and should be considered poor. The peak instantaneous discharge is rated as good. Station maintained and record developed by Dan Meyer.

Recommendations.-- Levels should be run during water year 2013. When levels run, an electric drop tape should be installed.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

06617500 ILLINOIS RIVER NEAR RAND

RATING TABLE.-- ILLRANCO08 USED FROM 01-OCT-2011 TO 31-OCT-2011
 ILLRANCO09 USED FROM 13-APR-2012 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

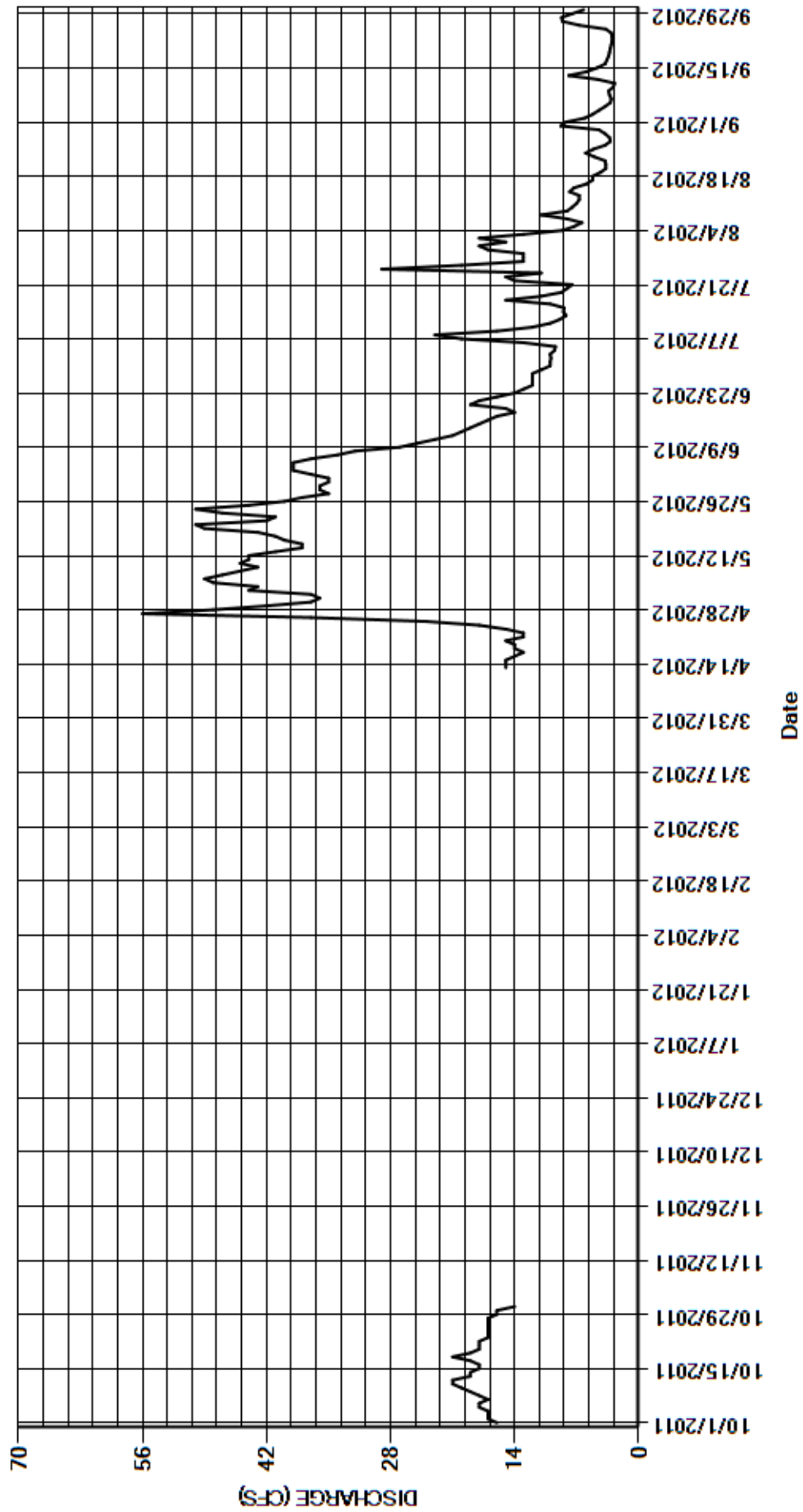
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16	---	---	---	---	---	---	36	35	10	15	8.2
2	17	---	---	---	---	---	---	37	37	9.9	18	6.1
3	17	---	---	---	---	---	---	44	39	10	13	5.2
4	17	---	---	---	---	---	---	43	39	9.5	8.6	4.5
5	18	---	---	---	---	---	---	48	39	9.4	7.3	3.8
6	18	---	---	---	---	---	---	49	37	13	6.4	3.2
7	17	---	---	---	---	---	---	47	34	20	8.1	3.1
8	18	---	---	---	---	---	---	45	32	23	11	3.3
9	19	---	---	---	---	---	---	43	27	16	8.1	3.4
10	20	---	---	---	---	---	---	45	25	12	7.5	2.9
11	21	---	---	---	---	---	---	44	23	10	7.0	2.7
12	21	---	---	---	---	---	---	44	21	8.9	6.7	4.6
13	19	---	---	---	---	---	e15	41	20	8.2	6.7	7.9
14	19	---	---	---	---	---	15	38	19	8.5	7.8	5.9
15	18	---	---	---	---	---	15	38	18	8.4	7.3	4.7
16	18	---	---	---	---	---	14	40	17	10	5.9	3.8
17	19	---	---	---	---	---	13	41	16	15	5.2	3.6
18	21	---	---	---	---	---	14	43	14	11	5.2	3.4
19	19	---	---	---	---	---	14	49	15	8.7	4.3	3.3
20	18	---	---	---	---	---	15	50	19	8.1	3.7	3.2
21	18	---	---	---	---	---	13	42	18	7.5	3.7	3.1
22	18	---	---	---	---	---	13	41	16	14	3.8	3.0
23	17	---	---	---	---	---	15	47	14	15	5.0	3.0
24	17	---	---	---	---	---	18	50	13	11	6.0	3.1
25	17	---	---	---	---	---	24	44	12	29	5.1	3.7
26	e17	---	---	---	---	---	37	40	12	20	3.8	6.7
27	e17	---	---	---	---	---	56	38	12	13	3.2	8.6
28	e17	---	---	---	---	---	48	35	12	13	3.3	8.7
29	e16	---	---	---	---	---	42	36	11	13	3.8	7.5
30	e16	---	---	---	---	---	37	36	10	17	4.5	6.2
31	e14	---	---	---	---	---	---	35	---	18	8.8	---
TOTAL	554	---	---	---	---	---	418	1309	656	400.1	213.8	140.4
MEAN	17.9	---	---	---	---	---	23.2	42.2	21.9	12.9	6.90	4.68
AC-FT	1100	---	---	---	---	---	829	2600	1300	794	424	278
MAX	21	---	---	---	---	---	56	50	39	29	18	8.7
MIN	14	---	---	---	---	---	13	35	10	7.5	3.2	2.7

CAL YR	2011	TOTAL	32007.0	MEAN	157	MAX	630	MIN	14	AC-FT	63490 (PARTIAL YEAR RECORD)
WTR YR	2012	TOTAL	3691.3	MEAN	18.3	MAX	56	MIN	2.7	AC-FT	7320 (PARTIAL YEAR RECORD)

MAX DISCH: 66.1 CFS AT 13:30 ON APR 27,2012 GH 2.13 FT SHIFT 0 FT
 MAX GH: 2.13 FT AT 13:30 ON APR 27,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

06617500 ILLINOIS RIVER NEAR RAND
WY2012 HYDROGRAPH



YAMPA RIVER BASIN
MORRISON CREEK BELOW SILVER CREEK

Water Year 2012

Location.-- Lat. 40°14'44", Long. 106°47'12", (Green Ridge, Colorado Quadrangle), SE1/4 of the NE1/4 in Section 10, T3N, R84W of the Sixth Principal Meridian in Routt County, approximately 200 ft. below the confluence Silver Creek.

Drainage Area and Period of Record.-- 71.9 sq. mi. (from topographic maps). ; October 2008 to present.

Equipment.-- Sutron shaft encoder connected to a Sutron high data rate (HDR) data collection platform (DCP) with satellite telemetry housed in an 18-inch diameter corrugated metal pipe stilling well with two 2-inch intakes with cleanouts. Primary reference is an electric drop tape inside the well. An old staff gage remains in the creek but should not be used as a reference since its datum does not match the primary reference. No other changes this water year.

Hydrologic Conditions.-- Moderate terrain near the gage station, originates in steep mountainous terrain of the Silver Creek and Morrison Creek drainages in the Routt National Forest south of the Service Creek Wilderness Area. The channel slope is moderate and consists of gravel and small to medium size cobbles ranging from 4 to 12 inches in diameter. Some large boulders are located along the banks and in the vicinity of the bridge. Gage location is immediately downstream of the Morrison Creek bridge crossing just downstream of the confluence of Morrison Creek and Silver Creek. The channel is straight for at least 100 feet downstream of the gage. The right and left banks are subject to overflow. Altitude of gage is approximately 7880 ft (from topographic map).

Gage-Height Record.-- Primary record is 15-minute shaft encoder data from satellite telemetry with the DCP log as backup. Continuous record kept from October 1- October 24, 2011 and April 24 - September 30, 2012. The gage station is closed during the winter months. The gage station was visited six times during water year 2012 to ensure the instruments remained calibrated to the primary reference. Three calibration corrections were made during water year 2012. On May 31, 2012 and July 25, 2012 the shaft encoder was adjusted by -0.01 ft. to match the primary reference gage. On June 20, 2012 the shaft encoder was adjusted by +0.01 ft. to match the primary reference gage. Record is complete and reliable except for October 24, 2011 (partial day record due to gage station closure for the winter); April 24, 2012 (partial day record due to gage opening); October 1-23, 2011 and April 25 - July 1, 2012 (backwater effect from beaver activity).

Datum Corrections.-- Levels were run to the electric tape index inside the gage shelter on August 2, 2012 using RM1 as base. Two new RMs were established, RM2 (5.672 ft) and RM3 (7.148 ft). The electric tape index was found to be at 9.468 ft. The given elevation for the electric tape index is 9.415 ft however the adjustment of +0.053 ft was not made during WY2012. The electric tape length was found to be 9.415 feet long. Levels should be run again in WY2013 to verify these results before making any changes, and to check new RM2 and RM 3. The level used was a Sokkia C320 (S/N 445601). A two peg test was performed on August 1, 2012 and a correction was made to the level. A 4 section, rectangular CST/Berger fiberglass rod was used. It was checked on August 1, 2012.

Rating.-- At low flows the control is a natural small cobble riffle downstream of the gage. At medium flows the small cobble riffle is drowned out as the channel controls. At higher flows the channel will overbank on the right and left side of the channel which consist of willows, small shrubs and grass. The PZF in the channel is approximately 1.00 ft and should be verified during next levels circuit. Rating No. 3 was used for water year 2012. Rating definition is fair to 1,160 cfs (150% of the highest discharge measurement made at the gage). Six measurements (Nos. 26- 31) were made this year, ranging in discharge from 3.43 cfs to 107 cfs. These measurements covered the range in stage except for lower daily flows on August 18-22 and 28-30, and September 2, 6-11, 15-25, 2012; and higher daily flow April 24 - May 10, 2012. The instantaneous peak flow of 203 cfs occurred at 0500 on April 27, 2012 at a gage height of 3.58 feet and a shift of -0.30 ft. It exceeded the stage of Measurement No. 27, made on April 24, 2012 by 0.59 feet in stage.

Discharge.-- Shifting control method was applied throughout the record period. Shifts were applied as defined by measurements and distributed by time. Shifts were distributed by time from October 1, 2011 to October 24, 2011 and from April 24, 2012 to September 30, 2012. Open-water measurements showed unadjusted shifts varying between -0.30 and +0.16 feet. The shifts for measurements nos. 26, 27, 28, and 29 were affected by backwater from a beaver dam. Shifts were given full weight and applied directly. Consideration was given to removal of beaver dams and the shifts and distributions were adjusted accordingly. Backwater effect from a partial beaver dam was evident in the hydrograph.

Special Computations.-- Discharge was estimated on October 24, 2011 (partial day record due to gage station closure for the winter); October 1-23, 2011 and April 24 - June 14, 2012 (backwater effect from beaver activity); and April 24, 2012 (partial day record due to gage station opening). Estimates for opening and closing day were made using adjacent periods of record and the corresponding discharge measurement. Estimates for discharge for October 1-23, 2011 were made by adjusting the calculated discharge to account for the changes in gage height caused by the beaver dam backwater effect (a combination of shift differential between measurement nos. 25 and 26 and gage height change caused by breach of dam on October 13, 2011). Estimated discharge for the period from April 24 - June 14, 2012 equals the calculated discharge. Measured shifts during this period were time adjusted to reflect changing backwater effects from the beaver dam.

Remarks.-- The record is considered good, except for days with estimated discharge which should be considered as fair. Days with estimated discharge include: October 1-24, 2011 and April 24 - July 1, 2012. Station maintained and record developed by Dana Miller and Dan Meyer.

Recommendations.-- Levels should be run in WY2013 to verify new reference marks (RM2 and RM3), check the PZF, and obtain channel cross section at the control. Continue to evaluate factors (moss, irrigation pumping, upstream diversion structures, gravel operations, sand bar, beaver dams, etc.) that are potentially contributing to shift variations. Evaluate Rating No.3 at both extremes of the 2013 hydrograph and revise accordingly.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

MORRISON CREEK BELOW SILVER CREEK

RATING TABLE-- MORBSCCO03 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

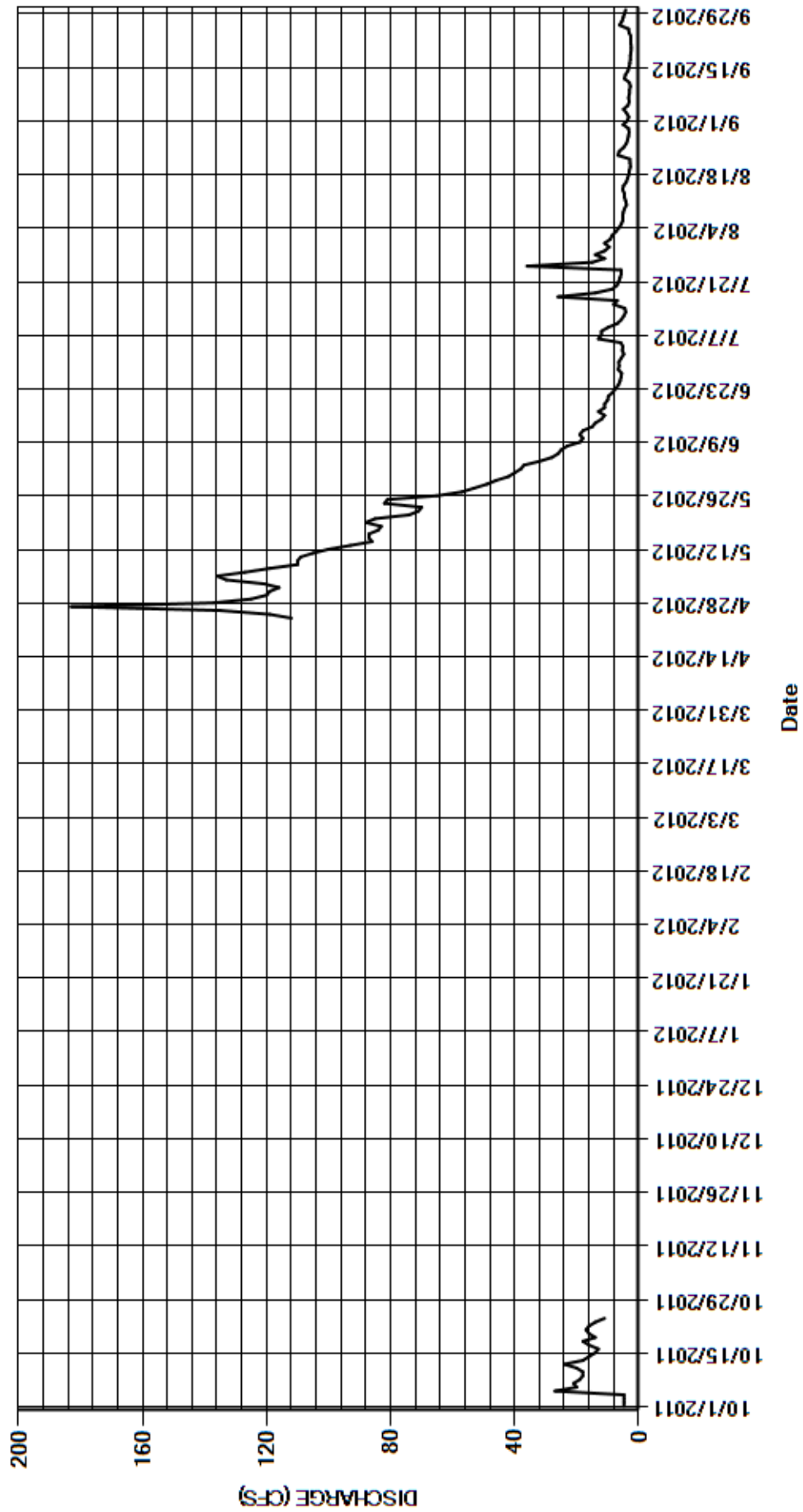
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e4.7	---	---	---	---	---	---	e119	e40	e5.6	9.2	3.7
2	e4.7	---	---	---	---	---	---	e116	e38	4.8	8.6	3.2
3	e4.7	---	---	---	---	---	---	e121	e37	5.3	7.4	3.9
4	e4.7	---	---	---	---	---	---	e133	e32	5.1	6.4	4.9
5	e27	---	---	---	---	---	---	e136	e28	5.8	5.6	3.5
6	e20	---	---	---	---	---	---	e127	e26	13	5.1	3.0
7	e21	---	---	---	---	---	---	e119	e25	12	5.2	3.3
8	e19	---	---	---	---	---	---	e110	e23	12	5.0	3.0
9	e18	---	---	---	---	---	---	e110	e19	9.9	4.6	3.0
10	e18	---	---	---	---	---	---	e109	e18	6.9	3.9	2.7
11	e20	---	---	---	---	---	---	e105	e19	5.6	4.2	3.0
12	e24	---	---	---	---	---	---	e100	e18	4.8	4.6	4.6
13	e18	---	---	---	---	---	---	e93	e15	4.2	4.6	4.3
14	e16	---	---	---	---	---	---	e86	e14	4.5	5.2	3.5
15	e14	---	---	---	---	---	---	e87	e12	8.1	4.9	3.1
16	e13	---	---	---	---	---	---	e87	e11	6.9	4.0	2.9
17	e16	---	---	---	---	---	---	e84	e13	26	3.6	2.7
18	e18	---	---	---	---	---	---	e83	e11	14	3.2	2.7
19	e14	---	---	---	---	---	---	e88	e11	8.5	3.0	2.5
20	e16	---	---	---	---	---	---	e85	e10	7.0	2.7	2.4
21	e17	---	---	---	---	---	---	e74	e9.8	6.4	2.8	2.5
22	e16	---	---	---	---	---	---	e71	e8.4	6.0	2.9	2.6
23	e14	---	---	---	---	---	---	e70	e7.4	5.6	6.7	2.5
24	e11	---	---	---	---	---	e112	e82	e6.5	5.7	6.3	3.1
25	---	---	---	---	---	---	e119	e81	e6.0	36	4.9	3.3
26	---	---	---	---	---	---	e135	e65	e5.7	15	4.0	6.2
27	---	---	---	---	---	---	e183	e57	e5.5	11	3.6	5.4
28	---	---	---	---	---	---	e137	e53	e6.6	14	3.3	5.0
29	---	---	---	---	---	---	e125	e49	e6.3	11	3.1	4.6
30	---	---	---	---	---	---	e120	e46	e6.4	9.5	3.3	4.2
31	---	---	---	---	---	---	---	e42	---	11	5.0	---
TOTAL	368.8	---	---	---	---	---	931	2788	488.6	301.2	146.9	105.3
MEAN	15.4	---	---	---	---	---	133	89.9	16.3	9.72	4.74	3.51
AC-FT	732	---	---	---	---	---	1850	5530	969	597	291	209
MAX	27	---	---	---	---	---	183	136	40	36	9.2	6.2
MIN	4.7	---	---	---	---	---	112	42	5.5	4.2	2.7	2.4

CAL YR	2011	TOTAL	36503.1	MEAN	187	MAX	860	MIN	4.7	AC-FT	72400 (PARTIAL YEAR RECORD)
WTR YR	2012	TOTAL	5129.8	MEAN	27.9	MAX	183	MIN	2.4	AC-FT	10170 (PARTIAL YEAR RECORD)

MAX DISCH: 203 CFS AT 05:00 ON APR 27,2012 GH 3.58 FT SHIFT -0.3 FT
 MAX GH: 3.58 FT AT 05:00 ON APR 27,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

MORRISON CREEK BELOW SILVER CREEK
WY2012 HYDROGRAPH



YAMPA RIVER BASIN
YAMPA R ABOVE LAKE CATAMOUNT NR STREAMBOAT SPRINGS
Water Year 2012

Location.-- Lat. 40°20'27", Long. 106°48'29", (Blacktail Mountain, Colorado Quadrangle), SE1/4 of the SE1/4 in Section 33, T5N, R84W of the Sixth Principal Meridian in Routt County, Hydrologic Unit 14050001, at County Road 18C bridge.

Drainage Area and Period of Record.-- 361 sq mi (from topographic maps). ; October 2003 to present.

Equipment.-- Sutron shaft encoder Model 5600-0531 housed in a 42-inch diameter corrugated metal pipe shelter and well. The shaft encoder is connected to a high data rate Sutron Satlink data collection platform (DCP) with satellite telemetry. Stilling well equipped with two 1.5-inch intakes connected to flush risers. The inside staff, with a range of approximately 0.00 to 6.66 feet, is the primary reference gage and is located on the inside wall of the pipe. The station has a Sutron air-temperature sensor. The station is also equipped with a stock tank heater which is used to keep the well from freezing in the winter.

Hydrologic Conditions.-- The basin consists of moderate terrain near the gage station, but originates in steep mountainous terrain in the Flattops Wilderness Area. Discharge affected by storage and subsequent releases of Yampa River flows from Stagecoach Reservoir approximately 5 miles upstream. The channel slope is moderate and consists of small gravel and rock. Channel is straight for approximately 100 feet upstream and 500 feet downstream with a slight bend as the river passes under the bridge. Altitude of gage is approximately 6880 ft (from topographic map).

Gage-Height Record.-- Primary record is 15-minute shaft encoder data from satellite telemetry with the DCP data log as backup. Continuous record kept from October 1, 2011 to September 30, 2012. Shaft encoder corrections were made at the time of site visits and ranged in value from 0.21 ft to -0.03 ft. Gage heights are recorded throughout the winter months; however, the river can be partially frozen, which in turn may result in the record being affected by ice conditions. The stilling well is generally kept ice free through use of a stock tank heater. The record is complete and reliable, except for the following days when ice on the control affected the stage discharge relationship: December 5-12, 16-28, 2011; January 1-6, 9, 10, 12-20, 23, 28-31 and February 1-8, 17-19, 25-27, 29, 2012.

Datum Corrections.-- Levels were run on August 2, 2012 to the adjustable brass nut/screw set in wood above the staff gage in gage shelter (RP1), using RM1 as the base. Reference mark #1 (RM1) is a MagNail in SW edge of concrete pad around the well head on right side of channel approx 48 ft downstream of gage shelter. Reference mark #2 (RM2) was found to be 0.016 ft. high. Reference mark #3 (RM3) was found to be 0.013 ft. high. RP2 the top of sill of the shelter door opening nearest hinged edge was established with an elevation of 6.360 ft using a carpenters level and was found to be -0.001 low. The adjustable brass nut/screw was found to be -0.001 low. Closure error was within the acceptable range and no adjustments were made to RP1.

Rating.-- Rating No. 12, in use since May 16, 2008, was used through the first measurement (No.190) of water year 2012. Two new ratings (Rating No. 13 and 14A) were developed following water year 2012 and applied to develop record for water year 2012. Rating No. 13 was applied to measurement No. 190 at 1700 on October 24, 2011 until the end of the peak flow at 0945 on April 27, 2012. Rating 14A was developed to capture changes to the control evident in measurements following high water in water year 2012. Rating 14A was applied at 1000 on April 27, 2012 to the end of the water year. It is well defined to a flow of 3,200 cfs, 150% of the historical highest discharge measurement made in water year 2011. Eleven measurements (numbers 190 through 200), ranging in discharge from 38.5 to 297 cfs, were made this water year. These measurements covered the range in stage except for higher daily flow on April 1, 2, 12, 24-30; May 1-12, 2012 and lower daily flow on June 20-27; September 15-30, 2012. The peak instantaneous flow of 601 cfs occurred at 0730 on April 27, 2012 at a gage height of 4.06 ft, with a shift of 0.00 ft. This peak exceeded the stage of Measurement 195 made on April 24, 2012 by 0.78 ft. Minimum daily flow of 21 cfs occurred on September 25, 2012.

Discharge.-- Shifting control method was applied throughout the record period. Shifts were applied as defined by measurements and were distributed by time and stage. Shifts were distributed by stage using shift curve YAMABVCOVAR1 from September 1 - October 24, 2011 (0945). Shifts were distributed by time from October 24, 2011 (1000) – September 30, 2012. Open-water measurements showed shifts varying between -0.18 ft. to 0.15 ft. Shifts were applied directly and given full weight, except for Measurement Nos. 191, 194-200 which were discounted from -5% to +5% to smooth shift distribution.

Special Computations.-- Discharge values were estimated for those days affected by ice. Estimated discharge values were computed by interpolation between adjacent good record, consideration of temperature and precipitation data from the Colorado Climate Center (Steamboat Springs, CO weather station), and by comparison to discharge record from the USGS operated and maintained gage station located upstream approximately 5 miles on the Yampa River below Stagecoach Reservoir.

Remarks.-- The record is good, except for periods affected by ice. Discharge for those days was estimated and are considered poor. The peak instantaneous flow is rated as good. Station maintained and record developed by Dana Miller and Dan Meyer.

Recommendations.-- Beaver activity on the control should be monitored during WY 2013.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

YAMPA R ABOVE LAKE CATAMOUNT NR STREAMBOAT SPRINGS

RATING TABLE.-- YAMABVCO12 USED FROM 01-OCT-2011 TO 24-OCT-2011
 YAMABVCO13 USED FROM 24-OCT-2011 TO 27-APR-2012
 YAMABVCO14A USED FROM 27-APR-2012 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

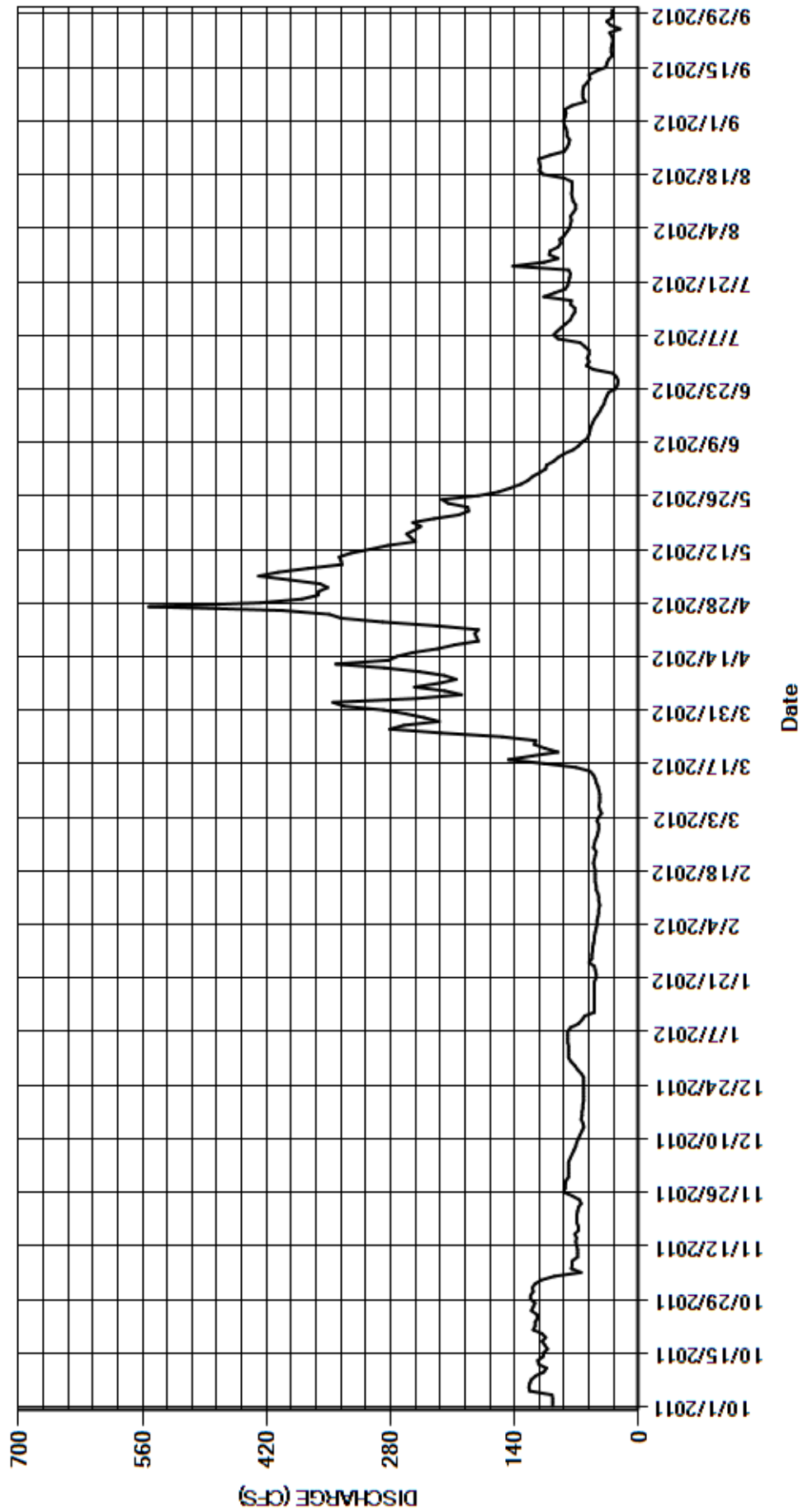
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	97	120	79	e79	e50	45	333	361	112	58	89	85
2	97	117	79	e79	e49	47	345	351	105	56	84	83
3	97	110	79	e79	e48	45	251	360	104	56	81	82
4	98	95	79	e80	e47	42	200	394	96	61	78	83
5	123	65	e77	e80	e47	44	219	429	91	66	77	75
6	124	76	e75	e80	e46	45	253	407	84	91	76	60
7	123	75	e73	80	e45	44	225	373	74	96	77	63
8	121	75	e71	77	e45	44	206	335	68	92	74	63
9	116	69	e70	e68	44	44	219	336	64	87	71	63
10	107	69	e68	e64	45	45	247	338	58	82	71	62
11	104	69	e66	61	45	46	287	325	56	77	74	58
12	113	70	e64	e50	46	48	342	303	55	75	75	55
13	114	71	62	e50	48	49	282	283	54	72	76	56
14	108	70	63	e50	48	51	273	252	52	72	75	48
15	107	72	65	e50	49	55	255	257	50	77	75	37
16	103	68	e64	e50	49	71	227	262	47	76	75	36
17	106	68	e64	e50	e49	107	208	253	44	107	84	34
18	109	70	e63	e50	e49	147	181	246	42	95	108	30
19	105	70	e63	e50	e50	120	183	255	39	83	112	31
20	109	70	e62	e50	51	91	185	231	38	80	111	31
21	119	69	e62	48	50	106	181	203	36	79	112	30
22	117	68	e62	48	49	118	228	192	34	78	113	29
23	117	65	e62	e49	48	116	289	193	26	77	100	30
24	114	67	e62	50	51	154	336	215	24	79	84	33
25	115	75	e62	56	e50	223	349	222	23	142	81	21
26	121	85	e62	53	e49	281	402	181	25	107	79	32
27	119	83	e65	53	e47	265	553	158	29	91	78	36
28	117	83	e69	e52	46	225	427	145	51	101	81	30
29	122	82	72	e52	e45	242	380	133	59	100	81	30
30	122	79	76	e51	---	263	362	125	56	91	82	30
31	119	---	79	e50	---	288	---	120	---	88	84	---
TOTAL	3483	2325	2119	1839	1385	3511	8428	8238	1696	2592	2618	1436
MEAN	112	77.5	68.4	59.3	47.8	113	281	266	56.5	83.6	84.5	47.9
AC-FT	6910	4610	4200	3650	2750	6960	16720	16340	3360	5140	5190	2850
MAX	124	120	79	80	51	288	553	429	112	142	113	85
MIN	97	65	62	48	44	42	181	120	23	56	71	21

CAL YR	2011	TOTAL	128636	MEAN	352	MAX	2360	MIN	60	AC-FT	255100
WTR YR	2012	TOTAL	39670	MEAN	108	MAX	553	MIN	21	AC-FT	78690

MAX DISCH: 601 CFS AT 07:30 ON APR 27,2012 GH 4.06 FT SHIFT 0 FT
 MAX GH: 4.06 FT AT 07:30 ON APR 27,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

**YAMPA R ABOVE LAKE CATAMOUNT NR STREAMBOAT SPRINGS
WY2012 HYDROGRAPH**



YAMPA RIVER BASIN
09238500 WALTON CREEK NEAR STEAMBOAT SPRINGS, CO.

Water Year 2012

Location.-- Lat. 40 24'29", Long. 106 47'11", (Steamboat Springs, Colorado, Quad., scale, 1:24,000), in SW1/4 of the NW1/4, in Section 11, T5N, R84W, (projected), Routt County, Hydrologic Unit 14050001, on left bank 0.4 miles downstream from Beaver Creek, 0.6 miles downstream from Storm King Creek, 4.5 miles upstream from its confluence with the Yampa River, and 6.0 miles southeast of Steamboat Springs.

Drainage Area and Period of Record.-- 42.4 sq mi (from topographic maps). ;

Equipment.-- Sutron shaft encoder connected to a Sutron HDR data collection platform (DCP) with satellite telemetry. The encoder and DCP are housed in a 42-inch diameter corrugated metal shelter and well. The station is equipped with two 2-inch intakes equipped with flush risers and valves. Primary reference gage is an inside staff (range of 0.00 to 6.6 ft.) located on inner wall of 42-inch diameter corrugated metal well. An adjustable brass screw/nut on the edge of the equipment shelf is the secondary reference gage but was not used this water year. The control is a broad-crested concrete weir 50-foot long with a low flow section on the left side.

Hydrologic Conditions.-- The basin above the gage consists of steep mountainous terrain originating at the top of Mount Werner and Walton Peak. Channel slope is steep at gage location and consists of large boulders (up to approximately 3-4 feet in diameter) typical of mountainous streams. The channel is straight for 200-feet upstream to 200-feet downstream of the gage, which is located immediately upstream of the weir. The right bank is high and less subject to overflow than the left bank. Some development has occurred in the vicinity of the gage, and a large home is located above the gage location.

Gage-Height Record.-- Primary record is 15-minute satellite telemetry data with the DCP log as backup. Continuous gage height records were kept from October 1 to October 24, 2011 and April 23 to September 30, 2012. Records were not kept during the winter period (October 25, 2011 to April 22, 2012), due to site accessibility and frozen channel issues. The record is complete and reliable except for the following dates: October 24, 2011 and April 23, 2012, which were partial records due to the shut down and start-up of the station in the Fall and Spring, respectively.

Datum Corrections.-- Levels were run on August 2, 2012 to the inside staff gage and adjustable brass screw/nut on the edge of the equipment shelf in the shelter using RM-6 as the base. The inside staff gage was found to be reading correct and no corrections were made. The level used was a Sokia C320 (S/N 445601). The level was adjusted at the last two peg test made on August 1, 2012. A four section, rectangular CST/Berger fiberglass rod was used. It was checked on August 1, 2012.

Rating.-- The control is a 50-foot long broad-crested concrete weir with a low flow section on the left side. This section is 9-feet wide at the downstream edge and 19-feet wide at the upstream edge. Rating No. 8, developed in November 2003, and extended in June 2007, was used in WY2012. Five measurements (numbers 75 through 79) were made during the current water year, ranging in discharge from 5.57 to 52.2 cfs. They cover the range in stage experienced except for higher daily flows April 23 - June 12, 2012; and lower daily flows August 16-22, 26-29, 31 and September 4-11, 13-25, 27-30, 2012. The instantaneous peak flow of 398 cfs occurred at 1915 on May 4, 2012 at a gage height of 1.88 feet, with a shift of 0.00 feet. It exceeded Measurement No. 76, made on June 13, 2012 by 0.90 ft. in stage. Minimum daily flows of 3.4 cfs occurred on September 10, 2012. There are no high flow measurement facilities at the gage site. Maximum stage for a safe wading measurement is about 1.20 ft (100 cfs).

Discharge.-- Shifting section control method was used throughout the period of record. Shifts were applied as defined by measurements and were distributed by time. This year's measurements had unadjusted shifts ranging between 0.04 to -0.11 feet. Shifts from Measurements 75 (-6.19%), 76(-5.09%), 78,(-2.08%), and 79(+7.12%) were adjusted to smooth shift distribution.

Special Computations.-- The station is closed during the winter months and no discharges are estimated during this period. Discharge data for October 24, 2011 (shut-down) and April 23, 2012 (start-up) were estimated using flow measurement data, partial day DCP data, and consideration of adjacent good data.

Remarks.-- The record is good, except as follows: October 24, 2011 and April 23, 2012, which were estimated and should be considered fair and April 24 - June 5, 2012, which should be considered fair to poor because the flow exceeded twice the highest WY2012 measurement. The peak flow for the year is considered poor because it exceeded 200% of the highest discharge measurement ever made at this gage of 106 cfs. The period from July 25, 2012 to September 30, 2012 should be considered poor because of uncertainties in discharge measurements and stage record. This gage station is used for water administration purposes only, the rating is considered more critical during low flow periods. Station maintained by Dana Miller and Dan Meyer. Record developed by Dan Meyer.

Recommendations.-- Due to high stream velocities/depth of flow, it is highly recommended that no stream flow measurements be waded above a gage height of 1.20 feet, that chest waders be worn above a gage height of 1.00 feet, and that a second person must be on site for safety reasons. Measurements on the weir should take into account angular flow. The broad-crested weir is wide enough to take reliable measurements at its upstream edge, though safety must be considered when on the weir. A drop tape should be installed during water year 2013. The adjustable brass nut and drop tape will become the primary reference. Gage intakes should be flushed at all visits, except during peak runoff. Flush valves in well are difficult to turn without a pipe wrench, and require entry into the stilling well. Stilling well air quality should be checked in Spring and early Fall. An outside staff gage should be installed on left weir wing wall near terminus of stilling well intakes.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09238500 WALTON CREEK NEAR STEAMBOAT SPRINGS, CO.

RATING TABLE-- WLTNCKCO08 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

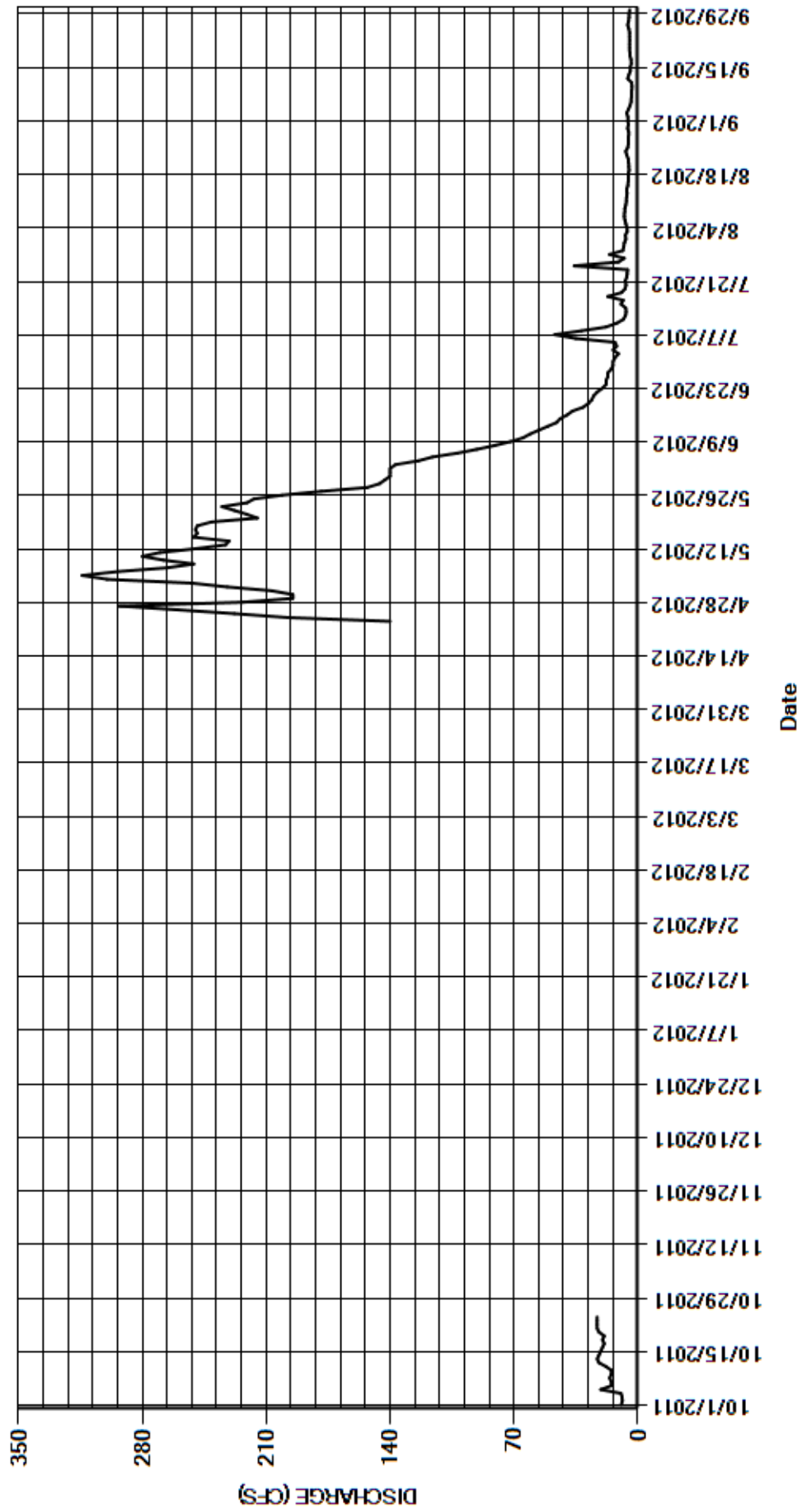
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	
1	9.4	---	---	---	---	---	---	207	140	13	6.8	5.7	
2	8.8	---	---	---	---	---	---	232	140	11	7.1	5.7	
3	8.9	---	---	---	---	---	---	252	137	14	6.0	6.3	
4	9.6	---	---	---	---	---	---	300	124	12	6.2	5.3	
5	21	---	---	---	---	---	---	314	116	13	6.8	4.4	
6	15	---	---	---	---	---	---	294	102	35	7.4	3.8	
7	15	---	---	---	---	---	---	266	91	47	7.7	3.7	
8	16	---	---	---	---	---	---	251	81	32	7.5	3.5	
9	15	---	---	---	---	---	---	268	72	18	7.4	3.5	
10	15	---	---	---	---	---	---	280	65	12	6.8	3.4	
11	18	---	---	---	---	---	---	270	61	8.2	6.5	3.6	
12	22	---	---	---	---	---	---	250	56	7.0	6.4	5.8	
13	23	---	---	---	---	---	---	233	51	6.7	6.1	5.1	
14	22	---	---	---	---	---	---	231	46	6.9	6.4	4.3	
15	21	---	---	---	---	---	---	251	44	9.6	5.7	4.3	
16	20	---	---	---	---	---	---	249	40	8.3	5.5	3.7	
17	19	---	---	---	---	---	---	250	37	17	5.3	3.9	
18	20	---	---	---	---	---	---	249	31	9.3	5.5	4.5	
19	19	---	---	---	---	---	---	241	28	7.3	5.0	4.6	
20	22	---	---	---	---	---	---	215	26	6.7	5.1	4.7	
21	23	---	---	---	---	---	---	221	25	7.2	5.3	4.7	
22	23	---	---	---	---	---	---	228	23	6.4	5.5	4.6	
23	23	---	---	---	---	---	---	e140	235	20	6.0	6.3	4.7
24	e23	---	---	---	---	---	---	198	221	18	5.9	6.9	4.7
25	---	---	---	---	---	---	---	228	217	18	36	5.7	5.1
26	---	---	---	---	---	---	---	260	201	17	11	5.4	5.8
27	---	---	---	---	---	---	---	293	179	17	7.7	5.4	5.3
28	---	---	---	---	---	---	---	223	153	15	16	5.3	5.0
29	---	---	---	---	---	---	---	195	146	14	8.5	5.2	5.0
30	---	---	---	---	---	---	---	195	143	14	8.0	5.8	4.6
31	---	---	---	---	---	---	---	140	---	7.7	5.4	---	
TOTAL	431.7	---	---	---	---	---	1732	7187	1669	414.4	189.4	139.3	
MEAN	18.0	---	---	---	---	---	216	232	55.6	13.4	6.11	4.64	
AC-FT	856	---	---	---	---	---	3440	14260	3310	822	376	276	
MAX	23	---	---	---	---	---	293	314	140	47	7.7	6.3	
MIN	8.8	---	---	---	---	---	140	140	14	5.9	5.0	3.4	

CAL YR	2011	TOTAL	47815.8	MEAN	239	MAX	1410	MIN	8.8	AC-FT	94840 (PARTIAL YEAR RECORD)
WTR YR	2012	TOTAL	11762.8	MEAN	63.6	MAX	314	MIN	3.4	AC-FT	23330 (PARTIAL YEAR RECORD)

MAX DISCH: 398 CFS AT 19:15 ON MAY 04,2012 GH 1.88 FT SHIFT 0 FT
 MAX GH: 1.88 FT AT 19:15 ON MAY 04,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09238500 WALTON CREEK NEAR STEAMBOAT SPRINGS, CO.
WY2012 HYDROGRAPH



YAMPA RIVER BASIN
WILLOW CREEK BELOW STEAMBOAT LAKE

Water Year 2012

Location.-- Lat. 40 47'28", Long. 106 56'40", (Hahns Peak Quadrangle), in the SW¼ of the SE¼ Section 29, T10N, R85W in Routt County, Hydrologic Unit 14050001, on left bank 50-feet below the Steamboat Lake outlet.

Drainage Area and Period of Record.-- 35.5 square miles. ;

Equipment.-- Sutron shaft encoder (SDI12) housed in a steel box shelter on an 18-inch diameter corrugated metal pipe stilling well with two 2-inch intakes. The shaft encoder is connected via cable to a Sutron high data rate (HDR) data collection platform (DCP) with satellite telemetry. The DCP is located in a separate NEMA housing box several feet from the stilling well. There is no outside staff. Primary reference is an electronic drop tape referenced to a line at the base of the device, connected at the edge of the wood instrument shelf.

Hydrologic Conditions.-- The basin consists of steep mountainous terrain originating at the top of Sand Mountain, Diamond Peak, and other portions of the mountain range dividing the Elk River drainage and Little Snake River drainage. The channel slope is moderate at the gage and consists of small to medium size rock ranging from 4 to 12 inches in diameter. Releases from Steamboat Lake control the flow in Willow Creek.

Gage-Height Record.-- Primary record is 15-minute shaft encoder data from satellite telemetry with the DCP log as backup. Record was kept from October 1 to October 25, 2011 (DCP shut-down for winter) and April 23 (DCP start-up in spring) to September 30, 2012. The outlet gage height record is complete and reliable except for October 25, 2011 and April 23, 2012, which were estimated. Releases from the reservoir were kept constant during both days of estimated record. No instrument calibration corrections were made this water year.

Datum Corrections.-- Levels were last run on August 10, 2011. Due to the closure error exceeding the allowable limit, levels should be run again in water year 2013.

Rating.-- Control is a cobble/small boulder riffle located just downstream of the gage. Gage location is immediately downstream (75 ft) of the Steamboat Lake outlet and flow is dictated by the gate valve position. The channel slope is moderate and consists of small to medium size rock ranging from 4 to 12 inches in diameter. Channel is straight for at least 100-ft downstream of the gage. The right and left banks are subject to overflow. Rating No. 12 (in use since October 1, 2008) was used the entire period of record. It is well defined to flows of 240 cfs, 150% of the historical highest discharge measurement made in WY2005. Five measurements (numbers 105 to 109) were taken ranging in discharge from 6.25 to 49.2 cfs. These measurements cover the range in discharge except for lower daily flows on July 30 and September 8 - 27, 2012; and higher daily flows from May 5 - 22, 2012. The instantaneous peak discharge of 76.2 cfs occurred at 2315 on May 7, 2012 at a gage height of 1.97 ft with a shift of 0.03 ft. The peak discharge exceeded the stage of Measurement No. 106, made on April 23, 2012, by 0.28 ft. The peak instantaneous gage height 1.99 ft. occurred at 0430 on May 16, 2012.

Discharge.-- Shifting control method was applied throughout the record period. Shifts were applied directly and were distributed by time from October 1 to October 25, 2011 and April 23 to September 30, 2012. Open-water measurements showed unadjusted shifts ranging between -0.07 and 0.06 ft. The shift from Measurement 106 was discounted 6.49%, Measurement 107 was adjusted -5.94%, and the shift from Measurement 109 was discounted 2.31% to smooth shift distribution.

Special Computations.-- No water is released from the reservoir during the winter months and no outlet record is kept. Discharge for October 25, 2011 and April 23, 2012 was estimated using flow measurements, partial day DCP data and consideration of adjacent day's flow data.

Remarks.-- Record is considered good from October 1 to October 24, 2011 and April 24 to September 30, 2012. The record is considered fair on days in which the flow was estimated (October 25, 2011 and April 23, 2012). The peak flow for the year is rated good. Station maintained and record developed by Dan Meyer.

Recommendations.-- Run levels to verify RP1 and length of electric drop tape.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

WILLOW CREEK BELOW STEAMBOAT LAKE

RATING TABLE.-- WILBSLCO12 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

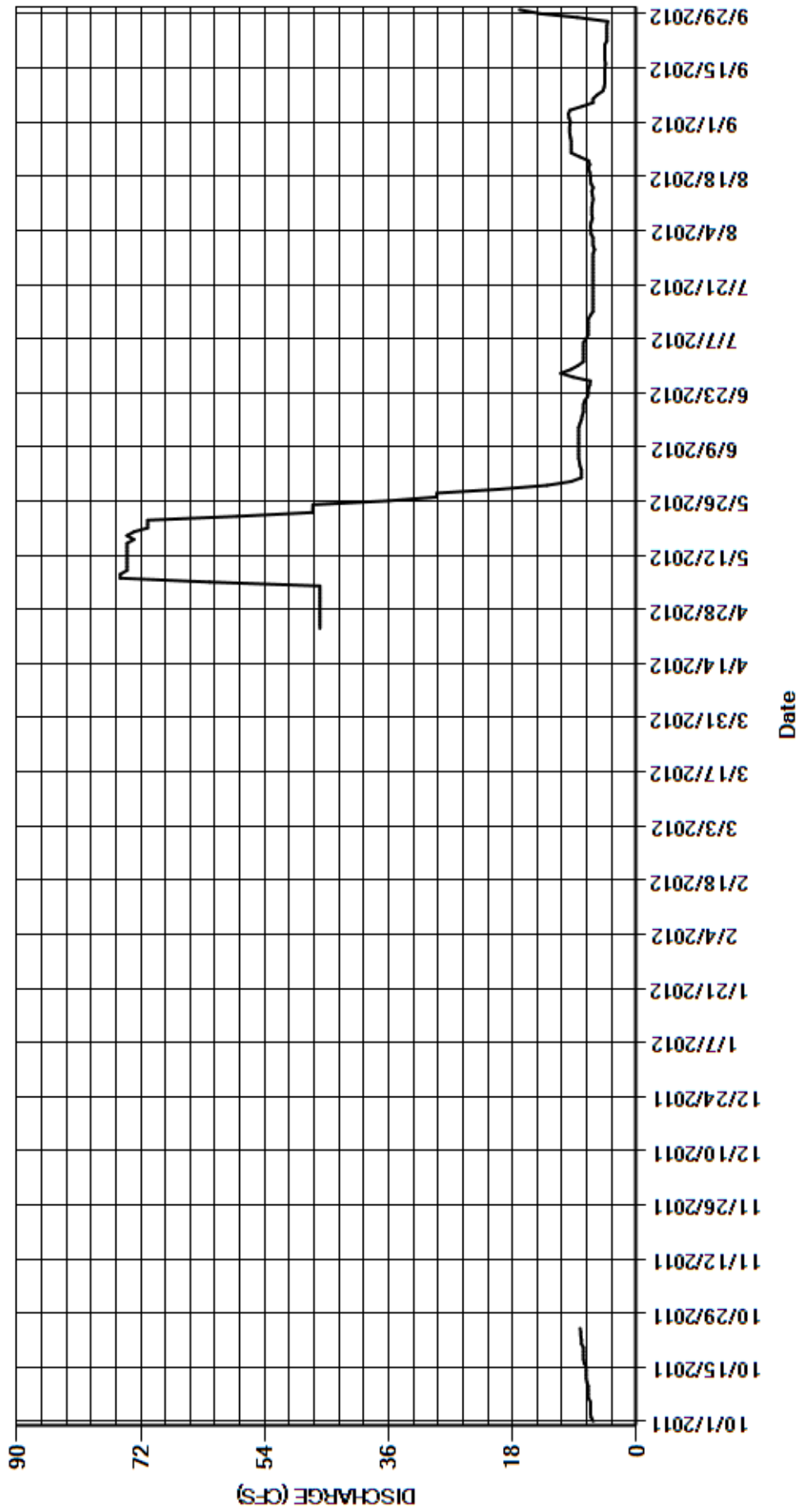
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.3	---	---	---	---	---	---	46	8.0	7.7	6.3	9.6
2	6.6	---	---	---	---	---	---	46	8.0	7.7	6.3	9.8
3	6.7	---	---	---	---	---	---	46	8.0	7.7	6.6	9.9
4	6.7	---	---	---	---	---	---	46	8.2	7.7	6.6	9.7
5	6.7	---	---	---	---	---	---	62	8.3	7.7	6.7	7.9
6	6.7	---	---	---	---	---	---	75	8.4	7.7	6.6	6.3
7	7.0	---	---	---	---	---	---	75	8.4	7.3	6.4	6.3
8	7.0	---	---	---	---	---	---	74	8.4	7.0	6.5	5.7
9	7.0	---	---	---	---	---	---	74	8.4	7.0	6.5	4.9
10	7.0	---	---	---	---	---	---	74	8.4	7.0	6.5	4.7
11	7.2	---	---	---	---	---	---	74	8.4	7.0	6.4	4.6
12	7.3	---	---	---	---	---	---	74	8.4	7.0	6.3	4.6
13	7.3	---	---	---	---	---	---	74	8.4	6.7	6.4	4.6
14	7.3	---	---	---	---	---	---	74	8.4	6.3	6.5	4.6
15	7.3	---	---	---	---	---	---	74	8.2	6.3	6.3	4.6
16	7.6	---	---	---	---	---	---	73	8.0	6.3	6.6	4.5
17	7.7	---	---	---	---	---	---	74	7.9	6.3	6.7	4.6
18	7.7	---	---	---	---	---	---	73	7.7	6.3	6.7	4.6
19	7.7	---	---	---	---	---	---	71	7.7	6.3	6.8	4.6
20	7.7	---	---	---	---	---	---	71	7.7	6.3	7.0	4.6
21	8.0	---	---	---	---	---	---	71	7.5	6.3	6.8	4.6
22	8.0	---	---	---	---	---	---	58	7.1	6.3	7.0	4.3
23	8.1	---	---	---	---	---	e46	47	7.0	6.3	8.3	4.3
24	8.1	---	---	---	---	---	46	47	7.0	6.3	9.5	4.3
25	e8.2	---	---	---	---	---	46	47	6.8	6.3	9.5	4.3
26	---	---	---	---	---	---	46	36	6.7	6.3	9.5	4.3
27	---	---	---	---	---	---	46	29	9.2	6.3	9.5	4.2
28	---	---	---	---	---	---	46	29	11	6.3	9.6	8.6
29	---	---	---	---	---	---	46	20	9.5	6.3	9.7	14
30	---	---	---	---	---	---	46	13	8.5	6.1	9.7	17
31	---	---	---	---	---	---	---	9.5	---	6.3	9.7	---
TOTAL	182.9	---	---	---	---	---	368	1756.5	243.6	208.4	229.5	190.6
MEAN	7.32	---	---	---	---	---	46.0	56.7	8.12	6.72	7.40	6.35
AC-FT	363	---	---	---	---	---	730	3480	483	413	455	378
MAX	8.2	---	---	---	---	---	46	75	11	7.7	9.7	17
MIN	6.3	---	---	---	---	---	46	9.5	6.7	6.1	6.3	4.2

CAL YR	2011	TOTAL	21315.5	MEAN	119	MAX	593	MIN	6.3	AC-FT	42280 (PARTIAL YEAR RECORD)	
WTR YR	2012	TOTAL	3179.5	MEAN	17.1	MAX	75	MIN	4.2	AC-FT	6310 (PARTIAL YEAR RECORD)	

MAX DISCH: 76.2 CFS AT 23:15 ON MAY 07,2012 GH 1.97 FT SHIFT 0.03 FT
 MAX GH: 1.99 FT AT 04:30 ON MAY 16,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

WILLOW CREEK BELOW STEAMBOAT LAKE
WY2012 HYDROGRAPH



YAMPA RIVER BASIN
WILLIAMS FORK AT MOUTH NEAR HAMILTON

Water Year 2012

Location.-- Lat. 40°26'14", Long. 107°38'50", in SE1/4 of the NW1/4 of Section 31, T6N, R91W, Moffat County, Hydrologic Unit 14050001, on left bank at coal mine service road crossing, 2,300 ft upstream from confluence with Yampa River, 6.1 mi north-northeast of Hamilton, and 8 mi south-southwest of Craig, CO.

Drainage Area and Period of Record.-- 419 sq miles; Hydrographic record kept from October 1, 1983 to September 30, 2001 by the USGS and April 27, 2005 to present by the State Engineers Office.

Equipment.-- Sutron high data rate (HDR) data collection platform (DCP) driven by a Sutron constant flow bubbler (CFB) and powered by a solar recharged 12-volt battery housed in a 6-foot square shelter over a 4-foot culvert well (no longer in use). A Campbell Scientific radar gage is used as the backup to the CFB. Outside gage (the primary reference gage) is a wire weight gage (WWG) mounted on the upstream side of the bridge almost directly above the orifice. A Sutron air temperature sensor is also in use at the station.

Hydrologic Conditions.-- The basin consists of moderate terrain near the gage station but originates in steep mountainous terrain in the Flattops. In the vicinity of the gage station, the channel slope is moderate. The bed material is composed of small rock, cobbles, and occasional large boulders. The primary use of water upstream of the gage is irrigation.

Gage-Height Record.-- Primary record is 15-minute CFB data from satellite telemetry with DCP, CFB, and radar logs as backup. Continuous records were kept from October 1, 2011 through September 30, 2012. The record is complete and reliable except for the following days: January 27-31 and February 24-27, 29, 2012 due to backwater effect from ice on the control. Instrument calibration corrections for WY2012 were made at the time of site visits and ranged from -0.26 to +0.04 ft. Corrections associated with measurements 87 and 88 were not made in the field.

Datum Corrections.-- Levels were not run during water year 2012.

Rating.-- Rating No. 7 (WMFKMHCO07), created on February 9, 2006 (and extended on May 20, 2008 to include the high gage heights recorded in water year 2008), was used throughout the entire water year. Eleven measurements, numbered 80 through 90, were taken during water year 2012. Measurements ranged in discharge from 4.70 to 337 cfs and covered the range in stage, except for lower daily flows on June 27-30 and July 1-2, 5, 7, 2012; and higher daily flows on April 12, 24-28, and May 3-7, 2012. The peak instantaneous flow of 643 cfs occurred at 0745 on April 27, 2012 at a gage height of 4.69 ft with a shift of 0.11 ft. The peak gage height exceeded the stage of Measurement 85 made May 10, 2012 by 0.77 ft.

Discharge.-- Shifting control method was applied throughout water year 2012. Shifts were applied as defined by measurements and were distributed by time throughout the water year. Open-water measurements showed shifts varying between -0.12 and 0.17 ft. Shifts were applied directly and given full weight, except for measurements Nos. 84, 86, 87, 88, and 90 which were discounted from -8% to 4% to smooth shift distribution. Shifts after adjustment ranged between -0.01 and 0.16 ft.

Special Computations.-- Discharge values were estimated for "b" (ice-affected) days (January 27-31, 2012 and February 24-27, 29, 2012) by consideration of measurement data and observations, weather data and adjoining periods of good record.

Remarks.-- The record is good except for the period of ice affected record. Discharge values were estimated during these periods and the record is considered poor. The peak instantaneous flow should be considered good. Station maintained and record developed by Dan Meyer.

Recommendations.-- Levels should be run and the PZF assessed in water year 2013. In addition, Rating No. 7 should be evaluated based upon the results of levels data and consideration of lower flows. Radar sensor data should be evaluated to determine if it can be used as the primary record instead of the CFB.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

WILLIAMS FORK AT MOUTH NEAR HAMILTON

RATING TABLE.-- WMFKMHCO07 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

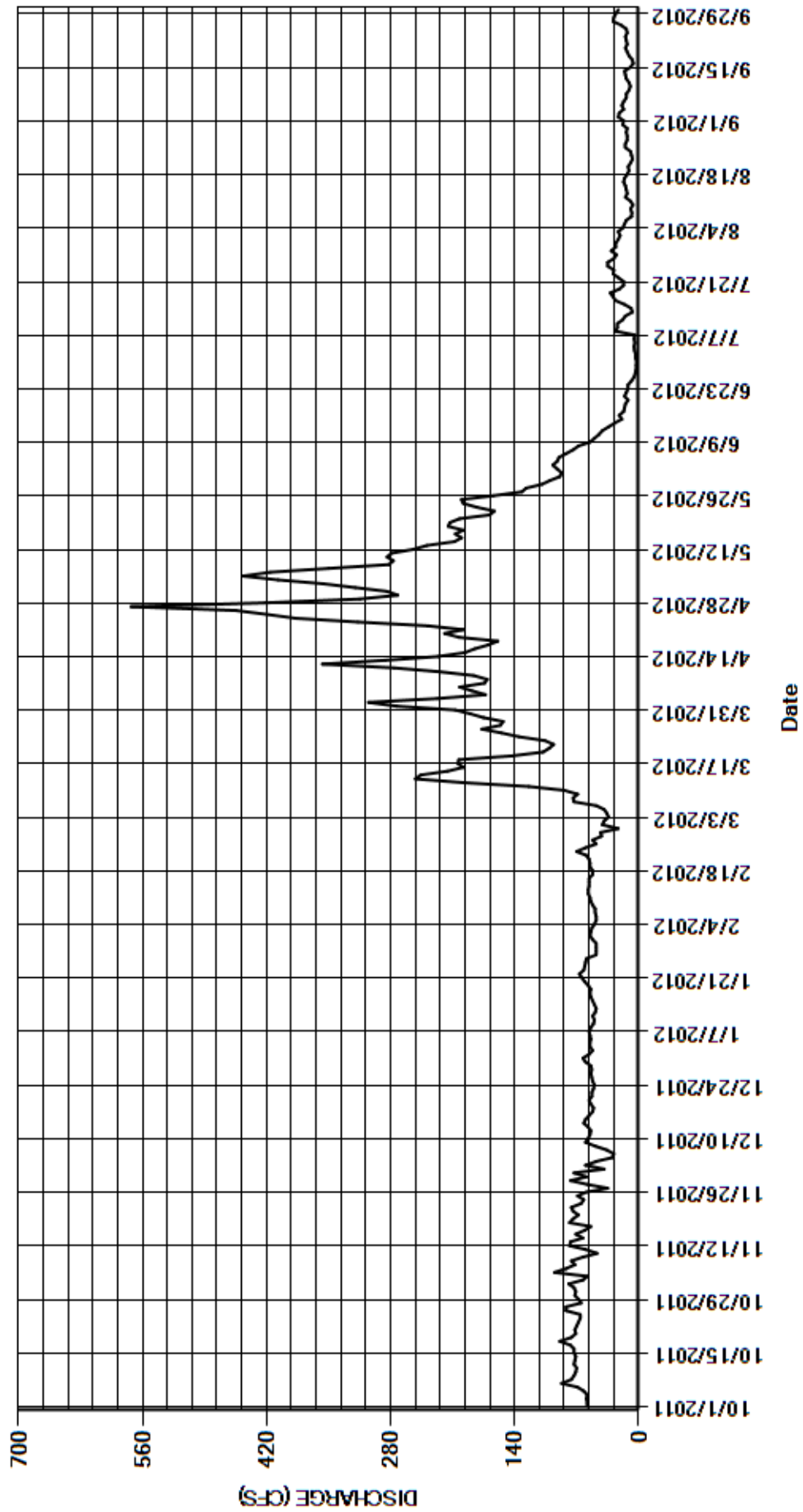
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	58	73	73	56	55	41	273	284	87	3.6	23	17
2	58	79	39	52	54	39	305	320	92	3.6	21	23
3	59	63	60	55	53	34	227	356	97	4.7	23	22
4	58	58	48	55	50	36	173	407	92	5.4	18	17
5	62	95	30	54	48	39	188	447	90	4.2	16	19
6	69	82	28	55	48	48	202	416	82	5.2	14	17
7	87	72	36	56	49	73	174	350	74	4.5	8.0	14
8	76	76	49	54	49	74	171	282	68	26	7.8	14
9	73	63	60	51	52	69	186	277	55	24	9.1	11
10	71	47	57	50	54	84	225	284	50	24	6.5	9.4
11	70	60	55	52	55	124	276	279	45	18	9.3	11
12	73	78	54	49	57	197	357	254	41	15	15	14
13	72	77	57	48	57	252	286	239	34	7.1	13	15
14	71	63	62	50	56	246	226	208	27	8.6	14	16
15	73	71	60	52	56	216	196	200	19	16	15	9.3
16	73	61	56	54	56	198	185	207	22	26	17	6.1
17	77	54	52	55	52	204	170	198	17	29	16	7.5
18	89	78	51	54	52	203	159	215	16	32	13	11
19	76	74	54	57	55	143	203	213	15	22	11	13
20	71	68	56	61	55	108	219	202	12	17	12	15
21	72	74	53	64	56	101	198	168	16	17	9.1	13
22	70	76	53	67	59	96	238	163	14	23	6.9	14
23	68	65	51	62	70	106	317	183	12	29	8.2	15
24	66	62	50	61	e60	135	388	198	12	28	9.3	13
25	66	69	52	60	e48	155	420	200	8.2	35	15	14
26	82	59	53	59	e52	177	455	164	5.3	35	15	20
27	82	35	54	e48	e42	156	573	132	3.9	28	13	29
28	65	58	53	e48	43	153	422	127	3.0	25	13	28
29	68	77	54	e48	e23	175	315	109	2.8	31	14	26
30	72	59	60	e48	---	190	272	100	2.4	26	13	23
31	71	---	63	e52	---	207	---	89	---	26	18	---
TOTAL	2198	2026	1633	1687	1516	4079	7999	7271	1114.6	598.9	416.2	476.3
MEAN	70.9	67.5	52.7	54.4	52.3	132	267	235	37.2	19.3	13.4	15.9
AC-FT	4360	4020	3240	3350	3010	8090	15870	14420	2210	1190	826	945
MAX	89	95	73	67	70	252	573	447	97	35	23	29
MIN	58	35	28	48	23	34	159	89	2.4	3.6	6.5	6.1

CAL YR	2011	TOTAL	146805.0	MEAN	402	MAX	3220	MIN	22	AC-FT	291200
WTR YR	2012	TOTAL	31015.0	MEAN	84.7	MAX	573	MIN	2.4	AC-FT	61520

MAX DISCH: 643 CFS AT 07:45 ON APR 27,2012 GH 4.69 FT SHIFT 0.11 FT
 MAX GH: 4.69 FT AT 07:45 ON APR 27,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

WILLIAMS FORK AT MOUTH NEAR HAMILTON
WY2012 HYDROGRAPH



GREEN RIVER BASIN
POT CREEK AT UTAH-COLORADO STATELINE

Water Year 2012

Location.-- Lat. 40°40'25", Long. 109°03'03", (Hoy Mountain, Utah-Colorado Quadrangle), in Section 1, T2S, R25E Salt Lake Meridian in Daggett County, on left bank approximately 0.2 miles upstream from the Utah-Colorado state line.

Drainage Area and Period of Record.-- 107sq mi (from topographic maps);

Equipment.-- Sutron Stage-Discharge Recorder (SDR), housed in a 42-inch diameter corrugated metal pipe on left bank, connected to a high data rate Sutron Satlink data collection platform (DCP) with satellite telemetry. Well is equipped with two 2-inch intakes with standard inside flushing devices. The primary reference gage is a staff gage inside stilling well. Supplemental outside staff gages are located on left and right banks but are not used for reference purposes. Backup chart recorder removed in Water Year 2012 (WY2012).

Hydrologic Conditions.-- Basin consists of moderate terrain near the gage station and originates in steep mountainous terrain in the Diamond and Uintah Mountain ranges. In the vicinity of the gage station, the channel slope is moderate with some sinuosity. The streambed is composed of sandstone and silt. Matt Warner, Calder and Crouse Reservoirs, located in Utah, all capture and control flow in Pot Creek upstream of gage. Irrigation diversions occur both upstream and downstream of the gage station and the river is subject to administration.

Gage-Height Record.-- Primary record is 15-minute satellite telemetry data with the DCP log and SDR as backup. Continuous record kept from October 1, 2011 to 1130 October 14, 2011 and 1245 April 19, 2012 through September 30, 2012. There was no record from 1145 October 14, 2011 through 1230 April 19, 2012 due to an equipment malfunction. The gage station was visited on 2 occasions to ensure the instruments remained calibrated. No instrument corrections were necessary this water year. Record is complete and reliable except for the period of no record as indicated above.

Datum Corrections.-- Levels have never been run by DWR personnel at this gage.

Rating.-- The control consists of an artificial weir type structure consisting of sandstone rocks grouted in place. Water pools upstream of the weir to a gage height of 0.50 ft (effective PZF=0.50 ft). Streamflow begins at gage heights exceeding 0.50 ft. Channel is straight for 100-feet upstream and bends to the left just below control before straightening for 150 feet downstream. Left bank is subject to overflow at higher stages. Right bank is almost vertical sandstone rock. Left bank covered with sagebrush and other native vegetation. This site is dry most of the year and the creek generally flows only in response to storm events, during the spring runoff period, and at times when water is released from upstream reservoirs in Utah. Due to weather constraints, the site is inaccessible during most of the year, including the late fall, winter and early spring months, which includes some periods when flow is recorded at the site during a typical water year. Rating No. 6 was created on November 16, 2005 and used for WY2012. Flow was recorded at the site on 1 day during WY2012: July 8, 2012. Zero flow was recorded on the remaining days in WY2012. No measurements were made this year as the creek was not flowing during the 2 station visits. Observations of zero flow were made on October 14, 2011 and April 19, 2012. The observation of zero flow along with a previous measurement obtained on May 26, 2011 covers the range in stage. The peak flow of 0.53 cfs occurred at 0315 on July 8, 2012 at a gage height of 0.77 ft. and a shift of -0.02 ft.

Discharge.-- Shifts were distributed by time throughout WY2012, based upon measurement no. 23, conducted during WY2011, along with observed zero flow in WY2012.

Special Computations.-- Discharges were estimated from 1145 on October 14, 2011 through 1230 on April 19, 2012. Flow was estimated to be 0 for the entire period. There was a slight chance of flow during this time however considering the light snowpack and no other method to estimate flow, it was assumed to be 0.

Remarks.-- The record is considered fair from October 1, 2011 to 1130 October 14, 2011 and 1245 April 19, 2012 through September 30, 2012 because no measurements were made during WY2012 and flow occurred on only one day during that time. The record is considered poor from 1145 October 14, 2011 through 1130 April 19, 2012 due to an equipment malfunction resulting in no data for that period of time. The instantaneous peak flow is considered fair. Station maintained and record developed Dan Meyer.

Recommendations.-- Levels need to be run at this site. Handrails should be added to platform.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

POT CREEK AT UTAH-COLORADO STATELINE

RATING TABLE-- PTCKSLCO06 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

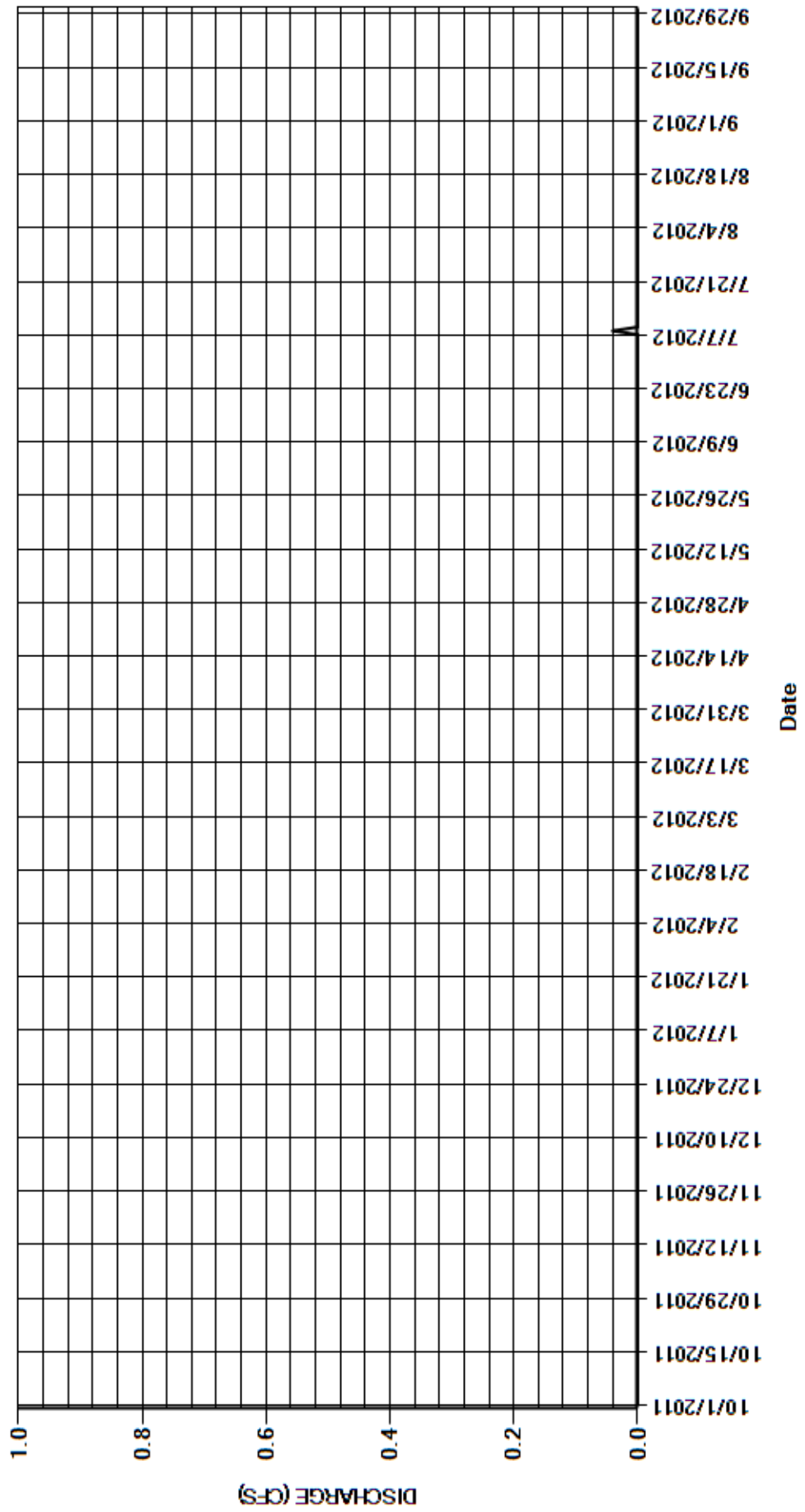
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.04	0.00	0.00
9	0.00	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00	0.00
14	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00	0.00
15	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00	0.00
16	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00	0.00
17	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00	0.00
18	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00	0.00
19	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00	0.00
20	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	e0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	e0.00	e0.00	e0.00	e0.00	---	e0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	e0.00	---	e0.00	e0.00	---	e0.00	---	0.00	---	0.00	0.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00
MEAN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000
AC-FT	0	0	0	0	0	0	0	0	0	.08	0	0
MAX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	341.00	MEAN	0.93	MAX	31	MIN	0.00	AC-FT	676
WTR YR	2012	TOTAL	0.04	MEAN	0.0001	MAX	0.04	MIN	0.00	AC-FT	.08

MAX DISCH: 0.53 CFS AT 03:15 ON JUL 08,2012 GH 0.77 FT SHIFT -0.02 FT
 MAX GH: 0.77 FT AT 03:15 ON JUL 08,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

POT CREEK AT UTAH-COLORADO STATELINE
WY2012 HYDROGRAPH



SAN JUAN RIVER BASIN
DOLORES TUNNEL OUTLET NEAR DOLORES
Water Year 2012

Location.-- Lat. 37°27'33", Long. 108°32'30", in SW¼SE¼ sec. 18, T. 37 N., R. 15 W., NMPM, Montezuma County, Hydrologic Unit 14080202, on left bank about 90 ft downstream from outlet of the tunnel.

Drainage Area and Period of Record.-- N/A; Published record by CoDWR exists from Oct 1, 1993 through present.

Equipment.-- Sutron Satlink 2 high data rate DCP with a shaft encoder in a concrete shelter and well. The primary reference gage is an electric drop tape. The control is a 15 ft. concrete Parshall flume located approximately 80 ft. below the outlet of the tunnel.

Hydrologic Conditions.-- Water from McPhee Reservoir is released through the Dolores Tunnel where it is outlet into a straight vertical concrete wall channel that is 25-ft wide. The converging section of the concrete Parshall flume is located approximately 80 ft. downstream of the tunnel outlet. Surging occurs at higher flows in the converging section due to the close proximity of the tunnel outlet and Parshall flume.

Gage-Height Record.-- The primary record is 15-minute shaft encoder data downloaded from satellite telemetry with the DCP download used as backup. The gage was visited on 12 separate occasions this water year to verify the instruments remained calibrated to the primary reference gage. The shaft encoder was adjusted 2 times this water year: Nov. 3, 2011 (+0.01 ft) and May 16, 2012 (-0.01 ft). No flush corrections were made this water year. Record is complete and reliable for the entire period of record. There was 1 erroneous punch on Mar. 23, 2012 due to the malfunction of the GOES West satellite. There was constant GH across this 15-min interval and it was estimated. During the winter, Dolores Water Conservation District (DWCD) lowered a gate in the channel below the flume. This kept the water checked higher and slowed the velocities below the flume. At low flows, there was no submergence of the flume, however during March 26-28, DWCD increased flows and caused the flume to submerge. This was observed and a discharge measurement performed.

Datum Corrections.-- Levels were run at this gage on Nov. 2, 2012 (WY2013). This was the first time levels were run at this gage; there were no corrections made with this levels run.

Rating.-- The control is a 15-foot concrete Parshall Flume. A non-standard Parshall flume rating is used. Moss in the flume can cause shifting. Rating 03, dated Oct. 12, 2010, was used for the entire water year. It is fairly well defined from 3.50 cfs to 360 cfs. Seven measurements, Nos. 105-111, were made this year ranging in discharge from 3.91 cfs to 334 cfs. They cover the range-in-stage experienced except for the lower daily flows of Nov. 1-6, 13-16, 18-30, Dec. 1, 3-8, 11, 14, 18, 21, 29, 31, 2011; Jan. 1-3, 5, 7, 9-18, 20-23, 25, 27, 30-31, Feb. 1-7, 10-11, 13-22, 24, 27, 29, Mar. 1-12, 14, 19, 2012, and higher average daily flows of May 29-30, Jun. 29, and Jul. 2, 2012. The peak discharge for the year of 368 cfs occurred at 1015 on May 29, 2012, at a gage height of 3.04 ft. and a shift of 0.00 ft. The gage height at that time exceeded the gage height of Measurement No. 108 by 0.22 ft in stage.

Discharge.-- Shifting control method was used for the entire water year. Shifts were applied as defined by measurements and were distributed by variable stage-discharge relationship and time. DOLTUNCOVS12B was developed based on measurements performed in water year 2012. VS12A was developed for irrigation year 2011 record and distributed from Oct. 1, 2011 through Oct. 31, 2011. Shifts were distributed by stage using VS12B from Nov. 1, 2011 until the end of the water year. The distribution of variable shift VS12B was interrupted periodically from Mar. 26-28, 2012 to account for time when the flume was submerged. One discharge measurement (No. 107) was made when the flume was submerged. The shift for measurement no. 107 was -0.09 ft. It was applied during the period of the day with increased flow. DWCD personnel raised the gate on Mar. 28, 2012 allowing for free flow through the flume. Open-water measurements showed unadjusted shifts varying from -0.02 to +0.03 feet. Shifts were applied directly and given full weight, except for Measurement Nos. 108 and 111, which were discounted -1% to +2% respectively to smooth shift distribution.

Special Computations.-- During backwater affected times of Mar. 26-28, 2012, the submerged shift associated with Meas. No. 107 (-0.09 ft) was applied for all times of increased flow until the affect was removed from the channel.

Remarks.-- Record rated good, except for March 26-28 which is rated as fair. The instantaneous peak flow is rated good. Station operated and maintained by Brian Leavesley. Record developed by Brian Leavesley.

Recommendations.-- Independent benchmark should be installed for level runs in the future.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

DOLORES TUNNEL OUTLET NEAR DOLORES

RATING TABLE.-- DOLTUNCO03 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

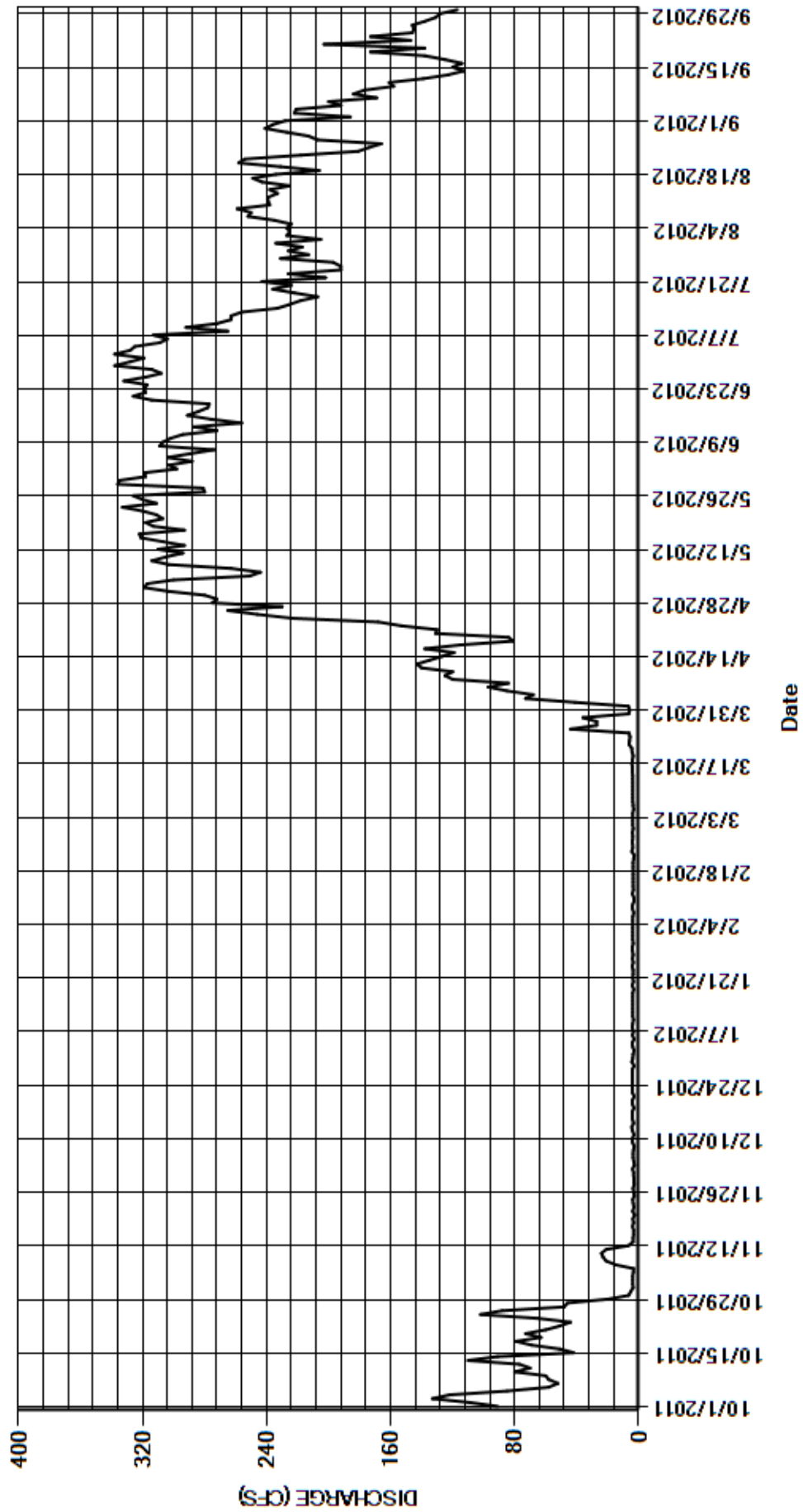
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	91	3.6	3.2	3.6	3.9	3.9	6.7	303	319	319	205	228
2	109	3.9	4.0	3.0	3.9	3.9	41	319	298	338	227	186
3	133	3.9	2.8	3.9	3.9	3.9	73	317	303	328	225	222
4	122	3.9	3.2	4.2	3.9	3.9	68	300	288	325	227	221
5	85	3.5	3.6	3.0	3.9	3.3	85	251	304	309	224	192
6	58	3.2	3.6	4.1	3.8	3.6	97	244	289	304	235	200
7	52	15	3.4	3.4	3.2	3.8	84	263	274	313	252	169
8	58	21	2.9	4.2	4.0	3.9	120	303	309	265	250	184
9	60	23	4.0	3.9	4.0	3.9	125	314	307	292	259	177
10	80	24	4.1	3.4	3.1	3.9	120	305	302	272	238	158
11	70	21	3.0	3.9	3.2	3.9	140	294	294	263	239	161
12	77	6.6	4.0	3.9	4.2	3.9	143	310	272	263	239	139
13	110	3.6	4.5	3.9	3.4	4.0	135	293	287	256	233	123
14	91	3.6	3.3	3.9	3.6	3.9	127	307	256	233	238	113
15	42	3.3	4.0	3.9	3.6	4.2	119	321	276	225	225	120
16	51	3.2	4.2	3.9	3.6	4.2	138	322	291	218	243	114
17	69	4.0	4.2	3.9	3.6	4.3	115	293	284	207	249	125
18	79	3.3	3.1	3.2	3.6	4.1	81	313	278	222	234	138
19	63	3.8	4.1	4.3	3.6	3.6	84	318	277	236	206	173
20	73	2.6	4.1	3.4	3.7	4.3	131	307	314	224	231	138
21	60	3.9	2.9	3.9	3.3	4.5	130	311	326	243	258	203
22	51	3.1	4.1	3.6	2.9	6.2	153	320	318	202	254	147
23	44	3.5	4.2	3.6	4.5	5.9	168	333	319	226	218	173
24	65	3.9	4.2	4.3	3.8	5.6	224	311	317	192	181	146
25	102	2.8	4.2	3.5	4.0	6.2	246	320	332	192	174	145
26	88	3.3	4.2	4.1	4.0	e44	265	326	318	197	166	146
27	48	3.6	4.2	3.6	3.8	e27	230	280	308	231	207	138
28	46	2.9	4.2	4.0	4.1	e27	275	281	314	213	213	131
29	20	3.1	3.0	4.2	3.5	36	272	336	338	226	227	128
30	6.5	3.2	4.4	3.5	---	6.4	280	335	328	217	241	117
31	5.1	---	3.8	3.9	---	5.8	---	318	---	234	236	---
TOTAL	2108.6	193.3	116.7	117.1	107.6	253.0	4275.7	9468	9040	7785	7054	4755
MEAN	68.0	6.44	3.76	3.78	3.71	8.16	143	305	301	251	228	158
AC-FT	4180	383	231	232	213	502	8480	18780	17930	15440	13990	9430
MAX	133	24	4.5	4.3	4.5	44	280	336	338	338	259	228
MIN	5.1	2.6	2.8	3.0	2.9	3.3	6.7	244	256	192	166	113

CAL YR	2011	TOTAL	43749.6	MEAN	120	MAX	367	MIN	2.6	AC-FT	86780
WTR YR	2012	TOTAL	45274.0	MEAN	124	MAX	338	MIN	2.6	AC-FT	89800

MAX DISCH: 368 CFS AT 10:15 ON MAY 29,2012 GH 3.04 FT SHIFT 0 FT
 MAX GH: 3.04 FT AT 10:15 ON MAY 29,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

DOLORES TUNNEL OUTLET NEAR DOLORES
WY2012 HYDROGRAPH



SAN JUAN RIVER BASIN
LONE PINE CANAL BELOW GREAT CUT DIKE NEAR DOLORES
Water Year 2012

Location.-- Lat. 37°30'42", Long. 108°35'21", in NW¼SW¼ sec. 35, T.38 N., R.16 W., NMPM, Montezuma County, Hydrologic Unit 14080202, on the right bank 550 ft. downstream from the Great Cut Dike of McPhee Reservoir.

Drainage Area and Period of Record.-- N/A; Diversion record Nov. 1, 1987 to present (Structure ID = 3200815). Published streamflow record Oct. 1, 1993 to present.

Equipment.-- Sutron Satlink 2 DCP and Sutron Stage-Discharge Recorder (SDR). The SDR is located in a concrete shelter and well next to the flume. The Satlink 2 is housed in the Great Cut pumping plant building. Shaft encoder/SDR is set to outside staff gage. Control is a 12-foot concrete Parshall flume. A foot bridge is located at the throat of the flume where an 8 ft wading rod or a bridge crane is used to make high flow measurements. No changes this water year.

Hydrologic Conditions.-- The canal is filled by gravity from McPhee Reservoir. The channel upstream and downstream of the Parshall flume is straight. At high flows (GH > 2.50-ft) the canal surges and the approach velocity to the flume is fast. During the water year, some moss does grow in the channel above the flume and on the flume floor itself.

Gage-Height Record.-- The primary record is 15-minute SDR data downloaded from satellite telemetry with DCP downloaded data used for backup purposes. The GOES West satellite was inoperable for a time between Mar. 21 - 23, 2012. The GOES East satellite was able to pick up most of the DCP transmissions during this time, except for one missed and one erroneous punch on Mar. 21, 2012 that were corrected in record. There is also a power issue in communication between the SDR in the gage house and the DCP in the pumphouse. If the display of the SDR is on while the DCP is polling for its 15-minute gage height value, there is not enough power to transmit from the SDR to the DCP and the gage height is not recorded in the DCP. The intake to the stilling well isolates when the gage height is below 0.20 ft. Flows below a gage height of 0.20 ft. are negligible and a 0 flow is assigned to them. Gage height corrections due to SDR calibration to the staff gage occurred five (5) times over the water year: -0.02 ft. on Oct 11, 2011, +0.03 ft. on Nov 28, 2011, -0.01 ft. on Mar 16, 2012, +0.01 ft. on Apr 27, 2012 and -0.01 ft. on Jul 5, 2012. Gage height record is complete and reliable for the entire period of record for the water year.

Datum Corrections.-- Levels were not run in WY2012. Levels were last run on Oct. 6, 2010 using BM1 as the base. No corrections to the record were made in WY2012.

Rating.-- Rating MVIDIVCO03 (dated 10/8/2010) in use since Feb 18, 2010, a non-standard 12-ft. Parshall flume rating, was used for the entire water year. Rating 03 is fairly well defined from 20 cfs to 475 cfs. Ten discharge measurements (Nos. 100-109) were made this year ranging in discharge from 26.6 cfs to 151 cfs. An observation of zero-flow was not made during this water year. The measurements cover the entire range-in-stage experienced except for the lower daily average flows of Oct 14-16, Nov 10-11, 2011; Feb 14-26, 29, Mar 1-14, 29-31, Apr 1, 5-24, 2012 and higher average daily flows of Jun. 5 and Jul. 5, 2012. The instantaneous peak flow of 157 cfs occurred at 0045 on Jun. 28, 2012 at a gage height of 2.10 ft. with a shift of 0.00 ft. The peak flow exceeded the stage of Measurement 108 (GH = 2.04 ft.) by 0.06 ft. in stage.

Discharge.-- Shifting control method was used for the entire water year. Shifts were applied as defined by measurements and were distributed by stage. Variable shift MVIDIVCOVS12C was developed and applied for the entire water year. Open-water measurements showed unadjusted shifts varying between -0.08 and +0.04 feet. Shifts were applied directly and given full weight except measurement Nos. 100, 102, 103, 104, 105, 106, 107, 108, and 109 which were discounted from -5% to 5% to smooth shift distribution.

Special Computations.-- No special computations this WY.

Remarks.-- Record is fair for the entire period. The peak instantaneous flow should be considered fair. A fair rating was given due to the non-standard velocity profile discovered within verticals during discharge measurements. Station maintained and record developed by Brian Leavesley.

Recommendations.-- An electric tape or drop tape should be installed. Three-point measurements should be used at this site to capture more accurate velocities within measurement verticals. It has been shown in WY10 that measurement at the gage within the flume showed a trend of positive shifts while measurements (when possible) within the channel above the flume would show less positive to negative shifts, even with measurements performed in succession on the same day. Measurements made in WY12 discovered a non-standard velocity profile when measuring in the flume and above in the channel. All discharge measurements at this gage will use the 3-point method from now on to determine discharge.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

LONE PINE CANAL BELOW GREAT CUT DIKE NEAR DOLORES

RATING TABLE.-- MVIDIVCO03 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

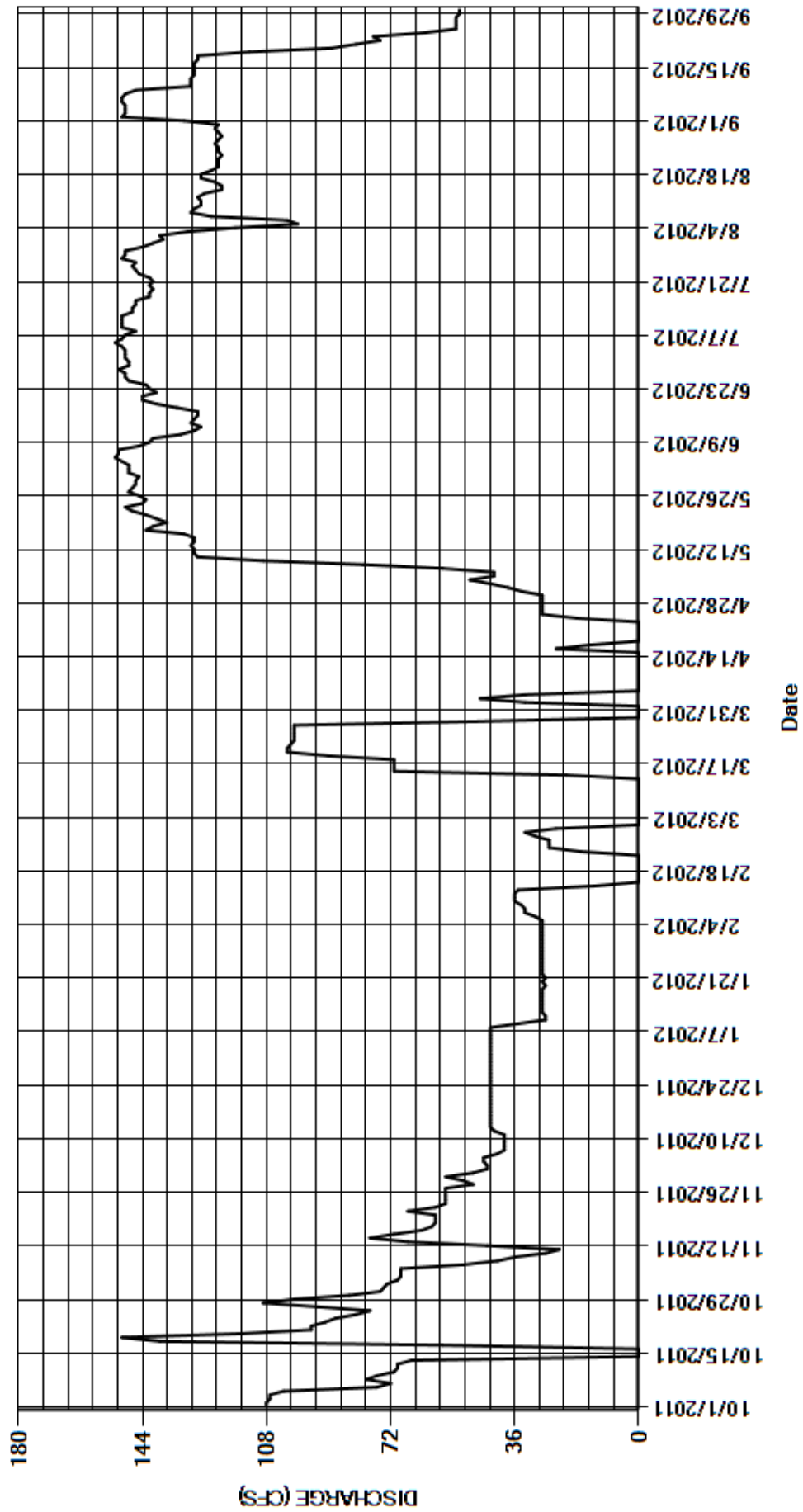
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	108	74	48	43	28	0.00	0.00	34	148	149	138	132
2	108	73	44	43	28	0.00	33	38	148	149	139	150
3	107	70	44	43	28	0.00	46	43	148	149	131	149
4	107	69	45	43	28	0.00	33	49	150	150	117	149
5	103	69	45	43	28	0.00	0.00	42	152	152	99	149
6	76	69	41	43	30	0.00	0.00	42	151	150	102	150
7	72	51	39	43	33	0.00	0.00	57	151	149	124	150
8	79	41	39	43	33	0.00	0.00	80	145	146	130	149
9	76	36	39	35	34	0.00	0.00	109	142	150	129	146
10	71	27	39	27	36	0.00	0.00	128	141	150	127	130
11	70	23	39	27	36	0.00	0.00	129	133	150	127	130
12	70	44	42	28	36	0.00	0.00	129	129	150	128	130
13	66	67	43	28	35	0.00	0.00	130	127	147	126	129
14	0.04	78	43	28	13	21	0.00	129	130	147	121	129
15	0.00	71	43	28	0.00	71	0.00	129	129	146	121	129
16	0.00	63	43	28	0.00	71	24	132	128	146	123	129
17	57	60	43	28	0.00	71	14	143	128	142	127	128
18	139	59	43	28	0.00	71	0.00	141	134	142	127	128
19	150	59	43	27	0.00	90	0.00	137	140	141	124	113
20	115	59	43	28	0.00	102	0.00	140	144	142	122	89
21	95	67	43	27	0.00	102	0.00	143	144	141	122	82
22	95	59	43	28	0.00	101	0.00	147	140	142	122	75
23	91	56	43	28	17	100	0.00	149	142	145	121	77
24	88	56	43	28	26	100	18	144	143	146	122	62
25	82	56	43	28	26	100	28	143	148	147	122	53
26	78	56	43	28	26	100	28	145	149	146	123	53
27	93	56	43	28	30	100	28	148	149	150	122	53
28	109	48	43	28	33	47	28	147	151	149	121	53
29	100	51	43	28	24	0.00	28	146	148	149	122	52
30	84	56	43	28	---	0.00	28	146	148	144	123	52
31	75	---	43	28	---	0.00	---	145	---	141	122	---
TOTAL	2564.04	1723	1321	991	608.00	1247.00	336.00	3564	4260	4547	3824	3300
MEAN	82.7	57.4	42.6	32.0	21.0	40.2	11.2	115	142	147	123	110
AC-FT	5090	3420	2620	1970	1210	2470	666	7070	8450	9020	7580	6550
MAX	150	78	48	43	36	102	46	149	152	152	139	150
MIN	0.00	23	39	27	0.00	0.00	0.00	34	127	141	99	52

CAL YR	2011	TOTAL	28967.64	MEAN	79.4	MAX	237	MIN	0.00	AC-FT	57460
WTR YR	2012	TOTAL	28285.04	MEAN	77.3	MAX	152	MIN	0.00	AC-FT	56100

MAX DISCH: 157 CFS AT 00:45 ON JUN 28,2012 GH 2.10 FT SHIFT 0 FT
 MAX GH: 2.10 FT AT 00:45 ON JUN 28,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

LONE PINE CANAL BELOW GREAT CUT DIKE NEAR DOLORES
 WY2012 HYDROGRAPH



DOLORES RIVER BASIN
DOLORES RIVER BELOW MCPHEE RESERVOIR

Water Year 2012

Location.-- Lat. 37°34'31", Long. 108°34'37", in SE¼SE¼ sec. 2, T.38 N., R.16 W., NMPM, Montezuma County, Hydrologic Unit 14030002, on right bank about 880 ft downstream from toe of the dam on the Dolores River.

Drainage Area and Period of Record.-- 819 mi².; Published by the USGS prior to the construction of McPhee Reservoir Oct. 1, 1938 to Sep. 30, 1952. Provisional graphic and electronic data Aug. 1985 to Sept. 1990. Published streamflow record Oct. 1990 to present.

Equipment.-- Stevens A-71 graphic water stage-recorder and a Sutron Satlink 2 HDR DCP with a shaft encoder on separate floats in a 60-in x 60-in cast concrete shelter and well. The Stevens A-71 chart recorder was removed on Mar. 23, 2012. The shaft encoder was replaced with a Sutron Stage-Discharge-Recorder (SDR) on Mar. 23, 2012. Primary reference is an electric drop tape inside the gage house. Secondary reference is the outside staff gage (0.00 to 4.50 ft) in the Parshall flume. The gage house is equipped with AC power. Control is a 15-foot concrete Parshall flume with flat concrete wing walls that extend the width of the channel and act as the 2nd stage control. No other changes this water year.

Hydrologic Conditions.-- Large rocks and cobble line the channel above and below the 15-ft concrete Parshall flume. Silt deposits typically do not occur at this gage since the gage is directly below McPhee Reservoir. Heavy moss growth on the control and in the channel above the control affects the stage-discharge relationship during the summer months. Moss growth in the flume tends to cause negative shifts.

Gage-Height Record.-- The primary record is 15-minute shaft encoder and SDR data downloaded from satellite telemetry with DCP download data used for backup purposes. Satellite telemetry is complete except for the period from 1430 Mar. 23, 2012 to 1145 Apr. 4, 2012 when the SDR was installed and the float was installed backwards. Data downloaded from the DCP was corrected and used during this period. The gage was visited on 24 separate occasions this water year to verify the instruments remained calibrated to the primary reference. The shaft encoder was adjusted one time this water year (Nov. 30, 2011) with a -0.01 ft correction. Moss was removed from the control 8 times this water year. Moss removal did not always occur at a discharge measurement, so moss removal corrections were applied as gage height corrections (Flush Correction) and were distributed by time between each occurrence. Record is complete and reliable.

Datum Corrections.-- Levels were not run this water year. Levels were last run on Sep. 29, 2010 using BM No. 1 as base. The ET index was found to be reading -0.002 feet low. No corrections were made since the ET index was within the allowable error tolerances.

Rating.-- The control is compound control with a 15 foot Parshall flume acting as the first stage from an elevation of 0.00 ft. to 4.50 ft. The second stage is an 18-inch wide concrete weir that extends 50 ft. in both directions from the staff gage. The crest of the weir is 4.50 ft. above the floor of the flume. The Parshall flume controls the stage-discharge relationship from a gage height of 0.00 ft. to 2.70 ft (0.00 cfs to 280 cfs). The rating does not follow a standard Parshall flume rating because water can seep under the flume and wing walls. At gage heights between 2.70 ft. and 5.10 ft. (280 cfs to 1,660 cfs) the control transitions from the flume to the weir. Gage heights 5.10 ft. to 7.50 ft. (1,660 cfs to 5,470 cfs) the flume will drown out and the weir will control the stage-discharge relationship. Rating DOLBMCCO04A, dated Nov. 9, 2004, was used the entire water year. It is fairly well defined from 13 cfs to 5,580 cfs. Nine measurements, Nos. 229 -237, were completed this year ranging in discharge from 27.5 cfs to 81.7 cfs. They cover the range-in-stage experienced for the entire water year. The peak instantaneous flow of 100 cfs occurred at 0715 on March 22, 2012 at a gage height of 1.50 ft with a shift of 0.00 ft. It exceeded the stage of measurement No. 232, made March 23, 2012 by 0.20 feet in stage.

Discharge.-- Shifting control method was used during the entire water year. Shifts were distributed by time for the entire period of record. Measurements show shifts varying from -0.02 ft to +0.06 ft. All shifts were given full weight except for measurement Nos. 231, 232, 234, 235 and 237, which were discounted from -3% to 6% to smooth the shift distribution. Gage height changes caused by removing moss from the flume were not applied in the shift because a discharge measurement did not occur every time moss was removed.

Special Computations.-- The period when the float was installed backwards on the SDR was corrected as follows: The DCP log file was adjusted by multiplying 2 times the quantity difference of the last good gage height reading minus the incorrect 15-minute gage height reading and adding the quantity to the incorrect 15-minute gage height reading. The last good gage height reading occurred at 22:00 GMT on Mar. 23, 2012 and was equal to 1.30. The equation looks as follows: $2(1.30 - A) + A = B$; where A = incorrect 15-minute gage height reading and B = corrected gage height reading. The value for B was imported into the record.

Remarks.-- Record and peak instantaneous flow should be considered good. Station maintained by Jody Payne (DWCD), Doug Pickering and Brian Boughton. Record developed by Brian Boughton.

Recommendations.-- Currently no recommendations have been made this water year.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

DOLORES RIVER BELOW MCPHEE RESERVOIR

RATING TABLE.-- DOLBMCCO04A USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

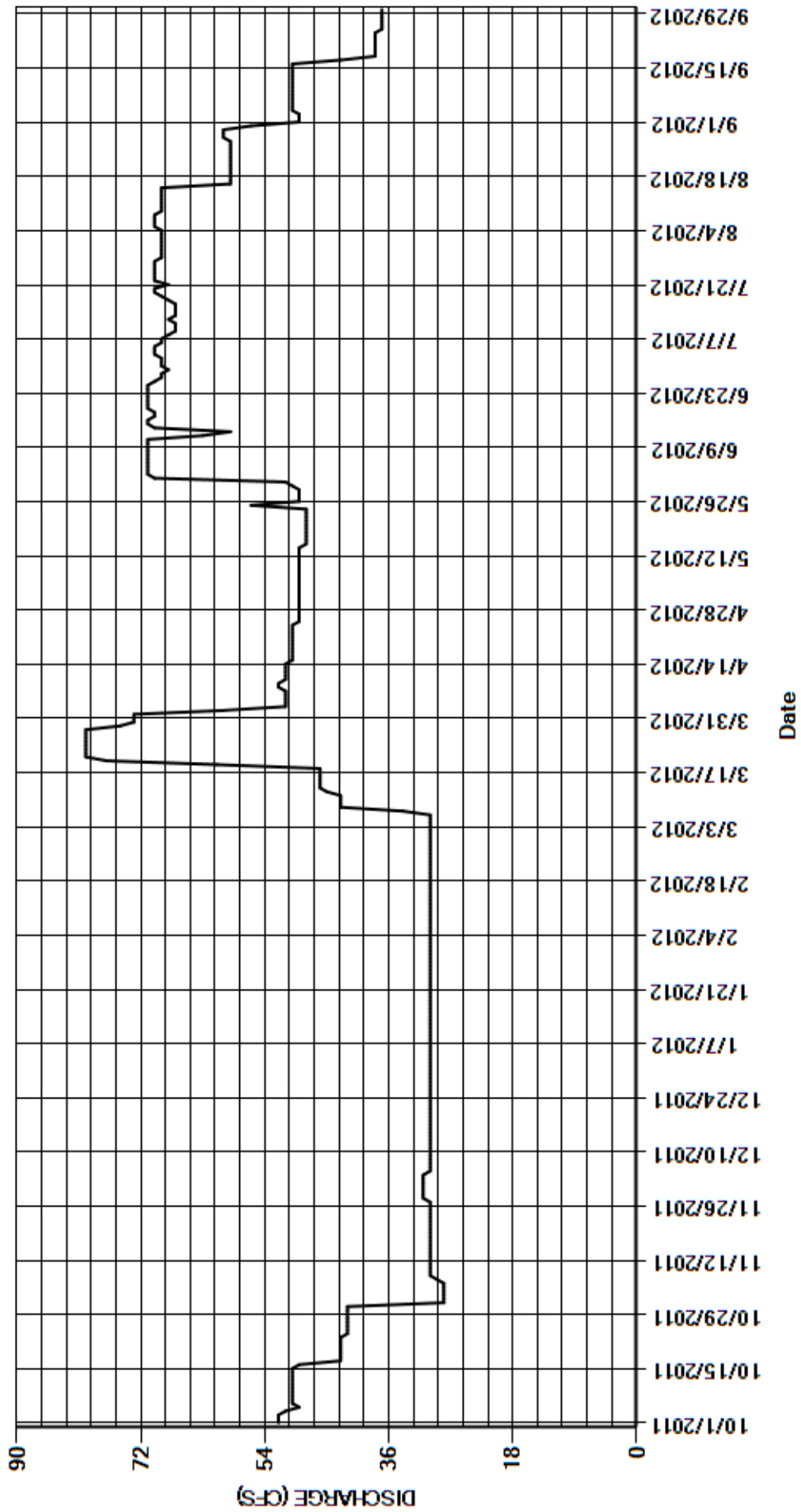
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	52	28	31	30	30	30	73	49	70	69	69	49
2	52	28	31	30	30	30	60	49	71	69	69	49
3	52	28	31	30	30	30	51	49	71	70	69	49
4	51	28	31	30	30	30	51	49	71	70	69	50
5	49	28	30	30	30	30	51	49	71	70	70	50
6	50	28	30	30	30	30	51	49	71	69	70	50
7	50	29	30	30	30	34	51	49	71	69	70	50
8	50	30	30	30	30	43	52	49	71	68	70	50
9	50	30	30	30	30	43	52	49	71	67	69	50
10	50	30	30	30	30	43	51	49	71	67	69	50
11	50	30	30	30	30	43	51	49	71	67	69	50
12	50	30	30	30	30	45	51	49	63	68	69	50
13	50	30	30	30	30	46	51	49	59	67	69	50
14	50	30	30	30	30	46	51	49	70	67	69	50
15	50	30	30	30	30	46	50	48	71	67	69	50
16	49	30	30	30	30	46	50	48	71	67	59	50
17	43	30	30	30	30	46	50	48	70	68	59	43
18	43	30	30	30	30	46	50	48	70	69	59	38
19	43	30	30	30	30	61	50	48	71	70	59	38
20	43	30	30	30	30	77	50	48	71	70	59	38
21	43	30	30	30	30	80	50	48	71	68	59	38
22	43	30	30	30	30	80	50	48	71	70	59	38
23	43	30	30	30	30	80	50	48	71	70	59	38
24	42	30	30	30	30	80	50	48	71	70	59	38
25	42	30	30	30	30	80	49	56	71	70	59	37
26	42	30	30	30	30	80	49	49	70	70	59	37
27	42	30	30	30	30	80	49	49	69	70	59	37
28	42	31	30	30	30	80	49	49	69	69	60	37
29	42	31	30	30	30	75	49	49	68	69	60	37
30	42	31	30	30	---	73	49	50	69	69	60	37
31	42	---	30	30	---	73	---	51	---	69	56	---
TOTAL	1442	890	934	930	870	1706	1541	1519	2096	2132	1983	1328
MEAN	46.5	29.7	30.1	30.0	30.0	55.0	51.4	49.0	69.9	68.8	64.0	44.3
AC-FT	2860	1770	1850	1840	1730	3380	3060	3010	4160	4230	3930	2630
MAX	52	31	31	30	30	80	73	56	71	70	70	50
MIN	42	28	30	30	30	30	49	48	59	67	56	37

CAL YR	2011	TOTAL	44406	MEAN	122	MAX	1460	MIN	28	AC-FT	88080
WTR YR	2012	TOTAL	17371	MEAN	47.5	MAX	80	MIN	28	AC-FT	34460

MAX DISCH: 100 CFS AT 07:15 ON MAR 22,2012 GH 1.50 FT SHIFT 0 FT
 MAX GH: 1.50 FT AT 00:00 ON OCT 01,2011

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

**DOLORES RIVER BELOW MCPHEE RESERVOIR
WY2012 HYDROGRAPH**



SAN JUAN RIVER BASIN
BLANCO DIVERSION NEAR PAGOSA SPRINGS

Water Year 2012

Location.-- Lat. 37°12'13", Long. 106°48'40", in NW¼NE¼ sec. 11, T.34 N., R.1 E., NMPM, Archuleta County.

Drainage Area and Period of Record.-- Basin area above diversion is 67.8 sq. mi. ; Diversion record Mar. 5, 1974 to present. Published stream flow record Oct 1, 1993 to present.

Equipment.-- Graphic water stage-recorder and Sutron Satlink 2 HDR satellite monitoring DCP with stage-discharge recorder (SDR). The SDR and graphic recorder are on separate floats in a concrete shelter and well. The primary reference is an electric drop tape at the edge of the instrument shelf. No outside staff gage. The control is a 12-ft concrete Parshall flume set in an underground concrete box culvert. In prior years, the instrumentation was connected to power supplied by the battery located in the gage house below the diversion dam. This year the SDR was connected to battery which is charged by the AC power in the control house. The battery in the control house provides a more reliable source of power. No other changes this water year.

Hydrologic Conditions.-- This diversion is the beginning of the Azotea Tunnel. This portion of the tunnel runs from the Blanco Diversion to the Little Oso Diversion. This is the first leg in the trans-mountain diversion of the San Juan / Chama project. Cobble, gravel, and silt are deposited in the box culvert above the Parshall flume. The hydraulic conditions cannot be directly observed since the structure is located underground.

Gage-Height Record.-- The primary record is 15-minute satellite telemetry data with SDR download, chart record, and DCP data used for backup purposes. The gage was visited on eighteen (18) separate occasions this water year to verify the instruments remained calibrated to the primary reference gage. The SDR was adjusted five (5) times this water year: +0.02 ft on Oct 19, 2011 was applied in record; -0.01 ft on May 2, 2012, +0.01 ft on Jun 19, 2012, -0.01 ft on Jul 16, 2012, and +0.01 ft on Aug 2, 2012 were not applied in the record due to the gage height vs. SDR readings by the USBR in the days prior to the corrections which all matched except for the days they were corrected. The gage is visited almost daily (during normal business hours) by the USBR/Chama personnel during the diversion season. USBR personnel will adjust the graphic water stage-recorder but do not make adjustments to the SDR. The record is complete and reliable.

Datum Corrections.-- Levels were not run in WY 2012. Levels were run in WY 2011 on the surface (not in to the flume floor). The reference point and diversion house floor were surveyed in reference to a brass cap located outside the diversion house. Using as-built drawings of the diversion structure, there is a discrepancy of the tape length being +0.05 ft longer than it should be. Further survey to flume floor will be required to confirm this.

Rating.-- The control is a 12-foot Parshall flume. The Parshall flume is located underground and approximately 50 to 80 ft downstream of the radial gates. The only access point is located at the radial gates. One channel at all stages. Rating No. 1 was used the entire water year. Rating No. 1 is a standard 12-foot Parshall flume rating at and above a gage height of 0.06-ft. Flows at or below a gage height of 0.05-ft are assumed to be negligible and ignored. No discharge measurements have ever been made at the gage due to safety concerns. The peak instantaneous flow of 336 cfs occurred at 2215 April 26, 2012 at a gage height of 3.43 ft with a shift of 0.00 ft.

Discharge.-- No discharge measurements are made at this gage since the control structure is located underground. The standard 12-ft Parshall flume rating was applied directly to the gage height record to calculate the discharge.

Special Computations.-- As diversions were declining in late June, there was an issue with the stilling well holding up at a GH of 0.09 ft. Gage heights for the periods 2345 Jun. 29, 2012 to 0245 Jun. 30, 2012 and 1800 Jun. 30, 2012 to 2345 Jun. 30, 2012 were estimated by setting the middle of the time period as the bottom of the diurnal flow and decreasing/increasing gage height by the step on either side of the bad gage height. Diversion gates were closed at approximately 0000 Jul. 1, 2012, so the flow for Jul. 1 – 2, 2012 was estimated to be zero. The stilling well self-cleared on Jul. 2, 2012.

Remarks.-- The record is fair as the tape length discrepancy remains to be confirmed. The peak instantaneous flow is rated fair. Station maintained and record developed by Brian Leavesley.

Recommendations.-- Try for WY2013 to obtain levels on the control structure in the tunnel.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

BLANCO DIVERSION NEAR PAGOSA SPRINGS

RATING TABLE-- BLADIVCO01 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

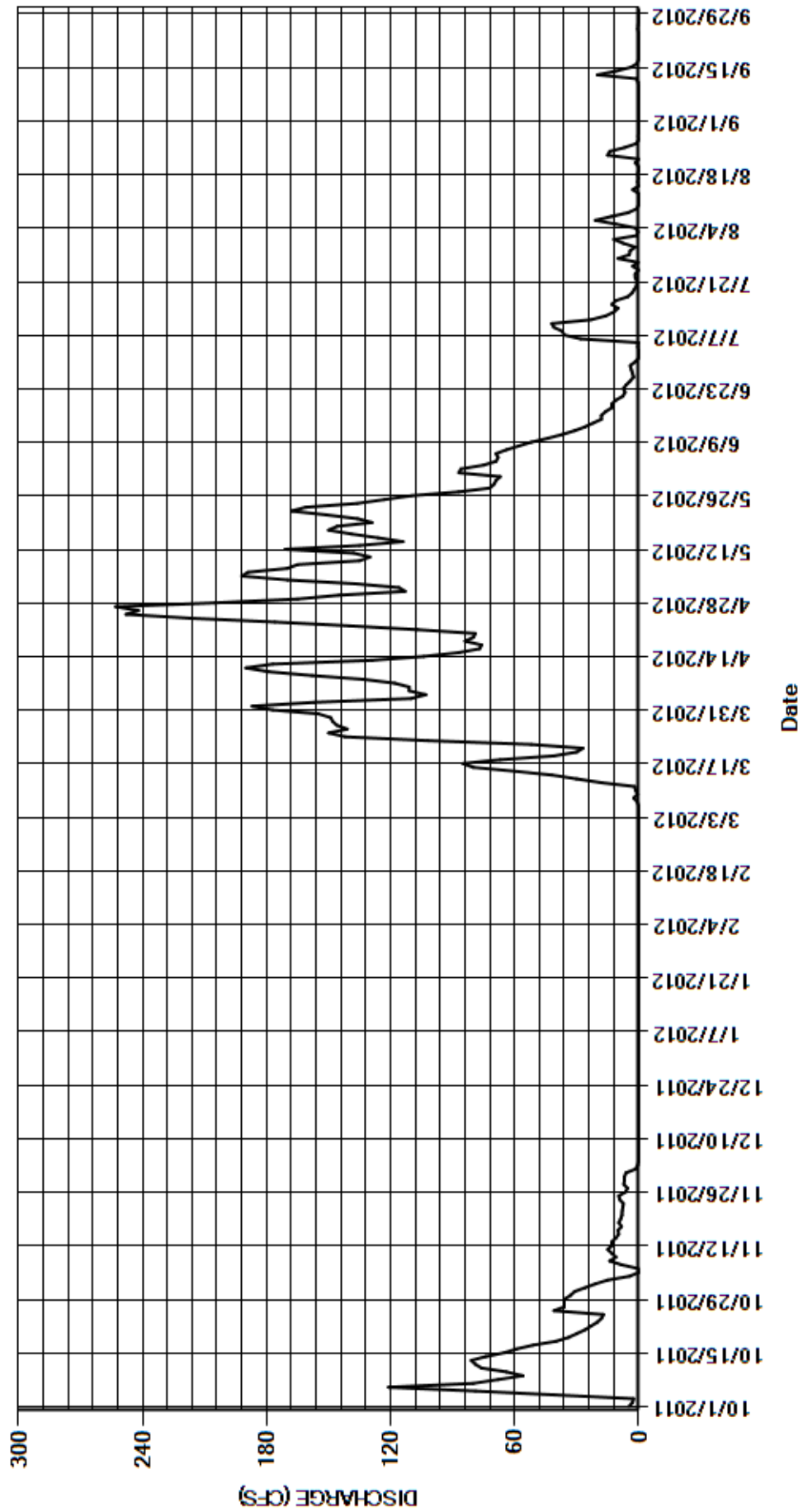
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.7	26	6.2	0.00	0.00	0.00	187	113	87	e0.00	12	0.00
2	3.0	21	1.6	0.00	0.00	0.00	157	116	86	e0.00	0.93	0.00
3	2.5	15	0.46	0.00	0.00	0.00	110	137	75	0.00	0.36	0.00
4	41	4.4	0.01	0.00	0.00	0.00	103	170	69	0.35	1.6	0.00
5	79	0.00	0.00	0.00	0.00	0.00	111	192	68	0.02	11	0.00
6	121	0.23	0.00	0.00	0.00	0.00	111	189	69	28	21	0.00
7	80	8.3	0.00	0.00	0.00	0.74	118	170	64	36	13	0.00
8	68	14	0.00	0.00	0.00	2.4	133	165	58	37	5.0	0.00
9	56	11	0.00	0.00	0.00	0.62	158	135	52	41	0.90	0.00
10	64	13	0.00	0.00	0.00	1.5	179	130	44	42	0.00	0.00
11	76	15	0.00	0.00	0.00	2.0	190	138	37	23	0.00	0.19
12	79	13	0.00	0.00	0.00	18	177	171	31	16	0.00	1.2
13	81	13	0.00	0.00	0.00	30	129	135	26	12	0.00	20
14	74	11	0.00	0.00	0.00	42	104	114	22	10	2.9	11
15	65	9.7	0.00	0.00	0.00	60	87	126	18	13	0.03	3.7
16	59	10	0.00	0.00	0.00	80	77	139	18	11	0.41	0.76
17	51	8.3	0.00	0.00	0.00	85	76	150	16	5.3	0.15	0.01
18	40	9.6	0.00	0.00	0.00	67	84	146	13	3.2	0.45	0.00
19	34	8.7	0.00	0.00	0.00	41	80	129	13	2.0	0.00	0.00
20	30	8.1	0.00	0.00	0.00	30	79	136	11	0.97	0.00	0.00
21	26	8.0	0.00	0.00	0.00	27	107	151	7.7	0.77	1.7	0.00
22	23	7.7	0.00	0.00	0.00	52	140	168	6.6	1.7	0.00	0.00
23	20	7.4	0.00	0.00	0.00	102	176	161	7.4	1.7	15	0.00
24	18	9.1	0.00	0.00	0.00	142	217	136	6.0	0.00	14	0.00
25	17	9.6	0.00	0.00	0.00	150	248	123	4.1	2.9	6.8	0.38
26	41	6.4	0.00	0.00	0.00	141	242	110	2.5	0.29	1.3	0.15
27	36	5.4	0.00	0.00	0.00	146	253	87	3.0	10	0.00	0.00
28	36	7.2	0.00	0.00	0.00	148	205	72	3.6	4.5	0.19	0.00
29	36	6.9	0.00	0.00	0.00	149	165	70	4.1	4.2	0.00	0.00
30	33	6.9	0.00	0.00	---	155	145	69	e1.7	1.7	0.00	0.00
31	31	---	0.00	0.00	---	177	---	67	---	7.5	0.00	---
TOTAL	1425.2	293.93	8.27	0.00	0.00	1849.26	4348	4115	923.7	316.10	108.72	37.39
MEAN	46.0	9.80	0.27	0.000	0.000	59.7	145	133	30.8	10.2	3.51	1.25
AC-FT	2830	583	16	0	0	3670	8620	8160	1830	627	216	74
MAX	121	26	6.2	0.00	0.00	177	253	192	87	42	21	20
MIN	2.5	0.00	0.00	0.00	0.00	0.00	76	67	1.7	0.00	0.00	0.00

CAL YR	2011	TOTAL	24853.33	MEAN	68.1	MAX	471	MIN	0.00	AC-FT	49300
WTR YR	2012	TOTAL	13425.57	MEAN	36.7	MAX	253	MIN	0.00	AC-FT	26630

MAX DISCH: 336 CFS AT 22:15 ON APR 26,2012 GH 3.43 FT SHIFT 0 FT
 MAX GH: 3.43 FT AT 22:15 ON APR 26,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

BLANCO DIVERSION NEAR PAGOSA SPRINGS
WY2012 HYDROGRAPH



SAN JUAN RIVER BASIN

09343300 RIO BLANCO BELOW BLANCO DIVERSION DAM NEAR PAGOSA

Water Year 2012

Location.-- Lat. 37°12'13", Long. 106°48'44", in NW¼, NE¼ sec. 11, T.34 N., R.1E., NMPM, Archuleta County, Hydrologic Unit 14080101, on left bank 250 ft downstream from Blanco Diversion Dam, 1.1 mi downstream from Leche Creek, and 12 mi southeast of Pagosa Springs.

Drainage Area and Period of Record.-- 69.1 mi².; March 1971 to current year.

Equipment.-- Graphic water stage-recorder and Sutron Satlink 2 HDR satellite monitoring DCP and a Sutron stage discharge recorder (SDR). The SDR and graphic recorder are on separate floats in a 48-inch by 48-inch concrete shelter and well. The primary reference is an electric drop tape at the edge of the instrument shelf. No outside staff gage. The control is a 4-ft steel Parshall flume set in a concrete structure that acts as a weir at high flows. No changes this water year.

Hydrologic Conditions.-- Cobble, gravel, and silt are deposited in the stilling pool above the control. Once a year, or at least every other year, the USBR removes the deposits above the control section. Approximately 250 feet above the control is a USBR diversion dam for the San Juan/Chama Project.

Gage-Height Record.-- The primary record is 15-minute SDR data downloaded from satellite telemetry with chart record and DCP data used for backup purposes. The gage was visited on 18 separate occasions this water year to verify the instruments remained calibrated to the primary reference gage. The SDR was not adjusted this water year. The gage is visited almost daily (during normal business hours) by the USBR-Chama personnel. USBR personnel will adjust the graphic water stage-recorder but do not make adjustments to the SDR. The record is complete and reliable, except for the following days when the stage discharge relationship was affected by ice on the control: Dec. 6-8, 16-19, 23-25, 2011 & Jan. 9-14, 28, 31, Feb. 1, 3-4, 7-8, 10-11, 16-19, 21-22, 24-26, Mar. 2-4, 2012 also, the days when logs and debris lodged on the control during a storm event on Jul. 5-6, 2012.

Datum Corrections.-- Levels not run this water year. Levels were last run on October 14, 2010 (WY2011). Levels were run to the inside gage (ET index) using RM#1 as the base. No corrections were made to the electric tape index and electric tape length.

Rating.-- The control is a four-foot Parshall flume installed in December 1979 to replace a v-notch weir. At an elevation of 3.00 feet, horizontal concrete wing walls extend in both directions for a total of 76 feet. There is one channel at all stages. Rating No. 6, in use since Oct. 1, 2000, continued to be used this water year. Rating No. 6 is based on the general shape of a four foot Parshall flume theoretical rating, and is the same as Rating No. 5, dated Dec. 26, 1985, above 3.00 feet. It is fairly well defined from 4.0 to 780 cfs. Eighteen measurements (Nos. 822 – 839) were made during this water year ranging in discharge from 3.64 to 41.2 cfs. They cover the range in stage experienced except for the higher average daily flows of May 6, Jul. 5-6, and Sep. 12-13, 2012. The peak instantaneous flow of 945 cfs occurred at 2115 on Sep. 12, 2012 at a gage height of 4.31 ft with a shift of +0.02 ft. It exceeded the stage of measurement No. 831, made May 14, 2012 by 2.52 feet in stage. The maximum gage height for the year occurred on Jul. 5, 2012 at 1700 at 4.84 ft, caused by debris lodging on the control during a storm event.

Discharge.-- Shifting section control method was used for all periods of good record. Shifting is mainly caused by erosion and deposition of small to medium gravels in the approach section of the flume and by the accumulation of trash and debris on the wing walls at flows above gage height of 2.70 ft. The approach sections and the wing walls are periodically cleaned by the USBR or State of Colorado employees and are noted on the chart. Shifts were applied as defined by measurements, flow events, and cleaning of the channel above the flume and were distributed by time for the entire period of record. Measurements showed unadjusted shifts from 0.00 ft. to +0.04 ft. All were given full weight and applied directly except for measurement Nos. 827 and 835 which were discounted from -1% and +4% to smooth shift distribution. No measurements were made during ice affect; winter measurement days may have been 'b'-days, but the flume was cleared for good gage height during the measurement.

Special Computations.-- The peak daily instantaneous flow for Jul. 5, 2012 was calculated by hand using a measured high water mark on 7/6/2012 of 3.73 ft above the top of the ogee crest, and a radial gate opening of 1.78 in. These calculations were 697 cfs and 24 cfs respectively. Discharge for periods of ice-affected gage height ('b'-days) were estimated using daily temperature data from the Navajo River at Banded Peak Ranch gaging station. Estimation was performed by looking at the base flow between affected periods and adjusting baseflow by observed trends in discharge-temperature relationship on good record days adjacent to the estimated period. Graphical data was a secondary source for estimation.

Remarks.-- The record is good, except for the period when ice or logs and debris on the control affected the stage discharge relationship, which is estimated and should be considered poor. Also, flows above 211 cfs should be considered fair record. The peak instantaneous flow should be considered poor. Station maintained and record developed by Brian Leavesley.

Recommendations.-- A crest gage should be installed at the gage to maintain a peak gage height record. Levels should be rerun at the gage in water year 2013 to tie in new R.M. #4. GPS should be taken to the site to obtain refined LAT/LONG coordinates as there is discrepancy in the seconds of longitude between the station description and AQUAMAP GIS.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09343300 RIO BLANCO BELOW BLANCO DIVERSION DAM NEAR PAGOSA

RATING TABLE.-- RIOBLACO06 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

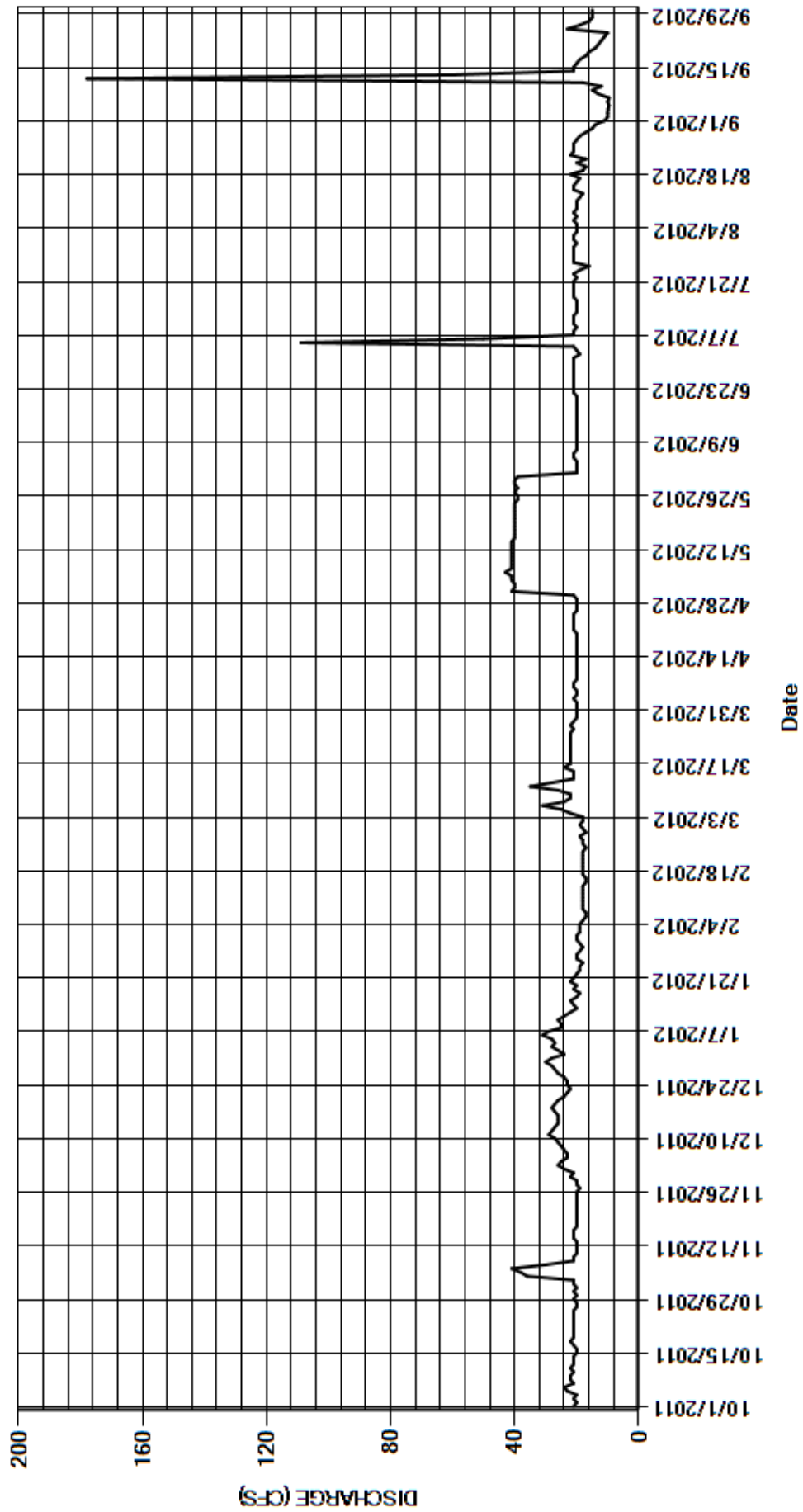
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	21	20	21	24	e20	19	20	41	20	21	21	11
2	20	21	24	26	19	e18	20	40	20	19	21	10
3	21	21	26	28	e19	e18	21	40	20	20	20	10
4	20	36	25	27	e19	e22	20	41	20	21	20	9.9
5	23	38	23	28	18	25	20	41	21	e109	20	9.6
6	24	41	e23	31	17	31	21	43	21	e50	21	10
7	21	30	e24	29	e17	24	21	41	20	21	20	9.5
8	22	21	e25	25	e18	22	20	41	20	21	21	13
9	22	21	26	e25	18	22	20	41	20	20	20	15
10	21	20	27	e26	e18	26	20	41	20	21	20	12
11	22	20	29	e24	e18	35	20	41	20	21	20	18
12	21	20	28	e22	18	28	20	41	20	21	19	178
13	21	20	27	e20	18	21	20	41	20	20	18	59
14	21	21	26	e21	18	21	20	41	20	20	21	21
15	20	21	26	22	17	21	20	40	20	20	21	21
16	20	21	e26	20	e17	24	20	40	20	20	20	20
17	21	20	e27	19	e18	22	20	40	20	21	19	19
18	22	20	e28	21	e18	22	20	40	20	21	22	17
19	21	20	e27	20	e18	22	20	40	20	21	18	16
20	21	20	26	22	18	22	20	40	20	21	17	14
21	21	20	24	21	e18	22	21	40	20	21	20	13
22	21	20	23	20	e18	22	21	40	21	20	17	12
23	21	20	e22	19	18	22	21	40	21	21	22	11
24	21	20	e23	19	e17	22	21	40	21	19	21	10
25	21	20	e23	18	e18	22	21	39	21	16	21	23
26	21	20	24	20	e18	21	20	39	21	21	21	19
27	20	19	26	20	19	22	20	40	21	21	20	16
28	20	20	27	e19	17	21	20	39	21	21	19	15
29	21	20	28	18	18	20	20	40	21	21	17	15
30	20	22	30	19	---	20	21	40	21	21	15	15
31	21	---	28	e20	---	20	---	39	---	20	14	---
TOTAL	653	673	792	693	522	699	609	1250	611	751	606	642.0
MEAN	21.1	22.4	25.5	22.4	18.0	22.5	20.3	40.3	20.4	24.2	19.5	21.4
AC-FT	1300	1330	1570	1370	1040	1390	1210	2480	1210	1490	1200	1270
MAX	24	41	30	31	20	35	21	43	21	109	22	178
MIN	20	19	21	18	17	18	20	39	20	16	14	9.5

CAL YR	2011	TOTAL	8766.0	MEAN	24.0	MAX	172	MIN	13	AC-FT	17390
WTR YR	2012	TOTAL	8501.0	MEAN	23.2	MAX	178	MIN	9.5	AC-FT	16860

MAX DISCH: 945 CFS AT 21:15 ON SEP 12,2012 GH 4.31 FT SHIFT 0.02 FT
 MAX GH: 4.84 FT AT 17:00 ON JUL 05,2012 (backwater from debris on control)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09343300 RIO BLANCO BELOW BLANCO DIVERSION DAM NEAR PAGOSA
WY2012 HYDROGRAPH



SAN JUAN RIVER BASIN
RIO BLANCO AT THE MOUTH NEAR TRUJILLO

Water Year 2012

Location.-- Lat. 37°07'40", Long. 107°02'03", in SW¼SE¼ sec. 2, T.33 N., R.2 W., NMPM, Archuleta County, Hydrologic Unit 14080101, on the right bank 0.75 miles upstream of San Juan River and 5.7 miles downstream of Rito Blanco.

Drainage Area and Period of Record.-- 170 mi².; Published record November 17, 1970 to present.

Equipment.-- Graphic water stage-recorder and a Sutron Satlink 2 DCP with a shaft encoder on a separate float in a 48-inch diameter corrugated well and a 96-inch X 60-inch wooden shelter. The primary reference gage is a steel drop tape referenced to an adjustable reference point (RP). A Sutron Constant Flow Bubbler (CFB) provides secondary gage height record independent of the stilling well. Air temperature sensor installed June 2012. No other changes this water year.

Hydrologic Conditions.-- Large cobbles and boulders line the channel above and below the gage. A large boulder weir was installed below the gage which acts as a control at higher flows (> 35 cfs). The United States Bureau of Reclamation diverts a majority of the water upstream of the gage for the San Juan Chama Project. The gage is located approximately one mile above the confluence with the San Juan River.

Gage-Height Record.-- The primary record is 15-minute shaft encoder data and CFB data downloaded from satellite telemetry with chart record for backup purposes. Shaft encoder data used until Oct. 19, 2011 at 1300 with CFB data used for the remainder of the water year. CFB data was used due to gage heights occurring in the channel which were below the level of the intakes to the stilling well. The stilling well becomes isolated at a gage height of 1.07 ft. The gage was visited on 15 separate occasions this water year to verify the instruments remained calibrated to the primary reference gage. The shaft encoder was adjusted on 1 occasion, Oct. 19, 2011 (+0.01 ft). The CFB was adjusted on 4 separate occasions, -0.03 ft on Apr. 4, 2012, +0.02 ft on May 21, 2012, +0.01 ft on Jun. 6, 2012, and +0.01 ft on Aug. 28, 2012. The record is complete and reliable, except for the following days when the stage discharge relationship was affected by ice on the control: Dec. 8, 2012 - Mar. 7, 2012, and Mar. 12, 2012. Chart record was also used for a daily average gage height on Jun. 6 - 8, when upgrade of firmware on the CFB caused the SDI address to reset and no data was collected by the DCP.

Datum Corrections.-- Levels were not run this water year. Levels were run Nov. 16, 2012 in water year 2013. A brass cap benchmark was installed and surveyed. No changes to the datum were made.

Rating.-- The low flow control is a cobble riffle 15-ft below the gage. At medium and high flows a boulder weir located 30-ft. below the gage controls. Small gravels fill and scour with the change in stage causing shifts. Rating No. 5, in use for record purposes since Mar. 30, 2010 was used for the entire water year. Eleven measurements (Nos. 645-655) were made during the water year ranging in discharge from 15.5 to 111 cfs. They cover the range in stage experienced except for the lower average daily flows of Jun. 2, 6-8, 12-27, 29-30, Jul. 1-4, 20-21, 24-26, 31, Aug. 1-7, 9-14, 16-17, 20-23, 26-31, Sep. 1-11, 18-25, 28-30, 2012 and the higher average daily flows of Jul. 6 and Sep. 13, 2012. The instantaneous peak flow of 1010 cfs occurred at 2130, Jul. 5, 2012 at a gage height of 4.23 ft and a shift of -0.04 ft. It exceeded Measurement No. 653 made Jul. 6, 2012 by 2.14 ft in stage.

Discharge.-- Shifting control method was used during the entire water year. Shifts were distributed by time and also by stage for the period of record. Shifting is mainly caused by erosion and deposition of small to medium gravels on the control section. Measurements show unadjusted shifts from -0.09 ft. to +0.01 ft. Shifts were applied directly and given full weight except for Measurement Nos. 646, 648, and 650 which were discounted -3% to +5% to smooth shift distribution. Variable stage-shift relationship VS12a was used for the period of Spring runoff from Mar. 8 to Jun. 4, 2012. Variable stage-shift relationship VS12b was used to capture the low end of the rating curve at gage heights below isolation of the stilling well as well as storm peak flows. VS12b was used from Jul. 5, 2012 through the end of the water year. The shift from measurement no. 647 was not used as the stage was affected by ice on the control.

Special Computations.-- Discharge for periods of ice affected record and gage isolation was estimated on the basis of adjacent good record days, partial good record days, comparison with the discharge at Rio Blanco below the Blanco Diversion Dam (RIOBLACO) gage and air temperature records at the Navajo River at Banded Peak (NAVBANCO) gage. From Jun. 6 - 8, the DCP did not record data; the chart recorder was used to calculate an average daily gage height.

Remarks.-- Record fair, except for those periods of ice affect which should be considered poor. Record for storm peaks of Jul. 5-6 and Sep. 12-13 should be considered poor. Paper chart record days of Jun. 6-8 should be considered fair. The instantaneous peak flow should be considered poor. Station maintained and record developed by Brian Leavesley.

Recommendations.-- Install an outside chain gage in WY2013 to measure gage heights below the isolation level of the stilling well.

STATE OF COLORADO
DIVISION OF WATER RESOURCES
OFFICE OF STATE ENGINEER

RIO BLANCO AT THE MOUTH NEAR TRUJILLO

RATING TABLE.-- RIOMOU005 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

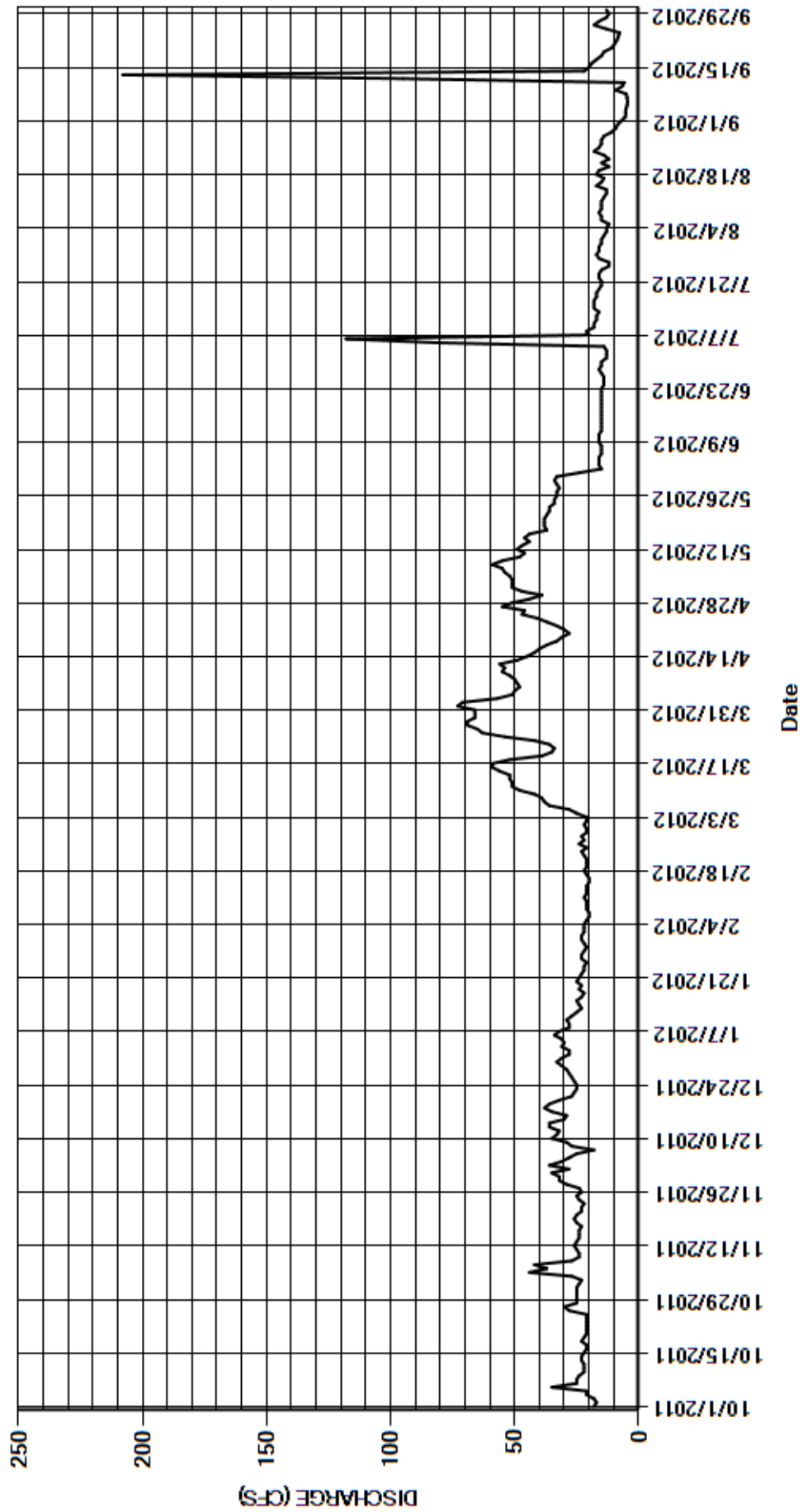
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	18	25	35	e28	e23	e22	73	47	24	13	15	6.9
2	17	24	28	e28	e22	e21	71	51	15	13	14	5.4
3	18	23	36	e31	e22	e21	57	51	16	13	13	5.2
4	21	27	31	e30	e22	e25	51	51	16	14	13	5.2
5	21	44	28	e31	e21	e28	50	52	16	82	12	4.7
6	35	37	25	e34	e20	e36	48	54	15	118	15	4.5
7	25	42	18	e32	e20	e38	49	55	15	20	15	4.7
8	25	27	e27	e28	e21	39	50	59	15	21	16	5.0
9	24	24	e29	e28	e21	42	52	55	16	18	15	9.2
10	22	24	e35	e29	e21	48	55	48	16	18	15	6.7
11	22	25	e33	e27	e22	51	54	46	16	17	15	5.8
12	22	26	e32	e25	e21	e51	56	49	15	17	14	95
13	23	25	e36	e23	e21	52	49	47	15	16	13	208
14	23	24	e36	e24	e21	52	45	44	15	18	13	22
15	22	24	e30	e25	e20	56	42	46	15	18	17	20
16	21	24	e29	e23	e20	59	40	44	15	18	15	19
17	21	23	e35	e22	e21	59	37	37	15	17	14	17
18	23	25	e38	e24	e22	52	33	38	15	17	17	15
19	22	26	e36	e23	e21	39	31	38	15	16	16	14
20	21	25	e32	e25	e21	35	28	38	15	15	12	11
21	21	23	e27	e24	e21	34	30	37	15	15	15	9.8
22	21	23	e26	e23	e22	36	33	36	15	16	12	8.8
23	21	22	e25	e22	e23	42	37	36	15	16	14	8.2
24	21	24	e25	e22	e21	54	41	34	14	15	18	7.7
25	21	25	e26	e21	e24	63	47	34	14	12	16	13
26	28	23	e27	e23	e22	65	46	33	14	12	15	18
27	30	24	e28	e23	e23	69	55	33	15	16	15	16
28	25	29	e29	e22	e21	69	51	32	16	17	14	13
29	25	32	e31	e21	e21	66	44	33	15	16	11	12
30	25	32	e33	e22	---	66	39	34	15	16	9.3	13
31	25	---	e31	e23	---	66	---	33	---	15	8.5	---
TOTAL	709	801	937	786	621	1456	1394	1325	463	665	436.8	603.8
MEAN	22.9	26.7	30.2	25.4	21.4	47.0	46.5	42.7	15.4	21.5	14.1	20.1
AC-FT	1410	1590	1860	1560	1230	2890	2760	2630	918	1320	866	1200
MAX	35	44	38	34	24	69	73	59	24	118	18	208
MIN	17	22	18	21	20	21	28	32	14	12	8.5	4.5

CAL YR	2011	TOTAL	13104.0	MEAN	35.9	MAX	271	MIN	13	AC-FT	25990
WTR YR	2012	TOTAL	10197.6	MEAN	27.9	MAX	208	MIN	4.5	AC-FT	20230

MAX DISCH: 1010 CFS AT 21:30 ON JUL 05,2012 GH 4.23 FT SHIFT -0.04 FT
MAX GH: 4.23 FT AT 21:30 ON JUL 05,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

RIO BLANCO AT THE MOUTH NEAR TRUJILLO
WY2012 HYDROGRAPH



SAN JUAN RIVER BASIN
09344000 NAVAJO RIVER AT BANDED PEAK RANCH NEAR CHROMO
Water Year 2012

Location.-- Lat. 37°05'07", Long. 106°41'20", in SE¼NW¼ sec. 24, T.33 N., R.2 E., NMPM, Archuleta County, Hydrologic Unit 14080101, on right bank at downstream side of private bridge on Banded Peak Ranch, 0.5 mi downstream from Cutthroat Creek, 2.8 mi downstream from East Fork of the Navajo River, and 11.2 mi northeast of Chromo, Co.

Drainage Area and Period of Record.-- 69.8 mi².; Continuous record kept by USGS, Oct. 1, 1936 to Sep. 30, 1995. Oct 1, 1995 to present by Colorado Division of Water Resources.

Equipment.-- Graphic water stage-recorder and shaft encoder connected to a Sutron Satlink 2 DCP in a 48-inch x 48-inch redwood shelter and well. The shaft encoder and graphic recorder are on separate floats. The floats are located inside a 14-inch PVC oil cylinder. The primary reference gage is an electric drop tape in the gage. A drop tape is a supplemental reference gage and is mainly used when the well is frozen. A Sutron constant-flow bubbler (CFB), air temperature sensor and tipping bucket precipitation gage are used for supplemental purposes. No changes this water year.

Hydrologic Conditions.-- The stream is composed of sand, gravel, and large cobble. In the spring, sustained high water scours sand and gravel from the streambed. In mid-Summer to late Fall and Winter, the sand and gravel are deposited in the channel at the gage. The control and channel are highly susceptible to fill and scour events.

Gage-Height Record.-- The primary record is 15-minute constant-flow bubbler data downloaded from satellite telemetry with the DCP log, shaft encoder data, and chart record for backup purposes. The gage was visited on 23 separate occasions this water year to verify the instruments remained calibrated to the primary reference gage. Four corrections were made to the CFB throughout the water year: a correction on Oct. 20, 2011 was not applied in record (removed from data), Feb. 27, Jul. 27 (not applied in record), and Sep. 12, 2012. During spring runoff, there is considerable sediment load that fills the intakes to the stilling well; therefore CFB data was preferred as it has shown to be reliable. In past years, at channel velocities above ~4.5 feet per second, there appeared to be drawdown in the stilling well caused by the velocity past the intakes after flushing. This was noticeable in water year 2012 as the channel filled with sediment and velocities increased over the center (river) intake. During the period of Mar. 21-23, 2012, the GOES west satellite malfunctioned causing loss of transmitted data, this period was backfilled using DCP downloaded data without loss of continuity. Record is complete and reliable, except for the following periods when the stage-discharge relationship was affected by ice on the control: Nov. 9-10, 17, 27, Dec. 5-12, 16-18, 23-29, 2011, Jan. 1-7, 9-19, 21, 23, 25-26, 28-31, Feb. 3-4, 8, 11, 18-27, Mar. 3-5, 2012.

Datum Corrections.-- Levels were run on Sep. 12, 2012 using BM#6 as the base. The electric tape index was found to be +0.014 ft and the drop tape reference point was +0.013 ft from their established elevations. No corrections were made since the electric tape index and drop tape index was found to be within allowable error tolerances.

Rating.-- The control consists of a cobble riffle whose location varies during the year from 30 to 70 feet below the gage. Shifting occurs throughout the range-in-stage. Rating No. 23, dated Aug. 22, 1996, was continued in use this year. It is fairly well defined between 22 and 603 cfs. Sixteen measurements (Nos. 869-884) were made during the current water year ranging in discharge from 32.8 to 174 cfs. They cover the range in stage except for the higher daily flows of Apr. 1-2, 11, 24-28, May 4-8, 11-28, Jun. 2, 2012, and the lower daily flows on Dec. 5-18, 24, 29, 2011; Jan 11-13, 16-31, Feb. 1-29, Mar. 1-4, 7-9, Jul. 23, 30, Aug. 2-4, 22, 26, 29-31, Sep. 1-11, 16-30, 2012. The peak discharge of 286 cfs occurred at 2200 on May 22, 2012 at a gage height of 3.08 feet with a shift of -0.11 feet. It exceeded high Measurement No. 877 by 0.27 ft in stage.

Discharge.-- Shifting control method was used during the entire water year. Shifting is caused mainly by erosion and deposition on the control section below the gage. Shifts were distributed by time with consideration given to changes in stage from Oct. 1, 2011 to Apr. 19, 2012, and from Jul. 24, 2012 to the end of the water year. Shifts were distributed by stage using variable stage shift relationship; NAVBANCOVS12a based on Msmts 875-880, from 1500 Apr. 19 to 1830 Jul. 24. Measurements showed unadjusted shifts from -0.16 to -0.06 ft. All were given full weight and applied directly except for Measurement Nos. 870, 871, 878, and 881 which were discounted from -4 to +5 % to smooth the shift distribution.

Special Computations.-- Discharge for periods of ice effect was estimated on the basis of good record before and after ice effect, partial day of good records, and the temperature record from the air temperature sensor at the gaging station.

The intakes proved to be unreliable at times in water year 2012, as one of the flush valves (high-level intake) rusted off the intake pipe, and another (mid-level) stripped the nut on the handle, leaving it closed for an extended period of time. A debris flow came down the river from a landslide above on Jul. 24, 2012, completely covering and filling the intakes with sediment. A reliable gage height from flushing the remaining (low-level) intake was nearly impossible as when it was plugged and then flushed, the GH would return to near the bubbler reading, but then immediately deviate to plugged condition again. The mid-level intake valve was repaired on Sep. 12, 2012 and the well cleaned of sediment. After this point it was noticed that -0.02' to -0.03' of velocity drawdown was experienced in the stilling well when the mid-level intake was open. The true GH is in question when this mid intake is open as long as velocities in the channel are relatively faster than normal.

This is the first year that bubbler data was used for development of the water year record. A comparison between shaft encoder (GH_1) and bubbler data (GH_2) was made, and the results showed that when flows were increasing such as during spring runoff that the stilling well recorded generally higher gage height than the bubbler until the intakes were flushed, at which point the stilling well would match the bubbler. At later times in the year when runoff flow was decreasing, the stilling well was generally at a lower gage height than the bubbler until a flush at which point the well would usually match the bubbler. It was concluded that the bubbler provided a better record of true gage height for this gage since the intakes and stilling well are sensitive to the nature of the channel as it produces a wide variety of sediment conditions that have an effect on the well.

Remarks.-- Record is considered good, except for periods of ice effect, which was estimated and should be considered poor. The period from Jul. 24 – Sep. 12, 2012, when the intakes to the stilling well were unable to be flushed should be considered fair. The peak instantaneous flow should be considered fair. Station maintained by Brian Leavesley, Brian Boughton and Sherry Schutz. Record developed by Brian Leavesley.

Recommendations.-- An outside staff gage is necessary at this location in order to set gage height when the stilling well gage height is in question. The shelter should be restrained to prevent deterioration. Levels should be run in water year 2013 or 2014, as the tape length was not recorded with levels run in water year 2012.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09344000 NAVAJO RIVER AT BANDED PEAK RANCH NEAR CHROMO

RATING TABLE.-- NAVBANCO23 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

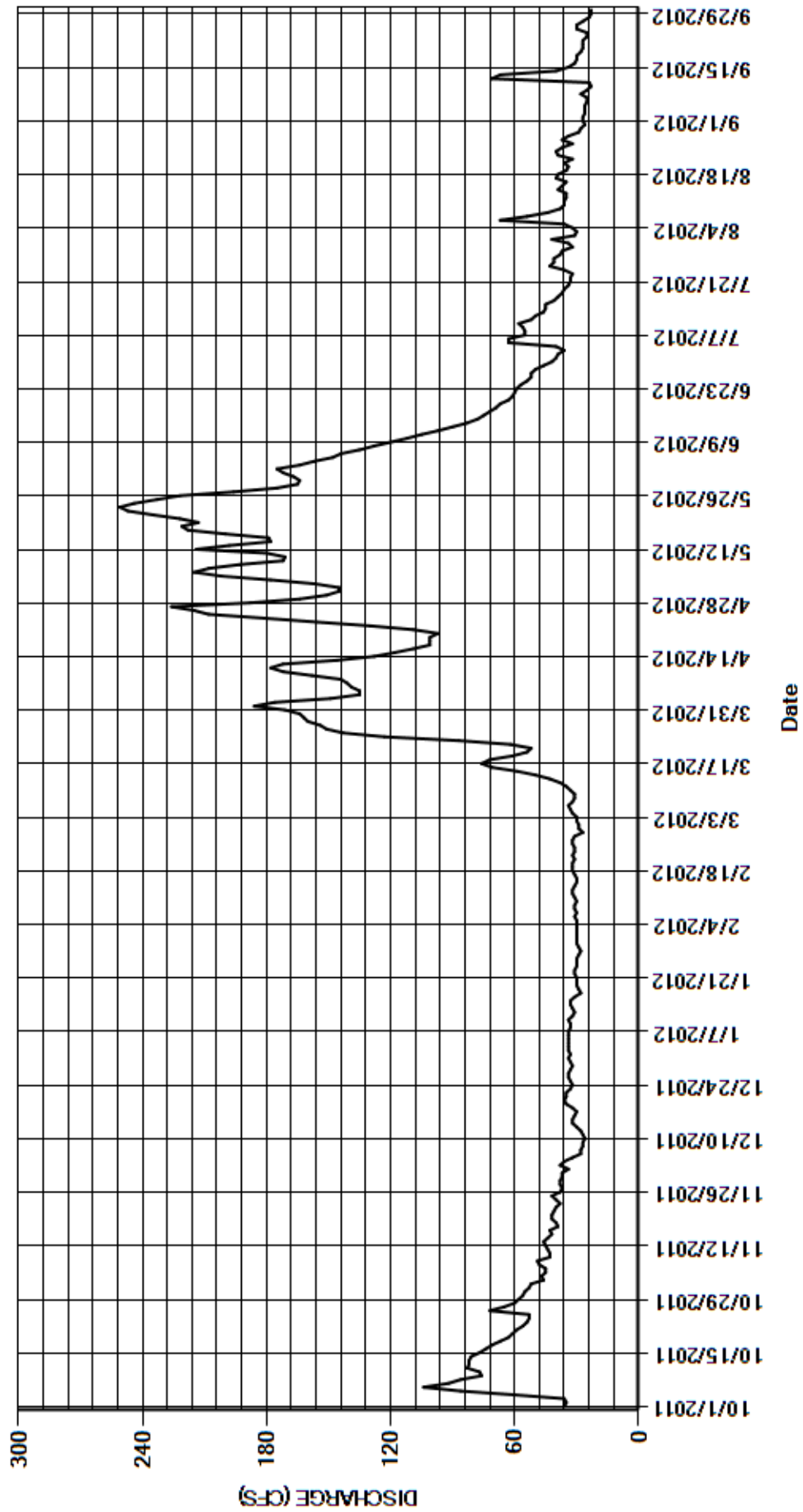
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	36	53	37	e33	30	29	186	145	172	40	42	27
2	35	52	34	e34	30	30	176	145	175	39	31	27
3	36	46	38	e34	e30	e30	149	157	164	36	30	26
4	60	47	36	e34	e30	e32	135	178	157	40	32	26
5	86	45	e32	e34	30	e33	135	202	148	63	36	26
6	104	45	e28	e34	31	34	139	215	144	63	67	25
7	92	48	e28	e34	30	32	141	208	135	55	54	25
8	86	49	e27	33	e31	31	144	193	128	55	44	28
9	76	e43	e27	e33	31	31	158	172	120	56	38	25
10	77	e43	e26	e34	30	33	172	171	112	58	36	23
11	83	44	e27	e32	e31	35	178	180	105	52	36	24
12	82	45	e28	e31	32	38	172	214	97	50	35	71
13	82	46	30	e32	32	43	146	198	90	46	35	67
14	81	44	32	e33	31	50	128	178	83	45	39	40
15	77	42	32	e33	30	59	118	179	78	45	37	34
16	74	43	e31	e31	30	71	109	200	75	41	35	31
17	71	e39	e30	e28	31	76	101	218	72	39	40	30
18	67	40	e32	e29	e32	72	101	221	69	37	39	30
19	63	42	35	e30	e32	61	101	213	67	36	35	28
20	61	42	36	30	e32	54	97	222	63	34	34	27
21	59	41	35	e30	e31	52	109	235	61	33	36	27
22	56	40	35	31	e32	62	130	247	60	33	32	27
23	54	38	e33	e31	e31	87	156	251	59	32	39	25
24	53	40	e32	30	e31	123	181	244	57	36	40	25
25	53	42	e33	e30	e32	143	208	233	54	43	37	30
26	72	38	e34	e30	e32	151	215	222	52	41	32	30
27	65	e37	e34	29	e31	154	226	196	52	41	37	27
28	60	38	e33	e28	27	160	188	175	50	38	34	24
29	58	38	e32	e29	29	162	164	165	46	37	29	23
30	56	37	33	e30	---	164	151	164	42	32	28	23
31	55	---	34	e30	---	171	---	167	---	34	26	---
TOTAL	2070	1287	994	974	892	2303	4514	6108	2787	1330	1145	901
MEAN	66.8	42.9	32.1	31.4	30.8	74.3	150	197	92.9	42.9	36.9	30.0
AC-FT	4110	2550	1970	1930	1770	4570	8950	12120	5530	2640	2270	1790
MAX	104	53	38	34	32	171	226	251	175	63	67	71
MIN	35	37	26	28	27	29	97	145	42	32	26	23

CAL YR	2011	TOTAL	33556	MEAN	91.9	MAX	464	MIN	25	AC-FT	66560
WTR YR	2012	TOTAL	25305	MEAN	69.1	MAX	251	MIN	23	AC-FT	50190

MAX DISCH: 286 CFS AT 22:00 ON MAY 22,2012 GH 3.08 FT SHIFT -0.11 FT
 MAX GH: 3.08 FT AT 22:00 ON MAY 22,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09344000 NAVAJO RIVER AT BANDED PEAK RANCH NEAR CHROMO
WY2012 HYDROGRAPH



SAN JUAN RIVER BASIN
OSO DIVERSION NEAR CHROMO,CO.

Water Year 2012

Location.-- Lat. 37°01'49", Long. 106°44'14", in NE¼NE¼ sec. 9, T.32 N., R.2 E., NMPM, Archuleta County, Hydrologic Unit 14080101, on the left bank 7 miles upstream of the confluence with the Little Navajo River.

Drainage Area and Period of Record.-- Drainage area above the diversion is 97.2 sq. mi. ; Diversion record Nov. 1, 1973 to present. Published streamflow record Oct. 1, 1990 to present.

Equipment.-- Sutron Satlink 2 DCP and a digital shaft encoder/stage-discharge recorder in a concrete control house used by the Bureau of Reclamation (Bureau) to house the telemetry for control of the Oso diversion structure. Shaft encoder was replaced with Sutron stage-discharge recorder on Jun. 6, 2012. The Bureau utilizes a Stevens A-71 chart recorder with an attached signal converter to send data to their SCADA system. The primary reference gage is an electric drop tape inside the gage house. Control is a 15-foot concrete Parshall flume set into the diversion tunnel below ground. No other changes this water year.

Hydrologic Conditions.-- The Oso diversion is part of the San Juan-Chama Project and is a transmountain diversion structure which creates an on-stream reservoir on the Navajo River above the diversion to collect runoff and settle out sediment. Water can be released downstream by means of a vertical Tainter gate or taken into the Azotea Tunnel which conveys water to the Rio Grande basin. Diversion amount is controlled by the capacity of the tunnel as water in the tunnel is also diverted from the Little Navajo River and Rio Blanco. The measurement flume is located within the diversion tunnel. It is typically a seasonal diversion where the Bureau attempts to capture and divert the maximum amount of spring runoff while adhering to minimum release limits set forth in the legislation for the San Juan-Chama Project and agreements between the Bureau and State of Colorado. Since the diversion primarily operates in the Spring and Summer, ice does not affect the control. Occasionally, the Tainter gates on the diversion tunnel will become stuck open from ice and diversion into the tunnel will take place.

Gage-Height Record.-- The primary record is 15-minute shaft encoder data downloaded from satellite telemetry with DCP downloads used for backup purposes. The record is complete and reliable. The station was visited 19 times over the water year by DWR personnel to ensure that the shaft encoder/SDR remained calibrated to the primary reference. There was one adjustment made to the shaft encoder throughout the water year: -0.01 ft. on Jun. 1, 2012.

Datum Corrections.-- No levels run this water year. Levels were run at the control house on Feb 24 2011 to tie in the R.P. in the control house to a brass cap (BM#1) outside. The flume itself was not surveyed on this circuit. No corrections to the datum were made.

Rating.-- The control is a standard 15-ft. concrete Parshall flume. Rating No. 1 (OSODIVCO01) is a standard 15-ft. Parshall flume rating above a gage height of 0.05 ft, and was used the entire water year. The flows below a gage height of 0.08 ft. are assumed to be 0. This is in part caused by the intake to the stilling well being 0.05 ft. above the floor of the flume or the stilling well does not provide sufficient depth for float movement. No measurements were made this water year because the flume is located underground. The peak instantaneous flow of 283 cfs occurred at 0030 on April 27, 2012 at a gage height of 2.70 ft. with a shift of 0.00 ft.

Discharge.-- No measurement of this diversion has taken place. With typical diversion, a 0.00 shift was applied for the entire year. OSODIVCOVS12A was developed to trim out gage heights 0.08 ft and below as zero flow. The VS was applied from the cessation of diversion through the end of the water year. The discharge record was computed by direct application of the rating to the gage height record.

Special Computations.-- No special computations were necessary.

Remarks.-- Record is rated as fair for the entire period. A fair rating was given due to the fact that levels have never been run in the tunnel to determine the actual elevation of the flume; also, measurements have never taken place due to the inaccessibility of the flume. The peak instantaneous flow is rated fair. Station maintained and record developed by Brian Leavesley.

Recommendations.-- Run levels in the tunnel on the flume/intake.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

OSO DIVERSION NEAR CHROMO, CO.

RATING TABLE-- OSODIVCO01 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

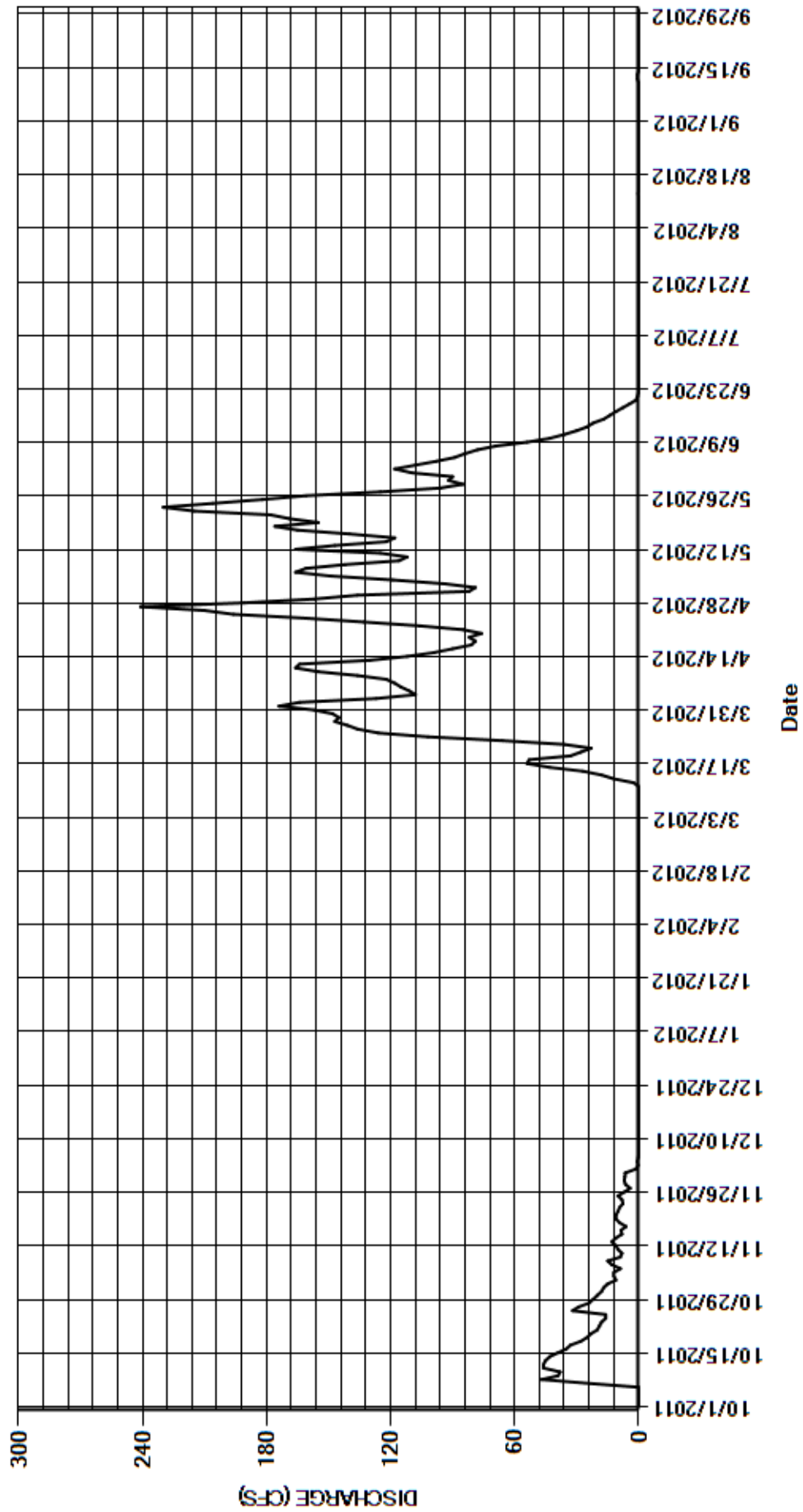
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	17	6.5	0.00	0.00	0.00	174	82	110	0.00	0.02	0.00
2	0.00	15	1.5	0.00	0.00	0.00	164	79	118	0.00	0.00	0.00
3	0.00	11	0.25	0.00	0.00	0.00	127	94	108	0.00	0.00	0.00
4	0.00	12	0.64	0.00	0.00	0.00	108	119	98	0.03	0.00	0.00
5	0.00	12	0.17	0.00	0.00	0.00	111	149	89	0.00	0.00	0.03
6	0.00	8.8	0.00	0.00	0.00	0.00	115	166	84	0.00	0.00	0.00
7	24	13	0.00	0.00	0.00	0.00	118	161	78	0.00	0.00	0.00
8	47	15	0.00	0.00	0.00	0.00	122	142	69	0.00	0.01	0.00
9	39	8.9	0.00	0.00	0.00	0.00	136	116	54	0.00	0.00	0.00
10	38	8.1	0.00	0.00	0.00	0.00	155	112	43	0.00	0.00	0.00
11	46	10	0.00	0.00	0.00	0.00	166	125	36	0.03	0.00	0.00
12	46	11	0.00	0.00	0.00	2.5	164	166	30	0.00	0.00	0.64
13	45	13	0.00	0.00	0.00	12	130	147	25	0.00	0.15	0.65
14	43	11	0.00	0.00	0.00	18	112	122	22	0.00	0.00	0.00
15	39	8.1	0.00	0.00	0.00	27	99	118	17	0.00	0.01	0.00
16	35	8.6	0.00	0.00	0.00	43	90	140	14	0.00	0.00	0.00
17	33	6.1	0.00	0.00	0.00	54	81	165	11	0.00	0.00	0.00
18	28	9.3	0.00	0.00	0.00	53	79	176	7.7	0.01	0.00	0.00
19	25	11	0.00	0.00	0.00	33	82	155	4.4	0.00	0.00	0.01
20	23	11	0.00	0.00	0.00	28	76	169	1.3	0.00	0.00	0.00
21	20	10	0.00	0.00	0.00	23	85	178	0.51	0.00	0.00	0.00
22	19	9.2	0.00	0.00	0.00	36	106	215	0.00	0.00	0.03	0.00
23	18	7.6	0.00	0.00	0.00	66	133	230	0.00	0.00	0.00	0.00
24	16	8.1	0.00	0.00	0.00	102	161	206	0.00	0.00	0.00	0.00
25	16	10	0.00	0.00	0.00	126	196	182	0.00	0.01	0.00	0.00
26	32	7.0	0.00	0.00	0.00	136	210	161	0.00	0.01	0.00	0.03
27	29	4.1	0.00	0.00	0.00	141	241	125	0.03	0.00	0.00	0.00
28	24	6.4	0.00	0.00	0.00	147	191	96	0.00	0.00	0.00	0.00
29	22	7.0	0.00	0.00	0.00	145	157	85	0.00	0.00	0.03	0.00
30	20	6.7	0.00	0.00	---	148	136	92	0.00	0.00	0.00	0.00
31	18	---	0.00	0.00	---	157	---	90	---	0.00	0.00	---
TOTAL	745.00	296.0	9.06	0.00	0.00	1497.50	4025	4363	1019.94	0.09	0.25	1.36
MEAN	24.0	9.87	0.29	0.000	0.000	48.3	134	141	34.0	0.003	0.008	0.045
AC-FT	1480	587	18	0	0	2970	7980	8650	2020	0.2	0.5	2.7
MAX	47	17	6.5	0.00	0.00	157	241	230	118	0.03	0.15	0.65
MIN	0.00	4.1	0.00	0.00	0.00	0.00	76	79	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	21709.78	MEAN	59.5	MAX	476	MIN	0.00	AC-FT	43060
WTR YR	2012	TOTAL	11957.20	MEAN	32.7	MAX	241	MIN	0.00	AC-FT	23720

MAX DISCH: 283 CFS AT 00:30 ON APR 27,2012 GH 2.70 FT SHIFT 0 FT
 MAX GH: 2.70 FT AT 00:30 ON APR 27,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

OSO DIVERSION NEAR CHROMO, CO.
WY2012 HYDROGRAPH



SAN JUAN RIVER BASIN
09344400 NAVAJO RIVER BELOW OSO DIVERSION DAM NEAR CHROMO

Water Year 2012

Location.-- Lat. 37°01'49", Long. 106°44'14", in NW¼NE¼ sec. 9, T.32 N., R.2 E., NMPM, Archuleta County, Hydrologic Unit 14080101, on left bank 600 ft downstream from Oso Diversion Dam, 5.8 mi east of Chromo, and 6.1 mi upstream from Little Navajo River.

Drainage Area and Period of Record.-- 100.5 mi². March 1971 to current year.; Published by USGS March 1, 1971 to Sept. 30, 1998; published by Colorado Division of Water Resources Oct. 1, 1998 to present.

Equipment.-- Graphic water stage-recorder and Sutron Satlink 2 DCP satellite monitoring connected to a Sutron Stage-Discharge Recorder (SDR) unit. Recorders are on separate floats in a concrete shelter and well. The primary reference gage is an electric drop tape in the gage house. No outside staff gage. Control is an 8-foot Parshall flume set in a 60-foot wide concrete structure that acts as a weir at higher flows. No other changes this water year.

Hydrologic Conditions.-- Cobble and gravel are deposited in the stilling pool above the control throughout the water year. At least once per year the USBR removes sediment deposited above the control section. Approximately 250 feet above the control is a USBR diversion dam (Oso Diversion structure) for the San Juan/Chama Project. The San Juan/Chama Project is a trans-basin diversion that diverts water through a pipeline and is delivered to the Rio Grande River basin in New Mexico.

Gage-Height Record.-- The primary record is 15-minute SDR data downloaded from satellite telemetry with chart record and DCP data used for backup purposes. The gage was visited on 21 separate occasions this water year to verify the instruments remained calibrated to the primary reference gage. The gage is visited almost daily (during normal business hours over the diversion season) by the USBR/Chama personnel. USBR personnel will adjust the graphic water stage-recorder but do not make adjustments to the SDR. One adjustment was made to the SDR unit this water year (+0.01 ft on 6/1/2012) which was not applied in the record as USBR visits before the adjustment showed the SDR in calibration with the primary reference gage (elec. tape). The record is complete and reliable, except for the following days when the stage discharge relationship was affected by ice on the control ("b" days): Dec. 5 - 15, 17 - 19, 23 - 24, 27 - 31, 2011; Jan. 1 - 5, 10, 13 - 14, Feb. 8, 2012, and when ice on the control was combined with an unusual drop in gage height ("a" days): Dec. 25 - 26, 2011.

Datum Corrections.-- Levels were not run this year. Last run on Oct. 14, 2010; no corrections were made.

Rating.-- The control is an 8-foot Parshall flume installed in September 1979 to replace a V-notch weir. At an elevation of 3.00 ft, horizontal concrete wing walls extend in both directions for a total of 60 feet. Rating No. 4 was developed and put into use on October 1, 2002. It is fairly well defined between 22 cfs and 1,100 cfs. It was used all year. Eighteen measurements (Nos. 838 - 855) were made during the current water year ranging in discharge from 19.8 cfs to 92.0 cfs. They cover the entire range in stage experienced except for the higher daily flows of Oct. 5-6, 2011; May 21, and Sep 13, 2012 and the lower daily flows of Sep. 11, 28-30, 2012. The peak instantaneous flow of 240 cfs occurred at 0145 on September 13, 2012 at a gage height of 3.12 feet with a shift of +0.04 feet. It exceeded measurement No. 846, made May 1, 2012, by 1.21 feet in stage.

Discharge.-- Shifting control method was used all year. Shifting is mainly caused by erosion and deposition of small to medium gravels in the approach section of the flume and by the accumulation of trash and debris on the wing walls. Shifts were applied as defined by measurements and flow events. All shifts were distributed by time. Measurements show unadjusted shifts varying from +0.01 to +0.09 ft. Shifts from measurements were applied directly and given full weight except for Measurement Nos. 841 and 842, which were discounted -3.03% and +3.45% respectively, to smooth shift distribution. One measurement was made during an ice affected day, Meas. No. 841; however, the control was cleared for the measurement but ice cover in the stilling pool could have possibly affected the velocity profile in the flume.

Special Computations.-- Discharge during ice-affected periods was estimated by considering baseflow discharge on either side of affected record period and smoothing the record between. Temperature and discharge data from Navajo River at Banded Peak Ranch (NAVBANCO), located 6 miles upstream was the primary means of estimating discharge variation around the baseflow during ice-affected days.

Remarks.-- Record good, except for those periods of ice affect and when water stage in the channel approaches the top of the flume or spills over the weir which should be considered poor. Days when ice on the control affected the stage discharge relationship, 'b'-days, should be considered fair. The peak instantaneous flow should be considered fair. Station maintained and record developed by Brian Leavesley.

Recommendations.-- Levels should be run again in WY2013.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09344400 NAVAJO RIVER BELOW OSO DIVERSION DAM NEAR CHROMO

RATING TABLE.-- NAVOSOCO04 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

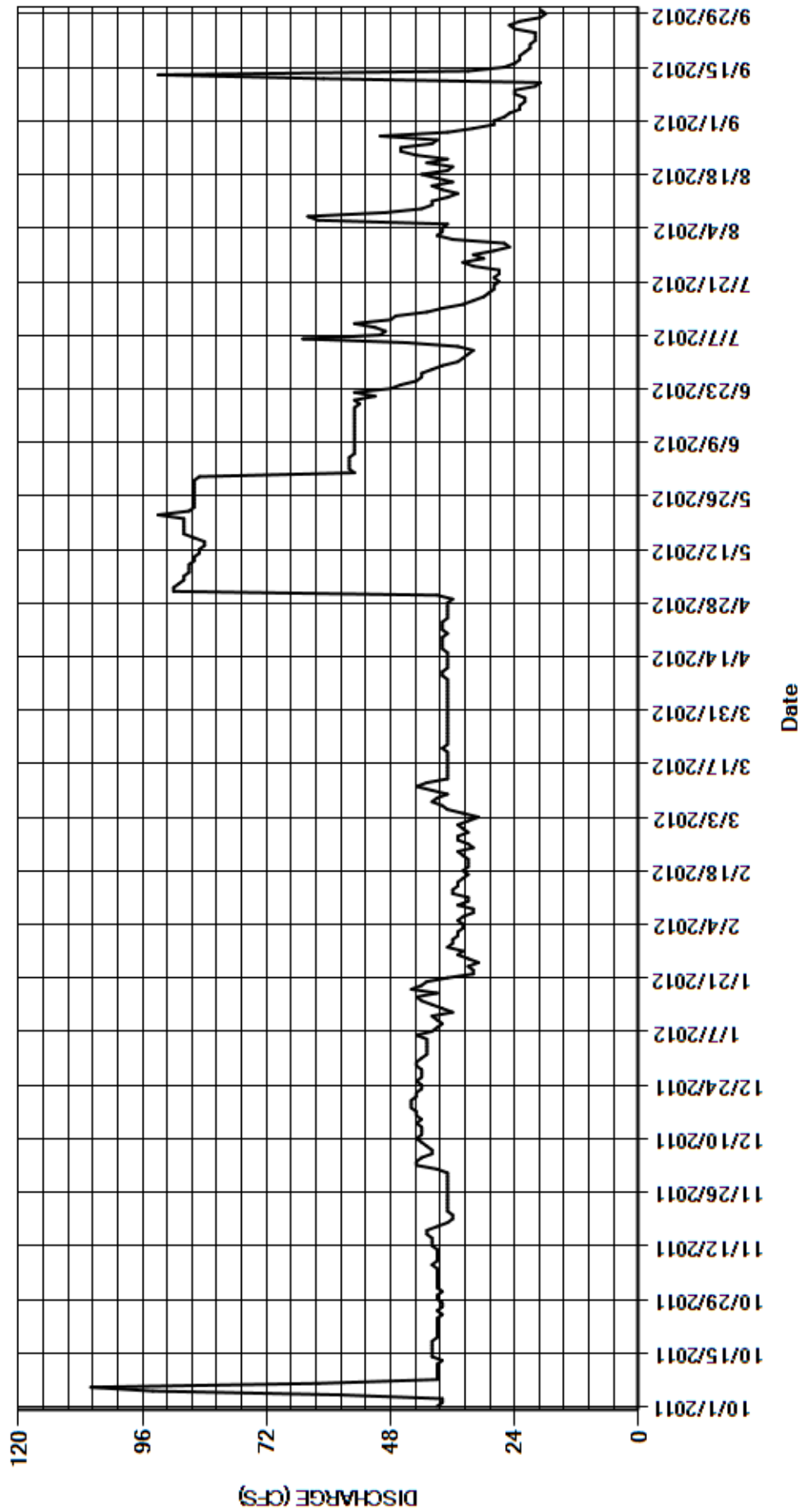
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	39	39	37	e41	35	35	37	90	55	34	36	28
2	38	39	39	e41	35	33	37	90	56	33	39	26
3	38	39	43	e41	34	31	37	89	56	32	38	25
4	58	39	43	e41	34	34	37	88	56	35	38	23
5	94	39	e42	e41	35	37	37	88	56	45	37	23
6	106	39	e40	43	34	38	37	87	55	65	62	22
7	62	40	e40	40	32	40	37	87	55	50	64	22
8	39	39	e41	39	e32	39	37	87	55	49	49	24
9	39	39	e42	38	35	37	38	86	55	51	42	24
10	39	39	e43	e39	33	40	38	86	55	55	40	20
11	39	39	e42	40	33	43	37	85	55	48	40	19
12	39	40	e42	36	36	41	37	85	55	47	37	61
13	38	40	e42	e38	36	37	37	84	55	41	35	93
14	40	40	e43	e40	35	37	37	84	55	38	38	33
15	40	41	e42	42	35	37	37	86	55	34	40	26
16	40	41	43	43	34	37	38	88	55	32	36	24
17	40	39	e43	39	33	37	38	88	55	30	39	23
18	40	37	e44	44	34	37	38	88	55	29	42	23
19	39	36	e44	42	33	37	38	88	54	28	37	22
20	39	36	44	41	33	37	37	88	55	28	36	21
21	39	37	43	37	33	38	38	93	51	27	41	21
22	39	37	43	32	34	37	38	87	55	28	37	20
23	39	37	e42	32	35	37	38	86	48	27	43	20
24	39	37	e42	33	32	37	37	86	46	27	46	20
25	38	37	e43	31	33	37	37	86	43	32	46	24
26	39	37	e42	33	35	37	37	86	42	34	40	25
27	38	37	e42	35	35	37	37	86	42	30	39	23
28	38	37	e42	34	33	37	37	86	40	32	50	19
29	39	37	e43	37	34	37	36	86	38	28	37	18
30	39	37	e43	36	---	37	39	86	35	25	32	19
31	38	---	e42	36	---	37	---	85	---	26	28	---
TOTAL	1371	1150	1306	1185	985	1152	1120	2695	1543	1120	1264	791
MEAN	44.2	38.3	42.1	38.2	34.0	37.2	37.3	86.9	51.4	36.1	40.8	26.4
AC-FT	2720	2280	2590	2350	1950	2280	2220	5350	3060	2220	2510	1570
MAX	106	41	44	44	36	43	39	93	56	65	64	93
MIN	38	36	37	31	32	31	36	84	35	25	28	18

CAL YR	2011	TOTAL	17663	MEAN	48.4	MAX	123	MIN	26	AC-FT	35030
WTR YR	2012	TOTAL	15682	MEAN	42.8	MAX	106	MIN	18	AC-FT	31110

MAX DISCH: 240 CFS AT 01:45 ON SEP 13,2012 GH 3.12 FT SHIFT 0.04 FT
 MAX GH: 3.12 FT AT 01:45 ON SEP 13,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09344400 NAVAJO RIVER BELOW OSO DIVERSION DAM NEAR CHROMO
 WY2012 HYDROGRAPH



SAN JUAN RIVER BASIN
LITTLE OSO DIVERSION NEAR CHROMO

Water Year 2012

Location.-- Lat. 37°04'32", Long. 106°48'38", in SW¼SE¼ sec. 23, T.33 N., R.1 E., NMPM, Archuleta County.

Drainage Area and Period of Record.-- 13.4 sq. mi. ; March 1971 to current year.

Equipment.-- Sutron Satlink 2 DCP and a digital shaft encoder (SE) in a concrete control house. Shaft encoder was replaced with a Sutron stage-discharge recorder (SDR) on June 6, 2012. Building used by the Bureau of Reclamation (Bureau) to house the telemetry for control of the Little Oso diversion structure. The Bureau utilizes a Stevens A-71 chart recorder with an attached signal converter to send stage data to their SCADA system. Shaft encoder is set to an inside electric tape. The primary reference gage is an electric drop tape inside the gage house. Control is a 6-foot concrete Parshall flume set into the diversion tunnel below ground. Replacement of the SE with SDR solved voltage issues limiting communication with the DCP when display of SE was on. No other changes this water year.

Hydrologic Conditions.-- The Little Oso Diversion is part of the San Juan-Chama Project. It is a transmountain diversion structure which creates an on-stream reservoir on the Little Navajo River to collect runoff and settle out sediment. Water can be released downstream by means of either a vertical Tainter slide gate or an adjustable Cipoletti weir or the slide gate. The water above the dam can be taken into the Azotea Tunnel which conveys water to the Rio Grande Basin. Diversion amounts are limited by the minimum downstream flow requirements of the Little Navajo River and the capacity of the tunnel. The Blanco diversion on the Rio Blanco is located above the Little Oso. The Oso diversion on the Navajo River is below. The Parshall flume is located within the diversion tunnel. It is typically a seasonal diversion where the Bureau attempts to capture and divert the maximum amount of spring runoff while adhering to minimum release requirements set forth in legislation for the San Juan-Chama Project and agreements between the Bureau and State of Colorado. Since the diversion primarily operates in the Spring and Summer, ice does not affect the control.

Gage-Height Record.-- The primary record is 15-minute shaft encoder/stage-discharge recorder data downloaded from satellite telemetry with the DCP and chart record used for backup purposes. The gage was visited on four (4) separate occasions by DWR staff to ensure that the shaft encoder remained calibrated to the primary reference gage. One datum correction took place during the water year. There was a +0.07 ft. adjustment to SE on Mar. 27, 2012, shortly after start of diversion season. During water year 2010, the Bureau changed the tape length and as close as can be determined by DWR, that change in tape length was -0.07 ft. Levels run in the tunnel in water year 2012, DWR determined that the tape is 0.05 ft. shorter than it should be. A +0.05 ft. datum correction was used for the entire period of record this water year. The gage height record is complete and reliable for the entire period of record except for the period Oct. 12-31, 2012 when the shaft encoder was disconnected at the gage house. Chart record was good and used to fill in the missing record.

Datum Corrections.-- Levels were run from the control house to the flume floor within the diversion tunnel on Nov. 10, 2011. At this time the tape length was determined to be 0.05 ft. too short. A datum correction of +0.05 ft was run for the entire water year 2012 record. The tape length has not been corrected yet.

Rating.-- The control is a standard 6-ft. concrete Parshall flume. Rating No. 1 (LOSODVCO01), a standard 6-ft. Parshall flume rating above a gage height of 0.15 ft, was used the entire water year. The flows below a gage height of 0.15 ft. are assumed to be 0. This is caused by either the intake to the stilling well being 0.15 ft. above the floor of the flume or the stilling well does not provide sufficient depth. No measurements were made this water year because the flume is located underground. The instantaneous peak flow of 33.9 cfs occurred at 2130 on Mar. 31, 2012 at a gage height of 1.24 ft, with a shift of 0.00 ft.

Discharge.-- The Parshall flume is located underground and for safety reasons, no measurements have been made at this gage. The rating was directly applied to the gage height record to compute discharge.

Special Computations.-- No special computations in water year 2012..

Remarks.-- Record is rated as fair for the entire period of record. A fair rating was given due to the fact that measurements have never taken place due to the inaccessibility of the flume. The instantaneous peak flow is rated fair. Station maintained and record developed by Brian Leavesley.

Recommendations.-- Adjustment of the tape length per the levels run on Nov. 10, 2011 should take place and the rating adjusted to reflect this. Also, a theoretical rating based on levels run on the flume should be tested.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

LITTLE OSO DIVERSION NEAR CHROMO

RATING TABLE-- LOSODVCO01 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

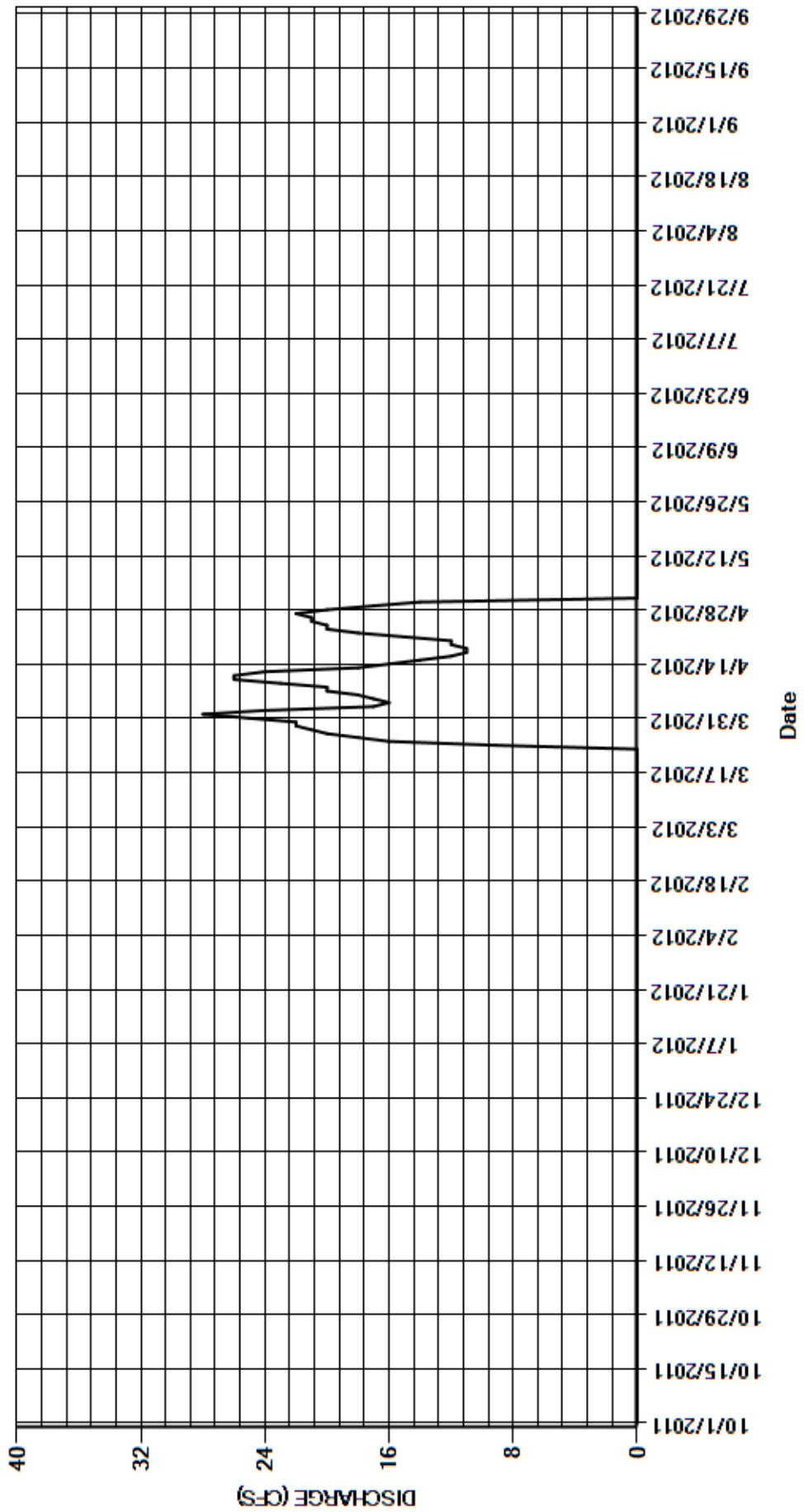
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	28	e0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	24	e0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	17	e0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	16	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	17	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	18	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	20	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	20	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	23	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	26	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	26	0.00	0.00	0.00	0.00	0.00
12	e0.00	0.00	0.00	0.00	0.00	0.00	24	0.00	0.00	0.00	0.00	0.00
13	e0.00	0.00	0.00	0.00	0.00	0.00	18	0.00	0.00	0.00	0.00	0.00
14	e0.00	0.00	0.00	0.00	0.00	0.00	16	0.00	0.00	0.00	0.00	0.00
15	e0.00	0.00	0.00	0.00	0.00	0.00	14	0.00	0.00	0.00	0.00	0.00
16	e0.00	0.00	0.00	0.00	0.00	0.00	12	0.00	0.00	0.00	0.00	0.00
17	e0.00	0.00	0.00	0.00	0.00	0.00	11	0.00	0.00	0.00	0.00	0.00
18	e0.00	0.00	0.00	0.00	0.00	0.00	11	0.00	0.00	0.00	0.00	0.00
19	e0.00	0.00	0.00	0.00	0.00	0.00	12	0.00	0.00	0.00	0.00	0.00
20	e0.00	0.00	0.00	0.00	0.00	0.00	12	0.00	0.00	0.00	0.00	0.00
21	e0.00	0.00	0.00	0.00	0.00	0.00	15	0.00	0.00	0.00	0.00	0.00
22	e0.00	0.00	0.00	0.00	0.00	0.00	18	0.00	0.00	0.00	0.00	0.00
23	e0.00	0.00	0.00	0.00	0.00	0.00	20	0.00	0.00	0.00	0.00	0.00
24	e0.00	0.00	0.00	0.00	0.00	9.1	20	0.00	0.00	0.00	0.00	0.00
25	e0.00	0.00	0.00	0.00	0.00	16	21	0.00	0.00	0.00	0.00	0.00
26	e0.00	0.00	0.00	0.00	0.00	18	21	0.00	0.00	0.00	0.00	0.00
27	e0.00	0.00	0.00	0.00	0.00	20	22	0.00	0.00	0.00	0.00	0.00
28	e0.00	0.00	0.00	0.00	0.00	21	20	0.00	0.00	0.00	0.00	0.00
29	e0.00	0.00	0.00	0.00	0.00	22	17	0.00	0.00	0.00	0.00	0.00
30	e0.00	0.00	0.00	0.00	---	22	14	0.00	0.00	0.00	0.00	0.00
31	e0.00	---	0.00	0.00	---	25	---	0.00	---	0.00	0.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	153.10	553	0.00	0.00	0.00	0.00	0.00
MEAN	0.000	0.000	0.000	0.000	0.000	4.94	18.4	0.000	0.000	0.000	0.000	0.000
AC-FT	0	0	0	0	0	304	1100	0	0	0	0	0
MAX	0.00	0.00	0.00	0.00	0.00	25	28	0.00	0.00	0.00	0.00	0.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	11	0.00	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	691.18	MEAN	1.89	MAX	31	MIN	0.00	AC-FT	1370
WTR YR	2012	TOTAL	706.10	MEAN	1.93	MAX	28	MIN	0.00	AC-FT	1400

MAX DISCH: 33.9 CFS AT 21:30 ON MAR 31,2012 GH 1.24 FT SHIFT 0 FT
 MAX GH: 1.24 FT AT 21:30 ON MAR 31,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

LITTLE OSO DIVERSION NEAR CHROMO
 WY2012 HYDROGRAPH



SAN JUAN RIVER BASIN
LITTLE NAVAJO RIVER BELOW LITTLE OSO DIVERSION DAM
Water Year 2012

Location.-- Lat. 37°04'37.8", Long. 106°48'41.3", in SW¼SE¼ sec. 23, T.33 N., R.1 E., NMPM, Archuleta County (Chromo, CO quad., scale 1:24,000, 1968), Hydrologic Unit 14080101. On right bank downstream from Little Oso Diversion Dam.

Drainage Area and Period of Record.-- 13.4 mi². ; Record published by USGS May 26, 1971 to September 30, 1996. Published by Colorado Division of Water Resources December 5, 1996 to current year.

Equipment.-- Graphic water stage-recorder and Sutron Satlink 2 DCP connected to a Sutron stage-discharge recorder (SDR) on separate floats in a wooden shelter and concrete well. The primary reference gage is a drop tape in the gage with an outside staff gage used for supplemental purposes. Control is a steel 5-foot Parshall flume set in concrete. Painting was completed this year on the siding installed on the gage house in the previous water year. No other changes this water year.

Hydrologic Conditions.-- The channel is straight for approximately 80-ft up and downstream of the control. The gage is located approximately 200-ft downstream of the Little Oso Diversion Dam. A large CMP culvert is located approximately 50-ft downstream of the gage. Snow, ice, trash and debris can collect in front of the CMP culvert and submerge the flume. The channel consists of small cobbles and sand.

Gage-Height Record.-- The primary record is 15-minute shaft encoder data downloaded from satellite telemetry with DCP and SDR downloaded data as backup. Chart record exists for additional backup purposes. The gage was visited on 20 separate occasions this water year to verify the instruments remained calibrated to the primary reference gage. The SDR unit was adjusted 3 times throughout the water year. Only one correction was applied in the record on Oct. 17, 2011 (+0.01 ft). Record is complete and reliable except for the following days when ice on the control affected the stage-discharge relationship. Ice on the control: Dec. 5-14, 24-31, 2011; Jan. 1-17, 21-22, 2012. The well heater also was not working which caused the well to freeze resulting in no gage height record on: Jan. 18-20, 23-31, Feb. 1-5, 2012.

Datum Corrections.-- No levels were run this year. Levels have never been run at this gage.

Rating.-- The control is a 5-foot Parshall flume installed in October 1996 to supplement an inverted Cipolletti weir at the Bureau's diversion structure. Sand/siltbars above the flume cause some shifting. Rating No. 1, a standard 5 foot Parshall flume rating, was used for the entire period of record. Fifteen measurements (Nos. 221-235) were made during the current water year ranging in discharge from 0.88 cfs to 18.3 cfs. The measurements cover the entire range-in-stage experienced except for the lower average daily flows of Sep. 3-7, 10, 22, 23, 2012 and higher average daily flows of May 4-5, 8, 12, 2012. The instantaneous peak flow of 28.9 cfs occurred at 1900 on May 8, 2012 at a gage height of 1.29 ft with a shift of -0.03 ft. It exceeded measurement No. 228, made May 1, 2012, by 0.32 ft in stage.

Discharge.-- Shifting control method was used during the entire water year. Shifting is mainly caused by erosion and deposition of sand and silts on the approach section above the flume. The USBR periodically opens the gate to the diversion stilling basin above the station and releases a large amount of silt and gravel upstream of the flume. Shifts were applied as defined by measurements. They were distributed by time with consideration of stage and storm events. Changes in shift were distributed across flow events such as rainfall and reservoir operations at the diversion. Measurements show shifts varying from -0.02 to -0.08 feet. Shifts were applied directly and given full weight except Measurement Nos. 222, 225, 232, 233, and 234, which were discounted from -9 % to +6% to smooth shift distribution. Measurement no. 224 was made during a period of ice affect on the control. Its shift was not applied and it is rated as poor.

Special Computations.-- Discharge for periods of ice-affected record was estimated on the basis of good record before and after ice, temperature records from the Navajo River at Banded Peak Ranch gaging station (NAVBANCO), precipitation record from Rio Blanco below Blanco Diversion gaging station (RIOBLACO), and partial days of good record.

Remarks.-- Record is rated fair due to the varying shifts measured, except for those periods of ice affected record, which are estimated and considered poor. The instantaneous peak discharge is rated fair. Station maintained by Brian Leavesley and Sherry Schutz and record developed by Brian Leavesley.

Recommendations.-- Benchmarks should be established and levels should be run at the gage. The levelness of the flume should be checked as well.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

LITTLE NAVAJO RIVER BELOW LITTLE OSO DIVERSION DAM

RATING TABLE.-- LITOSOCO01 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

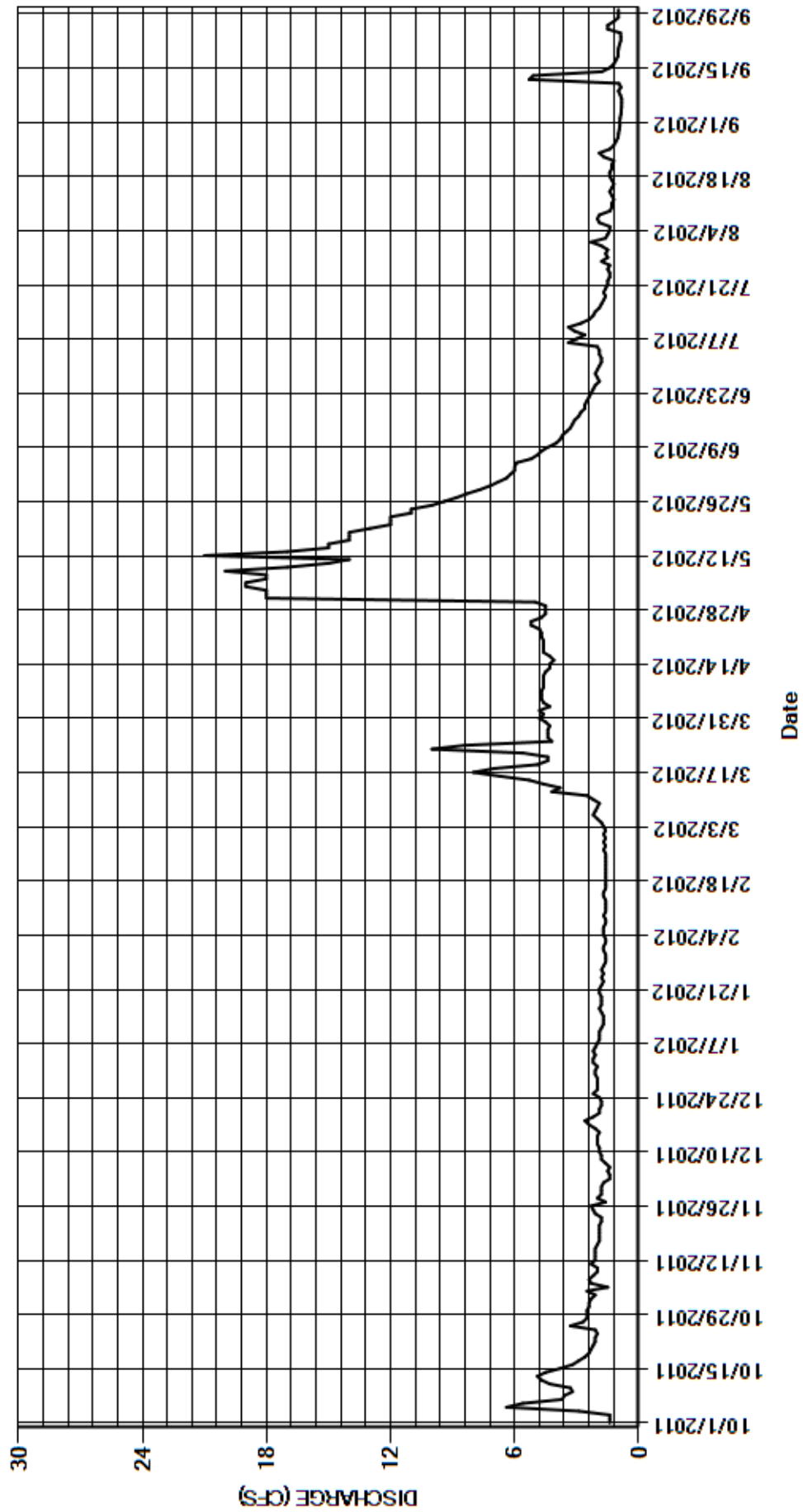
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.4	2.4	1.8	e2.0	e1.7	1.7	4.6	18	6.4	1.8	2.3	0.92
2	1.4	2.3	1.7	e2.2	e1.6	1.6	4.8	18	6.2	1.8	1.6	0.90
3	1.4	2.1	1.4	e2.2	e1.6	1.7	4.3	18	6.0	1.9	1.5	0.86
4	2.9	2.5	1.4	e2.1	e1.7	1.8	4.6	19	6.0	1.9	1.4	0.84
5	6.4	1.5	e1.5	e2.2	e1.7	2.0	4.7	19	5.9	2.0	1.4	0.83
6	5.6	2.3	e1.4	e2.1	1.7	2.2	4.7	18	5.2	3.4	1.9	0.82
7	3.7	2.4	e1.6	e2.0	1.6	2.1	4.7	18	4.9	3.0	2.0	0.82
8	3.6	2.2	e1.8	e1.9	1.6	2.0	4.6	20	4.7	2.6	1.9	0.89
9	3.2	2.0	e1.8	e1.9	1.7	1.9	4.6	17	4.4	3.1	1.4	0.98
10	3.3	2.0	e1.9	e1.9	1.6	2.2	4.6	15	4.0	3.4	1.3	0.86
11	4.3	2.3	e1.9	e1.8	1.6	2.5	4.6	14	3.8	2.8	1.3	0.96
12	4.7	2.1	e2.0	e1.7	1.6	4.2	4.5	21	3.7	2.4	1.2	5.3
13	4.9	2.1	e2.0	e1.7	1.6	3.8	4.3	17	3.5	2.2	1.3	5.1
14	4.5	2.1	e2.0	e1.7	1.7	4.6	4.3	15	3.3	2.1	1.4	1.8
15	3.8	2.1	1.9	e1.8	1.7	5.3	4.1	15	3.2	1.9	1.3	1.4
16	3.2	2.0	2.1	e1.9	1.6	6.7	4.3	14	3.1	1.8	1.2	1.2
17	2.9	1.9	2.4	e1.8	1.6	8.0	4.6	14	2.9	1.7	1.3	1.1
18	2.6	1.9	2.6	e1.8	1.6	7.0	4.6	14	2.8	1.6	1.4	1.0
19	2.4	1.9	2.2	e1.8	1.6	4.9	4.6	13	2.6	1.7	1.4	1.0
20	2.3	1.9	1.9	e1.9	1.6	4.4	4.6	12	2.6	1.6	1.3	0.98
21	2.2	1.9	1.9	e1.9	1.6	4.4	4.7	12	2.5	1.5	1.3	0.93
22	2.1	1.8	1.8	e1.8	1.6	5.6	4.7	12	2.4	1.5	1.2	0.87
23	2.1	1.8	1.8	e1.7	1.6	10	4.8	11	2.3	1.4	1.7	0.87
24	2.0	2.1	e1.9	e1.8	1.6	8.4	5.2	11	2.2	1.4	1.9	0.88
25	2.1	2.2	e2.2	e1.7	1.6	4.2	5.2	10	2.1	1.5	1.4	1.5
26	3.3	2.3	e2.0	e1.8	1.7	4.4	4.7	9.4	1.9	1.4	1.2	1.5
27	2.7	1.6	e2.0	e1.7	1.6	4.4	4.5	8.8	2.0	1.8	1.1	1.2
28	2.5	2.0	e2.0	e1.6	1.7	4.4	4.5	8.3	2.1	1.5	1.0	0.98
29	2.5	1.8	e2.0	e1.6	1.6	4.3	4.5	7.7	2.0	1.6	0.98	0.98
30	2.5	1.8	e2.1	e1.6	---	4.5	5.0	7.2	1.9	1.5	0.94	0.98
31	2.4	---	e2.1	e1.7	---	4.8	---	6.8	---	1.8	0.91	---
TOTAL	94.9	61.3	59.1	57.3	47.3	130.0	138.5	433.2	106.6	61.6	43.43	39.25
MEAN	3.06	2.04	1.91	1.85	1.63	4.19	4.62	14.0	3.55	1.99	1.40	1.31
AC-FT	188	122	117	114	94	258	275	859	211	122	86	78
MAX	6.4	2.5	2.6	2.2	1.7	10	5.2	21	6.4	3.4	2.3	5.3
MIN	1.4	1.5	1.4	1.6	1.6	1.6	4.1	6.8	1.9	1.4	0.91	0.82

CAL YR	2011	TOTAL	2265.55	MEAN	6.21	MAX	39	MIN	0.65	AC-FT	4490
WTR YR	2012	TOTAL	1272.48	MEAN	3.48	MAX	21	MIN	0.82	AC-FT	2520

MAX DISCH: 28.9 CFS AT 19:00 ON MAY 08,2012 GH 1.29 FT SHIFT -0.03 FT
 MAX GH: 1.29 FT AT 19:00 ON MAY 08,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

LITTLE NAVAJO RIVER BELOW LITTLE OSO DIVERSION DAM
WY2012 HYDROGRAPH



SAN JUAN RIVER BASIN
AZOTEA TUNNEL OUTLET NEAR CHAMA, NM
Water Year 2012

Location.-- Lat. 36° 51' 02.2" N; Long 106° 40' 18.4" W; By road, the station is 8.2 mi west of Chama, NM. Gage is located on the left side of diversion tunnel outlet.

Drainage Area and Period of Record.-- Drainage area is combined areas above diversion dams on the Rio Blanco (69.1 sq mi), Little Navajo River (13.4 sq mi), and Navajo River (100.5 sq mi). Total combined drainage area is 183 sq mi.; Historical record maintained from October 1, 1970 to September 30, 2008 by USGS. October 1, 2008 to present by Colorado Division of Water Resources.

Equipment.-- A Sutron SatLink 2 high data rate DCP is connected to a stage-discharge recorder (SDR). The equipment is located in a concrete control house maintained by the U.S. Bureau of Reclamation (Bureau) to house the telemetry for measurement of the outlet tunnel for the San Juan-Chama Project. The Bureau utilizes a Stevens chart recorder with an attached signal converter to determine water stage within measurement flume. The primary reference gage is an electric drop tape inside the gage house. Control is a 10 ft -concrete Parshall flume. No changes this water year.

Hydrologic Conditions.-- The Azotea Tunnel Outlet is the outfall of the San Juan-Chama Project's trans-mountain diversions of flows from Rio Blanco, Little Navajo River, and Navajo River in the San Juan River Drainage Basin of Colorado to the Rio Grande River Drainage Basin in New Mexico. The tunnel daylight to a 10-ft concrete Parshall flume and canal system. Downstream of the outlet the channel is composed of large riprap and boulders.

Gage-Height Record.-- The primary record is 15-minute SDR data downloaded from satellite telemetry with SDR downloaded and paper chart data used for backup purposes. Diversions through this gage are typically not made during winter months and not affected by ice. The gage house is not heated and the stilling well will freeze, however the floats typically free upon start of diversion in the spring. The gage was visited on 11 separate occasions this water year to verify the instruments remained calibrated to the primary reference gage. The SDR was adjusted on 4 separate occasions: -0.01 ft on Apr. 19, +0.01 ft on Jun. 18, -0.01 ft on Jul. 10 (which was not applied in the record due to matching gage height readings by USBR before and after the adjustment), and -0.02 ft on Sep. 6, 2012. (NOTE: a +0.02 ft correction was made on Mar. 7, 2013 when diversions commenced). The corrections were prorated and distributed by time to the last known matching reading (typically the last station visit by either DWR or USBR personnel). The record is complete and reliable, except for the following days when the SDR float was stuck in ice: Dec. 3-5, 2011, Mar. 8-11, 2012 and when the float weight got hung up on the floor of the gage shelter: Jul. 1-6, 21, 22, 24, 25, 2012 and when the stilling well was cleaned: Aug. 21, 2012.

Datum Corrections.-- Levels were run on Sep. 6, 2012 for the first time. BM 1 was established as a brass cap at the headwall of the Azotea Tunnel, approximately 150 ft. upstream of the tunnel mouth. BM 1 is stamped with the elevation 7532.30 (gage datum = 12.417 ft). BM 2 was established as the flume floor at the staff gage in the tunnel flume. BM 2 was used as the base. The electric tape length was found to be 0.024 ft too long. There were no corrections made in the field.

Rating.-- The control is a 10 ft concrete Parshall flume. The rating (AZOTUNNM02) is a nonstandard Parshall flume rating, developed Nov. 30, 2011. The rating was developed based on 1 year of measurements (water year 2011). The rating was used for the entire period of record in water year 2012. Six (6) measurements (No. 9-14) were made during the water year ranging in discharge from 30.3 cfs to 195 cfs. They covered the range in stage experienced except for the higher average daily flows of: Mar. 24-31, Apr. 1-15, 21-30, May 1, 3-27, Jun. 1-2, 2012. There was an observation of zero flow on Dec. 21, 2011. The peak flow of 638 cfs occurred at 0100 on Apr. 27, 2012, at a gage height of 5.55 ft and 0.00 ft shift. It exceeded the stage of measurement No. 12, made Jun. 1, 2012 by 2.84 feet in stage.

Discharge.-- Shifting control method was used for the entire water year. Shifts were applied as defined by measurements and were distributed by stage. The variable shift curve AZOTUNNM12A was used for the entire period of record. The variable shift curve is a 0.00 ft shift at a gage height of 0.11 ft and above. Flows below a gage height of 0.11 ft were assumed to be negligible and reduced to 0. Open-water measurements showed unadjusted shifts varying between -0.03 ft and +0.01 ft. Shifts were applied directly and given full weight except measurement Nos. 9, 10, 11, 12, 13 and 14 which were discounted from -3% to 7% back to the rating.

Special Computations.-- The SDR float appeared to hang up around a gage height of around 0.13 ft from July 1 to July 25. Chart data was used to identify that the gage height actually dropped below 0.13 ft and the days were estimated and called 'a'-days. The end of diversion in Dec. and beginning of diversion in Mar. were also periods that were estimated in record due to the SDR float not following the water level at low gage heights. A visual estimate of 10-15 gallons per minute was made at a station visit on Sep. 6, 2012. The gage height was 0.06 ft (corrected to 0.04 ft); as a result, for record purposes, a gage height of 0.10 ft was chosen to be the cutoff for measureable flow at the tunnel outlet. Discharge during ice-affected periods was estimated by considering baseflow discharge on either side of affected record period and smoothing the record between. Temperature and discharge data from Navajo River at Banded Peak Ranch (NAVBANCO), located 6 miles upstream was the primary means of estimating discharge variation around the baseflow during ice-affected days.

Remarks.-- The record should be considered good except for the period when the floats were frozen in the well which were estimated and should be considered poor. The record should be considered fair for all other estimated days. Station maintained by USBR and CDWR, record developed by Brian Leavesley.

Recommendations.-- Continued discharge measurement to confirm and refine developed rating curve.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

AZOTEA TUNNEL OUTLET NEAR CHAMA, NM

RATING TABLE-- AZOTUNNM02 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

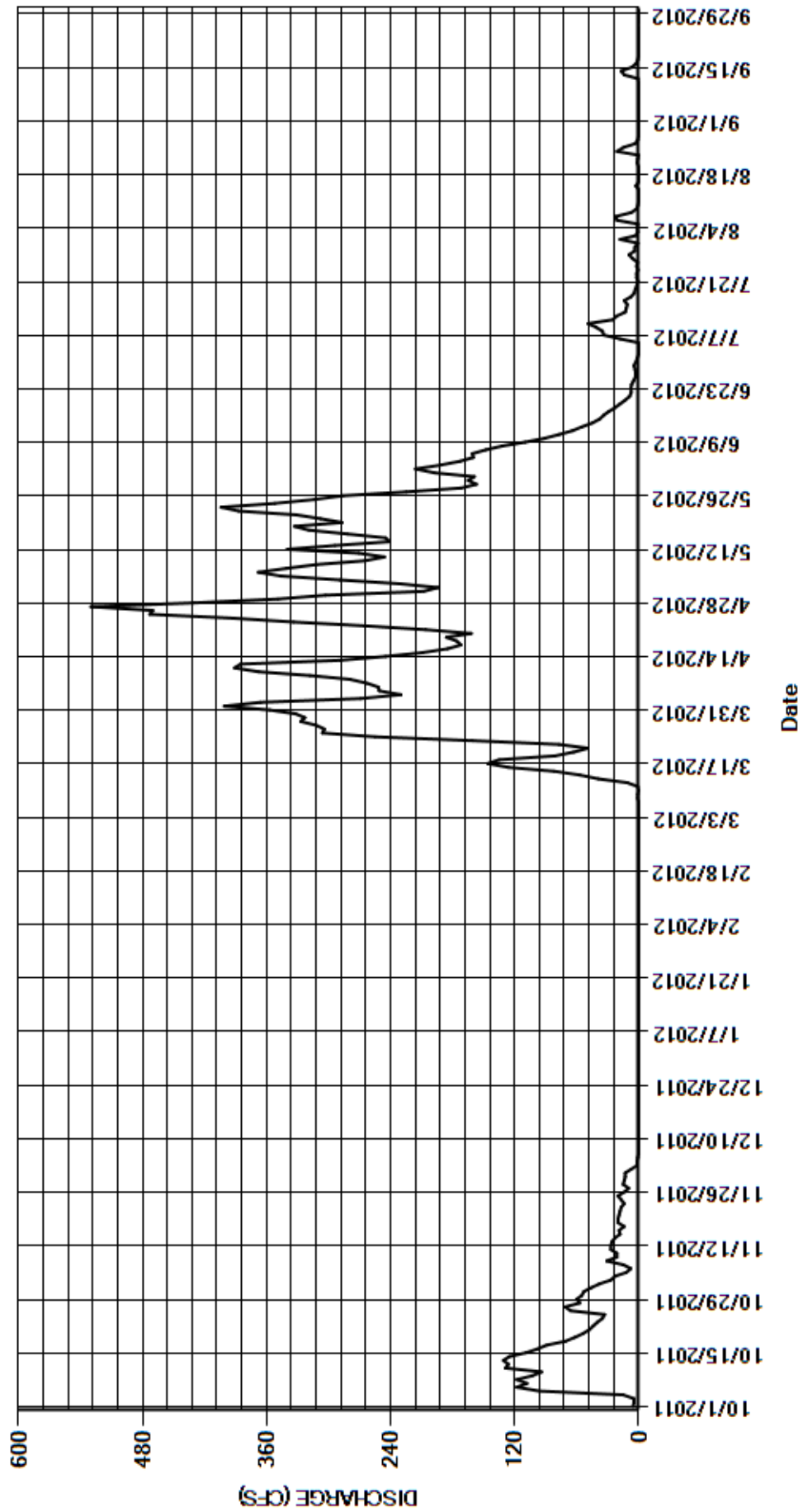
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.6	46	13	e0.00	e0.00	e0.00	401	208	198	e1.3	18	0.00
2	4.5	38	7.1	e0.00	e0.00	e0.00	366	194	216	e0.00	2.8	0.00
3	4.5	27	e1.4	e0.00	e0.00	e0.00	269	231	192	e0.00	0.85	0.00
4	15	23	e1.6	e0.00	e0.00	e0.00	230	289	173	e0.00	1.5	0.00
5	96	12	e0.86	e0.00	e0.00	e0.00	251	346	160	e0.20	0.64	0.00
6	118	7.6	e0.00	e0.00	e0.00	e0.00	252	368	161	e18	21	0.00
7	108	15	e0.00	e0.00	e0.00	e0.00	263	341	148	34	22	0.00
8	118	31	e0.00	e0.00	e0.00	e1.0	279	312	132	35	7.2	0.00
9	103	21	e0.00	e0.00	e0.00	e0.75	318	265	110	41	2.0	0.00
10	94	21	e0.00	e0.00	e0.00	e0.00	368	246	91	49	0.57	0.00
11	129	27	e0.00	e0.00	e0.00	e0.95	391	271	77	25	0.00	0.00
12	126	27	e0.00	e0.00	e0.00	11	385	340	64	21	0.00	0.56
13	131	26	e0.00	e0.00	e0.00	39	289	294	55	13	0.00	14
14	125	23	e0.00	e0.00	e0.00	57	245	241	45	12	0.00	17
15	109	18	e0.00	e0.00	e0.00	82	209	245	38	11	2.8	6.5
16	98	19	e0.00	e0.00	e0.00	126	185	282	34	14	0.07	2.4
17	89	14	e0.00	e0.00	e0.00	146	172	319	29	7.4	0.11	0.69
18	71	20	e0.00	e0.00	e0.00	135	176	333	23	4.2	0.24	0.00
19	62	20	e0.00	e0.00	e0.00	81	186	287	18	3.3	0.03	0.00
20	54	19	e0.00	e0.00	e0.00	63	162	308	13	1.8	0.00	0.00
21	48	18	e0.00	e0.00	e0.00	49	206	331	8.7	e0.70	e1.5	0.00
22	44	17	e0.00	e0.00	e0.00	77	265	387	7.2	e2.0	0.85	0.00
23	40	14	e0.00	e0.00	e0.00	161	334	404	7.4	2.1	0.00	0.00
24	35	17	e0.00	e0.00	e0.00	255	392	352	7.0	e0.77	21	0.00
25	33	20	e0.00	e0.00	e0.00	306	473	314	5.1	e2.0	15	0.00
26	66	14	e0.00	e0.00	e0.00	304	470	286	3.2	1.1	3.6	0.28
27	71	9.7	e0.00	e0.00	e0.00	312	530	225	2.9	6.0	0.83	0.00
28	57	15	e0.00	e0.00	e0.00	327	430	172	3.5	9.4	0.04	0.00
29	60	14	e0.00	e0.00	e0.00	323	349	157	4.6	3.7	0.00	0.00
30	55	13	e0.00	e0.00	---	332	303	165	2.6	3.7	0.00	0.00
31	53	---	e0.00	e0.00	---	357	---	159	---	0.77	0.00	---
TOTAL	2222.6	606.3	23.96	0.00	0.00	3545.70	9149	8672	2029.2	323.44	122.63	41.43
MEAN	71.7	20.2	0.77	0.000	0.000	114	305	280	67.6	10.4	3.96	1.38
AC-FT	4410	1200	48	0	0	7030	18150	17200	4020	642	243	82
MAX	131	46	13	0.00	0.00	357	530	404	216	49	22	17
MIN	4.5	7.6	0.00	0.00	0.00	0.00	162	157	2.6	0.00	0.00	0.00

CAL YR	2011	TOTAL	48190.74	MEAN	132	MAX	963	MIN	0.00	AC-FT	95590
WTR YR	2012	TOTAL	26736.26	MEAN	73.0	MAX	530	MIN	0.00	AC-FT	53030

MAX DISCH: 638 CFS AT 01:00 ON APR 27,2012 GH 5.55 FT SHIFT 0 FT
 MAX GH: 5.55 FT AT 01:00 ON APR 27,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

**AZOTEA TUNNEL OUTLET NEAR CHAMA, NM
WY2012 HYDROGRAPH**



SAN JUAN RIVER BASIN

09362750 FLORIDA RIVER ABOVE LEMON RESERVOIR NEAR DURANGO

Water Year 2012

Location.-- Lat. 37°25'36", Long. 107°40'28", in NW¼SE¼ sec. 31, T.37 N., R.7 W., NMPM, La Plata County, Hydrologic Unit 1408104, on the left bank 1.7 miles upstream of Miller Creek and 0.1 miles upstream of Willow Creek.

Drainage Area and Period of Record.-- 50.9 mi².; July 1, 1972 to present.

Equipment.-- Graphic water stage-recorder and a Sutron Satlink 2 DCP with a shaft encoder on a separate float located in a 72-inch by 72-inch exposed aggregate concrete shelter and a 42-inch corrugated metal pipe well. The floats are located inside of a 14-inch PVC oil cylinder. A Sutron Constant Flow Bubbler (CFB) is a secondary sensor that is used to help maintain good record when the intakes are plugged and winter periods when ice forms under the oil within the oil cylinder. The station is also equipped with a Sutron air-temperature sensor. The primary reference gage is an electric drop tape with a separate steel drop tape used when the well is frozen around the oil cylinder. No other changes this water year.

Hydrologic Conditions.-- Small boulders and cobble line the channel above and below the concrete ramp flume. The concrete ramp flume creates a large stilling pool above the control. Lemon Reservoir is below the gage but does not create backwater effect as the gage is well above the pool elevation in the reservoir.

Gage-Height Record.-- The primary record is 15-minute shaft encoder data downloaded from satellite telemetry with DCP log, CFB log, and chart record used for backup purposes. The gage was visited on 16 separate occasions this water year to verify the instruments remained calibrated to the primary reference gage. The shaft encoder was adjusted one time this water year. The adjustment made was +0.01 on May 22, 2012. The record is complete and reliable except for the days when ice on the control affected the stage-discharge relationship: Dec. 7-10, 15, 2011; Jan. 13-16, 18, 19, 24; Feb. 7-9, 21, 24, 28; Mar. 1-3, 20, 21, 2012.

Datum Corrections.-- Levels were run on Sep. 1, 2011 to the electric tape (ETI) and drop tape (RP) reference, using BM2 as the base. Bench mark #2 (BM2) is a square chiseled into a large boulder located 3.5 ft. south of the bank operated cableway. Bench mark #3 (BM3) was found to be -0.001 ft. low. Bench mark #4 (BM4) was found to be 0.003 ft. high. Bench mark #5 (BM5) was found to be -0.005 ft. low. The electric tape index was found to be reading correct (0.000). The drop tape index was found to be reading -0.002 ft. low. No changes were made to the ETI or RP index as they were found to be reading within acceptable error tolerances. The electric tape length and drop tape length were found to be reading 0.030 ft. long. No changes were made at the time of levels. The electric and drop tape length was also found to be 0.030 ft. long on July 31, 2008. The electric tape and drop tape were adjusted by 0.030 ft. on Nov. 15, 2011. The 0.030 ft. tape correction was applied from Oct. 1, 2010 to Nov. 15, 2011.

Rating.-- On April 2, 2002 a long throated flume, also known as a ramp flume was activated to act as the control section for the gage. The ramp flume is located about 75 feet below the inlets to the old gage and 5 feet below the new gage. Rating No. 7, in use since April 4, 2006, was continued in use for the duration of water year 2012. It is fairly well defined from 4.50 to 999 cfs. Fifteen measurements (Nos. 655-669) were made during the water year. They range in discharge from 8.89 cfs to 285 cfs. They cover the range in stage experienced except for the lower average daily flows of Jan. 18-21, 27, 28; Feb. 1-29; Mar. 1-3; Sep. 20-24, 2012 and the higher average daily flows of Apr. 24-26; May 4-7, 2012. The peak instantaneous flow of 462 cfs occurred at 2030 on May 05, 2012 at a gage height of 3.06 ft with a shift of +0.05 ft. It exceeded the stage of measurement No. 662 by 0.40 feet in stage.

Discharge.-- Shifting control method was used during the entire water year. Shifting is caused mainly by aquatic growth on the ramp flume and the fill and scour of sand and gravel above the concrete ramp flume. Shifts were applied as defined by measurements and were distributed by time and stage. Shifts were distributed by time from the beginning of the water year until 1045 on Apr. 17, 2012. Shifts were distributed by stage using variable shift curve FLOALECOVS12A from 1100 on Apr. 17, 2012 until the end of the water year. Shifts were applied directly and given full weight except for measurement Nos. 656, 659-665, 668 and 669 which were discounted from -7% to 6% to smooth shift distribution.

Special Computations.-- Discharge for periods of ice affect were estimated on the basis of partial day record, interim good record, and temperature data obtained from a temperature sensor at the gage house. No measurements were made during the ice affected period.

Remarks.-- Record good, except for estimated daily discharges during ice affect, which are poor. The instantaneous peak flow should be considered good. Station maintained and record developed by Brian Boughton.

Recommendations.-- No recommendations this water year.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09362750 FLORIDA RIVER ABOVE LEMON RESERVOIR NEAR DURANGO

RATING TABLE-- FLOALECO07 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

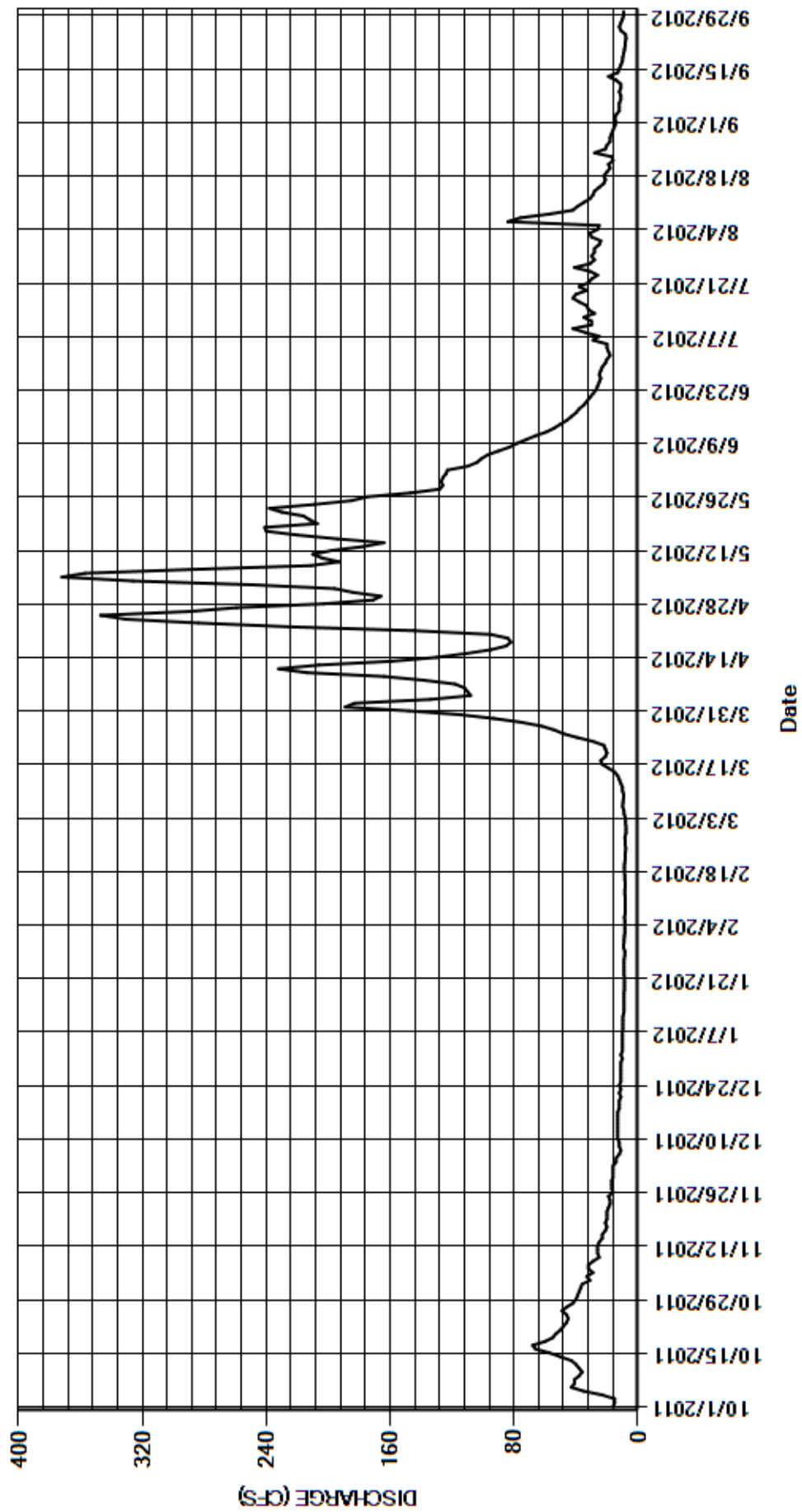
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16	37	16	11	8.8	e7.8	189	184	124	20	24	14
2	15	36	16	10	8.4	e8.1	183	196	123	18	30	15
3	15	31	16	10	8.4	e8.0	134	249	110	19	31	14
4	23	33	14	10	8.4	8.9	108	326	104	20	26	12
5	35	29	14	10	8.4	9.1	110	372	101	20	25	12
6	43	32	12	10	8.7	9.9	112	357	97	29	84	12
7	41	32	e11	10	e8.2	9.6	118	288	90	25	76	11
8	41	29	e12	9.7	e8.2	9.4	138	211	83	34	57	11
9	38	25	e12	9.7	e8.2	9.1	164	193	78	42	42	12
10	36	26	e13	9.7	8.2	9.9	214	204	72	30	39	11
11	38	26	13	9.7	8.2	10	232	210	66	30	35	11
12	40	26	13	9.1	8.4	11	206	197	59	35	31	14
13	43	25	13	e9.0	8.4	12	159	177	54	28	29	19
14	50	23	13	e9.0	8.3	13	130	164	50	32	28	13
15	57	23	e13	e9.0	8.2	15	111	194	46	33	25	12
16	66	21	13	e9.0	8.5	19	95	220	43	38	22	11
17	68	20	13	9.0	8.5	23	85	240	40	42	21	10
18	60	21	12	e8.8	8.7	24	82	241	38	40	22	9.8
19	55	20	12	e8.7	8.8	21	84	207	35	33	20	9.2
20	53	20	12	8.7	8.6	e20	95	212	33	38	18	8.7
21	50	20	11	8.7	e8.3	e21	145	216	31	32	19	8.3
22	48	19	12	8.9	8.3	22	225	230	29	30	16	8.1
23	46	18	11	8.9	8.1	29	284	238	27	26	17	7.7
24	45	18	12	e8.9	e7.8	39	331	209	26	31	28	8.0
25	46	19	11	8.9	8.2	48	347	185	25	41	21	11
26	49	16	11	8.9	8.3	54	289	175	24	31	20	12
27	46	17	11	8.5	8.4	62	259	147	25	28	18	11
28	42	17	11	8.4	e7.7	75	203	128	24	30	18	10
29	40	17	11	9.2	7.7	93	171	126	23	28	17	9.2
30	39	16	11	9.1	---	115	166	127	21	28	16	9.2
31	38	---	10	8.9	---	148	---	126	---	25	15	---
TOTAL	1322	712	385	287.4	241.3	963.8	5169	6549	1701	936	890	336.2
MEAN	42.6	23.7	12.4	9.27	8.32	31.1	172	211	56.7	30.2	28.7	11.2
AC-FT	2620	1410	764	570	479	1910	10250	12990	3370	1860	1770	667
MAX	68	37	16	11	8.8	148	347	372	124	42	84	19
MIN	15	16	10	8.4	7.7	7.8	82	126	21	18	15	7.7

CAL YR	2011	TOTAL	25835.1	MEAN	70.8	MAX	796	MIN	7.8	AC-FT	51240
WTR YR	2012	TOTAL	19492.7	MEAN	53.3	MAX	372	MIN	7.7	AC-FT	38660

MAX DISCH: 462 CFS AT 20:30 ON MAY 05,2012 GH 3.06 FT SHIFT 0.05 FT
 MAX GH: 3.06 FT AT 20:30 ON MAY 05,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09362750 FLORIDA RIVER ABOVE LEMON RESERVOIR NEAR DURANGO
 WY2012 HYDROGRAPH



SAN JUAN RIVER BASIN
FLORIDA RIVER BELOW LEMON RESERVOIR
Water Year 2012

Location.-- Lat. 37°22'50", Long. 107°39'43", in NE¼NW¼ sec. 20, T.36 N., R.7 W., NMPM, La Plata County, Hydrologic Unit 1408104, on the right bank next to the emergency spillway at the toe of the dam.

Drainage Area and Period of Record.-- 69.1 mi².; Published by the USGS (sta. no. 09362900) Oct. 1, 1955 to Sept. 30, 1963. Published streamflow record Colorado Division of Water Resources July 1, 1972 to present.

Equipment.-- Graphic water stage-recorder and a Sutron Satlink 2 DCP with a shaft encoder on a separate float in a 42 inch corrugated metal shelter and well. The primary reference gage is a steel drop tape referenced to a nonadjustable flat head screw set into the wooden instrument shelf. A tipping bucket rain gage (Texas Electronics, TR-525USW) was installed at the gage to measure precipitation. The gage is located within the stilling pool below the reservoir. The control is a concrete broad crested weir located approximately 200 ft. below the gage. A bank operated cableway is located approximately 400 ft. below the gage.

Hydrologic Conditions.-- The weir below Lemon Reservoir creates a large stilling pool below Lemon Reservoir dam. Flow in the channel is controlled by releases from the reservoir.

Gage-Height Record.-- The primary record is 15-minute shaft encoder data from satellite telemetry with DCP download data and graphic chart record for backup purposes. The gage was visited on 15 separate occasions this water year to verify the instruments remained calibrated to the primary reference gage. The shaft encoder was not adjusted this water year. No flush corrections were made this water year. The record is complete and reliable.

Datum Corrections.-- Levels were not run this water year. Levels were last run on Sep. 1, 2011 to the nonadjustable reference (RP), located inside the gage shelter using BM1 as the base. The drop tape reference point was found to be reading -0.002 ft. low. The drop tape reference was not adjusted as it was found to be within the allowable error tolerances. The drop tape length was reading correct and not adjusted.

Rating.-- The control is a concrete broad-crested weir located 200 ft. below the gage. Shifts occur as a result of moss growth on the weir. Rating No. 2, dated Jan. 11, 1977, was continued in use this year. It is well defined from 0.6 to 980 cfs. The point-of-zero-flow (PZF) was not measured this water year. The PZF is approximately 1.10 ft. Seventeen measurements (Nos. 532 - 548) were made during the current water year ranging in discharge from 9.49 cfs to 237 cfs. These measurements cover the range in stage experienced except for the lower average daily flow on Apr. 12, 2012 and the higher average daily flow of Jun. 1, 2012. The peak instantaneous flow of 240 cfs occurred at 1000 on May 25, 2012 at a gage height of 3.23 ft. with a shift of 0.00 ft. It exceeded the stage of measurement No. 539, made May 22, 2012 by 0.04 ft.

Discharge.-- Shifting control method was used, for the entire water year. Shifts were applied as defined by measurements and were distributed by time and stage. The variable shift curve (FLOBLECOVS11A) in place at the end of water year 2011 continues until Oct. 3, 2011 when moss was removed from the control. Shifts were distributed by time the remaining part of water year 2012. Open water measurements show unadjusted shifts varying from -0.07 ft. to +0.03 ft. Shifts were applied directly and given full weight except for Measurement Nos. 538, 539, 544 and 548 which were discounted -3% to 6% to smooth shift distribution. The shifts for measurements nos. 541, 542 and 543 were not used.

Special Computations.-- Discharge measurement nos. 541, 542 and 543 appeared to be low at the time they were made. It was unknown if the moss in the measurement cross-section had a negative impact on the discharge measurement. The stationary moving bed test did not indicate the moss had an impact. Check measurements (543, 544 and 545) were made on Jul. 27, 2012 using an ADCP and a conventional Price AA meter. All the discharge measurements were made at the same cross-section. Measurement no. 543 used the same procedure as measurements no. 541 and 542. Measurement no. 544 was a conventional measurement. Measurement no. 545 the moss was removed from the measurement cross-section. The discharge for measurement no. 544 and 545 were much higher than 543.

Remarks.-- Record and instantaneous peak flow should be considered good. Station maintained by Brian Leavesley and Brian Boughton. Record developed by Brian Boughton.

Recommendations.-- None.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

FLORIDA RIVER BELOW LEMON RESERVOIR

RATING TABLE-- FLOBLECO02 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

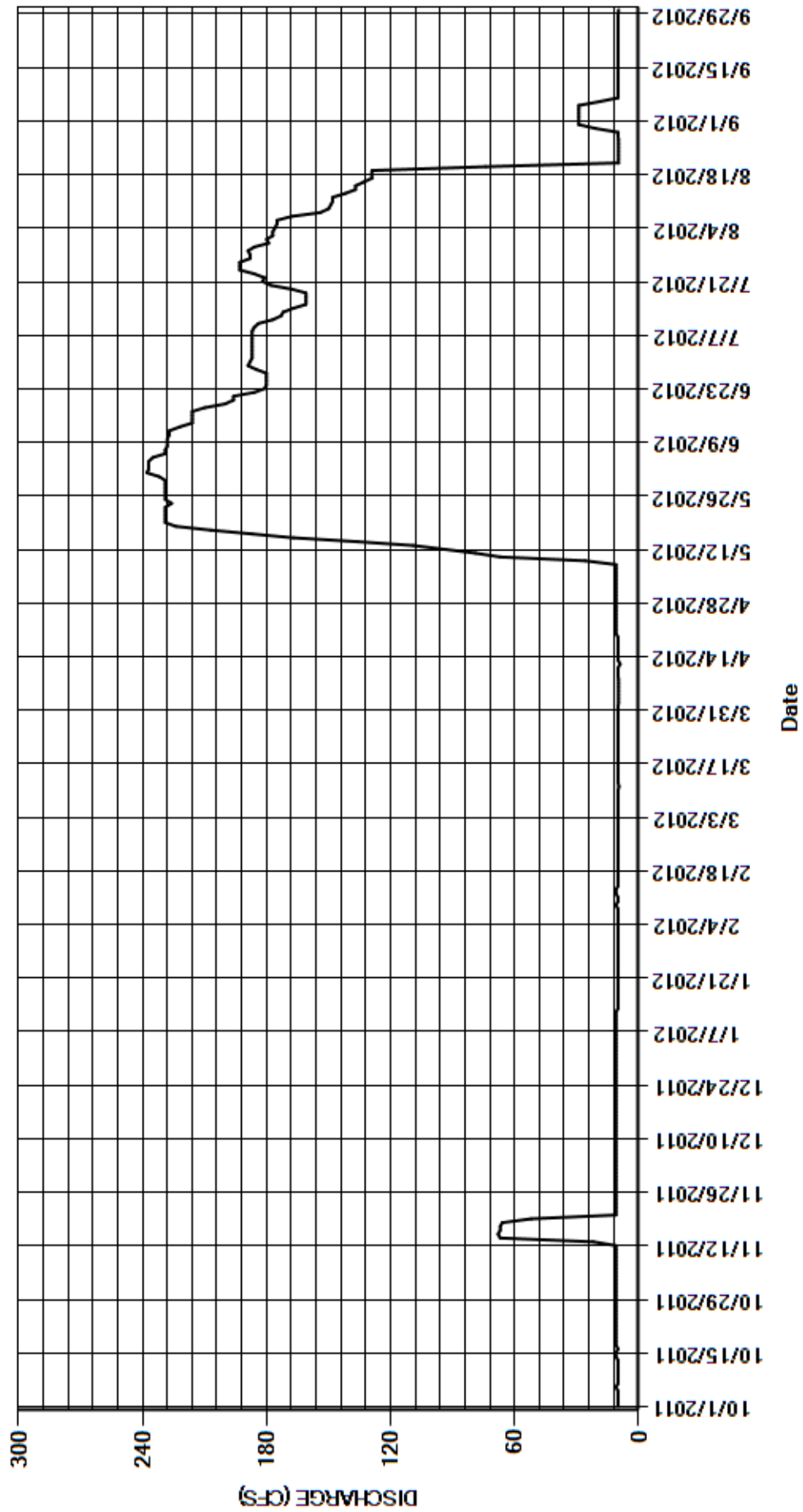
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10	11	11	11	10	10	10	11	238	187	180	29
2	10	11	11	11	10	10	9.7	11	237	187	177	29
3	10	11	11	11	10	10	9.7	11	237	187	177	29
4	10	11	11	11	10	10	9.7	11	237	187	176	29
5	10	11	11	11	10	10	9.7	11	235	187	175	29
6	11	11	11	11	10	10	9.7	11	229	187	175	19
7	10	11	11	11	10	10	9.7	11	229	187	168	10
8	10	11	11	11	10	10	9.8	11	228	187	154	10
9	10	11	11	11	11	10	10	26	228	186	150	10
10	10	11	11	11	10	10	10	67	228	184	149	10
11	10	11	11	11	10	9.6	10	79	227	177	148	10
12	10	11	11	11	11	10	9.0	94	227	173	148	10
13	10	22	11	10	11	10	10	109	222	172	142	10
14	11	67	11	10	10	10	10	136	216	167	137	10
15	11	68	11	10	10	10	10	167	216	161	137	10
16	10	67	11	10	10	10	10	187	216	161	133	10
17	11	67	11	10	10	10	10	207	216	161	129	10
18	11	66	11	10	10	9.9	10	224	210	161	129	10
19	11	52	11	10	10	10	10	229	200	168	129	10
20	11	11	11	10	10	10	11	229	196	178	74	10
21	11	11	11	10	9.9	10	11	229	196	182	9.7	10
22	11	11	11	10	10	10	11	229	186	181	9.7	10
23	11	11	11	10	10	10	11	229	181	186	9.7	10
24	11	11	11	10	10	10	11	226	180	193	9.7	10
25	11	11	11	10	10	10	11	229	180	193	9.7	10
26	11	11	11	10	10	10	11	229	180	193	9.7	10
27	11	11	11	10	10	10	11	229	180	188	9.8	10
28	11	11	11	10	10	10	11	229	185	188	10	10
29	11	11	11	10	10	10	11	229	189	189	10	9.9
30	11	11	11	10	---	10	11	229	188	186	21	9.7
31	11	---	11	10	---	10	---	232	---	179	29	---
TOTAL	328	662	341	322	292.9	309.5	308.0	4361	6317	5603	3125.0	403.6
MEAN	10.6	22.1	11.0	10.4	10.1	9.98	10.3	141	211	181	101	13.5
AC-FT	651	1310	676	639	581	614	611	8650	12530	11110	6200	801
MAX	11	68	11	11	11	10	11	232	238	193	180	29
MIN	10	11	11	10	9.9	9.6	9.0	11	180	161	9.7	9.7

CAL YR	2011	TOTAL	28426.0	MEAN	77.9	MAX	241	MIN	8.6	AC-FT	56380
WTR YR	2012	TOTAL	22373.0	MEAN	61.1	MAX	238	MIN	9.0	AC-FT	44380

MAX DISCH: 240 CFS AT 10:00 ON MAY 25,2012 GH 3.23 FT SHIFT 0 FT
 MAX GH: 3.23 FT AT 10:00 ON MAY 25,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

FLORIDA RIVER BELOW LEMON RESERVOIR
 WY2012 HYDROGRAPH



SAN JUAN RIVER BASIN
09357500 ANIMAS RIVER AT HOWARDSVILLE, CO

Water Year 2012

Location.-- Lat. 37°49'59", Long 107°35'56", (Howardsville, Colo., Quad., scale, 1:24,000), San Juan County, Hydrologic Unit 14080104, unsurveyed on right bank 1,000 ft downstream from bridge on State Highway 110, 0.4 miles southwest of Howardsville, 0.4 miles downstream from Cunningham Creek, and 1.66 miles upstream of Arrastra Creek.

Drainage Area and Period of Record.-- 55.9 mi².; USGS published record October 1935 to September 1982; Colorado Division of Water Resources published record October 1982 to present.

Equipment.-- Graphic water stage-recorder and a Sutron Satlink 2 DCP with a shaft encoder on a separate float in a 36-in x 36-in wooden shelter and well. The primary reference gage is a steel drop tape referenced to an adjustable reference point (RP). An air temperature sensor is located at the gage as well. The control is a cobble riffle located approximately 50-ft. below the gage. No changes this water year.

Hydrologic Conditions.-- Drainage area consists of forested mountains with many rocky peaks above 11,000 ft. in elevation. Cobbles and boulders line the channel above and below the gage. Avalanches above the gage can diminish the flows at the gage but the events are typically short lived.

Gage-Height Record.-- The primary record is 15-minute shaft encoder data downloaded from satellite telemetry with the DCP and chart record for backup purposes. The gage was visited on 21 separate occasions this water year to verify the instruments remained calibrated to the primary reference gage. The shaft encoder was adjusted 3 times this water year: +0.01 ft on Mar. 23, -0.01 ft on Apr. 25, and +0.01 ft on Jun. 26. The corrections were prorated and distributed by time to the last known matching reading (typically the last station visit). The record is complete and reliable, except for the following days when the stage discharge relationship was affected by ice on the control: Nov. 9, Dec. 5 - 12, 14 - 18, 21 - 28 31, 2011; Jan. 1 - 10, 12 - 15, 17 - 18, 21 - 23, 25 - 26, 28 - 31, Feb. 1, 3 - 8, 10 - 11, 15 - 22, 24 - 29, Mar. 2 - 6, 8 - 9, 12, 14, 19 - 21, 2012. It was noticed in this and previous water years that the SE wheel will ice up during cold periods in winter months causing the tape to become dislodged from the pins. When corrected, it is difficult to determine where to begin the correction, but it typically can be seen in partial days of good record.

Datum Corrections.-- Levels were not run in water year 2012. Levels were last run on September 2, 2011, using BM1 as the base. No corrections were made as the elevation of the drop tape index and drop tape length were both found to be within allowable tolerances.

Rating.-- One channel at all stages. The control is a large cobble riffle located below the station. The channel controls at high flow. Gravel and sand fill and scour, causing shifts. Rating No. 09, instituted on May 13, 2009, was used for the entire water year. Eighteen measurements (Nos. 1216 - 1233) were made during the current water year ranging in discharge from 14.7 to 227 cfs. They cover the range in stage experienced except for the lower average daily flows of Feb. 1 - 29 and Mar. 1 - 12, 2012 and the higher average daily flows of May 4 - 7, 11, 15 - 26, 31 and Jun. 1 - 2, 6, 2012. The peak flow of 439 cfs occurred at 2045 on May 22, 2012 at a gage height of 2.47 ft. with a shift of +0.03 ft. The peak exceeded Measurement No. 1226 by 0.53 ft. in stage. The maximum gage height of 2.70 ft. occurred on Jan. 28, 2012 at 1130 due to ice forming on the control.

Discharge.-- Shifting control method was used during the entire water year. Shifting is caused mainly by erosion and deposition of small cobble and gravels on the control section below the gauge. Shifts were applied as defined by measurements and were distributed by stage. Shifts were distributed by stage continuing the ANIHOWVS11B variable shift curve from water year 2011 from 0000 Oct. 1, 2011 until the 1st measurement 1200 Oct. 3, 2011. Shifts were distributed by stage using shift curve ANIHOWCOVS12a from 1215 Oct. 3, 2011 until the peak at 2045 May 22, 2012. The descending limb of the hydrograph was defined by Measurements 1227 to 1234 and shift curve ANIHOWCOVS12b. Shift curve 12b was applied from the peak through the end of the water year. Unadjusted measurements show shifts varying from -0.03 to 0.05 ft. All were given full weight and applied directly except for Measurement Nos. 1217, 1222, 1226, 1227, and 1229 which were discounted from -7% to +7% to smooth shift distribution. There were no measurements in water year 2012 that appeared to be affected by ice.

Special Computations.-- Discharge for the days when ice affected the gage height record was estimated on the basis of partial days of good record, good gage data before and after ice affected data, measurements, and air temperature data collected at the gage.

Remarks.-- Record good, except for the winter periods affected by ice, which are estimated and should be considered poor. The peak instantaneous flow should be considered good. Station maintained and record developed by Brian Leavesley.

Recommendations.-- Design a cover for the SE to reduce accumulation of moisture and icing on the tape wheel.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09357500 ANIMAS RIVER AT HOWARDSVILLE, CO

RATING TABLE-- ANIHOWCO09 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

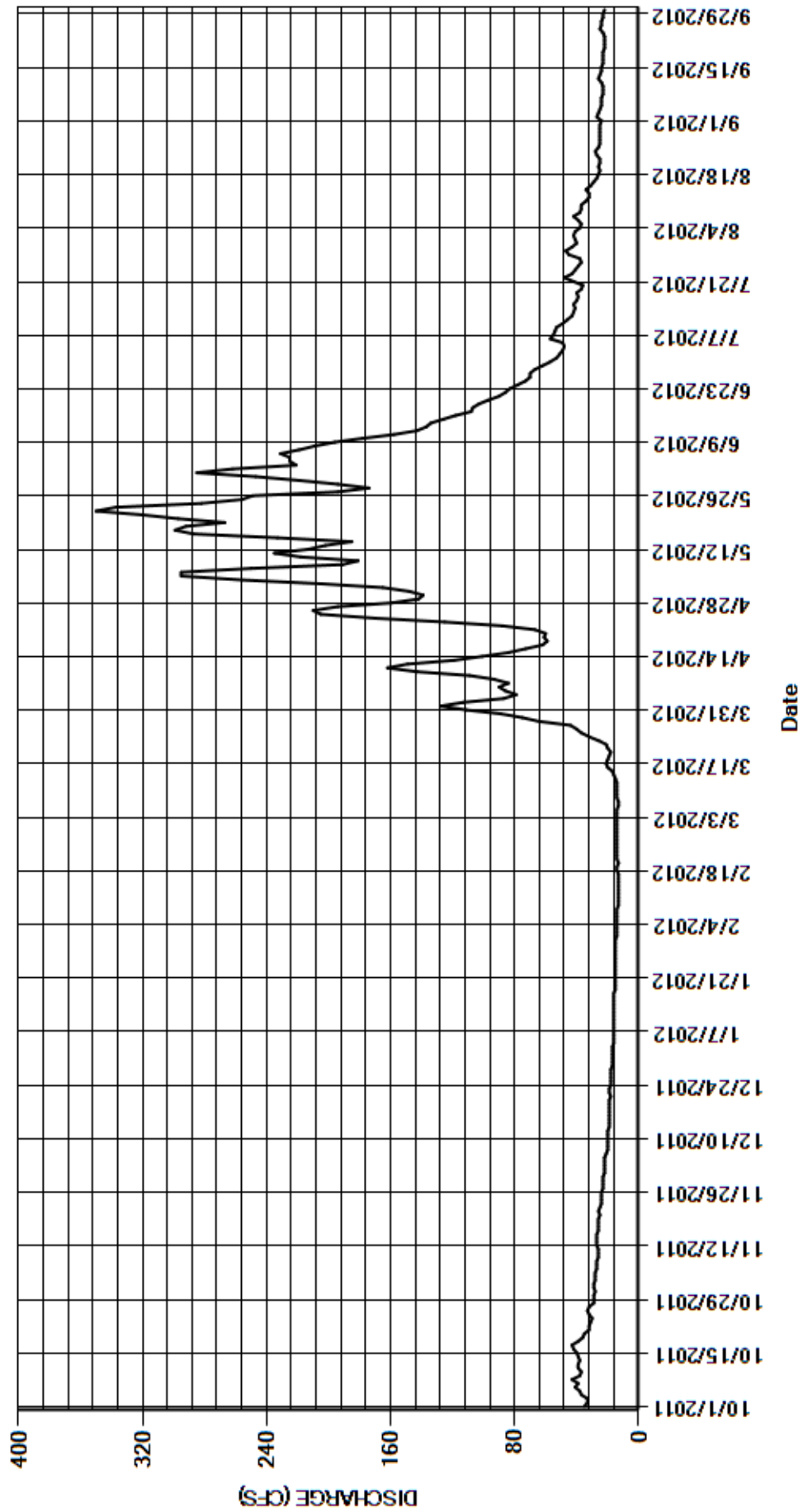
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	35	29	22	e17	e14	14	128	148	285	53	41	24
2	33	29	22	e17	14	e14	113	165	262	51	42	27
3	33	28	22	e17	e14	e14	87	205	221	49	41	26
4	37	28	22	e16	e14	e14	79	256	225	48	38	25
5	38	28	e22	e16	e14	e14	86	295	225	49	37	24
6	41	27	e21	e16	e14	e13	90	295	231	57	39	24
7	39	27	e20	e16	e14	13	84	250	219	55	42	24
8	43	27	e20	e16	e14	e14	93	191	209	54	38	23
9	38	e26	e20	e16	13	e14	109	181	196	53	37	23
10	37	26	e20	e16	e13	14	143	218	178	49	37	23
11	39	26	e20	16	e13	14	162	235	158	46	34	24
12	39	27	e20	e16	13	e14	149	213	143	43	32	26
13	38	27	19	e16	13	15	119	202	137	42	32	25
14	39	27	e19	e16	13	e16	101	185	134	41	34	24
15	40	27	e19	e16	e13	17	84	233	126	42	31	24
16	42	26	e19	16	e13	20	73	287	118	40	29	23
17	43	26	e19	e16	e13	21	62	299	108	39	27	23
18	39	26	e19	e15	e14	20	59	292	107	40	26	23
19	36	26	19	15	e14	e19	61	267	103	37	25	23
20	35	25	19	15	e13	e18	60	297	97	36	26	22
21	32	26	e18	e15	e14	e20	67	320	90	42	25	22
22	32	25	e19	e15	e14	21	88	350	86	48	25	22
23	31	24	e19	e15	14	26	125	337	83	43	27	22
24	30	24	e18	15	e14	32	170	282	78	41	28	23
25	32	24	e18	e15	e14	37	205	256	73	39	26	25
26	33	24	e18	e15	e14	40	210	249	70	37	25	24
27	32	23	e18	15	e14	44	194	194	70	38	25	24
28	29	23	e18	e15	e14	64	159	174	67	45	25	23
29	29	23	17	e15	e14	75	142	194	62	47	25	23
30	29	23	17	e15	---	89	139	219	57	43	25	22
31	28	---	e17	e15	---	111	---	247	---	40	25	---
TOTAL	1101	777	600	485	396	871	3441	7536	4218	1387	969	710
MEAN	35.5	25.9	19.4	15.6	13.7	28.1	115	243	141	44.7	31.3	23.7
AC-FT	2180	1540	1190	962	785	1730	6830	14950	8370	2750	1920	1410
MAX	43	29	22	17	14	111	210	350	285	57	42	27
MIN	28	23	17	15	13	13	59	148	57	36	25	22

CAL YR	2011	TOTAL	44409	MEAN	122	MAX	982	MIN	13	AC-FT	88090
WTR YR	2012	TOTAL	22491	MEAN	61.5	MAX	350	MIN	13	AC-FT	44610

MAX DISCH: 439 CFS AT 20:45 ON MAY 22,2012 GH 2.47 FT SHIFT 0.03 FT
 MAX GH: 2.70 FT AT 11:30 ON JAN 28,2012 (Backwater from ice)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09357500 ANIMAS RIVER AT HOWARDSVILLE, CO
WY2012 HYDROGRAPH



SAN JUAN RIVER BASIN
LA PLATA AND CHERRY CREEK DITCH NEAR HESPERUS
Water Year 2012

Location.-- Lat. 37°19'26", Long. 108°03'41", in SE¼NW¼ sec. 3, T.35 N., R.11 W., NMPM, La Plata County, hydrologic unit 14080105, on the right bank approximately 1.1 miles downstream of the headgate and 2.5 miles north of the town of Hesperus, CO.

Drainage Area and Period of Record.-- NA. ; Diversion record 1948 to present. Published streamflow record Oct. 1, 1993 to present.

Equipment.-- Sutron Satlink 2 DCP with a shaft encoder in a wood shelter and 22-in x 22-in concrete well. Primary reference gage is a staff gage located on the inside of the stilling well. A tipping bucket (precipitation gage Texas Electronics, TR- 525USW) was installed on June 7, 2012. Control is a 5-foot concrete Parshall flume. No other changes this water year.

Hydrologic Conditions.-- The ditch above and below the control is sand, gravel, cobble and sparse small boulders with a very well defined stilling pool. The stilling pool fills with sand and gravel causing the approach velocity to increase. Beavers have been known to build dams downstream of the flume which can submerge the flume.

Gage-Height Record.-- The primary record is 15-minute shaft encoder data downloaded from satellite telemetry with DCP download data for backup purposes. Data downloaded from the DCP was used on Mar. 21-23, 2012 to overwrite erroneous and missing data caused by the malfunction of the GOES West satellite. The gage was visited on 21 separate occasions this water year to verify the shaft encoder remained calibrated to the primary reference. Two adjustments were made to the shaft encoder. Adjustments were made on May 1, 2012 (+0.01 ft. correction) and May 17, 2012 (-0.01 ft. correction). Record is complete and reliable except for the following days when ice on the control affected the stage-discharge relationship and when the intakes were plugged. Ice on the control ("b" days): Nov. 5, 9-11, 14-24, 2011; intakes plugged ("a" days) Apr. 24, 25, 2012.

Datum Corrections.-- Levels were not run this water year. Levels were last run on August 22, 2008 to the inside staff gage. The staff gage was found to be reading +0.006 ft. high. No corrections were made as the staff gage was found to be within allowable tolerances.

Rating.-- The control is a 5-foot concrete Parshall flume. Rating No. 02 in use since January 1, 2011 was used the entire water year. Rating No. 02 defines the control with gravel and cobble in the stilling pool above the Parshall flume. The intake to the stilling well is 0.04 ft. above the floor of the flume. Flows below a gage height of 0.04 ft. are assumed to be negligible and a 0 flow is assigned to them. Five discharge measurements (Nos. 47-51) were made this year, ranging in discharge from 1.85 cfs to 28.4 cfs. An observation of zero flow was made on June 7, 2012. Measurements and observation of zero flow cover the range-in-stage experienced except for higher average daily flows of May 4-7, 12, 16-20, 2012. The peak instantaneous flow of 31.8 cfs occurred at 0000 on May 7, 2012 at a gage height of 1.24 ft. with a shift of 0.00 ft. It exceeded the stage of measurement no. 49 made May 17, 2012 by 0.09 feet in stage.

Discharge.-- Shifting control method was used all water year. Shifts were distributed by time. Open-water measurements showed raw shifts varying between -0.01 and +0.03 feet. All measurements were given full weight except for Measurement Nos. 47, 50 and 51 which were discounted -5% to 4% to smooth shift distribution.

Special Computations.-- Discharge for periods of ice-affected record was estimated on the basis of good record before and after ice, temperature records at LAPHESCO, by cutting off ice peaks on electronic chart record and partial days of good record. The gage hydrograph was used to determine periods of ice-affected record. Discharge for the period of plugged intakes was estimated on the basis of partial day record, good record before and after and verbal correspondence with the water commissioner stating the ditch turned in 20 cfs at the startup.

Remarks.-- Record is good, except for periods when ice affected the stage-discharge relationship and when the intakes were plugged. Record during the ice affected period and when the intakes were plugged should be considered poor. The instantaneous peak discharge should be considered good. Station maintained by Russell Crangle, Matt Schmitt and Brian Boughton. Record developed by Brian Boughton.

Recommendations.-- None.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

LA PLATA AND CHERRY CREEK DITCH NEAR HESPERUS

RATING TABLE.-- LPCDITCO02 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

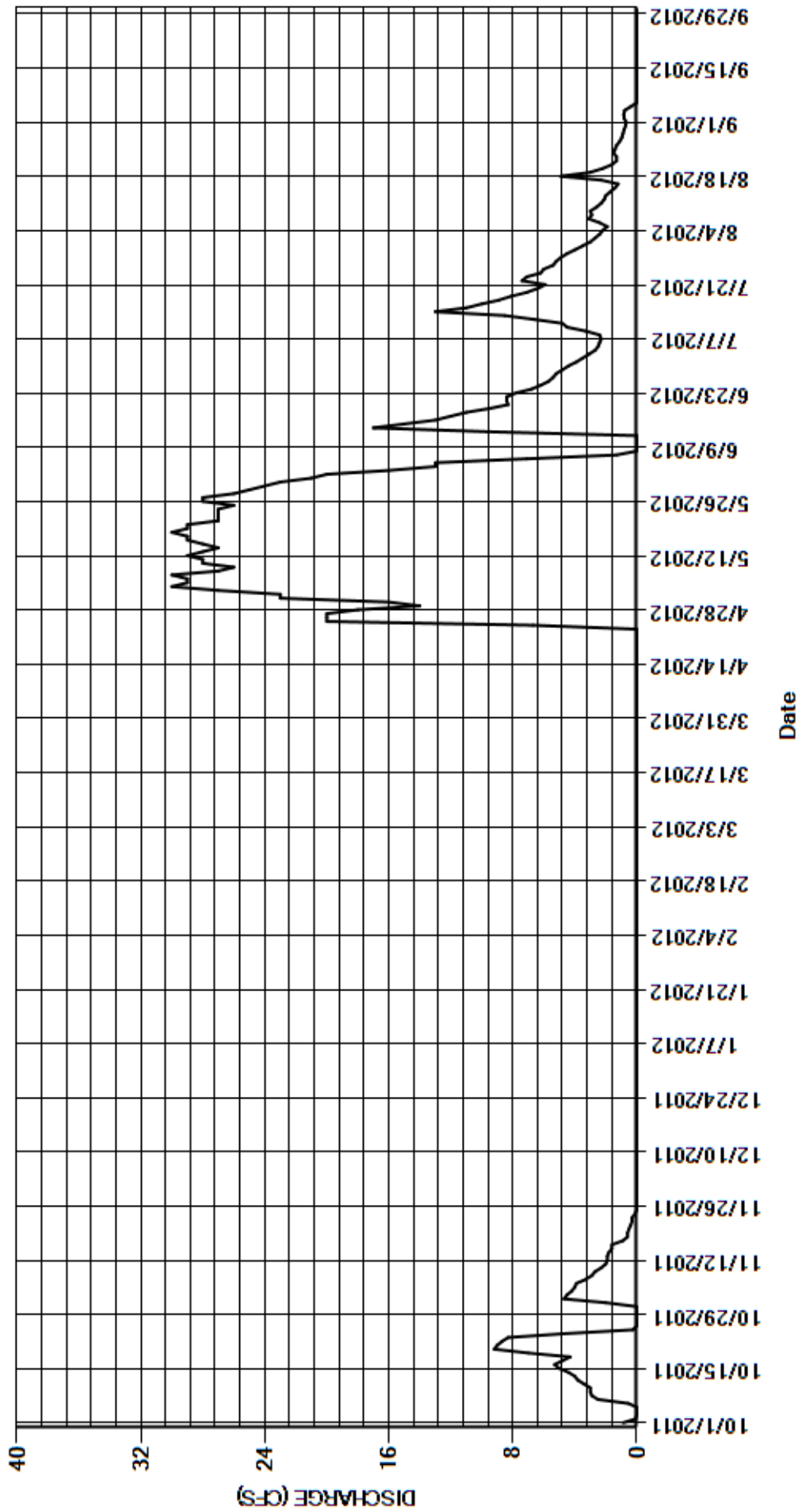
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.87	2.0	0.00	0.00	0.00	0.00	0.00	23	21	3.9	3.0	0.68
2	0.06	4.7	0.00	0.00	0.00	0.00	0.00	23	20	3.5	2.7	0.82
3	0.00	4.5	0.00	0.00	0.00	0.00	0.00	27	16	3.1	2.4	0.84
4	0.00	4.2	0.00	0.00	0.00	0.00	0.00	30	13	2.7	2.2	0.78
5	0.00	e4.0	0.00	0.00	0.00	0.00	0.00	29	13	2.5	1.9	0.38
6	0.55	3.9	0.00	0.00	0.00	0.00	0.00	29	7.1	2.4	2.4	0.00
7	2.5	3.3	0.00	0.00	0.00	0.00	0.00	30	1.3	2.3	3.1	0.00
8	2.9	2.9	0.00	0.00	0.00	0.00	0.00	27	0.00	2.4	2.9	0.00
9	3.0	e2.7	0.00	0.00	0.00	0.00	0.00	26	0.00	3.3	3.0	0.00
10	3.0	e2.3	0.00	0.00	0.00	0.00	0.00	28	0.00	4.5	2.6	0.00
11	3.4	e2.0	0.00	0.00	0.00	0.00	0.00	28	0.00	4.8	2.3	0.00
12	3.8	1.9	0.00	0.00	0.00	0.00	0.00	29	0.00	6.6	2.1	0.00
13	4.0	1.9	0.00	0.00	0.00	0.00	0.00	28	9.6	8.5	2.0	0.00
14	4.4	e1.8	0.00	0.00	0.00	0.00	0.00	27	17	13	1.7	0.00
15	5.0	e1.6	0.00	0.00	0.00	0.00	0.00	28	15	11	1.4	0.00
16	5.3	e1.6	0.00	0.00	0.00	0.00	0.00	29	13	10	1.2	0.00
17	4.8	e0.90	0.00	0.00	0.00	0.00	0.00	29	12	8.9	2.3	0.00
18	4.3	e0.60	0.00	0.00	0.00	0.00	0.00	30	11	8.1	4.9	0.00
19	7.0	e0.60	0.00	0.00	0.00	0.00	0.00	29	9.5	7.1	3.0	0.00
20	9.2	e0.50	0.00	0.00	0.00	0.00	0.00	29	8.3	6.4	2.2	0.00
21	9.0	e0.40	0.00	0.00	0.00	0.00	0.00	27	8.4	5.9	1.6	0.00
22	8.7	e0.30	0.00	0.00	0.00	0.00	0.00	27	8.4	7.4	1.3	0.00
23	8.3	e0.30	0.00	0.00	0.00	0.00	0.00	27	7.8	7.1	1.3	0.00
24	4.7	e0.10	0.00	0.00	0.00	0.00	e6.7	27	6.8	6.2	1.5	0.00
25	0.25	0.00	0.00	0.00	0.00	0.00	e20	26	6.2	6.0	1.4	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	20	28	5.7	5.4	1.3	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	20	28	5.4	5.2	1.1	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	18	26	5.2	4.9	0.96	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	14	25	4.8	4.5	0.89	0.00
30	0.00	0.00	0.00	0.00	---	0.00	16	24	4.4	4.0	0.82	0.00
31	0.00	---	0.00	0.00	---	0.00	---	23	---	3.5	0.73	---
TOTAL	95.03	49.00	0.00	0.00	0.00	0.00	114.70	846	249.90	175.1	62.20	3.50
MEAN	3.07	1.63	0.000	0.000	0.000	0.000	3.82	27.3	8.33	5.65	2.01	0.12
AC-FT	188	97	0	0	0	0	228	1680	496	347	123	6.9
MAX	9.2	4.7	0.00	0.00	0.00	0.00	20	30	21	13	4.9	0.84
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	23	0.00	2.3	0.73	0.00

CAL YR	2011	TOTAL	1905.99	MEAN	5.22	MAX	40	MIN	0.00	AC-FT	3780
WTR YR	2012	TOTAL	1595.43	MEAN	4.36	MAX	30	MIN	0.00	AC-FT	3160

MAX DISCH: 31.8 CFS AT 00:00 ON MAY 07,2012 GH 1.24 FT SHIFT 0 FT
 MAX GH: 1.24 FT AT 00:00 ON MAY 07,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

LA PLATA AND CHERRY CREEK DITCH NEAR HESPERUS
 WY2012 HYDROGRAPH



SAN JUAN RIVER BASIN
PINE RIDGE DITCH NEAR HESPERUS

Water Year 2012

Location.-- Lat. 37°17'31", Long. 108°02'07", in NE¼ NW¼ sec. 14, T.35 N., R.11 W., NMPM, La Plata County, Hydrologic Unit 14030105, on the left bank approximately 0.9 miles below the head-gate and 0.3 miles north of the Town of Hesperus.

Drainage Area and Period of Record.-- N/A; Diversion record Nov. 1, 1947 to present. Published streamflow record Oct. 1, 1993 to present.

Equipment.-- Sutron Satlink 2 DCP with a shaft encoder in a 30-in diameter corrugated metal well and a 42-in diameter corrugated metal shelter. Primary reference gage is outside staff gage installed in flume (0.00-ft to 2.06-ft.). The control is a 3-foot steel Parshall flume with a depth of 2-ft. No other changes this year.

Hydrologic Conditions.-- The ditch above and below the control is silt and gravel with a very well defined stilling pool. The approach conditions into the flume are good. Vegetative growth downstream of the flume can cause submergence if the ditch is not maintained. On April 29, 2008 a 34 in x 50 in elliptical corrugated metal pipe was installed in the ditch approximately 200-ft below the gage. The culvert appears to be adequate and allows the flume to operate under free-flow conditions. The culvert was installed to access the Indian Shadows subdivision.

Gage-Height Record.-- The primary record is 15-minute shaft encoder data downloaded from satellite telemetry with the DCP log as backup. Data downloaded from the DCP was used on Mar. 21-22, 2012 to overwrite erroneous and missing data caused by the malfunction of the GOES West satellite. The gage was visited on 8 separate occasions this water year to verify the instruments remained calibrated to the primary reference gage. No shaft encoder corrections were necessary this water year. The record is complete and reliable, except for the following days when the stage discharge relationship was affected by ice: Mar. 17-23, 2012.

Datum Corrections.-- Levels were not run this water year. Levels were last run on August 22, 2008.

Rating.-- The control is a standard, 3-foot, steel Parshall flume. Rating No. 01 in use since the gage was installed was used all water year. Rating No. 01 is a standard 3-ft Parshall flume rating above a gage height of 0.06-ft. At gage heights below 0.06-ft the well becomes isolated as the invert of the intake is 0.06-ft. above the floor of the flume at the staff gage. Flows below a gage height of 0.06-ft. are assumed to be negligible and a 0 discharge is assigned to them. One discharge measurement (No. 21) was made this water year. The discharge measured was 8.36 cfs. Observations of zero flow were made on October 11, 2011 and August 10, 2012. Measurements and observation of zero flow cover the range-in-stage except for the higher daily flows of May 1, 2, 5, 2012. The peak instantaneous flow of 8.96 cfs occurred at 0145 on May 3, 2012 at a gage height of 0.85 ft. with a shift of -0.02 ft. It exceeded the stage of Measurement No. 21, made May 1, 2012 by 0.04 ft. in stage. The peak instantaneous gage height 1.35 ft. occurred at 2015 on March 17, 2012 was caused by ice submerging the flume.

Discharge.-- Shifts were applied as defined by measurements and were distributed by stage. Shift curve PINDITCOVS11A was applied throughout the entire period of record. Measurements are made at the staff gage and well intake, in the flume. All measurements made were given full weight.

Special Computations.-- The gage hydrograph along with the hydrograph from the La Plata River at Hesperus (LAPHESCO) was used to determine periods of ice-affected record. Discharge for periods of ice-affected record was estimated on the basis of good record before and after ice, temperature data from LAPHESCO and partial days of good record.

Remarks.-- Record is good, except for the period when the flume was affected by backwater from ice. Record during these periods are estimated and should be considered poor. Record when the average daily flows are greater than 0 but less than 0.55 cfs should be considered poor. Station maintained by Russell Crangle and Brian Boughton. Record developed by Brian Boughton.

Recommendations.-- None.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

PINE RIDGE DITCH NEAR HESPERUS

RATING TABLE-- PINDITCO01 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

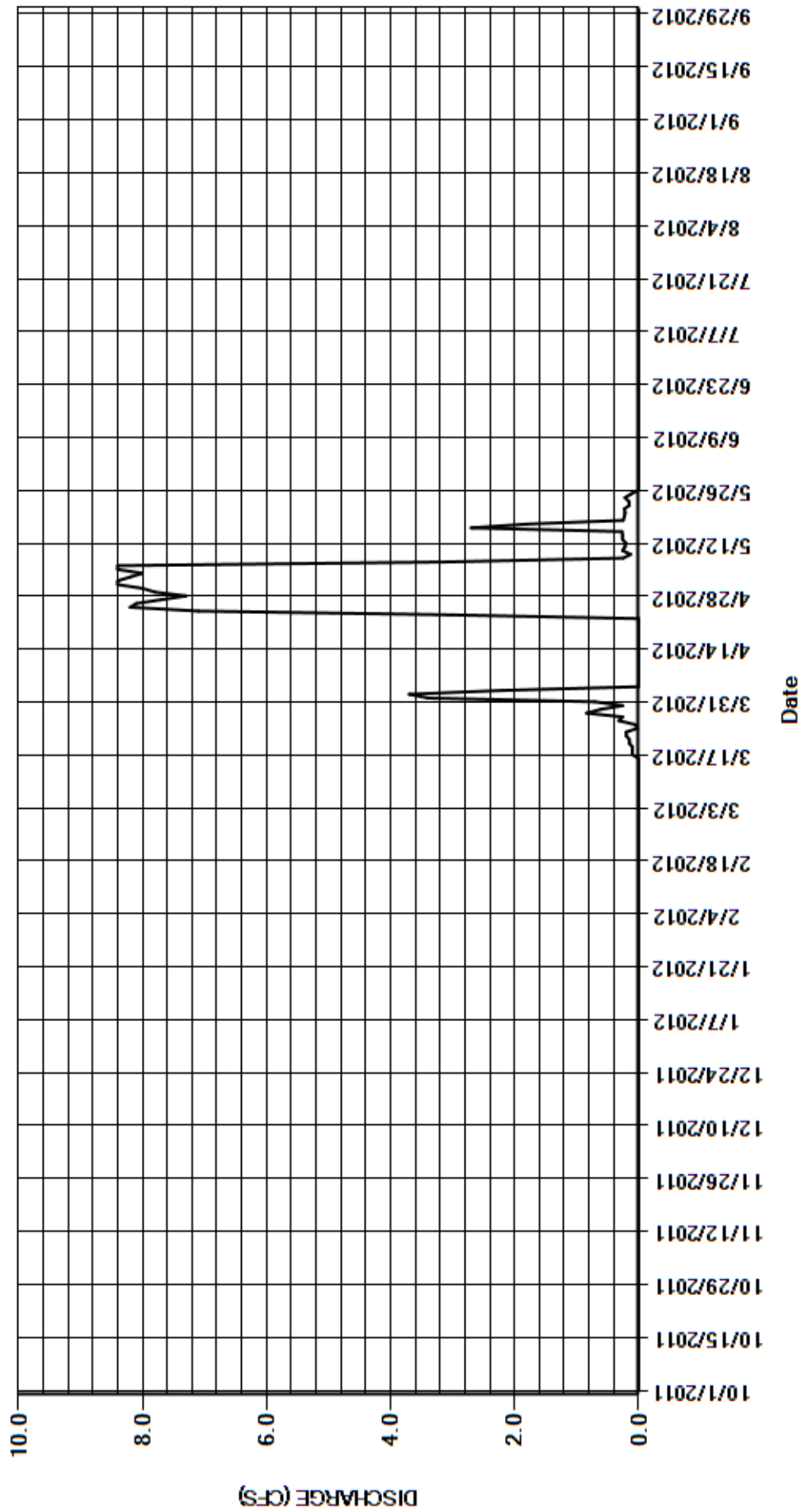
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	3.4	8.4	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	3.7	8.4	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	2.2	8.2	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.0	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.4	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.4	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.1	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.7	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	e0.10	0.00	1.8	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	e0.10	0.00	0.25	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	e0.10	0.00	0.23	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	e0.15	0.00	0.22	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	e0.15	0.00	0.23	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	e0.20	0.00	0.15	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	e0.20	3.0	0.16	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.02	7.1	0.22	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.06	8.2	0.12	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.32	8.1	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.26	7.7	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.84	7.3	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.61	7.8	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	---	0.26	8.0	0.00	0.00	0.00	0.00	0.00
31	0.00	---	0.00	0.00	---	0.71	---	0.00	---	0.00	0.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	4.08	66.50	60.84	0.00	0.00	0.00	0.00
MEAN	0.000	0.000	0.000	0.000	0.000	0.13	2.22	1.96	0.000	0.000	0.000	0.000
AC-FT	0	0	0	0	0	8.1	132	121	0	0	0	0
MAX	0.00	0.00	0.00	0.00	0.00	0.84	8.2	8.4	0.00	0.00	0.00	0.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	308.88	MEAN	0.85	MAX	10	MIN	0.00	AC-FT	613
WTR YR	2012	TOTAL	131.42	MEAN	0.36	MAX	8.4	MIN	0.00	AC-FT	261

MAX DISCH: 8.96 CFS AT 01:45 ON MAY 03,2012 GH 0.85 FT SHIFT -0.02 FT
 MAX GH: 1.35 FT AT 20:15 ON MAR 17,2012 (Backwater from ice)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

PINE RIDGE DITCH NEAR HESPERUS
WY2012 HYDROGRAPH



SAN JUAN RIVER BASIN
09365500 LA PLATA RIVER AT HESPERUS

Water Year 2012

Location.-- Lat. 37°17'23", Long. 108°02'24", in NE¼SW¼ sec. 14, T.35 N., R.11 W., NMPM La Plata County, Hydrologic Unit 14080105, on right bank at Hesperus 700 ft downstream from U.S. Highway 160.

Drainage Area and Period of Record.-- 37 mi², approximately. ; Periodic data June 1904 to Nov. 1910. Continuous from June 1917 to current year, with some periods of monthly data only.

Equipment.-- Graphic water-stage recorder and a Sutron Satlink 2 HDR DCP with a shaft encoder on a separate float in a 64-inch x 64-inch concrete block shelter and a 42-inch diameter corrugated metal well. The primary reference gage is an electric drop tape inside the gage house. The station is also equipped with a Sutron air temperature sensor and an electric float tank heater which is used to keep the well from freezing in the winter. Control is man-made concrete ramp flume located approximately 15 feet downstream. A steel foot bridge is located 60 feet below the gage house. No changes this year.

Hydrologic Conditions.-- Drainage area above the gage is 37 square miles. The basin begins in high mountain terrain above 11,000 feet and drops to 8,100 feet at the gage from USGS topographic maps. The basin mainly consists of rock and forested mountains above the gage and changes to agricultural lands of moderate slope terrain below the gage. Small cobbles and gravel are deposited in the stilling pool above the control during low flow and scour during moderate to high flow events. The La Plata and Cherry Creek Ditch and the Pine Ridge Ditch export water above the gage for irrigation of approximately 2,600 acres. The Pine Ridge Ditch exports water into the Lightner Creek drainage basin for domestic purposes.

Gage-Height Record.-- The primary record is 15-minute shaft encoder data from satellite telemetry with DCP download data and graphic chart record for backup purposes. The gage was visited 43 separate occasions this water year to verify the instruments remained calibrated to the primary reference gage. The shaft encoder was adjusted on 3 separate occasions (Nov. 22, 2011 with +0.01 ft correction, Feb. 1, 2012 with a +0.03 ft correction and Jun. 22, 2012 with -0.02 ft correction). The record was corrected by distributing the correction by time to the last known matched reading. The record is complete and reliable, except for the following days when the stage-discharge relationship was affected by ice on the control and the floats were frozen in the well. Ice on the control ("b" days): Dec. 5-12, 15-18, 22-29, 2011; Jan. 1-18, 21-26; Feb. 1, 6-8, 10, 11, 13, 17-22, 24-27, 29; Mar. 1-5, 20 2012. Floats frozen in the well ("a" days) Jan. 28-31, 2012.

Datum Corrections.-- Levels were run on Aug. 27, 2012 to the electric tape index (ET index) using RM #1 as the base. The ET index was found to be reading -0.008 ft. low. The electric tape length was found to be reading +0.005 ft. long. No corrections were made since the ET index and ET length were found to be within the allowable error tolerances. Levels were also run to the three other reference marks (RM#2, RM#3 and RM#4). RM#2 was found to be reading -0.002 feet low. RM#3 was found to be reading +0.005 feet high and RM#4 was found to be reading -0.010 feet low.

Rating.-- The control is a long throated flume, hereafter referred to as a "Ramp Flume" that was constructed in August of 2000 to act as the control section for the gage. Low flows (0 to 4 cfs) are controlled by the low flow notch in the ramp flume. Medium flows (4 cfs to 500 cfs) are controlled by the second stage of the ramp flume and high flows (flows above 500 cfs) are controlled by the channel. The ramp flume is located about 15 feet below the inlets to the gage. A concrete ledge with an eight-inch "I" beam, located about 60 feet below the station and a large boulder drop structure, located 30 feet below the station, act to limit scour but do not act as a control section. Flows are contained within a single channel up to a gage height of 5.8 feet. Flows above a gage height of 5.8 feet will overbank on the right side only. The left bank is contained by the small mesa that is approximately 15-feet above the flow line of the channel. Rating No. 38 in use since Oct. 1, 2008 was used until Nov. 22, 2011. Rating No. 39 began on Nov. 22, 2011 and was used the remaining water year. The rating is well-defined to 560 cfs. Seventeen discharge measurements (Nos. 1482-1498) were made this year, ranging in discharge from 6.23 to 136 cfs. They cover the range in stage experienced except for the lower daily flows of Jan. 23, 24, 28-31; Feb. 4, 6-11, 17-25; Sep. 16-30, 2012 and the higher daily flow of Mar. 31; Apr. 1, 25, 26, 2012. The peak instantaneous flow of 168 cfs occurred at 2300 Mar. 31, 2012 at a gage height of 4.36 ft. with a shift of 0.00 ft. It exceeded the stage of measurement No. 1489, made Apr. 25, 2012 by 0.11 feet in stage. The peak instantaneous gage height 4.54 ft. occurred at 0730 on Feb. 19, 2012 was caused by backwater from ice on the control.

Discharge.-- Shifting control method was used for the entire water year. Shifts were applied as defined by measurements and were distributed by time and stage. Shifts were distributed by stage using the variable shift curve LAPHESCOVS11A until Nov. 22, 2011. On Nov. 22, 2011 rating no. 39 was implemented and all subsequent measurements plotted on the rating or were adjusted to the rating. Open-water measurements showed shifts varying between -0.02 and +0.04 feet. Shifts were applied directly and given full weight except measurement Nos. 1482, 1485, 1491, 1492, 1493, 1494, and 1496 which were discounted from -6% to +6% to smooth shift distribution.

Special Computations.-- Discharge for periods of ice-affected record was estimated on the basis of good record before and after ice, temperature records, by cutting off ice peaks on graphic chart and partial days of good record. The gage hydrograph was used to determine periods of ice-affected record.

Remarks.-- Record good, except for periods when ice affected the stage-discharge relationship and when the floats were frozen in the well. Record during these periods should be considered poor. The peak instantaneous flow should be considered good. Station maintained by Russell Crangle and Brian Boughton. Record developed by Brian Boughton.

Recommendations.-- Currently, the top of the sill of the shelter door is at a gage height of 5.80 ft. Although high flow events above a gage height of 5.80 ft are rare, they occur, and may warrant the installation of a crest gage. The large boulder weir that was installed stabilized the control but made the high water measurement section poor. A bank operated cableway may need to be installed in the weir pool above the gage to provide more reliable high water measurements.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09365500 LA PLATA RIVER AT HESPERUS

RATING TABLE.-- LAPHESCO38 USED FROM 01-OCT-2011 TO 22-NOV-2011
 LAPHESCO39 USED FROM 22-NOV-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

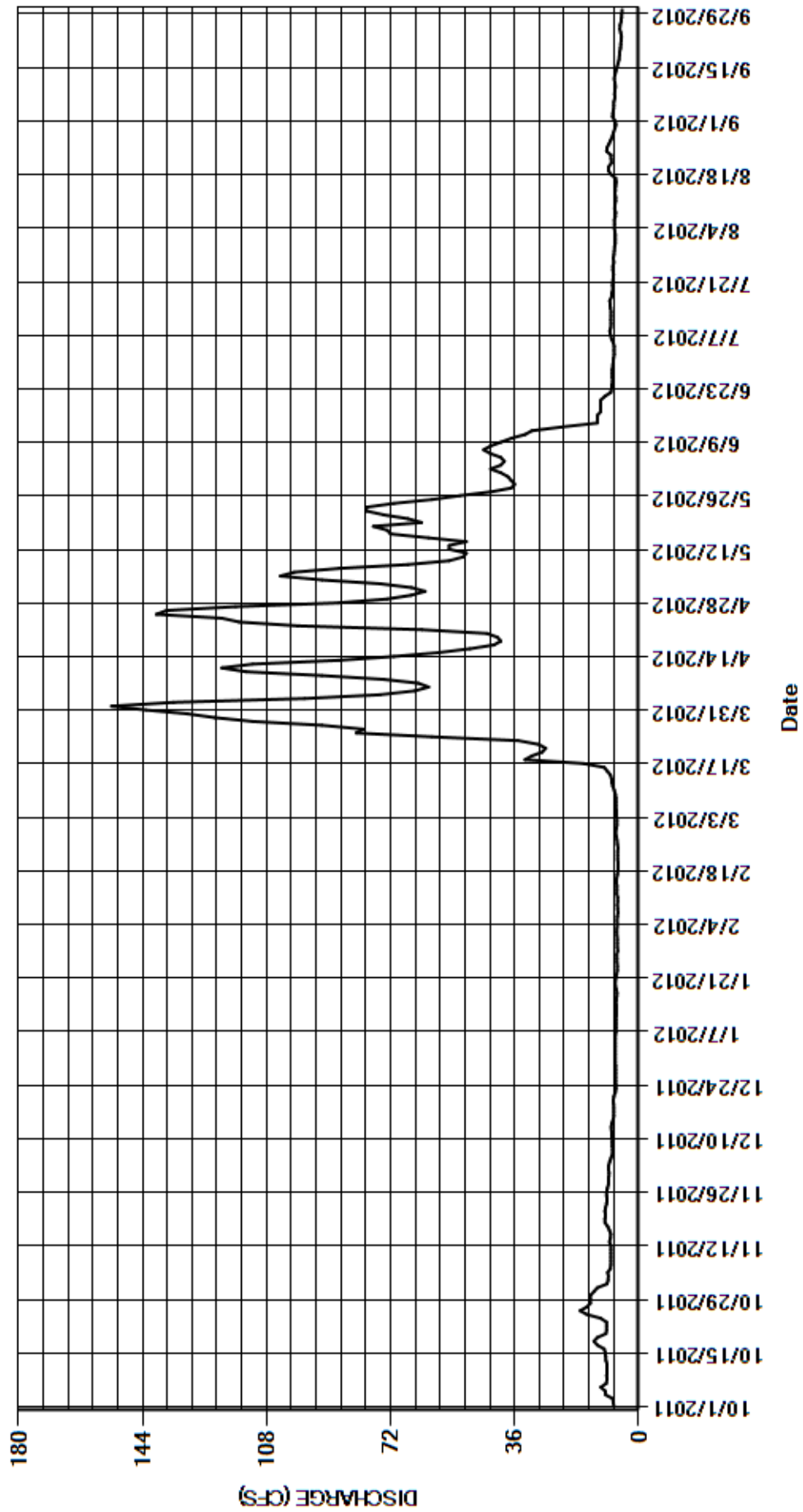
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.2	12	8.6	e6.8	e6.3	e6.3	153	62	40	7.3	6.8	6.9
2	7.4	9.2	8.8	e6.8	6.4	e6.3	135	66	43	7.1	6.8	7.6
3	7.5	8.9	8.7	e6.8	6.3	e6.4	97	75	40	7.2	6.9	7.5
4	9.6	8.8	8.4	e6.8	6.2	e6.4	75	92	39	7.1	7.1	7.3
5	9.7	9.0	e8.0	e6.8	6.3	e6.5	65	104	40	7.4	7.0	7.2
6	11	8.2	e7.6	e6.8	e6.2	6.6	61	100	43	7.9	7.1	7.2
7	9.4	8.1	e7.6	e6.5	e6.0	6.6	64	87	45	8.2	6.8	6.9
8	9.2	8.1	e7.7	e6.5	e6.1	6.6	74	67	43	8.4	6.7	7.0
9	9.3	8.1	e7.7	e6.5	6.2	6.8	92	55	40	8.1	7.0	6.9
10	9.2	8.1	e7.8	e6.5	e6.1	7.1	114	51	37	8.0	6.9	6.8
11	9.2	8.1	e7.8	e6.5	e6.1	7.5	121	50	33	8.1	6.7	6.9
12	9.2	8.1	e7.9	e6.4	6.4	7.8	112	55	31	8.0	6.7	7.1
13	9.5	8.5	8.0	e6.4	e6.3	7.9	87	55	22	8.0	6.9	6.9
14	9.6	8.2	7.8	e6.5	6.3	8.2	71	50	12	8.2	6.8	6.6
15	9.7	8.1	e7.4	e6.5	6.5	9.1	58	61	12	8.3	6.7	6.3
16	10	8.5	e7.2	e6.4	6.4	10	49	72	12	8.4	6.5	6.0
17	12	9.0	e7.2	e6.3	e6.2	16	42	73	11	7.9	6.7	5.7
18	13	9.8	e7.2	e6.5	e6.0	33	40	77	11	7.8	8.1	5.6
19	12	9.8	7.3	6.8	e6.0	31	41	63	11	7.5	8.8	5.5
20	9.5	9.6	7.4	6.8	e6.0	e28	44	67	11	7.6	8.7	5.3
21	9.3	9.8	7.2	e6.6	e6.1	27	63	74	9.8	7.5	7.9	5.2
22	9.3	9.6	e6.8	e6.4	e6.1	29	99	79	8.1	7.4	8.0	5.1
23	9.3	9.3	e6.6	e6.2	6.1	35	116	79	7.9	7.3	8.0	5.0
24	11	9.2	e6.6	e6.2	e6.0	60	121	71	7.8	7.5	9.3	5.2
25	15	9.3	e6.7	e6.3	e6.2	82	140	60	7.6	7.5	9.2	5.5
26	17	9.3	e6.7	e6.3	e6.3	80	137	52	7.7	7.2	8.6	5.4
27	15	9.1	e6.7	6.4	e6.5	92	117	43	7.7	7.4	8.1	5.1
28	14	8.8	e6.7	e6.1	6.7	112	87	37	7.7	7.2	7.6	5.0
29	14	8.8	e6.7	e6.2	e6.5	123	73	36	7.5	7.1	7.3	4.9
30	14	8.7	6.8	e6.2	---	131	66	37	7.4	7.0	6.9	4.8
31	13	---	6.8	e6.2	---	143	---	38	---	6.8	6.6	---
TOTAL	334.1	268.1	230.4	201.0	180.8	1138.1	2614	1988	655.2	236.4	229.2	184.4
MEAN	10.8	8.94	7.43	6.48	6.23	36.7	87.1	64.1	21.8	7.63	7.39	6.15
AC-FT	663	532	457	399	359	2260	5180	3940	1300	469	455	366
MAX	17	12	8.8	6.8	6.7	143	153	104	45	8.4	9.3	7.6
MIN	7.2	8.1	6.6	6.1	6.0	6.3	40	36	7.4	6.8	6.5	4.8

CAL YR	2011	TOTAL	12785.3	MEAN	35.0	MAX	295	MIN	4.4	AC-FT	25360
WTR YR	2012	TOTAL	8259.7	MEAN	22.6	MAX	153	MIN	4.8	AC-FT	16380

MAX DISCH: 168 CFS AT 23:00 ON MAR 31,2012 GH 4.36 FT SHIFT 0 FT
 MAX GH: 4.54 FT AT 07:30 ON FEB 19,2012 (BACKWATER FROM ICE)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09365500 LA PLATA RIVER AT HESPERUS
WY2012 HYDROGRAPH



SAN JUAN RIVER BASIN
CHERRY CREEK AT THE MOUTH NEAR RED MESA
Water Year 2012

Location.-- Lat. 37°07'03", Long. 108°11'55.32" NAD 83, in NW¼ SW¼ sec. 7, T.33 N., R.12 W., NMPM, La Plata County, Hydrologic Unit 14080105. Approximately 740-ft upstream of the confluence with the LaPlata River.

Drainage Area and Period of Record.-- 75.3 mi². ; Colorado Division of Water Resources published record October 1988 to present.

Equipment.-- Graphic water stage-recorder and a Sutron Satlink 2 DCP with a shaft encoder on a separate float in a 42-in corrugated metal well in a concrete block shelter. The primary reference gage is a steel drop tape referenced to a nonadjustable reference point (RP) on the wooden instrument shelf.

Hydrologic Conditions.-- The channel bottom is composed of cobble and gravel. Dense willows line the channel banks. At higher flows the dense willows impact the stage discharge relationship. The creek is ephemeral and only flows during the spring snow melt, significant rain storms and irrigation returns from La Plata and Cherry Creek Ditch.

Gage-Height Record.-- The primary record is 15-minute shaft encoder data from satellite telemetry with DCP download data and graphic chart record for backup purposes. The gage was visited on 32 separate occasions this water year to verify the instruments remained calibrated to the primary reference gage. The shaft encoder was adjusted two times this water year. A -0.01 ft. correction was applied on Oct. 19, 2011 and a +0.01 ft. correction was applied on Nov. 22, 2011. Shaft encoder corrections were distributed by time back to the last site visit when the readings matched. The record is complete and reliable, except for the following days when the stage-discharge relationship was affected by ice on the control: Nov. 17, 23, 24, 27-30; Dec. 1, 2, 4-31, 2011; Jan. 1-31, Feb. 1-29; Mar. 1-17, 2012.

Datum Corrections.-- Levels were not run this water year.

Rating.-- The control at low flows is a natural cobble riffle located 5-ft. below the gage. Dense willows along the left and right bank control at high flow. Willow growth causes the shifts to vary at high flows. Rating No. 4, in used since Oct. 13, 2010 was used for the entire water year. Rating no. 4 is fairly well defined from 0 to 55 cfs. Ten measurements (Nos. 100-109) were made during the current water year ranging in discharge from 1.12 to 22.8 cfs. Four observation of zero flow were made this water year on Aug. 21, 24, Sep. 11, 14, 2012. Observations of zero flow and the measurements cover the range in stage experienced except for the higher daily flows on Apr. 1, 2, 2012. The peak instantaneous flow of 28.6 cfs occurred at 1200 on Apr. 01, 2012 at a gage height of 2.28 with a shift of -0.02 ft. It exceeded the stage of measurement no. 103, made Mar. 28, 2012 by 0.24 ft. in stage.

Discharge.-- Shifting control method was used for the entire water year. Shifting is caused by willows, trash, leaf debris and the movement of sediment. Shifts were applied as defined by measurements and were distributed by time. Discharge was assumed to be 0 on Aug. 19, 20 and was verified on Aug. 21, 2012. Open-water measurements showed shifts varying between -0.06 and +0.02 feet. Shifts were applied directly and given full weight except Measurement Nos. 101, 103, 104, 105, 106, 107 and 108 which were discounted by -9% and 7% to smooth shift distribution.

Special Computations.-- The administrative record for the La Plata River below Cherry Creek (LAPCHECO) and the published record for La Plata River at Colorado/New Mexico Stateline (LAPMEXCO) were compared to the hydrograph at the Cherry Creek gage. The trends in the hydrograph at LAPCHECO and LAPMEXCO along with good record before and after ice and temperature records at the La Plata River at Colorado/New Mexico State line gage were used to develop the estimated discharge at the Cherry Creek gage during the winter.

Remarks.-- Record is fair except for the periods when ice affected the stage-discharge relationship. Periods of ice affected record should be considered poor. The peak instantaneous flow should be considered fair. Station maintained by Russell Crangle, Brian Leavesley and Brian Boughton. Record developed by Brian Boughton.

Recommendations.-- Run levels in water year 2013 to verify the new benchmarks did not move.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

CHERRY CREEK AT THE MOUTH NEAR RED MESA

RATING TABLE-- CHEREDCO04 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

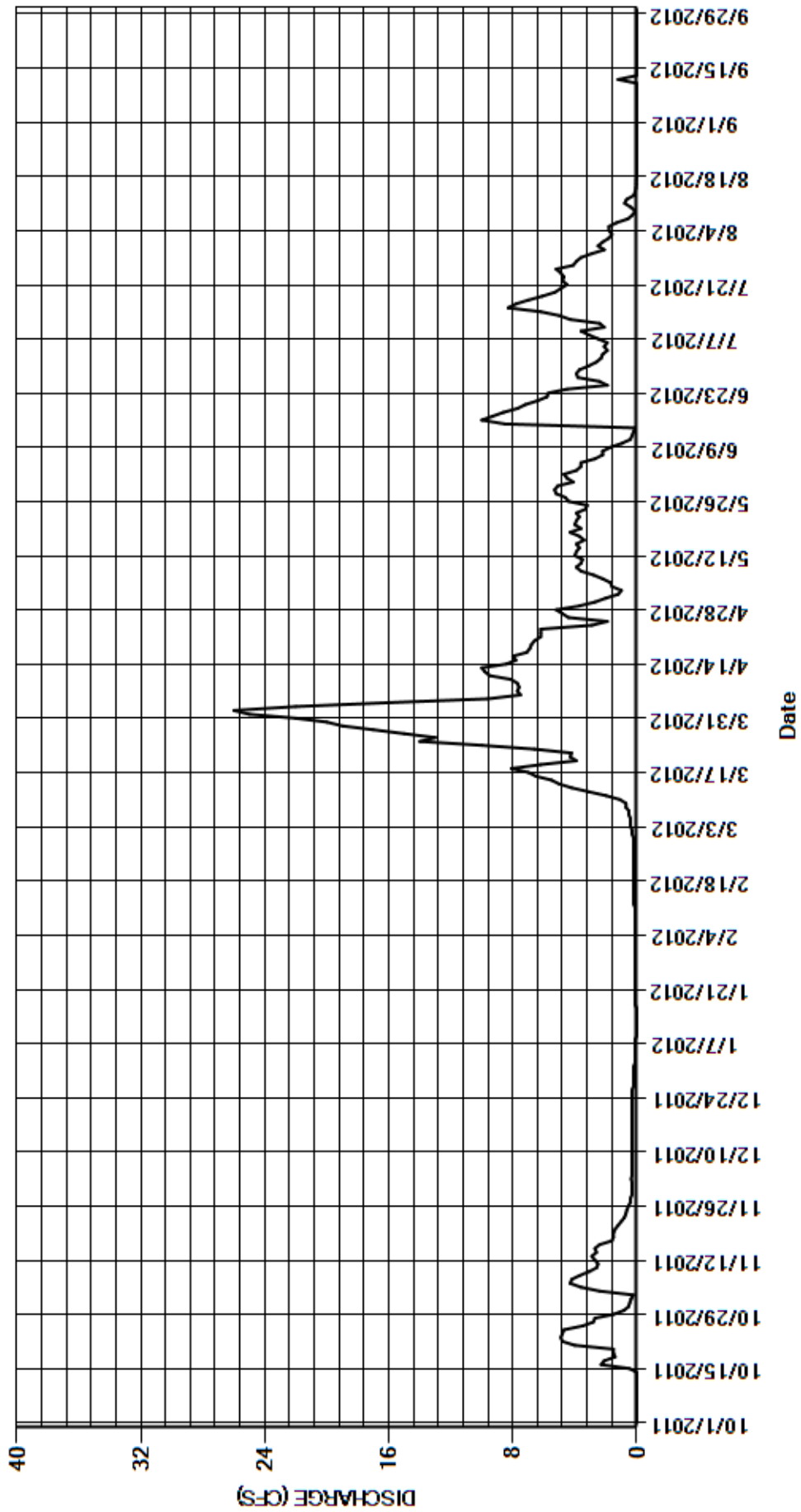
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.45	e0.30	e0.20	e0.10	e0.30	25	2.0	4.5	2.6	2.2	0.00
2	0.00	0.36	e0.30	e0.10	e0.10	e0.30	26	1.2	4.7	2.3	1.8	0.00
3	0.00	0.23	0.36	e0.10	e0.10	e0.40	22	0.99	3.9	2.2	1.6	0.00
4	0.00	2.4	e0.30	e0.10	e0.10	e0.40	16	1.6	3.6	1.9	1.8	0.00
5	0.00	3.6	e0.30	e0.10	e0.10	e0.40	9.6	1.7	3.6	2.1	1.8	0.00
6	0.00	4.3	e0.30	e0.10	e0.10	e0.50	7.5	2.2	2.7	1.9	1.3	0.00
7	0.00	4.2	e0.30	e0.10	e0.10	e0.50	7.7	2.8	2.2	2.5	0.57	0.00
8	0.00	3.7	e0.30	e0.10	e0.10	e0.70	7.6	3.6	2.2	3.1	0.27	0.00
9	0.00	3.1	e0.30	e0.00	e0.10	e0.70	7.7	3.9	1.7	3.6	0.10	0.00
10	0.00	2.6	e0.30	e0.00	e0.10	e1.1	8.1	3.6	0.95	2.1	0.38	0.00
11	0.00	2.5	e0.30	e0.00	e0.10	e2.0	9.5	3.5	0.42	2.4	0.78	0.00
12	0.00	2.7	e0.30	e0.00	e0.20	e3.1	9.8	4.0	0.30	4.3	0.66	1.2
13	0.00	2.9	e0.30	e0.00	e0.20	e4.2	10	3.9	0.21	5.0	0.21	0.01
14	0.00	2.6	e0.30	e0.00	e0.20	e5.0	8.4	3.7	0.11	6.2	0.10	0.01
15	0.48	2.7	e0.30	e0.00	e0.20	e5.5	7.8	3.9	8.5	8.3	0.05	0.00
16	2.3	2.4	e0.30	e0.00	e0.20	e6.5	8.0	3.4	10	7.8	0.03	0.00
17	2.1	e1.6	e0.30	e0.10	e0.20	e7.0	7.1	3.7	9.3	7.0	0.02	0.00
18	1.4	1.5	e0.30	e0.10	e0.20	8.1	6.9	4.3	8.6	6.1	0.01	0.00
19	1.5	1.5	e0.30	e0.10	e0.20	6.2	6.8	3.6	7.7	5.3	e0.00	0.00
20	1.5	1.4	e0.30	e0.10	e0.20	3.9	6.6	4.0	7.2	4.9	e0.00	0.00
21	4.0	1.2	e0.30	e0.10	e0.20	4.3	6.2	3.9	6.4	4.5	e0.00	0.00
22	4.8	1.0	e0.30	e0.10	e0.20	4.2	6.2	3.7	5.8	4.8	e0.00	0.00
23	4.9	e0.80	e0.30	e0.10	e0.20	6.6	6.2	3.9	5.7	4.7	e0.00	0.00
24	4.8	e0.70	e0.30	e0.10	e0.20	10	2.9	3.3	4.5	4.9	e0.00	0.00
25	4.7	0.64	e0.30	e0.10	e0.20	14	1.9	3.2	1.9	5.2	0.00	0.00
26	3.5	0.53	e0.30	e0.10	e0.20	13	4.4	4.4	2.4	4.1	0.00	0.00
27	2.8	e0.40	e0.20	e0.10	e0.20	15	4.8	4.6	3.8	3.9	0.00	0.00
28	2.7	e0.40	e0.20	e0.10	e0.20	17	5.2	5.2	3.9	3.6	0.00	0.00
29	1.5	e0.30	e0.20	e0.10	e0.20	19	3.7	5.3	3.7	2.9	0.00	0.00
30	0.83	e0.30	e0.20	e0.10	---	20	2.7	5.1	3.1	2.1	0.00	0.00
31	0.53	---	e0.20	e0.10	---	22	---	4.1	---	2.5	0.00	---
TOTAL	44.34	53.01	8.86	2.40	4.70	201.90	262.3	108.29	123.59	124.8	13.68	1.22
MEAN	1.43	1.77	0.29	0.077	0.16	6.51	8.74	3.49	4.12	4.03	0.44	0.041
AC-FT	88	105	18	4.8	9.3	400	520	215	245	248	27	2.4
MAX	4.9	4.3	0.36	0.20	0.20	22	26	5.3	10	8.3	2.2	1.2
MIN	0.00	0.23	0.20	0.00	0.10	0.30	1.9	0.99	0.11	1.9	0.00	0.00

CAL YR	2011	TOTAL	1880.63	MEAN	5.15	MAX	27	MIN	0.00	AC-FT	3730
WTR YR	2012	TOTAL	949.09	MEAN	2.59	MAX	26	MIN	0.00	AC-FT	1880

MAX DISCH: 28.6 CFS AT 12:00 ON APR 01,2012 GH 2.28 FT SHIFT -0.02 FT
 MAX GH: 2.61 FT AT 09:00 ON MAR 08,2012 (Backwater from ice)

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

CHERRY CREEK AT THE MOUTH NEAR RED MESA
WY2012 HYDROGRAPH



SAN JUAN RIVER BASIN
LONG HOLLOW AT THE MOUTH NEAR RED MESA
Water Year 2012

Location.-- Lat. 37°03'02", Long. 108°10'23", in SE¼SW¼ sec. 32, T.33 N., R.12 W., NMPM, La Plata County, Hydrologic Unit 14080105, on the right bank 600 feet downstream of Government Draw and 2.6 miles south of the town of Redmesa.

Drainage Area and Period of Record.-- 46.5 mi².; October 1, 1988 to present.

Equipment.-- Graphic water stage-recorder and Sutron Satlink 2 satellite monitoring DCP and shaft encoder on separate floats in a wooden shelter and well at a 4-foot steel Parshall flume. Primary reference gage is outside staff gage installed in flume. An insulated floor is installed in the stilling well when the temperatures fall below freezing. The floor was installed on Nov. 22, 2011 and removed on Mar. 05, 2012. No other changes.

Hydrologic Conditions.-- The drainage area above the gage is 46.5 square miles. The creek above and below the control is mainly silt with some sand and gravel. The approach conditions into the flume are poor. The stilling pool above the flume is poor. Excessive approach velocities tend to cause a positive shift to a standard Parshall flume rating. The creek base flow is from irrigation return flows and flashy rain events. Construction of Long Hollow Reservoir (located approximately 800 to 1,000 feet above the gage) began July 2012 and caused the flows to become more erratic than usual. Surface flows were diverted and dam site was dewatered when necessary for construction purposes.

Gage-Height Record.-- The primary record is 15-minute shaft encoder data downloaded from satellite telemetry with chart record used for backup purposes. Data downloaded from the DCP was used on Nov. 8, 2011 to fill in missing data and Mar. 22-23, 2012 to overwrite erroneous data and fill in missing data caused by the malfunction of the GOES West satellite. The gage was visited on 28 separate occasions this water year to verify the instruments remained calibrated to the primary reference gage. The shaft encoder was adjusted two times this water year. Shaft encoder corrections were made on Oct. 24, 2011 (+0.01 ft.) and Dec. 21, 2011 (+0.01 ft.). The shaft encoder corrections were distributed by time to the last inspection when the shaft encoder matched the primary reference gage. Moss and silt were removed from the control on several occasions, resulting in corrections from 0.00 ft to -0.02 ft. The corrections were distributed as instrument corrections because measurements were not made at the same time the flume was cleaned.

Datum Corrections.-- Levels were not run this year. Levels were last run on Mar. 2, 2009 using the floor of the flume at the staff gage as the base. Levels were used to determine if the converging section of the flume is level. Results indicate the flume is -0.07 ft. low on the intake side (right-edge-of-water). No other benchmarks were set at the time.

Rating.-- The control is a 4-foot Parshall flume installed in 1988 to monitor the return flows through Long Hollow for the Animas/La Plata Conservancy District. Horizontal dirt and grass wing walls extend in both directions above an elevation of 2.25 feet. Rating No. 1A, in use since October 1, 2007 was used until Nov. 22, 2011. Rating 01A is a standard 4-foot Parshall flume rating from gage height 0 to 2.25 ft. Gage heights above 2.25 ft. flow in the natural channel. A theoretical rating was developed above a gage height of 2.25 ft. No measurements have been made above stage 2.25. Rating no. 02 was developed from discharge measurements within the flume. The upper end of the rating was smoothed to tie into the theoretical portion of rating 01A. The rating is well defined from 1.44 to 29 cfs. Four measurements were made during the current water year ranging in discharge from 2.05 to 5.46 cfs. They cover the range in stage experienced except for the lower average daily flows of Oct. 1, 2, 2011, Jun. 13-30, Jul. 1-6, 10, 14, 15, 17-31, Aug. 1-16, 19-23, 26-31, Sep. 1-11, 17, 19, 20, 24-26, 2012 and the higher average daily flow of Feb. 13, 14, 23, Mar. 1, 2, 11-19, Aug. 17, Sep. 12, 2011. The peak instantaneous flow of 108 cfs occurred at 1715 on Aug. 17, 2012 at a gage height of 2.89 ft. and a shift of 0.00 ft. It exceeded the stage of Measurement No. 215, made Nov. 22, 2011 by 2.45 ft. in stage.

Discharge.-- Shifting control method was used during the entire water year. Shifting is mainly caused by moss growth in the flume. Variable shift curve LONREDCOVS11A in use at the end of water year 2011 continued until Nov. 22, 2011 when a new rating was implemented. A 0 shift and the new rating was applied directly for the remaining part of the water year. Open-water measurements showed unadjusted shifts varying between -0.02 and +0.01 feet. Shifts were applied directly and given full weight except for Measurement Nos. 215, 216, 217 and 218 which were discounted -7% to +7% to smooth shift distribution.

Special Computations.-- The peak instantaneous flow was compared to the peak at the gage on the La Plata River at Colorado/New Mexico Stateline. The Stateline gage is approximately 4.5 miles downstream of the confluence of Long Hollow. The peak at the Stateline gage occurred at 2030 on Aug. 17, 2012 at a flow of 123 cfs.

Remarks.-- Record is fair. The peak instantaneous flow should be considered poor. Station maintained by Russell Crangle and Brian Boughton. Record developed by Brian Boughton.

Recommendations.-- Levels should be run in Water Year 2013.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

LONG HOLLOW AT THE MOUTH NEAR RED MESA

RATING TABLE.-- LONREDCO01A USED FROM 01-OCT-2011 TO 22-NOV-2011
 LONREDCO02 USED FROM 22-NOV-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

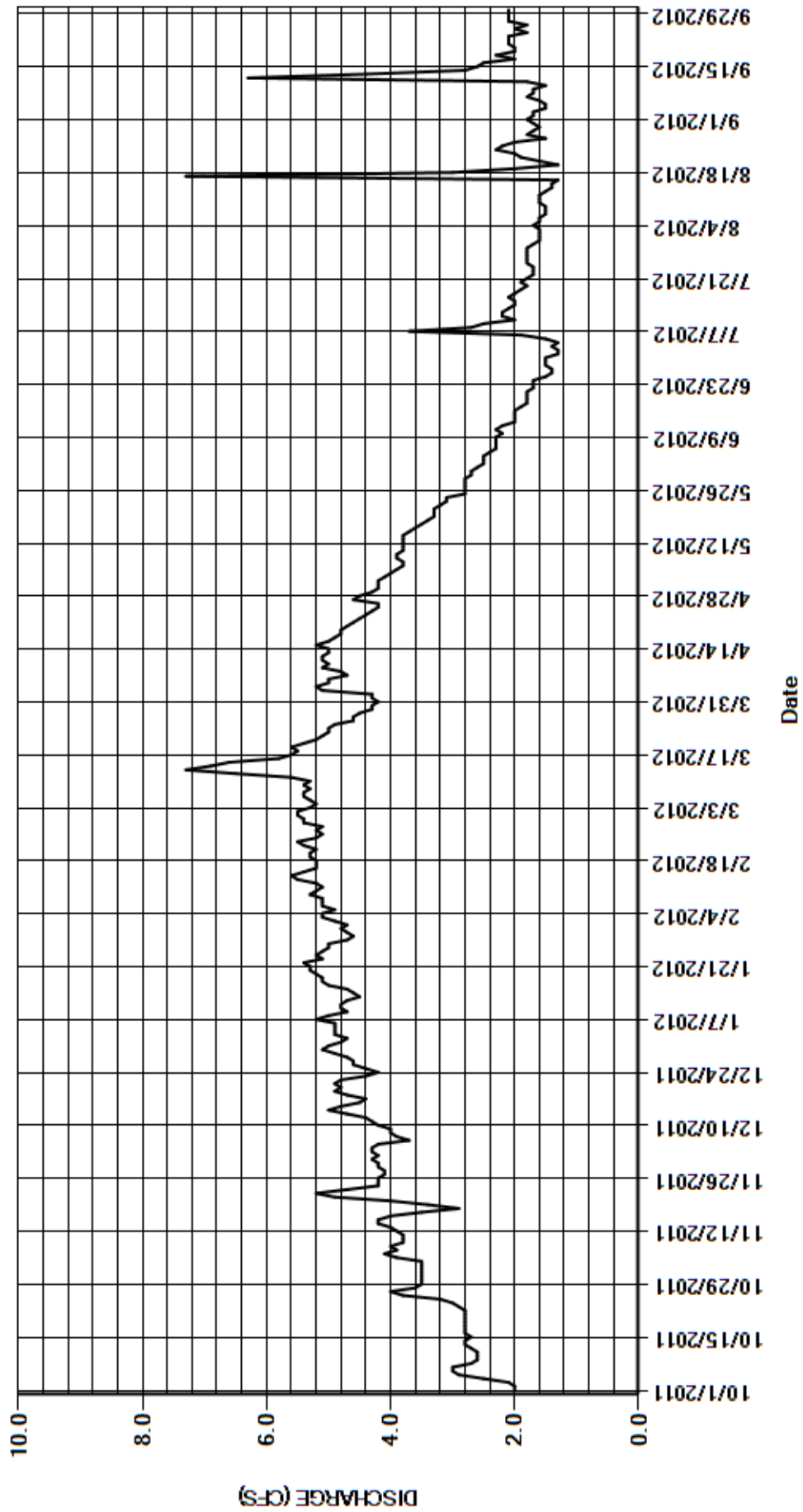
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.0	3.5	4.3	4.8	4.7	5.5	4.3	4.2	2.6	1.3	1.6	1.8
2	2.0	3.5	4.2	4.7	4.9	5.5	4.3	4.2	2.5	1.3	1.6	1.7
3	2.1	3.5	4.3	4.9	5.1	5.3	5.1	4.1	2.5	1.4	1.6	1.7
4	2.5	3.5	4.3	4.9	5.1	5.2	5.2	4.0	2.5	1.3	1.7	1.5
5	2.9	3.9	4.2	4.9	4.9	5.3	5.0	3.9	2.4	1.5	1.6	1.5
6	3.0	4.1	3.7	4.9	5.1	5.4	5.0	3.8	2.3	1.9	1.6	1.6
7	3.0	3.9	3.9	5.2	5.1	5.4	4.7	3.8	2.3	3.7	1.5	1.8
8	2.7	4.0	4.0	5.0	5.1	5.3	4.8	3.9	2.3	2.7	1.5	1.7
9	2.6	3.8	4.0	4.7	5.3	5.4	5.1	3.9	2.3	2.5	1.5	1.7
10	2.6	3.8	4.2	4.8	5.2	5.3	5.0	3.8	2.2	2.0	1.6	1.5
11	2.6	3.8	4.3	4.8	5.1	5.6	5.1	3.8	2.3	2.2	1.6	1.8
12	2.7	3.9	4.4	4.7	5.2	6.5	5.1	3.8	2.2	2.2	1.6	6.3
13	2.8	4.0	4.7	4.5	5.5	7.3	5.0	3.8	2.0	2.1	1.5	4.4
14	2.8	4.2	5.0	4.6	5.6	6.9	5.0	3.8	2.0	2.0	1.4	2.8
15	2.7	4.2	4.8	4.7	5.4	6.6	5.2	3.7	2.0	2.0	1.4	2.6
16	2.8	4.0	4.5	5.0	5.2	5.8	5.0	3.6	2.0	2.1	1.3	2.5
17	2.8	3.5	4.4	5.1	5.2	5.6	4.9	3.5	1.9	2.0	7.3	2.0
18	2.8	2.9	4.7	5.1	5.2	5.5	4.8	3.4	1.8	1.9	3.0	2.3
19	2.8	3.4	4.9	5.2	5.3	5.6	4.8	3.3	1.8	1.8	2.0	2.0
20	2.8	4.0	4.8	5.3	5.3	5.4	4.7	3.3	1.8	1.9	1.3	2.0
21	2.8	4.9	4.9	5.3	5.2	5.2	4.6	3.3	1.8	1.8	1.6	2.1
22	2.8	5.2	4.8	5.4	5.4	5.1	4.5	3.2	1.7	1.7	1.9	2.1
23	2.9	4.7	4.4	5.1	5.5	5.0	4.4	3.1	1.7	1.7	2.0	2.1
24	3.0	4.2	4.2	5.2	5.2	5.0	4.3	3.1	1.7	1.7	2.3	1.8
25	3.2	4.2	4.4	5.1	5.1	4.9	4.2	2.8	1.5	1.8	2.2	2.0
26	3.8	4.2	4.6	5.0	5.2	4.6	4.2	2.8	1.4	1.8	2.0	1.8
27	4.0	4.1	4.6	5.0	5.1	4.6	4.6	2.8	1.4	1.8	1.5	2.1
28	3.6	4.1	4.7	4.7	5.4	4.5	4.5	2.8	1.5	1.8	1.8	2.1
29	3.5	4.2	4.9	4.6	5.4	4.3	4.3	2.8	1.5	1.8	1.7	2.1
30	3.5	4.2	5.1	4.7	---	4.3	4.2	2.7	1.5	1.7	1.6	2.1
31	3.5	---	5.0	4.8	---	4.2	---	2.7	---	1.6	1.7	---
TOTAL	89.6	119.4	139.2	152.7	151.0	166.1	141.9	107.7	59.4	59.0	58.5	65.5
MEAN	2.89	3.98	4.49	4.93	5.21	5.36	4.73	3.47	1.98	1.90	1.89	2.18
AC-FT	178	237	276	303	300	329	281	214	118	117	116	130
MAX	4.0	5.2	5.1	5.4	5.6	7.3	5.2	4.2	2.6	3.7	7.3	6.3
MIN	2.0	2.9	3.7	4.5	4.7	4.2	4.2	2.7	1.4	1.3	1.3	1.5

CAL YR	2011	TOTAL	1429.7	MEAN	3.92	MAX	6.6	MIN	1.6	AC-FT	2840
WTR YR	2012	TOTAL	1310.0	MEAN	3.58	MAX	7.3	MIN	1.3	AC-FT	2600

MAX DISCH: 108 CFS AT 17:15 ON AUG 17,2012 GH 2.89 FT SHIFT 0 FT
 MAX GH: 2.89 FT AT 17:15 ON AUG 17,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

LONG HOLLOW AT THE MOUTH NEAR RED MESA
WY2012 HYDROGRAPH



SAN JUAN RIVER BASIN
PIONEER DITCH AT THE COLORADO-NEW MEXICO STATELINE
Water Year 2012

Location.-- Lat. 36°59'55", Long. 108°11'12", in NW¼SE¼ sec. 10, T.32 N., R.13 W., NMPM, La Plata County, CO, Hydrologic Unit 14080105, on right bank at Colorado-New Mexico State line.

Drainage Area and Period of Record.-- N/A; Diversion record Nov. 1, 1973 to present (Structure ID = 3304640). Published streamflow record Oct. 1, 1993 to present.

Equipment.-- A Sutron high data rate Satlink 2 DCP with a shaft encoder in a 30-inch diameter corrugated metal pipe shelter and a 20-inch x 20-inch concrete well. Primary reference gage is outside staff gage (0 to 1.06-ft) installed in flume. Control is a 1-foot concrete Parshall flume. No other changes this year.

Hydrologic Conditions.-- Heavy vegetation growth upstream and downstream will cause changes in shifts from year to year. A head gate to the first ditch lateral is located approximately 25-ft below the flume. On occasion the vegetation growth downstream and operations at the head gate can submerge the Parshall flume. The ditch was cleaned in March 2012.

Gage-Height Record.-- The primary record is 15-minute shaft encoder data downloaded from DCP with satellite telemetry log as backup. The gage was visited on 22 separate occasions this water year to verify the instruments remained calibrated to the primary reference gage. The shaft encoder was adjusted one time this water year (May 10, 2012). The adjustment made was -0.01 ft. The adjustment was distributed by time to the last known correct reading. The record is complete and reliable, except for the following days when ice in the well heaved the float. Floats frozen in the well ("a" days) Dec. 5-14, 18, 2011; Jan. 1-27, 2012.

Datum Corrections.-- Levels have never been run at this gage.

Rating.-- The control is a standard, 1-foot, concrete Parshall flume. Rating No. 01 is a standard 1 ft. Parshall flume rating above a gage height of 0.12 ft. The intake to the stilling well is 0.12 ft. above the floor of the flume. Flows below a gage height 0.12 ft. are assumed to be negligible and a 0 flow is assigned to them. Rating No. 01 has been used since the gage was installed and was used all water year. One discharge measurement was made this water year, No. 25. The measured flow was 3.46 cfs. Ten observations of zero or negligible flow were made this water year. They were made on Nov. 18, 2011; Jan. 27, Jul. 2, 16, 30; Aug. 9, 16, 27; Sep. 4, 17, 2012. Discharge measurements and observations of zero flow cover range in stage experienced except for the higher daily flow of Apr. 8-15, 28-30, May 1, 2, 4-10, 2012. The peak instantaneous flow of 8.58 cfs occurred at 1730 on August 17, 2012 at a gage height of 1.65 ft with a shift of 0.00 ft.

Discharge.-- Shifting control method was used for the entire water year. Shifts were applied as defined by measurements and were distributed by time. Shifts were distributed using a 0 shift. The shift for the open water measurement was -0.02. It was discounted -3% to the rating.

Special Computations.-- No special computations were necessary this water year

Remarks.-- Record is good except for the period when ice heaved the floats. Record during this period should be considered fair. The peak instantaneous flow is assumed to be good, but it is unknown if the flume was submerged. Station maintained by Matt Schmitt, Russell Crangle and Brian Boughton. Record developed by Brian Boughton.

Recommendations.-- Currently the bottom of the well is level with the bottom of the intake. Mud and silt can build up enough and not allow the float to settle to the bottom. The existing stilling well should be removed and a deeper one installed or the bottom of the existing well should be removed and excavated deeper.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

PIONEER DITCH AT THE COLORADO-NEW MEXICO STATELINE

RATING TABLE-- PIODITCO01 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

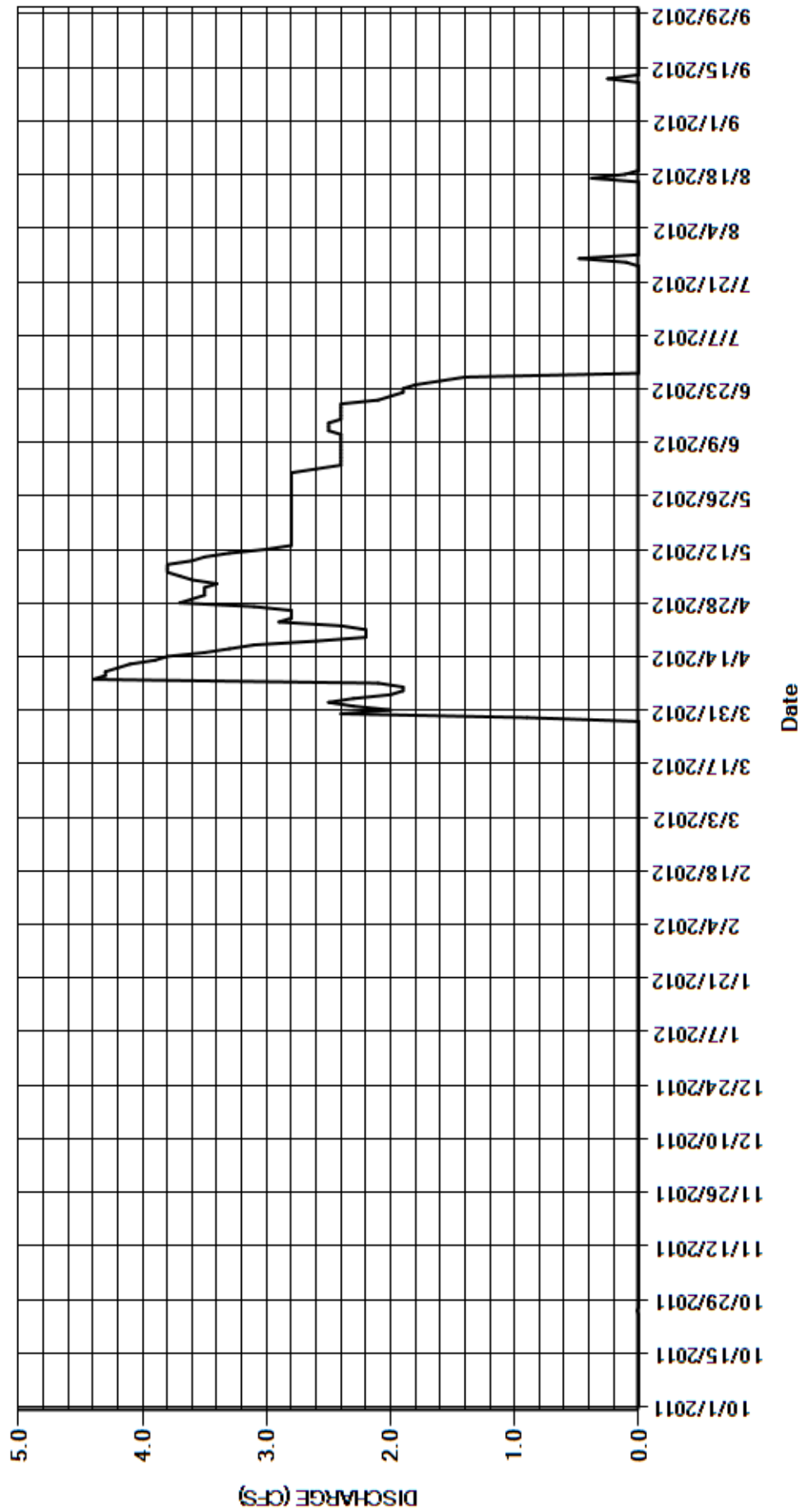
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	e0.00	0.00	0.00	2.3	3.5	2.8	0.00	0.00	0.00
2	0.00	0.00	0.00	e0.00	0.00	0.00	2.5	3.5	2.6	0.00	0.00	0.00
3	0.00	0.00	0.00	e0.00	0.00	0.00	2.3	3.4	2.4	0.00	0.00	0.00
4	0.00	0.00	0.00	e0.00	0.00	0.00	2.0	3.6	2.4	0.00	0.00	0.00
5	0.00	0.00	e0.00	e0.00	0.00	0.00	1.9	3.7	2.4	0.00	0.00	0.00
6	0.00	0.00	e0.00	e0.00	0.00	0.00	1.9	3.8	2.4	0.00	0.00	0.00
7	0.00	0.00	e0.00	e0.00	0.00	0.00	2.1	3.8	2.4	0.00	0.00	0.00
8	0.00	0.00	e0.00	e0.00	0.00	0.00	4.4	3.8	2.4	0.00	0.00	0.00
9	0.00	0.00	e0.00	e0.00	0.00	0.00	4.3	3.6	2.4	0.00	0.00	0.00
10	0.00	0.00	e0.00	e0.00	0.00	0.00	4.3	3.5	2.4	0.00	0.00	0.00
11	0.00	0.00	e0.00	e0.00	0.00	0.00	4.2	3.3	2.4	0.00	0.00	0.00
12	0.00	0.00	e0.00	e0.00	0.00	0.00	4.1	3.0	2.5	0.00	0.00	0.25
13	0.00	0.00	e0.00	e0.00	0.00	0.00	3.9	2.8	2.5	0.00	0.00	0.00
14	0.00	0.00	e0.00	e0.00	0.00	0.00	3.8	2.8	2.5	0.00	0.00	0.00
15	0.00	0.00	0.00	e0.00	0.00	0.00	3.5	2.8	2.4	0.00	0.00	0.00
16	0.00	0.00	0.00	e0.00	0.00	0.00	3.3	2.8	2.4	0.00	0.00	0.00
17	0.00	0.00	0.00	e0.00	0.00	0.00	3.1	2.8	2.4	0.00	0.38	0.00
18	0.00	0.00	e0.00	e0.00	0.00	0.00	2.6	2.8	2.4	0.00	0.11	0.00
19	0.00	0.00	0.00	e0.00	0.00	0.00	2.2	2.8	2.4	0.00	0.00	0.00
20	0.00	0.00	0.00	e0.00	0.00	0.00	2.2	2.8	2.1	0.00	0.00	0.00
21	0.00	0.00	0.00	e0.00	0.00	0.00	2.2	2.8	2.0	0.00	0.00	0.00
22	0.00	0.00	0.00	e0.00	0.00	0.00	2.4	2.8	1.9	0.00	0.00	0.00
23	0.00	0.00	0.00	e0.00	0.00	0.00	2.9	2.8	1.9	0.00	0.00	0.00
24	0.00	0.00	0.00	e0.00	0.00	0.00	2.8	2.8	1.8	0.00	0.00	0.00
25	0.00	0.00	0.00	e0.00	0.00	0.00	2.8	2.8	1.6	0.00	0.00	0.00
26	0.01	0.00	0.00	e0.00	0.00	0.00	2.8	2.8	1.4	0.10	0.00	0.00
27	0.00	0.00	0.00	e0.00	0.00	0.00	3.1	2.8	0.00	0.48	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	3.7	2.8	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.90	3.6	2.8	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	---	2.4	3.5	2.8	0.00	0.00	0.00	0.00
31	0.00	---	0.00	0.00	---	2.0	---	2.8	---	0.00	0.00	---
TOTAL	0.01	0.00	0.00	0.00	0.00	5.30	90.7	95.7	59.20	0.58	0.49	0.25
MEAN	0.0003	0.000	0.000	0.000	0.000	0.17	3.02	3.09	1.97	0.019	0.016	0.008
AC-FT	.02	0	0	0	0	11	180	190	117	1.2	1.0	0.5
MAX	0.01	0.00	0.00	0.00	0.00	2.4	4.4	3.8	2.8	0.48	0.38	0.25
MIN	0.00	0.00	0.00	0.00	0.00	0.00	1.9	2.8	0.00	0.00	0.00	0.00

CAL YR	2011	TOTAL	315.40	MEAN	0.86	MAX	3.6	MIN	0.00	AC-FT	626
WTR YR	2012	TOTAL	252.23	MEAN	0.69	MAX	4.4	MIN	0.00	AC-FT	500

MAX DISCH: 8.58 CFS AT 17:30 ON AUG 17,2012 GH 1.65 FT SHIFT 0 FT
 MAX GH: 1.65 FT AT 17:30 ON AUG 17,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

PIONEER DITCH AT THE COLORADO-NEW MEXICO STATELINE
 WY2012 HYDROGRAPH



SAN JUAN RIVER BASIN
ENTERPRISE DITCH AT THE COLORADO-NEW MEXICO STATELINE
Water Year 2012

Location.-- Lat. 37°00'34.6", Long. 108°11'23.3", in SW¼SE¼ sec. 3, T.32 N., R.13 W., NMPM, La Plata County, CO, Hydrologic Unit 14080105, on left bank 2,200 ft. upstream of the confluence of La Plata River and Johnny Pond Arroyo .

Drainage Area and Period of Record.-- NA
; Diversion record Nov. 1, 1948 to present (Structure ID = 3300540 – water used in Colorado) and/or diversion record Nov. 1, 1973 to Oct. 31, 2010 (Structure ID = 3304639 – water used in New Mexico). Diversion record Nov. 1, 2010 to present (Structure ID = 3300540 - water used in Colorado and New Mexico).

Equipment.-- Published streamflow record Oct. 1, 1993 to present.
Sutron Satlink 2 high data rate DCP with a shaft encoder in a 30" diameter corrugated metal pipe shelter and 24" X 17" X 27" (L, W, H) concrete stilling well. Primary reference gage is an outside staff gage installed in flume. Control is a 2-foot concrete Parshall flume. No changes this year.

Hydrologic Conditions.-- The ditch above and below the control is silt with a very well defined stilling pool above the flume. The approach conditions into the flume are good but can degrade if willow growth along the ditch is not maintained. The last time ditch maintenance occurred near the flume was between May 4th and 10th 2006. Silt can deposit in the stilling pool above the flume causing the velocity to increase. Vegetative growth downstream can submerge the flume if the ditch is not maintained.

Gage-Height Record.-- The primary record is 15-minute shaft encoder data downloaded from satellite telemetry with DCP log as backup. Data downloaded from the DCP was used on Mar. 21-23, 2012 to overwrite erroneous data and fill in missing data caused by the malfunction of the GOES West satellite. The gage was visited on 19 separate occasions this water year to verify the shaft encoder remained calibrated to the primary reference gage. The shaft encoder was adjusted once this water year (- 0.01 on Sep. 5, 2012). In the winter, water from melting snow can seep in to the stilling well and freeze under the float causing false gage height readings. The period affected by the freezing well is Dec. 9-13, 26-31, 2011, Jan. 1-27, 2012 and it was assumed no diversions were made during this period. Record is complete and reliable.

Datum Corrections.-- Levels were not run this water year. Levels were last run on Mar. 2, 2009 using the floor of the flume at the staff gage as the base. Levels were used to determine if the converging section of the flume is level. Results indicate the flume was properly set. No other benchmarks were set at the time.

Rating.-- The control is a 2 foot concrete Parshall flume. Rating No. 01 is a standard 2-ft. Parshall flume rating above a gage height of 0.03 ft. and was used the entire water year. The intake to the stilling well is 0.03 ft. above the floor of the flume. Flows below a gage height 0.03 ft. are assumed to be negligible and a 0 flow is assigned to them. The rating is fairly well defined to 7.4 cfs. One discharge measurement and two observations of zero flow (Aug. 9, 16, 2012), were made this water year. They range in discharge from 0.00 to 2.70 cfs. The measurements cover the entire range in stage experienced except for the higher average daily flows of Apr. 2-30; May 1-7, 2012. The peak instantaneous flow of 6.22 cfs occurred at 1945 on Apr. 13, 2012 at a gage height of 0.85 ft with a shift of 0.00 ft. It exceeded the stage of measurement No. 32, made on May 10, 2012 by 0.35 feet in stage.

Discharge.-- Shifting section control method was used for all periods of good record as the range in stage experienced this year was confined to the Parshall flume. Measurements are made in the flume at the staff gage and well intake. Shifts were applied as defined by measurements and were distributed by time. All shifts were given full weight. A 0.00 ft. shift was applied for the entire period of record.

Special Computations.-- No special computations were necessary this water year.

Remarks.-- Record and peak instantaneous flow should be considered good. Station maintained by Matt Schmitt, Russell Crangle and Brian Boughton. Record developed by Brian Boughton.

Recommendations.-- Additional benchmarks should be established at the gage.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

ENTERPRISE DITCH AT THE COLORADO-NEW MEXICO STATELINE

RATING TABLE-- ENTDTICO01 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

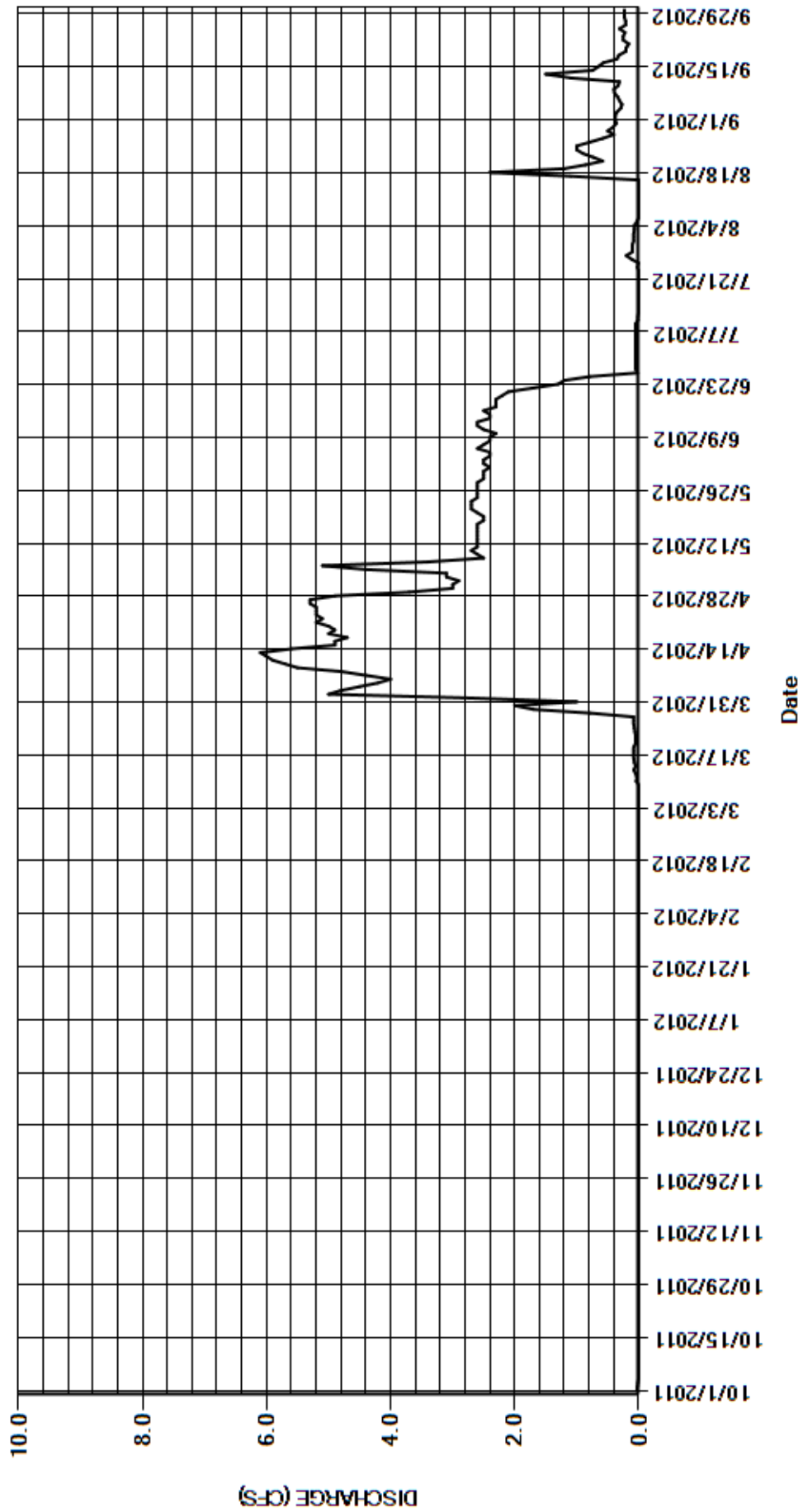
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.03	0.00	0.00	e0.00	0.00	0.00	2.7	3.0	2.4	0.05	0.08	0.38
2	0.02	0.00	0.00	e0.00	0.00	0.00	5.0	2.9	2.5	0.05	0.08	0.38
3	0.01	0.00	0.00	e0.00	0.00	0.00	4.8	3.1	2.5	0.05	0.07	0.35
4	0.00	0.00	0.00	e0.00	0.00	0.00	4.5	3.1	2.4	0.05	0.07	0.29
5	0.00	0.00	0.00	e0.00	0.00	0.00	4.2	4.4	2.4	0.05	0.03	0.27
6	0.00	0.00	0.00	e0.00	0.00	0.00	4.0	5.1	2.6	0.05	0.00	0.31
7	0.00	0.00	0.00	e0.00	0.00	0.00	4.4	3.4	2.5	0.05	0.00	0.34
8	0.00	0.00	0.00	e0.00	0.00	0.00	4.8	2.5	2.4	0.05	0.00	0.39
9	0.00	0.00	e0.00	e0.00	0.00	0.00	5.5	2.6	2.4	0.05	0.00	0.40
10	0.00	0.00	e0.00	e0.00	0.00	0.04	5.7	2.7	2.3	0.01	0.00	0.33
11	0.00	0.00	e0.00	e0.00	0.00	0.03	5.9	2.6	2.5	0.01	0.00	0.31
12	0.00	0.00	e0.00	e0.00	0.00	0.05	6.0	2.6	2.6	0.00	0.00	1.1
13	0.00	0.00	e0.00	e0.00	0.00	0.08	6.1	2.6	2.6	0.00	0.00	1.5
14	0.00	0.00	0.00	e0.00	0.00	0.05	5.6	2.6	2.4	0.00	0.00	0.74
15	0.00	0.00	0.00	e0.00	0.00	0.07	4.9	2.6	2.4	0.00	0.00	0.65
16	0.00	0.00	0.00	e0.00	0.00	0.08	4.9	2.6	2.5	0.00	0.00	0.57
17	0.00	0.00	0.00	e0.00	0.00	0.08	4.7	2.6	2.3	0.00	1.1	0.35
18	0.00	0.00	0.00	e0.00	0.00	0.08	5.0	2.5	2.3	0.00	2.4	0.32
19	0.00	0.00	0.00	e0.00	0.00	0.08	4.9	2.5	2.3	0.00	1.2	0.21
20	0.00	0.00	0.00	e0.00	0.00	0.05	5.0	2.6	2.2	0.00	0.86	0.20
21	0.00	0.00	0.00	e0.00	0.00	0.05	5.2	2.7	2.1	0.00	0.58	0.16
22	0.00	0.00	0.00	e0.00	0.00	0.05	5.1	2.7	1.7	0.00	0.73	0.25
23	0.00	0.00	0.00	e0.00	0.00	0.06	5.2	2.7	1.3	0.00	0.90	0.25
24	0.00	0.00	0.00	e0.00	0.00	0.07	5.2	2.6	1.2	0.02	1.0	0.22
25	0.00	0.00	0.00	e0.00	0.00	0.08	5.2	2.6	0.79	0.00	1.0	0.31
26	0.00	0.00	e0.00	e0.00	0.00	0.08	5.3	2.6	0.02	0.11	0.79	0.21
27	0.00	0.00	e0.00	e0.00	0.00	0.08	5.3	2.6	0.05	0.20	0.58	0.21
28	0.00	0.00	e0.00	0.00	0.00	0.78	4.9	2.6	0.05	0.10	0.40	0.23
29	0.00	0.00	e0.00	0.00	0.00	1.7	3.7	2.5	0.05	0.10	0.50	0.23
30	0.00	0.00	e0.00	0.00	---	2.0	3.0	2.5	0.05	0.10	0.41	0.23
31	0.00	---	e0.00	0.00	---	1.0	---	2.5	---	0.08	0.36	---
TOTAL	0.06	0.00	0.00	0.00	0.00	6.64	146.7	87.2	55.81	1.18	13.14	11.69
MEAN	0.002	0.000	0.000	0.000	0.000	0.21	4.89	2.81	1.86	0.038	0.42	0.39
AC-FT	0.1	0	0	0	0	13	291	173	111	2.3	26	23
MAX	0.03	0.00	0.00	0.00	0.00	2.0	6.1	5.1	2.6	0.20	2.4	1.5
MIN	0.00	0.00	0.00	0.00	0.00	0.00	2.7	2.5	0.02	0.00	0.00	0.16

CAL YR	2011	TOTAL	448.99	MEAN	1.23	MAX	5.9	MIN	0.00	AC-FT	891
WTR YR	2012	TOTAL	322.42	MEAN	0.88	MAX	6.1	MIN	0.00	AC-FT	640

MAX DISCH: 6.22 CFS AT 19:45 ON APR 13,2012 GH 0.85 FT SHIFT 0 FT
 MAX GH: 0.85 FT AT 19:45 ON APR 13,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

ENTERPRISE DITCH AT THE COLORADO-NEW MEXICO STATELINE
WY2012 HYDROGRAPH



SAN JUAN RIVER BASIN
09366500 LA PLATA RIVER AT THE COLORADO-NEW MEXICO STATELINE
Water Year 2012

Location.-- Lat. 36°59'59", Long. 108°11'17", in NW¼SE¼ sec. 10, T.32 N., R.13 W., NMPM, La Plata County, CO, Hydrologic Unit 14080105, on right bank at Colorado-New Mexico State line, 0.5 mi downstream of Johnny Pond Arroyo, and 4.9 mi north of La Plata, NM.

Drainage Area and Period of Record.-- 331 mi². ; Jan. 1920 to current year. Monthly data only for some periods.

Equipment.-- Graphic water stage-recorder and Sutron Satlink 2 DCP and shaft encoder on separate floats in a 42-inch diameter CMP well and 64-inch by 64-inch cement block shelter. The floats are located inside of a 14 inch PVC oil cylinder. The primary reference gage is an electric drop tape inside the gage house. A drop tape is used to reference the gage inside the oil cylinder when the well is frozen. The station is also equipped with an air temperature sensor. The control is a compound concrete long throated flume, hereafter referred to as a "ramp flume". A foot bridge located 6-feet below the gage house is used for access and to make high flow measurements. No changes this water year.

Hydrologic Conditions.-- The drainage area above the gage is 331 square miles. The basin begins in high mountain terrain above 11,000 feet and drops to 5,972 feet at the gage. The gage is located at the Colorado-New Mexico Stateline. The basin mainly consists of rock and forested mountains to an elevation of 8,000 feet (Hesperus) and changes to agricultural from Hesperus to the Stateline. Many diversions for irrigation occur above this gage.

Gage-Height Record.-- The primary record is 15-minute shaft encoder data downloaded from satellite telemetry with DCP download data and graphic chart record for backup purposes. The gage was visited on 47 separate occasions this water year to verify the instruments remained calibrated to the primary reference gage. The shaft encoder was adjusted 7 times this water year (Nov. 18, 2011 with +0.01 ft. correction, Dec. 21, 2011 with -0.01 ft. correction, Mar. 5, 2012 with +0.01 ft. correction, Apr. 6, 2012 with -0.01 ft. correction, May 10, 2012 with -0.01 ft. correction, and Sep. 14, 2012 with -0.01 ft. correction). The correction applied on May 25, 2012, was removed at the end of the measurement. The record was corrected by distributing the correction by time to the last known matched reading. The record is complete and reliable, except for the following days when the stage discharge relationship was affected by ice on the control: Dec. 7-19, 25-31, 2011; Jan. 1-30, 2012 and when the intake valve remained closed after a flush: Jul. 30-31, Aug. 1-6, 2012.

Datum Corrections.-- Levels were run on Aug. 23, 2012 to the electric tape index (ET index) using RM #3 as the base. The ET index was found to be reading +0.002 ft. high. The electric tape length was found to be reading +0.006 ft. long. No corrections were made since the ET index and ET length were found to be within the allowable error tolerances. Levels were also run to the two other reference marks (RM#4 and RM#5) and a secondary reference point. RM#4 was found to be reading +0.007 feet high. RM#5 was found to be reading +0.015 feet high. The DT index was found to be reading +0.002 ft. high. The drop tape length was found to be reading -0.002 ft. short. No corrections were made since the DT index and DT length were found to be within the allowable error tolerances.

Rating.-- The control is a long throated flume, hereafter referred to as a "Ramp Flume" that was constructed in August of 2001 to act as the control section for the gage. Low flows, 0 to 1.6 cfs, (GH 2.80 ft. to 3.30 ft.) are controlled by the low flow notch in the ramp flume. Medium flows, 1.6 cfs to 320 cfs, (GH 3.30 ft. to 5.37 ft.) are controlled by the second stage of the ramp flume. High flows (above 320 cfs) are controlled by the channel. High flows begin when the stage reaches 5.37 ft. At stages 5.37 ft. to 8.40 ft., water will overbank on the left side into a natural section lined with grass, trees and willows. The ramp flume is located about 14 feet below the inlets to the gage. The point-of-zero-flow (PZF) is approximately 2.80 ft. The PZF was measured with a wading rod on Sep. 30, 2011 and Sep. 14, 2012. Rating No. 33 in use since Oct. 1, 2008 was used the entire water year. The rating is well-defined to 572 cfs. The upper end of the rating table (above 1200 cfs) is based on the poor measurement made Sept. 9, 2003. Seventeen discharge measurements (Nos. 1432-1448) were made this year, ranging in discharge from 0.11 to 73.3 cfs. Two observations of 0 flow were made this year. Observations of 0 flow were made on Aug. 14 and 16, 2012. Measurements and observations of 0 flow cover the range in stage experienced except for the higher daily flows of Apr. 27, 2012. The peak instantaneous flow of 123 cfs occurred at 2030 Aug. 17, 2012 at a gage height of 4.55 ft. with a shift of 0.00 ft. It exceeded the stage of measurement No. 1439, made Apr. 25, 2012 by 0.26 feet in stage.

Discharge.-- Shifting control method was used for the entire water year. Shifts were applied as defined by measurements and were distributed by stage. The variable shift curve LAPMEXCOVS11A in use at the end of water year 2011 continued until 1330 Oct. 24, 2011. Variable shift curve LAPMEXCOVS12B began at 1345 Oct. 24, 2011 and was used the remaining water year. Open-water measurements showed unadjusted shifts varying between -0.03 and +0.01 feet. Shifts were applied directly and given full weight except measurement Nos. 1432, 1437, 1438, 1439, 1440, 1441, and 1444 which were discounted from -8% to 7% to smooth shift distribution. The shift for measurement Nos. 1443 and 1446 were not used.

Special Computations.-- Discharge for periods of ice-affected record was estimated on the basis of good record before and after ice, temperature records, by cutting off ice peaks on graphic chart and partial days of good record. The gage hydrograph was used to determine periods of ice-affected record. The period when the intake valve was closed was estimated by using good record before and after the intake was closed. Hydrograph comparisons to the other stream (LAPCHECO & LONREDCO) and diversion (ENTDITCO & PIODITCO) gages upstream were made to ensure the system was operating relatively steady.

Remarks.-- Record good, except for periods when ice affected the stage-discharge relationship and when the intake valve was closed. Record during these periods were estimated and should be considered poor. The peak instantaneous flow should be considered good. Station maintained by Russell Crangle, Matt Schmitt, Brian Leavesley and Brian Boughton. Record developed by Brian Boughton.

Recommendations.-- Install a crest stage gage.

STATE OF COLORADO
 DIVISION OF WATER RESOURCES
 OFFICE OF STATE ENGINEER

09366500 LA PLATA RIVER AT THE COLORADO-NEW MEXICO STATELINE

RATING TABLE.-- LAPMEXCO33 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

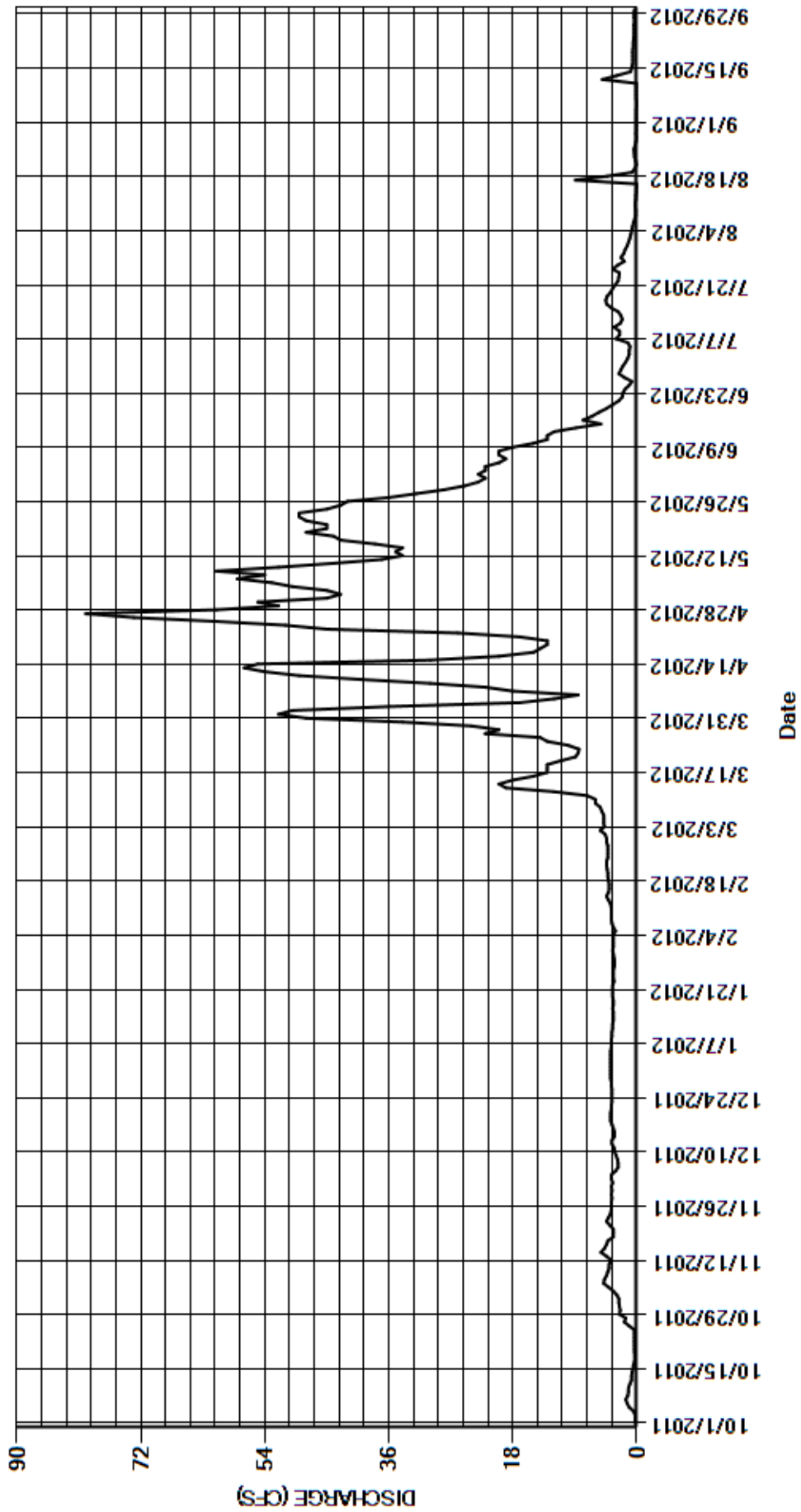
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.25	2.6	3.7	e3.8	3.4	4.6	52	45	22	1.6	e1.2	0.07
2	0.24	2.6	3.5	e3.8	3.4	5.3	50	43	23	1.3	e1.0	0.05
3	0.24	2.9	3.7	e3.8	3.4	4.7	36	45	22	1.1	e0.86	0.05
4	0.48	3.4	3.7	e3.8	3.4	4.8	17	50	22	1.1	e0.73	0.05
5	1.1	4.1	3.1	e3.8	3.1	4.8	12	53	20	0.98	e0.60	0.02
6	1.4	4.8	2.7	e3.7	3.4	4.8	8.5	58	19	1.3	e0.49	0.01
7	1.6	4.7	e2.7	e3.7	3.6	5.1	18	54	20	3.0	0.28	0.05
8	1.3	4.4	e2.8	e3.7	3.7	5.3	22	61	20	2.5	0.16	0.08
9	1.2	4.2	e3.0	e3.6	3.7	6.0	30	52	18	2.5	0.15	0.09
10	1.2	4.0	e3.2	e3.6	3.7	6.0	40	44	15	3.3	0.23	0.07
11	1.0	4.0	e3.3	e3.5	3.7	7.2	49	37	13	2.4	0.26	0.06
12	0.76	3.7	e3.6	e3.5	3.8	12	54	34	13	2.1	0.14	5.0
13	0.76	4.4	e3.6	e3.4	4.1	19	57	35	12	2.3	0.12	2.9
14	0.69	5.2	e3.2	e3.4	4.4	20	55	34	8.8	2.7	0.04	0.91
15	0.55	4.7	e3.2	e3.4	4.1	18	30	38	5.2	3.7	0.04	0.73
16	0.48	4.4	e3.4	e3.5	4.0	15	20	43	7.8	4.4	0.01	0.60
17	0.31	4.2	e3.6	e3.4	4.0	13	15	44	6.5	4.5	8.9	0.57
18	0.28	3.4	e3.8	e3.4	4.1	13	14	48	5.5	4.3	4.3	0.57
19	0.32	3.4	e3.8	e3.5	4.2	13	13	45	4.4	3.8	0.69	0.59
20	0.34	3.4	3.8	e3.5	4.2	11	13	45	3.5	3.5	0.28	0.55
21	0.34	3.9	3.7	e3.5	4.3	8.9	17	48	2.6	3.1	0.06	0.51
22	0.37	4.4	3.7	e3.5	4.4	8.5	26	49	2.1	2.7	0.18	0.49
23	0.36	4.1	3.6	e3.3	4.4	8.4	45	49	2.0	2.6	0.32	0.42
24	0.35	3.8	3.6	e3.4	4.2	10	51	45	1.7	2.5	0.37	0.39
25	0.37	3.7	e3.6	e3.4	4.2	13	61	43	1.1	3.5	0.41	0.40
26	1.1	3.7	e3.6	e3.4	4.2	14	73	42	0.71	2.8	0.24	0.45
27	1.8	3.7	e3.7	e3.2	4.2	22	80	36	1.8	1.8	0.11	0.33
28	1.6	3.6	e3.7	e3.2	4.4	20	61	32	2.6	2.3	0.03	0.41
29	2.5	3.7	e3.8	e3.3	4.4	24	52	28	2.3	1.9	0.11	0.41
30	2.4	3.6	e3.8	e3.4	---	34	55	25	2.0	e1.7	0.05	0.36
31	2.5	---	e3.8	3.5	---	48	---	23	---	e1.4	0.04	---
TOTAL	28.19	116.7	108.0	108.9	114.1	403.4	1126.5	1328	299.61	78.68	22.40	17.19
MEAN	0.91	3.89	3.48	3.51	3.93	13.0	37.6	42.8	9.99	2.54	0.72	0.57
AC-FT	56	231	214	216	226	800	2230	2630	594	156	44	34
MAX	2.5	5.2	3.8	3.8	4.4	48	80	61	23	4.5	8.9	5.0
MIN	0.24	2.6	2.7	3.2	3.1	4.6	8.5	23	0.71	0.98	0.01	0.01

CAL YR	2011	TOTAL	6271.97	MEAN	17.2	MAX	115	MIN	0.11	AC-FT	12440
WTR YR	2012	TOTAL	3751.67	MEAN	10.3	MAX	80	MIN	0.01	AC-FT	7440

MAX DISCH: 123 CFS AT 20:30 ON AUG 17,2012 GH 4.55 FT SHIFT 0 FT
 MAX GH: 4.55 FT AT 20:30 ON AUG 17,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

09366500 LA PLATA RIVER AT THE COLORADO-NEW MEXICO STATELINE
WY2012 HYDROGRAPH



SAN JUAN RIVER BASIN
MANCOS RIVER NEAR MANCOS

Water Year 2012

Location.-- Lat. 37°21'15", Long. 108°15'33", in NE¼NE¼ sec. 27, T.36 N., R.13 W., NMPM, Montezuma County, Hydrologic Unit 14080107, on the right bank 0.32 miles downstream of the confluence of the East and West Mancos River, 2 miles upstream from the town of Mancos, CO.

Drainage Area and Period of Record.-- 72.6 mi². ; Published by the USGS Oct. 1, 1931 to Sept. 30, 1938. Published by the Colorado Division of Water Resources Nov. 1953 to present.

Equipment.-- Graphic water stage-recorder and a Sutron Satlink 2 DCP with a shaft encoder on a separate float in a 64 in x 64 in concrete block shelter and a 42 in CMP well. The primary reference gage is a steel drop tape referenced to an adjustable reference point (RP). An air temperature gage is installed to assist in ice day estimates. No other changes.

Hydrologic Conditions.-- Large cobbles and boulders line the channel above and below the gage. Diversions for irrigation and filling reservoirs affect the flow at the gage.

Gage-Height Record.-- The primary record is 15-minute shaft encoder data downloaded from satellite telemetry with the DCP and chart record used for backup purposes. The gage was visited on 25 separate occasions this water year to verify the instruments remained calibrated to the primary reference gage. The shaft encoder was adjusted two (2) times throughout the year, ranging from -0.01 ft to +0.01 ft. Three (3) flush corrections were made this water year. The flush corrections occurred on Mar. 28 (+0.05 ft.), Apr 2 (+0.06 ft.), and Apr. 30 (+0.03 ft.). The flush corrections were distributed by time within the final record depending on the time of a close inflection point on the hydrograph. The stilling well was cleaned out with pumps on Jun. 15. The gage height during the period of cleaning was estimated. The record is complete and reliable, except for the following days when the stage discharge relationship was affected by ice: Nov. 10, 17, 26-30, Dec. 5-11, 14-18, 21-28, 31, 2011; Jan. 1-15, 18-19, 21-23, 25, 28-29, 31, Feb. 1, 7-8, 10-11, 13, 15-29, Mar. 1-9, 11, 14, 20-21, 2012. On the following days during the winter months the control was ice affected but it was stable with a steady measured ice-affected shift: Dec. 1-4, 12-13, 19-20, 29-30, 2011, and Jan. 16-17, 20, 24, 26-27, 30, Feb. 2-6, 9, 12, 14, 2012.

Datum Corrections.-- Levels were not run in water year 2012. Levels were last run on Oct. 6, 2010 using the drop tape reference point (RP) as the base. The benchmarks established on Aug. 16, 2007 were not used because the level loop did not close within allowable error tolerances. Elevations on BM 1 and BM 2 were established from the Oct.6, 2010 set of levels. No adjustments to the datum were made.

Rating.-- The control is a rock riffle located directly below the gage. The channel is the control at high flow. Gravel and sand fill and scour on the control section causing shifts. Rating No. 10, in use since October 28, 2008, was used for the entire water year. It is well defined from 0.99 cfs to 800 cfs. Eighteen (18) measurements (Nos. 650 - 667) were made during the water year ranging in discharge from 1.83 cfs to 50.5 cfs. They cover the range in stage experienced except for the lower average daily flows of Jan. 12-17, 21, 25, 27-28, Feb. 1-4, 2012 and the higher average daily flows of Apr. 1-2, 2012. The peak instantaneous flow of 68.3 cfs occurred at 0115 on April 1, 2012 at a gage height of 4.08 ft. with a shift of 0.00 ft. It exceeded the stage of Measurement No. 658, made April 2, 2012 by 0.12 feet in stage.

Discharge.-- Shifting control method was used during the entire water year. Shifting is caused mainly by gravel and sand filling and scouring on the control section. Shifts were transitioned (prorated by time) from water year 2011 through to the first measurement of water year 2012 and then distributed by stage using variable shift curve MANMANCOVS12a from October 28, 2011 until November 25, 2011 when ice formed on the river. Measurements during the winter months indicated a different shift regime therefore shifts were distributed by time until March 4, 2012, when the flow in the river began to increase. Transition between the variable shift and proration by time is sharp, however it occurred on ice affected days. Shifts were distributed by stage using variable shift curve MANMANCOVS12a from March 5, 2012 through the end of the water year. Measurements show unadjusted shifts varying from -0.06 feet to +0.03 feet. Shifts were applied directly and given full weight except Measurement Nos. 653, 654, 657, 661, 662, and 665, which were discounted from -9% to +6% to smooth shift distribution. Measurement No. 662 was performed on Jun. 15 while the well was being flushed and there is no electronic gage height record. Gage height record was replaced by prorated tape readings before and after the measurement. Measurement No. 652 on Dec. 8 was made during a period of ice affected gage height and the shift was not considered in the final distribution.

Special Computations.-- Discharge for periods of ice affect were estimated on the basis of good partial day record, interim good record, and air temperature record at the gage.

Remarks.-- Record good, except for those periods of ice affected record, which are estimated and poor. Periods of ice affect determined to have a steady gage height with ice affect present on the control as determined through measurement are considered fair. The peak instantaneous flow should be considered good. Station maintained by Div 7 staff and record developed by Brian Leavesley.

Recommendations.-- A threshold should be installed to prevent mice and rodents from entering the shelter.

STATE OF COLORADO
DIVISION OF WATER RESOURCES
OFFICE OF STATE ENGINEER

MANCOS RIVER NEAR MANCOS

RATING TABLE.-- MANMANCO10 USED FROM 01-OCT-2011 TO 30-SEP-2012

DISCHARGE, IN CFS, WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

MEAN VALUES

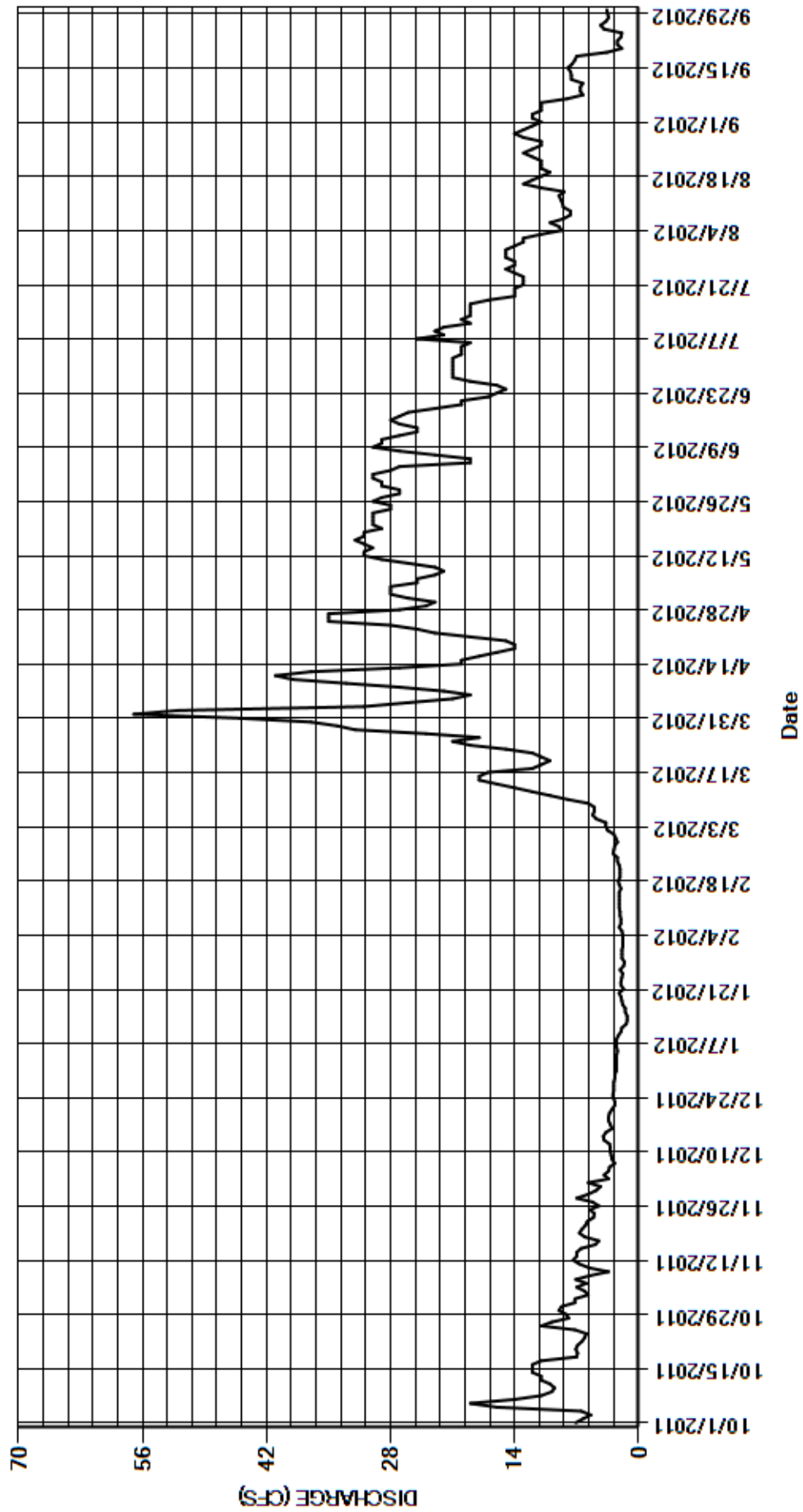
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.1	7.2	e4.3	e2.5	e1.8	e2.8	57	26	30	21	13	11
2	6.3	7.2	e5.7	e2.5	e1.8	e3.5	52	28	30	21	13	12
3	5.4	5.7	e3.4	e2.5	e1.8	e3.7	31	28	28	20	11	12
4	6.5	6.1	e3.9	e2.5	e1.8	e3.7	26	28	27	20	8.7	11
5	16	7.0	e3.4	e2.4	e1.9	e4.8	21	25	19	20	9.0	11
6	19	5.9	e3.3	e2.5	e2.2	e5.2	19	25	19	19	10	11
7	14	7.1	e2.7	e2.5	e2.0	e5.0	22	23	23	25	8.5	8.1
8	11	5.5	e3.0	e2.5	e2.0	e5.0	27	22	27	22	7.7	6.3
9	9.8	3.4	e3.1	e2.3	e2.1	e5.7	33	23	30	23	7.7	6.6
10	9.5	e5.6	e3.2	e2.0	e2.1	8.0	39	26	29	22	8.5	6.6
11	10	6.7	e3.2	e1.9	e2.2	e10	41	29	29	19	8.6	6.3
12	11	7.4	e3.3	e1.4	e2.2	12	37	31	27	20	8.8	7.6
13	11	7.0	e3.9	e1.3	e2.2	14	27	31	25	19	9.0	7.6
14	12	7.0	e4.0	e1.3	e2.2	e16	20	30	25	19	8.4	7.7
15	12	6.5	e3.7	e1.5	e2.2	18	20	31	27	19	11	8.0
16	12	4.9	e3.0	e1.5	e2.0	18	18	32	28	19	13	7.5
17	11	e4.5	e3.2	e1.8	e2.2	17	16	31	27	17	12	7.2
18	7.0	6.1	e3.4	e1.9	e2.3	12	14	31	26	14	11	7.0
19	6.9	6.7	e3.4	e2.0	e2.1	11	14	29	23	14	10	3.6
20	7.1	6.4	e3.3	e2.2	e2.1	e10	15	30	20	14	11	1.9
21	6.9	6.0	e3.0	e1.7	e2.1	e11	19	30	20	13	11	2.4
22	6.4	5.8	e2.7	e2.0	e2.2	12	23	30	17	13	11	2.4
23	6.1	5.1	e2.7	e2.0	e2.4	15	25	30	16	13	12	2.0
24	5.9	5.0	e2.9	e1.9	e2.4	19	28	28	15	14	13	1.9
25	7.2	5.5	e2.9	e1.8	e2.9	21	35	28	16	15	12	3.9
26	11	e4.5	e2.8	e2.1	e2.8	18	35	30	19	14	11	4.3
27	9.8	e5.2	e2.8	e1.7	e2.7	24	35	29	21	14	11	3.7
28	7.9	e7.0	e2.8	e1.6	e2.4	32	27	27	21	15	13	3.4
29	8.2	e5.7	e2.7	e1.9	e2.6	34	24	27	21	15	14	3.5
30	9.0	e4.8	e2.7	e1.9	---	37	23	29	21	15	13	3.6
31	8.7	---	e2.5	e1.9	---	45	---	29	---	14	12	---
TOTAL	291.7	178.5	100.9	61.5	63.7	453.4	823	876	706	542	332.9	191.1
MEAN	9.41	5.95	3.25	1.98	2.20	14.6	27.4	28.3	23.5	17.5	10.7	6.37
AC-FT	579	354	200	122	126	899	1630	1740	1400	1080	660	379
MAX	19	7.4	5.7	2.5	2.9	45	57	32	30	25	14	12
MIN	5.4	3.4	2.5	1.3	1.8	2.8	14	22	15	13	7.7	1.9

CAL YR	2011	TOTAL	10960.6	MEAN	30.0	MAX	244	MIN	2.5	AC-FT	21740
WTR YR	2012	TOTAL	4620.7	MEAN	12.6	MAX	57	MIN	1.3	AC-FT	9170

MAX DISCH: 68.3 CFS AT 01:15 ON APR 01,2012 GH 4.08 FT SHIFT 0 FT
MAX GH: 4.08 FT AT 01:15 ON APR 01,2012

FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

**MANCOS RIVER NEAR MANCOS
WY2012 HYDROGRAPH**



Station Identification Codes

DIV I

CODE	NAME
ADATUNCO	ALVA B. ADAMS TUNNEL AT EAST PORTAL, NEAR ESTES PARK
ADANETCO	ALVA B. ADAMS TUNNEL AT EAST PORTAL (NET), NEAR ESTES PARK
BCRMORCO	BEAR CREEK AT MORRISON
BCRSHECO	BEAR CREEK AT SHERIDAN
BERDITCO	BERTHOUD PASS DITCH AT BERTHOUD PASS
BFCLYOCO	BOULDER CREEK FEEDER CANAL NEAR LYONS
BIGLASCO	BIG THOMPSON AT MOUTH, NEAR LA SALLE
BOBGLNCO	BOB CREEK DITCH NEAR GLENDEVEY
BOCBGRCO	SOUTH BOULDER CREEK BELOW GROSS RESERVOIR
BOCELSCO	SOUTH BOULDER CREEK NEAR ELDERADO SPRINGS
BOCMIDCO	MIDDLE BOULDER CREEK AT NEDERLAND
BOCOBOCO	BOULDER CREEK AT BOULDER
BOCOROCO	BOULDER CREEK NEAR ORODELL
BORDITCO	BOREAS PASS DITCH AT BOREAS PASS
BOSDELCO	SOUTH BOULDER CREEK, DIVERSION NR ELDERADO SPRINGS
BTABESCO	BIG THOMPSON RIVER ABOVE LAKE ESTES
BTBLESCO	BIG THOMPSON RIVER BELOW LAKE ESTES
BTCANYCO	BIG THOMPSON RIVER AT MOUTH OF CANYON, NEAR DRAKE
BTPPMCCO	CHARLES HANSEN FEEDER CANAL POWER PLANT TO BIG THOMPSON
BUCKRMVCO	BUCKHORN CREEK NEAR MASONVILLE
BTNFDRCO	NORTH FORK BIG THOMPSON RIVER AT DRAKE
CAPDCPCO	CAMERON PASS DITCH NEAR CAMERON PASS
CLAFTCCO	CACHE LA POUFRE AT CANYON MOUTH, NEAR FORT COLLINS
CLAGRECO	CACHE LA POUFRE NEAR GREELEY
CLAWASCO	CACHE LA POUFRE AT GREELEY WASTEWATER TREATMENT PLANT
CLEDERCO	CLEAR CREEK AT DERBY
COCREPCO	COAL CREEK NEAR PLAINVIEW
DEADDPCCO	DEADMAN DITCH NEAR DEADMAN PARK
DILTUNCO	DILLE TUNNEL NEAR DRAKE
FALIDACO	FALL RIVER AT MOUTH NEAR IDAHO SPRINGS
FISHESCO	FISH CREEK NEAR ESTES PARK
GRNDRDCO	GRAND RIVER DITCH AT LA POUFRE PASS
GUMCLRCCO	A.P. GUMGLICK TUNNEL RELEASE TO CLEAR CREEK AT JONES PASS
HFCBBSCO	CHARLES HANSEN FEEDER CANAL BELOW BIG THOMPSON SIPHON
HFCWASCO	CHARLES HANSEN FEEDER CANAL WASTEWAY TO BIG THOMPSON
HOMSPICCO	AURORA HOMESTAKE PIPELINE
HSPTUNCO	HOOSIER PASS TUNNEL AT MONTGOMERY RES., NEAR ALMA
LAPTUNCO	LARAMIE POUFRE TUNNEL
LEFTHDCO	LEFTHAND DIVERSION S. ST. VRAIN CREEK NEAR WARD
LTCANYCO	LITTLE THOMPSON RIVER AT CANYON MOUTH, NEAR BERTHOUD
MICHIGANCO	MICHIGAN DITCH AT CAMERON PASS
MIDSTECO	MIDDLE ST. VRAIN CREEK NR. PEACEFUL VALLEY
MOFTUNCO	MOFFAT WATER TUNNEL, GILPIN COUNTY
OLYTUNCO	OLYMPUS TUNNEL (ESTES FOOTHILLS CANAL) AT LAKE ESTES
ONEJURCO	SOUTH PLATTE RIVER AT JULESBURG CHANNEL #1
PIOHDGCO	PIIONEER DITCH AT HEADGATE
PIOSTLCO	PIIONEER DITCH AT CO/NE STATE LINE
PLAANTCO	SOUTH PLATTE RIVE BELOW ANTERO RESERVOIR
PLABALCO	SOUTH PLATTE RIVER AT COOPER BRIDGE, NEAR BALZAC
PLACHACO	SOUTH PLATTE RIVER BELOW CHATFIELD RESERVOIR
PLACHECO	SOUTH PLATTE RIVER BL. CHEESMAN RESERVOIR
PLADENCO	SOUTH PLATTE RIVER AT DENVER
PLAGEOCO	SOUTH PLATTE RIVER NEAR LAKE GEORGE
PLAGRACO	NORTH FORK SOUTH PLATTE RIVER AT GRANT
PLAHARCO	SOUTH PLATTE RIVER ABOVE ELEVENMILE RESERVOIR
PLAHENCO	SOUTH PLATTE RIVER AT HENDERSON
PLAJUCCO	SOUTH PLATTE RIVER AT JULESBURG COMBINED
PLAJULCO	SOUTH PLATTE RIVER AT JULESBURG LEFT CHAN. #4
PLAJURCO	SOUTH PLATTE RIVER AT JULESBURG RIGHT CHAN. #2
PLAKERCO	SOUTH PLATTE RIVER NEAR KERSEY
PLASPICCO	SOUTH PLATTE RIVER ABOVE SPINNEY RESERVOIR
PLASPLCO	SOUTH PLATTE RIVER AT SOUTH PLATTE
PLASTRCCO	SOUTH PLATTE RIVER BELOW STRONTIA SPRINGS
PLAWATCO	SOUTH PLATTE RIVER AT WATERTON
PLAWELCO	SOUTH PLATTE RIVER NEAR WELDONA
ROBTUNCO	ROBERTS TUNNEL AT EAST PORTAL NEAR GRANT
SKYDCLCO	SKYLINE DITCH AT CHAMBERS LAKE
SSVWARCO	SOUTH ST. VRAIN NEAR WARD
STCTUNCO	STRAIGHT CREEK TUNNEL AT EISENHOWER TUNNEL
STLINECO	STATELINE DITCH RETURN NEAR JULESBURG
SVCLYOCO	SAINT VRAIN CREEK AT LYONS
SVCPLACO	ST. VRAIN CREEK AT MOUTH, NEAR PLATTEVILLE

SVSLYOCO	ST. VRAIN SUPPLY CANAL NEAR LYONS
TARBORCO	TARRYALL CREEK AT BORDEN DITCH NEAR JEFFERSON
TARTARCO	TARRYALL CREEK BELOW TARRYALL RESERVOIR
VIDTUNCO	VIDLER TUNNEL NEAR ARGENTINE PASS
WINDESCO	WIND RIVER NEAR ESTES PARK
WINBYPCO	WIND RIVER BY-PASS NEAR ESTES PARK
WSDEARCO	WILSON SUPPLY DITCH NEAR EATON RESERVOIR

DIV II

CODE	NAME
ARKCACCO	ARKANSAS RIVER AND CATLIN CANAL COMBINED
ARKCANCO	ARKANSAS RIVER AT CANYON CITY
ARKCARCO	ARKANSAS RIVER BELOW X-Y DITCH DAM NEAR CARLTON
ARKCATCO	ARKANSAS RIVER BELOW CATLIN DAM NEAR FOWLER
ARKGRNCO	ARKANSAS RIVER AT GRANITE
ARKLAJCO	ARKANSAS RIVER AT LA JUNTA
ARKNEPCO	ARKANSAS RIVER NEAR NEPESTA
ARKNECCO	ARKANSAS RIVER AT NEPESTA ROAD BRIDGE COMBINED
ARKPORCO	ARKANSAS RIVER AT PORTLAND
ARKPUECO	ARKANSAS RIVER ABOVE PUEBLO
ARKROCCO	ARKANSAS RIVER AT ROCKY FORD
ARKSALCO	ARKANSAS RIVER AT SALIDA
ARKWELCO	ARKANSAS RIVER NEAR WELLSVILLE
BOUTUNCO	CHARLES H. BOUSTEAD TUNNEL
BUSTUNCO	BUSK-IVANHOE TUNNEL
CATCANCO	CATLIN CANAL AT CATLIN DAM, NEAR FOWLER
CANSWKCO	CROOKED ARROYO NEAR SWINK
CCACCRCO	CLEAR CREEK ABOVE CLEAR CREEK RESERVOIR
CCBCCRCO	CLEAR CREEK BELOW CLEAR CREEK RESERVOIR
CHCRNACO	CHALK CREEK AT NATHROP
COLDITCO	COLUMBINE DITCH
COCRBVCO	COTTONWOOD CREEK NEAR BUENA VISTA
CRBRLVCO	CUCHARAS RIVER AT BOYD RANCH NEAR LA VETA
CRHBLVCO	CUCHARAS RIVER AT HARRISON BRIDGE NEAR LA VETA
EWIDITCO	EWING DITCH
GRAWESCO	GRAPE CREEK NEAR WESTCLIFFE
HILCANCO	HIGHLAND CANAL BELOW HIGHLAND DAM NEAR LAS ANIMAS
HOMTUNCO	HOMESTAKE TUNNEL
HRC194CO	HORSE CREEK AT HIGHWAY 194
HURREDCO	HUERFANO RIVER NEAR REDWING
LAKATLCO	LAKE CREEK ABOVE TWIN LAKES RESERVOIR
LAKBTLCO	LAKE CREEK BELOW TWIN LAKES RESERVOIR
LARDITCO	LARKSPUR DITCH AT MARSHALL PASS
LFBSLCO	LAKE FORK CREEK BELOW SUGAR LOAF DAM NEAR LEADVILLE
MUDTOOCO	MUDDY CREEK NEAR TOONERVILLE
NMCHIGCO	NINEMILE CANAL AT NINEMILE DAM NEAR HIGBEE
OXFDITCO	OXFORD FARMERS DITCH NEAR NEPESTA
PURHILCO	PURGATOIRE RIVER BELOW HIGHLAND DAM NEAR LAS ANIMAS
PURHICCO	PURGATOIRE RIVER BELOW HIGHLAND DAM NEAR LAS ANIMAS (COMBINED)
PURNICCO	PURGATOIRE R AT NINEMILE DAM, NR HIGBEE COMBINED
PURNINCO	PURGATOIRE RIVER AT NINEMILE DAM, NEAR HIGBEE
PURTRICO	PURGATOIRE RIVER AT TRINIDAD
RACRSTCO	RATON CREEK ABOVE STARKVILLE
RULTOOCO	RULE CREEK NEAR TOONERVILLE
TWITUNCO	TWIN LAKES TUNNEL
WURDITCO	WURTZ DITCH NEAR TENNESSEE PASS
WUREXTCO	WURTZ EXTENSION DITCH NEAR TENNESSEE PASS

DIV III

CODE	NAME
ALABELCO	ALAMOSA CREEK BELOW TERRACE RESERVOIR
ALARANCO	ALAMOSA RIVER BELOW RANGER CREEK
ALATERCO	ALAMOSA CREEK ABOVE TERRACE RESERVOIR
ALAWIGCO	ALAMOSA RIVER ABOVE WIGHTMAN FORK NEAR JASPER
BIGSPGCO	BIG SPRING CREEK AT MEDANO RANCH NEAR MOSCA
CARLAGCO	CARNERO CREEK NEAR LA GARITA
CBPALACO	CLOSED BASIN PROJECT CANAL NEAR ALAMOSA
CHECRECO	CHERRY CREEK NEAR CRESTONE
COCRMICO	COTTON CREEK NEAR MINERAL HOT SPRINGS
COCRESO	COTTONWOOD CREEK NEAR CRESTONE
CONLASCO	COMBINED CONEJOS RIVER (NORLASCO SOULASCO)

CONMOGCO	CONEJOS RIVER NEAR MOGOTE
CONPLACO	CONEJOS RIVER BELOW PLATORO RESERVOIR
CULSANCO	CULEBRA CREEK AT SAN LUIS
DEDMOUCO	DEADMAN CREEK AT MOUTH OF CANYON NEAR CRESTONE
DEDCRECO	DEADMAN CREEK NEAR CRESTONE
DLFDT0CO	DON LA FONT DITCH, COMBINED, AT PIEDRA PASS
DLFDT1CO	DON LA FONT DITCH NO. 1 AT PIEDRA PASS
DLFDT2CO	DON LA FONT DITCH NO. 2 AT PIEDRA PASS
GARVILCO	GARNER CREEK NEAR VILLA GROVE
GOOWAGCO	GOOSE CREEK AT WAGONWHEEL GAP
KERVILCO	KERBER CREEK NEAR VILLA GROVE
LAGLAGCO	LA GARITA CREEK NEAR LA GARITA
LAJCAPCO	LAJARA CREEK AT GALLEGOS RANCH NEAR CAPULIN
LITSPGCO	LITTLE SPRING CREEK AT MEDANO RANCH NEAR MOSCA
LOSORTCO	LOS PINOS RIVER NEAR ORTIZ
MAJVILCO	MAJOR CREEK NEAR VILLA GROVE
NCLCONCO	NORTH CLEAR CREEK BELOW CONTINENTAL RESERVOIR
NOCRESCO	CRESTONE CREEK, NORTH NEAR CRESTONE
NORDLSCO	NORTON DRAIN NEAR LA SAUSES
NORDSCCO	SOUTH CHANNEL NORTON DRAIN DITCH NEAR LA SAUSES
NORLASCO	NORTH CHANNEL CONEJOS RIVER NEAR LASAUSES
PINDELCO	PINOS CREEK NEAR DEL NORTE
PRWDITCO	PINE RIVER WEMINUCHE PASS DITCH AT WEMINUCHE PASS
RIOALACO	RIO GRANDE RIVER AT ALAMOSA
RIODELCO	RIO GRANDE NEAR DEL NORTE
RIOLINCO	RIO GRANDE AT RIO GRANDE-ALAMOSA COUNTY LINE
RIOLOBCO	RIO GRANDE NEAR LOBATOS
RIOMILCO	RIO GRANDE AT THIRTY MILE BRIDGE
RIOMONCO	RIO GRANDE AT MONTE VISTA
RIOSFKCO	SOUTH FORK RIO GRANDE RIVER AT SOUTH FORK
RIOTRICO	RIO GRANDE RIVER ABOVE THE MOUTH OF TRINCHERA CREEK
RIOWAGCO	RIO GRANDE RIVER AT WAGONWHEEL GAP
RITCRECO	RITO ALTO CREEK NEAR CRESTONE
SAGSAGCO	SAGUACHE CREEK NEAR SAGUACHE
SANCRECO	SAN ISABEL CREEK NEAR CRESTONE
SANFTGCO	SANGRE DE CRISTO CREEK NEAR FT. GARLAND
SANMANCO	SAN ANTONIO RIVER NEAR MANASSA
SANORTCO	SAN ANTONIO RIVER AT ORTIZ
SOUCRECO	SOUTH CRESTONE CREEK NEAR CRESTONE
SOULASCO	SOUTH CHANNEL CONEJOS RIVER NEAR LASAUSES
SPACRECO	SPANISH CREEK NEAR CRESTONE
TABDITCO	TABOR DITCH AT SPRING CREEK PASS
TARBELCO	TARBELL DITCH NEAR COCHETOPA PASS
TREDITCO	TREASURE PASS DITCH AT WOLF CREEK PASS
TRIMTNCO	TRINCHERA CREEK ABOVE MOUNTAIN HOME RESERVOIR
TRISMICO	TRINCHERA CREEK BELOW SMITH RESERVOIR
TRITURCO	TRINCHERA CREEK AB. TURNER'S RANCH
UTEFTGCO	UTE CREEK NEAR FORT GARLAND
WCSBITCO	WILLIAM'S CREEK-SQUAW PASS DITCH AT SQUAW PASS
WEMDITCO	WEMINUCHE PASS DITCH AT WEMINUCHE PASS
WFKMOUCO	WIGHTMAN FORK AT MOUTH AT ALAMOSA RIVER
WFKCROCO	WIGHTMAN FORK BELOW CROPSY CREEK NEAR SUMMITVILLE
WILCRECO	WILLOW CREEK NEAR CRESTONE

DIV IV

CODE	NAME
ABCLATCO	ABC LATERAL
GUNREDCO	GUNNISON RIVER BELOW REDLANDS DIVERSION DAM
MUDAPRCO	MUDDY CREEK ABOVE PAONIA RESERVOIR
MUDBPRCO	MUDDY CREEK BELOW PAONIA RESERVOIR
RLCGRJCO	REDLANDS CANAL NR GRAND JUNCTION
SOUCANCO	SOUTH CANAL NR MONTROSE
UNCUPSCO	UNCOMPAHGRE RIVER UPSTREAM OF SOUTH CANAL
UNCBRGCO	UNCOMPAHGRE RIVER AT UNCOMPAHGRE ROAD BRIDGE
UNCOLACO	UNCOMPAHGRE RIVER NEAR OLATHE

DIV V

CODE	NAME
BLUNINCO	BLUE RIVER AT HIGHWAY 9 BRIDGE
CHAGULCO	CHAPMAN GULCH NEAR NAST
CRYDOWCO	CRYSTAL RIVER AT DOW FISH HATCHERY NEAR CARBONDALE
FRYIVLCO	FRYINGPAN RIVER NEAR IVANHOE LAKE
FRYMERCO	FRYINGPAN RIVER AT MEREDITH
FRYNFNCO	NORTH FORK FRYINGPAN RIVER NEAR NORRIE
FRYSFUCO	SOUTH FORK FRYINGPAN RIVER AT UPPER STATION
FRYTHOCO	FRYINGPAN RIVER NEAR THOMASVILLE
IVCRNACO	IVANHOE CREEK NEAR NAST
ROABMCCO	ROARING FORK RIVER BELOW MAROON CREEK NEAR ASPEN
ROAFRYCO	ROARING FORK RIVER ABOVE MOUTH OF FRYINGPAN RIVER NEAR BASALT
RFCMERCO	ROCKY FORK CREEK NEAR MEREDITH
SNAKEYCO	SNAKE RIVER AT KEYSTONE
WSDRAVCO	WEST DIVIDE CREEK NEAR RAVEN

DIV VI

CODE	NAME
ILLRANCO	ILLINOIS RIVER NEAR RAND
MICMERCO	MICHIGAN RIVER NEAR MEADOW CREEK RESERVOIR
MICWLDCCO	MICHIGAN RIVER NEAR WALDEN
MORBSCCO	MORRISON CREEK BELOW SILVER CREEK
PTCKSLCO	POT CREEK AT UTAH-COLORADO STATELINE NEAR VERNAL
WILBSLCO	WILLOW CREEK BELOW STEAMBOAT LAKE
WLTNCKCO	WALTON CREEK NEAR STEAMBOAT SPRINGS
WMFKHMCO	WILLIAMS FORK AT MOUTH NEAR HAMILTON
YAMABVCO	YAMPA RIVER ABOVE LAKE CATAMOUNT

DIV VII

CODE	NAME
ANIHOWCO	ANIMAS RIVER NEAR HOWARDSVILLE
AZOTUNNM	AZOTEA TUNNEL OUTLET NEAR CHAMA NM
BLADIVCO	BLANCO DIVERSION NEAR PAGOSA SPRINGS
CHEREDCO	CHERRY CREEK AT THE MOUTH NEAR RED MESA
DOLBMCCO	DOLORES RIVER BELOW MCPHEE RESERVOIR
DOLTUNCO	DOLORES TUNNEL OUTLET NEAR DOLORES
ENTDITCO	ENTERPRISE DITCH AT THE COLO-NEW MEXICO STATELINE
FLOALECO	FLORIDA RIVER ABOVE LEMON RESERVOIR NEAR DURANGO
FLOBLECO	FLORIDA RIVER BELOW LEMON RESERVOIR
LAPHESCO	LA PLATA RIVER AT HESPERUS
LAPMEXCO	LA PLATA RIVER AT THE COLORADO/NEW MEXICO LINE
LITOSOCO	LITTLE NAVAJO RIVER BELOW LITTLE OSO DIVERSION DAM NEAR CHROMO
LONREDCO	LONG HOLLOW AT THE MOUTH NEAR RED MESA
LOSODVCO	LITTLE OSO DIVERSION NEAR CHROMO
LPCDITCO	LA PLATA AND CHERRY CREEK DITCH NEAR HESPERUS
MANMANCO	MANCOS RIVER NEAR MANCOS
MVIDIVCO	LONE PINE CANAL BELOW GREAT CUT DIKE NEAR DOLORES
NAVBANCO	NAVAJO RIVER AT BANDED PEAKS RANCH NEAR CHROMO
NAVOSOCO	NAVAJO RIVER BELOW OSO DIVERSION DAM NEAR CHROMO
OSODIVDO	OSO DIVERSION NEAR CHROMO
PINDITCO	PINE RIDGE DITCH NEAR HESPERUS
PIODITCO	PIONEER DITCH AT THE COLORADO-NEW MEXICO STATELINE
RIOBLACO	RIO BLANCO BELOW BLANCO DIVERSION DAM NEAR PAGOSA
RIOMOUCO	RIO BLANCO AT THE MOUTH NEAR TRUJILLO