2017 Hydrography and Satellite Monitoring Annual Report

Introduction

The primary mission of the DWR Hydrographic and Satellite Monitoring team is to collect, analyze, and present accurate, high quality 'real time' flow and storage data in Colorado rivers, streams, creeks, canals, ditches and reservoirs to support the water rights administration mission of DWR. Hydrographers in each Division office around the State operate and maintain a system of streamflow and reservoir level gaging stations on these watercourses and diversion structures; perform streamflow measurements to maintain stage-discharge relationships at gaging stations; and maintain satellite monitoring equipment with the goals of making the data available in near real time. The team develops streamflow records at select locations in coordination with other State and federal entities and the water user community.

The Satellite-linked Monitoring System (SMS) provides the Division of Water Resources, other State and federal entities, the water user community and the public at large with access to real-time streamflow and storage data from gaging stations across the State of Colorado. These data and software systems provide for more effective and efficient water rights administration, water resource management, computerized hydrologic record development, and high (flood) and low flow alerts. The SMS allow the Division of Water Resources to collect, process, store, and distribute any kind of environmental data transmitted from remote locations. The data set of interest to the Division is the water level at rivers, streams, diversion structures, and reservoirs. The SMS converts these raw water level values into several products of use to various users. The products range from raw data passed on to other computer systems to the official Hydrographic Records of mean daily streamflows. Users include Division of Water Resources personnel and other water users requiring real-time flow data for water rights administration, computer systems performing other analyses, and the varied user community of State and federal agencies, municipalities, canal companies, attorneys, recreationists, and consulting engineers needing access to real-time stream flow data.

<u>General Program Support</u>

- Matt Hardesty, Chief of Hydrography and Well Metering
- David Hutchens, Electronics Specialist IV (office in Lakewood): Satellite telemetry inventory, maintenance and statewide installation.
- Scott Cuthbertson, Deputy State Engineer

Division 1
Russell Stroud (PSRS IV),
Lee Cunning (PE I)
Patrick Tyler (EPS Tech III)
Tony Arnett (EPS Tech II)
Matt Rusch (EPS Tech II)
Michael Pockrus (EPS Tech II)
Bob Erosky (EPS Tech II): 0.8 FTE Retired 2/28/2018 and replaced by Travis Gilbertson
Devin Ridnour (EPS Tech II): 0.6 FTE
Jara Johnson (EPS Tech II): 0.8 FTE

Division 2
Joe Talbott (PSRS IV),
Lori Lest (PE I)
Cheston Hart (PSRS II) Position converted to PSRS II from EIT 1 in May 2018
Anthony Gutierrez (EPS Tech II)
Matt Rusch (EPS Tech II)
John Canaday (EPS Tech II) replaced Warren Gabbert March 12, 2018 (Transfer to Div. 7)

Division 3
Scott Veneman (PSRS IV),
Jesse Jaminet (PSRS II)
Lee Conner (EIT I)
Lanny McDonald (EPS Tech II)
Geoff Warden (EPS Tech II)

Division 4
Vacant (PSRS II) after retirement of Jerry Thrush April 2018: Supported by Paul Schmucker, James Holiman and Jason Ullmann.

Division 5
Craig Bruner (PE I): Supported by Neal Misbach, Troy Wineland, and Jake DeWolfe and Corey Beaugh (transferred to Division 7)

Division 6
Dan Meyer (PE I): Other duties as Assistant Division Engineer

Division 7
Brian Boughton (PE II): Oversees streamflow record development in Divs. 4-7
Brian Leavesley (EIT II)

Gaging Station and Hydrographic Operations

Hydrographic staff are responsible for: designing, constructing, maintaining and operating streamgages, gage infrastructure, satellite monitoring equipment, conducting regular discharge measurement for the purposes of maintaining and developing stage-discharge and velocity indexed relations as well as working and publishing streamflow records. Hydrographers also respond to requests for water measurements from Water Commissioners, Division and State staff as well as measurement and rating requests from Ditch and Canal operators, cooperating entities and consulting engineering firms.

Data Source	1	2	3	4	5	6	7	Grand Total
Co. Division of Water Resources-Non Published Stream Gage	113	132	42	30	21	10	45	393
Co. Division of Water Resources-Published Stream Gage	62	45	56	9	14	8	25	219
Co. Division of Water Resources-Published Stream Gage (Non-Telemetered)	7	3	4					14
Grand Total	**182**	**180**	**102**	**39**	**35**	**18**	**70**	**626**

Streamflow Measurement Statistics

Hydrographers and water commissioners across the State made 4,855 measurements in Water Year 2017 in streams, rivers, canals and ditches (see table below). These measurements were made to calibrate stage-discharge relationships at streamgaging stations, in canals and ditches in support of real-time water administration decision-making and in support of historic streamflow record development.

Division							
1	2	3	4	5	6	7	Grand Total
1381	891	1659	193	199	108	424	4855

Hydrographic Tool Development

In 2017, Phil DeArcos and other OIT staff in conjunction with Hydrography and the DWR Water Information Team were able to implement FTP website and

Web Service decoding capabilities for use in the administrative flow network. In the coming year, Hydrography and the Water Information Team will also work on making improvements to the Surface Water Conditions Website and consider additional telemetry system improvements to allow handling of generic data files such as those provided by SCADA systems.

Satellite Monitoring Station Upgrades, Refurbishments and New Gages

Approximately 50 DCPs are replaced annually assuming the equipment has about a 10 year life. This annual replacement rate represents about 10-12% of the current SM network each year. David Hutchens manages the satellite monitoring equipment inventory and coordinates with the Lead Hydrographer in each Division to perform equipment upgrades.

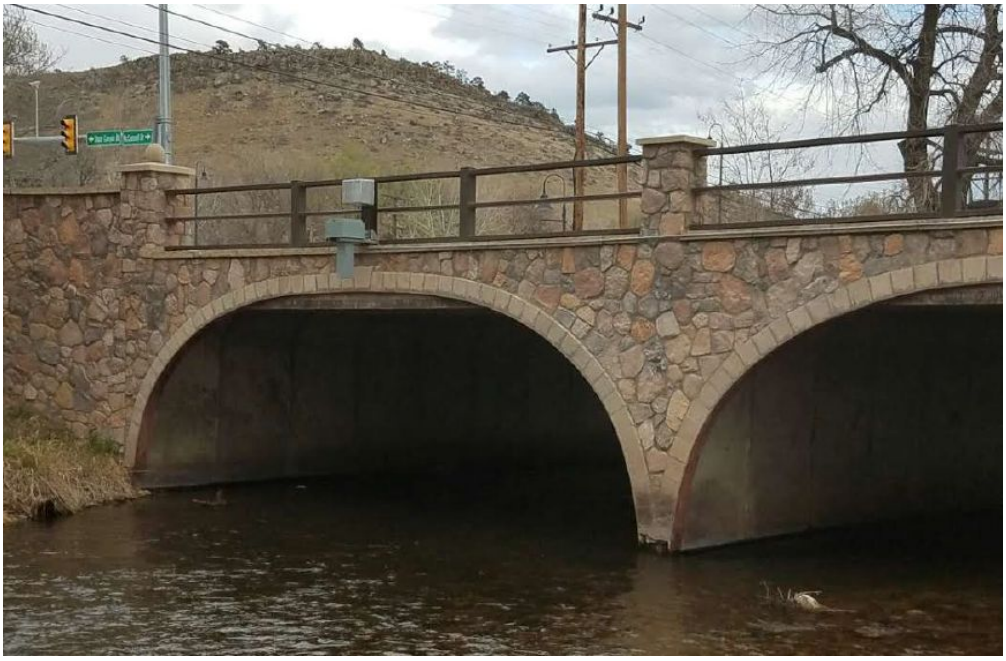
Along with equipment upgrades, DWR Hydrography also continues to refurbish and maintain existing streamgages and refurbish existing gages with funds from CWCB for this purpose. The Hydrography program also obtains funds from cooperators for operation of various gages around the state.

Division 1

Big Thompson River at LaSalle Reconstruction: Replacement of control, stilling well and gage shelter.

Little Thompson River at Canyon Mouth Reconstruction

Saint Vrain Creek at Lyons Relocations to McConnell St. Bridge



Division 2

Cucharas River at Colorado Highway 10 New Gage Construction

Huerfano River at Badito Re-construction

Huerfano River at I-25 New Gage Construction:

Division 3

No significant modifications or additions made to the system.

Division 4

No significant modifications or additions made to the system.

Division 5

No significant modifications or additions made to the system.

Division 6

No significant modifications or additions made to the system.

Division 7

- Navajo River Below Oso Diversion Dam Ogee Spillway Radar Installation
- Rio Blanco River Below Blanco Diversion Dam Ogee Spillway Installation

Training

The annual Hydrography Conference was held in Gunnison on October 24-26, 2017.