

1957
ANNUAL REPORT

A. RALPH OWENS, DIVISION ENGINEER
Irrigation Division No. 1

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Mr. J. E. Whitten, State Engineer
State of Colorado
State Capitol Building
Denver, Colorado

Dear Mr. Whitten:

I hereby present the Annual Report of the Office of Division Engineer of Irrigation Division No. 1, for the year 1957.

Weather-wise, the year has been one of surprise. Precipitation and soil moisture deficient for several years continued so until April when amounts ranging from 1.50 inches at Sterling to 6.85 inches at Boulder were recorded. These amounts were exceeded during May, ranging from 4.49 inches at Sterling to 9.27 inches at Boulder. The snowpack in our mountain areas normally diminishes during April, but this year continued to increase through April and May. Due to cool weather, the snow melt was slow, permitting the many "off channel" reservoirs to fill - Maximum storage being reached about July 1st when reports from the water commissioners gave a total of 1,163,500 acre feet. Storage May 1st for all purposes was 665,000 acre feet, deducting municipal and Colorado Big Thompson storage, left a balance of 362,000 acre feet which was 74% of the average for this date. November 1st total 888,000 acre feet - Of this amount, 470,000 is for irrigation, or 24% of the average carry-over.

Probably the best yardstick of the water supply of this basin is the "date of water call". The most senior being to supply 1885 priority in Water District No. 2 - this existed but a short time. For several short periods, Water District No. 1 called water junior to 1888. However, for the greater part of the season "No Demand" was made on upstream areas. It is difficult to think back to 1956 when for only brief periods, water rights junior to 1871 were supplied.

The excellent water supply is reflected by the crops which are much above normal; this is particularly true of the Henrylynn and Riverside Irrigation Districts and all of South Park which have been well nigh "ham strung" for several years. The past six weeks of cool moist weather have hampered sugar beet and corn for grain harvests. Any considerable amount of snow and cold weather would cause a heavy loss on the sugar beet crop.

Return flow is very much better than a year ago. The index station for this is the flow at Kersey - November 1956 average was 367 c.f.s. - Measurements late October and early November indicate that the average November flow will be 1050 c.f.s. By about January 1st when reservoirs will all be filled to safe levels, the flow at Kersey will probably exceed 1500 c.f.s. and at Julesburg, 2000 c.f.s.

No reservoir dams were lost this year, though they were filled to capacity for a longer than normal period. Several were in danger and might well have been lost with considerable damage to property, if not life. Promptly lowering the water level is believed to have saved two.

The third probably was saved by virtue of a heavy dam, as the capacity of the outlet pipe is too small to lower the water level rapidly.

The City of Colorado Springs placed the sealer face on Montgomery reservoir dam this fall, completing that unit of their Hoosier Pass trans-mountain system. This dam is entirely of loose rock which passes water freely. The sealing face consists of a 12 inch blanket of asphaltic concrete.

The Trans-mountain diversions this season were curtailed during the period of maximum runoff due to lack of need for immediate use and lack of storage space for later use. The total diverted to the basin was 281,324 acre feet. Of this amount, the Colorado Big Thompson Project was responsible for 192,200 acre feet and the City of Denver, 51,000 acre feet.

The controversy over stock water dams continues. One on Beaver Creek in Water District No. 1 was removed during the season, and after the close of the season some channel work was done with a dragline. Several dams (not stock) remain. A meeting, sponsored by the Soil Conservation Service, was held at Anton during the summer at which time our position on this matter was outlined to the farmers. It is hoped that this will bear fruit with farmers and Soil Conservation Service men in that area. Two small dams on Box Elder Creek in Water District No. 1 were also removed because they interfered with irrigation rights.

The long continued controversy between Colorado and Wyoming users of the waters of the Laramie River were finally resolved. Under the new agreement or compact, Colorado has gained approximately 10,000 acre feet annually. The figures now are:

Trans-mountain diversion from the Laramie River..19,875 acre ft.
 Divertible to Colorado meadow land before July 31st.. 27,700 " "
 " " " " " after " .. 1,800 " "

For the 4,845 acres of meadow land, the per acre diversions reduce to:
 5.7172 prior to July 31st and 0.3715 after July 31st


Confirmation of this negotiated compact was obtained in time to operate under it this season. Water was so plentiful in Wyoming this year that no complaints were received about our refusal to charge natural overflow water against the ranchers' allotments.

The flow of Sand Creek was so heavy that Wyoming water users made no complaints.

The administration of the Big Thompson Project water, the amounts delivered to the several stream systems, and the problems encountered therewith will be contained in the report of Special Deputy State Engineer, C. E. Schnurr.

Tabulations of Water Commissioners' Annual Reports, Amounts of Water in Storage, Totals of Trans-Mountain Diversions and Amounts Diverted by the several users from the Laramie River and Tributaries accompany and form a part of this report.

Respectfully submitted,


 Division Engineer
 Irrigation Division No. 1

TRANS-MOUNTAIN DIVERSIONS

Name of Diversion	From Dist.	To Dist.	Source of Supply	Diverted Acre Ft.	Totals Ac.Ft.
✓ Boreas Pass	36	8	Blue River	462	
✓ *Hoosier Pass	36	10	" "	<u>7,025</u> *	7,487
✓ Berthoud Pass	51	7-2	Colo. River	566	
✓ Moffat Tunnel	51	6-7-8	" "	46,400	
✓ Wms.Fork Tun.	51	7-8	" "	4,641	
Adams Tunnel	51		" "	192,200	
Eureka Ditch	51	4	" "	124	
Grand River D.	51	3	" "	<u>15,980</u>	259,911
✓ Cameron Pass D.	47	3	Michigan River	63	
✓ Michigan Ditch	47	3	" "	<u>1,079</u>	1,142
✓ Wilson Supply (Sand Creek)	48	3	Sand Creek	<u>923</u>	923
✓ Deadman Ditch	48	3	Laramie River	360	
Laramie Poudre Tunnel	48	3	" "	15,047	
✓ Skyline Ditch	48	3	" "	3,479	
Columbine Ditch	48	3	" "	0	
Bob Creek Ditch	48	3	" "	0	
Lost Lake Ditch	48	3	" "	<u>0</u>	<u>18,886</u>
Grand Total					281,324

* Not included in Grand Total

Dist.	Use	June 1	July 1	August 1	September 1	October 1	November 1
1	Dist. Irrig. Big Thomp. Municipal Total	141,699	140,958	123,651	79,268	47,873	66,163
2	Dist. Irrig. Big Thomp. Municipal Total	50,759	71,003	57,437	51,121	31,487	34,591
3	Dist. Irrig. Big Thomp. Municipal Total	131,032 127,412 6,147 264,591	162,649 136,225 8,470 307,344	148,261 128,270 8,154 284,685	115,097 104,160 8,027 227,284	100,855 84,389 6,642 191,886	121,030 77,574 6,642 205,246
4	Dist. Irrig. Big Thomp. Municipal Total	109,146 83,489 192,635	117,240 93,805 211,045	97,932 93,805 191,737	93,164 80,798 173,962	89,587 63,786 153,373	89,587 60,200 149,787
5	Dist. Irrig. Big Thomp. Municipal Total	34,715	35,984	35,984	30,685	28,152	28,421
6	Dist. Irrig. Big Thomp. Municipal Total	28,464 4,966 25,459 58,889	35,075 5,205 44,406 84,686	33,366 5,622 42,546 81,534	30,867 5,113 47,410 83,380	27,000 5,779 46,998 79,777	27,109 7,265 45,678 80,042
7	Dist. Irrig. Municipal Total	30,007 12,138 42,145	30,000 10,710 40,710	29,263 11,795 41,058	24,645 11,914 36,559	22,650 11,692 34,342	22,761 9,641 32,402
8	Cherry Creek Municipal	17,109	17,071	17,232	17,444	17,444	15,662
9	Dist. Irrig. Municipal Total	8,951	8,766	7,931	7,613	6,800	6,956
23	Dist. Irrig. Municipal Total	82,608	6,700 116,650 123,350	6,700 182,904 189,604	6,700 195,289 201,989	6,500 194,504 201,004	6,500 195,598 202,098
64	Dist. Irrig.	109,347	122,637	113,107	76,188	50,427	66,624
Totals							
	Irrigation	644,120	731,012	653,635	515,348	411,331	469,742
	Big Thomp.	215,867	235,235	227,697	190,071	153,954	145,039
	Municipal	143,461	197,307	262,631	280,084	277,280	273,221
	Grand Total	1,003,448	1,163,554	1,143,963	986,099	842,565	888,002
	Note:	Cherry Creek Reservoir not included.					

Dist.	Use	Dec. 1956	Jan. 1957	Feb. 1957	March 1957	April 1957	May 1957
1	Dist. Irrig. Big Thomp. Municipal Total	22,367	45,725	56,214	71,759	86,591	108,371
2	Dist. Irrig. Big Thomp. Municipal Total	7,755	12,445	16,697	16,697	17,304	30,367
3	Dist. Irrig. Big Thomp. Municipal Total	24,553 45,802 4,708 75,063	29,157 56,820 4,708 90,685	32,168 69,660 4,708 106,536	36,193 83,907 4,708 124,808	40,054 101,407 4,708 146,169	54,307 119,342 4,708 178,357
4	Dist. Irrig. Big Thomp. Municipal Total	19,373 30,323 49,696	22,459 40,816 63,275	22,531 50,161 72,692	23,034 65,885 88,919	24,145 75,177 99,322	43,183 80,083 123,266
5	Dist. Irrig. Big Thomp. Municipal Total	7,227	9,085	11,119	13,034	14,071	24,333
6	Dist. Irrig. Big Thomp. Municipal Total	7,345 2,269 14,164 23,778	8,376 2,269 13,660 24,305	9,155 2,237 13,236 24,618	9,732 2,243 13,203 25,178	10,283 2,237 9,983 22,503	17,969 2,237 6,294 26,500
7	Dist. Irrig. Municipal Total	1,174 9,572 10,746	2,844 8,827 11,671	4,554 6,226 10,780	6,237 4,097 10,334	6,514 4,676 11,190	9,975 9,304 19,279
8	Municipal	16,420	15,587	16,327	16,303	14,335	17,714
9	Dist Irrig. Municipal Total	1,694	2,268	2,792	2,908	2,955	6,311
23	Dist. Irrig. Municipal Total	49,984	48,728	48,658	49,396	52,550	63,756
64	Dist. Irrig.	10,749	27,110	38,379	51,565	55,780	67,266
Totals							
	Irrigation	102,237	159,469	193,609	253,833	257,697	362,082
	Big Thomp.	78,394	99,905	122,058	152,035	178,821	201,662
	Municipal	78,428	91,510	89,155	87,707	86,252	101,776
	Grand Total	259,059	350,884	404,822	493,575	522,770	665,520

WATER IN STORAGE SOUTH PLATTE RIVER SYSTEM

Irrigation Only -- Figures in Acre Feet

<u>Year</u>	<u>May 1</u>	<u>November 1</u>	<u>May 1 in % of Normal</u>	<u>Nov. 1 % of Normal</u>
1938	314,019	345,829	64	176
1939	579,578	41,842	117	21
1940	242,892	45,075	49	22
1941	311,425	155,188	63	79
1942	533,002	350,255	108	179
1943	628,397	161,921	127	88
1944	563,588	132,258	114	68
1945	456,907	348,079	97	178
1946	509,884	162,197	103	88
1947	522,501	307,760	106	157
1948	598,680	151,688	121	78
1949	435,006	259,855	88	132
1950	507,847	117,058	103	60
1951	404,734	286,460	82	141
1952	674,975	244,932	136	125
1953	637,992	198,884	129	101
1954	541,842	90,554	110	49
1955	413,533	118,939	84	60
1956	295,334	44,039	60	22
1957	362,082	469,742	74	240

Av. 1938-1955
May 1 - 493,431
Nov. 1 - 195,487

OFFICE OF STATE ENGINEER OF COLORADO
 Diversions from Laramie River and Tributaries
 - 1957 -
 Recapitulation - Totals for Season
 - - - -

Name of Ditch	Amount Diverted Day Second Feet to July 31st	Amount Diverted Day Second Feet After July 31st
Bliler - Boswell Stuck Warren	843.41	0
Mansfield & Enlg. Mansfield No. 2	735.24	64.46
Forrester No. 1 Grace Cr. & Enlg.	1,026.39	0.96
Detro No. 1 Detro No. 2 Lower La Garde	445.85	0
Jimmy Cr. (Net) La Garde minus Lower L.G. La Garde No. 1 Schnitger	946.18	0
Yelton	323.48	0
Homestead No. 1 (Big Jenkins) Homestead No. 2 (Little Jenkins) Pache Nellie	773.70	140.56
Martin No. 1 Martin No. 2 & Enlg. Wright	1,745.88	161.33
Brown - Nun Cr. Cabin Davy Forrester - Brown Cr. Stubb	799.79	32.00
Link No. 1 Link No. 2 Smith - Brown Cr. Upper Hills	528.84	18.35
Brown -- Porter Cr.	50.70	16.92
Lamb	470.16	12.93

Laramie River Diversions - Continued

Name of Ditch	Amount Diverted Day Second Feet to July 31st	Amount Diverted Day Second Feet After July 31st
British Cr.		
Comet		
Homestead - McIntyre Cr.		
Lower Grant		
Upper Grant		
Stuart No. 1		
Stuart No. 2	485.34	28.48
Brinker		
McIntyre		
Pine Creek & Enlg.	304.72	0
Glendevey		
Talmadge	53.51	13.84
Lower Jim		
Trollope		
Ward No. 1		
Ward No. 2	544.82	0
Jim minus Lower Jim		
Jim No. 2		
Lone Tree		
Ollie		
Timothy	1,165.93	215.37
Total Meadow Land Diversion . . .	11,243.94	705.20

Summary through July 31-Allotment		<u>27,700</u> A.F.
Total Diverted	11,243.94 day second feet or	22,302 "
Total Unused balance		<u>5,399</u> "
	Total	27,701 "

Summary after July 31 - Allotment		<u>1800</u> A.F.
Total Diverted		705.20 day s.f.or
		1398.7 A.F.
Total Unused Balance		<u>401.3</u> "
		1800 Acre Feet

WATER COMMISSIONERS ANNUAL REPORTS

1957

ACRE FEET WATER USED

Dist. No.	Direct Flow	Reservoir	Big Thompson Project	Total	Acres Irrigated	First Day Used	Last Day Used
1	248,752	107,727		356,479	158,659	May 1	Oct 22
2	373,791	78,166	2,932	454,889	233,420	May 1	Oct 31
3	328,293	87,983	51,449	467,730	265,840	May 5	Oct 31
4	163,170	20,772	29,894	213,836	150,340	May 21	Oct 31
5	101,488	11,364	8,116	120,963	111,960	Mar 22	Oct 19
6	116,330	7,187	221	123,738	174,290	Apr 15	Oct 25
7	88,145			88,145	116,738	Feb 23	Nov 1
8	135,592	550		136,142	18,574	Apr 10	Oct 21
9	25,865	1,443		27,308	15,471	Mar 22	Oct 31
23	141,197			141,197	44,846	Mar 11	Aug 15
47*	386,000 Est.			386,000	128,556		
48	23,701			23,701	4,845	May 1	Nov 16
64	199,383	96,042		295,425	158,933	Feb 26	Oct 31
65	<u>17,081</u>			<u>17,081</u>	<u>8,320</u>	Apr 27	Oct 30
Total	2,348,793	411,234	92,612	2,852,639	1,590,842		

* No Water Commissioner Until September

ANNUAL REPORT FOR WATER YEAR 1957

SPECIAL DEPUTY STATE ENGINEER - LOVELAND OFFICE

NORTHERN COLORADO WATER CONSERVANCY AREA - IRRIGATION DIVISION NO. 1

The 1957 water year will, no doubt, be recorded as one of the best in the history of irrigation in this Northern Colorado Water Conservancy District area. The snow pack in the mountains during the winter months was much higher than normal and this, combined with an unusually high precipitation during the months of April and May, resulted in one of the highest stream runoff records for each of the streams in this area.

The peaks of precipitation and runoff occurred at the right time to enable all the reservoirs to fill (except those that had small inlets or had their inlets damaged by high water) which was the first time this had happened for several years. During the period of free water or no call by decrees below the mouth of the Big Thompson River, The Colorado-Big Thompson Project facilities stored a total of 11,166 day second feet or 22,150 acre-feet of Big Thompson River water:--11,480 acre-feet was stored in Carter Lake and 10,670 acre-feet was stored in Horsetooth Reservoir. There was very little holdover storage at the end of the 1956 irrigation season, but because of the situation as explained above, nearly all the reservoirs were filled by the beginning of this season. The peak runoff generally occurs between the first and fifteenth of June, but this year, it occurred on the last of June or the first part of July. This caused an unusually high runoff for the month of July and the first part of August which, without using storage water, took care of most irrigation demands by the various ditches.

Prior to this year, all original orders for "project" water went first to the water commissioners or Special Deputy State Engineer, thence to the Special Deputy State Engineer, thence to the Northern Colorado Water Conservancy District. However, this year, according to a directive issued by the State Engineer, the method was changed. All orders for "project" water by the various irrigation companies were given directly to the Northern Colorado Water Conservancy District. They were then given to the Special Deputy State

Engineer, who then compiled and dispatched them to the various water commissioners within whose district said "project" water would be distributed. This was a good year to make this change because there were only about half as many ditches calling for "project" water as in previous years. There were no problems which could not or were not handled in a satisfactory manner. However, because of the small numbers of orders handled, the testing of this procedure could not be entirely conclusive. Since the procedure would be the same regardless of the number of orders, I see no reason for the results to be any different even with a maximum number of orders. There would be, of course, a noticeable increase in the amount of work and time involved for the Special Deputy State Engineer to process the maximum number of orders.

The above normal precipitation and high runoff caused some damage to irrigation facilities. Several irrigation ditch diversion dams along the St. Vrain Creek were out of service for a short time. However, by the time water was needed for irrigation, they had been either temporarily or permanently repaired. The greatest damage to lands and irrigation facilities occurred along the Little Thompson River and its tributaries. Maintenance was heavy along several of the irrigation ditches, especially where they were located along steep hillsides. The most expensive repairs of this type were to the Hansen Feeder Canal where not only cleaning of the rock slides was necessary but, also, the replacement of several feet of concrete lining.

There were 120,871.8 acre-feet of "project" water ordered for delivery to the water users within the District this year. The distribution to the various districts was as follows:

DISTRIBUTION OF PROJECT WATER ORDERED FOR THE VARIOUS WATER DISTRICTS

(Note: Quantities given are in acre-feet based on one second foot for 24 hours equals 2 acre-feet)

<u>Water District</u>	<u>Supply</u>	<u>Grand Total</u>
No. 1		0.0
No. 2	Via Boulder Creek & Platte Valley Canal 1,912.8 Via Big Thompson River by exchange <u>1,020</u>	2,932.8
No. 3	Direct from proj. canals including replacement To Poudre River <u>2,478.4</u> <u>76,675.4</u>	79,153.8
No. 4	Via Hansen Feeder Canal direct 1,615.3 Via St. Vrain Supply Canal direct 82.3 To Little Thompson River 7,126.0 To Big Thompson River <u>20,492.8</u>	29,316.4
No. 5	To St. Vrain Creek direct 6,318.0 Direct from project canals <u>2,151.0</u>	8,469.0
No. 6	To Boulder Creek 639.8 Direct from project canals 360.0 Total orders for 1957 season	<u>999.8</u> 120,871.8

The amounts of water ordered and delivered each month by individuals and ditch companies in each district will be found in the tables at the end of this report.

In these tables, the amount of water ordered by the several ditch companies and individuals is not necessarily the same amount of water delivered to them, except where delivery is made direct from the "Project Canals". Where this is true, the ordered amount is considered, for all practical purposes, to be the delivered amount and these amounts are furnished by the Conservancy District. In the case where several ditch companies and individual users have their water delivered to a natural stream as a carrier, the total of all their orders is delivered to them at this common delivery point. Here the total of all orders is measured and a comparison or check is made of the total amount of water delivered. These figures are shown in the tables. The actual amount of water

delivered, then, to each individual or ditch company, is administered by the water commissioner of each water district involved and would be the amount ordered less the carrying charge assessed. The carrying charges are variable depending upon several conditions. However, a basic carrying charge for each water district has been outlined by the State Engineer.

From November 1, 1956 to October 31, 1957, inclusive, there was delivered from the Colorado River, as measured through the 15-foot Parshall Flume at the East Portal of Adams Tunnel, 99,173.8 day second feet or 196,720 acre-feet. (This water was used for producing power by the U.S.B.R. The water was first taken through Mary's Lake and Estes Power plants and then discharged into the afterbay of the Estes Power plant, which is called Lake Estes, and here the water is mixed with the Big Thompson River water. Water from both the Big Thompson River and the "Project" is measured into and out of Lake Estes.

During this same period, 139,029.5 day second feet or 275,760 acre-feet of water were diverted from Lake Estes as measured through the measuring flume called, Estes-Foothills Canal at West Portal near Estes Park. This amount includes 41,976 day second feet or 83,260 acre-feet of Big Thompson River water which was determined daily as "Operation Skim". Part of this was stored legally by the "Project" and the balance was returned to the Big Thompson River at the Big Thompson delivery point from the Hansen Feeder Canal.

The following is a summary of water in the Estes Park area. All values are in acre-feet, based on 1 c.f.s. x 1.983471, for the period of November 1, 1956 to October 31, 1957, inclusive:

INFLOW TO AREA		
Adams Tunnel	196,720	
Wind River measured into system	1,760	
Big Thompson River at Estes Park	137,080	
Fish Creek near Estes Park	<u>4,390</u>	339,950
OUTFLOW FROM AREA		
Estes Foothills Canal	275,760	
Stored in Mary's Lake & Lake Estes	973	
To City of Estes Park	240	
Big Thompson River below Lake Estes	<u>61,610</u>	
		<u>338,583</u>
Loss or Difference		1,367

The next area in sequence is called the Carter Lake area. The same period is considered and values are also as before. The summary is as follows:

INFLOW TO AREA			
Estes Foothills Canal	275,760		
Releases from Rattlesnake & Flatiron Reservoirs	444		
Dille Tunnel at West Portal	1,830		
Storage in Carter Lake - 11/1/56	<u>21,630</u>		299,664
OUTFLOW FROM AREA			
To Big Thompson River	84,274		
To Horsetooth Reservoir	133,210		
To Cottonwood Creek	<u>17</u>	217,501	
Releases from Carter to Little Thompson River	7,250		
Small Canal turnouts	117		
Supply Ditch	1,820		
15-foot Parshall Flume at Lyons	<u>11,550</u>	<u>20,737</u>	
			<u>238,238</u>
	Gain in Storage should be		<u>61,426</u>
	Actual Gain		<u>60,200</u>
	Loss in Area		1,226

The next area in sequence to the north is called the Horsetooth area. The same period is considered and values are also as in the other areas considered above. The summary is as follows:

INFLOW TO AREA			
From Hansen Feeder Canal less turnouts	131,612		
Storage - November 1, 1956	<u>33,307</u>		164,919
OUTFLOW FROM AREA			
20 ft. Parshall to Poudre River	64,970		
10 ft. Parshall to Poudre Valley Ditch	12,413		
Direct from Hansen Supply Canal	742.6		
Direct via Dixon Feeder Canal	866.8		
Replacement deliveries	<u>869.0</u>		<u>79,861.4</u>
	Gain in Storage should be		<u>85,057.6</u>
	Actual Gain		<u>77,442.0</u>
	Loss in Area		7,615.6

The next area in sequence to the south is called Boulder Reservoir area. The same period is considered as in the other areas above and the values are in acre-feet based as above. The summary is as follows:

INFLOW TO AREA

10 ft. Parshall Flume	4,807	
Boulder Reservoir storage - 11/1/56	<u>2,126</u>	6,933

OUTFLOW FROM AREA

Releases from Boulder Feeder Canal		
Turnouts	194	
To Boulder & Whiterock Ditch	360	
To Boulder Creek at 10 ft. Parshall	2,723	
To Dry Creek	<u>166</u>	

3,443

Storage should be 3,490

Actual Storage	7,365
Storage Should be	<u>3,490</u>
Total GAIN in Area	<u>3,875</u>

SUMMARY OF GAINS AND LOSSES OF PROJECT AREAS LISTED ABOVE

Estes area - Loss -	1,367	
Carter Lake area - Loss -	1,226	
Horsetooth area - Loss -	<u>7,615.6</u>	10,208.6
Boulder Reservoir area - Gain -	<u>3,875.0</u>	
Overall Project - Loss -	<u>6,333.6</u>	

After the "Project" water is released into Boulder Creek, that part of the water which is ordered by the Platte Valley Ditch Company for Water District No. 2 is picked up into the Lower Boulder Ditch, thence, through the Coal Ridge Extension Ditch to the Coal Ridge Waste Way Lake where it is stored and released to the South Platte River. The amounts of water measured into this Lake as measured through the 8-foot Parshall Flume are as follows:

	<u>JUNE</u>	<u>JULY</u>	<u>AUGUST</u>	<u>SEPT.</u>	<u>OCT.</u>	<u>TOTALS</u>
Day second feet	190.4	233.7	655.4	494.5	0	1574
Acre-Feet	378	464	1300	981	0	3120

Coal Ridge Waste Lake Outlet at 8-foot Parshall Flume

Day second feet	0	49.2	632.6	443.8	97	1222.6
Acre-Feet	0	97.6	1250	880	192	2420

Without taking into consideration evaporation, seepage, and releases, the above figures show that there should be 700 acre-feet of storage in Coal Ridge Waste Way Lake as of November 1, 1957.

This is the third year for the diversion of Big Thompson water at Estes Park by the U.S.B.R. in what we call "Operation Skim". This year has probably established a record for some time for the amount of water used and the total number of days involved. "Skim" started on April 16 and operated continuously until September 26. There was no change in administrative procedures for this phase of the project for this year. There was, however, additional facilities provided by the Bureau which helped in the administration. The 15-foot Parshall Flumes above and below Lake Estes were increased in height so that a more accurate measurement could be made at high flows. The flumes will now measure up to approximately 850 second feet before the water flows over the top. This was a decided help this year, since the flows were this high or higher for a number of days. Even with the added facilities, the administration of this phase of the project takes a number of hours of extra work and requires a watchful eye twenty-four hours a day from the day it starts until the day it ends. The monthly diversions at Estes Park, as determined daily for "Operation Skim", are as follows:

	<u>APRIL</u>	<u>MAY</u>	<u>JUNE</u>	<u>JULY</u>	<u>AUGUST</u>	<u>SEPT.</u>	<u>OCT.</u>	<u>TOTALS</u>
Day Sec. ft.	384	4,837	16,593	14,881	4,628	653	0	41,976
Acre-Feet	762	9,590	32,910	29,520	9,180	1300	0	83,260

Skim Water Returned to Big Thompson River from Hansen Feeder Canal At South of Big Thompson Siphon at 15-Foot Parshall Flume

Day Sec. Ft.	380	4,674	7,310.1	13,955.4	4,713	683	0	31,715
Acre-Feet	754	9,270	14,500	27,680	9,350	1,350	0	62,900

Project Water Delivered to Big Thompson River From Hansen Feeder Canal At South of Big Thompson Siphon at 15-Foot Parshall Flume

Day Sec. Ft.	0	0	0	892.6	1,557.5	4,969	3,351.2	10,770.3
Acre-Feet	0	0	0	1,770	3,090	9,860	6,650	21,370

APRIL MAY JUNE JULY AUGUST SEPT. OCT. TOTALS

Big Thompson River Diverted and Stored as Measured Through the 8-Foot Parshall Flume at West Portal of Dille Tunnel

	APRIL	MAY	JUNE	JULY	AUGUST	SEPT.	OCT.	TOTALS
Day Sec. Ft.	0	0	870	51	0	0	0	921
Acre-Feet	0	0	1,730	101	0	0	0	1,830

(Note: All foregoing quantities are in acre-feet based on 1 c.f.s. for 24 hours times 1.983471)

The difference between first and second totals above show that 20,360 acre-feet of Big Thompson River water was stored in the Project system. This, together with the Big Thompson River water diverted to the Project system via the Dille Tunnel, makes a grand total of 22,190 acre-feet of Big Thompson River water stored in the "Project" system. This grand total was computed another way and found to be 22,150 acre-feet which is a very close check.

Dams in this area were checked frequently throughout the season. As far as sight inspection could determine, no major dams were ever in danger. One small dam in the middle of the Big Elk Meadows series of dams on the West Fork of the Little Thompson River was cut to prevent the meadow from washing out at the end of the dam. A complete report of this area was sent in at an earlier date.

One more power plant is being constructed as a part of the Colorado-Big Thompson Project and is scheduled to be completed and in operation in 1959. It is located at the entrance to the Big Thompson Canyon just below the Handy Dam. The completion of this phase of the project will add to the complicated system of stream measurements and control. I hope that the advanced planning has been adequate so that the necessary equipment for proper administration has been included in the original design.

A total of 265 current meter measurements of streams and ditches were made during this year. Most of these measurements were made by Mr. Dean Thompson, the hydrographer working out of this office. The hydrographic work in this office is more than can be handled by

a personnel of two during regular working hours. During the irrigation season, there are a minimum of thirty-four gaging stations operating that have to be checked and the data compiled. The charts from these stations must be worked each week and data kept current. The charts and data from five of these stations must be worked, checked and kept up to date the year around. Fifteen of the total number of stations are stream gaging stations, nine of which have their annual data published. None of the ditches in the various water districts have been included in the total number of gaging stations mentioned above.

Snow surveys were made at the Hour Glass Lake course on the Cache la Poudre drainage by Mr. Wilkinson, Mr. Thompson and myself. Equipment for some of these surveys was rented from the City of Greeley.

It is important for the equipment in this office to be adequate to aid the personnel in efficiently and promptly processing the work which it has to turn out. We have been able to get by with the old, well-used machines so far. Recently, however, the old calculator began to give us trouble and I sent it in for repairs. Up to the present time, it has not been returned nor replaced. It is imperative that one be obtained before the next irrigation season starts. I have employed stenographers from time to time when it was absolutely necessary and they have been unable to use the old typewriter which we now have. At the present time, the only office machine which we have is a small, portable adding machine, which is adequate, but which needs cleaning. More work could be turned out more efficiently if we had an additional adding machine.

The Bureau of Reclamation employees are to be commended for their excellent cooperation. Mr. K. W. Dickey and his personnel, the Estes Park Power Plant operators and dispatchers at the Flatiron office have given me excellent assistance, especially in "Operation Skim".


I wish to thank the Northern Colorado Water Conservancy District for the office space and its secretarial help in answering the phone, taking messages, etc. when it was necessary for me to be out of the office.

They also furnished two short-wave mobile units for the hydrographer and for me. I believe these units helped this year and during a maximum water year would probably prove to be invaluable.

The following tables give a detailed distribution of "Project" water and other hydrographical data and are included as an integral part of this report.

It should be noted that, in previous reports, the "Project" canals connected with the Horsetooth Reservoir have been called the "Horsetooth Feeder Canal" and the "Horsetooth Supply Canal". These are now known and so recorded in this report as the "Hansen Feeder Canal" and the "Hansen Supply Canal".

Respectfully submitted,


Clark E. Schnurr
Special Deputy State Engineer

ANNUAL REPORT FOR WATER YEAR 1957
SPECIAL DEPUTY STATE ENGINEER - LOVELAND OFFICE

Colorado--Big Thompson Project Water Ordered and
Delivered to Water Users in Water District No. 3
During Season of 1957

NOTE: Unless otherwise specified, all quantities are in
 Acre Feet. 1 c.f.s. for 24 hours = 2 acre feet.

From Hansen Supply Canal to Poudre River as Ordered

<u>Ditch Company</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>	<u>October</u>	<u>Total</u>
North Poudre		6,133.4	11,075.0	891.6	3,089.8	21,189.8
Canyon Canal			46.6	174.4		221.0
P. Va. & Lake		55.0	78.2		240.0	373.2
Water Sup. & Stor.			1,499.8	10,195.8	4,266.8	15,962.4
Ideal Cement			40.6	33.6		74.2
New Mercer				536.8		536.8
Lar. Co. No. 2			114.0	446.8	69.0	629.8
Arthur			218.6	210.2		428.8
Larimer & Weld		1,433.4	11,891.6	9,200.0	11,750.0	34,275.0
Lake Canal			1,429.8	1,095.8		2,525.6
Box Elder Channel		76.4	125.4	38.2		240.0
Webster		16.0				16.0
City of Greeley						
Exchange				135.8	67.0	202.8
TOTAL-POUDRE RIVER	0.0	7,714.2	26,519.6	22,959.0	19,482.6	76,675.4

Delivered to Users Direct from Hansen Supply Canal

Brewster		33.4	35.4	0		68.8
Nauta		40.2	0	0		40.2
Kilburn		32.6	27.2	0.6		60.4
Graves		33.0	27.0	0		60.0
Greeley, City of		271.0	122.2	0		393.2
Herring		66.0	0	54.0		120.0
TOTAL-HANSEN SUPPLY	0.0	476.2	211.8	54.6	0.0	742.6

Delivered to Users from Dixon Poudre Canal

Board of Agric.					401.8	401.8
Aranci	12.0	12.0		12.0		36.0
Maxwell	63.6	100.8	25.6	62.0		252.0
Dixon Res. Co.				177.0		177.0
Total Replacement Deliveries During Season						869.0
					TOTAL	2,478.4

(Water District No. 3 - Continued)

Combined Total of Orders Delivered to Poudre River as Measured
Through 20' Parshall Flume from Hansen Supply Canal

	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>	<u>October</u>	<u>Total</u>
Second Feet		3,906	13,362	11,509	3,975	32,742
Acre Feet		7,750	26,500	22,830	7,890	64,970

Windsor Extension of Hansen Supply Canal at 10' Parshall Flume

Second Feet			67.2	191.8	5,998.7	6,257.7
Acre Feet			133	380	11,900	12,413

Monree Canal at 10' Parshall Flume

Second Feet	3,945	5,292	5,327	6,072	383	21,019
Acre Feet	7,820	10,500	10,570	12,040	760	41,690

(This includes both 'Project' and River Water)

Note: All acre feet quantities in above three tables is based
on 1 c.f.s. for 24 hours x 1.983471.

The total of the first two tables (77,383 acre feet) was the amount
delivered from the total amount ordered (76,675.4 acre feet). This shows an
over-delivery of 707.6 acre feet, or about 0.9 of one percent over-delivery.

Annual Report for Water Year 1957
Special Deputy State Engineer - Loveland Office

Colorado—Big Thompson Project Water Ordered and
Delivered to Water Users in Water District No. 4
During Season of 1957

NOTE: Unless otherwise specified, all quantities are in Acre Feet. 1 c.f.s. for 24 hours = 2 acre feet.

'Project' Orders to Big Thompson River from Hansen Feeder Canal

<u>Ditch Company</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>	<u>October</u>	<u>Total</u>
Handy				330.0	370.0	700.0
Loveland				34.8		34.8
Home Supply		1,587.4	1,550.0	1,797.6	2,395.0	7,330.0
Louden		8.0	56.6	894.2	816.8	1,775.6
George Riet					1,320.0	1,320.0
Greeley-Loveland			375.0	6,600.0	1,774.8	8,749.8
Farmers				227.4		227.4
Hillsboro			76.0	20.0		96.0
Buckhorn Exchange		180.8	46.4	32.0		259.2
Platte Valley Exchange*		0	1,020.0	0	0	1,020.0
Total to Big Thompson River**						21,512.8
Total Water Users Water District No. 4						20,492.8

* This amount is for Water District No. 2 and is included in the first total so that a comparison can be made to actual deliveries.

**This compares to actual total delivery of 21,370 acre feet or an under-delivery of 142.8 acre feet, or about 0.7 of one percent. The monthly distribution of this delivery was given earlier in this report.

'Project' Water Ordered by Buckhorn Water Users Association
From Hansen Feeder Canal

<u>Ditch Company</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>	<u>October</u>	<u>Total</u>
Cottonwood Creek	0	0	0	17.4	0	17.4
Miner	2.6	13.4	0	0	0	16
Devine Light	7.8	33.6	30.6	8.4	27.4	107.8
Marten's	0	21.2	2.8	14.0	0	38.0
Smith	0	57.0	6.0	30.0	0	93.0
(Olin) Van Hees	0	66.0	27.8	32.2	32.0	158
Spence	0	15.1	0	0	0	15.1
Union	8.0	372.2	127.4	193.4	145.6	846.6
Perkins	65.8	110.4	26.6	36.2	28.2	276.2
Hock	0	12.6	7.8	0	0	20.4
Hedberg	1.2	15.3	12.2	5.4	0	34.1
Total for Season						1,615.3

(Water District No. 4 - Continued)

Pumped Direct from St. Vrain Supply Canal

<u>Ditch Company</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>	<u>October</u>	<u>Total</u>
Bennet			2.0	7.0	1.8	10.8
Bramlet		4.0	25.8	24.8	16.9	71.5
Total						82.3

'Project' Water Ordered for Users Along Little Thompson River

Culver	14.0	0	0	0	0	14.0
Boulder & Larimer	0	0	0	0	852.5	852.5
Ish	0	2,462.4	3,000.0	585.1	0	6,047.5
Eagle	67.0	42.0	0	0	0	115.0
Minor & Langan	0	28.2	26.8	0	0	55.0
Breisch	12.0	30.0	0	0	0	42.0
Total						7,126.0

Combined Total of Acre Feet Delivered to Little Thompson Water Users as Measured Through Two 4-Foot Parshall Flumes

Second Feet	48.9	1,306.9	1,550	749.9	3,655.7
Acre Feet*	97	2,599	3,080	1,492	7,257

*Based on 1 c.f.s. for 24 hours times 1.983471

This shows that there was an over-delivery of 131 acre feet, or about 1.8 percent.

In all cases, however, the ordered amount in acre feet is based on 1 c.f.s. for 24 hours times 2.

ANNUAL REPORT FOR WATER YEAR 1957
SPECIAL DEPUTY STATE ENGINEER - LOVELAND OFFICE

Colorado—Big Thompson Project Water Ordered and
Delivered to Water Users in Water District No. 6
During Season of 1957

NOTE: Unless otherwise specified, all quantities are in
 Acre Feet. 1 c.f.s. for 24 hours = 2 acre feet.

'Project' Water Ordered for Delivery to Boulder Creek

<u>Ditch Company</u>	<u>August</u>	<u>September</u>	<u>October</u>	<u>Totals</u>
City of Boulder	0	215.8	132.0	347.8
Leggett	51.2	113.0	0	164.2
Lower Boulder	0	60.0	0	60.0
Platte Valley*	1,112.8	800.0	0	1,912.8
Boulder and Weld	40.0	27.8	0	67.8
Total - Boulder Creek				**2,552.6

* This was ordered for Water District No. 2. The total orders to this District
 (No. 6) is less this amount from the above total, or 639.8 acre feet from this
 source.

'Project' Water Ordered and Delivered Direct from 'Project' Canals

Boulder and Whitereck	0	360.0	0	360.0
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'Project' Water Delivered from Total of all Orders as Recorded Through
10-Foot Farshall Flume Delivery Point of all Orders to Boulder Creek
From Boulder Feeder Canal

Day Second Feet	624.0	656.5	92.2	1,372.7
Acre Feet (d.s.f. x 1.983471)	1,240	1,300	183	2,723

** This total or the amount ordered compares to total acre feet immediately above
 which shows that 170.4 acre feet more water was delivered than was ordered, or
 approximately 7 percent of the ordered amount.

The Following Tables Give the Monthly Discharge in Day Second Feet and Acre Feet (d.s.f. x 1.983471) at the Gaging Stations as Indicated.

season November 1, 1956, through October 31, 1957, Inclusive

(Continued on Next Page)

NOVEMBER DECEMBER JANUARY FEBRUARY MARCH APRIL

Adams Tunnel at East Portal Near Estes Park at 15' Parshall Flume

Day Second Feet	11,653.3	11,444	13,661	14,155	14,350	11,438
Acre Feet	23,110	22,700	27,100	28,080	28,460	22,690

Estes Foothills Canal at Rating Section at West Portal near Estes Park

Day Second Feet	11,005	11,175	13,398	13,953	14,224	11,835
Acre Feet	21,830	22,170	26,570	27,680	28,210	23,470

Big Thompson River at 15' Parshall Flume above Lake Estes at Estes Park, Colorado

Day Second Feet	535	354.4	265.4	280	370.8	1,158
Acre Feet	1,060	703	526	555	735	2,300

Big Thompson River at 15' Parshall Flume below Lake Estes near Estes Park, Colorado

Day Second Feet	582	419	353.3	308	403	937
Acre Feet	1,150	831	701	611	799	1,860

Fish Creek at 5' Parshall Flume above Lake Estes near Estes Park, Colorado

Day Second Feet	3.4	2.1	1.5	2.5	9.8	253.8
Acre Feet	6.7	4.2	3.0	5.0	19.4	503

Hansen Feeder Canal at Rating Section North of Big Thompson Siphon near Drake, Colo.

Day Second Feet	6,692	5,739	6,752	7,465	9,554	1,125
Acre Feet	13,270	11,380	13,390	14,810	18,950	18,100

Values of winter months during December, January, February, March, and part of April for Fish Creek Station at Estes Park were estimated; also for the months of January, February, and parts of December for the Station on Big Thompson River at Estes Park.

The Following Tables Give the Monthly Discharge in Day Second Feet and
Acre Feet (d.s.f. x 1.983471) at the Gaging Stations as Indicated.

Season November 1, 1956, through October 31, 1957, Inclusive

(Continued from Preceding Page)

	<u>MAY</u>	<u>JUNE</u>	<u>JULY</u>	<u>AUGUST</u>	<u>SEPTEMBER</u>	<u>OCTOBER</u>	<u>YEARLY TOTAL</u>
<u>Adams Tunnel at East Portal Near Estes Park at 15' Parshall Flume</u>							
Day Second Feet	3,352.4	85.0	237.5	2,659.5	4,899.1	11,239	99,173.4
Acre Feet	6,650	169	471	5,280	9,720	22,290	196,720
<u>Estes Foothills Canal at Rating Section at West Portal Near Estes Park</u>							
Day Second Feet	8,415.4	16,587	15,090	7,015	5,459.1	10,873	139,029.4
Acre Feet	16,690	32,900	29,930	13,910	10,830	21,570	275,760
<u>Big Thompson River at 15' Parshall Flume above Lake Estes at Estes Park, Colorado</u>							
Day Second Feet	7,072	24,708	22,898	7,574	2,363	1,528	69,106.4
Acre Feet	14,030	49,010	45,420	15,020	4,690	3,030	137,080
<u>Big Thompson River at 15' Parshall Flume below Lake Estes near Estes Park, Colorado</u>							
Day Second Feet	3,538	9,083	8,478	3,463	1,874	1,620	31,058.4
Acre Feet	7,020	18,020	16,820	6,870	3,720	3,210	61,610
<u>Fish Creek at 5' Parshall Flume above Lake Estes near Estes Park, Colorado</u>							
Day Second Feet	1,146	612	107.1	44.3	18.1	14.2	2,214.4
Acre Feet	2,270	1,210	212	87.9	35.9	28.2	4,390
<u>Hanson Feeder Canal at Rating Section North of Big Thompson Siphon near Drake, Colo.</u>							
Day Second Feet	3,475.2	4,944.5	1,666	1,750	2,668	7,334	67,164.4
Acre Feet	6,890	9,810	3,300	3,470	5,290	14,550	133,210

WATER IN STORAGE SOUTH PLATTE RIVER SYSTEM

Irrigation Only -- Figures in Acre Feet

	May 1	November 1	May 1 in % of Normal	Nov. 1 % of Normal
1938	314,019	345,829	65	176
1939	579,578	41,842	117	21
1940	242,892	45,075	49	22
1941	311,425	155,188	63	79
1942	533,002	350,255	108	179
1943	628,397	161,921	127	88
1944	563,588	132,258	114	68
1945	456,907	348,079	97	178
1946	509,884	162,197	103	88
1947	522,501	307,760	106	157
1948	598,680	151,688	121	78
1949	435,006	259,855	88	132
1950	507,847	117,058	103	60
1951	404,734	286,460	82	141
1952	674,975	244,932	136	125
1953	637,992	198,884	129	101
1954	541,842	90,554	110	49
1955	413,533	118,939	84	60
1956	295,334	44,039	60	22
1957	362,082	469,742	74	240

Avg 1938-1955
May 1 493,431
Nov 1 195,487

Use	Dec. 1956	Jan. 1957	Feb. 1957	March 1957	April 1957	May 1957
Dist. Irrig.	22,367	45,785	36,214	21,739	86,592	100,117
Big Thompson						
Municipal						
Total						
Dist. Irrig.	7,759	12,665	16,697	16,697	17,304	30,114
Big Thompson						
Municipal						
Total						
Dist. Irrig.	24,553	29,157	32,168	36,193	40,054	54,300
Big Thompson	45,802	56,880	69,648	82,907	101,607	119,114
Municipal	6,708	6,708	6,708	6,708	6,708	6,708
Total	75,063	90,685	108,536	124,808	146,169	178,122
Dist. Irrig.	19,373	22,459	22,531	21,034	24,145	43,120
Big Thompson	30,323	40,816	50,162	65,885	75,177	80,082
Municipal						
Total	49,696	63,275	72,692	86,919	99,322	123,202
Dist. Irrig.	7,227	9,085	11,119	13,034	14,071	24,311
Big Thompson						
Municipal						
Total						
Dist. Irrig.	7,345	8,376	9,155	9,732	10,283	17,980
Big Thompson	2,269	2,249	2,237	2,243	2,237	2,211
Municipal	14,164	13,660	13,236	13,203	9,983	6,290
Total	23,778	24,385	24,628	25,178	22,503	26,481
Dist. Irrig.	1,174	2,844	4,554	6,237	6,504	9,971
Municipal	9,572	8,827	6,226	4,097	4,676	9,100
Total	10,746	11,671	10,780	10,334	11,180	19,071
Municipal	16,420	15,587	16,327	16,303	14,335	17,111
Dist. Irrig.						
Municipal						
Total	1,694	2,268	2,792	2,908	2,915	6,311
Dist. Irrig.						
Municipal	49,984	48,728	48,658	49,396	52,550	63,754
Total						
Dist. Irrig.	10,749	27,110	38,379	51,865	55,780	67,261
Totals						
Irrigation	102,237	159,469	198,409	253,833	257,697	362,082
Big Thompson	78,394	99,995	122,058	152,935	178,821	207,164
Municipal	78,428	91,510	89,152	87,707	86,252	88,177
Grand Total	259,059	350,974	409,622	493,575	522,770	657,423