

1958
ANNUAL REPORT

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

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 for the year ending October 31, 1958.

Generally, precipitation was above normal during the first half of the actual irrigation season and below normal the last half. Hail in the lower portion of the valley was devastating. Run-off was ample for all needs until June 14th, after which water districts above Denver were regulated to supply water district No. 2 immediately below Denver. The earliest date of call was to supply priority date 5-1-65. Locally, however, there was insufficient flow in districts 7, 8 and 9, to supply priorities junior to 1862 for much of the late summer.

Yields were average to above. This seems to be particularly true of South Park where the hay crop is reported to be well above average. Personal observations indicate that the meadow turf has thickened considerably since 1956. Contrary to this, reports from North Park and the Laramie River Valley, while rather fragmentary, indicate below average yields.

Fall irrigation was necessary on alfalfa, also to some extent, on land to be plowed. Heavy winds about October 20th caused consider-

able damage to corn (for grain) necessitating hand picking.

Maximum storage was reached June 1st with reservoirs full or nearly so. Storage at this time as follows:

| | | |
|----------------|-----------|--|
| 709,000 | Acre Feet | - Privately-owned water for irrigation |
| 259,000 | Acre Feet | - Colorado Big Thompson Project water |
| <u>277,000</u> | Acre Feet | - Municipally-owned water |
| 1,245,000 | Acre Feet | - Total |

Minimum storage was reached October 1st; however, minimum for municipal purposes was reached November 1st and will continue to diminish until next spring. Amounts in storage November 1st:

| | | |
|----------------|-----------|--|
| 312,000 | Acre Feet | - Privately-owned water for irrigation |
| 62,000 | Acre Feet | - Colorado Big Thompson Project water |
| <u>217,000</u> | Acre Feet | - Municipally-owned water |
| 591,000 | Acre Feet | - Total |

| | | |
|---------|-----------|-------------------------------|
| 594,000 | Acre Feet | - Used for irrigation |
| 60,000 | Acre Feet | - Used for municipal purposes |

In general, trans-mountain diversions were not started until late, due to lack of facilities for utilizing the water.

The Great Western Reservoir was in trouble again this year. This was built many years ago for irrigation purposes, but due to poor run-off, rarely trapped much water. It was purchased several years ago by developers of Broomfield Heights and is used for municipal purposes, now obtaining a firm supply of water by pumping from an irrigation canal. In the summer of 1957, the dam developed a slip and the water level was lowered to about 40 feet, after which there was apparently no further movement of the dam. Plans were prepared for repairs and raising the dam. This work was completed prior to this season and had every appearance of being a good job. Late in May, when water was at spillway level (62 feet), a leak developed in the outlet pipe, the pipe at this time being used under pressure. Water fountained up through an old outlet tower - the method

of operation was immediately changed so the outlet pipe would not be under pressure. Early in June, a transverse shear crack developed several hundred feet north of the outlet. At this time, the outlet valve was opened to the maximum believed safe - shear cracks continued to open and the dam commenced to settle and move downstream. Finally the supply line from the pump, normally used in filling the lake was cut at the downstream end, the pipe filled with water and used as a true siphon to lower the water level in the reservoir - about this time the outlet valve was closed as it was evident the outlet pipe was pulled in two. After getting the siphon in operation, the spillway was dug out with back-hoe and dragline to about the 1957 elevation. While the dragline was still working in the spillway, it appeared questionable whether the dam could be saved, as it was settling or subsiding faster than the water in the reservoir. As a last ditch fight, it was decided to dump dirt into the reservoir from the top of the dam - the theory (or maybe dream) being that perhaps a blanket of dirt over the upper ends of the shear cracks might reduce the amount of percolating water and obviate a complete failure. This went on continuously for about 36 hours, during which time about 5,000 cubic yards of dirt was placed in front of the bad section. By this time, the movement of the dam was slowed materially and the reservoir had lowered about 8 feet - earth moving equipment was put on a standby basis - a round the clock watch was requested of the owners and the State and division engineers went to bed. Total settlement of the dam for a distance of 600 feet was 15 feet; total downstream drift of the slip area was 20 feet. Subsequent drilling has disclosed that a layer of black muck superimposed^{by}/gravel lies under the slipped portion of this dam. No doubt, this unstable material is largely

responsible for our difficulties.

This reservoir is located on a tributary of Dry Creek, several miles southwest of Broomfield and some 25 miles above the confluence with the South Platte River. There are approximately fifty farm homes along the course of this stream - crossings of the U. S. Highway No. 87, the Denver-Boulder Turnpike and numerous state and county roads. A dam failure would have produced a flood peak of, roughly, 25,000 cubic feet per second.

Cherry Creek Reservoir gained (February through May) from 4,300 acre feet to 8,600 acre feet. Since this time, the reservoir has lost by seepage and evaporation, approximately, 1,100 acre feet. The bulk of this water was available during the early spring when the Henrylyn Irrigation District was filling its reservoirs. As it appeared these reservoirs would be filled by the main South Platte River, the District Officials were contacted, who released their call for storage water.

Three small floods originated on Cherry Creek during the summer. These were passed through the reservoir and the water delivered to senior rights, a short distance below Denver.

Probably too much has already been said about Stock Water Dams, but inasmuch as they continue to be built at the present rate (211 for the first 10 months of 1958), they constitute a steadily growing administration problem. Approximately 60% of Colorado now suffers from inadequate water supplies, yet in accord with our state laws, we permit increasing amounts of run-off to be trapped behind stock water dams to the detriment of decreed water rights of many years standing.

There was no complaint this season about pumping plants and their affect on stream flow, probably because their use was not so constant. However, their potential is great and in drouth cycles disastrous to many decreed water rights.

Approximately 50 new Parshall measuring flumes are now being installed in South Park. All are steel flumes varying in crest width from 18 inches to 6 feet. The total cost f.o.b. Denver amounted to some \$9,000. Freight and installation will probably bring the rancher investment to \$20,000.

Urban development of the areas surrounding Denver, has engendered many problems, not only in acquiring firm water supplies from irrigation rights, but in the treatment of the actual water to make it potable. Available supplies in Clear Creek are now carrying such a heavy load of sewage (treated though it is), that the chlorine and detergent contact render them virtually unfit for domestic use. The policy of the City of Denver in refusing service outside the so-called "blue line" will force numerous communities to consolidate their water service facilities and divert above the major sources of polution.

The day is rapidly approaching when no water will be diverted for irrigation from the South Platte River in District No. 8. Eventually, Clear Creek Valley will be built up solidly from Denver to Golden. The same will probably be true of Bear Creek Valley from Denver to Morrison.

Administration of the waters of the Laramie River continued according to the decision of the U. S. Supreme Court as amended by negotiated compact in 1957.

Meadow Land Diversions

| | <u>Allotment</u> | <u>Diverted</u> | <u>Unused</u> |
|------------------|------------------|-----------------|---------------|
| Prior to July 31 | 27,700 | 22,938 | 4,762 |
| After July 31 | 1,800 | 1,219 | 581 |
| Transmountain | 19,875 | 14,766 | 5,109 |

No complaints were received from Wyoming on our administration of the waters of the Laramie River or Sand Creek.

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

Tabulations of the Water Commissioners Annual Reports, Amounts of Water in Storage, Amounts Diverted by Trans-mountain Projects and the Amounts Diverted by Individual Users from the Laramie River, accompany and are 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 | Ac. Ft. Diverted | 1st Day | Last Day |
|--|------------|----------|-------------------------------|------------------|---------|----------|
| *Boreas Pass | 36 | 8 | Blue River | 214 | 6-4 | 7-31 |
| # Hoosier Pass | 36 | 10 | " " | 6,296 | 5-8 | 7-31 |
| Berthoud Pass | 51 | 7-2 | Colo. River | 424 | 6-14 | 8-3 |
| ** Moffat Tunnel | 51 | 6-7-8 | " " | 14,970 | 6-18 | 10-31 |
| Williams Fork | 51 | 6-7-8 | <i>No diversion this year</i> | | | |
| Adams Tunnel | 51 | 1-6 inc. | Colo. River | 216,630 | 11-1-57 | 10-31 |
| Eureka Ditch | 51 | 4 | " " | 65 | 7-12 | 8-23 |
| Grand River D. | 51 | 3 | " " | 13,683 | 6-4 | 9-6 |
| Cameron Pass | 47 | 3 | Michigan | 0 | | |
| Michigan Ditch | 47 | 3 | " | 0 | | |
| Wilson Supply (Sand Creek) | 48 | 3 | Sand | 1,399 | 5-13 | 6-30 |
| Deadman | 48 | 3 | Laramie River | 461 | 5-23 | 7-3 |
| Laramie Poudre T. | 48 | 3 | " " | 13,718 | 6-11 | 9-12 |
| Skyline Ditch | 48 | 3 | " " | 587 | 6-13 | 6-28 |
| Columbine | 48 | 3 | " " | 0 | | |
| Bob Creek | 48 | 3 | " " | 0 | | |
| Lost Lake | 48 | 3 | " " | 0 | | |
| Total Diverted from Colorado River | | | | 245,986 | | |
| " " " Laramie | | | | 14,766 | | |
| " " " Sand Creek | | | | 1,399 | | |
| | | | | <u>262,151</u> | | |

* Diversions continued into August -- Amount too small to consider.
 # Not included in total.
 ** Diversions continued until November 14.

Acre Feet in Storage 1st of Month
1958

Division No. 1

| Use | Dec. '57 | Jan. '58 | Feb. '58 | Mar. '58 | Apr. '58 | May |
|-----------------|----------|-----------|-----------|-----------|------------|--------|
| 1 Dist. Irrig. | 104,344 | 107,999 | 113,458 | 123,827 | E. 128,000 | 133,0 |
| Big Thomp. | | | | | | |
| Municipal | | | | | | |
| Total | | | | | | |
| 2 Dist. Irrig. | 48,197 | 56,762 | 59,820 | 65,425 | 69,955 | 72, |
| Big Thomp. | | | | | | |
| Municipal | | | | | | |
| Total | | | | | | |
| 3 Dist. Irrig. | 128,023 | 129,500 | 132,648 | 132,146 | 140,598 | 139, |
| Big Thomp. | 85,565 | 95,135 | 107,267 | 113,947 | 128,786 | 141, |
| Municipal | 6,642 | 6,642 | 6,642 | 6,642 | 6,642 | 6, |
| Total | 220,230 | 231,277 | 246,557 | 252,735 | 276,026 | 288, |
| 4 Dist. Irrig. | 86,319 | 87,993 | 84,004 | 85,000 | 87,573 | 94, |
| Big Thomp. | 69,663 | 76,975 | 85,339 | 93,634 | 103,800 | 103, |
| Municipal | | | | | | |
| Total | 155,982 | 164,968 | 169,343 | 178,634 | 191,373 | 198, |
| 5 Dist. Irrig. | 28,475 | 28,475 | 28,475 | 29,034 | 30,098 | 33, |
| Big Thomp. | | | | | | |
| Municipal | | | | | | |
| Total | | | | | | |
| 6 Dist. Irrig. | 25,520 | 24,738 | 23,353 | 21,147 | 19,950 | 21, |
| Big Thomp. | 7,265 | 7,265 | 7,513 | 7,584 | 7,732 | 5, |
| Municipal | 41,285 | 40,528 | 40,356 | 40,522 | 39,492 | 32, |
| Total | 74,070 | 72,531 | 71,222 | 69,253 | 67,174 | 59, |
| 7 Dist. Irrig. | 22,761 | 21,789 | 22,402 | 25,876 | 25,907 | 26, |
| Municipal | 11,307 | 8,319 | 6,532 | 4,937 | 3,301 | 8, |
| Total | 34,068 | 30,108 | 28,934 | 30,813 | 29,208 | 34, |
| 8 Municipal | 14,725 | 15,187 | 14,745 | 15,642 | 16,918 | 17, |
| 9 Dist. Irrig. | 6,956 | 6,956 | 6,956 | 7,093 | 7,226 | 8, |
| Municipal | | | | | | |
| Total | | | | | | |
| 23 Dist. Irrig. | 6,500 | 6,500 | 6,500 | 6,500 | 6,500 | 6, |
| Municipal | 194,757 | 194,952 | 194,967 | 195,000 | 195,000 | 188, |
| Total | 201,257 | 201,452 | 201,467 | 201,500 | 201,500 | 195, |
| 64 Dist. Irrig. | 83,264 | 114,327 | 109,854 | 112,474 | 109,625 | 122, |
| Totals: | | | | | | |
| Irrigation | 540,359 | 585,039 | 587,470 | 608,522 | 625,432 | 659, |
| Big Thomp. | 162,493 | 179,375 | 200,119 | 215,165 | 240,318 | 250, |
| Municipal | 268,716 | 265,628 | 263,242 | 262,743 | 261,353 | 253, |
| Grand Total | 971,568 | 1,030,042 | 1,050,831 | 1,086,430 | 1,127,103 | 1,162, |

Acre Feet in Storage 1st of Month
1958

Division No. 1

| Use | June '58 | July '58 | Aug. '58 | Sept. '58 | Oct. '58 | Nov. '58 |
|--------------------|-----------|-----------|----------|-----------|----------|----------|
| 1 Dist. Irrig. | 133,986 | 136,500 | 90,466 | 49,695 | 25,640 | 15,014 |
| Big Thomp. | | | | | | |
| Municipal | | | | | | |
| Total | | | | | | |
| 2 Dist. Irrig. | 70,469 | 70,000 E. | 44,800 | 21,347 | 12,016 | 11,850 |
| Big Thomp. | | | | | | |
| Municipal | | | | | | |
| Total | | | | | | |
| 3 Dist. Irrig. | 168,953 | 170,520 | 137,257 | 107,755 | 100,115 | 104,380 |
| Big Thomp. | 146,679 | 138,819 | 102,931 | 56,091 | 30,118 | 29,400 |
| Municipal | 6,649 | 6,649 | 6,649 | 5,220 | 5,220 | 5,220 |
| Total | 322,281 | 315,988 | 246,837 | 169,066 | 135,453 | 139,000 |
| 4 Dist. Irrig. | 99,993 | 95,140 | 88,560 | 77,562 | 68,158 | 77,500 |
| Big Thomp. | 103,878 | 96,433 | 62,339 | 31,132 | 20,914 | 29,200 |
| Municipal | | | | | | |
| Total | 203,871 | 191,573 | 150,899 | 108,694 | 89,072 | 106,700 |
| 5 Dist. Irrig. | 34,583 | 29,340 | 24,954 | 17,453 | 14,663 | 15,700 |
| Big Thompson | | | | | | |
| Municipal | | | | | | |
| Total | | | | | | |
| 6 Dist. Irrig. | 33,708 | 32,705 | 28,308 | 22,281 | 18,428 | 16,800 |
| Big Thomp. | 8,371 | 8,580 | 5,980 | 3,449 | 5,165 | 3,000 |
| Municipal | 49,297 | 46,163 | 43,736 | 38,755 | 33,425 | 29,200 |
| Total | 91,396 | 87,448 | 78,024 | 64,485 | 57,018 | 49,200 |
| 7 Dist. Irrig. | 29,060 | 27,496 | 17,200 | 5,448 | 1,546 | 2,500 |
| Municipal | 9,649 | 11,595 | 9,544 | 10,295 | 11,356 | 11,400 |
| Total | 38,709 | 39,091 | 26,744 | 15,743 | 13,002 | 13,900 |
| 8 Municipal | 17,897 | 16,059 | 17,960 | 16,776 | 17,500 | 16,700 |
| 9 Dist. Irrig. | 8,523 | 8,222 | 6,425 | 4,885 | 4,359 | 3,500 |
| Municipal | | | | | | |
| Total | | | | | | |
| 23 Dist. Irrig. | 8,015 | 7,880 | 3,400 | 2,400 E. | 2,427 | 2,400 |
| Municipal | 193,810 | 190,636 | 185,279 | 176,981 | 168,085 | 154,200 |
| Total | 201,825 | 198,516 | 188,679 | 179,381 | 170,512 | 156,600 |
| 64 Dist. Irrig. | 121,739 | 124,718 | 102,822 | 49,018 | 31,635 | 62,000 |
| Totals: | | | | | | |
| Irrigation | 709,029 | 702,521 | 544,192 | 357,844 | 278,987 | 312,000 |
| Big Thomp. | 258,928 | 243,832 | 171,250 | 90,672 | 56,197 | 61,700 |
| Municipal | 277,302 | 271,102 | 263,168 | 248,027 | 235,586 | 216,900 |
| Grand Total | 1,245,259 | 1,217,455 | 978,610 | 696,543 | 570,770 | 590,700 |

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>November 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 |
| 1958 | 659,070 | 312,026 | 136 | 151 |

OFFICE OF STATE ENGINEER OF COLORADO
 Diversions from Laramie River and Tributaries
 - 1958 -
 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 | 803.21 | 0 |
| Mansfield & Enlg. Mansfield No. 2 | 1,115.81 | 0 |
| Forrester No. 1 Grace Cr. & Enlg. | 818.33 | 4.76 |
| Detro No. 1 Detro No. 2 Lower La Garde | 283.49 | 5.87 |
| Jimmy Cr. (Net) La Garde minus Lower L.G. La Garde No. 1 Schnitger | 1,013.37 | 0 |
| Yelton | 318.19 | 0 |
| Homestead No. 1 (Big Jenkins) Homestead No. 2 (Little Jenkins) Pache Nellie | 602.19 | 0 |
| Martin No. 1 Martin No. 2 & Enlg. Wright | 2,035.87 | 273.85 |
| Brown - Nun Cr. Cabin Davy Forrester - Brown Cr. Stubb | 873.24 | 6.27 |
| Link No. 1 Link No. 2 Smith - Brown Cr. Upper Hills | 900.59 | 7.92 |
| Brown - Porter Cr. | 28.54 | 5.51 |
| Lamb | 510.80 | 71.16 |

Laramie River Diversions - Continued

| Name of Ditch | Amount Diverted Day Second Feet to July 31st | Amount Diver Day Second After July |
|---------------------------------------|--|--|
| British Cr. | | |
| Comet | | |
| Homestead - McIntyre Cr. | | |
| Lower Grant | | |
| Upper Grant | | |
| Stuart No. 1 | | |
| Stuart No. 2 | 557.60 | 29.91 |
| Brinker | | |
| McIntyre | | |
| Pine Creek & Enlg. | 272.94 | 1.37 |
| Glendevey | | |
| Talmadge | 81.47 | 54.95 |
| Lower Jim | | |
| Trollope | | |
| Ward No. 1 | | |
| Ward No. 2 | 183.31 | 0 |
| Jim minus Lower Jim | | |
| Jim No. 2 | | |
| Lone Tree | | |
| Ollie | | |
| Timothy | <u>1,165.48</u> | <u>152.92</u> |
| Total Meadow Land Diversion | 11,564.43 | 614.49 |
| <hr/> | | |
| Summary through July 31 - Allotment | | 27,700 A |
| Total Diverted | 11,564.43 or | <u>22,938</u> |
| Total Unused Balance | | 4,762 |
| | | |
| Summary after July 31 - Allotment | | 1,800 A |
| Total Diverted | 614.49 day s.f. or | <u>1,219 A</u> |
| Total Unused Balance | | 581 A |

SUMMARY OF WATER COMMISSIONERS ANNUAL REPORTS

1958

ACRE FEET WATER USED

| Dist. No. | Direct Flow | Reservoir | Big Thompson Project | Other | Total | Acres Irrigated | First Day Used | Last Day Used |
|-----------|------------------|------------|----------------------|--------|-----------|------------------|----------------|---------------|
| 1 | 186,288 | 89,861 | 10,044 | | 286,193 | 158,734 | May 4 | Nov. 1 |
| 2 | 283,967 | 61,097 | 13,476 | | 358,540 | 209,870 | Apr. 21 | Oct. 31 |
| 3 | 217,937 | 108,241 | 118,285 | 26,682 | 471,145 | 284,340 | May 4 | Oct. 31 |
| 4 | 101,835 | 39,440 | 75,195 | | 216,470 | 143,172 | May 1 | Oct. 31 |
| 5 | 55,922 | 27,697 | 33,452 | | 117,071 | 111,960 | May 6 | Oct. 31 |
| 6 | 71,332 | 12,781 | 6,677 | | 90,790 | 174,690 | Apr. 7 | Oct. 31 |
| 7 | 89,602 | 11,113 | | | 100,715 | 115,770 | Apr. 1 | Oct. 31 |
| 8 | 101,513 (1) | 27,328 (2) | | 205 + | 128,841 | 25,270 | Feb. 15 | Oct. 31 |
| 9 | 14,446 | 4,833 | | | 19,279 | 15,471 | May 12 | Oct. 31 |
| 23 | 83,025 | 1,500 | | | 84,525 | 43,407 | Apr. 30 | July 26 |
| 64 | 156,488 | 102,611 | | | 259,099 | 157,626 | Apr. 17 | Oct. 31 |
| 65 | 17,770 | | | | 17,770 | 8,110 | Apr. 22 | Oct. 31 |
| 47 | 325,000 * | | | | 325,000 | 128,482 | | |
| 48 | 24,157 | 486,502 | 257,129 | 26,682 | 2,499,595 | 4,845 | May 6 | Nov. 6 |
| | <u>1,729,282</u> | | | | | <u>1,581,747</u> | | |

(1) Includes 49,754 Acre Feet Municipal. (2) Includes 20,582 Municipal (Acre Feet.)
 * Estimated. † Dammed from wells for domestic use by City of Englewood, not included in totals.

1955

ANNUAL REPORT OF WATER YEAR 1955
SPECIAL DEPUTY STATE ENGINEER - DENVER OFFICE
NORTHERN COLORADO WATER CONSERVANCY AREA - IRRIGATION DIVISION NO. 1

The water users within the Northern Colorado Water Conservancy District area experienced an irrigation season with an adequate water supply that was evident at an early date. This gave the farmers a chance to plan ahead for a maximum use of their land with a maximum amount of water available. Because of this advance knowledge, this year's yield of crops should prove one of the highest in recent times. This advance knowledge was largely due to the initial 100 per cent quota of 'project' water set by the NCCWD and the high carryover storage in the private reservoirs. It was also helped by the favorable snow reports even though they were, in some instances, below normal.

Another high light of this season was the 'switch' of weather conditions from an unusually high precipitation at the first half of the season to a below normal precipitation during the last half of the season. This condition caused one of the heaviest demands of 'project' water for the months of July and August during the history of the 'Project.' This was fortunate for the Power Phase of the Project because it vacated space for water to be stored after being used for power. There was practically no 'project' storage space available along the Eastern slope until the heavy irrigation demands started. The natural stream flow also changed from its normal trend during June. The flow dropped much faster after it reached a peak and was lower than anticipated during July and August. This condition was general for the streams along the foothills and resulted in the heavy 'project' demands during these months.

This new method of processing 'project' water orders was the same this year as initiated last year. This year it was thoroughly tested as practically all the ditch companies in each of the districts ordered 'project' water. There were no particular problems encountered; however, a few minor changes in delivery of copies of the original orders to the water commissioners may be made before another water

288,131.1 Acre Feet of 'project' water was ordered for delivery to water users within the district this year. The distribution to the various water districts was as follows:

Distribution of 'Project' Water Ordered for Various Water Districts
1 c.f.s. for 24 hours = 2 Acre Feet

| <u>Water District</u> | <u>Supplied from</u> | <u>Total</u> |
|------------------------|--|----------------|
| No. 1 | Via Big Thompson River | 13,161 |
| No. 2 | Via Big Thompson River | 606 |
| | Via Poudre Creek and Lower Boulder Ditch | <u>13,866</u> |
| No. 3 | Via Cache La Poudre River | 132,635.4 |
| | Direct to water users from 'Project' canals via Hansen Supply Canal. | 1,128.6 |
| | Via Dixon Feeder Canal Including replacement | <u>1,554.6</u> |
| No. 4 | Via Big Thompson River | 60,920.6 |
| | Via Little Thompson River | 13,823.2 |
| | Via 'Project' canals to Buckhorn water users and other individual water users. | <u>2,992.1</u> |
| | | 77,735.9 |
| No. 5 | Via St. Vrain River | 28,665.5 |
| | Via 'Project' canals direct to water users including Dry Creek replacement | <u>7,711.1</u> |
| No. 6 | Via Poudre Creek | 7,440.6 |
| | Via 'Project' canals direct to water users. | <u>3,626.4</u> |
| TOTAL TO ALL DISTRICTS | | 288,131.1 |

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 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

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.

During the 1957 irrigation season, water district No. 1 did not call for 'project' water and a minimum amount was called for by water district No. 2. During the 1958 season, however, water district No. 1 called for nearly all of their 'project' water. This was released from the project facilities at the Big Thompson River delivery point. The Big Thompson River was then used as a carrier and the water measured at various places along it to its confluence with the South Platte River near Greeley. It was measured by the Lower Latham headgate located about three miles below the confluence of the Big Thompson River with the South Platte River. This measurement indicated that we were able to deliver from 88 to 90 per cent of the water. The only time that any difficulty was encountered in delivering this water was at the beginning and at the end of the run.

This was by far the most successful delivery of water via the above described route that we have had since the initiation of this procedure. The success no doubt was due to a continued flow. I hope that the future orders for water to water district No. 1 will continue to be made in a similar manner.

An additional amount of water was released from the Union Reservoir, located in district No. 5, for delivery to district No. 1 via the St. Vrain River and South Platte River. This release of water was ordered so that its arrival would coincide with that from the Big Thompson River. Some problems arose from this complicated procedure, but we expect to have most of them eliminated in another year.

From November 1, 1957, to October 31, 1958, inclusive, a total of 109,236 day second feet or 214,670 acre feet of water was delivered from the Colorado River on the Western Slope to the Eastern Slope. These figures were computed from the chart off the 15' Parshall Flume at the East Portal of Adams Tunnel. After the water was measured through this flume, it went through the project facilities; thence through the Mary's Lake power plant; thence to Mary's lake; thence through the Estes Park power plant; thence to Lake Estes. At this point the water is intermingled with the Big Thompson River. Both the natural flow and the 'project' water is measured into and out of Lake Estes.

During this same period, 131,742.1 day second feet or 261,300 acre feet of water was delivered from Lake Estes through the Estes Foothills Canal. These amounts were computed from the charts at the measuring flume called Estes Foothills Canal at the Western Portal near Estes Park. This total computed figure includes 22,514⁰ day second feet or 44,660 acre feet of Big Thompson River water which was determined daily as 'Operation Skim' at Estes Park.

This is the fourth year for the diversion of river water from Lake Estes in what we call 'Operation Skim'. This year only about $\frac{1}{2}$ the amount was diverted for 'Operation Skim' as was diverted in 1957. No change was made in the administration of this phase of the project. The additional facilities that were installed last year continued to show their value in helping to administer the water. Even with the added facilities, the administration of this phase of the project requires a continuous 'watchful eye' from the time it is started to the time it is finished.

The total amount of 'Operation Skim' delivered back to the river at the Big Thompson delivery point each month is shown as follows:

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

| | May | June | July | August | September | October | Totals |
|------------|---------|--------|-------|--------|-----------|---------|----------|
| Second Ft. | 9,213.6 | 11,026 | 2,104 | 63.7 | 391 | | 22,798.3 |
| Acre Ft. | 18,270 | 21,970 | 4,170 | 126 | 776 | | 45,212.0 |

Another attempt was made this year to evaluate the loss of 'project' water in various areas. It is hard to attain an exact evaluation because, in several instances, the water is not actually measured and also it is almost impossible to interpolate the time lapse involved.

The summary is as follows. All values are in acre feet, based on 1 c.f.s. x 1.983471.

Estes Park Area

INFLOW TO AREA

| | |
|----------------------------------|--------------|
| Adams Tunnel | 216,670 |
| Wind River measured into system | 1,760 |
| Big Thompson River at Estes Park | 88,310 |
| Fish Creek near Estes Park | <u>1,810</u> |

306,986

OUTFLOW FROM AREA

| | |
|-------------------------------------|---------------|
| Estes Foothills Canal | 261,300 |
| Stored in Mary's Lake & Lake Estes | 20 |
| To City of Estes Park | 400 |
| Big Thompson River below Lake Estes | <u>47,320</u> |

309,040

Gain

2,954

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 | 261,300 |
| Releases from Rattlesnake & Flatiron Reservoirs | 52 |
| Dille Tunnel at West Portal | 0 |
| Storage in Carter Lake | <u>61,426</u> |

322,778

OUTFLOW FROM AREA

| | |
|-------------------------|----------|
| To Big Thompson River | 119,520 |
| To Horsetooth Reservoir | 99,470 |
| To Cottonwood Creek | <u>0</u> |

218,990

| | |
|---|---------------|
| Releases from Carter to Little Thompson River | 14,000 |
| Small Canal turnouts | 200 |
| Supply Ditch | 5,350 |
| 15' Parshall Flume at Lyons | <u>51,160</u> |

70,710

Total Storage should be
Actual Storage 10-31-58

33,078

29,282

Loss in Area

3,796

The next area in sequence to the north is called the Horsetooth area. The same

summary is as follows:

| | | | |
|--|-------------------------|---------------|----------------|
| INFLOW TO AREA | | | |
| From Hansen Feeder Canal less turnouts | | 96,697 | |
| Storage - November 1, 1957 | | <u>77,442</u> | 174,139 |
| OUTFLOW FROM AREA | | | |
| 20 ft. Parshall to Poudre River | | 126,989 | |
| 10 ft. Parshall to Poudre Valley Ditch | | 7,796 | |
| Direct from Hansen Supply Canal | | 1,129 | |
| Direct via Dixon Feeder Canal | | 686 | |
| Replacement deliveries | | <u>869</u> | |
| | | | <u>137,469</u> |
| | Storage should be | | 36,670 |
| | Actual Storage 10-31-58 | | <u>29,486</u> |
| | Loss in Area | | 7,184 |

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 at Lyons | | 22,107 | |
| Boulder Reservoir storage 11-1-57 | | <u>7,365</u> | 29,472 |
| OUTFLOW FROM AREA | | | |
| Releases from Boulder Feeder Canal and Reservoir | | 5,987 | |
| To Boulder Creek at 10 ft. Parshall | | <u>21,618</u> | |
| | | | <u>27,605</u> |
| | Storage should be | | 1,867 |
| | Actual Storage 10-31-58 | | 3,058 |
| | Storage should be | | <u>1,867</u> |
| | Total GAIN in Area | | <u>3,875</u> |
| | | | 1191 |

SUMMARY OF GAINS AND LOSSES OF PROJECT AREAS LISTED ABOVE

| | | |
|--------------------------------|--------------|--------------|
| Carter Lake area - Loss- | 3,796 | |
| Horsetooth area - Loss- | <u>7,184</u> | 10,980 |
| Estes Area - Gain- | 2,054 | |
| Boulder Reservoir area - Gain- | <u>1,191</u> | 3245 |
| | | <u>3,254</u> |
| Overall Project - Loss- | | 7,735 |

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 are shown on the tabulated sheets in the back of this report.

The major dams in this area were checked throughout the season and from 'sight' inspection, all appeared to be in good condition. An inspection was made of the rip-rap on Boulder Reservoir Dams and Left Hand Dam by the Deputy State Engineer, Division Engineer of Irrigation Division No. 1, and myself. A report of this inspection was made by the Deputy State Engineer, and the owners of the dams were notified of the recommendations.

The construction of the power plant along the Big Thompson River at the entrance to the Big Thompson Canyon is completed. This is the last of the features of the Colorado--Big Thompson Project to be completed. The installation of the equipment is almost completed and the first water for testing the equipment is scheduled to be run through the plant early in the spring of 1959. Several current meter measurements will be made of the amounts of water used by the power plant and gages will be rated so the flow to and through the plant can be observed. This information will be relayed to various key points where it can be used readily by both the Bureau of Reclamation and the State Engineer employees. The final contemplated procedure for making these current meter measurements is being worked out now.

The commonly called 'Dille' tunnel and diversion works will probably be used at times in conjunction with this power plant. The Bureau of Reclamation is in the process now of installing something at and along the entrance of this tunnel so that the actual inspection of the 8 foot Parshall measuring flume can be made while water is running through it. Current meter measurements can also be made from this same installation.

The operation of this power plant will increase and complicate the tabulation of 'project' and river water. The advance planning has included many features which we hope will give us the necessary information at the right time to properly admin-

A total of 370 current meter measurements of streams and ditches were made during this year. Most of these were made by the hydrographer, Mr. Dean Thompson, working out of this office. I wish to compliment Mr. Thompson for the excellent work he is doing and the wonderful cooperation he has given me. I am especially grateful for the many hours of overtime he has spent during the irrigation period, in helping to keep all the necessary data current and also in 'taking over' occasionally to give me a 'breather.'

The number of gaging stations is increasing. A minimum of 36 gaging stations are now ⁱⁿ operation that have to be checked. The data for each of these also has to be compiled. Fifteen of these 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. It has been our intention, however, to make spot measurements at least once every two years of all the major ditches in the various districts.

The equipment in this office is still in need of modernization. We are able to do the work with the one adding machine, one calculator, and one typewriter which we now have. All of these machines are hand operated. If we had modern automatic machines, especially an automatic calculator, the work could be processed much more efficiently and promptly.

The Bureau of Reclamation employees are to be commended for their excellent cooperation. Mr. K. W. Dickey and his personnel, the Estes Power Plant operators and the 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 they have provided and the secretarial help in answering the phone, taking messages, etc., when it was necessary for Mr. Thompson and myself to be out of the office. Also for the use of the two short wave mobile units installed in the State car and in my car. These units have helped us a great deal in the administration during this irrigation season. It is hard to realize how we got along in past years

without them.

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

Respectfully submitted,

Clark E. Schnurr
Special Deputy State Engineer

ANNUAL REPORT FOR WATER YEAR 1958
SPECIAL DEPUTY STATE ENGINEER---LOVELAND OFFICE

Colorado--Big Thompson Project Water Ordered and
Delivered to Water Users in Water District No. 1 and No.2
During Season of 1958

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

Ordered For Delivery to District No. 1 Via Big Thompson
River Delivery Point through 15' Parshall Flume

| <u>Ditch Company</u> | <u>June</u> | <u>July</u> | <u>August</u> | <u>September</u> | <u>October</u> | <u>Total</u> |
|----------------------|-------------|-------------|---------------|------------------|----------------|--------------|
| Bijou | | 2,650 | 8,839 | | | 11,489 |
| Riverside | | | 1,672 | | | <u>1,672</u> |
| TOTAL | | | | | | 13,161 |

Ordered For Delivery to District No. 2 Via Big Thompson
River Delivery Point Through 15' Parshall Flume

| | | | | | | |
|--------------|--|--|-----|--|--|-----|
| Lower Latham | | | 606 | | | 606 |
|--------------|--|--|-----|--|--|-----|

Ordered for Delivery to District No. 2 Via Boulder Creek
and Measured at 10' Parshall Flume

| | | | | | | |
|---|--|---------|-------|---------|-------|--------|
| Platte Valley | | 4,286.8 | 5,406 | 3,990.8 | 192.4 | 13,866 |
| TOTAL TO DISTRICT NO. 2 FROM BOTH SOURCES | | | | | | 14,472 |

The water ordered for delivery to District No. 2, designated as Platte Valley ditch, was delivered to Boulder Creek, thence through Lower Boulder Ditch to the Coal Ridge Waste Lake reservoir, and then through the outlet of this reservoir to the South Platte River.

South Platte Supply Canal Above Coal Ridge Waste Lake
Reservoir at 8' Parshall Flume

| | | | | | | |
|----------------|------|---------|-------|-------|-----|---------------|
| Day Second Ft. | 91.8 | 2,045.3 | 2,558 | 2,001 | 113 | 6,809.1 |
| Acre Ft. | 182 | 4,060 | 5,070 | 3,970 | 224 | <u>13,504</u> |

Outlet Below Coal Ridge Waste Lake to South Platte
at 8' Parshall Flume

| | | | | | | |
|----------------|--|-------|-------|-------|------|---------------|
| Day Second Ft. | | 1,921 | 2,405 | 1,975 | 89.5 | 6,390.5 |
| Acre Ft. | | 3,810 | 4,770 | 3,920 | 178 | <u>12,676</u> |

In the two tables above, the Acre Feet is based on 1 s.f.s. multiplied by 1.983471.

ANNUAL REPORT FOR WATER YEAR 1958
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 1958

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>April</u> | <u>May</u> | <u>June</u> | <u>July</u> | <u>August</u> | <u>September</u> | <u>October</u> | <u>Total</u> |
|----------------------|--------------|------------|-------------|-------------|---------------|------------------|----------------|--------------|
| North Poudre | | 160.0 | 8,354.2 | 12,500.8 | 7,780.0 | 2,168.5 | 63.6 | 31,047.1 |
| Ft. Collins | | | | | | 444.6 | 35.4 | 480.0 |
| Canvon Canal | | | | 294.6 | 442.9 | | | 737.5 |
| Pl. Val. & I. | | | 28.8 | 336.8 | 503.4 | 278.0 | 691.4 | 1,838.4 |
| W. Sup. & Str. | | | | 8,546.0 | 16,333.4 | 12,020.4 | 2,025.2 | 38,934.0 |
| Ideal Cement | | | | | 61.4 | | | 61.4 |
| Jackson | | | | | 110.6 | 78.2 | 90.0 | 278.8 |
| Ltl. Ca la P. | | | | | 120.2 | 48.8 | 86.0 | 255.0 |
| New Mercer | | | | 638.4 | 1,063.4 | 660.2 | | 2,362.0 |
| Lar. Co. #2 | | | | 660.0 | 894.0 | 918.0 | | 2,472.0 |
| Arthur | | | | 378.4 | 581.8 | 534.0 | | 1,494.2 |
| Larimer & Weld | | | | 10,537.4 | 19,443.8 | 14,487.6 | 1,330.2 | 47,799.0 |
| Josh Ames | | | | | 164.0 | 20.0 | 40.0 | 224.0 |
| Lake Canal | | | | 972.0 | 1,794.8 | 945.2 | 17.0 | 3,729.0 |
| Box Elder | | | | | 81.0 | 176.0 | | 260.0 |
| Box Elder Ch. | | | | 87.0 | 141.8 | 41.2 | | 270.0 |
| Whitney | | | | 72.0 | | 240.0 | | 312.0 |
| Webster | | | 14.0 | 26.0 | 16.0 | 19.0 | | 75.0 |
| TOTAL | | | | | | | | |
| POUDRE RIVER | 0.0 | 160.0 | 8,397.0 | 37,075.4 | 49,535.5 | 33,088.7 | 4,378.8 | 132,635.4 |

Delivered to Users Direct from Hansen Supply Canal

| | | | | | | | | |
|---------------|-----|-----|-------|-------|-------|-------|------|---------|
| Brewster | | | 16.7 | 59.9 | 61.6 | 22.7 | 50.8 | 211.7 |
| Kilburn | | | | 23.4 | 30.4 | 34.2 | 30.4 | 118.4 |
| Graves | | | | 27.0 | 32.0 | | | 66.0 |
| Greeley | | | 241.8 | 132.4 | 160.6 | 121.7 | | 656.5 |
| Herring | | | | 76.0 | | | | 76.0 |
| TOTAL | | | | | | | | |
| HANSEN SUPPLY | 0.0 | 0.0 | 258.5 | 318.7 | 291.6 | 178.6 | 81.2 | 1,128.6 |

(Water District No. 3 - Continued)

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

| | <u>April</u> | <u>May</u> | <u>June</u> | <u>July</u> | <u>August</u> | <u>September</u> | <u>October</u> | <u>Total</u> |
|-------------|--------------|------------|-------------|-------------|---------------|------------------|----------------|--------------|
| Second Feet | | 90 | 4,270.1 | 18,646 | 24,930 | 13,749 | 2,341.7 | 64,026.8 |
| Acre Feet | | 179 | 8,470.0 | 36,980 | 49,450 | 27,270 | 4,640.0 | 126,989.0 |

Windsor Extension of Hansen Supply Canal at 10' Parshall Flume

| | | | | | | | | |
|-------------|-----|--|--|-------|-------|---------|------|---------|
| Second Feet | 357 | | | 216.2 | 266.4 | 3,069.3 | 20.7 | 3,929.6 |
| Acre Feet | 708 | | | 429 | 528.0 | 6,090.0 | 41.1 | 7,796.1 |

Monroe Canal at 10' Parshall Flume

| | | | | | | | | |
|-------------|-----|-------|-------|--------|--------|-------|-------|----------|
| Second Feet | 207 | 321.0 | 3,594 | 5,909 | 5,983 | 3,114 | 738 | 19,669.8 |
| Acre Feet | | 652.0 | 7,130 | 11,720 | 11,870 | 6,180 | 1,460 | 39,010.0 |

Delivered to Users from Dixon Feeder Canal

Ditch Company

| | | | | | | | | |
|-----------------------------|-----|-----|------|------|------|------|-------|-------|
| Aranci | | | 16.0 | 12.0 | 12.0 | | | 40.0 |
| Maxwell | | | 63.0 | 77.6 | 66.4 | 33.6 | 32.0 | 272.6 |
| Dixon Res. Co. | | | | | | 26.4 | 145.6 | 172.0 |
| Bd. of Agric. | | | | | | | 201.0 | 201.0 |
| TOTAL—DIXON FEEDER CANAL | 0.0 | 0.0 | 79.0 | 89.6 | 78.4 | 60.0 | 378.6 | 685.6 |

Total Replacement Delivered 869.0

The total amount of water delivered to the Poudre River as measured at Parshall Flumes (20' on Hansen Supply plus 10' on Windsor Extension) was 134,485.1 Acre Feet. This was the amount delivered compared to ordered amount of 132,635.4 Acre Feet. This shows an over delivery of approximately 1.6 per cent.

The total amount of 'Project' water ordered by water users in District No. 3 was 135,318.6 Acre Feet.

Annual Report for Water Year 1958
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 1958

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>April</u> | <u>May</u> | <u>June</u> | <u>July</u> | <u>August</u> | <u>September</u> | <u>October</u> | <u>Total</u> |
|----------------------------------|--------------|------------|----------------|-----------------|-----------------|------------------|-----------------|-----------------|
| Handy | | | 435.4 | 2,850.0 | 1,904.2 | 1,448.8 | 5,511.8 | 12,150.2 |
| Loveland | | | | 22.0 | 211.4 | 116.6 | 36.0 | 386.0 |
| Home Supply | | | 1,375.0 | 3,100.0 | 3,100.0 | 2,210.0 | 615.0 | 10,400.0 |
| South Side | | | | 139.6 | 463.8 | 180.0 | 108.6 | 892.0 |
| Louden | | | | 2,131.8 | 2,493.4 | 1,588.0 | 435.0 | 6,648.2 |
| George Rist | | | | | 54.2 | 32.0 | 1,851.6 | 1,937.8 |
| Greeley-Loveland | | | 1,100.0 | 9,700.0 | 10,375.0 | 3,000.0 | 2,365.8 | 26,540.8 |
| Farmers | | | 216.0 | 198.6 | 247.8 | 247.4 | | 909.8 |
| Hillsboro | | | 17.6 | 352.4 | 150.0 | | | 520.0 |
| Big T. & Platte | | | | | 35.4 | 28.6 | 72.0 | 136.0 |
| B'horn Exchange | | | 44.0 | 290.0 | 40.6 | 25.2 | | 399.8 |
| TOTAL--BIG THOMPSON RIVER | 0.0 | 0.0 | 3,188.0 | 18,784.4 | 19,075.8 | 8,876.6 | 10,095.8 | 60,920.6 |

Combined Orders Delivered to Big Thompson River
As Measured Through 15' Parshall Flume from Hansen Feeder Canal

| | | | | | | |
|-------------|-------|--------|--------|-------|--------|--------|
| Second Feet | 1,593 | 10,716 | 15,115 | 4,464 | 5,570 | 37,458 |
| Acre Feet | 3,160 | 21,250 | 29,980 | 8,850 | 11,050 | 74,290 |

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

| <u>Ditch Company</u> | <u>April</u> | <u>May</u> | <u>June</u> | <u>July</u> | <u>August</u> | <u>September</u> | <u>October</u> | <u>Total</u> |
|----------------------|--------------|------------|-------------|-------------|---------------|------------------|----------------|--------------|
| Cottonwood Cr. | | | | | | | | 0.0 |
| Miner | | | 23.8 | | | 20.8 | | 44.6 |
| Devine Light | | | 23.4 | 32.2 | 55.8 | 13.8 | 48.6 | 173.8 |
| Martens | | | 11.2 | 16.8 | 26 | 9.2 | 5.8 | 69.0 |
| Van Hees | 18.0 | | | 90.0 | 51.8 | 84 | 67 | 310.8 |
| Smith | | | 1.8 | 70.4 | 50 | 2.8 | 39 | 164.0 |
| Union | | | 178.8 | 437.2 | 516.4 | 190.4 | 226.2 | 1,549.0 |
| Perkins | | | 43 | 139 | 98.2 | 68 | 66 | 414.2 |
| Hock | | | 3 | 7.5 | 8.9 | 3.1 | | 22.5 |

(Water District No. 4 - Continued)

'Project' Water Ordered by Buckhorn Water Users Association
From Hansen Feeder Canal (Continued from Preceding Page)

| <u>Ditch Company</u> | <u>April</u> | <u>May</u> | <u>June</u> | <u>July</u> | <u>August</u> | <u>September</u> | <u>October</u> | <u>Totals</u> |
|----------------------|--------------|------------|-------------|-------------|---------------|------------------|----------------|---------------|
| Hedberg | | | 5.9 | 9.6 | 12.9 | 4.7 | 5.1 | 38.2 |
| Spence | | | | | | 1.7 | 3.9 | 5.6 |
| Hyatt | | | | | | | 0.9 | 0.9 |
| TOTAL FOR SEASON | | | | | | | | 2,792.6 |

Furnished Direct From St. Vrain Supply Canal

| | | | | | | | | |
|-----------------|--|--|--|------|------|------|------|-------|
| Hertha Turncut* | | | | | 35.2 | 72 | | 107.2 |
| Bramlet Pump | | | | 12.7 | 23.2 | 64.1 | 21.8 | 81.8 |
| Bennet | | | | 4.5 | | 5 | 1.9 | 11.4 |
| TOTAL | | | | | | | | 200.4 |

*Only 50 Acre Feet of this total was charged; the balance was used for experimental purposes.

'Project' Water Ordered for Users Along Little Thompson River

| | | | | | | | | |
|------------------|---------|---------|---------|-------|-------|------|--|----------|
| Ish | 1,422.4 | 3,739.8 | 3,959.8 | 1,326 | | | | 10,488 |
| Culver | | 85 | 155 | 243.8 | | 93.2 | | 577 |
| Boulder-Lar. | | | | | 1,674 | 201 | | 1,875 |
| Rockwell | | 121 | 128.4 | 169.8 | | | | 419.2 |
| Ide and Starbird | | | | | | | | 0.0 |
| Blower | | 32 | | | | | | 32 |
| Breisch Pump | | 16 | 20 | 40 | | 5 | | 81 |
| Miner-Longan | | | 65 | 128 | | 42 | | 235 |
| Eagle | | | | | 73.8 | 16.2 | | 90 |
| Osborn-Caywood | | | | | 50 | 16 | | 66 |
| TOTAL | | | | | | | | 13,823.2 |

Water ordered to the Big Thompson River for delivery to Water Districts No. 1 and No. 2 amounted to 13,767 Acre Feet. This added to that ordered for District No. 4 water users (60,920.6) gives a total of 74,687.4 Acre Feet which was total ordered for delivery to Big Thompson River at its delivery point. The actual combined deliveries as measured at 15' Parshall as shown by table above was 74,200 or 397 Acre Feet under delivery.

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

| | <u>June</u> | <u>July</u> | <u>August</u> | <u>September</u> | <u>October</u> | <u>Totals</u> |
|-------------|-------------|-------------|---------------|------------------|----------------|---------------|
| Second Feet | 763 | 2,067 | 2,293 | 1,782 | 153.7 | 7,057.7 |
| Acre Feet* | 1,512 | 4,100 | 4,550 | 3,540 | 302.5 | 14,000 |

*This total is correct to nearest three places and computed by multiplying second feet by 1.083471.

ANNUAL REPORT FOR WATER YEAR 1958
SPECIAL DEPUTY STATE ENGINEER - LOVELAND OFFICE

Colorado—Big Thompson Project Water Ordered and
Delivered to Water Users in Water District No. 5
During Season of 1958

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

'Project Water Ordered for Users to be Delivered to St. Vrain River

| <u>Ditch Company</u> | <u>April</u> | <u>May</u> | <u>June</u> | <u>July</u> | <u>August</u> | <u>September</u> | <u>October</u> | <u>Total</u> |
|----------------------|--------------|------------|-------------|-------------|---------------|------------------|----------------|-----------------|
| So. Ledge | | | | 92.6 | 109. | 53.4 | | 255 |
| Peck | | | | | 156 | 148 | | 304 |
| City of Longmont | | | 78.2 | 321.8 | | 397.8 | 751.2 | 1,570 |
| Highland | | | | 6,087.6 | 6,599.8 | 5,529.2 | 1,074.9 | 19,291.5 |
| Swede | | | 145 | 650.6 | 584 | 156.8 | 273.8 | 1,810.2 |
| Rough & Ready | | | | 497.4 | 1,075.8 | 1,200 | 379.8 | 3,153 |
| Davis & Downing | | | | | 249.8 | 47.6 | 84.4 | 381.8 |
| Longmont Supply | | | | | 186 | 50 | | 236 |
| Oligarchy | | | | | 283.8 | 615.2 | | 899 |
| Niwot | | | | | 66 | | | 66 |
| James | | | | | 99.8 | 18 | 343.2 | 416 |
| Clover Basin | | | | | | 24 | | 24 |
| Palmerton | | | | | | | 114 | 114 |
| TOTAL | | | | | | | | <u>28,665.5</u> |

Combined Total of Above Orders of Project Water Delivered to
St. Vrain River as Measured by Difference in 15' and 10'
Parshall Flumes Near Lyons at End of St. Vrain Supply Canal
and at Piginning of Boulder Feeder Canal Respectively. All
Values Are in Acre Feet Based on Day Second Foot Times
1.082/71.

| | | | | | | | |
|----------------------------|--|-----|--------|--------|--------|-------|--------|
| 15' Parshall | | 716 | 12,930 | 18,410 | 15,300 | 3,810 | 51,160 |
| 10' Parshall | | 422 | 5,080 | 2,890 | 7,020 | 695 | 22,107 |
| TOTALS DELIVERED TO | | | | | | | |
| ST. VPAIN RIVER | | 288 | 7,850 | 9,520 | 8,280 | 3,115 | 29,053 |

Comparing the ordered amount with the amount delivered, there was an overdelivery to
 St. Vrain River of 388 Acre Feet.

'Project' Orders Direct from 'Project' Canals

| <u>Ditch Company</u> | <u>June</u> | <u>July</u> | <u>August</u> | <u>September</u> | <u>October</u> | <u>Totals</u> |
|----------------------|-------------|-------------|---------------|------------------|----------------|---------------|
| McConnell | | 0.8 | 33 | 28.6 | 12.6 | 75 |
| Supply | 1,579.2 | 1,733.2 | 910 | 648.8 | 303.8 | 5,175 |

(Water District No. 5 - Continued)

'Project' Orders Direct from 'Project Canals
(Continued)

| <u>Ditch Company</u> | <u>June</u> | <u>July</u> | <u>August</u> | <u>September</u> | <u>October</u> | <u>Totals</u> |
|----------------------|-------------|-------------|---------------|------------------|----------------|---------------|
| Kincaid | 15 | 8 | | | | 23 |
| Rudd | 6.2 | 36.9 | 79.6 | 56.2 | 15.3 | 194.2 |
| Holland | | 30 | 383.8 | 281 | 74.5 | 769.3 |
| Left Hand | | 127.4 | 471.4 | 259.2 | 68 | 926 |
| Star | | 10 | 10 | | | 20 |
| Dry Creek | | 95 | 189.6 | 42.4 | | 327 |
| Behrman | | | | 2.9 | | 2.9 |
| Boden | | 2.8 | | 4.9 | | 7.7 |
| Schureman | | | 74 | 51 | | 125 |
| Steel | | 2.6 | 6.2 | 0.7 | 27.1 | 60 |
| Cherry | | | 6 | | | <u>6</u> |
| TOTAL | | | | | | 7,711.1 |

ANNUAL REPORT FOR WATER YEAR 1958
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 1958

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>June</u> | <u>July</u> | <u>August</u> | <u>September</u> | <u>October</u> | <u>Totals</u> |
|----------------------|-------------|-------------|---------------|------------------|----------------|---------------|
| City of Boulder | 148.2 | 541.2 | 1,098.6 | 874.8 | 33.2 | 2,696.0 |
| Leggett | | 529.6 | 474 | 322 | 73.4 | 1,672.0 |
| Lower Boulder | | 411 | 1,036.4 | 305.8 | 4.8 | 1,758.0 |
| Coal Ridge | | 863.2 | 52 | | | 915.2 |
| Boulder & Weld | | 113.6 | 155.2 | 42.4 | | 311.2 |
| Godding | | | 28 | | | 28.0 |
| Smith and Emmons | | | 60.2 | | | 60.2 |
| Platte Valley* | | 4,286.8 | 5,406 | 3,990.8 | 182.4 | 13,866.0 |
| TOTAL | | | | | | **21,306.6 |

*This was ordered for Water District No. 2 and delivered to Boulder Creek through the
 10' flume.

'Project Water Ordered and Delivered Direct from 'Project Canals

| | | | | | | |
|---------------------|--|-------|---------|-------|-------|---------|
| Boulder & Lefthand | | | 110 | 218.4 | 36.4 | 364.8 |
| Boulder & Whiterock | | 505.2 | 1,611.4 | 973.4 | 171.6 | 3,261.6 |
| TOTAL | | | | | | 3,626.4 |

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

| | | | | | | |
|------------------------------|-------|-------|-------|-------|-----|----------|
| Day Second Feet | 111.5 | 3,416 | 4,338 | 2,836 | 195 | 10,897.4 |
| Acre Feet (d.s.f. x 1.98371) | 221 | 6,780 | 8,600 | 5,630 | 387 | 21,618 |

**This total or the amount ordered compares to total acre feet immediately above which
 shows that 313 acre feet more water was delivered than was ordered.

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, 1957, through October 31, 1958, 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 Ft. | 9,827 | 9,150 | 12,702 | 7,060.5 | 13,223 | 6,811.7 |
| Acre Ft. | 19,490 | 18,150 | 25,190 | 14,000 | 26,230 | 13,510 |

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

| | | | | | | |
|----------------|--------|--------|--------|--------|--------|---------|
| Day Second Ft. | 9,864 | 9,121 | 12,523 | 6,949 | 13,144 | 6,904.4 |
| Acre Ft. | 19,560 | 18,090 | 24,880 | 13,780 | 26,070 | 13,690 |

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

| | | | | | | |
|----------------|-------|-------|-----|-----|-----|-------|
| Day Second Ft. | 927 | 563 | 366 | 356 | 399 | 890 |
| Acre Ft. | 1,840 | 1,120 | 726 | 706 | 819 | 1,770 |

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

| | | | | | | |
|----------------|-------|-------|-----|-----|-----|-------|
| Day Second Ft. | 944 | 616 | 434 | 405 | 125 | 927 |
| Acre Ft. | 1,870 | 1,220 | 861 | 803 | 243 | 1,840 |

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

| | | | | | | |
|-----------------|----|----|----|----|----|----|
| Day Second Ft.* | | | | | | 74 |
| Acre Ft. | 25 | 20 | 15 | 12 | 15 | 47 |

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

| | | | | | | |
|----------------|-------|--------|--------|---------|--------|--------|
| Day Second Ft. | 4,623 | 5,164 | 4,625 | 3,435.8 | 7,969 | 7,082 |
| Acre Ft. | 9,170 | 10,240 | 13,340 | 6,810 | 15,810 | 14,050 |

*Values for months of November, December, January, February, March are estimated.

The Following Tables Give the Monthly Discharge in Day Second Feet and Acre Feet (d.s.f. x 1,982,471) at the Gaging Stations as Indicated.

Season November 1, 1957, through October 31, 1958, 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 Totals</u> |
|---|------------|-------------|-------------|---------------|------------------|----------------|----------------------|
| <u>Adams Tunnel at East Portal Near Estes Park at 15' Parshall Flume</u> | | | | | | | |
| Day Second Ft. | 977.1 | 3,268.6 | 5,646.1 | 12,332 | 14,826 | 15,412 | 109,236 |
| Acre Ft. | 1,940 | 2,580 | 11,200 | 24,460 | 29,410 | 30,570 | 216,670 |
| <u>Estes Foothills Canal at Rating Section at West Portal Near Estes Park</u> | | | | | | | |
| Day Second Ft. | 10,303 | 12,255 | 7,726.7 | 12,297 | 15,247 | 15,388 | 131,742.1 |
| Acre Ft. | 20,440 | 24,310 | 15,330 | 24,390 | 30,240 | 30,520 | 261,300 |
| <u>Big Thompson River at 15' Parshall Flume Above Lake Estes at Estes Park, Colorado</u> | | | | | | | |
| Day Second Ft. | 14,845 | 15,254 | 5,347 | 3,053 | 1,829 | 864 | 44,523 |
| Acre Ft. | 29,440 | 30,250 | 10,610 | 6,060 | 3,600 | 1,360 | 88,310 |
| <u>Big Thompson River at 15' Parshall Flume Below Lake Estes Near Estes Park, Colorado</u> | | | | | | | |
| Day Second Ft. | 6,165 | 4,797 | 3,595 | 3,185 | 1,572 | 790 | 23,855 |
| Acre Ft. | 12,230 | 9,510 | 7,130 | 6,300 | 3,120 | 1,570 | 47,320 |
| <u>Fish Creek at 5' Parshall Flume above Lake Estes near Estes Park, Colorado</u> | | | | | | | |
| Day Second Ft. | 584 | 142 | 30 | 19 | 12 | 12 | 795 |
| Acre Ft. | 1,160 | 281 | 60 | 38 | 24 | 23 | 1,820 |
| <u>Hansen Feeder Canal at Rating Section North of Big Thompson Siphon near Drake, Colo.</u> | | | | | | | |
| Day Second Ft. | 1,829.8 | 3,257.6 | 2,324 | 2,509 | 4,485 | 2,744 | 50,148.2 |
| Acre Ft. | 3,630 | 6,490 | 4,610 | 4,980 | 8,900 | 5,440 | 99,470 |

REPORT OF S. V. WALLACE, WATER COMMISSIONER

February 11 1959

ACRE FEET OF WATER DIVERTED IN 1958

| Name of Ditch | Acre feet diverted in 1957 | Number of days diversion in 1957 | Acre feet diverted in 1958 | Number of days diversion in 1958 | 25 year average in Acre feet |
|------------------------|----------------------------------|---|----------------------------------|---|---------------------------------------|
| Brantner | 12,116 | 161 | 13,792 | 186 | 15,598 |
| Brighton | 7,730 | 161 | 6,976 | 159 | 7,577 |
| Farmers Independent | 23,282 | 141 | 17,642 | 168 | 20,486 |
| Evans #2 | 41,534 | 142 | *14,588 | 68 | 21,190 |
| Fulton | 24,026 | 153 | 22,640 | 172 | 22,877 |
| Lupton Bottom | 18,422 | 164 | 16,906 | 186 | 18,425 |
| Platteville | 13,422 | 148 | 13,268 | 176 | 15,163 |
| Meadow Island No. 1 | 6,616 | 137 | 4,824 | 128 | 4,679 |
| Meadow Island No. 2 | 10,788 | 127 | 9,540 | 130 | 8,324 |
| Western Ditch | 22,522 | 138 | 17,130 | 159 | 16,102 |
| Union Ditch | 23,346 | 139 | 25,786 | 161 | 24,298 |
| Lower Latham | 37,866 | 137 | 35,958 | 155 | 29,322 |

*Colorado Big Thompson Project Water to Evans No. 2 13,476