

DIVISION OF WATER RESOURCES

STATE ENGINEERS OFFICE

IRRIGATION DIVISION NO. 4

ANNUAL REPORT

1973 Water Year

December 7, 1973

Mr. C. J. Kuiper, State Engineer
Division of Water Resources
1845 Sherman Street
Denver, Colorado 80203

Dear Mr. Kuiper:

On behalf of the staff and field personnel of Irrigation Division No. 4, I submit herewith the annual report for the water year 1972-1973, together with the reports of the district water commissioners. This report is submitted as required under the provisions of Colorado law, as stated in C.R.S. 148-12-7, 1963.

Respectfully submitted,

Ralph V. Kelling, Jr.
Ralph V. Kelling, Jr.
Division Engineer

RVK:mm

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ANNUAL REPORT 1973

IRRIGATION DIVISION NUMBER FOUR

INTRODUCTORY STATEMENT

Purpose:

The purpose of this report is the presentation to the state engineer of a summary of division activities for the 1973 water year, together with the reports of the district water commissioners, as required by law.

Location:

The division is located in southwestern Colorado and is defined within the following drainage basins: Gunnison River, San Miguel River, Little Dolores River, Coates Creek, and that portion of the Dolores River within Mesa and Montrose Counties. Larger cities in the area include Gunnison, Montrose, and Delta.

As defined in the 1969 Annual Report, the division boundary was modified by the Water Rights Determination and Administration Act of 1969, the so-called 'Senate Bill 81'. Thus Division 4 now encompasses a more legitimate drainage entity, being deleted of those land areas whose streams are tributary to the Colorado River within former Water District 42 - excepting the Gunnison River drainage basin. Twelve water districts are defined in the division which further refines areas of water commissioner responsibility into administrable drainage entities.

Land and Climate:

Elevations range from 4,500 feet to in excess of 14,000 feet in the San Juan Mountain range. The climate is semi-arid with precipitation varying from 10-15 inches per year. Recent precipitation minimums at Grand Junction have been less than six inches annually. In excess of 650,000 acres are irrigated annually, with major crops being hay, sugar beets, small grains, and mountain fruits. Beef cattle and sheep are the primary stock production.

Industry:

Agriculture and ranching are the mainstay of the regional economy, with fruit ranching, lumbering, and mining being important areas of employment. Uranium, coal, and silver are the major mineral resources, with oil and gas exploration activity having a surge of renewal throughout the division. The present energy crisis undoubtedly is creating greatly increased interest and exploration activities by the industry in this region of Western Colorado. This trend will likely continue for the next few years. Tourism, of great importance to the areas economy, will no doubt be drastically reduced due to the critical shortage of gasoline. Of current interest concerning regional industrial development are the following activities:

1. Continued development of a major ski facility and associated resort complex at Telluride.

2. Completion of a major plant of the Russell Stover Candy Company at Montrose. The facility has made initial production runs and will employ 600 people at full capacity.
3. Continued expansion of the ski resort complex at Crested Butte.
4. A regional land-rush boom and associated new housing construction.
5. Regional coal resource investigations, including water rights, by major coal and oil companies.
6. A marked increase in oil and gas exploration activity began last year on the major geological structure known as the Douglas Arch, which is northwest of Grand Junction. A proposed deep test well northwest of Nucla, seismic activity south of Norwood, and a test well northwest of Cedaredge are all indicators of future regional developments in exploration which relate to the present energy crisis. The geological environment throughout much of the division from source beds to structure, as well as a lack of drilling appear to make this region of prime importance in view of the present national shortage of oil and natural gas.

Water Resource Projects:

Operating projects within Division 4 are the Uncompahgre,

which includes Taylor Park and the Gunnison Tunnel, Fruit-growers reservoir, Paonia project, Crawford project, and the Bostwick Park project which includes the Silverjack reservoir. The Fruitland Canal portion of the Fruitland Mesa project is now completed. Blue Mesa and Morrow Point reservoirs of the Curecanti Unit are completed and have been on-line for power for several years. All of the above are Bureau of Reclamation projects; in addition the following projects are in various study phases by the Bureau: Grand Mesa, Fruitland Mesa, Dallas Creek, San Miguel, Upper Gunnison, and Uncompahgre Extension. A few pages about the Uncompahgre Project are included in this report, as well as a brief report of Manager Harold Anderson concerning this years operations.

Land Use Planning:

A very recent comprehensive document has been prepared by the Colorado Land Use Commission which proposes guidelines for a master state land-use plan. Goals of the plan identify concerns in the areas of environment, economic and population development, natural resources, and related social concerns. Features of the study include an attempt to retain flexibility in problem-solving and to respect local government and private sector input in the planning process.

Division 4 is divided into two regions, mountain and northwest, with the mountain environment deserving

special attention because of its fragility. The mountain region is dependent on recreation and tourism, and the northwest region is defined within the plateau areas, and includes small communities, orchards, and grazing land.

To date the extent of division involvement has been to act as a consultant to the in-house planning section in Denver. Initial areas of concern have been with adequate water supply related to subdivision developments in W. D. 59 (primarily Crested Butte area), W. D. 62, Blue Mesa, and W. D. 60, Telluride areas.

Among the regional planning agencies are the various boards of county commissioners or planning commissions, the Tri-County Planning Commission and the Region 10 Planning Commission.

Land ownership by county is as follows:

Ownership in Acres

County	Private	Federal	State	County and Municipal
Delta	364,580	396,264	0	2,335
Montrose	512,679	1,241,684	70,345	157
Mesa	555,531	1,497,735	0	3,556
Ouray	208,183	160,390	1,920	49
San Miguel	384,539	476,240	16,479	0
Gunnison	426,501	1,624,900	13,388	200
Hinsdale	32,577	648,683	1,218	505
Saguache	590,693	1,329,876	95,195	180

Water Usage:

The economy is agriculturally dominated, and consequently the major water usage is for irrigation. Farms and ranches are oriented to the regions drainage systems, and related water diversions are tied to the irrigable lands. Many major reservoirs are located on major rivers, and long canals and tunnels are required to transport available water to the point of use. Recently greatly increased usage of water in the division furnishes electrical power, as generated at the Curecanti Unit reservoirs of the Colorado River Storage Project. Hydropower plants of the three dams will have a combined total installed capacity of 200,000 kilowatts. The availability of water and power will undoubtedly help to promote the industrial development of the potentially vast supply of fossil fuels and mineral resources throughout the Upper Colorado River Basin.

Listed below are the various power plants in the division and water usage of each for the 1973 water year:

<u>Name</u>	<u>Owner</u>	<u>Diversion, A. F.</u>
Ouray Hydro-Electric	Western Colo. Power Co.	8,456
Oliver Electric	Colo-Ute Electric Assn.	6,222
Ames-Illium	Western Colo. Power Co.	10,150
	(Trout Lake)	12,045
Blue Mesa reservoir	U. S. Bureau of Rec.	796,190
Morrow Point reservoir	U. S. Bureau of Rec.	891,220
Nucla Power Plant	Colo-Ute Electric Assn.	18,250
Redlands Power Co.	Redlands Water & Power Co.	<u>473,552</u>
	Division 4 Total.....	2,216,085

PERSONNEL:

Personnel changes in Division 4 were as follows: retirement of R. E. Robinson and replacement by Richard Drexel; transfer of Ronald Blewitt and replacement by Tom Kelly; appointment of Howard Noble as well commissioner and replacement by Roger Noble; addition of new employees Paul Stockemer, David Woolley, and Grover Shaw; resignation of Bill Glendening and Robert Pearce; and the loss by death of Harold Cyphers. The overlap of personnel at the Cedaredge office, in order to phase out a retiree and also obtain a smooth transition and effective on-the-job training of the replacement, appears to have produced the desired results. The good water year relieved the new employee of some decision-making pressures of the learning process, yet general indoctrination was effective and the increasing paper work load along with the latest tabulation effort was handled efficiently.

MILEAGE:

State reimbursement for travel is now \$0.12/mile, the average price of gasoline/gallon is \$0.45, and the division is undoubtedly facing severe consumption restrictions or outright rationing along with the rest of the country. Since the divisions work function is agriculturally oriented, it is presumed that gasoline sufficient to our needs will be made available on a priority basis, and it is hoped that personnel mileage expenses will be promptly and equitably adjusted to costs. Based on recent historical averages, total annual commissioner mileage for the years 1970 through 1972 was 146,332 miles. The same average for the years 1963 through 1968 was 146,343 miles, applying a 15% reduction of division mileage due to a re-defined division boundary in

1969. Assuming 45,000 staff miles and using an average 12 MPG gives 15,944 gallons required by the division for an average water year. If a 10% reduction of demand is assumed and a 15% variable applied (depending on water year), a requirement of from 12,200 to 16,500 gallons of gasoline appears to be necessary for effective administration of the division water supply in any given year of the foreseeable future.

Water Commissioners Annual Mileage Review:

<u>Year</u>	<u>Total Annual Mileage</u>	<u>Total Mileage Through August</u>
1963	180,550	142,786
1964	172,358	125,608
1965	168,162	123,387
1966	168,598	123,927
1967	176,164	128,407
1968	167,174	119,841
1969	149,862	117,063
1970	135,195	100,659
1971	143,852	104,829
1972	160,070	122,224
1973*	157,709	110,144

* December 1973 mileage is estimated.

Note that for mileage research purposes the division boundary was changed by legislation half way through the year 1969, or an estimated loss of 15% of historic mileage.

No distinction of terrain conditions are recognized to date in mileage expenses, be it highway travel or a 4-wheel drive requirement. Roughly 70% of commissioner personnel own 4-wheel drive equipment as a necessary means of travel. Although all travel is not 4-wheel drive, the requirement always exists and a personal investment in this type of equipment appears to be an essential part of the job.

No state vehicles are assigned to Division 4.

PERSONNEL DATA SHEET

Personnel:

<u>Name & Position</u>	<u>District</u>	<u>Months Worked/ Budgeted</u>	<u>Mileage</u>
Division Engineer (W. R. E. IV) Ralph V. Kelling, Jr.	Staff	Annual	12,500
Assistant Division Engineer (W. R. E. III) Thomas A. Kelly	Staff	Annual	12,500
Senior Clerk-Typist Melita Maten	Staff	Annual	--
Hydrographer Harold Coffey	Staff	Annual	6,250
Water Commissioners:			
Howard Noble	All	Annual	12,000
Richard L. Drexel	WD 40	Annual	10,000
Chalmer Garber	WD 61	Jan-Dec	7,200
Ralph Glendening	WD 41	Annual	12,000
Edwin S. Hofmann	WD 59-62	Annual	9,000
Roger Noble	WD 68	Annual	9,250
William E. Rhodes	WD 28	Jan-Dec	6,500
* W. W. Saunders	WD 42,63,73,74	Annual	15,000
Elton J. Watson	WD 40	Annual	10,600
Deputy Water Commissioners:			
Clifford Aldridge	WD 40	Apr 22-Oct 31	4,100
Richard Belden	WD 40	Apr 22-Oct 31	2,800
Russell Bertram	WD 40	Apr 15-Oct 31	2,600
James E. Carr	WD 40	Apr 15-Oct 31	7,000
Buck L. Catt	WD 42	Apr 7--Oct 15	6,500
Lloyd Connell	WD 40	Apr 22-Oct 31	7,200
Silas A. Freshour	WD 40	Apr 22-Oct 31	1,900
Mack Gorrod	WD 40	Apr 22-Oct 31	4,300
Dwayne C. Mansker	WD 60	Jan-Dec	10,000
Jack L. McHugh	WD 40	Apr 22-Oct 31	6,700
Frank Peterson	WD 40	Apr 15-Oct 15	5,100
Grover P. Shaw	WD 59	Apr 15-Oct 15	6,300
Paul Stockemer	WD 40	Apr 15-Oct 31	7,500
Stephen Tuck	WD 40	Apr 22-Oct 31	7,200
Charley Woolley	WD 40	Apr 1--Oct 31	5,100
David Woolley	WD 40	Apr 22-Oct 31	2,600
* Doug Gilbreath	WD 42	Apr 15-Oct 31	1,500

* These personnel have transferred to Irrigation Division No. 5 but are retained on Irrigation No. 4 roster as their duties are partially herein utilized. However, salary and mileage accounting are in Division No. 5.

WATER SUPPLY

Snow Pack:

The water supply outlook as of May 1, 1973, in Division No. 4 is taken from Soil Conservation Service monthly water supply bulletins, and prints of pertinent pages are included as a reference in this report. Significant data is as follows:

Summary of Snow Measurements:

<u>Basin or Watershed</u>	<u>No. of Courses Averaged</u>	This Years Snow Water as	
		<u>% of Last Yr.</u>	<u>Average</u>
Gunnison	12	273	160
Surface Creek	3	237	153
Uncompahgre	3	236	177

Streamflow Forecasts (1000 A. F. - Apr-Sept):

<u>Forecast Point</u>	<u>Forecast</u>	<u>% of Avg.</u>	<u>Average</u>
Gunnison River inflow to Blue Mesa	850	111	767
Gunnison River near Grand Junction	1800	158	1137
Surface Creek near Cedaredge	22	138	16
Uncompahgre River at Colona	200	155	129

The available water supply for the irrigation season lived up to early predictions, and made one of the best water years in recent memory. Flooding threatened in several areas but significant damage was minor. The spring was very late due to an

exceptionally large snow-pack in the mountain watersheds and even on the regions desert lands. An excellent first cutting of hay was obtained in the Crawford-Maher area without an early irrigation. Due to the good year there was very little summer administration and its associated misunderstandings.

Published records from five U. S. Geological Survey stream gaging stations are presented for recent years, and in general terms these records help to indicate how the administration of water rights is affected by variations in run-off. For example, the Uncompahgre River normally peaks twice during the spring run-off, usually in latter May and again in latter June. High stream flows seldom require administration, whereas low flows require critical management. A necessary and continual part of the water officials function appears to be in educating new water users to a management system which is complex and very often difficult to accept without argument and confrontation.

Weather Modification:

The Durango office of the Bureau of Reclamation is going into the fourth winter in conducting a cloud-seeding research project in the San Juan Mountains. Seeding operations were suspended for 6 weeks last season when snowfall reached 150% of normal. The techniques which are being developed will permit the seeding of winter snowstorms without contributing to local hardships. The Bureau expects an initial annual yield of 250,000 A. F. of water from one season of cloud-seeding.

Precipitation:

The water year began October 1st with a series of regional storms, and the winter snow-pack wound up as one of the best on record. A cold winter with few winds and low run-off apparently combined to create these high snow-pack conditions. Precipitation at Blue Mesa reservoir from January through June was 3.58", compared to the 2.12" average of the three previous years. A hydrometeorological data sheet for Blue Mesa reservoir is supplied as a supplement to the report. No hail suppression work is being conducted in Division 4.

Figures of a general nature relating to effective water supply are as follows:

<u>County</u>	<u>Avg. Mean Temperature, F.</u>	<u>Avg. Annual Rainfall, In.</u>	<u>Avg. Annual Snowfall, In.</u>
Delta	51.0	7.75	18.5
Mesa	52.5	9.06	27.3
Montrose	49.6	9.11	28.4
Ouray	44.5	23.27	146.0
San Miguel	39.5	23.79	165.7
Gunnison	38.5	10.67	50.2
Hinsdale	36.5	20.00	145.0
Saguache	43.6	8.10	26.3

Chalmer Garber (W. D. 61) has concluded some 28 years of record keeping as observer of the Weather Bureau station at Paradox.

Floods:

Flooding threatened on the Uncompahgre and Dolores Rivers yet did not materialize to any serious extent. Some 8,000 cfs was recorded at the Dolores River at Bedrock in early May. A local area of flooding existed for a short period on the Gunnison River west of Delta; the problem was alleviated by a reduction of

releases through the Curecanti Unit reservoirs. This locality is in the river bottom and is plagued by high water in the spring of most normal water years. Telephone communication was maintained with the U. S. Geological Survey at Grand Junction and the River Forecast Center of the National Weather Service in Salt Lake City during the high water period.

Areas subject to flash flooding vary from year to year within the division, and all are associated with locally heavy rains. In recent years three localities have been subject to minor flooding, as follows: Ouray-Ridgway area, Paradox area, and Hotchkiss-Paonia area. No flash floods of consequence occurred in 1973 in Division 4.

Water Budget:

As with several recent water years, reports of total water diversions by area are identified as including a relatively small percentage of all decreed water rights, among which may be numerous owner reports. In addition, duplications of water are unavoidable since some ditches and reservoirs account for practically the same water. For example, the Curecanti Unit reservoirs account in duplicate for practically the same water for power. Average drainage area yields from many gaging stations records are not compatible with the "common source" doctrine, nor are they compatible to district boundaries. Depletions by irrigation, municipal, domestic, and other uses are unknown variables, thus no attempt to identify the various depletions by water district has been made for purposes of this report.

Underground Water:

Aquifers of significance in the division are not well known at this time due to a paucity of ground water literature and very scattered regional drilling, much of which has been confined to alluvial valleys. A few deep water wells, including oil well dry holes, exist, in addition to shallow seismic survey drill holes, but it is probably that water logs of only very few of these holes have been retained. Potentially all formations may prove productive, with the shale sections having a minimal water content and sands, especially of the Dakota and Entrada formations, capable of containing large volumes of water. A number of good water wells in the Grand Junction area produce from Morrison sands; in the Montrose area the Dakota formation is the primary aquifer. At this time most wells are for domestic and stockwater purposes, and as such do not contribute effectively to the area economy.

Colorado Geological Survey Bulletin 33, Bibliography of Hydrogeologic Reports in Colorado, by Richard H. Pearl, published in 1971, is the most recent publication on water resources in Colorado West. This bulletin is a welcome and necessary compilation of all published literature in the field, and should serve as an excellent reference for those interested in Colorado's water resources.

Wells:

A recent problem on Surface Creek near Cedaredge in which pumps take water directly from the stream has apparently been resolved

and the solution may be of interest as it relates to well administration. The particular circumstances developed over the past three years as new owners moved in and settled on small tracts bordering the stream. Without a knowledge of state water law or an understanding of local administration, these parties took water from the stream by pump, resulting in injury to senior rights and complaints by various water interests. The parties, ten in all, now purchase reservoir storage averaging 1/2 A. F. per season, and using the stream as a carrier, divert it from the stream by pump at regulated intervals during the irrigation season for lawn and garden use. Pumps are meter-tested for accurate capacity, the electric switch boxes are locked and controlled by the water commissioner, and no decree or measuring devices is required. Protection to vested water rights is assured in that no pump is allowed to pull the full purchase order, which benefit accrues to the stream. The legality of this practice may be subject to review, yet senior vested rights are fully recognized and protected, and the public interest appears to be properly served.

Well Commissioner, Howard Noble, is performing a new function in the division under the recently enacted legislation of H. B. 1042. Involvement to date has included establishing well files and map plats, making inspections and familiarization trips, in addition to training his replacement and acting in the capacity of a floating water commissioner.

TRANS-MOUNTAIN DIVERSIONS:

<u>NAME</u>	<u>SOURCE</u>	<u>RECIPIENT AND/ OR CLAIMANT</u>	<u>ANNUAL AVG. DIVER. A.F.</u>	<u>AMOUNT A. F.</u>
Red Mountain Ditch	Mineral Cr.	Ouray Ditch Co. Montrose, Colo.	260	297
Carbon Lake Ditch	" "	" "	---	281
St. John Ditch	E. Fk. Animas River	Charles, Gunn, & % W. Worley Olathe, Colo.	---	No Diversion
Mineral Pt. Ditch	Burrows Cr., tr. N. Fk. Animas River	W. Gibbs Ouray, Colo.	---	No Record
Larkspur Ditch	Tr. of Tomichi Creek	Rocky Ford High- line Canal Co. Rocky Ford, Colo.	125	269*
Tabor	Cebolla Cr.	Colo. Div. of Wildlife Alamosa, Colorado	670 ('69 W.Y.)	465*
Tarbell	Cochetopa	Saguache Land & Water Company Saguache, Colo.	410 ('69 W.Y.)	524*
Divide Cr. High- line Feeder Ditch	Divide Cr.	F. M. Starbuck, Mgr. Silt, Colorado	2125	1301
Leon Lake	Leon Creek	Sam Oaks Eckert, Colo.	1550	1730

* Published one year in arrears by USGS - Water Resources Data for Colorado, Part I - Surface Water Records 1972

TRANS-BASIN DIVERSIONS:

Leopard Cr. Ditch	Leopard Cr.	Harry McClure Ridgway, Colo.	1372	1233 1971 W.Y. 1000 1972 W.Y. 1019 1973 W.Y.
N. Fk. of the Paxton Ditch	Cottonwood & Horsefly Creeks	William Hofmann Montrose, Colo.	30	10 1971 W.Y. 13 1972 W.Y. 4.41 1973 W.Y.
Cimarron Feeder of the Garnet Ditch	W. Fk. of the Cimarron	Unc. Valley Water Users Ass'n. Montrose, Colorado	2500	2516 1971 W.Y. 2785 1972 W.Y. 2330 1973 W.Y.
Gunnison Tunnel	Gunnison River	" "	350,000	346,729 ('65-70 Avg.) 335,850 1971 284,546 1973
Head & Ferrier Ditch	Soap Creek	H. Head & Ferrier Delta, Colorado	146	164 ('65-70 Avg.) 200 1972 W.Y. 180 1973 W.Y.
Lake Brennand	Lake Brennand	Town of Crested Butte, Colorado	---	No Record
Meek Tunnel	Crystal Cr.	Carton Meek Maher, Colorado	---	No Record
Mesa Cr. Ditch	Mesa Creek	" "	---	78

Reservoir Storage:

In sharp contrast to the 1972 water year, all reservoirs filled in 1973. As mentioned earlier, the late spring delayed the agricultural season, and of course the filling of reservoirs also occurred at a later than normal period of time.

Listed below are selected reservoirs and storage volumes of each on specific dates:

<u>Name of reservoir</u>		<u>Storage in A. F., Nov. 1, 1973</u>		<u>Storage in A. F., May 1, 1973</u>
Blue Mesa		532,700		308,600
Morrow Point		76,590		115,300
Silver Jack		9,630		10,660
Taylor Park		71,390		42,470
Paonia	Nov. '73	5,395	June '73	18,468
Crawford	"	6,630	"	14,395
Fruit Growers	"	843	"	4,356
Beaver		Empty	"	835
Park	"	1,087	"	3,383
Carson		Empty		Empty
Gurley		1,873		4,723
Buckeye		1,700		610

Problems with dams, restrictions of storage, and a comprehensive storage report are covered in several other categories of this report.

RECAPITULATION SHEET

U. S. BUREAU OF RECLAMATION

CURECANTI UNIT RESERVOIRS - COLORADO RIVER STORAGE PROJECT

BLUE MESA RESERVOIR

<u>WATER YEAR</u>	<u>CUMULATIVE DIS- CHARGE A. F.</u>	<u>PEAK STOR- AGE A. F.</u>	<u>CUMULATIVE STOR- AGE A. F. (10-1- 66 - 12-31-66)</u>
1966	50,110 (10-1-66 - 12-31-66)		
1967	473,535	574,900 (7-20-67)	360,100
1968	979,468	796,854 (8-30-68)	
1969	948,793	853,659 (11-2-69)	
1970	1,327,822	831,700 (7-8-70)	
1971	1,077,340	647,700 (1-1-71)	
1972	807,440	542,500 (7-2-72)	
1973	796,190	829,300 (7-22,23-73)	

MORROW POINT RESERVOIR

1971	1,483,974 (12-1-71 - 9-31-71)	118,700 (12-26-70)
1972	897,210	117,600 (11-28-71)
1973	891,220	116,500 (10-5-72)

CRYSTAL RESERVOIR

Primary construction is now underway, and the river diversion tunnel has recently been completed.

BOSTWICK PARK PROJECT - SILVERJACK RESERVOIR

<u>WATER YEAR</u>	<u>CUMULATIVE DIS- CHARGE, A. F.</u>	<u>DISCHARGE THRU OUTLET WORKS</u>	<u>DISCHARGE THRU SPILLWAY</u>
1971	10,129 (July-Sept., Incl.)	6970	3159
Reservoir filled and spilled first time on May 24, 1971			
1972	31,191 (May-Sept., Incl.)	31,101 (May-Sept., Incl.)	90
1973	13,682 (July-Oct., Incl.) (3,986 Irrigation)	13,682 (July-Oct., Incl.)	No Record

Daily diversion records are kept at the local Power Operations office of the U. S. Bureau of Reclamation, and in turn furnished to the Division 4 office on a monthly basis.

Agriculture:

The region has been economically depressed for a number of years because it is agriculturally oriented and dominated. However, this past year has seen a dramatic reversal of form with shortages and high prices commanding attention. Beet production has consistently equaled the best in the state, hay crops in general have been quite good, and fruit yields were excellent, with the apple harvest yielding bumper crops. The farm labor force is seasonal.

Presented below is a brief resume by area:

<u>County</u>	<u>Average Growing Season, Days</u>	<u>Crop Production*</u>			<u>Livestock**</u>	
		<u>Barley</u>	<u>Beets</u>	<u>Corn</u>	<u>Cattle-Calves</u>	<u>Stock Sheep</u>
Delta	146	65	18.4	86	49,400	27,000
Montrose	153	59.6	16.3	78	48,400	58,000
Mesa	188	54.3	21.0	89.7	77,000	51,000
Ouray	48	64	16.7	---	15,000	4,100
San Miguel	45	52	-----	---	9,500	29,000
Gunnison	49	--	-----	---	38,000	14,000
Hindsdale	45	--	-----	---	3,500	5,300
Saguache	105	50	-----	50	52,000	16,500

* 1971 Colorado Agriculture Statistics, Published July 1973; in bu./ac. or tons/ac.

** Number of head, 1972

Fruit production includes apples, peaches, pears, and sweet and tart cherries, all highly susceptible to frost and hail damage.

No record of production for the current year is available,

however, the 1973 crop year was excellent for peaches, and a record apple crop was recorded in the Delta-Cedaredge area. No recent dollar values are available, but several 1968 fruit crop farm values in dollars are as follows:

Commerical apples - 4,366,000; peaches - 1,770,000
 pears - 724,000; cherries, tart - 531,000; cherries
 sweet - 117,000

Several crop dollar values for 1971 are as follows:

County	Corn	Sugar Beets	Barley	Hay
Delta	773,600	597,400	680,100	2,160,000
Montrose	1,428,700	674,500	1,305,500	2,419,000
Mesa	1,492,000	3,523,700	207,000	3,204,000
Ouray	24,500	15,100	24,500	704,000
San Miguel	27,500	--	27,200	259,200
Gunnison	--	--	--	1,247,000
Hindsdale	--	--	--	44,800
Saguache	13,750	--	1,499,000	1,854,000

The above production data have been extracted from several sources, including:

1973 Colorado Yearbook - Colorado Interstate Gas Company
 1973 Colorado Agriculture Statistics - Colorado Department of Agriculture.

COLORADO RIVER COMPACTS:

The Colorado River Compact of 1922 and the Upper Colorado River Basin Compact of 1948 are the definitive documents. The Upper Basin's share of Colorado River water is 7,500,000 acre feet per year, of which Colorado is allocated 51 3/4%. The Lower Basin can put a call on the Upper Basin in any series of water short years, based on the long term average flow at Lee Ferry.

Although there apparently exists a wealth of information concerning these compacts on the Colorado River by various state, federal, and other agencies, there is not available operational criteria in the event of a "call" on the Colorado River. The fact that a call on the river has not occurred to date does not preclude than an operational plan should exist. Presumably water rights decreed prior to 1922 shall in any event not be subject to call. Undoubtedly the operational experience of numerous interstate compacts will prove valuable in establishing these criteria for the Colorado River.

It is further feasible and possible that the existence of the Curecanti reservoirs and Lake Powell may in fact preclude any future compact call from occurring in Colorado. No definitive document is available to date that speaks to this subject.

DAMS

Storage Reservoirs:

1. Beaver reservoir on the East Fork of Minnesota Creek in W. D. 40 developed a major abutment failure within the reservoir basin and in front of the upstream face of the dam. The seepage zone apparently enlarged rapidly in early August, and upon notice to the commissioner on August 13, 1973, the two seep holes extended from gage rod elevations 57.0' to 54.0'. Prompt reaction by water commissioner Elton Watson may have averted a disaster. The company is proceeding with another major repair and storage will be of critical concern in the 1974 and future filling seasons.
2. Porter No. 1 reservoir (W. D. 40) was repaired for the third season, and hopefully the lenses which created the slip conditions have been removed.
3. Full Moon reservoir did not fill in the 1973 water year since the owner has indicated an intent to abandon. However, the Division of Wildlife has shown an interest in the property and may rehabilitate the dam if feasible. Storage capacity is 420 A. F., and either for recreation, mining and milling, or irrigation, the property would appear to have desirable features.
4. A major dam failure occurred in Division 4 on July 15, 1973, when the Hidden Treasure dam on Henson Creek above Lake City failed. A part of the log cribbing

below the concrete dam gave way (with the dam proper remaining intact), spilling an estimated 1/2 million cubic yards of debris down Henson Creek. There is no known injury or loss of life, but Lake City's water source of supply was lost for several months. Gravels and cobbles completely filled the reservoir and V-notch canyon many years ago, which created the hazard. The water supply was used for power purposes, conditionally decreed for 215 cfs and 96.7 A. F., upon reconstruction and use.

5. The Lucky Chance Pipe Line and Water Right (undecreed) is located on the North Fork of Henson Creek 7 miles above the Hidden Treasure dam. The structure is also filled in, was also a power diversion, and in other ways is very comparable to both the Hidden Treasure and Ute-Ulay structures. An inspection did not reveal unsafe conditions. The engineering features and construction of each seem very up-to-date, although all were probably built in the mid 1880's.

Reservoir stop storage orders are in effect as follows:

<u>Name</u>	<u>Water District</u>	<u>Order Date</u>	<u>Restriction</u>
Dogfish	40	8-9-72	5' below spillway.
Lone Cabin	40	"	5' below lowest embankment.
Waterbug	40	"	5' below spillway.
Weir & Johnson	40	"	5' below spillway.
Porter # 1	40	Verbal, fall 1973	2' below spillway.
Beaver	40	Verbal, fall 1973	not over 50' on gage in filled season; may fill late.
Full Moon	68	8-24-72	5' below dam crest.
Hidden Treasure	62	Verbal, fall 1973	enlarge channel opening at base of dam.

Various staff personnel from the Dam Section have made numerous inspection trips this season, including Mr. Stan Miller, under contract to the Department, and recently retired from the Colorado Water Conservation Board. Mr. Paddock's Annual Report will cover more specifically the Sections operations in Division 4.

Livestock Water Tanks - Permits Issued 1973

<u>Name</u>	<u>Stream</u>	<u>Height</u>	<u>Capacity, A. F.</u>	<u>Permit Number</u>
Gary Dixon #1-73	SW27-51N-10W	11.1	1.0	14205
Paul B. Swanson #1	NE23-47N-9W	15	1.0	14379
Hostetler 73 #1	NW13-48N-3E	10	5.0	14410

Only one problem developed concerning stock water tanks, and it will be reported in the 1974 Annual Report since the issues have not been resolved at this time. The problem relative to water supply involves the taking and impoundment of 0.06 cfs of decreed direct flow into a non-permitted and undecreed pond, (W. D. 68) and subsequent removal of the control stem which is now under water.

WATER RIGHTS

A. Tabulation:

Water commissioner personnel were again involved with correcting errors and making other revisions to the tabulation after completing annual reports. Mr. Walt Knudsen met with selected personnel on several occasions to coordinate efforts in this regard. Work continued on this project throughout the winter and until

Uncompahgre Project

COLORADO, Delta, Gunnison, and Montrose Counties

REGION 4, Bureau of Reclamation

PROJECT HEADQUARTERS, Montrose, Colo.



The project is on the western slope of the Rocky Mountains in west-central Colorado. Project lands surround the town of Montrose and extend along both sides of the Uncompahgre River to Delta, a distance of 34 miles. Project features include the Taylor Park Dam and Reservoir, Gunnison Tunnel, 7 diversion dams, 143 miles of main canals, 425 miles of laterals, and 215 miles of drains. The system diverts water from the Uncompahgre and Gunnison Rivers to irrigate over 76,000 acres of project land.

PLAN

The project plan provides for storage in Taylor Park Reservoir on the Taylor River, which is a part of the Gunnison River Basin, and diversion of water from the Gunnison River by the Gunnison Diversion Dam through the Gunnison Tunnel and the South Canal to the Uncompahgre River.

To distribute the waters of the Gunnison and Uncompahgre Rivers, the South and West Canals were constructed and the more important private canals, taking water directly from the Uncompahgre River were purchased, enlarged, and extended. Laterals were also constructed to take water from the South Canal.

Taylor Park Dam and Reservoir

Taylor Park Dam is on the Taylor River, a tributary of the Gunnison River. The dam is a zoned earthfill structure 206 feet high, with a crest length of 675 feet and a volume of 1,115,000 cubic yards. It creates a reservoir with a storage capacity of 106,200 acre-feet. The spillway is an overflow-type weir crest 180 feet long, with a capacity of 10,000 cubic feet per second. The outlet works is a horseshoe tunnel with a diameter of 10 feet and a capacity of 1,500 cubic feet per second.

Gunnison Diversion Dam, Tunnel, and Canal System

The Gunnison Diversion Dam on the Gunnison River about 12 miles east of Montrose is a timber-crib weir with concrete wings and a removable crest. The dam has a hydraulic height of 10 feet. It diverts releases from the Taylor Park Dam into the Gunnison Tunnel.

The Gunnison Tunnel has a rectangular section 11 feet wide and 12 feet high with an arch roof. It is

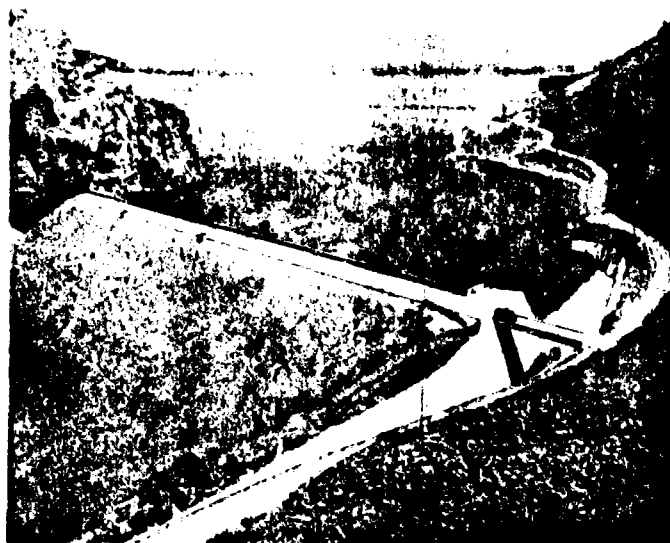
5.8 miles long and has a capacity of 1,000 cubic feet per second.

South Canal extends from the end of the Gunnison Tunnel generally southwest 11.4 miles to the Uncompahgre River. Part of the canal is concrete lined; the remainder is unlined. The canal has a diversion capacity of 1,010 cubic feet per second.

West Canal extends generally northwest about 21 miles from the Uncompahgre River at the confluence of the South Canal with the river. It has a diversion capacity of 172 cubic feet per second and is unlined.

Montrose and Delta Diversion Dam and Canal

The diversion dam is on the Uncompahgre River about 8 miles south of Montrose. The dam is a concrete gate structure with removable crest, and has a hydraulic height of 12 feet. The canal extends generally northwest about 40 miles from the diversion point and has a diversion capacity of 563 cubic feet per second. The canal is unlined. The dam and canal were privately constructed and later purchased by the Bureau.



Taylor Park Dam.

Loutzenhizer Diversion Dam and Canal

The diversion dam is on the Uncompahgre River about 2 miles south of Montrose. It is a pile-and-timber weir with a concrete apron. The dam has a hydraulic height of 9 feet. The canal extends generally northwest 14.5 miles from the diversion dam and has a diversion capacity of 120 cubic feet per second. The dam and canal were privately constructed and later purchased by the Bureau.

Selig Diversion Dam and Canal

Selig Diversion Dam is on the Uncompahgre River about 5 miles northwest of Montrose. It is a pile-and-timber weir with removable crest and concrete apron. Its hydraulic height is 10 feet. The canal extends generally north about 20 miles from the diversion dam. This unlined canal has a diversion capacity of 320 cubic feet per second. The dam and canal were privately constructed and later purchased by the Bureau.

Ironstone Diversion Dam and Canal

Located on the Uncompahgre River about 8 miles northwest of Montrose, the Ironstone Diversion Dam is a concrete gate structure with a concrete wing. The hydraulic height is 8 feet. The unlined canal runs 14 miles northwest from the diversion dam. The diversion capacity is 400 cubic feet per second. The dam and canal were privately constructed and were later acquired by the Government.

East Canal Diversion Dam and Canal

Located on the Uncompahgre River about 10 miles northwest of Montrose, the East Canal Diversion Dam is a concrete weir with an earth embankment wing. The hydraulic height is 8 feet. The unlined canal extends 10.6 miles north from the diversion dam. Its diversion capacity is 165 cubic feet per second. The dam and canal were privately constructed and were later acquired by the Bureau.

Garnet Diversion Dam and Canal

The diversion dam is on the Uncompahgre River about 15 miles northwest of Montrose. The dam is a rockfill weir, concrete surfaced. It has a hydraulic height of 4 feet. Garnet Canal is unlined and extends 10.7 miles northwest from the diversion dam. Its diversion capacity is 75 cubic feet per second. The dam and canal were constructed by private interests and later acquired by the Bureau.

Lateral and Drainage Systems

There are 425 miles of laterals which distribute the water to project lands. A system of subsurface drains totaling 215 miles has been constructed in recent years.

DEVELOPMENT**Early History**

The lands now comprising the project were formerly part of the Ute Indian Reservation. Settlement by

white settlers rapidly followed the cession of the lands from the Indians to the United States. By 1903, about 30,000 acres in the Uncompahgre Valley were irrigated by a system which included three small diversion dams on the Uncompahgre River. As the possibilities for greater use of irrigation water were evident, a larger development of the scheme by the State of Colorado was begun but was not completed when work by the Reclamation Service commenced.

Investigations

Active support for driving a tunnel from the Gunnison River to the Uncompahgre Valley to obtain additional water was solicited as early as 1890. In 1894, the Geological Survey completed a survey and found the tunnel project feasible. The tunnel project was too expensive an undertaking for local interests, but in 1901 the State of Colorado appropriated \$25,000 for starting the work of the tunnel. Only 900 feet of tunnel were driven before the funds were exhausted. In 1901, surveys of the project were begun by the Geological Survey, and the general scheme of the project was outlined in the first report. After the passage of the Reclamation Act in 1902, the Uncompahgre Valley was selected for immediate development. The original surveys by the Geological Survey, plus the investigational work carried out by the Reclamation Service, served as a basis for authorization of the project in 1903.

Authorization

The project (originally called Gunnison project) was authorized by the Secretary of the Interior on March 14, 1903, under the provisions of the National Reclamation Act. Rehabilitation of the project and construction of Taylor Park Dam was approved by the President on November 6, 1935.

Construction

Construction began in July 1904, and the first water for irrigation was available during the season of 1908. The Gunnison Tunnel was completed in 1909 and the Gunnison Diversion Dam in January 1912. The project was transferred to the Uncompahgre Valley Water Users' Association for operation and maintenance in 1932. Taylor Park Dam was completed in 1937, having been built from funds allotted under the National Industrial Recovery Act. Other improvements made during the same period included enlargement, lining, and smoothing portions of the Gunnison Tunnel; constructing concrete and steel structures to replace the worn-out wooden structures in the irrigation system; relining portions of the canals; and constructing a drainage system to relieve and prevent waterlogging of land.

Operating Agency

The project is operated and maintained by the Uncompahgre Valley Water Users' Association.

BENEFITS

Irrigation

About 76,300 acres of land receive full irrigation water supply from the facilities of the project. Principal crops are alfalfa, wheat, corn, oats, potatoes, beans, barley, sugar beets, and onions.

Recreation

Free camp and picnic grounds have been provided at Taylor Park Reservoir. Cabins are available in privately owned resort developments in the area. Camping, picnicking, swimming, boating are popular activities, and fishing is good for rainbow, brown, and Loch Leven trout. Some brook and native trout are also caught.

PROJECT DATA

Land Areas (1958)

Irrigable area (acres): Full irrigation service . . .	76, 295
Number of irrigated farms	1, 940

Area Irrigated and Crop Value

Year	Area irrigated (acres)	Crop value
1948	72, 130	\$3, 960, 437
1949	72, 795	4, 016, 532
1950	73, 427	3, 724, 621
1951	74, 207	6, 076, 028
1952	70, 349	5, 557, 325
1953	73, 529	4, 389, 980
1954	72, 526	5, 743, 048
1955	73, 762	4, 990, 262
1956	73, 987	5, 671, 204
1957	60, 345	4, 382, 283
1958	63, 070	4, 682, 442

Facilities in Operation (June 30, 1958)

Storage dams	1
Reservoir capacity (acre-feet, active)	106, 200
Diversion dams	7
Canals (miles)	143
Laterals (miles)	425
Drains (miles)	215

Climatic Conditions

Annual precipitation (inches)	9. 0
Temperature:	
Maximum	109°
Minimum	-36°
Mean	51. 4°
Growing season (days)	150
Elevation of irrigable area (feet)	4950-6400

Settlement

Number of persons served with project water (1958):	
Farm irrigation service	7, 000
Municipal water service	6, 300
Other water service	10, 800
Total	24, 100

¹ Urban and suburban, residential, commercial, and industrial lands.

ENGINEERING DATA

Water Supply

UNCOMPAHGRE RIVER

Drainage area at Colona, Colo. (square miles)	437
Annual discharge (acre-feet):	
Maximum (1921)	331, 200
Minimum (1934)	102, 200
Average (1903-50)	208, 300

GUNNISON RIVER

Drainage area at Gunnison Tunnel (square miles)	3, 980
Annual discharge (acre-feet):	
Maximum (1948)	1, 689, 600
Minimum (1934)	548, 300
Average (1910-50)	1, 327, 600
Average annual diversion, 1948-55 (acre-feet)	562, 500

Storage Facilities

TAYLOR PARK DAM

Type: Zoned earthfill.	
Location: On the Taylor River, 30 miles north-east of Gunnison, Colo.	
Construction period: 1935-37.	
Date of closure (first storage): 1937.	
Reservoir, Taylor Park:	
Average annual inflow, 1939-50 (acre-feet)	137, 050
Total capacity to elevation 9330 (acre-feet)	106, 200
Surface area (acres)	2, 010
Dimensions (feet):	
Structural height	296
Hydraulic height	153
Top width	35
Maximum base width	1, 000
Crest length	675
Crest elevation	9344. 0
Total volume (cubic yards)	1, 115, 000
Spillway: Uncontrolled concrete side-channel weir and concrete-lined chute in left abutment.	
Crest length (feet)	180
Crest elevation (feet)	9330. 0
Capacity at elevation 9336.0 (cubic feet per second)	10, 000
Outlet works: Concrete-lined tunnel through right abutment, controlled by two 48-inch needle valves.	
Capacity at elevation 9330.0 (cubic feet per second)	1, 500

Foundation: Competent, fine-grained phyllites and granitic intrusions in left abutment and river channel; firm, much-jointed, warped and faulted sedimentary formations in right abutment. Major inactive fault with crush zone extends through right abutment.

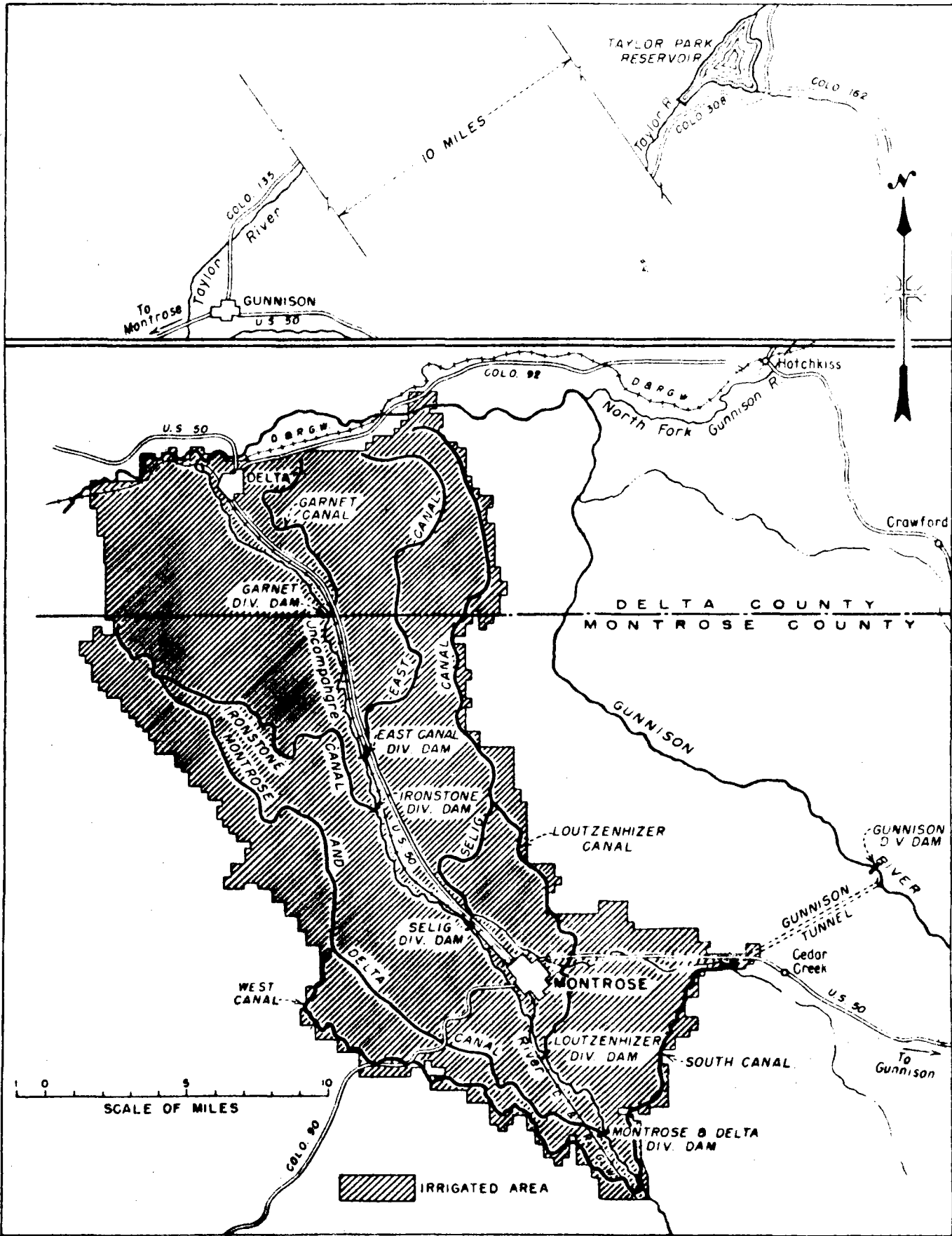
Special treatment: Shaft excavated in fault zone beneath cutoff wall and backfilled with concrete; grout curtain beneath cutoff walls and supplementary grouting of foundation, abutments, and fault zone.

Diversion Facilities

GUNNISON DIVERSION DAM

Type: Timber crib weir, concrete wings, removable crest.	
Location: On the Gunnison River, about 12 miles east of Montrose, Colo.	
Year completed: 1912.	
Supplemental construction in 1915.	
Dimensions (feet):	
Structural height	16
Hydraulic height	10
Weir crest length	237
Crest length	244
Crest elevation	6542. 5
Volume (cubic yards)	3, 200
Headworks: Concrete gate structure with two 6-foot 11-inch by 11-foot 7-inch steel plate gates.	
Diversion capacity (cubic feet per second)	1, 000

Uncompahgre Project



Uncompahgre project.

December 7, 1973

Uncompahgre Project, Montrose, Colorado-Season 1973

"Under the terms of the contract between the Bureau of Reclamation and the Uncompahgre Valley Water Users' Association approved August 4, 1931, the operation and maintenance of the project was taken over by the Association on January 1, 1932.

The project irrigation system includes 575 miles of irrigation canals and 204 miles of drainage canals.

It requires 1,600 second feet of water entering the Project during periods of peak demand.

The water content of the snowfall on the Uncompahgre watershed on March 1, 1973, was 117% of the normal content for March 1, for the period of record.

On April 1, 1973, the water content was 94% of the normal content for April 1, and 258% on May 1, 1973, for the period of record.

The Taylor Park Reservoir filled and water started over the spillway at 5:30 P.M. on June 2, 1973.

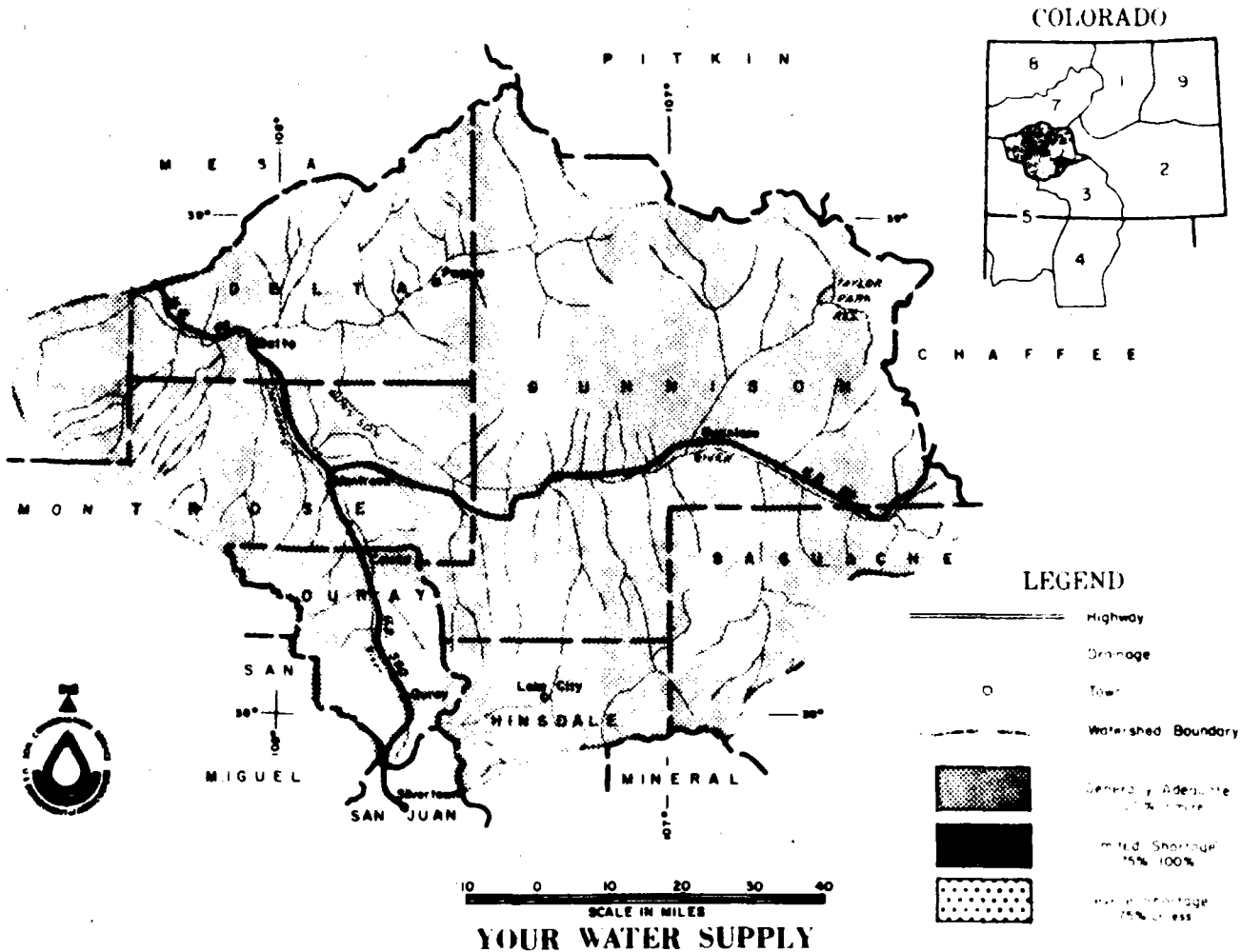
The Gunnison Tunnel was shut out on June 25 at 8:00 P.M. and turned back in at 2:00 P.M. on June 26 for the annual summer inspection of the tunnel and A Canal.

The C Canal was shut out 34 times for an average time of 40 minutes to wash gravel and drift from the diversion dam forebay. The extended period of high run-off in the Uncompahgre River was excellent for water supply but caused considerable difficulty with heavy amounts of drift and gravel movement. The

WATER SUPPLY OUTLOOK FOR THE SOIL CONSERVATION DISTRICTS IN THE GUNNISON RIVER WATERSHED IN COLORADO

as of
May 1, 1973

U. S. DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE
COLORADO EXPERIMENT STATION, STATE ENGINEERS OF COLORADO AND NEW MEXICO



THE SNOWPACK INCREASED FANTASTICALLY DURING APRIL. SOME AREAS INCREASED AS MUCH AS 60 PERCENT. IT IS FELT THESE INCREASES MAY BE DUE IN PART TO THE COLD TEMPERATURES. THERE WAS LITTLE SNOWMELT. STREAMFLOW WAS GENERALLY BELOW NORMAL. THERE WILL BE ADEQUATE WATER OVER THE BASIN. FORECASTS WERE INCREASED IN SOME CASES AS MUCH AS 40 PERCENT. CARRY-OVER RESERVOIR STORAGE IS SIMILAR TO LAST YEAR, BUT SLIGHTLY LESS. VALLEY SOILS ARE IN GOOD CONDITION.

This report prepared by
JACK N. WASHICHA and RONALD E. MORELAND
SNOW SURVEY UNIT, SOIL CONSERVATION SERVICE
DENVER, COLORADO

Issued by
H. D. BURDICK - STATE CONSERVATIONIST P. J. PORTER - AREA CONSERVATIONIST
U. S. DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE
DENVER, COLORADO GLENMOUNT SPRINGS, COLORADO

The Conservation of Water begins with the Snow Survey

STREAMFLOW FORECASTS (1000 Ac. Ft.) Apr-Sept

FORECAST POINT	FORECAST	% of Average	Average
			†
Gunnison R. inflow to Blue Mesa (1)	850	111	767
Gunnison nr Grand Junction (2)	1800	158	1137
N. Fork of Gunnison(3)	370	143	258
Surface Creek nr Cedaridge	22	138	16
Uncompahgre at Colona	200	155	129

†(1) Observed flow plus change in storage in Taylor Reservoir. (2) Observed flow plus change in storage in Blue Mesa, Morrow Point and Taylor Reservoirs. (3) Observed flow plus change in storage in Paonia Reservoir.

WATER SUPPLY OUTLOOK (related with respect to Usual Supply)

STREAM or AREA	Flow Period	
	Spring Season	Late Season
Taylor	Exc.	Exc.

SUMMARY of SNOW MEASUREMENTS

(COMPARISON WITH PREVIOUS YEARS)

RIVER BASIN and/or SUB-WATERSHED	Number of Courses Averaged	THIS YEAR'S SNOW WATER AS PERCENT OF	
		Last Year	Average †
Gunnison	12	273	160
Surface Creek	3	237	153
Uncompahgre	3	236	177

SOIL MOISTURE

RIVER BASIN	Number of Stations	THIS YEAR'S MOISTURE as PERCENT OF	
		Last Year	Average †
Gunnison	1	126	126
Surface Creek	1	110	122
Uncompahgre	1	110	122

RESERVOIR STORAGE (Thousand Ac. Ft.) END OF MONTH

RESERVOIR	Usable Capacity	Usable Storage		
		This Year	Last Year	Average †
Blue Mesa	830	305	319	--
Morrow Point	121	115	116	--
Taylor	106	42	77	59

RESERVOIR STORAGE (Thousand Ac. Ft.) END OF MONTH

RESERVOIR	Usable Capacity	Usable Storage		
		This Year	Last Year	Average †

† 1953-1967 period.

Return if not delivered
 UNITED STATES DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE
 SNOW SURVEY UNIT
 P. O. BOX 17107
 DENVER, COLORADO 80217

OFFICIAL BUSINESS
 PENALTY FOR PRIVATE USE \$ 300

POSTAGE AND FEES PAID
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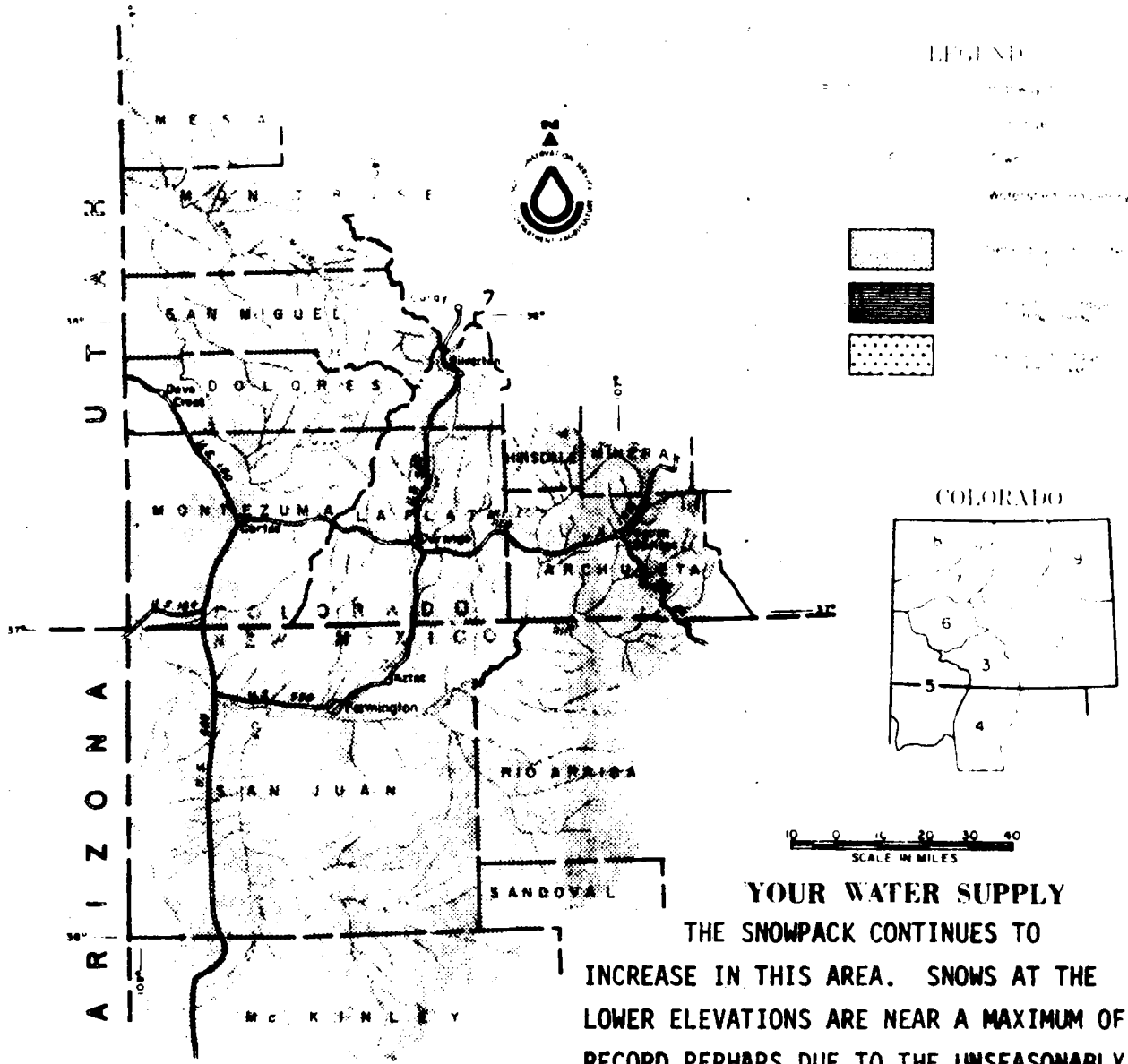


FIRST CLASS MAIL

WATER SUPPLY OUTLOOK
FOR THE SOIL CONSERVATION DISTRICTS IN THE
SAN MIGUEL, DOLORES, ANIMAS, AND SAN JUAN
WATERSHEDS IN COLORADO AND NEW MEXICO

as of
November 1972

U.S. DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE
COLORADO EXPERIMENT STATION, STATE ENGINEERS OF COLORADO AND NEW MEXICO



YOUR WATER SUPPLY
THE SNOWPACK CONTINUES TO
INCREASE IN THIS AREA. SNOWS AT THE
LOWER ELEVATIONS ARE NEAR A MAXIMUM OF
RECORD PERHAPS DUE TO THE UNSEASONABLY

COOL TEMPERATURES. SNOWMELT HAS BEEN DELAYED. THE REMAINING LOW AND MEDIUM
ELEVATION SNOW WOULD MELT RAPIDLY WITH WARM TEMPERATURES. HIGH WATER CAN BE
EXPECTED IN THE NEW FLOOD PLAINS. TEMPERATURES AND PRECIPITATION WILL
REGULATE PEAK FLOWS. SOILS ARE WET OVER MOST OF THE AREA.

WATER SURVEY UNIT, SOIL CONSERVATION SERVICE
FARMINGTON, NEW MEXICO

STATE ENGINEERS OF COLORADO AND NEW MEXICO
DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE
COLORADO EXPERIMENT STATION, STATE ENGINEERS OF COLORADO AND NEW MEXICO

The Conservation of Water begins with the Snow Survey

STREAMFLOW FORECASTS (1000 Ac. Ft.) Apr-Sep

FORECAST POINT	FORECAST	% of Average	Average
Animas at Durango	615	150	409
Dolores at Dolores	380	165	231
La Plata at Hesperus	40	167	24
Los Pinos at Bayfield (1)	305	157	194
Piedra Cr. at Piedra	260	160	163
San Juan at Carracas	625	165	379
Inflow to Navajo Res. (1) (Apr-Jul)	1050	170	619

(1) Observed flow plus change in storage in Vallecito Reservoir.

WATER SUPPLY OUTLOOK Expressed as "Poor, Fair, Average, Excellent" with Respect to Usual Supply.

STREAM or AREA	Flow Period	
	Spring Season	Late Season
Florida	Exc.	Exc.
Mancos	Exc.	Exc.
San Miguel	Exc.	Exc.

SUMMARY of SNOW MEASUREMENTS
(COMPARISON WITH PREVIOUS YEARS)

RIVER BASIN and/or SUB-WATERSHED	Number of Courses Averaged	THIS YEAR'S SNOW WATER AS PERCENT OF	
		Last Year	Average †
Animas	6	315	190
Dolores	4	1800	271
San Juan	3	301	158

SOIL MOISTURE

RIVER BASIN	Number of Stations	THIS YEAR'S MOISTURE as PERCENT OF	
		Last Year	Average †
Animas	3	101	88
Dolores	3	178	105
San Juan	3	101	88

RESERVOIR STORAGE (Thousand Ac. Ft.) END OF MONTH

RESERVOIR	Usable Capacity	Usable Storage		
		This Year	Last Year	Average †
Groundhog	22	7	12	9
Lemon	40	16	26	19
Narraguinnep		16		
Navajo	1696	1170	847	326
Vallecito	126	58	79	59

RESERVOIR STORAGE (Thousand Ac. Ft.) END OF MONTH

RESERVOIR	Usable Capacity	Usable Storage		
		This Year	Last Year	Average †

† 1953-1967 period

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 SOIL CONSERVATION SERVICE
 SNOW SURVEY UNIT
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 DENVER, COLORADO 80217

OFFICIAL BUSINESS
 PENALTY FOR PRIVATE USE \$3x

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GUNNISON RIVER NEAR GRAND JUNCTION*

WATER YEAR	TOTAL (CFS)	MEAN	MAXIMUM	MINIMUM	TOTAL (A. F.)
1965	1,318,700	3,606	15,300	650	2,611,000
1966	528,300	1,444	5,360	540	1,046,000
1967	446,961	1,125	4,520	500	886,500
1968	727,993	1,989	7,450	522	1,444,000
1969	945,294	2,590	9,460	561	1,875,000
1970	1,136,067	3,113	11,100	857	2,253,000
1971	1,121,461	3,072	6,260	923	2,224,000
1972	604,732	1,652	3,460	486	1,199,000

*Surface Water Records of Colorado - U.S.G.S. - Annual Publication in cooperation with the State of Colorado, et. al.

Water Commissioners Summary, 1973 Water Year

	28	40	41	42	59	60	61	62	63	73	74	68
Water District:												
Direct flow diversions in A. F.	305,525	451,491	568,991	520,640	299,313	200,394	9,599	417,001	21,011	4,974	2,191	109,474
Reservoir storage in A. F.	2,668	66,004	75	2,143	27,300	22,338	1,090	3,755	0	0	0	224
Acres Irrigated	34,049	159,016	91,264	10,778	39,155	25,600	2,730	32,997	3,143	1,077	1,055	25,368
Number of ditches reported	284	1,108	166	25	445	279	41	245	83	23	14	319
Number of reservoirs reported	6	291	5	62	4	76	1	23	0	11	0	47
Average demand in A. F./acre	9.0	2.8	6.5	3.8	7.3	7.8	3.5	4.0	6.7	4.6	2.1	4.3
Power diversions in A. F.	0	0	17,812	473,552	0	22,198	0	1,687,410	0	0	0	8,416

Trans-mountain/trans-basin diversions (Name and amount, A. F.)

	28	40	41	42	59	60	61	62	68
Larkspur-524 (1972 W.Y.) Tarbell-269 (1972 W.Y.)									
Divide Creek - 1301 Leon Lake-1730 Head & Ferrrier 180 Mesa Cr.-78			Gunnison Tunnel- 284,546 Red Mtn. - 0		Lake Brennand- no record	No. Fk. of Paxton ditch - 4.5	State line ditch from Utah-11,574	Tabor-465 (1972 W.Y.)	Red Mtn.-297 Carbon Lake- 281 St. John-0 Mineral Pt.- no record Leopard Cr.- 1019 (1972 W.Y.) Cimarron(Gar-net) -2330

TABLE A

 DIVISION SUMMARY - DIVISION NO. 4
 Direct Flow Diversions
 1973

Water District	Total Ditches Reported		Irrigation Diversions Ac. Ft.	No. of Acres Irrigated	Ac. Ft. Per Acre	Industrial, Fish Use Diversions Ac. Ft.	Municipal Use Diversions Ac. Ft.	Recreation Use Diversions Ac. Ft.	Trans Mtn. Diversions Ac. Ft.	Total Diversions Ac. Ft.	No. of Daily Ditch Rpts.	Delivered to Compact Cmtmt. A.F.
	Active	Inactive										
28	246	0	305,525	34,049	9.0	0	0	0	793* (fm Div.4)	306,318	3,596	0
40	548	39	451,491	159,016	2.0	6,222	4,622	0	257- (to Div.4)	463,636	22,480	0
41	81	0	596,291	91,264	6.5	17,812	In Dist. 62	0	0	614,103	2,325	0
42	49	0	41,394	10,778	3.8	473,552	5,694	0	0	520,640	677	0
59	143	0	285,880	39,155	7.3	0	13,433	0	0	299,313	3,162	0
60	212	0	200,394	25,600	7.8	40,720	2,792	4,100	0	248,006	2,360	0
61	14	0	9,599	2,730	3.5	0	14	0	11,574**	21,187	675	0
62	113	0	416,536	32,997	4.0	1,687,410	In Dist. 41	0	465* (fm Div.4)	2,104,411	1,488	0
63	45	0	21,011	3,143	6.7	0	0	0	0	21,011	433	0
73	11	0	4,974	1,077	4.6	0	0	0	0	4,974	272	0
74	9	0	2,191	1,055	2.1	0	0	0	0	2,191	200	0
68	133	0	107,844	25,368	4.3	8,416	1,052	0	578 (to Div. 4)	109,474	2,181	0
TOTALS	1,604	39	2,443,130	426,232	---	2,234,132	27,607	4,100	14,968	4,715,264	39,849	0

Colorado River Compact deliveries in 1973 - None

NA = No Water Available NU = Non Use or No Record

* 1972 Figures; Record Published 1 - year in arrears by U. S. G. S.

** Imported water from La Sal Mtns., Utah

DIVISION SUMMARY - DIVISION NO. 4
Storage Report - Acre Feet
1973

Water District	Amount in Storage Acre Feet			Actual Am't of Diverted to Storage During Season	Delivered from Storage to Irrigation	Storage to Industrial/Power Use	Storage for Municipal Use	Storage for Recreation Use	Storage to Projects
	11-1-72	6-1-73	10-31-73						
28	900	3,713	1,117	2,813	2,668	0	0	3,713	0
40	6,000	84,757	28,578	78,757	64,004	0	1,301	84,757	24,563
41	1,720	2,668	2,354	948	75	0	3,265	1,300	0
42	1,100	5,441	4,866	4,341	2,143	0	2,500	5,441	0
59	33,650	107,300	71,390	73,650	27,300	0	0	107,300	27,300
60	9,626	37,540	11,316	27,914	22,338	30,300	500	37,540	0
61	87	1,700	610	1,613	1,090	0	0	1,700	0
62	653,000	960,160	659,000	307,160	3,755	1,687,410	0	960,160	3,057
63	0	650	0	0	0	0	0	0	0
73	0	45	0	0	0	0	45	0	0
74	0	0	0	0	0	0	0	0	0
68	150	374	150	224	224	0	246	0	0
TOTALS	706,233	1,204,348	779,381	497,420	123,597	1,717,710	7,857	1,201,911	54,920

TABLE OF ORGANIZATION - PERSONNEL

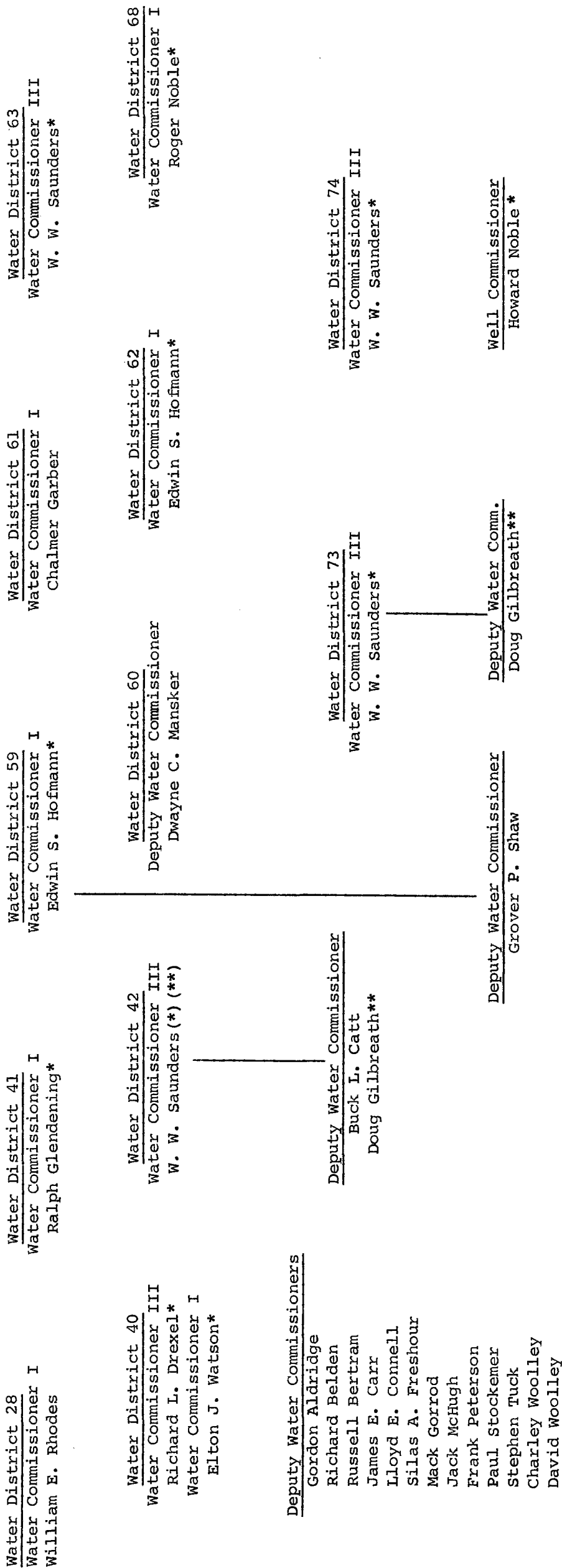
IRRIGATION DIVISION NO. 4

* * * * *
 Division Engineer - Ralph V. Kelling, Jr.

Assistant Division Engineer - Thomas A. Kelly

Senior Clerk Typist - Melita Maten

Hydrographer - Harold Coffey***



* Annual
 ** Seasonal w/Div. 5
 *** Jointly w/Div. 7

AREAS OF RESPONSIBILITY OF WATER COMMISSIONERS AND DEPUTIES

IRRIGATION DIVISION NO. 4

Well Commissioner

Howard Noble - Division Wide

Water District - 28William E. Rhodes - Tomichi and Coche-
topa CreeksWater District - 40Richard L. Drexel - Crystal Creek; the
Gunnison River from
Mesa County line to
Montrose County line
and its tributaries
except the Uncompah-
gre RiverElton Watson - North Fork of the Gunnison
River and Smith Fork

Deputies:

Gordon Aldridge - Upper Surface Creek

Richard Belden - Gunnison River and
Escalante CreekRussell Bertram - Granby and Battle-
ment Reservoirs

James E. Carr - Leroux Creek

Lloyd E. Connell - Minnesota Creek
and Stewart Mesa

Silas A. Freshour - Beaver Creek

Mack Gorrod - Ward, Kiser, & Youngs
Creek ReservoirsJack McHugh - Youngs, Kiser, and
Ward CreeksPaul Stockemer - Muddy, Anthracite,
Hubbard CreeksFrank Peterson - Dry Creek and Al-
falfa Run

Stephen Tuck - Forked Tongue

Charley Woolley - Lower Surface Cr.

David Woolley - Park Basin

Water District - 41Ralph Glendening - Uncompahgre River
from Colona to
DeltaWater District - 42W. W. Saunders - Gunnison River below Mesa
County line and its tri-
butaries

Deputy: Buck L. Catt - (same area)

Water District - 59E. S. Hofmann - Gunnison River above Gunni-
son and tributaries on north
side of the Gunnison River
from Gunnison to Mesa Creek

Deputy: Grover Shaw - (same area)

Water District - 60

Dwayne Mansker - San Miguel River

Water District - 61Chalmer Garber - Dolores River below San
Miguel County line to con-
fluence with San Miguel
River (Paradox Valley)Water District - 62E. S. Hofmann - Cimarron River, Lake Fork of
the Gunnison, and Cebolla
CreekWater District - 63W. W. Saunders - Dolores River below conflu-
ence of San Miguel RiverWater District - 68

Roger Noble - Uncompahgre River above Colona

Water District - 73

W. W. Saunders - Little Dolores River

Water District - 74

W. W. Saunders - Coates Creek

HYDROMETEOROLOGICAL DATA - BLUE MESA RESERVOIR (From U. S. Bureau of Reclamation, CRSP Power Operations Office, monthly reports)

	January	February	March	April	May	June	July	August	September	October	November	December	
Precip. (In.)	.53	.07	.55	.23	.40	.46	1.58	2.69	2.28	1.50	.85	.44	
Avg. Temp. (Max)	27.80	39.00	42.10	46.90	62.30	70.60	82.90	82.40	(not avail.)	54.70	45.00	31.20	
Avg. Temp. (Min)	1.00	6.30	16.20	20.10	30.60	40.10	47.70	48.40	"	26.50	21.70	5.50	
Total Ann. Precip.	11.58 In.												
Total Ann. Dischg.	1,237,220 A.F.												
			6 months precipitation sub total						2.24				

1971

Precip. (In.)	.13	.39	.16	.56	.80	.00	2.00	1.97	0.92	0.89	.11	1.56	
Avg. Temp. (Max)	34.10	37.70	47.10	57.70	65.80	80.10	83.30	81.90	70.60	61.50	48.50	25.90	
Avg. Temp. (Min)	6.20	12.90	14.10	14.10	23.00	38.60	46.50	48.50	35.30	28.80	15.70	1.30	
Total Ann. Precip.	9.49 In.												
Total Ann. Dischg.	1,281,300 A.F.												
			6 months precipitation sub total						2.04				

1972

Precip. (In.)	1.14	.00	.09	.43	.05	.36	.36	.81	1.77	2.34	0.55	0.94	
Avg. Max. Temp.	23.70	36.00	56.00	61.10	69.20	77.50	84.50	80.40	71.90	60.10	38.00	24.60	
Avg. Min. Temp.	-8.20	1.20	18.00	26.40	29.00	42.70	46.10	45.80	39.90	35.90	17.60	-1.30	
Total Ann. Precip.	8.84 In.												
Total Ann. Dischg.	785,050 A.F.												
			6 months precipitation sub total						2.07				

1973

Precip. (In.)	0.52	0.38	0.35	0.49	1.08	0.76	1.50	0.78	0.69	0.45			
Avg. Max. Temp.	19.70	28.30	42.30	51.80	67.10	75.90	82.00	81.30	72.40	65.10			
Avg. Min. Temp.	-8.20	.00	17.20	21.40	31.80	40.10	44.70	45.60	37.20	27.70			
Total Ann. Precip.													
Total Ann. Dischg.													
			6 months precipitation sub total						3.58				