

COPY FOR M. WILLIAM MATTERN

Richard D. Lamm

~~XXXXXXXXXX~~  
Governor



C. J. KUIPER  
State Engineer

**DIVISION OF WATER RESOURCES**

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DIVISION WATER ENGINEER  
DIVISION 7  
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January 12, 1978

Mr. C. J. Kuiper  
State Engineer  
Colorado Division of Water Resources  
1313 Sherman Street  
Denver, Colorado 80203

Dear Mr. Kuiper:

Attached herewith is our Annual Report for the  
period November 1, 1976 through October 31, 1977.

Very truly yours,

Orlyn J. Bell, P.E.  
Acting Division Engineer

OJB:alf  
XC: W.R. Smith  
M.W. Mattern  
O.J. Bell  
E.W. Blank  
File

ANNUAL REPORT  
WATER DIVISION VII  
REPORT PERIOD NOVEMBER 1, 1976 THRU OCTOBER 31, 1977

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Submitted To  
Mr. C. J. Kuiper  
State Engineer  
State of Colorado

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by  
Orlyn J. Bell  
Acting Division Engineer  
Durango, Colorado

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January 12, 1978

CONTENTS

	<u>PAGE</u>
I. INTRODUCTORY STATEMENT .....	1
II. PERSONNEL .....	3
III. WATER SUPPLY	
A. STREAMFLOW .....	5
1. Snow Pack .....	5
2. Precipitation .....	5
3. Soil Moisture .....	7
4. Underground Water .....	7
5. Floods .....	7
6. Transmountain Diversions .....	7
B. RESERVOIR STORAGE .....	8
IV. AGRICULTURE .....	9
V. COMPACTS	
A. San Juan-Chama Diversion Project .....	9
B. La Plata River Compact .....	10
VI. STRUCTURES	
A. Dams .....	11
B. Livestock Water Tanks .....	12
C. Canals, Ditches, and Pipelines .....	12
D. Wells .....	13
VII. WATER RIGHTS	
A. Tabulations .....	13
B. Referee Rulings and Decrees .....	14
VIII. ORGANIZATIONS	
A. Water Conservation and Conservancy Districts .....	14
B. Incorporated Ditch Companies .....	15
IX. WATER COMMISSIONERS' RECORDS .....	16
X. DIVISION ENGINEER'S SUMMARIES	
Table A - Direct Flow Diversions .....	17
Table B - Storage Report, Acre-Foot .....	18
XI. DIVISION ENGINEER'S RECOMMENDATIONS AND SUGGESTIONS .....	16

1977 ANNUAL REPORT  
DIVISION 7  
DURANGO, COLORADO

Water Division 7, comprised of the San Juan River Basin located in Southwestern Colorado, was a Spanish territory for many years and later a part of Mexico. It was added to the United States after the Mexican War. Although the Basin was part of a large area ceded to the Ute Indians, adjustments of Indian land boundaries during the 1870's opened a large part to future settlers. With the arrival of the narrow gauge railroad in the 1880's, mining and the raising of livestock and farming increased.

Of slightly under 5,000,000 acres in the Basin, approximately half are federally controlled forest or woodlands. Land uses are for timber production, watershed, recreation, wildlife and agriculture. Of the 1.6 million acres of non-federal land, more than half is used for livestock grazing. Livestock grazing is also permitted on a large part of the federally controlled lands. The importance of rangeland and grazeable woodland as watersheds, overshadows all other considerations. Food and cover for wildlife is also of great importance.

Soils in the area are highly variable. They include deep, wind-deposited soils in the valleys, shale-derived clays in many valleys and adjoining slopes, and shallow, stony rocky soils over much of the mountain and foothill areas.

The geologic formations, along with the vegetative cover, make the San Juan Basin one of the most scenic areas in Colorado. Rocks ranging in age from one-to-five hundred million years are exposed here. They are crystalline, volcanic, and sedimentary in nature and of various geological ages.

Climate in the San Juan Basin differs with elevation. Variations are found in the mountainous foothill mesa and desert zones. A climatic feature common to all zones is that winter snow accounts for about half of the annual precipitation, averaging about twenty-one inches.

Most of the Basin has an elevation of over 6,000 feet, therefore, not only is the growing season limited (six months generally), but also the mean daily temperature. One hundred and ninety-five thousand acres of irrigated croplands produce crops of dry beans,<sup>1</sup> pasture grass, hay, small grain, and corn.

The Basin is one of the most popular recreation areas in the state, with over twenty million dollars per year being spent on hunting and fishing alone. There are several big game animals indigenous to the area such as elk, deer, black bear, and

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<sup>1</sup>The Dove Creek area is the major producer of beans in Colorado. This is dryland farming with very little if any irrigation water used.

big horn sheep. The western cottontail rabbit is the principal small game animal, while others include the snowshoe hare, squirrels, game birds, and waterfowl. The Basin provides good fishing both in the streams and lakes which provide an excellent habitat for Rainbow, Native Brown, and Brook Trout; Walleye, Northern Pike, and Kokanee Salmon.

Winter sports are an important activity with approximately 100,000 skier visits annually. At the Purgatory Ski Area, the largest of five ski areas, in or adjacent to the Basin, development now in progress will make the San Juan Basin a major attraction for skiers. Cross country skiing and snowmobiling are currently among the rapidly growing winter sports.

The Denver and Rio Grande Western Railroad conducts daily passenger tours every summer on its narrow gauge line between Durango and Silverton. Formerly a principal means of transporting heavy freight, the railroad was converted to passenger service mainly due to the curtailment of mining and the topographic nature of the Basin, making the construction costs of expansion too high.<sup>2</sup> All freight moving into the Basin except from the South, must be transported by truck over the mountain passes. Highway construction and maintenance is costly due to the terrain and unstable shale soils, but cheaper than railroad construction.

The growth of the San Juan Basin is dependent on certain other utilities and their respective services such as the availability of telephone, electric, and natural gas. These are available in most communities, and as of 1976, telephones were modernized by the installation of direct distance dialing.

There is a definite need for rural water and sewage disposal systems. A shortage of underground water and the limitations of certain soils for septic systems create problems. This is particularly important at a time when rapid growth with subdivision of farms and ranches for housing development is taking place. Home construction and recreational developments have been on the rise in rural areas in recent years, with a more rapid increase projected for the future.

Clean air and clear water are among the valuable resources of the area. Pollution of these resources must be eliminated. The most common source of water pollution in the San Juan Basin is sediment resulting from soil erosion. The lack of plant cover accelerates the runoff from snow melt and rain, leading to critically eroded areas. Deep gullies are the most obvious feature of these areas. Wind erosion on

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<sup>2</sup> The change in mode of transportation also must be considered as a reason for the lack of railroad expansion.

dry crop land is less critical generally, but is serious in some localized areas and contributes to air pollution. Air pollution on prevailing westerly winds from the Four-Corners Power Plant near Shiprock, New Mexico, previously of major concern in the area, has been greatly alleviated by the installation of scrubbers. Pollution such as lumber mills, is of a minor extent.

Water is the most important resource in the San Juan Basin. Of the total annual water supply, approximately 470,000 acre feet are used locally. There are slightly over 195,000 acres of irrigated land within the Basin at the present time. Water will be available for an additional 250,000<sup>3</sup> acres in the western part of La Plata County and dryland areas of Dolores and Montezuma Counties with the proposed Animas-La Plata Project and the Dolores Project, which is now under construction. There are nine major irrigation systems which distribute water to seventy percent of all irrigated croplands in the San Juan Basin. They are listed in this report with other pertinent data concerning the administration of water in Division 7 for the year 1977.

## II. PERSONNEL

The following changes in personnel occurred during the reporting period:

August 1, 1977	William P. Lynn to Water Commissioner "C"
September 14, 1977	Wayne M. Crosby transferred to Denver Office

Because of the early arrival of warmer weather and the lack of snow and ice cover, the need for administration of water began early. We requested and received approval from Denver to start our part-time commissioners early and give them additional work time this year. This was paid for through special action of the Legislature on the drought situation.

Mileage reimbursement was raised to 14¢ a mile for all vehicles except four-wheel drive which went to 18¢ a mile as of July 1, 1977. This is a step closer to reality in operating private vehicles, but is still short of the break-even point.

A break-down of Division personnel, time worked and miles driven in the reporting period follows on the next page.

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<sup>3</sup>Subject to change depending on cost-benefit.

NOVEMBER 1, 1976 THROUGH OCTOBER 31, 1977

<u>NAME</u>	<u>POSITION</u>	<u>GRADE</u>	<u>MONTHS BUDGETED/ WORKED</u>		<u>MILEAGE</u>
Wayne M. Crosby	Division Engineer	P.E. V	12	10.5	973 P 12,275 S*
Orlyn J. Bell	Act. Div. Engineer	P.E. III	12	12	1,473 P 1,639 S*
Edward W. Blank	Hydrographer	P.E. II	12	12	18,632 S
Ann-L. Fauth	Secretary	Sec. 1-B	12	12	--

FULL-TIME EMPLOYEES IN FIELD

<u>NAME</u>	<u>POSITION</u>	<u>RIVER BASIN</u>	<u>MONTHS BUDGETED/ WORKED</u>		<u>MILEAGE</u>
E. Ivan Danielson	Water Comm. B	Animas River	12	12	8,875 P
George E. Davis	Water Comm. B	Florida River	12	12	9,615 P 3,933 S
George Edmonson	Water Comm. A	McElmo Creek	12	12	13,811 P
Glen E. Humiston	Water Comm. C	Mancos R., McElmo Cr., Dolores R., Disappointment Cr.	12	12	13,443 S
J. Russell Kennedy	Water Comm. B	La Plata River	12	12	13,504 P
William P. Lynn**	Water Comm. C	Blanco, Navajo, Piedra, San Juan	12	12	12,317 P
Larry Nielsen	Water Comm. B	Navajo/Blanco R.	12	12	12,416 P
Avrit G. Sparks	Water Comm. B	Pine R./Siembritas	12	12	10,698 P
Wilford E. Speer	Water Comm. B	Dolores R., Disappointment Cr.	12	12	16,350 P

PERMANENT PART-TIME EMPLOYEES IN FIELD

Roy M. Brown, Jr.	Water Comm. A	San Juan/Lower Blanco River	6.0	7.3	14,819 P
Ronald R. Robinson	Water Comm. A	Piedra River	5.0	5.9	6,506 P
Bob R. Shahan	Water Comm. A	Blanco/Navajo R.	3.2***	3.4	2,230 P
Lawrence J. Shock	Water Comm. A	Siembritas Cr., Lower Pine R.	8.4****	9.0	5,969 P 5,829 S
		TOTAL	178.6	180.1	129,556 P 55,751 S

GRAND TOTAL MILES DRIVEN IN DIVISION 185,307\*\*\*\*

\* Vehicle #5313 used by Division Engineer, Assistant, Hydrographer and Dam Section Personnel

\*\* To Water Commissioner "C" August 1, 1977

\*\*\* Includes 4 days tabulation time

\*\*\*\* Includes 30 days tabulation time

\*\*\*\*\* This is 26,492 more miles than driven in the 1975-1976 period

NOTE: All excess days worked as against those budgeted were due to drought conditions.

P - Private Vehicle

S - State Vehicle

III. WATER SUPPLY

A. STREAMFLOW

1. Snow Pack (Winter 1976-1977)

The San Juan Basin received a much below-normal snow pack this year resulting in a very short period of runoff. All streams were below average in flow and most set new record low totals. April first forecasts proved to be somewhat high and are listed below. This was the third year for our participation in snow courses on the Mancos and La Plata Rivers, with good correlation between water content and actual runoff. The figures tabulated below give a good indication of the water supply in representative drainages throughout the Division.

<u>SNOW PACK</u>	<u>NO. OF COURSES AVERAGED</u>	<u>THIS YEAR'S WATER CONTENT AS A PERCENTAGE OF</u>	
		<u>LAST YEAR</u>	<u>AVERAGE</u>
ANIMAS RIVER	6	28	33
DOLORES RIVER	4	24	20
SAN JUAN RIVER	5	25	30
LA PLATA RIVER	1	14	15 (11 years)
MANCOS RIVER	1	22	23 (3 years)

<u>WATER SUPPLY</u>	<u>APRIL THRU SEPT. (1000 A.F.) FORECAST</u>		<u>% OF AVERAGE</u>	<u>15 YEAR AVERAGE</u>	<u>THIS YEAR</u>	<u>% OF LAST YEAR</u>
ANIMAS RIVER AT DURANGO	165	39	423	151	41	
DOLORES RIVER AT DOLORES	81	35	232	47	22	
LA PLATA RIVER AT HESPERUS	7	31	24	5	21	
PIEDRA RIVER AT ARBOLES	70	38	185	46	25	

2. Precipitation (Summer 1977)

Near-normal precipitation was received during the summer and early fall months (June excepted) at the Durango weather recording station. However, many of the agricultural areas to the west received less precipitation. The rainfall that did occur was generally too little and much too late to save non-irrigated agriculture. There was some localized heavy rains in late July but the result was flash flooding. The total cumulative monthly precipitation to the long-term average at the Durango Gage was 49.1% for October 1, 1976 through September 30, 1977. The following tables indicate the comparative streamflows on four river gaging stations for 1977. These represent probably the two highest and two lowest within the Division with regard to streamflow normalcy.



COMPARATIVE STREAM FLOW DATA

LA PLATA RIVER AT HESPERUS (ACRE FEET)

<u>MONTH</u>	<u>1967-1976 MONTHLY AVERAGE STREAMFLOW</u>	<u>1977 MONTHLY STREAMFLOW</u>	<u>PERCENT OF MONTHLY AVERAGE</u>	<u>PERCENT OF CUMULATIVE MONTHLY AVERAGE</u>
January	455	314	69.0	69.0
February	491	242	49.3	58.8
March	1,091	281	25.8	41.1
April	3,113	509	16.4	26.1
May	8,610	1,210	14.1	18.6
June	7,241	1,220	16.8	18.0
July	2,778	746	26.8	19.0
August	1,398	817	58.4	21.2
September	1,302	576	44.2	22.3
October	1,241	363	29.3	22.6
November	751	286	38.1	23.1
December	563	-	-	-

LA PLATA RIVER AT COLORADO-NEW MEXICO STATE LINE (ACRE FEET)

January	616	236	38.3	38.3
February	856	263	30.7	33.9
March	1,360	49	3.6	19.4
April	4,697	183	3.9	9.7
May	6,818	324	4.8	7.4
June	4,592	414	9.0	7.8
July	1,359	796	58.6	11.2
August	659	403	61.1	12.7
September	610	16	2.6	12.4
October	1,057	10	0.9	11.9
November	575	114	19.8	12.1
December	619	-	-	-

NAVAJO RIVER AT BANDED PEAKS (ACRE FEET)

January	1,755	1,300	74.1	74.1
February	1,680	1,440	85.7	79.8
March	2,603	1,650	63.4	72.7
April	5,598	3,460	61.8	67.5
May	17,195	6,630	38.6	50.2
June	20,215	3,600	17.8	36.9
July	9,145	2,500	27.3	35.4
August	4,705	3,430	72.9	38.1
September	3,818	2,370	62.1	39.5
October	3,525	1,980	56.2	40.4
November	2,377	1,428	60.1	41.0
December	1,882	1,230	65.4	41.6

ANIMAS RIVER AT HOWARDSVILLE (ACRE FEET)

January	1,012	820	81.0	81.0
February	849	660	77.7	79.5
March	1,025	620	60.5	72.7
April	2,070	2,420	116.9	91.2
May	14,802	6,860	46.3	57.5
June	24,146	9,140	37.8	46.7
July	12,858	2,950	22.9	41.3
August	4,315	2,960	68.6	43.3
September	3,366	2,670	79.3	45.1
October	2,137	1,740	81.4	46.3
November	1,441	1,190	82.6	47.1
December	1,163	984	84.6	47.7

### 3. Soil Moisture

Soil moisture content was extremely poor because the limited precipitation could not keep up with the evaporation and transpiration occurring throughout the year. Much of the non-irrigated land would not even germinate the seed and a majority of the seed that did germinate did not have enough soil moisture to produce a mature plant.

### 4. Underground Water

Below-normal precipitation and the lack of winter snowpack provided little recharge to the area aquifers. Continued depletion through pumping caused the water table to drop drastically and many wells went dry. Area well drillers were kept busy trying to find deeper water at dry well sites, and finding water at new sites.

### 5. Floods

The lack of snowpack prevented most flooding this year. Locally heavy rains on July 25, produced some flash flooding on the lower La Plata River (3,400 c.f.s. peak estimate at the State Line); the Narraguinne; and other isolated areas. Damage was minimal as the dry soil was able to absorb a lot of the precipitation and the heavy rains were of short duration.

### 6. Transmountain Diversions

<u>NAME OF DITCH</u>	<u>WATER DISTRICT</u>	<u>SOURCE OF SUPPLY</u>	<u>RECIPIENT</u>	<u>AMOUNT A.F.</u>
Pine R. Weminuche Pass (Fuchs Ditch)	31	Pine River	Leland & Harley Fuchs Del Norte, Colorado	0
Weminuche Pass Ditch (Raber-Lohr Ditch)	31	Pine River	Hilde Lohr & Leon Raber Del Norte, Colorado	65.5
Treasure Pass Diversion	29	San Juan R.	Fred Falk, Del Norte, CO	14.0
Williams Creek Squaw Pass Diversion Ditch	78	Piedra River	Seaborn Collins, Navajo Development Co., Creede, CO	0
Don LaFont Ditch #1 E., South River Peak Ditch	78	Piedra River	Colo. Div. of Wildlife	0
Don LaFont Ditch #2 W., (Piedra Pass Ditch)	78	Piedra River	Colo. Div. of Wildlife	0
Carbon Lake Ditch	30	Animas River	Ouray Ditch Co., Montrose, CO	575*
Red Mountain Ditch	30	Animas River	Ouray Ditch Co., Montrose, CO	203*
Mineral Point Ditch	30	Animas River	Warren Gibbs, Ouray, CO	No Structure
St. John Ditch	30	Animas River	Charles Gunn & W. Worley, Olathe, Colorado	No Structure

\* Records are poor on Carbon Lake and Red Mountain Ditches due to charts not being changed on time. Carbon Lake Ditch flume also is bent, submerged, and full of stream bed material.

B. RESERVOIR STORAGE

Division VII had good carryover storage going into 1976, however, a dry summer and fall depleted this. As of January 31, 1977 the two major irrigation reservoirs, (Vallecito and Lemon) contained 83% and 86% of normal. By the end of the spring storage season June 30, they had 24% and 31% of normal for that date respectively. There was virtually no spring storage for any reservoir in the Division. At the end of the irrigation season the percent of normal storage for the same two reservoirs was 19% and 24%.

Most of the irrigation companies, districts, and other reservoir owners used this water very judiciously, conserving some for domestic water for the fall and winter of 1977 in case there is again limited precipitation. It will take an above-normal winter snowpack and the right set of circumstances during spring runoff in order to get the reservoir storage back to normal. The following is a Reservoir Comparative Report on the two largest reservoirs, compiled in order to show this year's storage against the ten-year average.

RESERVOIR STORAGE COMPARATIVE REPORT (ACRE-FEET)

VALLECITO RESERVOIR - PINE RIVER

MONTH	1967-1976	1967-1976	1976	1977	1977	PERCENT OF MONTHLY AVERAGE CONTENT
	MONTHLY AVERAGE CONTENT E. O. M.	AVERAGE MONTHLY CHANGE	MONTHLY CONTENT E. O. M.	MONTHLY CONTENT E. O. M.	NET MONTHLY CHANGE	
January	57,120		53,230	47,340		82.9
February	58,300	1,180	55,390	47,200	(140)	81.0
March	62,120	3,820	60,120	47,670	470	76.7
April	68,920	6,800	74,620	51,119	3,449	74.2
May	90,310	21,390	109,350	38,913	(12,206)	43.1
June	106,580	16,270	119,960	26,086	(12,827)	24.5
July	90,820	(15,760)	93,660	19,654	(6,432)	21.6
August	71,400	(19,420)	69,120	14,759	(4,895)	20.7
September	57,440	(13,960)	54,550	11,085	(3,674)	19.3
October	53,180	(4,260)	52,160	13,300	2,215	25.0
November	55,220	2,040	48,530	15,617	2,317	28.3
December	56,280	106	47,890	17,799	2,182	31.6

LEMON RESERVOIR - FLORIDA RIVER.

MONTH	1968-1976*	1968-1976*	1976	1977	1977	PERCENT OF MONTHLY AVERAGE CONTENT
	1968-1976*	1968-1976*				
January	20,085		19,826	17,375		86.5
February	20,181	96	19,897	17,168	(207)	85.1
March	20,485	304	20,513	17,260	92	84.3
April	22,298	1,813	25,844	19,105	1,845	85.7
May	29,582	7,284	36,738	16,632	(2,473)	56.2
June	32,141	2,559	34,727	9,995	(6,637)	31.1
July	26,618	(5,523)	24,975	7,163	(2,832)	26.9
August	20,095	(6,523)	18,240	6,123	(1,040)	30.5
September	19,292	(803)	17,805	4,727	(1,396)	24.5
October	19,488	196	18,527	5,225	498	26.8
November	20,007	519	18,193	5,486	261	27.4
December	17,720	(2,287)	17,711	5,033	(453)	28.4

\* Nine-year average

#### IV. AGRICULTURE

The year 1977 in Southwestern Colorado was dry. Hopefully it will remain as the driest of record for many years to come. Winter precipitation was less than half that of 1934 which was the previous low year. The crops grown, or not grown as the case may be, reflect well the shortage of water.

In Montezuma County, 50,000 acres of dryland beans were planted. Sixty to sixty-five percent of these were plowed under before harvest, and those harvested yielded on the average 75 lbs. per acre. In 1975, 107,000 acres were planted and the yield was near the normal 425 lbs. per acre; this amounts to 3% of production in 1977 as against 1975.

There were 40,000 to 45,000 acres of winter wheat planted in Montezuma County in 1977. Most of this was harvested, and yielded 10 bushels to the acre; 17 bushels are about normal. Two thousand acres of dryland hay yielded 3/4 ton per acre. Normally it would yield 1.2 tons. Only about half was bailed.

Irrigated hay was hit even harder with the Summit Irrigation System normally irrigating 5,000 acres, making only domestic runs and irrigating zero acres this year for no production. The Montezuma Valley Irrigation District with about 35,000 acres, had less than half of normal supply and planted an estimated 13,000 acres. Yields dropped to 1.5 tons per acre from the normal 2.1 tons. Other counties suffered similarly.

The one bright spot was pasture lands. Through the early months, the grass seemed to be dormant and when the rains came in late July it really took a stand. Fall pasture was much better than spring and summer. It was strange to see cattle being fed in the late spring and summer, and yet have pasture to graze in the late fall when normally the stock is being taken off the range.

Stockwater was also a serious consideration all season long. Many springs, creeks, ponds and wells that normally provide water were dry.

#### V. COMPACTS

##### A. SAN JUAN-CHAMA DIVERSION PROJECT

Runoff was at an all-time low this water year, which did not help either Colorado water users or the Project, but it did make for easier administration of the Project, i.e., if the water wasn't there, neither was the sediment or the trash and debris, and if there was less natural flow than the minimum bypass, then there was no need to argue about how much should be diverted.

Our records show that for the water year there were 189 days on the Blanco River

that the minimum bypass was not reached. During these 189 days the total deficit flow was 2,054 acre feet, of which 1,667 acre feet occurred naturally and 387 acre feet were illegally diverted by the U.S. Bureau of Reclamation. This diversion can be attributed for the most part to gate leakage of about 1.0 c.f.s. per day. Some of this water was recovered to Colorado, however, by releasing it down the Little Navajo River for stockwater out of the Little Oso air vent valve.

The Navajo bypass fell below the minimum 267 days; the U.S. Bureau of Reclamation diverted on 100 of these days, and again, basically due to gate leakage. The total underage of the minimum bypass was 6,200 acre feet, with only 52 acre feet attributable to the U.S.B.R.

Total diversion through the San Juan-Chama tunnels this water year was 17,400 acre feet with 13,220 acre feet coming from the Blanco; 40 acre feet from the Little Navajo; and 4,140 acre feet from the Navajo River. Data from the Banded Peaks gaging station on the Navajo River shows a yearly stream flow (Oct. to Sept.) of 31,847 acre feet as compared to a ten-year average of 74,500 acre feet (42% of normal). This gives some indication of the severity of the drought and the reason the minimum bypass levels were not exceeded on many days at the diversion points.

A Judgment was signed and filed in the United States District Court on November 17, 1977 on Civil Action 74-M-318, commonly known as the Schutze vs Stamm Case. The long-awaited ruling on the action filed by the Southwest Water Conservation District in 1974 helped, but was not the total answer to problems on the Blanco and Navajo Rivers. In essence, the judge ruled that the U.S.B.R. had not operated the Project properly, had in fact harmed the Colorado water users, and was not to do so again. He also agreed that the fisheries had been damaged but was not willing to rule on any changes that needed to be made in order to correct the situation. This leaves us in the position of going back to court if we do not like future handling of the Project, rather than being able to get immediate statutory relief. However, the groundwork has been laid.

#### B. LA PLATA RIVER COMPACT

Everyone knew that the La Plata River would be a tinderbox for hostilities as far as water administration was concerned this year. We knew we were in for a "long hot summer", and somberly talked about the administration getting easier when the river went dry. If the late summer rains had not come I'm sure that it would have dried up almost entirely.

Irrigation out of the Colorado ditches began in early February; by late April

and early May senior water users had released us from their priority calls to fill stockponds and cisterns. During this time the River remained dry from approximately the H.H. Ditch diversion to the confluence of Long Hollow and the La Plata River.

The New Mexico Compact commissioners called for a Compact split on May 4 when the stream flow at Hesperus raised to 21 c.f.s. After many reversals of opinion and indecision, the Colorado diversions were ceased early on May 7. Morning and evening checks up and down the River culminated in the participation of the local Sheriff's Department and the locking of many headgates. The dry stream channel was finally soaked up and six days later the first water arrived at the State Line Station. Nearly 60 acre feet per day were used. Colorado diversions were picked up on the 14th of May and the attempt to deliver water through to meet the Compact lasted until the River dropped below the point where it was reasonable to pass water through. Colorado placed the River under a futile call and began diverting all water at Hesperus.

On July 25 a 3.5" rainfall in a 2-hour period fell in portions of the Long Hollow drainage, producing a flash flood in the Marvel-Red Mesa area that peaked at the State Line Station at 3,400 c.f.s., resulting in high soil erosion, stockdam damage, and limited irrigation structure damage.

March through October streamflow at Hesperus was 21% of the 1967-76 average. The State Line streamflow was 10% for the same period.

There were only traces of precipitation in February and March. May and July were above normal and all other months were far below normal. At present the soil moisture is very low in the whole La Plata drainage and a lot of moisture is needed to make up the deficiencies.

## VI. STRUCTURES

### A. DAMS

The major news this year was approval of the Dolores River Project for the construction phase. The groundbreaking ceremony was held on site near Cortez on September 24, 1977. The McFee Dam, major feature of the Dolores Project, will store behind it 381,000 A.F. of water. The Project will have an average annual water development of 126,000 A.F. including 90,900 A.F. for irrigation of 61,600 acres; 8,700 A.F. for municipal and industrial use, and 27,000 A.F. for fishery, wildlife and recreational enhancement. At the groundbreaking ceremony, many people who have worked towards this Project throughout the 75 years since its inception were honored, and a very prestigious assembly of government officials was present.

On the negative side was the illegal construction of the Keesee Dam near Mancos in early August. The dam was discovered by the Water Commissioner during construction

and reported to the Division 7 Engineer's Office, and subsequently to the State Engineer. Plans for the dam had not been filed with the State Engineer even though the structure reached a height of 45' and was 1,300' long. A breach in the dam was ordered and when the dam was not breached and construction continued, the District Water Court issued a Temporary Restraining Order. The dam was subsequently breached. This structure was visited by personnel from the Dam Section and a representative of the Army Corps of Engineers.

There were no permits issued for major dam structures this year in the Division. The Sapington Dam in District 77 was reviewed and returned to the engineer for more work and information. The Dove Creek Dam was just recently submitted for review and it appears a permit will be issued in the near future.

Several inspectors from the Dam Section visited the Division this year. From these inspections, letters were written to reservoir owners outlining maintenance programs, etc. Compliance with orders was generally good throughout the Division, although follow-up letters were necessary to receive communication from owners for work completed.

#### B. LIVESTOCK WATER TANKS

There were twenty-four permits issued for livestock water tanks and/or erosion control dams this year. Last year, forty-five permits were issued.

#### C. DITCHES, CANALS, PIPELINES

The shortage of water this year provided ample opportunity for new construction and repair work to take place. Among the construction were new flumes in the outlet of Narraguinnep Reservoir and the inlet to Summit Reservoir. Road construction in the vicinity of Summit Reservoir also necessitated realignment of the inlet canal.

Repair work was required on the Narraguinnep Reservoir inlet flume that was nearly washed out during the July 25 flash flood. There was extensive soil erosion in the canal approaching the flume, at the flume, and in Lone Pine Canal around Narraguinnep when the capacities of all were greatly exceeded.

River channelization is in progress at the head of the Jackson Gulch Reservoir inlet canal to stabilize bed load. This work includes the installation of a series of gabions.

An erosion study was conducted on the Florida Canal with the U.S.B.R. giving technical assistance to the ditch company. It was determined that ditch damage was largely due to lack of maintenance. Therefore, repair work was not funded by the Bureau of Reclamation.

As a part of the Drought Assistance Program, the Soil Conservation Service has partially funded the installation of pipelines to replace ditches in areas where there are large losses due to seepage and evaporation. Funding was 80% of the cost up to \$2,500 for individuals, and a maximum of \$50,000 on combined projects. Participation has been good in this area with 52 pipelines completed in La Plata County alone. Average total cost for these pipelines has been \$4,000.

#### D. WELLS

Well drillers remained busy in this area as many wells went dry and had to be deepened or redrilled. This was on top of the normal drilling work load. There were 435 permits issued for household, domestic, and livestock wells, and there were 13 permit denials. Commercial well permits issued numbered 101 with Eaton International accounting for 73 of these wells, (these were actually re-issue of permits that had expired). Three commercial well permits were denied.

### VII. WATER RIGHTS

#### A. TABULATION

We received no new revised listings of the October 10, 1974 Tabulation. This was because of the time-consuming setbacks C.S.U. had in converting over to the System 2000 with all our records. Each year prior to this one, we have spent considerable time reviewing the tabulation and making corrections. Since we had no listings showing these revisions we decided to cease further review until such time as we receive the new listings. Hopefully this will be in time to review and make corrections before the next printing.

We have been working on corrections to the W-case decrees 1970-1975 for which we did receive a listing and have also been diligently compiling the data on W-case decrees 1976-1977. These have been submitted in keypunched form. We should receive a revised and updated tabulation printout showing all submitted data to date. This would include the 1974 Tabulation and W-cases through the end of 1976.



B. REFEREE'S FINDINGS AND DECREES

	<u>NO.</u> <u>FILED</u>	<u>INVESTIGATED</u> <u>BY</u> <u>DIVISION VII</u>	<u>REFEREE</u> <u>RULINGS</u>	<u>COURT</u> <u>DECREES</u>
1. Underground Water Rights	32	32	38	34
2. Change of Water Rights	33	33	31	16
3. Plans of Augmentation	1	1	2	2
4. Surface Water Rights	140	140	76	60
5. Due Diligence:				
Quadriennial Findings	14	14	20	18
Conditional Made Absolute	20	20	37	34
6. Water Storage Rights	47	47	8	6
<b>TOTALS</b>	<u>287</u>	<u>287</u>	<u>212</u>	<u>170</u>

Quite a number of applications were received during the latter part of the last reporting year and were subsequently investigated and a ruling made by the referee after the new calendar year began.

The decree process has not been set in motion on many filings for various reasons. The Federal Water Cases W-1120-73 through W-1139-73, W-1143-73 through W-1148-73, and W-1551-76 through W-1633B-77 were postponed indefinitely until a ruling comes down from the U.S. Supreme Court on the Reserved Rights Doctrine. The next stage is in the State Courts and then probably back up to the U.S. Supreme Court before anything definite is decided.

Rulings on the Colorado Water Conservation Board's minimum flow and lake level decrees have also been postponed until such time as the constitutionality of the legislation under which they were conceived is tested. A court case in Division 5 is now in progress and we should have the results sometime in 1978. The decrees affected are W-1485-76 through W-1547-76.

The continued consultations between the Water Court and the Division Engineer's Office remains of great benefit to both entities, but more importantly, produces better decrees for the public.

VIII. ORGANIZATIONS

A. WATER CONSERVATION AND CONSERVANCY DISTRICTS

<u>NAME</u>	<u>ADDRESS</u>	<u>ATTORNEY</u>	<u>PRESIDENT</u>
La Plata Water Conservation	Box 497, Durango	F. S. Maynes	V. A. Paulek
Dolores Water Conservancy	16 E. Main, Cortez	George Armstrong	Bruce McAfee
Florida Water Conservancy	Box 1157, Durango	L. W. McDaniel	Loyd Hess
Mancos Water Conservancy	Cortez	Guy Dyer	Noland Alexander
Pine River Irrigation Dist.	843 Main, Durango	Robert Duthie	Frank Wommer, Jr.
San Miguel Water Conservancy	Box 497, Durango	F. S. Maynes	George M. Young
Southwest Water Conservation	Box 497, Durango	F. S. Maynes	Fred Kroeger

B. INCORPORATED DITCH COMPANIES

<u>NAME</u>	<u>OFFICER</u>	<u>ADDRESS</u>
<u>DISTRICT 29</u>		
Echo Ditch Company	William Jackson	Pagosa Springs, Colorado
Park Ditch Company	Hood Formwalt	Pagosa Springs, Colorado
<u>DISTRICT 30</u>		
Animas Ditch Company	R. V. Bonds	Rt. 2, Box B61, Durango, CO
Animas Consolidated Ditch Co.	Dave James	33800 H.W. 550, Durango, CO
Florida Canal Company	T. G. Eggleston	135 Riverview Dr., Durango
Florida Farmers Ditch Co.	Hazel Brown	505 C.R. 234, Durango, CO
Hermosa Ditch Company	A. A. Albrecht	B132 C.R. 203, Durango, CO
Pioneer Ditch Company	Roy Annala	122 C.R. 510, Durango, CO
Reid Ditch Company	Animas Valley Ditch Co., Althea Knowlton	4315 C.R. 250, Durango, CO
<u>DISTRICT 31</u>		
King Ditch Company	John Olbert, Sec.	Rt. 1, Ignacio, Colorado
Los Pinos Ditch Company	Mrs. Frank Ludwig, Sec.	Box 245, Bayfield, Colorado
Robert Morrison Ditch Company	Rex Richmond	Rt. 1, Ignacio, Colorado
Schroder Irrigation Ditch Company	Jim Sitton, Pres.	Rt. 1, Bayfield, Colorado
Spring Creek Ditch (Pine River Canal Co. & Spring Creek Ext.)	Carl Rainwater, Sec.	Rt. 2, Ignacio, Colorado
Sullivan Ditch Company	David Sullivan, Sec.	Rt. 2, Ignacio, Colorado
Thompson-Epperson Ditch Company	Ruby Bowers, Sec.	Rt. 1, Ignacio, Colorado
Vallecito Reservoir (Pine River Irrigation District)	E. G. Loring, Pres.	Rt. 1, Bayfield, Colorado
	Steve Newman, Sup't.	Rt. 1, Bayfield, Colorado
<u>DISTRICT 32</u>		
Montezuma Valley Irrigation Company	Victor Bryan	Cortez, Colorado
<u>DISTRICT 33</u>		
Big Stick Ditch Company	Grant Paulek	Hesperus, Colorado
Hay Gulch Ditch Company	Lawrence Huntington	Hesperus, Colorado
H. H. Ditch Company	Orlo Schmitt	Hesperus, Colorado
Joseph Freed Ditch Company	Nancy Price	Hesperus, Colorado
La Plata River & Cherry Creek Ditch Company	Roland Bartel	Mancos, Colorado
Lightner Canal Company	V. A. Paulek	Hesperus, Colorado
Pine Ridge Ditch Company	CO. Div. Wildlife	Durango, Colorado
Red Mesa-Ward Reservoir & Ditch Supply Company	Nancy Price	Hesperus, Colorado
Reorganized Revival Ditch Company	Lila Greer	Hesperus, Colorado
Slade Ditch Company	Judy Albrecht	Hesperus, Colorado
Townsite Ditch Company	Judy Albrecht	Hesperus, Colorado
Treanor Enterprise Ditch Company	Ruth Candelaria	Marvel, Colorado
<u>DISTRICT 34</u>		
Bauer Lakes Water Company	Leroy Everett	Mancos, Colorado
Ratliff & Root Ditch Company	Lloyd Doerfer	Mancos, Colorado
Town of Mancos Ditch Company	Geraldine Wallace	Mancos, Colorado
Webber Ditch Company	Vernon Ellis	Mancos, Colorado
Webber Reservoir & Ditch Company	Foster Hall	Mancos, Colorado
<u>DISTRICT 71</u>		
Summit Irrigation System	Eddie McRea	Dolores, Colorado
Groundhog Reservoir & Beaver Ditch System	Victor Bryan	Cortez, Colorado
Montezuma Valley Irrigation Dist.	Victor Bryan	Cortez, Colorado
<u>DISTRICT 78</u>		
Piedra Falls Ditch Company	Raymond McWhiter	Pagosa Springs, Colorado

IX. WATER COMMISSIONERS' RECORDS

All of the diversion records, reservoir data, annual information, and perpetual structure information revisions have been keypunched and forwarded on to Denver for computer processing. These will be available in all the usual forms shortly, at both the Denver Office and in the Division Office in Durango. Before sending this to Denver for inclusion in the Data Bank, we used the Fort Lewis College facilities and the program developed by U.N.C. to obtain the information summarized in the next section.

X. DIVISION ENGINEER'S SUMMARIES

The summaries are contained on Table A and Table B on the following two pages.

XI. DIVISION ENGINEER'S RECOMMENDATIONS AND SUGGESTIONS

Last year the Division Engineer made two recommendations both of which were partially accomplished this year. First was to hold the annual meeting in February in order that the Division would have the benefit of the year's completed records. The meeting was changed from mid December to mid January and we did get preliminary, local results from our records which were corrected and then sent to Denver for processing. The second recommendation was for more leeway to use local facilities for keypunching and programming in making the annual computations. The previously tighter restrictions were relaxed and consequently we now offer more complete data.

Division 7 has several pressing needs which will have to be remedied. The vacant position of Division Engineer needs to be filled. This should be done prior to any gearing up for the next irrigation season so that new personnel can become oriented without being directly under fire. Also, the lack of a groundwater specialist or individual working specifically with wells and subdivisions puts an undue burden on other personnel and the public because of the inability for us to provide proper services. When you can't get it all done all the time, something slides.

In conclusion, I am taking this opportunity to thank each and every member of the Division 7 force for their cooperation and effort in completing a year well done. I also thank those in Denver whose efforts contributed to our wellbeing and a special thanks to the people of southwestern Colorado who really supported us in this past difficult drought year.

Respectfully submitted,

*Orlyn J. Bell*

Orlyn J. Bell, P.E.  
Acting Division Engineer

DIVISION SUMMARY - DIVISION VII  
DIRECT FLOW DIVERSIONS

TABLE A

WATER DIST.	TOTAL DITCHES				NO. OF ACRES IRRIGATED	A.F./AC. COMMERCIAL	INDUSTRIAL USE DIVER.		MUNICIPAL USE DIVER.		RECREATION USE DIVER.		DOMES.	STOCK	TRANSMOUNTAIN DIVERSIONS		TOTAL DITCH COMPACT DIVER. RPTS.
	ACTIVE	INACTIVE*	DIVERIONS				A.F.	A.F.	A.F.	A.F.	A.F.	FISH			DIVERIONS	FROM	
			INFO.	NA													
29	134	56	21	140	62,287	18,813	3.31	2,338	1,505	3,644	1,898	5,515	14	13,455	90,656	4,564	
30	161	322	37	167	133,064	38,934	3.42	8,914	5,699	7,885	188	4,666	778	9,885	171,079	9,755	
31	99	174	18	48	90,301	55,039	1.64	42	446	607	50	4,468	66	---	95,980	13,093	
32	77	34	87	39	56,391	27,319	2.06	12	1,898	---	13	1,043	---	---	59,357	8,617	
33	40	22	43	19	5,658	2,728	2.07	---	---	---	14	3,081	---	3,033	11,786	5,953	
34	45	13	32	25	7,671	3,872	1.98	2	718	---	31	1,601	---	---	10,023	1,647	
16	28	1	0	4	3,424	2,073	1.65	---	---	478	---	---	1	---	3,903	1,112	
59	7	1	13	14	641	1,311	0.49	---	---	---	1	---	---	---	642	80	
71	45	78	23	56	5,763	2,312	2.49	144	1,400	4,600	83	27	---	---	12,017	2,644	
77	60	22	12	59	15,350	2,958	5.19	2	---	2,065	8	256	---	3,957	21,638	2,166	
78	59	41	37	48	38,400	10,085	3.81	1,579	*	---	*1,737	---	---	---	41,724	2,605	
POT.	755	765	323	619	418,950	165,444	2.53	13,033	11,674	19,279	4,023	20,658	858	30,330	518,805	52,236	

NA = NO WATER AVAILABLE NU = NON USE

TRANSMOUNTAIN DIVERSIONS: DESIGNATE EITHER TO OR FROM DIVISION

- 1) Delivered to New Mexico thru Blanco Tunnel Diversion, San Juan-Chama Project
- 2) Water diverted in Colorado for use in New Mexico
- 3) 39,178 A.F. diverted in District 71 for direct irrigation thru M.V.I. System in District 32
- 4) Estimate 20,000 acres of 35,000 possible under M.V.I. System and 0 of 5,000 acres possible under Summit System
- 5) 1,898 A.F. diverted in District 71 for Town of Cortez in District 32 thru M.V.I. System
- 6) 41,076 A.F. diverted in District 71 for use in District 32
- 7) 379 A.F. diverted in Colorado for use in New Mexico; 2,654 A.F. delivered to New Mexico in river under La Plata River Compact (Irrigation season)
- 8) Delivered to New Mexico through Navajo and Little Navajo (Oso and Little Oso Tunnel diversions) San Juan-Chama Project

\* appear to be unrealistic numbers

TABLE B

Storage Report - Acre Feet

WATER DISTRICT	Amount in Storage Acre Feet		Actual Am't Diverted to Storage During Season	Delivered from Storage to Irrigation	Storage to Industrial Use	Storage to Municipal Use	Storage to Recreation Use	Storage to Projects
	11-1-76	5-1-77						
29	2,720	2,787	2,590	165	---	---	---	---
30	35,186	35,596	20,533	19,494	7,298	97	---	---
31	52,342	51,049	13,324	44,174	---	220	---	2,983 (evaporation)
32	11,603	19,801	11,068	20,099	---	---	---	---
33	427	853	359	663	---	---	---	---
34	4,690	5,012	3,886	2,087	---	83	---	75
46	---	---	---	---	---	---	---	---
69	469	419	423	---	---	---	---	---
71	8,819	8,518	7,290	899	---	---	---	1,591 (Groundhog to Dist. 32)
77	90	310	90	147	---	---	---	---
78	14,499	14,248	13,745	40	---	369	---	---
TOTALS	130,855	138,593	73,308	87,765	7,298	769	---	4,649