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REVISED JULY 1976

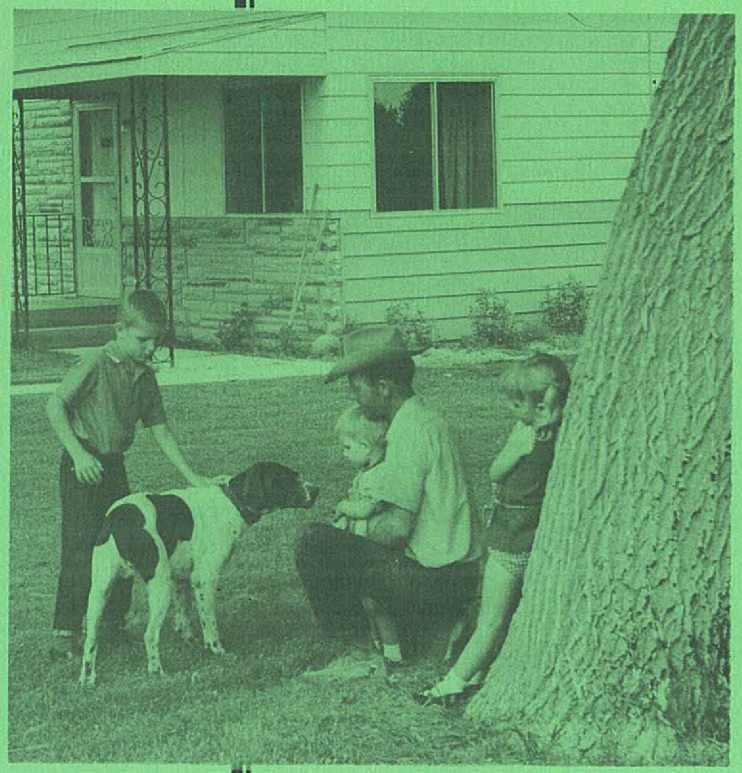
JENSEN UNIT

CENTRAL UTAH PROJECT
DEFINITE PLAN REPORT

DECEMBER 1975

APPENDIX B

WATER SUPPLY



DEPARTMENT OF THE INTERIOR
THOMAS S. KLEPPE, SECRETARY

Bureau of Reclamation
Gilbert G. Stamm, Commissioner

JENSEN UNIT

CENTRAL UTAH PROJECT
DEFINITE PLAN REPORT

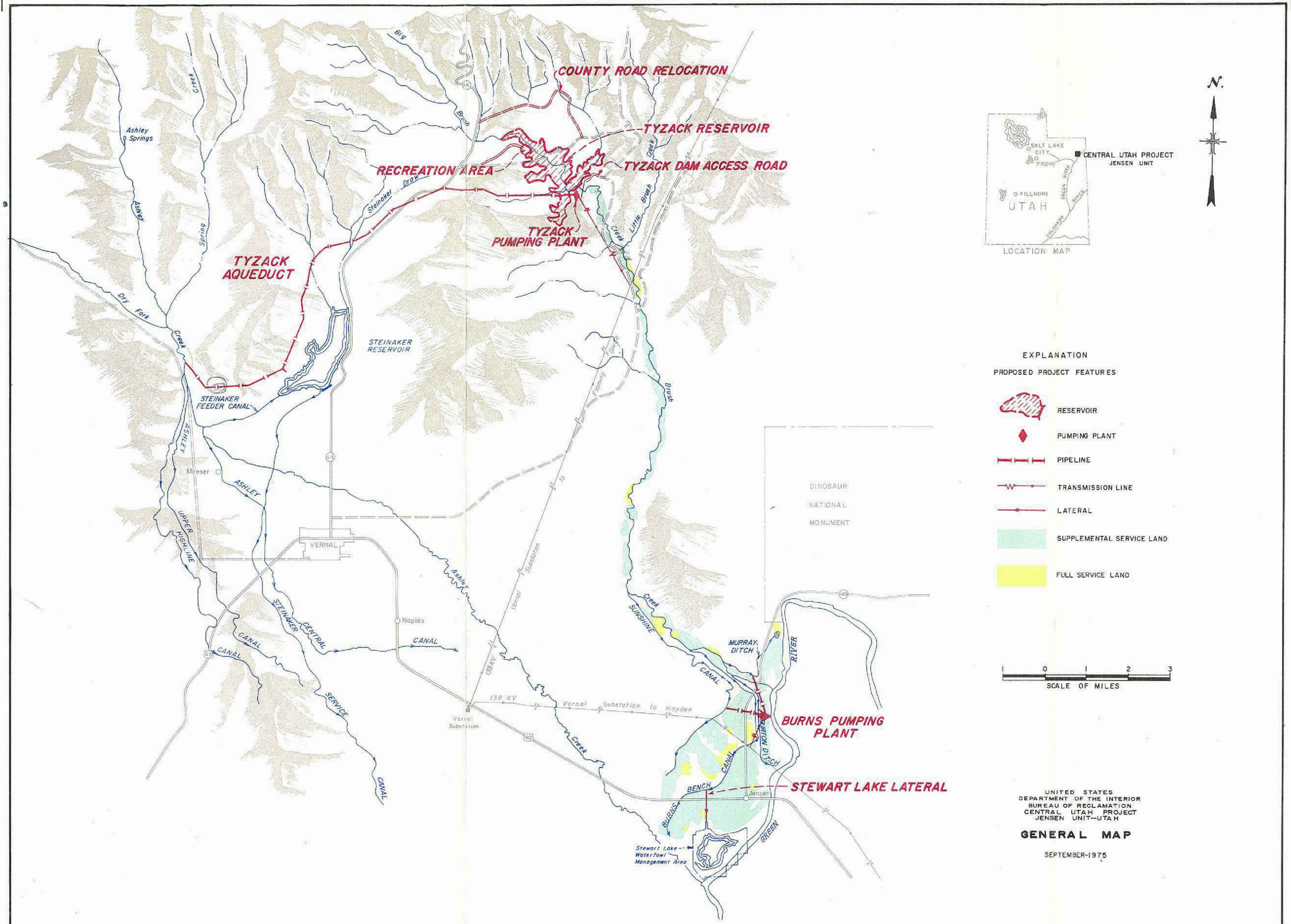
DECEMBER 1975

APPENDIX B

WATER SUPPLY

BUREAU OF RECLAMATION
GILBERT G. STAMM, COMMISSIONER

Upper Colorado Region
David L. Crandall, Regional Director



UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL UTAH PROJECT
JENSEN UNIT—UTAH

GENERAL MAP

SEPTEMBER-1975

450 — 418 — 71

SUMMARY SHEETS

Jensen Unit

LOCATION

Uintah County, northeastern Utah, in Uinta Basin of Upper Colorado River Basin.

AUTHORIZATION

Initial Phase of the Central Utah Project, including Jensen Unit, authorized as a participating project of the Colorado River Storage Project by act of April 11, 1956 (70 Stat. 105).

PLAN OF DEVELOPMENT

The Jensen Unit will provide municipal and industrial water to augment existing supplies throughout the project area and water for irrigation in the vicinity of Jensen. It also will benefit fish and wildlife, recreation, and flood control.

The main project feature will be Tyzack Reservoir to be constructed on Big Brush Creek. Project water will be pumped from the reservoir to Ashley Creek by the Tyzack Pumping Plant and Aqueduct and exchanged with Ashley Spring for municipal and industrial use. Tyzack Reservoir operation will be coordinated with operation of Steinaker Reservoir of the Vernal Unit to avoid winter operation of the Tyzack Aqueduct. Treatment and distribution of the municipal and industrial water will be the responsibility of the water users.

Storage water to be used for irrigation below Tyzack Reservoir will be released from the reservoir to Big Brush Creek and conveyed in the Brush Creek channel to points of diversion. The project Burns Pumping Plant will pump water from Green River for the irrigation of lands near Jensen and for municipal and industrial purposes by exchange with water from Big Brush Creek. The irrigation water, whether supplied from the reservoir or the pumping plant, will be distributed by existing canals. Only minor extensions of existing irrigation distribution facilities will be required and these will be provided by the water users. Project drainage will be provided as necessary. Power for operation of the project pumping plants will be obtained from the Colorado River Storage Project system.

Specific recreational facilities will be provided at Tyzack Reservoir. Measures for fish and wildlife will include a fishery pool in Tyzack Reservoir and rehabilitation of public lands as big game range to compensate for range lands that will be inundated by the reservoir. Also improvements will be made in the methods of water deliveries to the Stewart Lake Waterfowl Management Area, permitting improved operation of the area.

IRRIGATION SERVICE AREA (acres)

Full service land	440
Supplemental service land	3,640
Total	4,080

WATER SUPPLY (average annual acre-feet)

Project increases in supply	
Municipal and industrial use	18,000
Irrigation	4,600
Total	22,600
Depletion of Colorado River	15,000
Increases in salinity concentration at Imperial Dam (mg/1)	
From stream depletion	1.5
From increase in salt load	.1

COSTS

Construction costs (January 1975 prices, except as noted)	
Tyzack Dam and Reservoir	$18,455,000
Tyzack Pumping Plant and discharge line (aqueduct)	1/9,420,000
Burns Pumping Plant and discharge lines	3,290,000
Drains	774,000
Tyzack Pumping Plant switchyard	2/121,000
Burns Pumping Plant switchyard	65,000
Facilities to connect with Colorado River Storage Project power system	121,000
Transmission line to Tyzack Pumping Plant	97,000
Transmission line to Burns Pumping Plant	93,000
Recreational facilities	757,000
Fish and wildlife development	43,000
Permanent operating facilities	27,000
Total	33,263,000
Annual operation, maintenance, and replacement costs (1972-74 prices)	177,000

1/ Entire cost at July 1975 prices except $6,000 for acquisition of land and land rights which was estimated at January 1975 prices.

2/ At July 1975 prices.

COST ALLOCATIONS ($1,000)

	Construction costs	Reimbursable interest during construction (5.116 percent)	Annual operation, maintenance, and replacement costs
Reimbursable costs			
Municipal and industrial water	$25,668	$2,338	$120
Irrigation	4,933		6
Recreation			48
Subtotal	30,601	2,338	174
Nonreimbursable costs			
Fish and wildlife			
Enhancement	596		1
Mitigation	20		
Recreation	757		
Flood control	609		2
Highway improvement	680		
Subtotal	2,662		3
Total	33,263	2,338	177

REPAYMENT OF REIMBURSABLE COSTS (50-year repayment period)

Municipal and industrial water			
Prepayment 1/	58		
Water users	16,903	1,543	120
Ad valorem tax revenue	8,707	795	
Subtotal	25,668	2,338	120
Irrigation			
Prepayment 1/	11		
Water users	750		6
Apportioned revenues from Colorado River Storage Project	4,172		
Subtotal	4,933		6
Recreation (State of Utah)			48
Total	30,601	2,338	174

1/ Includes payments made for investigation from Colorado River Development Fund and funds contributed by State of Utah.

MUNICIPAL AND INDUSTRIAL WATER CONSTRUCTION COSTS AND REPAYMENT[1/]

Item	Initial use Block 1 (6,000 acre-feet)	Deferred costs or subsequent construction[2/] Block 2 (6,000 acre-feet)	Block 3 (6,000 acre-feet)	Total (18,000 acre-feet)
Tyzack Reservoir	$4,565,000	$4,566,000	$4,566,000	$13,697,000
Tyzack Pumping Plant and related facilities	10,546,000			10,546,000
Burns Pumping Plant and related facilities		2,363,000	1,323,000	3,686,000
Permanent operating facilities		19,000		19,000
Total	15,111,000	6,948,000	5,889,000	27,948,000
Annual payment (50 years)	842,600	387,400	328,400	1,558,400

1/ Costs shown include $2,338,000 in reimbursable interest during construction but exclude $58,000 in prepayments.

2/ "Subsequent construction" refers only to Burns Pumping Plant and related facilities.

BENEFIT-COST ANALYSIS
(100-year period of analysis at 3.25 percent interest)

	Direct	Indirect and public	Total
Average annual benefits			
Municipal and industrial water	$2,055,000		$2,055,000
Irrigation	166,000	$17,000	183,000
Fish and wildlife	24,000		24,000
Recreation	88,000		88,000
Flood control	24,000		24,000
Total	2,357,000	17,000	2,374,000

	Direct effects	Indirect effects	Total
Negative externalities			
Concentrating effects of stream depletion	$282,000	$63,000	$345,000
Increase in salt load	18,800	4,200	23,000

Average annual equivalent costs	1,371,000
Benefit-cost ratios	
Without externalities	
Ratio of total benefits to costs	1.73:1
Ratio of direct benefits to costs	1.72:1
With negative externalities from increased salt load	
Ratio of total benefits to costs	1.71:1
Ratio of direct benefits to costs	1.70:1

PROJECT FEATURES

Tyzack Reservoir	
Capacity (acre-feet)	
Active	24,000
Inactive and dead	2,000
Total	26,000
Surcharge	7,600
Normal water surface area (acres)	520
Tyzack Dam	
Height above streambed (feet)	145
Crest length (feet)	1,640
Volume of dam (cubic yards)	2,030,000
Tyzack Pumping Plant	
Maximum operating head (feet)	587
Design diversion capacity (second-feet)	46
Tyzack Discharge Line (aqueduct)	
Capacity (second-feet)	46
Length (miles)	11.8
Burns Pumping Plant	
Maximum static head at average flow of river (feet)	52 to 195
Design diversion capacity (second-feet)	97.4

Appendixes to the Jensen Unit, Central Utah Project, have been prepared in four volumes with the data grouped as follows.

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DESIGNS AND ESTIMATES
PLAN FORMULATION

APPENDIX B
WATER SUPPLY

APPENDIX C
PROJECT LANDS
DRAINAGE
GROUND WATER

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AGRICULTURAL ECONOMY
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CHAPTER I

GENERAL DESCRIPTION

Introduction

The Jensen Unit will be operated to supply about 18,000 acre-feet of municipal and industrial water to the Vernal and Jensen areas. In addition a full or supplemental irrigation supply will be provided to about 805 acres of irrigable land in the upper Brush Creek area and 3,277 acres of irrigable land in the lower Brush Creek area.

Location

The municipal and industrial water will be used in the vicinity of Vernal and Jensen to meet the demands resulting from the rapidly expanding petroleum, oil shale, tar sands, and related industries. The project lands are located along Brush Creek and in the area of the community of Jensen, which is located on the west bank of the Green River about 12 miles southeast of Vernal.

Climate

The climate in the Jensen Unit hydrologic area is characterized by rather wide extremes in temperature and precipitation. Summers are warm and dry. Winters are cold, but snowfall and wind movement are relatively light, and blizzard conditions or other hardships are not often associated with these cold temperatures. Winds are generally light. Although winds associated with low pressure and thunderstorms are occasionally strong, little or no damage results. The frost-free period averages 119 days, however, killing frosts have been recorded every month of the year.

Precipitation in the area is light in all seasons, and no individual month averages over 1 inch. During summer months precipitation occurs principally from thunderstorms. Snowfall in the area is light, averaging about 20 inches per year.

Weather data have been recorded at the Jensen station since 1932 and the Vernal airport station since 1894. Climatological data obtained from these weather stations were used to determine consumptive use, effective precipitation, and other data pertinent to the determination of the regional irrigation requirements. Climatological data from these weather stations are shown in Tables 1 and 2.

Present development

Except for the high flood and winter flows, all of the water on Brush Creek is presently diverted and benefically used, mostly for

Table 1
Climatic conditions at Vernal airport
(elevation 5,280 feet)

	Precipitation (inches)			Temperature (° F.)		
Month	1894-1973 average	Maximum year (1941)	Minimum year (1934)	1903-73 average	Maximum	Minimum
January	0.55	0.69	0.06	16.2	57	-38
February	.50	.30	.45	22.4	64	-32
March	.62	.62	.88	34.6	79	-16
April	.85	1.96	.17	45.8	85	0
May	.70	.70	T	54.9	93	12
June	.73	1.22	.05	62.6	101	24
July	.52	.33	T	69.6	103	25
August	.79	2.07	.10	67.4	100	32
September	.64	2.60	.72	59.5	94	17
October	.86	3.07	.00	47.8	86	-1
November	.51	.55	.28	32.6	72	-16
December	.70	.67	.10	21.8	61	-32
Annual	7.97	14.78	2.81	44.6	103	-38

Table 2
Climatic conditions at Jensen
(elevation 4,720 feet)

	Precipitation (inches)			Temperature (° F.)		
Month	1932-73 average	Maximum year (1941)	Minimum year (1934)	1940-73 average	Maximum	Minimum
January	0.52	0.56	0.22	15.0	58	-36
February	.47	.21	.57	22.5	67	-35
March	.61	.62	.03	35.4	77	-17
April	.76	1.71	.10	47.1	87	8
May	.63	.75	.27	57.1	97	18
June	.70	.97	.27	64.7	106	25
July	.45	.38	.30	72.0	105	38
August	.78	1.49	.49	69.7	103	30
September	.67	2.28	.02	60.1	100	17
October	.92	2.53	.16	48.2	87	0
November	.46	.38	.83	33.2	72	-9
December	.70	.67	.37	20.8	60	-25
Annual	7.67	12.55	3.63	45.5	106	-36

irrigation. On the adjacent Ashley Creek only the infrequent flood flows which cannot be diverted to Steinaker Reservoir have not been put to beneficial use. Present diversions from Brush Creek possible within ideal demand average 11,400 acre-feet over the 1930-72 period, while the average flow of Big and Little Brush Creeks totals 29,100 acre-feet over this same period. Lacking adequate storage regulation, excessive diversions are also often made during flood periods.

Tyzack Reservoir and related works will make possible regulation and use of the present unused winter and flood flows on Brush Creek. The unit will also make limited use of Ashley Creek spills at Steinaker Reservoir.

The need for regulatory storage on Brush Creek is demonstrated by Figure 1 which compares the pattern of Brush Creek flows to future irrigation and municipal and industrial demands.

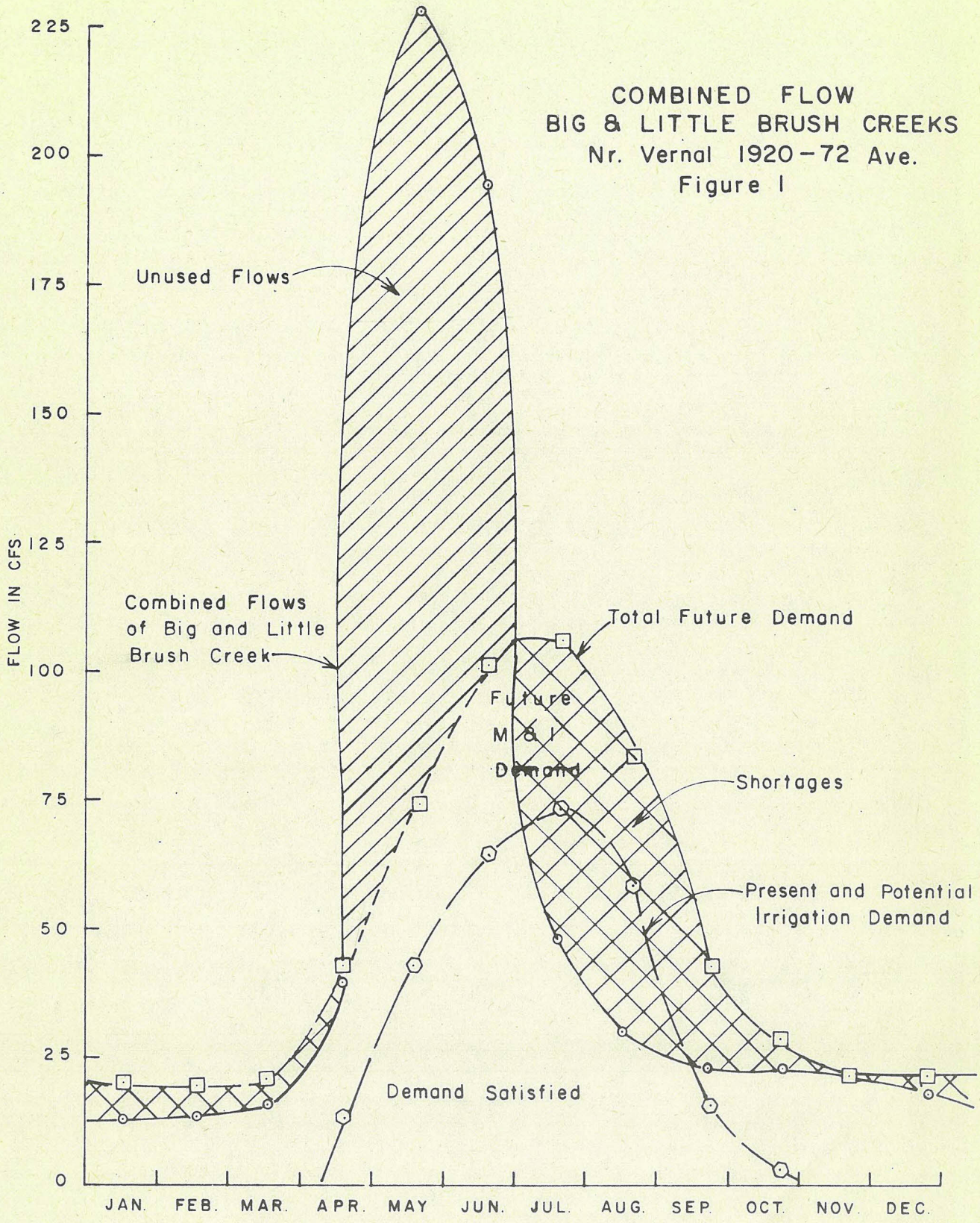
Irrigation

Existing storage includes East Park Reservoir on Little Brush Creek and Oaks Park Reservoir on Big Brush Creek. East Park Reservoir has a capacity of about 2,650 acre-feet. The Utah Division of Wildlife Resources has purchased about 1,300 acre-feet of East Park Reservoir storage and maintains it as a minimum pool for fishery conservation. The remaining 1,350 acre-feet of storage water is conveyed down Little Brush Creek and Big Brush Creek and used to supply irrigation water to the Sunshine Irrigation Company water users in the vicinity of Jensen. This water is piped past the sink area in Little Brush Creek near the Little Brush Creek cave. Oaks Park Reservoir stores water for diversion out of Big Brush Creek drainage through the Oaks Park Canal to Ashley Creek for irrigation near Vernal. The reservoir has a capacity of 5,740 acre-feet. Historically an average of 4,200 acre-feet has been diverted.

Steinaker Reservoir, a 37,560 acre-foot-capacity off-stream reservoir constructed under the Vernal Unit of the Central Utah Project, stores winter and high runoff flows from the adjacent Ashley Creek drainage for irrigation and culinary use in Ashley Valley. An average annual supply of 18,000 acre-feet of irrigation storage water is delivered to Ashley Valley from Steinaker Reservoir.

Municipal and Industrial Water

The city of Vernal and most of Ashley Valley are served by a modern municipal water system supplied by excellent quality water from Ashley Spring in Ashley Creek Canyon. This system was extended to many areas in Ashley Valley in connection with the construction of the Vernal Unit of the Central Utah Project. Presently about 5,000 acre-feet of water per year is diverted from the Ashley Springs. About one-third of this water, 1,600 acre-feet, is Vernal Unit water delivered from the springs into the pipeline in exchange for Steinaker storage water released to downstream


COMBINED FLOW
BIG & LITTLE BRUSH CREEKS
Nr. Vernal 1920-72 Ave.
Figure 1
FLOW IN CFS
225
200
175
150
125
100
75
50
25
0
Unused Flows
Combined Flows of Big and Little Brush Creek
Total Future Demand
Future M & I Demand
Shortages
Present and Potential Irrigation Demand
Demand Satisfied
JAN.
FEB.
MAR.
APR.
MAY
JUN.
JUL.
AUG.
SEP.
OCT.
NOV.
DEC.

rights. Additional Ashley Springs water could be diverted to municipal and industrial use provided exchange or replacement water is provided to existing water users downstream on Ashley Creek.

Most residents of the community of Jensen obtain their domestic water supply from a recent extension of the Ashley Valley system, although a few are still supplied by small springs, wells, cisterns, and irrigation ditches.

CHAPTER II

WATER RESOURCES

Available Supply

Big Brush Creek is the prinicpal source of project water. Brush Creek has a drainage area of about 255 square miles at its mouth, including the area drained by Big and Little Brush Creeks. Water in the upper reaches of both Little Brush and Big Brush Creeks disappears in channel "sinks" and leaves a dry channel for some distance. The water that disappears in these sinks reappears in Big Brush Creek Spring. The water supply for the Jensen area is comprised of flows from Big Brush Creek Spring, some water piped past the Little Brush Creek sinks, and water pumped from the Green River.

Period of Study

Water supply records were developed for the 53-year period of 1920 through 1972. The period selected as a basis for operation studies was 1930 through 1972. This period includes the extremely low runoff years of 1931 through 1935 and 1960 and 1961 as well as the exceptionally high runoff years of 1947, 1950, 1952, and 1962. The variations in annual runoff during this extended period are considered to be representative of the range in water supply that may be experienced by the project in future years.

Definitions of Streamflow

Historical flow

Historical streamflow is the discharge actually experienced at a gaging station or point of measurement. It is the runoff of a drainage area above the point of measurement as influenced by nature and the activities of man. It may be recorded or estimated.

Natural flow

Natural flow past a specified point on a stream is the historical flow from the drainage area tributary to the stream above the point of measurement, corrected for man-controlled modifications caused by stream diversion, storage, water, water exports, or return flow.

Modified flow

Whenever the historical flow of a stream is corrected for changes caused by manmade developments it becomes modified flow. The period of study and conditions for which the modification was made must be specified. Following are three types of modified flow.

Past Modified Flow

This is the historical flow of a stream during the period of study modified to reflect flow conditions at the beginnning of the period of study.

Present Modified Flow

This is the historical flow of a stream during the period of study modified to reflect present conditions of flow for the period of study.

Future Modified Flow

This is the historical flow of a stream during the period of study modified to reflect future conditions of flow under a specified plan.

Runoff Records

The U.S. Geological Survey has maintained streamflow gaging stations at a number of locations within Brush Creek drainage basin. The U.S. Bureau of Reclamation has maintained one station "Little Brush Creek near Mouth." Records from these stations are the basis for water supply studies for the Jensen Unit. Each of the gaging stations is described in the following paragraphs; summarized information pertaining to the stations is tabulated in Table 3, and their locations are shown on Figure 2.

Oaks Park Canal near Vernal

The Oaks Park Canal gaging station was established by the Ashley Valley Reservoir Company in July 1941 and is operating at present. It is located in the SE¼ sec. 12, T. 1 S., R. 20 E., Salt Lake Meridian, on left bank of the canal 1,000 feet downstream from Oaks Park Dam, and 200 feet downstream from point of diversion from Big Brush Creek. The elevation of this station is 9,240 feet (by barometer). The available record for this station is the historical flow of Oaks Park Canal. The station was operated by the Ashley Valley Reservoir Company from July 1941 to April 1946, and from July 1969 to 1972, and by the U.S. Geological Survey from May 1946 to June 1969. The purpose of this canal is to carry water from the Big Brush Creek drainage over to the Ashley Creek drainage to be used for irrigation in the Vernal area. The historical flow of the canal is shown on Table 4.

Table 3
Stream gaging stations in Jensen Unit

Gaging station	Location	Drainage area (square miles)	Available records	Average water year runoff for 1920 to 1972 period (acre-feet)
Oaks Park Canal near Vernal, Utah	SE¼ sec. 12, T. 1 S., R. 20 E., Salt Lake Meridian, 1,000 feet downstream on left bank from Oaks Park Dam.		July 1941 to present	1/4,200
Big Brush Creek above cave, near Vernal	SE¼ sec. 30, T. 1 S., R. 21 E., Salt Lake Meridian, on right bank at road bridge ¼ mile downstream from Government Creek, 1 mile upstream from cave.	23	April 1946 to June 1955	1/6,300
Big Brush Creek near Vernal	SE¼SW¼ sec. 3, T. 3 S., R. 22 E., Salt Lake Meridian, on left bank 3 miles upstream from Little Brush Creek.	82 approximately	April 1939 to present	26,600
Little Brush Creek below East Park Reservoir near Vernal	SW¼ sec. 2, T. 1 S., R. 21 E., Salt Lake Meridian, on right bank 2 miles downstream from East Park Reservoir.	20 approximately	July 1949 to September 1955	11,100
Little Brush Creek near Vernal	SE¼ sec. 24, T. 1 S., R. 21 E., Salt Lake Meridian, ½ mile upstream from cave and 3/4 mile upstream from Kane Hollow.	28 approximately	October 1945 to September 1952	13,300
Little Brush Creek near mouth	SE¼NE¼ sec. 1, T. 3 S., R. 22 E., Salt Lake Meridian.		April 1964 to September 1969	4,600
Brush Creek near Jensen, Utah	SW¼ sec. 4, T. 5 S., R. 23 E., Salt Lake Meridian, on right bank 280 feet upstream from bridge on State Highway 149.	255	April 1939 to September 1965	13,400
Green River near Jensen	SW¼SE¼ sec. 5, T. 5 S., R. 24 E., Salt Lake Meridian, 1 mile downstream from Cub Creek and Chew Ranch, 4 miles southeast of Dinosaur National Monument headquarters, 6½ miles northeast of Jensen, and 12 miles upstream from Brush Creek.	25,400	October 1946 to present	1/3,067,000

1/ Average for period of record.

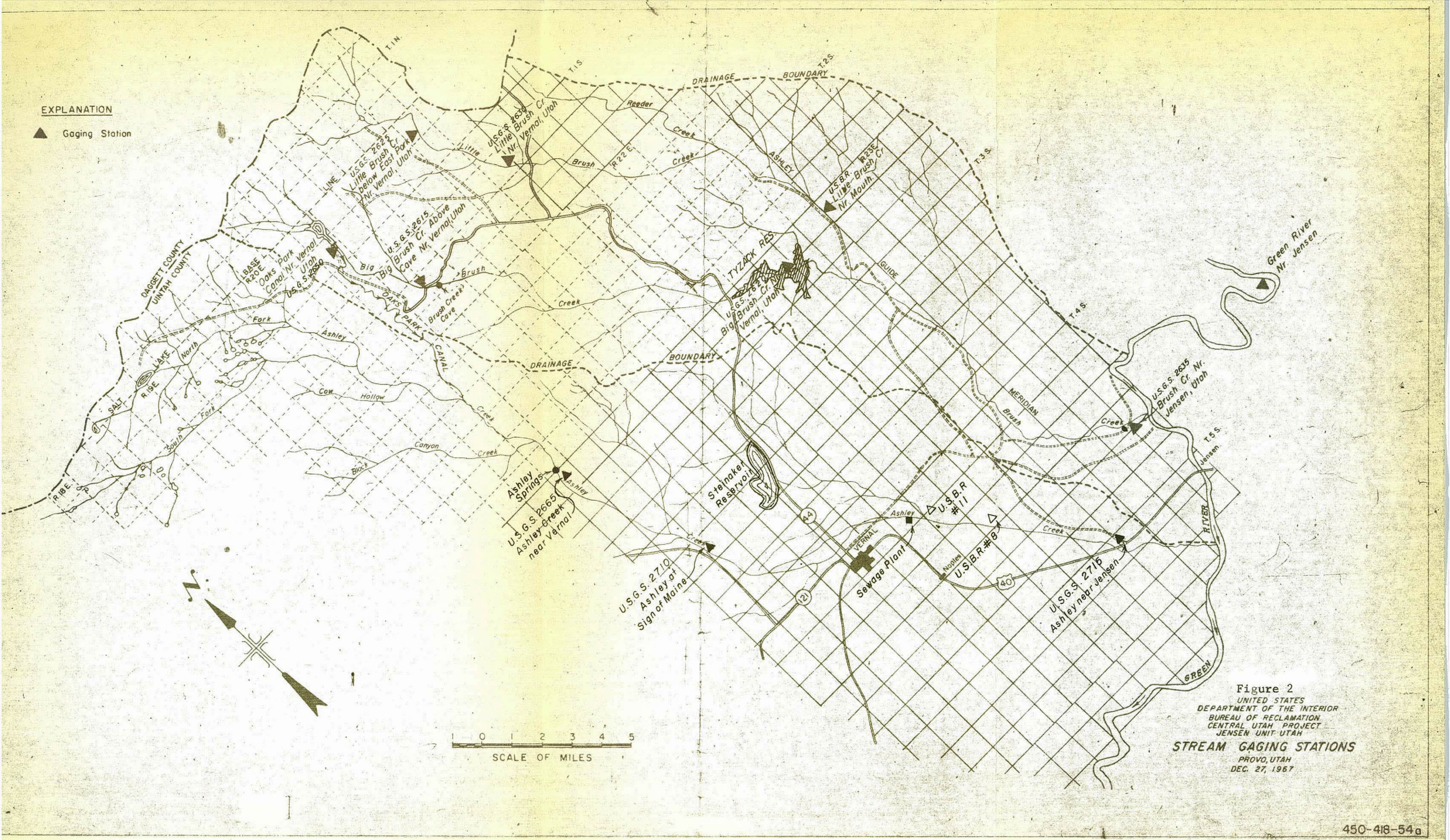


Figure 2
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL UTAH PROJECT
JENSEN UNIT UTAH
STREAM GAGING STATIONS
PROVO, UTAH
DEC. 27, 1967

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418-1
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Table 4

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

CENTRAL UTAH PROJECTS OFFICE

HYDROLOGIC DATA

Title: Historical Flow of Oaks Park Canal near Vernal Unit:

May 1946 - 1966 U.S.G.S. Records

July 1941 - 1946 Ashley Valley Reservoir Company Records

(Unit: 1,000 acre-feet)

YEAR	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	TOTAL
1920													
1921													
1922													
1923													
1924													
1925													
1926													
1927													
1928													
1929													
1930													
1931													
1932													
1933													
1934													
1935													
1936													
1937													
1938													
1939													
1940													
1941										1.4	0.9	0.8	3.1
1942										1.1	2.0	2.3	5.4
1943	0.6									2.6	2.0	1.1	6.3
1944										1.3	3.2	1.4	5.9
1945	.1									1.5	1.5	1.5	4.6
1946	.6	0.1						0.1	1.9	1.8	.2	.2	4.9
1947								.1	.1	1.2	1.2	1.1	3.7
1948	1.3								.2	2.0	2.4	.8	6.7
1949	.2								.2	1.3	2.5	1.0	5.2
1950	.3									.6	2.6	1.2	4.7
1951	.8									2.2	1.1	.6	4.7
1952	.6									1.9	.5	.7	3.7
1953	1.3	.4								2.5	2.7	.5	7.4
1954									1.0	2.2	.7	.3	4.2
1955									.2	1.9	.2	.1	2.4
1956										2.3	1.5	.6	4.4
1957										1.0	1.7	.7	3.4
1958	.8									2.0	1.8	.5	5.1
1959	.3								.4	1.1	.6	.6	3.0
1960	.3								.1	1.9	.7		3.0
1961										2.0	1.4	.6	4.0
1962	.1									.3	2.0	2.4	4.8
1963	.4									1.7	.7		2.8
1964	.5									1.6	1.1	1.7	4.9
1965	1.1											.3	1.4
1966	.1	.6							.1	2.5	1.5	.9	5.7
1967										.1	1.8	.5	2.4
1968	1.2									.8	.3	.7	3.0
1969	1.4								.2	1.4	2.0	1.1	6.1
1970	.1									.9	1.8	1.6	4.4
1971	.4									1.0	1.0	1.0	3.4
1972	.1									1.3	1.5	1.0	3.9
1973													
1974													
1975													
1976													
1977													
1978													
1979													
1941-72 TOTAL	12.6	1.1						0.2	4.4	47.4	45.1	27.8	138.6
MEAN	.4	0						0	.1	1.4	1.4	.9	4.2
PERCENT													

Big Brush Creek above Cave near Vernal

The gaging station was established by the Geological Survey in April 1946, and was discontinued in June 1955. It was located in the SE¼ of sec. 30, T. 1 S., R. 21 E., Salt Lake Meridian, on right bank at road bridge ¼ mile downstream from Government Creek, 1 mile upstream from cave. The station had a drainage area of 23 square miles, with an elevation of 8,360 feet (by barometer). The available record for this station is the historical flow of Big Brush Creek above the cave and is summarized in Table 5. These are U.S. Geological Survey records from April 1946 to June 1955. Oaks Park Canal diverts from Big Brush Creek above this station to Ashley Creek Basin. The average water year runoff for this station was 6,300 acre-feet. The flow here is affected by Oaks Park Reservoir and diversions to Oaks Park Canal. The water in Big Brush Creek enters a cave approximately 1 mile below this station and reappears in springs approximately 6 miles downstream. Some of the water that reappears in the springs is from other sources.

Big Brush Creek near Vernal

The gaging station was established by the Geological Survey in March 1939 and has operated continuously to the present time. The station is located in the SE¼SW¼ sec. 3, T. 3 S., R. 22 E., Salt Lake Meridian, 3 miles upstream from Little Brush Creek, and 10 miles northeast of Vernal. The elevation of the station is 5,530 feet, and the drainage area covers approximately 82 square miles. This is the key gaging station for the water supply to the Jensen Unit. The streamflow at this gage is affected by two small irrigation diversions above the station, by Oaks Park Reservoir with a capacity of 6,250 acre-feet, and by Oaks Park Canal which diverts water from Oaks Park Reservoir to Ashley Creek for irrigation. The streamflow is also affected by Big Brush Creek entering a cave and traveling approximately 6 miles underground and reappearing in springs. Some of the water that reappears is from other sources. Table 6 shows the present modified flow of Big Brush Creek near Vernal. This record includes the recorded flows from April 1939 through September 1972. For the years 1920 through March 1939, the flows were estimated by correlation with the past modified flow of Ashley Creek near Vernal.

Little Brush Creek below East Park Reservoir near Vernal

The gaging station was established by the Geological Survey in July 1949 and operated continuously through September 1955 when it was discontinued. The station was located in the SW¼ sec. 2, T. 1 S., R. 21 E., Salt Lake Meridian, 2 miles downstream from East Park Reservoir, and 20 miles north of Vernal. The elevation of the station was 8,650 feet, and the drainage area covers approximately 20 square miles. The flow at this station is regulated by East Park Reservoir. Table 7 shows the historical flow of Little Brush Creek below East Park Reservoir near Vernal.

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Table 5

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

CENTRAL UTAH PROJECTS OFFICE

HYDROLOGIC DATA

Title: Historical Flow of Big Brush Creek Above Cave Unit:

USGS Records.

(Unit: 1,000 acre-feet)

YEAR	OCT.	NOV.	DEC.	JAN.	FEB	MAR	APR.	MAY	JUNE	JULY	AUG	SEPT.	TOTAL
1920													
1921													
1922													
1923													
1924													
1925													
1926													
1927													
1928													
1929													
1930													
1931													
1932													
1933													
1934													
1935													
1936													
1937													
1938													
1939													
1940													
1941													
1942													
1943													
1944													
1945							0.4	0.6	0.6	0.3	0.1	0.1	2.1
1946							.1	5.1	5.0	1.0	.2	.2	11.8
1947	0.1	0.1					.2	2.6	2.0	.5	.3	.1	6.0
1948	.3						.2	3.6	4.0	.6	.3	.1	9.0
1949	.1	.1					.5	3.3	3.7	.7	.3	.2	9.4
1950	.2	.1	.1	.1	.1	.1	.1	2.1	.7	.3	.2	.2	3.9
1951	.2	.1				.1	1.1	4.9	4.3	.5	.3	.2	11.5
1952	.1						.1	1.3	.8	.4	.3	.1	3.4
1953	.2	.1	.1				.4	1.3	.3	.2	.1	.1	2.5
1954	.1						.1	1.1	1.2				2.5
1955	.1												
1956													
1957													
1958													
1959													
1960													
1961													
1962													
1963													
1964													
1965													
TOTAL	1.4	.5	.2	.1	.1	.2	3.2	25.9	22.6	4.5	2.1	1.3	62.1
MEAN	.2	.1					.3	2.6	2.3	.5	.2	.1	6.3
PERCENT													

INTERIOR - RECLAMATION SLC UTAH

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REV. NOV. 1970

Table 6

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

CENTRAL UTAH PROJECTS OFFICE

HYDROLOGIC DATA

Title: Present Modified Flow of Big Brush Creek near Vernal Unit:

U.S.G.S. Records April 1939 to present. 1920 through March 1939 estimated by correlation with the Past Modified Flow of Ashley Creek near Vernal.

(Unit: 1,000 acre-feet)

YEAR	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	TOTAL
1920	1.4	1.2	0.9	0.9	0.9	1.0	1.2	11.8	12.6	1.9	1.3	1.2	36.3
1921	1.3	1.3	1.1	1.0	.9	1.2	1.6	12.8	17.1	4.3	1.8	1.7	46.1
1922	1.8	1.4	1.2	1.1	1.0	1.3	1.6	13.0	16.4	3.4	1.8	1.5	45.5
1923	1.7	1.5	1.3	1.1	1.0	1.3	1.7	11.9	12.4	5.0	1.5	1.0	41.4
1924	1.4	1.2	1.1	1.0	1.0	1.2	1.7	7.4	2.3	1.2	.9	.9	21.3
1925	.9	.9	.9	.9	.9	1.1	1.9	5.6	3.3	1.8	1.4	1.5	21.1
1926	2.4	1.8	1.2	1.0	.9	1.1	4.2	8.2	2.1	1.7	1.3	1.0	26.9
1927	1.0	.9	.9	.8	.8	1.0	1.5	10.2	6.6	2.8	1.7	3.1	31.3
1928	2.5	2.1	1.3	1.2	1.0	1.2	2.3	13.2	3.9	1.8	1.3	1.0	32.8
1929	1.1	1.2	.9	1.0	.9	1.1	1.5	10.7	13.0	3.0	1.7	1.7	37.8
1930	2.0	1.6	1.2	1.2	1.0	1.2	3.4	9.3	5.4	1.8	1.8	1.5	31.4
1931	2.0	1.4	1.1	1.1	.9	1.2	1.6	3.7	1.0	.5	.8	.8	16.1
1932	.7	.8	.8	.9	.9	1.0	1.3	9.5	7.5	2.3	1.5	1.3	28.5
1933	1.3	1.0	.8	.8	.7	.8	1.0	3.7	5.6	1.2	1.1	.8	18.8
1934	.6	.7	.7	.7	.7	.8	2.1	3.1	.6	.4	.9	.9	12.2
1935	.8	.9	.8	.8	.8	1.0	1.2	4.6	11.8	1.8	1.2	.9	26.6
1936	.7	.7	.7	.7	.7	.7	1.4	4.5	1.4	1.0	1.3	1.2	15.0
1937	1.2	1.0	.8	.7	.7	.7	1.4	12.2	5.7	2.5	1.5	1.2	29.6
1938	1.1	.9	.8	.7	.7	.8	1.5	8.0	10.9	2.7	1.5	1.3	30.9
1939	2.4	1.9	1.3	1.1	.9	1.2	3.9	10.0	1.7	.9	.8	1.0	27.1
1940	1.0	.8	.7	.7	.7	.7	2.2	7.1	1.2	.9	.7	.8	17.5
1941	.8	.7	.6	.7	.6	.7	.8	11.3	10.7	2.1	1.4	1.5	31.9
1942	3.4	2.4	1.5	1.1	.9	1.1	3.7	9.8	11.4	2.7	1.7	1.2	40.9
1943	1.1	1.0	.8	.8	.7	.9	3.5	5.2	2.7	1.3	1.1	.9	20.0
1944	.9	.8	.8	.7	.7	.8	.9	10.5	14.4	3.5	1.8	1.4	37.2
1945	1.2	1.1	1.0	.9	.8	.9	1.0	6.1	5.6	1.6	1.2	1.1	22.5
1946	1.1	1.0	.9	.8	.7	.8	2.4	2.5	1.6	1.1	1.0	.8	14.7
1947	.9	.9	1.0	.9	.8	.9	2.1	13.6	11.9	4.5	2.1	1.6	41.2
1948	1.2	.9	.9	.9	.7	.8	1.2	8.3	5.3	2.0	1.6	1.3	25.1
1949	1.0	.8	.8	.8	.7	.8	2.0	12.2	9.4	2.3	2.0	1.2	34.0
1950	1.8	1.2	1.1	1.0	.8	.9	3.1	10.1	11.1	2.4	1.6	1.2	36.3
1951	1.2	1.0	1.0	.8	.8	.8	1.0	6.1	3.5	1.6	1.1	.8	19.7
1952	.9	.8	.7	.6	.6	.8	2.8	14.1	9.4	2.0	1.7	1.0	35.4
1953	1.0	.9	.9	.9	.8	.9	1.2	3.8	5.6	1.7	1.2	.8	19.7
1954	.9	.8	.8	.7	.7	.8	2.1	5.1	1.5	1.2	.9	.9	16.4
1955	.8	.8	.6	.7	.6	.8	1.0	3.6	2.5	1.3	1.0	.7	14.4
1956	.7	.7	.7	.7	.7	.8	1.3	6.0	2.1	1.1	.9	.7	16.4
1957	.7	.7	.7	.7	.6	.7	.7	4.5	12.7	2.9	1.8	1.2	27.9
1958	1.0	.8	.7	.7	.7	.8	1.1	9.9	5.0	1.4	1.0	.8	23.9
1959	.7	.6	.7	.7	.6	.6	.9	4.7	3.4	1.2	1.0	.8	15.9
1960	.8	.6	.6	.6	.5	.6	1.3	2.7	2.4	1.0	.9	.6	12.6
1961	.7	.7	.8	.6	.5	.6	.7	3.9	2.3	.9	.8	.8	13.3
1962	.7	.7	.6	.5	.7	1.0	5.3	14.2	8.7	1.7	1.1	1.1	36.3
1963	1.0	.7	.7	.6	.6	.7	.9	3.3	2.0	.7	.6	.7	12.5
1964	.7	.6	.6	.6	.6	.6	.7	6.4	5.3	1.4	1.0	.8	19.3
1965	.8	.6	.5	.6	.7	.6	.8	6.7	14.5	3.6	2.0	1.0	32.4
1966	1.1	1.2	.9	.8	.7	.9	3.1	10.2	1.9	1.1	1.1	.9	23.9
1967	.9	.7	.7	.7	.6	.7	1.1	7.2	12.6	2.8	1.5	1.4	30.9
1968	1.2	.9	.8	.8	.7	.8	1.1	5.6	15.2	2.6	1.8	1.1	32.6
1969	1.5	.9	.8	.8	.8	.8	2.0	11.5	4.0	2.1	1.4	1.0	27.6
1970	.9	.8	.8	.7	.7	.9	.9	8.0	13.3	2.5	1.4	1.1	32.0
1971	1.1	.7	.7	.7	.8	.8	1.0	5.9	12.2	2.1	1.6	1.5	29.1
1972	1.2	.9	.9	.9	.9	1.1	1.5	6.7	3.8	1.3	1.3	1.0	21.5
1973													
1974													
1975													
1976													
1977													
1978													
1979													
1920-72 TOTAL	63.2	53.1	46.1	43.4	40.3	47.3	93.4	420.2	370.5	104.6	70.4	59.2	1411.7
MEAN	1.2	1.0	.9	.8	.7	.9	1.8	7.9	7.0	2.0	1.3	1.1	26.6
PERCENT													

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Table 7

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

CENTRAL UTAH PROJECTS OFFICE

HYDROLOGIC DATA

Title: Historical flow of Little Brush Creek below East Park Reservoir Unit:

Correlated with Past Modified flow Ashley Creek near Vernal (1950-1955 are USGS records)

(Unit: 1,000 acre-feet)

YEAR	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	TOTAL
1920	0.2	0.2	0.1	0.1	0.1	0.2	0.2	6.5	7.3	1.2	0.3	0.1	16.5
1921	.2	.2	.2	.1	.1	.3	.4	6.8	12.5	1.6	.6	.2	23.2
1922	.3	.2	.2	.2	.2	.3	.3	6.9	12.1	1.7	.8	.2	23.4
1923	.3	.3	.2	.2	.2	.3	.4	6.3	7.1	1.7	.4	.1	17.5
1924	.2	.2	.2	.1	.2	.3	.4	3.7	1.8	.9	.1		8.1
1925	.1	.1	.1	.1	.1	.2	.5	2.7	2.4	1.2	.3	.2	8.0
1926	.5	.3	.3	.1	.1	.2	1.7	4.2	1.6	1.1	.3	.1	10.5
1927	.1	.1	.1	.1	.1	.1	.3	5.4	3.7	1.4	.6	.5	12.5
1928	.5	.4	.2	.2	.2	.3	.7	7.0	2.6	1.1	.3	.1	13.6
1929	.1	.2	.1	.1	.1	.2	.3	5.6	7.6	1.5	.6	.2	16.6
1930	.4	.2	.2	.2	.2	.2	1.2	4.8	3.3	1.1	.8	.2	12.8
1931	.4	.2	.2	.2	.1	.2	.4	1.6	.5	.7	.1		4.6
1932		.1	.1	.1	.1	.2	.2	5.0	4.1	1.4	.4	.1	11.8
1933	.2	.1			.1	.1		1.6	3.2	.9	.2		6.4
1934						.1	.6	1.3	.3	.7	.1	.1	3.2
1935		.1			.1	.2	.2	2.1	6.6	1.2	.2		10.7
1936							.2	1.9	1.0	.9	.3	.1	4.4
1937	.2	.1					.2	6.5	3.4	1.4	.4	.1	12.3
1938	.1	.1				.1	.3	4.1	5.8	1.4	.4	.1	12.4
1939	.5	.3	.3	.2	.1	.3	1.5	3.5	1.1	.9	.1	.2	9.0
1940	.4	.2	.2		.1	.1	.8	3.4	1.0	.9	.1	.1	7.3
1941	.3	.2	.1	.1	.1	.2		6.3	5.1	1.3	.4	.2	14.3
1942	.6	.4	.4	.2	.1	.2	1.1	4.5	6.0	1.4	.3	.1	15.3
1943	.1	.1					1.8	3.4	2.0	1.1	.2		8.7
1944								4.7	8.9	1.6	.4	.1	15.7
1945	.1	.1				.1		3.0	3.3	1.2	.4	.1	8.3
1946	.1	.1			.1	.1	1.2	1.6	.9	.8	.1	.1	5.1
1947	.2	.2	.1	.1	.1	.1	.6	6.5	4.6	1.5	.4	.1	14.5
1948	.1	.2		.1		.1	.2	5.1	2.6	1.0	.1		9.5
1949					.1		.3	5.6	5.5	1.3	.3	.1	13.2
1950	.2	.2	.1	.1	.1	.1	.8	5.1	6.1	.9	.9	.2	14.8
1951	.1	.1				.1	.1	3.7	2.4	1.4	.2	.1	8.2
1952	.1	.1				.1	1.2	7.6	4.6	1.0	.8	.1	15.6
1953	.1	.1					.1	2.2	4.3	1.0	.2	.1	8.1
1954	.1	.1	.1				.5	3.2	.9	1.0	.1		6.0
1955								2.1	1.5	1.2	.2	.1	5.1
1956						.1	.2	4.8	2.0	1.0	.1		8.2
1957								1.1	7.9	1.4	.5	.2	11.1
1958	.1	.1		.1	.1	.1	.2	5.4	2.4	1.0	.1		9.6
1959								2.0	1.9	.9	.1		4.9
1960							.5	2.5	1.6	.8			5.4
1961								3.0	2.8	1.0	.1	.1	7.0
1962	.4	.3	.2	.1	.1	.2	2.0	5.9	5.5	1.5	.6	.1	16.9
1963	.1							3.0	1.0	7.8	.1	.1	12.1
1964								4.2	3.8	1.1	.2		9.3
1965								2.7	9.6	1.7	1.2	.2	15.4
1966							.6	4.8	1.4	.8	.1		7.7
1967								4.5	7.6	1.7	.3	.1	14.2
1968								1.6	11.2	1.3	.7	.1	14.9
1969							.2	6.9	2.8	1.2	.3		11.4
1970								4.4	6.1	1.4	.2		12.1
1971	.1							3.1	5.8	1.3	.2		10.5
1972		.1				.1	.2	4.5	3.6	1.1	.1		9.7
1973													
1974													
1975													
1976													
1977													
1978													
1979													
1920-1972 TOTAL	7.5	6.0	3.7	2.8	3.0	5.5	22.6	219.9	224.7	69.6	17.3	5.0	587.6
MEAN	.1	.1	.1	.1	.1	.1	.4	4.2	4.2	1.3	.3	.1	11.1
PERCENT													

This record includes the recorded flows from July 1949 through September 1955. For the years 1920 through June 1949 and 1956 through 1972, the flows were estimated by correlation with the past modified flow of Ashley Creek near Vernal.

Little Brush Creek near Vernal

This gaging station was established by the Geological Survey in October 1945 and operated continously through September 1952 when it was discontinued. The station was located in the SE¼ sec. 24, T. 1 S., R. 21 E., Salt Lake Meridian, 1/2 mile upstream from the Little Brush Creek cave, 3/4 mile upstream from Kane Hollow, and 17½ miles north of Vernal. The elevation of the station is 8,000 feet, and the drainage area covers approximately 28 square miles. The flow at this station is regulated by East Park Reservoir. Below the gage the water bypasses the cave and sink area in a steel pipe. Table 8 shows the present modified flow of Little Brush Creek near Vernal. This record includes the recorded flows from October 1945 through September 1952. For the years 1920 through 1944 and 1953 through 1972, the flows were estimated by correlation with the flow of Ashley Creek near Vernal.

Little Brush Creek near mouth

The gaging station was established by the Bureau of Reclamation in April 1964 and has operated continously to the present time. The station is located in the SE¼NE¼ sec. 1, T. 3 S., R. 22 E., Salt Lake Meridian, 2.2 miles upstream from Brush Creek. It is at elevation 5,720 feet. The flow at this station is regulated by East Park Reservoir. Table 9 shows the present modified flow of Little Brush Creek near mouth. This record includes the recorded flows from April 1964 through September 1969. For the years 1920 through March 1964 and 1970 through 1972, the flows were estimated by correlation with the present modified flow of Big Brush Creek near Vernal.

Brush Creek near Jensen

This gaging station was established by the Geological Survey in April 1939 and was discontinued in 1965. The station was located in the SW¼ sec. 4, T. 5 S., R. 23 E., Salt Lake Meridian, 280 feet upstream from the bridge on State Highway 149, and about 2,000 feet upstream from the mouth, and 2 3/4 miles north of Jensen. The elevation of the station is 4,730 feet, and the drainage area covers approximately 255 square miles. The records from this station were used as an indication of the unused water in Brush Creek with the present storage facilities in operation. The streamflow at this gage is affected by many diversions above the station for irrigation. Table 10 shows the historical flow of Brush Creek near Jensen from May 1939 through September 1965.

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Table 8

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

CENTRAL UTAH PROJECTS OFFICE

HYDROLOGIC DATA

Title: Present Modified Flow of Little Brush Creek near Vernal Unit:

USGS Records from 1945 through 1952. From 1920 through 1944 and 1953 through 1972 records were estimated by correlation with the historical flow of Ashley Creek near Vernal.

(Unit: 1,000 acre-feet)

YEAR	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	TOTAL
1920	0.2	0.1	0.1	0.1	0.1	0.1	0.3	9.5	8.0	0.9	0.4	0.1	19.9
1921	.2	.2	.1	.1	.1	.1	.5	10.3	14.7	1.1	.6	.4	28.4
1922	.3	.2	.1	.1	.1	.1	.5	10.5	13.6	1.1	.6	.3	27.5
1923	.2	.2	.1	.1	.1	.1	.6	9.5	7.8	1.1	.5		20.3
1924	.2	.1	.1	.1	.1	.1	.6	5.6	1.1	.7			8.7
1925	.1	.1	.1	.1	.1	.1	.7	3.9	2.0	.9	.5	.3	8.9
1926	.4	.2	.1	.1	.1	.1	1.3	6.3	.9	.8	.4		10.7
1927	.1	.1	.1	.1	.1	.1	.5	8.1	3.9	1.0	.6	.9	15.6
1928	.4	.3	.1	.1	.1	.1	.8	10.5	2.4	.9	.4		16.1
1929	.1	.1	.1	.1	.1	.1	.5	8.5	8.4	1.0	.6	.4	20.0
1930	.3	.2	.1	.1	.1	.1	1.1	7.3	3.3	.9	.6	.3	14.4
1931	.3	.2	.1	.1	.1	.1	.6	2.1		.5			4.1
1932	.1	.1	.1	.1	.1	.1	.4	7.5	4.4	1.0	.5	.2	14.6
1933	.2	.1	.1			.1	.2	2.1	3.3	.7	.2		7.0
1934							.8	1.4		.5			2.7
1935	.1	.1	.1	.1	.1	.1	.3	3.0	7.1	.9	.3		12.2
1936							.4	2.9		.7	.4	.1	4.5
1937	.1	.1					.4	9.8	3.4	1.0	.5	.1	15.4
1938	.1	.1				.1	.5	6.1	6.4	1.0	.5	.2	15.0
1939	.4	.2	.1	.1	.1	.1	1.2	5.2	.1	.7		.3	8.5
1940	.3	.2	.1	.1	.1	.1	.9	5.1		.7			7.6
1941	.2	.2	.1	.1	.1	.1	.2	9.5	5.6	1.0	.6	.4	18.1
1942	.5	.3	.1	.1	.1	.1	1.1	6.8	6.6	1.1	.6	.2	17.6
1943	.1	.1					1.3	4.8	1.4	1.0	.6		9.3
1944	.1	.1					.1	7.0	9.7	1.1	.7	.1	18.9
1945	.1	.2	.1	.1		.1	.3	4.6	2.2	1.0	.5	.3	9.5
1946	.3	.1	.1	.1	.1	.1	.6	1.9	.9	.8	.4	.1	5.5
1947	.1	.1	.1	.1			.2	11.2	6.1	1.6	.6	.5	20.6
1948	.1	.1	.1				.3	7.1	2.0	.5	.4	.2	10.8
1949	.1						.6	8.7	4.0	.7	.8	.1	15.0
1950	.2	.2	.1	.1	.1	.1	1.0	8.1	7.6	1.1	1.0	.2	19.8
1951	.1	.1	.1			.1	.1	4.4	2.5	1.6	.3	.1	9.4
1952	.1					.1	1.5	9.9	5.3	1.1	.8	.1	18.9
1953	.2	.1	.1	.1	.1	.1	.3	2.1	4.0	1.0	.5		8.6
1954		.1	.1	.1			.8	5.6		.7	.1		7.5
1955	.1	.1					.1	4.6	1.5	.8	.2		7.4
1956	.1	.1					.4	7.2	1.5	.9	.2		10.4
1957								1.0	8.8	1.1	.7	.3	11.9
1958	.2	.1	.1	.1	.1	.1	.4	8.2	2.0	.9	.4		12.6
1959							.1	2.7	1.5	.8	.1		5.2
1960	.1						.7	3.6	1.2	.8			6.4
1961								4.5	2.6	.9	.4	.3	8.7
1962	.3	.2	.1	.1	.1	.1	1.4	9.0	6.0	1.1	.6	.2	19.2
1963	.1							4.4		.9			5.4
1964	.1							6.3	3.9	.9	.4		11.6
1965	.1							4.0	10.7	1.1	.7	.4	17.0
1966	.2	.1					.8	7.2	21.4	.8	.2		30.7
1967							.1	6.8	8.4	1.1	.7	.1	17.2
1968	.2							1.9	12.2	1.0	.7	.2	16.2
1969	.2						.3	10.5	2.8	1.0	.6	.1	15.5
1970	.1							6.8	6.7	1.1	.6	.2	15.5
1971	.1							4.6	6.4	1.0	.2	.1	12.4
1972	.1	.1	.1			.1	.4	6.9	3.7	.9	.1		12.4
1973													
1974													
1975													
1976													
1977													
1978													
1979													
1920-1972 TOTAL	8.3	5.3	3.0	2.6	2.3	2.9	26.2	327.1	250.0	49.5	22.3	7.8	707.3
MEAN	.16	.10	.06	.05	.04	.05	.49	6.17	4.72	.93	.42	.15	13.34
PERCENT													

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REV. NOV. 1970

Table 9

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

CENTRAL UTAH PROJECTS OFFICE

HYDROLOGIC DATA

Title: Present Modified Flow of Little Brush Creek near mouth Unit:

April 1964-1969 Measured with USBR Recorder, 1920 - March 1964 and 1970-72 correlated with present modified flow of Big Brush Creek near Vernal

(Unit: 1,000 acre-feet)

YEAR	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	TOTAL
1920	0.3	0.2	0.3	0.3	0.4	0.3	0.2	0.9	0.9	0.9	0.5	0.4	5.6
1921	.3	.2	.4	.4	.4	.4	.3	.9	1.0	1.1	.8	.8	7.0
1922	.3	.2	.4	.4	.4	.4	.3	.9	1.0	1.1	.8	.7	6.9
1923	.3	.3	.4	.4	.4	.4	.3	.9	.9	1.2	.7	.3	6.5
1924	.3	.2	.4	.4	.4	.4	.3	.3	.5	.8	.2	.2	4.4
1925	.1	.2	.3	.3	.4	.4	.3	.1	.6	.9	.6	.7	4.9
1926	.3	.3	.4	.4	.4	.4	.5	.4	.5	.9	.5	.3	5.3
1927	.1	.2	.3	.3	.3	.3	.3	.7	.7	1.1	.9	1.2	6.4
1928	.3	.3	.4	.4	.4	.4	.4	.9	.6	.9	.5	.3	5.8
1929	.2	.2	.3	.4	.4	.4	.3	.8	.9	1.1	.9	.9	6.8
1930	.3	.3	.4	.4	.4	.4	.5	.6	.7	.9	.9	.7	6.5
1931	.3	.2	.3	.4	.4	.4	.3	.1	.4	.6	.1	.1	3.6
1932		.1	.3	.3	.4	.3	.2	.6	.8	1.0	.7	.5	5.2
1933	.3	.2	.3	.3	.3	.3	.2	.1	.7	.8	.3	.1	3.9
1934		.1	.3	.2	.3	.3	.4	.1	.3	.6	.2	.2	3.0
1935		.2	.3	.3	.3	.3	.2	.1	.9	.9	.4	.2	4.1
1936		.1	.3	.2	.3	.2	.3	.1	.4	.7	.4	.4	3.4
1937	.2	.2	.3	.2	.3	.2	.3	.9	.7	1.0	.7	.4	5.4
1938	.2	.2	.3	.2	.3	.3	.3	.4	.9	1.0	.7	.5	5.3
1939	.3	.3	.4	.4	.4	.4	.5	.7	.5	.7	.1	.3	5.0
1940	.1	.1	.3	.2	.3	.2	.4	.3	.4	.7		.1	3.1
1941		.1	.2	.2	.2	.2	.2	.8	.9	.9	.6	.7	5.0
1942	.3	.4	.4	.4	.4	.4	.5	.6	.9	1.0	.9	.4	6.6
1943	.2	.2	.3	.3	.3	.3	.5	.1	.6	.8	.3	.2	4.1
1944	.1	.1	.3	.2	.3	.3	.2	.6	.9	1.1	.9	.6	5.6
1945	.2	.2	.3	.3	.3	.3	.2	.2	.7	.9	.4	.3	4.3
1946	.2	.2	.3	.3	.3	.3	.4	.1	.5	.7	.3	.1	3.7
1947	.1	.2	.3	.3	.3	.3	.4	.9	.9	1.1	1.2	.8	6.8
1948	.2	.2	.3	.3	.3	.3	.2	.4	.7	.9	.8	.5	5.1
1949	.1	.1	.3	.3	.3	.3	.3	.9	.8	1.0	1.2	.4	6.0
1950	.3	.2	.3	.4	.3	.3	.5	.7	.9	1.0	.8	.4	6.1
1951	.2	.2	.3	.3	.3	.3	.2	.2	.6	.9	.3	.1	3.9
1952	.1	.1	.3	.1	.2	.3	.4	.9	.8	.9	.9	.3	5.3
1953	.1	.2	.3	.3	.3	.3	.2	.1	.7	.9	.4	.1	3.9
1954	.1	.1	.3	.2	.3	.3	.4	.1	.5	.8	.2	.2	3.5
1955		.1	.2	.2	.2	.3	.2	.1	.6	.8	.2		2.9
1956		.1	.3	.2	.3	.3	.2	.2	.6	.7	.2		3.1
1957		.1	.3	.2	.2	.2	.1	.1	.9	1.1	.9	.5	4.6
1958	.1	.1	.3	.2	.3	.3	.2	.6	.7	.8	.3	.1	4.0
1959		.1	.3	.2	.2	.2	.2	.1	.6	.8	.3	.1	3.1
1960		.1	.2	.1	.1	.2	.2	.1	.5	.7	.2		2.4
1961		.1	.3	.1	.1	.2	.1	.1	.5	.7	.1	.1	2.4
1962		.1	.2	.1	.3	.3	.5	.9	.8	.9	.3	.3	4.7
1963	.1	.1	.3	.1	.1	.2	.1	.1	.5	.6			2.2
1964		.1	.2	.1	.1	.2	.1	.1	.9	.8	.3	.1	3.0
1965	.1	.1	.2	.1	.2	.2	.2	.2	.4	.7	1.0	.8	4.2
1966	.4	.2	.3	.3	.3	.3	.2	.7	.5	.6	.2	.2	4.2
1967	.2	.2	.3	.3	.2	.3	.2	.1	.1	.3	.3	.1	2.6
1968					.1	.1	.1	.5	.5	.5	.8	.1	2.7
1969	.1	.1	.2	.1	.2	.3	.5	.5	.8	.6	.3	.2	3.9
1970	.1	.1	.3	.2	.3	.3	.2	.4	.9	.5	.5	.3	4.1
1971	.2	.1	.3	.2	.3	.3	.2	.2	.9	.9	.7	.7	5.0
1972	.3	.2	.3	.3	.4	.4	.3	.2	.6	.8	.4	.3	4.5
1973													
1974													
1975													
1976													
1977													
1978													
1979													
1920-1972 TOTAL	8.0	8.8	15.8	13.7	15.6	15.9	15.2	22.6	36.0	44.6	27.1	18.3	241.6
MEAN	.2	.2	.3	.3	.3	.3	.3	.4	.7	.8	.5	.3	4.6
PERCENT													

418-1
REV. DEC. 1960

Table 10

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

CENTRAL UTAH PROJECTS OFFICE

HYDROLOGIC DATA

Title: Historical flow of Brush Creek near Jensen, Utah. Unit:

USGS Records Records discontinued September 1965

Unit: 1,000 acre-feet

YEAR	OCT.	NOV.	DEC.	JAN.	FEB	MAR	APR.	MAY	JUNE	JULY	AUG	SEPT.	TOTAL
1920													
1921													
1922													
1923													
1924													
1925													
1926													
1927													
1928													
1929													
1930													
1931													
1932													
1933													
1934													
1935													
1936													
1937													
1938													
1939								5.6				0.1	
1940		0.1	0.1	0.1	0.1	0.1	0.3	2.9					3.7
1941		.4	.8	.8	1.0	.5	.3	7.6	7.0		1.3	1.3	21.0
1942	3.5	2.5	1.8	1.5	1.3	1.6	5.1	6.4	6.6	0.3			30.6
1943		.8	1.6	1.4	1.3	1.1	1.5	.7	1.7		.1	.1	10.3
1944	.2	.1	.9	.9	.8	1.3	1.1	12.4	11.9	.8			30.4
1945	.1	.4	1.0	1.0	.9	.7	.3	3.2	3.6		.1		11.3
1946	.3	.7	.8	.8	.7	.8	1.4	.1			.1		5.7
1947	.6	.8	1.2	1.2	1.1	1.3	1.1	9.5	10.3	1.6	1.2	.2	30.1
1948	.2	.6	1.0	.9	1.0	1.4	1.2	3.8	1.7	.1	.1		12.0
1949	.2	.3	.7	.9	.9	1.4	1.3	7.2	5.8	.1		.1	18.9
1950	.8	.7	.9	.8	.6	1.1	3.7	7.2	6.7	.1		.2	22.8
1951	.1	.5	1.0	.9	.8	.6		2.7	.8		.1	.1	7.6
1952	.2	.6	1.0	.8	.8	1.4	5.9	11.5	5.5				27.7
1953	.1	.5	1.0	1.0	.9	1.2	.1	1.0	1.7			.1	7.6
1954		.6	.9	.9	.6	.4	.2	1.3	.1			.1	5.1
1955	.3	.2	.7	.8	.8	1.2	.4	.3					4.7
1956		.3	.7	.8	.7	1.0	.1	1.3					4.9
1957		.2	.7	.7	.8	.8	.2	.5	8.1	.3	.1		12.4
1958	.2	.8	.8	.9	1.0	.6	.4	4.0	1.3				10.0
1959	.1	.1	.5	.6	.8	.3					.1	.3	2.8
1960	.3	.2	.6	.6	.6	1.0	.2	.2			.3		4.0
1961	.2	.3	.6	.9	.8	.3		.4	.1			.7	4.3
1962	1.2	.6	.7	.6	2.1	4.3	6.7	10.4	4.2			.1	30.9
1963	.1	.2	.5	.8	.8	.2		.1					2.7
1964			.6	.7	.7	.6	.1	2.9	1.9				7.5
1965		.3	.8	.8	.7	.9	.8	3.0	10.6	.9	.2	.6	19.6
1940-65 TOTAL	8.7	12.8	21.9	22.1	22.6	26.1	32.4	100.6	89.6	4.2	3.7	3.9	348.6
MEAN	.3	.5	.8	.9	.9	1.0	1.2	3.9	3.4	.2	.1	.2	13.4
PERCENT													

INTERIOR - RECLAMATION SLC UTAH

Green River near Jensen

The gaging station was established by the Geological Survey in October 1903 and fragmentary records are available through December 1915 when it was discontinued. It was reestablished in October 1946 and has operated continously to the present time. The station is located in the SW¼SE¼ sec. 5, T. 5 S., R. 24 E., Salt Lake Meridian, 1 mile downstream from Cub Creek and Chew Ranch, 4 miles southeast of Dinosaur National Monument, 6½ miles north of Jensen, and 12 miles upstream from Brush Creek. The elevation of the station is 4,760 feet, and the drainage area covers approximately 25,400 square miles. The records from this station were used to demonstrate the available water supply at the Burns Pumping Plant. The streamflow at this gage is affected by diversions above the station for irrigation. The flow has been regulated by Flaming Gorge Reservoir since November 1, 1962. Table 11 shows the historical flow of Green River near Jensen from October 1946 through September 1972.

Quality of Water

Big Brush and Little Brush Creek are typical mountain streams that contain water of excellent chemical quality. Water samples taken in the upper reaches of the streams show a low dissolved solids concentration of calcium bicarbonate water. The water at Tyzack Reservoir, with conventional treatment, should be suitable for all intended uses. The dissolved solids concentration increases downstream. Although the sodium increases, it never presents a hazard to the use of water on project lands. The quality of water which will be pumped from the Green River for use in the Jensen Unit is good and will likewise present no hazard to the project lands. Appraisals of the suitability of water for irrigation were made assuming the project lands would be adequately drained to maintain their classification. Tables 12 through 19 summarize the quality of water data collected in the Jensen area. A table showing the number of samples collected at each station is as follows.

Quality of water samples collected

Sampling station	Number of samples
Big Brush Creek at Ratliff Reservoir site	24
Big Brush Creek near Vernal	64
Little Brush Creek near mouth	31
Brush Creek above Burns Bench Canal heading	53
Unnamed Drain #1 near mouth, southwest of Jensen	20
Unnamed Drain #2 near mouth, southwest of Jensen	15
Brush Creek near Jensen	54
Green River near Jensen	43

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REV. NOV. 1970

Table 11

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

CENTRAL UTAH PROJECTS OFFICE

HYDROLOGIC DATA

Title: Historical flow of Green River near Jensen Unit:

USGS Records 1947 - Present

(Unit: 1,000 acre-feet)

YEAR	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	TOTAL
1920													
1921													
1922													
1923													
1924													
1925													
1926													
1927													
1928													
1929													
1930													
1931													
1932													
1933													
1934													
1935													
1936													
1937													
1938													
1939													
1940													
1941													
1942													
1943													
1944													
1945													
1946													
1947	98	89	85	51	68	306	358	1,126	1,011	509	246	110	4,057
1948	117	100	92	84	83	195	428	889	759	184	86	43	3,060
1949	59	56	54	52	56	159	406	940	1,079	372	111	64	3,408
1950	119	106	64	77	72	208	531	843	1,202	577	193	105	4,097
1951	101	107	91	70	95	147	344	788	1,033	502	275	120	3,673
1952	138	83	74	71	74	91	773	1,421	1,199	327	178	93	4,522
1953	69	58	55	73	73	126	198	421	936	281	143	59	2,492
1954	53	67	56	53	73	115	255	572	332	307	101	72	2,056
1955	77	72	33	37	40	102	271	562	540	178	112	50	2,074
1956	51	55	77	80	50	272	454	918	992	252	142	61	3,404
1957	60	62	47	47	65	141	264	854	1,573	906	236	122	4,377
1958	122	102	75	68	102	153	356	1,103	805	141	75	54	3,156
1959	58	60	62	47	55	105	199	438	696	260	127	87	2,194
1960	123	102	56	50	52	272	467	492	554	129	57	38	2,392
1961	64	77	46	46	48	115	161	354	472	94	62	94	1,633
1962	148	103	71	63	260	273	914	1,050	820	451	144	58	4,355
1963	68	35	32	46	63	58	121	339	204	31	28	30	1,055
1964	21	38	64	74	76	63	147	538	486	255	147	143	2,052
1965	168	158	214	259	247	272	413	598	695	237	104	109	3,474
1966	150	161	159	112	104	246	322	418	257	131	134	133	2,327
1967	154	114	136	163	122	144	219	463	676	319	219	204	2,933
1968	222	205	221	218	153	135	227	617	782	344	257	202	3,583
1969	180	182	183	222	263	238	488	720	427	270	232	203	3,608
1970	182	171	229	150	119	141	234	795	742	303	175	146	3,387
1971	119	112	120	153	99	159	424	650	783	285	170	152	3,226
1972	141	195	222	192	213	221	293	595	594	219	179	78	3,142
1973													
1974													
1975													
1976													
1977													
1978													
1979													
1947-1972 TOTAL	2,862	2,670	2,618	2,558	2,725	4,457	9,267	18,504	19,649	7,864	3,933	2,630	79,737
MEAN	110	103	101	98	105	171	356	712	756	303	151	101	3,067
PERCENT													

Table 12

QUALITY OF WATER

Sampling Site Location Big Brush Creek at Ratliff Reservoir Site

Lab. No.	Field No.	Sampling Date	ECx10⁶ @ 25° C	pH	Total dissolved salts p.p.m.	Boron p.p.m.	% Sodium	Sodium Adsorption Ratio	Residual Carbonates me/l	(CFS) or Est. Flow (CFS)	Equivalents per million or milliequivalents per liter							
											Cations				Anions			
											Ca	Mg	Na	K	CO_3	HCO_3	Cl	SO_4
2784	1	4-29-65	412	8.5	255		4.3	.1	None	22	2.53	1.71	.19	.02	.21	2.44	.07	1.73
2956	2	5-28-65	171	7.8	121		5.8	.1	"	110	1.18	.42	.10	.02	None	1.24	.03	.45
3424	3	6-25-65	110	8.2	76		6.7	.1	"	215	.76	.34	.08	.02	"	.75	None	.45
3776	4	7-23-65	291	8.5	170		3.9	.1	"	27	1.98	.97	.12	.02	.15	1.99	.05	.90
3990	5	8-30-65	380	8.2	233		4.1	.1	"	40	3.93		.17	.03	None	2.66	.11	1.36
4217	6	10-5-65	370	8.5	228		4.8	.1	"	E 10	3.88		.20	.06	.16	2.03	.07	1.88
4604	7	10-27-5	371	8.5	226		4.8	.1	"	E 10	3.79		.19	.02	.13	2.39	.06	1.42
200	8	1-26-66	438	8.0	271		4.7	.1	"	E 10	4.43		.22	.03	None	2.57	.07	2.04
526	9	3-23-66	524	8.2	360		4.2	.1	"	E 7	5.47		.24	.03	"	3.07	.01	2.66
593	10	4-28-66	112	7.8	87		4.1	.1	"	E 25	1.38		.06	.03	"	1.29	.06	.12
905	11	5-26-66	99	7.3	66		3.6	.1	"	E 30	.70	.34	.04	.02	"	.88	.01	.21
1258	12	6-30-66	295	7.8	175		3.3	.1	"	E 8	2.14	.80	.10	.02	"	2.79	.03	.24
1259	13	7-28-66	342	7.9	207		3.4	.1	"	E 6	2.37	.97	.12	.03	"	2.80	.05	.64
1549	14	9-2-66	272	7.9	144		2.3	.1	None	E 10	1.80	1.03	.07	.02	None	2.63	.04	.35
1722	15	10-27-6	300	8.3	167		2.1	.1	"	E 12	2.10	1.24	.07	.01	.04	2.97	.08	.33
2561		10-3-66	180	8.4	93		4.3	.1	"	E 12	.86	1.10	.09	.02	.04	1.56	.03	.44
2009	16	1-1-67	312	8.2	183		2.8	.1	"	E 8	2.12	1.00	.09	.02	None	2.41	.09	.73
2343	17	4-5-67	312	8.2	177		3.1	.1	"	E 8	2.22	1.20	.11	.01	"	3.21	.05	.28
2441	18	4-28-67	231	8.1	142		2.3	.1	"	E 15	1.70	.88	.06	.02	"	2.25	.04	.37
2628	19	5-27-67	76	7.5	79		2.3	.03	"	E 125	.60	.22	.02	.02	"	.66	.03	.17
2868	20	6-30-67	117	7.5	85		6.1	.1	"	E 50	.88	.35	.08	.01	"	1.08	.02	.22
3032	21	7-28-67	231	7.7	127		3.0	.1	"	E 15	1.73	.85	.08	.02	"	2.34	.01	.33
3033	22	9-1-67	243	7.9	133		3.2	.1	"	E 20	1.77	.94	.09	.02	"	2.43	.02	.37
3420	23	11-6-67	304	8.4	181		2.7	.1	"	E 10	2.17	1.11	.09	.02	.15	3.04	.05	.15
3628	24	2-2-68	336	8.0	205		2.0	0.6	"	E 8	2.42	1.41	.08	.02	None	3.36	.05	.52
Equivalent Weights											20.0	12.2	23.0	39.1	30.0	61.0	35.5	48.0

Table 13

QUALITY OF WATER

Sampling Site Location Big Brush Creek near Vernal

Lab No	Field No	Sampling Date	EC x 10^6 @ 25° C	pH	Total dissolved salts ppm	Boron ppm	% Sodium	Sodium Adsorption Ratio	Residual Carbonates me/l	CFS E.F.	Equivalents per million or milliequivalents per liter							
											Cations				Anions			
											Ca	Mg	Na	K	CO_3	HCO_3	Cl	SO_4
50	2	9-26-55	468	8.4	278	0	3.1		0		3.18	2.79	.19	.03	.65	2.82	.10	2.62
86	3	5-24-56	133	8.2	108	0	6.5	.3	0		1.00	.28	.09	.02	0	.88	0	.51
115	4	7-9-56	395	8.4	218	.08	4.3	.1	0		2.11	1.20	.15	.03	.16	2.69	.01	.63
124	5	8-7-56	404	8.2	246	.05	3.7	.1	0		2.64	1.25	.15	.03	0	3.02	.03	1.02
159	6	9-17-56	527	7.9	324	.05	3.3	.1	0		3.22	1.68	.17	.03	.22	3.19	.05	1.64
168	7	10-19-6	483	8.3	322	.05	3.2	.1	0		3.26	1.68	.17	.14	.46	3.27	.09	1.43
220	8	2-4-57	475	8.4	298	.02	2.5	.1	0		3.27	1.84	.13	.03	.07	3.84	.71	1.25
242	9	3-12-57	462	8.4	292	.02	4.7	.2	0		3.12	1.88	.25	.03	0	3.69	.59	1.00
287	10	4-11-57	392	8.4	227	0	4.7	.1	0		2.05	1.82	.19	.02	0	2.80	.15	1.13
CU 288	11	5-21-57	162	7.9	105													
289	12	6-18-57	131	8.3	102	0	3.1	.05	0		1.02	.22	.04	.02	0	.76	0	.54
382	13	7-19-57	308	8.6	183	0	3.7	.1	0		1.85	.98	.11	.03	.33	2.07	.03	.54
CU 383	14	8-14-57	290	8.6	172													
489	15	10-7-57	391	8.4	241	.02	3.5	.1	0		2.49	1.33	.14	.03	.28	2.65	.06	1.00
490	16	10-31-7	377	8.2	230													
523	17	2-11-58	338	8.4	176	0	3.9	.1	0		1.74	1.94	.15	.02	.24	2.26	.10	1.25
613	18	4-21-58	376	8.2	220	0	3.7	.1	0		2.51	1.42	.15	.02	.20	2.94	.04	.92
614	19	5-27-58	137	7.7	87	0	5.0	.1	0		.92	.41	.07	.01	0	.99	0	.42
615	20	6-30-58	355	7.8	203	0	4.5	.1	0		2.47	1.08	.17	.03	0	2.44	0	1.31
729	21	9-3-58	403	8.4	323	0	4.1	.1	0		2.59	1.33	.17	.03	.32	2.41	.02	1.37
751	22	10-28-8	365	8.2	235	.13	3.4	.1	0		2.08	1.53	.13	.04	.18	2.63	.01	.96
803	23	2-3-59	341	8.3	204								.12					
821	24	4-13-59	376	8.3	211	.01	3.9	.1	0		2.88	1.66	.16	.03	.21	2.95	.07	.90
822	25	5-8-59	186	8.1	115													
873	26	6-3-59	119	8.1	87	.01	6.1	.1			.79	.42	.08	.02	0	.89	.03	.39
CU 821	27	7-8-59	376	8.3	211	.01	3.9	.1	0		2.28	1.66	.16	.03	.21	2.95	.02	.90
1054	28	7-30-59	307	7.7	188	.10	3.7	.1	0		2.01	1.08	.12	.02	0	2.51	.04	.68
1055	29	9-1-59	394	7.9	243													
1056	30	9-28-59	396	7.8	255	.10	3.3	.1	0		2.58	1.45	.14	.03	0	3.03	.08	1.09
1157	31	10-29-9	452	7.9	276		2.7	.1	0		3.02	1.56	.13	.03	.18	3.03	.06	1.47
1220	32	1-28-60	444	8.3	254		2.7	.1	0		2.92	1.69	.13	.02	.28	3.38	.06	1.04
1246	33	4-14-60	264	8.5	159		3.3	.1	0		1.64	.98	.09	.02	.08	1.97	.02	.66
216	34	4-1-64	555	8.4	377		4.7	.2	None		3.82	2.20	.30	.03	.35	3.04	.14	2.82
483	35	4-28-64	597	8.1	421		4.6	.2	None	E 10	4.06	2.34	.31	.02	None	3.69	.12	2.92
484	36	5-12-64	480	8.3	322		5.1	.2	None	E 6	3.20	1.84	.27	.02	.18	2.73	.08	2.34
720	37	5-27-64	152	8.0	85		6.9	.1	"	E130	1.26	.21	.11	.01	None	.89	.01	.69
907	38	6-25-64	194	8.4	144		4.8	.1	"	E 20	1.39	.56	.10	.02	.08	1.10	.01	.88
1028	39	7-8-64	318	8.6	186		4.6	.1	"	E 10	2.33	.98	.16	.01	.33	1.86	.03	1.26
									Equivalent Weights		200	12.2	23.0	39.1	30.0	61.0	35.5	48.0

Table 13 (Continued)

QUALITY OF WATER

Sampling Site Location Big Brush Creek near Vernal

Lab. No.	Field No.	Sampling Date	EC x 10^6 @ 25° C	pH	Total dissolved salts ppm	Boron ppm	% Sodium	Sodium Adsorption Ratio	Residual Carbonates me/l	CFS E.F.	Equivalents per million or milliequivalents per liter							
											Cations				Anions			
											Ca	Mg	Na	K	CO_3	HCO_3	Cl	SO_4
1192	40	8-5-64	410	8.2	248		5.0	.2	"	T.	2.89	1.31	.22	.02	None	2.85	.08	1.51
1457	41	8-26-64	431	8.6	275		5.0	.2	"	E 5	2.85	1.67	.24	.03	.19	2.21	.10	2.29
1682	42	9-30-64	417	8.5	271		4.1	.1	"	E 10	2.76	1.67	.19	.02	.27	2.38	.08	1.91
1882	43	10-28-4	417	8.6	268		4.7	.1	"	E 10	2.75	1.68	.22	.02	.35	2.60	.12	1.60
2249	44	2-4-65	426	8.5	304		7.0	0.2	"	E 10	2.03	2.15	0.32	0.04	0.18	1.75	0.09	2.52
2782	45	4-29-65	426	8.4	280		4.9	.2	"	E 15	2.68	1.72	.23	.03	.23	1.15	.04	3.24
2957	46	5-28-65	171	8.0	123		5.6	.1	"	E 75	1.23	.43	.10	.02	None	1.23	.02	.53
3423	47	6-29-65	148	8.2	98		7.1	.1	"	E100	1.04	.37	.11	.02	"	1.01	.08	.45
3772	48	7-23-65	337	8.1	208		4.0	.1	"	E 15	2.43	.89	.14	.02	"	2.23	.03	1.23
3986	49	8-30-65	380	8.5	238		4.7	.1	"	E 15	4.01		.20	.04	.20	2.48	.12	1.45
4213	50	10-5-65	406	8.5	259		6.0	.2	"	E 10	4.08		.22	.06	.16	2.38	.08	1.74
4600	51	10-27-65	398	8.6	235		4.7	.1	"	E 10	4.06		.20	.02	.23	2.52	.02	1.51
196	52	1-26-66	500	8.3	313		4.2	.1	"	E 10	5.19		.23	.03	.13	3.15	.10	2.07
522	53	3-23-66	526	8.0	364		3.9	.1	"	E 7	5.71		.23	.03	None	3.02	.20	2.75
2341	54	4-5-67	738	8.0	563		5.6	.2	"	25	5.30	2.89	.49	.06	"	2.95	.16	5.63
2439	55	4-28-67	593	7.9	433		4.5	.2	"	37	4.40	2.08	.31	.06	"	2.52	.09	4.24
2626	56	5-27-67	151	7.5	122		1.7	.03	"	192	1.21	.50	.03	.03	"	.89	.02	.86
2866	57	6-30-67	224	7.7	156		4.3	.1	"	E 50	1.73	.49	.10	.02	"	1.21	.02	1.11
3028	58	7-28-67	473	8.4	332		3.9	.1	"	E 15	3.57	1.63	.21	.04	.12	2.34	.10	2.89
3029	59	9-1-67	443	7.9	297		4.2	.1	"	E 24	3.29	1.46	.21	.04	None	2.46	.08	2.46
3418	60	11-6-67	526	8.3	362		5.1	.2	"	E 12	3.53	2.02	.30	.03	.23	2.97	.06	2.62
3626	61	2-2-68	643	8.0	480		4.0	.2	"	E 9	4.72	2.61	.31	.03	None	3.40	.10	4.17
4251	62	5-8-68	306	8.0	183		4.2	.1	"	E 40	2.14	1.28	.15	.03	"	2.14	.05	1.41
4030	63	6-4-68	134	7.5	105		1.4	.02	"	E 19	1.03	.34	.02	.02	"	.97	.01	.43
4252	64	7-1-68	200	7.7	114		2.9	.06	None	E 50	1.42	.92	.07	.02	None	1.54	.03	.86
4634	65	8-2-68	309	8.2	185		2.6	.07	"	E 19	2.14	1.18	.09	.02	"	2.49	.04	.90
5357	66	9-6-68	349	8.4	221		2.9	.1	"	15	2.40	1.56	.12	.02	.12	2.56	.03	1.39
5358	67	10-2-68	301	8.1	187		3.5	.1	"	12	2.10	1.16	.12	.02	None	2.37	.02	1.01
5507	68	11-5-68	401	8.3	247		3.7	.1	"	9	2.80	1.58	.17	.02	.06	3.08	.03	1.40
										Equivalent Weights	20.0	12.2	23.0	39.1	30.0	61.0	35.5	48.0

Table 13 (continued)

QUALITY OF WATER

Sampling Site Location Big Brush Creek near Vernal

Lab. No.	Field No.	Sampling Date	ECx 10^6 @ 25°C	pH	Total dissolved salts p.p.m.	Boron p.p.m.	% Sodium	Sodium Adsorption Ratio	Residual Carbonates me/l	Flow c.f.s.	Equivalents per million or milliequivalents per liter							
											Cations				Anions			
											Ca	Mg	Na	K	CO_3	HCO_3	Cl	SO_4
5758	69	2/10/69	420	8.2	253		4.3	0.1	None	14	2.80	1.82	0.21	0.03	None	3.42	0.12	1.32
6585	70	7/1/69	184	7.9	110		4.0	.1	None	55	1.28	.62	.08	.02	None	1.54	.01	.45
6586	71	8/1/69	296	8.0	180		3.6	.1	None	28	2.06	1.08	.12	.03	None	2.35	.05	.89
6787	72	9/3/69	357	8.3	236		5.1	.1	None	21	2.49	1.25	.20	.02	0.19	2.40	.08	1.29
7513	73	10/1/69	464	8.1	324		5.1	.2	None	14	2.74	2.04	.26	.04	None	1.76	.05	3.27
7367	74	2/3/70	534	8.1	450		5.4	.2	None	12	3.18	2.39	.32	.05	None	1.57	.09	4.28
7514	75	4/2/70	573	7.9	397		4.5	.2	None	14	3.78	2.39	.29	.04	None	2.86	.10	3.54
8566	76	9/1/70	417	8.5	294		4.2	.1	None	21	3.08	1.49	.20	.04	.18	2.16	.05	2.42
8906	77	10/1/70	465	8.4	302		3.6	.1	None	19	3.26	1.75	.19	.03	.12	2.40	.09	2.62
8996	78	11/4/70	615	8.2	440		3.6	.1	None	13	4.58	2.39	.26	.04	None	3.30	.06	3.74
9216	79	2/8/71	623	8.0	423		4.5	.2	None	13	4.25	2.55	.32	.04	None	3.16	.13	3.68
9398	80	4/1/71	508	8.2	344		4.5	.2	None	14	3.22	2.33	.26	.03	None	2.85	.10	2.72
9504	81	5/4/71	324	8.3	215		4.1	.1	None	45	2.31	1.13	.15	.03	.18	2.07	.10	1.27
9795	82	6/2/71	116	7.7	89		7.1	.1	None	201	.93	.22	.09	.03	None	.89	.02	.39
9882	83	6/30/71	185	8.1	128		5.6	.1	None	75	1.26	.55	.11	.03	None	1.31	.04	.60
10057	84	8/2/71	333	8.2	195		5.0	.1	None	27	2.27	1.14	.18	.03	None	2.34	.06	1.22
10324	85	9/1/71	413	8.3	289		6.9	.2	None	26	2.83	1.46	.32	.05	.11	2.16	.13	2.26
10950	86	12/1/71	598	8.2	405		5.2	.2	None	15	4.27	2.25	.36	.04	None	3.57	.14	3.03
11111	87	2/3/72	514	8.1	360		4.1	.1	None	13	3.28	2.25	.24	.03	None	2.98	.11	2.60
11809	88	5/11/72	213	7.8	149		5.0	.1	None	87	1.49	.58	.11	.03	None	1.33	.04	.84
11851	89	6/1/72	133	7.7	92		3.7	.1	None	140	.94	.34	.05	.03	None	.87	.02	.46
12284	90	7/26/72	434	8.3	287		5.0	.2	None	22	2.78	1.55	.23	.03	.12	2.46	.08	1.97
12529	91	8/9/72	452	8.4	305		4.5	.1	None	20	2.96	1.64	.22	.04	.17	2.21	.07	2.52
783	92	4/24/73	688	8.1	482		6.9	.3	None		4.40	2.40	.51	.06	None	2.80	.16	4.60
924	93	5/21/73	188	7.7	142		3.6	.1	None		1.40	.43	.07	.04	None	1.33	.01	.55
1098	94	6/11/73	122	7.9	89		4.1	.1	None		.86	.27	.05	.03	None	.84	None	.37
									Equivalent Weights		20.0	12.2	23.0	39.1	30.0	61.0	35.5	48.0

Table 14

QUALITY OF WATER

Sampling Site Location Little Brush Creek near Mouth

Lab. No.	Field No.	Sampling Date	EC x 10^6 @ 25° C	pH	Total dis-solved salts p.p.m.	Boron p.p.m.	% Sodium	Sodium Adsorp-tion Ratio	Residual Carbon-ates me/l	CFS or Est. Flow	Equivalents per million or milliequivalents per liter							
											Cations				Anions			
											Ca	Mg	Na	K	CO_3	HCO_3	Cl	SO_4
	1																	
487	2	4-1-64	1070	7.9	737		4.0	.2	None	E-3	8.59	3.91	.52	.06	None	3.60	.22	19.26
488	3	5-12-64	1700	7.8	1452		4.9	.3	"	1	13.32	7.94	1.12	.13	"	5.14	.24	17.63
723	4	5-27-64	1820	7.7	1660		5.9	.4	"	1	13.88	8.13	1.40	.12	"	3.23	.33	19.97
909	5	6-25-64	366	8.3	271		4.9	.1	"	14	2.58	1.05	.19	.03	.09	1.48	.03	2.25
1031	6	7-8-64	349	8.3	216		4.5	.1	"	15	2.52	.88	.16	.02	.06	1.44	.03	2.05
1194	7	8-5-64	421	7.6	270		4.0	.1	"	14	3.11	1.20	.18	.04	None	1.89	.06	2.58
1460	8	8-26-64	1610	8.4	1410		5.7	.4	"	11	12.06	7.58	1.20	.12	.12	1.54	.33	18.97
1683	9	9-30-64	1680	7.9	1490		5.9	.4	"	1	12.82	7.76	1.29	.13	None	2.05	.43	19.52
1885	10	10-24-4	1710	8.2	1540		5.7	.4	"	1	13.53	8.02	1.31	.13	"	3.09	.39	19.51
2250	11	1-27-65	1250	8.0	1020		4.3	0.2	"	2	9.61	4.67	0.64	0.08	"	4.06	0.24	10.70
2786	12	4-29-65	933	8.2	730		5.6	.3	"	3	5.53	4.25	.58	.06	"	1.72	.20	8.50
2900	13	5-28-65	1520	8.0	1520		6.7	.4	"	1	11.14	8.31	1.40	.13	"	1.10	.45	19.43
3427	14	6-29-65	1470	8.1	1360		6.6	.4	"	1	10.07	7.71	1.26	.12	"	1.13	.38	17.67
3775	15	7-23-65	447	8.3	305		4.7	.2	"	16	3.32	1.16	.22	.03	"	1.65	.05	2.92
3989	16	8-30-65	580	8.3	413		4.5	.2	"	11	6.15		.29	.05	.06	2.39	.11	3.93
4216	17	10-5-65	590	8.5	413		4.6	.2	"	11	6.10		.30	.10	.22	2.27	.10	3.91
4603	18	10-27-5	1170	8.2	972		6.3	.3	"	3	12.90		.87	.09	None	1.43	.24	12.19
199	19	1-26-66	1005	8.0	792		4.9	.2	"	4	10.83		.56	.07	"	2.41	.24	8.81
525	20	3-23-66	1050	7.8	830		4.4	.2	"	4	11.48		.53	.07	"	3.09	.24	8.75
2342	21	4-5-67	1190	8.0	963		4.3	.2	"	4	10.20	3.93	.63	.07	"	4.84	.20	9.79
2440	22	4-28-67	1680	7.6	1510		4.1	.3	"	2	15.00	7.37	.97	.14	"	5.62	.36	17.50
2627	23	5-27-67	1720	7.7	1580		4.5	.3	"	1	14.87	7.80	1.08	.13	"	5.11	.38	18.39
2867	24	6-30-67	224	7.7	156		4.3	.1	"	2	1.73	.49	.10	.02	"	1.21	.02	1.11
3030	25	7-28-67	319	7.6	221		3.6	.1	"	5	2.45	.97	.13	.03	"	1.65	.03	1.90
3031	26	9-1-67	542	7.8	384		4.4	.2	"	1	4.07	1.73	.27	.03	"	2.39	.02	3.69
3419	27	11-6-67	1350	7.8	1140		4.7	.3	"	1	10.64	5.47	.80	.09	"	4.87	.27	11.86
3627	28	2-1-68	1000	7.9	815		3.9	.2	"	1	7.79	4.17	.49	.06	"	4.18	.21	8.12
4254	29	5-8-68	723	8.2	531		4.7	.2	"	2	5.06	3.06	.40	.04	"	3.14	.16	5.26
4031	30	6-4-68	323	7.5	235		5.2	.1	"	5	2.44	.84	.18	.03	"	1.69	.03	1.77
4253	31	7-6-68	762	7.7	570		4.4	.2	"	1	5.86	2.73	.40	.06	"	2.89	.08	6.08
4635	32	8-2-68	459	7.8	326		4.6	.1	None	9	3.28	1.46	.23	.02	None	1.70	.01	3.28
5359	33	9-6-68	755	8.0	573		3.8	.2	"	9	6.23	2.73	.36	.04	"	3.34	.12	5.90
5360	34	10-2-68	1940	7.9	1750		5.3	.4	"	.5	16.00	10.00	1.47	.13	"	5.87	.40	21.33
5508	35	11-5-68	1790	7.9	1590		4.4	.3	"	1.2	15.90	7.60	1.09	.19	"	6.48	.40	17.90
							Equivalent Weights				200	122	230	391	300	610	355	480

Table 14 (continued)

QUALITY OF WATER

Sampling Site Location Little Brush Creek near mouth

Lab. No.	Field No.	Sampling Date	ECx 10^6 @ 25° C	pH	Total dis-solved salts ppm	Boron ppm	% Sodium	Sodium Adsorp-tion Ratio	Residual Carbon-ates me/l	Flow c.f.s.	Equivalents per million or milliequivalents per liter							
											Cations				Anions			
											Ca	Mg	Na	K	CO_3	HCO_3	Cl	SO_4
5759	36	2/10/69	900	8.0	663		2.8	0.1	None	2.5	6.85	4.00	0.32	0.08	None	5.59	0.14	5.52
6587	37	7/1/69	278	7.8	187		4.4	.1	None	19	2.08	.72	.13	.03	None	1.49	.01	1.46
6568	38	8/1/69	356	7.7	250		5.3	.2	None	8	2.68	1.04	.21	.04	None	1.74	None	2.23
6788	39	9/3/69	895	8.2	708		4.6	.2	None	1.4	6.83	3.14	.48	.07	None	3.00	.18	7.34
7368	40	2/3/70	733	8.1	585		5.6	.2	None	3	4.47	3.55	.48	.06	None	1.46	.18	6.92
8567	41	9/1/70	626	8.5	495		4.0	.2	None	3	5.02	2.18	.30	.07	0.26	2.52	.14	4.65
8905	42	10/1/70	1,400	7.8	1,200		4.1	.3	None	2	11.47	5.56	.73	.09	None	4.09	.27	13.49
8997	43	11/4/70	1,280	8.0	1,050		4.4	.3	None	2	10.60	5.20	.73	.09	None	5.29	.27	11.00
9217	44	2/8/71	1,010	7.9	767		4.5	.2	None	3	7.52	4.24	.55	.04	None	4.33	.28	7.45
9399	45	4/1/71	1,020	8.0	805		4.8	.2	None	3	7.72	4.27	.61	.05	None	4.23	.28	7.96
9505	46	5/4/71	502	7.9	372		4.0	.1	None	12	3.80	1.46	.22	.05	None	1.95	.05	3.53
9796	47	6/2/71	255	7.8	171		4.6	.1	None	24	1.82	.66	.12	.03	None	1.19	.04	1.38
10058	48	8/2/71	578	8.1	398		4.8	.2	None	2.5	4.20	1.72	.30	.04	None	2.32	.06	3.88
10325	49	9/1/71	808	7.8	623		4.0	.2	None	3.5	6.49	2.71	.39	.06	None	3.30	.14	6.21
10951	50	12/1/71	1,100	7.9	866		4.3	.2	None	3.5	8.73	4.35	.59	.06	None	4.08	.22	9.16
11112	51	2/72	950	7.9	768		4.5	.2	None	3	7.12	4.07	.53	.06	None	3.52	.21	8.00
11810	52	5/11/72	319	8.0	232		3.6	.1	None	30	2.29	.83	.12	.06	None	1.39	.05	1.86
11852	53	6/1/72	359	8.1	243		4.6	.1	None	22	2.61	.88	.17	.04	None	1.49	.04	2.13
12285	54	7/26/72	443	7.8	306		4.5	.1	None		3.20	1.18	.21	.03	None	1.93	.05	2.66
									Equivalent Weights		200	12.2	230	39.1	300	61.0	355	480

Table 15

QUALITY OF WATER

Sampling Site Location Brush Creek above Burns Bench Canal Heading

Lab No	Field No	Sampling Date	ECx 10^6 @ 25° C	pH	Total dis-solved salts ppm	Boron ppm	% Sodium	Sodium Adsorp-tion Ratio	Residual Carbon-ates me/l	Est. Flow C.F.S.	Equivalents per million or milliequivalents per liter							
											Cations				Anions			
											Ca	Mg	Na	K	CO_3	HCO_3	Cl	SO_4
CU 619	1	4-17-58	839	7.4	660	.12	14.6	.7	0		4.88	3.08	1.38	.10	.31	3.24	.18	5.71
620	2	5-28-58	262	7.9	167	.08	6.5	.2	0		1.93	.47	.17	.03	0	1.56	.01	1.03
621	3	7-1-58	517	8.4	348	.15	13.6	.5	0		2.94	1.78	.76	.04	.21	2.12	.04	3.12
728	4	9-2-58	564	8.3	381	.07	9.7	.4	0		3.33	2.06	.58	.04	.25	2.47	.02	3.27
752	5	10-29-8	585	8.4	414	.22	12.3	.5	0		3.07	2.45	.77	.04	.09	2.49	.11	3.58
804	6	2-3-59	688	8.1	498	0	12.3	.5	0		3.54	3.13	.94	.04	.24	2.09	.12	5.20
825	7	4-13-59	608	8.3	414	.08	14.8	.6	0		2.90	2.67	.98	.06	.24	2.04	.16	4.12
826	8	5-8-59	404	7.7	266	0	9.7	.3	0		2.74	1.14	.42	.04	0	2.15	.02	2.17
827	9	6-3-59	279	7.9	187	0	11.3	.3	0		1.80	.76	.33	.03	0	1.58	.0	1.34
828	10	7-7-59	570	8.3	396	0	10.5	.4	0		3.75	2.03	.68	.05	.23	2.61	.10	3.55
1057	11	7-30-59	529	7.8	363	15	9.1	.3	0		3.35	1.83	.52	.04	0	2.76	.10	2.88
1058	12	9-2-59	630	8.2	439	0	7.8	.3	0		4.22	2.07	.54	.06	.17	2.96	.10	3.66
1059	13	9-29-59	645	7.9	460													
CU 1158	14	10-29-9	687	7.8	473		9.6	.4	0		4.29	2.46	.72	.04	.41	3.16	.12	3.82
1221	15	1-27-60	678	8.6	472		13.4	.6	0		3.51	2.94	1.00	.03	.25	2.96	.20	4.07
1247	17	4-12-60	473	8.2	319		6.8	.2	0		3.23	1.52	.35	.05	0	3.05	.08	2.05
1248	16	5-3-60	555	8.6	387		10.6	.4	0		3.56	2.00	.63	.03	.25	2.68	.10	3.22
1354	18	6-2-60	333	7.8	205		8.1	.2	0		2.27	.89	.28	.03	0	2.12	.04	1.31
1369	19	7-1-60	483	8.3	343		10.1	.3	0		2.96	1.70	.53	.04	.28	2.18	.09	2.68
1370	20	8-2-60	390	8.2	263		8.0	.2	0		2.48	1.05	.31	.04	.24	1.88	.05	1.71
1601	21	9-14-60	590	8.3	399		11.0	.4	None		3.21	2.39	.70	.05	.22	2.11	.13	3.89
1602	22	10-21-0	611	8.2	394		8.3	.3	"		4.28	1.96	.57	.04	.08	3.36	.12	3.29
1603	23	11-22-0	788	7.9	554		10.4	.5	"		4.90	3.11	.93	.04	.13	3.72	.20	4.93
1604	24	12-21-0	719	8.0	499		9.5	.4	"		4.76	2.82	.80	.04	.19	3.46	.18	4.59
2044	25	2-8-61	725	8.2	613		14.6	.6	"		3.93	3.43	1.27	.05	None	1.26	.18	7.24
2045	27	4-26-61	703	7.6	493	.07	10.7	.4	"		4.42	2.58	.84	.04	"	3.51	.15	4.22
CU 2046	28	6-1-61	373	8.1	236		9.0	.3	"		2.35	.95	.33	.04	"	1.81	.05	1.81
2047	29	6-29-61	515	7.6	349		8.5	.3	"		3.58	1.51	.48	.05	"	2.59	.08	2.95
2048	30	8-3-61	523	7.9	353		8.9	.3	"		3.16	1.83	.49	.04	"	2.47	.07	2.98
2274	30A	9-5-61	718	7.6	538	.20	10.8	.5	"		4.20	3.06	.89	.07	"	3.05	.16	5.01
2343	31	10-2-61	842	7.5	628	.07	8.2	.4	"	E 12	5.95	2.73	.78	.06	"	3.65	.18	5.69
2344	32	10-31-61	1783	7.4	1588	.80	10.0	.7	None	E 15	16.32	3.83	2.25	.12	None	3.53	.26	18.73
2345	33	1-30-62	737	7.9	553		8.3	.4	"	E 15	4.27	3.18	.68	.04	"	2.78	.18	5.21
30	34	3-30-64	837	8.2	618		11.	.5	"	E 5	4.85	3.59	1.07	.04	"	3.33	.22	6.00
217	35	4-27-64	751	8.2	540		9.8	.4	"	E 6	4.66	3.07	.85	.05	"	3.43	.12	5.08
485	36	5-12-64	734	8.0	503		10	.4	"	E 8	4.68	2.74	.84	.06	"	3.31	.14	4.87
721	37	5-26-64	272	8.3	163		22	.6	"	E 100	2.14	.46	.72	.02	.07	1.39	.02	1.86
906	38	6-9-64	351	7.7	250		6.7	.2	"	E 80	2.63	.83	.25	.03	None	2.09	.04	1.61
										Equivalent Weight	20.0	12.2	23.0	39.	30.0	61.0	35.5	48.0

Table 15 (Continued)

QUALITY OF WATER

Sampling Site Location Brush Creek above Burns Bench Canal Heading

Lab. No.	Field No.	Sampling Date	ECx10⁶ @25°C	pH	Total dissolved salts ppm	Boron ppm	% Sodium	Sodium Adsorption Ratio	Residual Carbonates me/l	Est. Flow C.F.S.	Equivalents per million or milliequivalents per liter: Cations: Ca	Mg	Na	K	Anions: CO_3	HCO_3	Cl	SO_4
1029	39	7-1-64	442	8.6	287		10	.3	"	E 15	3.12	1.24	.51	.03	.19	1.86	.05	2.80
1191	40	7-29-64	493	8.5	334		7.8	.3	"	E 7	3.29	1.62	.42	.04	.17	2.27	.10	2.83
1458	41	9-2-64	582	8.5	397		8.5	.3	"	E 4	3.70	2.20	.55	.05	.35	2.44	.10	3.61
1680	42	10-7-64	550	8.5	387		9.0	.3	"	T.	3.38	2.12	.55	.04	.24	2.55	.16	3.14
1883	43	10-28-64	758	8.2	548		10.0	.5	"	E 4	5.03	2.95	.91	.06	None	3.96	.14	4.85
2247	44	2-4-65	885	8.3	672		16	0.7	"	E 10	4.16	3.81	1.48	0.07	0.22	1.50	0.22	7.08
2783	45	4-29-65	683	8.4	489		13	.5	"	E 8	3.17	3.17	.95	.06	.07	1.94	.14	5.20
2958	46	5-25-65	244	8.1	168		9.2	.2	"	E 100	1.83	.42	.23	.02	None	1.46	.03	1.01
3425	47	6-23-65	213	8.5	132		9.0	.2	"	E 100	1.50	.51	.20	.02	.13	1.08	None	1.02
3773	48	7-22-65	337	8.1	208		4.0	.1	"	E 12	4.88	1.62	.60	.06	.13	2.33	.08	4.63
3987	49	8-31-65	587	8.4	428		12	.5	"	E 5	5.85		.80	.05	.11	2.24	.14	4.21
4214	50	9-29-65	578	8.4	398		9.5	.4	"	E 25	5.59		.60	.10	.19	2.30	.13	3.47
4601	51	10-28-5	618	8.3	429		11	.4	"	E 12	5.95		.72	.04	.06	2.34	.10	4.21
197	52	1-25-66	775	8.1	553		.13	.6	"	E 10	7.32		1.08	.05	None	2.61	.20	5.64
523	53	3-23-66	834	8.0	643		.12	.6	"	E 10	8.46		1.15	.06	"	3.20	.12	6.35
Equivalent Weights											200	12.2	23.0	39.1	30.0	61.0	35.5	48.0

Table 16

QUALITY OF WATER

Sampling Site Location Unnamed Drain #1 near Mouth Southwest of Jensen

Lab. No.	Field No.	Sampling Date	ECx10⁶ @25°C	pH	Total dissolved salts ppm	Boron ppm	% Sodium	Sodium Adsorption Ratio	Residual Carbonates me/l	Est. Flow (CFS)	Equivalents per million or milliequivalents per liter: Cations: Ca	Mg	Na	K	Anions: CO_3	HCO_3	Cl	SO_4
2	1	4-1-64								.5								
219	2	4-27-64	1680	8.0	1458		4.8	.3	None	E 1	13.96	7.51	1.08	.12	None	5.71	.32	16.24
518	3	5-12-64	2340	8.3	2000		3.8	4.0	"	T.	7.30	10.21	11.20	.27	.34	2.35	1.40	24.88
753	4	5-26-64	2210	8.4	1890		3.7	3.4	"	E 25	7.69	9.18	10.00	.22	.43	2.80	1.15	22.71
519	4	5-31-64	2070	7.3	1710		3.3	3.0	"	E 50	9.45	7.43	8.60	.26	None	6.58	1.32	17.82
938	5	6-9-64	2640	8.1	2320		3.9	4.1	"	E 50	9.27	10.41	12.90	.40	"	3.96	1.88	27.16
1062	6	7-1-64	1720	8.3	1390		3.4	2.7	"	E 1	6.84	6.68	6.96	.29	.57	3.21	.96	16.03
1225	7	7-29-64	1830	8.5	1510		37.0	3.1	"	E 25	7.01	6.64	8.08	.17	.41	3.56	.98	16.95
1489	8	9-2-64	1610	8.3	1300		36.0	2.9	"	E 1/3	6.14	6.57	7.32	.18	.35	3.51	.74	15.61
1712	9	10-7-64	1610	8.3	1310		32.0	2.5	"	E 3	7.30	6.17	6.56	.18	.61	3.75	.80	15.05
Equivalent Weights											200	12.2	23.0	39.1	30.0	61.0	35.5	48.0

Table 16 (continued)

QUALITY OF WATER

Sampling Site Location Unnamed Drain #1 near Mouth Southwest of Jensen

Lab. No.	Field No.	Sampling Date	EC x 10^6 @ 25° C.	pH	Total dis-solved salts p.p.m.	Boron p.p.m.	% Sodium	Sodium Adsorp-tion Ratio	Residual Carbon-ates me/l	Est. Flow (CFS)	Equivalents per million or milliequivalents per liter							
											Cations				Anions			
											Ca	Mg	Na	K	CO_3	HCO_3	Cl	SO_4
1914	10	10-28-64	2240	8.2	1894		35.0	3.3	"	E 5	7.95	9.25	9.56	.30	None	4.61	1.57	20.88
2278	11	2-4-65	2000	8.3	1680		42	3.7	"	E 3	6.05	7.50	9.70	0.11	0.23	2.71	0.94	19.48
2815	12	4-28-65	2170	8.3	1940		36	3.3	"	Trickle	6.81	9.96	9.64	.25	.24	1.98	1.49	22.95
2989	13	5-25-65	1830	8.2	1600		35	2.9	"	E 1/5	6.78	7.78	7.84	.22	None	2.09	1.21	18.32
3459	14	6-23-65	2100	8.5	1830		37	3.4	"	E .4	5.21	11.19	9.68	.15	.23	2.67	1.50	21.83
3807	15	7-22-65	1920	8.3	1690		35	2.9	"	E1 1/2	6.94	8.11	8.08	.23	.27	2.55	1.17	19.37
4023	16	8-31-65	1720	8.1	1490		27	2.2	"	E 1/3	16.09		6.12	.18	None	6.11	.87	15.41
4244	17	9-29-65	2070	8.3	1760		39	3.6	"	E 1/2	14.94		9.68	.35	.28	2.62	1.43	20.64
4635	18	10-28-65	2020	8.0	1840		34	3.0	"	T	17.13		8.88	.27	None	5.13	1.22	19.93
228	19	1-25-66	1850	7.8	1620		36	3.1	"	E .2	14.54		8.32	.10	"	3.76	.98	18.22
553	20	3-23-66	2520	7.6	2390		34	3.6	"	E1/10	22.68		12.10	.33	"	8.14	1.76	25.21
									Equivalent Weights		200	12.2	23.0	39.1	30.0	61.0	35.5	48.0

Table 17

QUALITY OF WATER

Sampling Site Location Unnamed Drain #2 near Mouth Southwest of Jensen

Lab. No.	Field No.	Sampling Date	EC x 10^6 @ 25° C.	pH	Total dis-solved salts p.p.m.	Boron p.p.m.	% Sodium	Sodium Adsorp-tion Ratio	Residual Carbon-ates me/l	Est. Flow (CFS)	Equivalents per million or milliequivalents per liter							
											Cations				Anions			
											Ca	Mg	Na	K	CO_3	HCO_3	Cl	SO_4
939	1	6-24-64	414	8.5	282		54.0	.2	None	E .75	3.14	1.03	.24	.01	.27	1.33	.12	2.70
1063	2	7-1-64	2090	8.3	1800		34.0	2.9	"	E .5	8.44	8.12	8.48	.15	.21	1.83	.98	22.17
1226	3	7-29-64	1780	8.5	1520		33.0	2.8	"	E .25	7.12	6.64	6.96	.12	.13	1.57	.80	18.34
1490	4	9-2-64	2310	8.2	2060		31.0	2.9	"	T	11.18	9.40	9.40	.16	None	3.24	1.11	25.79
1713	5	10-7-64	1600	8.4	1290		29.	2.2	"	E .25	7.52	6.36	5.76	.31	.61	3.82	.99	14.53
1915	6	10-28-4	2560	8.1	2292		32	3.1	"	E .30	12.35	9.72	10.28	.23	None	4.63	1.32	26.63
2816	7	4-28-65	2590	8.4	2390		35	3.6	"	Trickle	9.04	11.75	11.52	.18	.17	1.29	1.53	29.50
2990	8	5-25-65	2000	8.1	1830		33	3.0	"	E 1/2	8.18	8.67	8.56	.17	None	2.12	1.19	22.27
3460	9	6-23-65	2450	8.3	2280		36	3.5	"	E .2	12.15	7.78	11.04	.08	.13	1.63	1.36	27.93
3808	10	7-22-65	2440	8.1	2280		33	3.2	"	E 1/4	10.96	9.90	10.36	.17	None	3.44	1.47	26.48
4024	11	8-31-65	2330	8.2	2180		33	3.2	"	E 1/2	20.48		10.32	.17	"	2.79	1.39	26.79
4245	12	9-25-65	2300	8.2	2060		36	3.3	"	E 3/4	17.56		9.80	.23	"	1.80	1.23	24.56
4636	13	10-28-5	2600	7.9	2370		33	3.3	"	E .25	22.06		10.80	.22	"	4.33	1.48	27.27
229	14	1-25-66	2900	7.7	2960		36	4.1	None	Tri-ckle	26.39		14.90	.22	None	4.25	1.68	35.58
554	15	3-23-66	580	7.4	413		19	.7	"	E 1/5	4.85		1.15	.07	"	1.42	.17	4.48
									Equivalent Weights		200	12.2	23.0	39.1	30.0	61.0	35.5	48.0

Table 18

QUALITY OF WATER

Sampling Site Location **Brush Creek near Jensen**

Lab. No.	Field No.	Sampling Date	EC x 10^6 @ 25° C	pH	Total dissolved salts ppm	Boron ppm	% Sodium	Sodium Adsorption Ratio	Residual Carbonates me/l	Est. Flow CFS	Equivalents per million or milliequivalents per liter: Cations: Ca	Mg	Na	K	Anions: CO_3	HCO_3	Cl	SO_4
CU 35	1	8-9-55																
55	2	9-26-55	1140	8.4	865	.17	22.4				5.88	3.89	2.88	.18	.66	3.33	.35	8.48
79	3	3-14-56	977	8.0	739	.01	12.4	.6	0		6.87	2.87	1.39	.08	.40	3.79	.25	6.77
89	4	5-25-56	350	8.2	263	.0	11.7	.5	0		2.53	.59	.42	.04	.07	1.79	.02	1.70
112	5	7-10-56	3108	7.9	3348	.27	41.5	5.3	0		13.71	13.42	19.40	.17	.66	7.53	1.47	37.54
122	6	8-7-56	3323	8.1	3044	.42	37.9	4.2	0		11.79	12.14	14.68	.15	.09	5.41	1.20	32.06
158	7	9-10-56	2310	7.8	1920	.30	46.8	4.6	0		6.41	1.09	12.04	.13	.96	4.12	.84	19.81
172	8	10-18-6	4114	7.9	37500	.38	45.3	6.3	0		13.83	14.64	23.75	.19	1.17	3.10	1.61	46.43
212	9	2-5-57	730	8.3	524	.07	13.3	.6	0		3.98	2.94	1.07	.04	.12	3.17	.19	4.55
248	10	3-11-57	754	8.1	554	.07	16.7	.8	0		4.44	2.68	1.44	.05	0	3.52	.16	4.93
279	11	4-11-57	1174	8.2	856													
280	12	5-20-57	1200	8.3	874	.04	35.5	2.3	0		5.06	3.18	4.60	.13	0	2.97	.38	9.62
281	13	6-12-57	315	8.8	191	0	11.6	.5	0			.61	.49	.03	0	1.43	.03	1.32
CU 384	14	7-19-57	3963	8.0	3646	.32	43.3	5.8	0		14.41	14.18	22.00	.19	0	8.44	1.57	40.77
385	15	8-14-57	1156	8.3	900	.08	30.0	1.8	0		5.67	3.25	3.86	.09	.06	3.59	.34	8.88
491	16	10-7-57	2475	1.8	2124	.08	35.1	3.4	0		10.68	9.08	10.75	.16	.37	6.55	.74	22.92
492	17	10-31-57	927	8.2	699	.03	23.3	1.2	0		4.41	3.13	2.33	.05	.39	3.08	.22	6.29
533	18	2-10-58	735	7.9	491	.02	16.9	.8	0		4.25	2.55	1.39	.05	0	3.62	.11	4.45
616	19	4-11-58	1084	8.0	810	.07	23.7	1.3	0		5.08	4.03	2.87	.13	0	2.87	.32	8.92
617	20	5-28-58	334	8.4	199	.43	14.9	.4	0		2.15	.62	.49	.03	0	1.77	.11	.41
618	21	7-1-58	3670	8.0	3226	.77	22.5	2.0	0		9.26	12.50	6.54	.16	.48	3.90	1.42	28.36
727	22	9-2-58	3396	8.1	3050	.77	43.4	5.3	0		10.46	13.01	18.13	.18	.40	4.08	1.06	36.24
753	23	10-29-8	2221	8.3	1934	.33	29.1	2.3	0		7.05	8.62	6.48	.14	.32	3.04	.70	18.23
805	24	2-3-59	825	8.0	609	0	21.1	1.0	0		3.54	3.55	1.91	.64	.32	1.98	.26	6.48
829	25	4-13-59	3456	8.2	3100	.50	46.1	5.9	0		10.15	13.22	20.25	.16	.24	3.45	1.23	38.96
830	26	5-8-59	3201	7.8	2824	.42	41.6	4.9	0		11.50	12.24	17.01	.16	0	6.59	1.05	33.27
CU831	27	6-3-59	3498	7.9	3108													
832	28	7-7-59	3676	8.1	3306	.50	44.1	5.8	0		13.16	13.42	21.15	.19	0	7.20	1.31	39.41
1060	29	7-30-59	3286	7.9	3000													
1061	30	9-1-59	1285	8.2	1014	.20	34.7	2.3	0		4.64	4.31	.48	.09	0	2.79	.29	10.76
1062	31	9-29-59	727	8.2	534	.25	15.3	.7	0		4.58	2.07	1.22	.08	.16	2.65	.10	5.04
1159	[illegible]	10-[illegible]	[illegible]	8.3	[illegible]	[illegible]	47.4	5.0	0									
1222	33	1-27-60	735	8.2	515		11.9	.5	0		4.58	2.81	1.00	.03	.31	3.91	.18	4.02
1249	34	4-12-60	631	8.5	451		16.7	.7	0		3.81	1.97	1.17	.06	0	3.17	.10	3.74
31	35	3-30-64	1250	8.2	992		26	1.7	None	E 2	5.36	5.12	3.86	.06	None	3.21	.34	10.85
218	36	4-28-64	3880	7.9	3552		38	5.1	"	E 5	15.79	15.89	20.20	.17	"	7.50	1.16	43.39
486	37	5-12-64	4200	7.9	1938		40	5.4	"	E 5	16.32	17.02	22.00	.26	"	7.47	1.14	46.99
722	38	5-26-64	320	8.5	190		2.9	.1	"	E 50	2.31	.67	.09	.01	.09	1.41	.03	1.55
									Laverdet Wards		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table 18 (Continued)

QUALITY OF WATER

Sampling Site Location Brush Creek near Jensen

Lab. No.	Field No.	Sampling Date	ECx 10^6 @ 25° C.	pH	Total dissolved salts p.p.m	Boron p.p.m	% Sodium	Sodium Adsorption Ratio	Residual Carbonates me/l	Est. Flow (CFS)	Equivalents per million or milliequivalents per liter: Cations: Ca	Mg	Na	K	Anions: CO_3	HCO_3	Cl	SO_4
908	39	6-9-64	448	7.7	315		16	.5	"	E 12	2.88	1.10	.75	.04	None	2.05	.07	2.65
1030	40	7-1-64	1560	8.4	1250		36	2.7	"	T.	6.19	5.65	6.64	.13	.14	2.00	.43	16.04
1193	41	7-29-64	1650	8.2	1380		31	2.4	"	T.	8.00	5.97	6.40	.17	None	3.32	.39	17.83
1459	42	9-2-64	2480	8.4	2130		39	4.0	"	T.	8.8	4.71	12.16	.16	.31	2.27	.68	27.65
1681	43	10-7-64	3280	8.1	3080		41	5.0	"	T.	12.28	13.34	17.96	.14	None	4.35	.97	38.40
1884	44	10-28-4	3560	8.2	3310		42	5.3	"	E 5	12.46	15.10	19.80	.24	"	4.39	1.09	42.12
2248	45	2-4-65	866	8.4	676		16	0.7	"	E 10	3.94	3.98	1.47	0.06	0.46	1.17	0.20	7.62
2785	46	4-28-65	911	8.3	676		20	1.0	"	E 5	4.36	3.77	2.03	.07	.10	2.28	.20	7.65
2959	47	5-25-65	285	8.2	207		13	.3	"	E 70	1.98	.56	.38	.02	None	1.51	.04	1.33
3426	48	6-23-65	224	8.9	154		14	.3	"	E 75	1.52	.47	.32	.02	.37	.79	.01	1.16
3774	49	7-22-65	2400	8.3	2240		38	3.7	"	E 1	9.77	8.81	11.40	.32	.11	1.94	.77	27.48
3988	50	8-31-65	2340	8.0	2220		36	3.6	"	E 1	20.06		11.48	.18	None	3.24	.89	27.59
4215	51	9-29-65	694	8.4	487		15	.7	"	E 10	6.39		1.18	.11	.16	2.77	.15	4.60
4602	52	10-28-5	756	8.3	545		16	.7	"	E 7	7.02		1.40	.06	.11	2.54	.19	5.75
198	53	1-25-66	687	8.2	539		13	.6	"	E 10	7.12		1.08	.05	None	2.27	.18	5.80
524	54	3-23-66	1010	8.0	777		17	.9	"	E 5	9.49		1.98	.07	"	3.44	.24	7.86
Equivalent Weights											200	12.2	23.0	39.1	30.0	61.0	35.5	48.0

INTERIOR - RECLAMATION SALT LAKE

Form R 4 - 412
(Rev. 12/58)

Table 19

QUALITY OF WATER

Sampling Site Location Green River near Jensen

Lab. No.	Field No.	Sampling Date	ECx 10^6 @ 25° C.	pH	Total dissolved salts p.p.m	Boron p.p.m	% Sodium	Sodium Adsorption Ratio	Residual Carbonates me/l	Flow c.f.s.	Equivalents per million or milliequivalents per liter: Cations: Ca	Mg	Na	K	Anions: CO_3	HCO_3	Cl	SO_4
CU 1250	1	5/3/60	483	8.2	315		32.3	1.2	0		1.96	1.35	1.60	0.05	0	2.27	0.42	2.27
1355	2	6/2/60	253	8.0	153		26.2	.7	0		1.25	.55	.65	.03	0	1.46	.14	.88
1371	3	7/1/60	387	8.0	252		30.6	1.0	0		1.72	1.00	1.22	.05	0	1.98	.33	1.68
1372	4	8/2/60	552	7.8	347		36.8	1.6	0		2.10	1.52	2.15	.07	0	2.59	.67	2.58
1605	5	9/14/60	670	8.0	418		39.9	1.9	0		2.34	1.71	2.73	.06	.12	2.46	.90	3.36
1606	6	10/21/60	761	7.8	487		37.7	1.9	None		2.88	2.09	3.05	.07	None	3.21	.89	3.99
1607	7	11/22/60	728	8.2	474		23.0	1.0	None		3.05	2.15	1.57	.05	.21	2.89	.68	3.04
1608	8	12/21/60	846	8.3	556		42.5	2.4	None		2.45	2.55	3.76	.08	.21	2.78	.99	4.86
2066	9	2/8/61	632	8.3	419		42.2	2.0	None		1.77	1.92	2.75	.07	.14	1.70	.98	3.69
2067	11	4/26/61	560	7.8	376		30.6	1.3	None		2.50	1.44	1.76	.06	None	2.75	.43	2.58
2068	12	6/1/61	282	7.8	185	None	16.8	.5	None		1.90	.60	.51	.03	None	1.92	.16	.96
2069	13	6/29/61	331	8.0	198		29.7	.9	None		1.50	.71	.95	.03	None	1.90	.29	1.01
2070	14	8/3/61	749	7.9	490		31.1	1.5	None		3.75	1.66	2.49	11	None	2.97	.80	4.24
Equivalent Weights											200	12.2	23.0	39.1	30.0	61.0	35.5	48.0

Table 19 (continued)

QUALITY OF WATER

Sampling Site Location Green River near Jensen

Lab No.	Field No.	Sampling Date	EC x 10⁶ @ 25°C	pH	Total dis-solved salts ppm	Boron ppm	% Sodium	Sodium Adsorp-tion Ratio	Residual Carbon-ates me/l	Flow c.f.s.	Equivalents per million or milliequivalents per liter							
											Cations				Anions			
											Ca	Mg	Na	K	CO_3	HCO_3	Cl	SO_4
CU 2282	15	9/5/61	876	7.6	607	0.05	38.9	2.2	None		3.36	2.37	3.72	0.12	0.24	2.98	1.11	3.24
2347	16	10/2/61	598	7.5	377		24.3	1.0	None	3,305	3.41	1.40	1.57	.07	None	3.67	.41	2.37
2350	17	10/31/61	582	8.3	389		23.9	1.4	None	1,892	2.68	1.44	2.03	.06	.24	2.27	.56	3.10
2517	18	4/17/62	580	7.9	396		28.3	1.2	None		3.00	1.49	1.80	.08	None	3.01	.42	2.94
2821	19	5/1/62	330	8.0	217	.28	22.2	.7	None		1.66	1.07	.79	.04	None	2.13	.16	1.27
2822	20	5/15/62	256	8.0	161		21.5	.6	None		1.38	.64	.56	.03	None	1.78	.11	.72
2823	21	6/29/62	353	7.7	209		18.6	.6	None		2.10	.84	.68	.04	None	2.46	.19	1.01
2824	22	7/19/62	469	7.7	303	.15	27.1	1.0	None		2.24	1.44	1.38	.04	None	2.64	.34	2.12
3988	23	2/5/64	658	8.5	418		32.5	1.5	None	1,100	2.93	1.72	2.28	.08	.26	2.99	.90	2.86
28	24	3/30/64	639	8.5	418		34	1.6	None	1,199	2.51	1.84	2.37	.08	.36	2.69	1.02	2.73
214	25	4/27/64	503	8.2	342		32	1.3	None	4,752	2.36	1.22	1.70	.07	None	2.36	.34	2.65
481	26	5/12/64	492	8.5	324		29	1.1	None		2.34	1.24	1.51	.06	.33	2.07	.44	2.31
718	27	5/26/64	245	8.6	146		24	.6	None	High	1.37	.52	.61	.02	.08	1.40	.13	.91
904	28	6/9/64	288	7.6	182		18	.5	None	High	1.85	.58	.53	.04	None	1.96	.13	.91
1026	29	7/1/64	307	8.2	161		27	.8	None	9,090	1.58	.58	.82	.02	None	1.62	.18	1.20
1189	30	1/29/64	661	7.7	440		31	1.4	None	3,170	3.07	1.91	2.27	.08	None	2.94	.63	3.77
1455	31	9/2/64	708	8.6	458		33	1.6	None	1,694	3.24	1.91	2.53	.08	.36	2.69	.68	4.03
1678	32	10/7/64	705	8.7	497		32	1.5	None	1,892	3.29	2.00	2.50	.08	.42	2.57	.74	4.14
1880	33	10/28/64	692	8.7	489		32	1.5	None	2,080	3.22	1.88	2.45	.07	.11	2.94	.64	3.93
2245	34	2/5/65	670	8.7	449		34	1.6	None	4,721	2.27	2.16	2.35	.07	.33	2.05	.60	3.87
2780	35	4/28/65	507	8.6	343		31	1.2	None	8,990	2.17	1.41	1.62	.07	.31	1.93	.35	2.68
2954	36	5/25/65	233	8.7	160		26	.7	None	High water	1.38	.37	.62	.03	.26	1.21	.12	.81
3421	37	6/23/65	205	8.3	135		22	.5	None	High water	1.17	.51	.48	.02	.01	1.33	.11	.73
3770	38	7/22/65	391	8.4	236		34	1.2	None	3,806	1.69	.97	1.38	.04	None	1.87	.43	1.78
3984	39	8/31/65	526	8.7	330		47	2.2	None	1,892	2.84		2.57	.07	.39	1.10	.59	3.10
4211	40	9/29/65	688	3.4	436		48	2.6	None	5,087	4.64		3.46	.18	.38	2.54	.85	4.51
4598	41	10/28/65	589	8.8	368		38	1.7	None	2,360	3.89		2.39	.07	.40	1.68	.87	3.40
194	42	1/25/66	690	8.5	466		33	1.6	None		5.02		2.52	.08	.31	3.04	.83	3.44
520	43	3/23/66	605	8.1	428		32	1.4	None	4,721	4.43		2.12	.10	None	2.49	.52	3.64
USGS	44	4/26/66	594	8.1	392	.06	29.8	1.3	None	3,510	2.69	1.65	1.87	.06	None	2.57	.48	3.12
USGS	45	10/17/66	912	7.6	627	.09	38.6	2.2	None	2,790	3.59	2.39	3.83	.10	None	3.34	1.02	5.31
USGS	46	1/12/67	767	8.1	519	.06	31.1	1.5	None	2,600	3.54	1.97	2.52	.07	None	3.02	.71	4.58
USGS	47	2/17/67	786	8.1	534	.05	30.5	1.5	None	1,450	3.64	2.14	2.57	.07	None	3.21	.68	4.71
USGS	48	7/18/67	634	7.5	435	.05	30.4	1.3	None	4,840	2.79	1.73	2.00	.06	None	2.66	.56	3.50
USGS	49	10/5/67	858	7.5	615		32.5	1.7	None	2,340	3.39	2.96	3.09	.07	None	3.11	.73	5.60
USGS	50	1/22/68	736	8.1	506		30.1	1.4	None	2,850	3.34	2.14	2.39	.06	None	3.11	.62	4.33
USGS	51	4/4/68	706	8.0	480		33.5	1.6	None	3,120	2.64	2.47	2.61	.07	None	3.15	.68	3.79
USGS	52	7/19/68	649	7.8	435		30.6	1.4	None	4,840	2.64	2.14	2.13	.06	None	2.69	.51	3.66
USGS	53	9/12/68	780	7.8	531		31.1	1.6	None	3,580	3.19	2.63	2.65	.06	None	3.05	.62	4.79
USGS	54	12/18/68	721	8.1	484		31.8	1.5	None	2,700	3.04	2.14	2.44	.05	None	2.88	.65	4.25
									Equivalent Weights		200	122	230	391	300	610	355	480

Table 17 (continued)

QUALITY OF WATER

Sampling Site Location Green River near Jensen

Lab. No	Field No.	Sampling Date	EC x 10^6 @ 25° C	pH	Total dissolved salts ppm	Boron ppm	% Sodium	Sodium Adsorption Ratio	Residual Carbonates me/l	Flow c.f.s.	Equivalents per million or milliequivalents per liter							
											Cations				Anions			
											Ca	Mg	Na	K	CO_3	HCO_3	Cl	SO_4
USGS	55	1/22/69	746	8.1	504		32.8	1.6	None	4,840	3.14	2.22	2.65	0.06	None	2.88	0.62	4.48
USGS	56	3/14/69	778	7.9	525		32.4	1.6	None	4,500	3.34	2.30	2.74	.07	None	3.10	.76	4.71
USGS	57	6/13/69	355	7.4	235		29.2	1.0	None	5,280	1.60	.99	1.09	.05	None	1.70	.31	1.48
USGS	58	7/23/69	688	6.6	470		33.6	1.6	None	2,880	2.94	1.89	2.48	.08	None	2.70	.59	3.85
USGS	59	8/22/69	800	8.0	498		32.9	1.6	None	2,640	2.89	2.55	2.70	.07	None	2.95	.71	4.18
USGS	60	9/29/69	729	7.3	494		33.5	1.7	None	3,050	2.89	2.47	2.74	.07	None	3.02	.71	4.60
USGS	61	10/14/69	713	7.7	472	0.11	34.3	1.7	None	2,580	3.04	1.89	2.61	.06	None	3.05	.59	4.04
USGS	62	10/28/69	677	8.1	451		36.4	1.8	None	2,540	2.84	1.81	2.70	.07	None	2.95	.65	3.54
USGS	63	11/25/69	677	8.0	455		31.7	1.5	None	2,520	2.84	1.89	2.22	.05	None	2.98	.65	3.39
USGS	64	12/12/69	694	8.3	450		31.2	1.5	None	3,760	2.64	2.39	2.31	.06	None	3.00	.65	3.75
USGS	65	1/3/70	691	7.9	450	.11	33.6	1.6	None	2,060	2.94	1.89	2.48	.08	None	3.03	.62	3.77
USGS	66	2/10/70	659	8.1	435	.14	32.2	1.5	None	1,620	2.79	1.89	2.26	.07	None	3.21	.73	3.29
USGS	67	3/12/70	695	8.3	502	.12	36.7	1.8	None	2,340	2.94	1.89	2.83	.06	0.13	3.15	.79	4.00
USGS	68	4/17/70	640	8.1	412	.06	32.1	1.5	None	3,330	2.84	1.89	2.26	.06	None	3.16	.54	3.37
USGS	69	5/13/70	340	7.9	220	.04	22.5	.7	None	10,100	1.95	.99	.87	.05	None	2.49	.21	1.23
USGS	70	6/15/70	309	7.7	208	.06	37.1	1.2	None	13,000	1.25	.68	1.17	.05	None	1.80	.21	1.15
USGS	71	7/15/70	475	7.6	309	.05	31.4	1.2	None	3,970	2.05	1.32	1.57	.06	None	2.31	.45	2.08
USGS	72	8/14/70	676	8.3	448	.08	33.6	1.6	None	2,230	3.09	1.81	2.52	.07	.07	2.92	.59	3.62
USGS	73	9/16/70	724	8.8	481	.07	35.1	1.7	None	1,710	2.94	2.06	2.74	.07	.67	2.47	.71	4.08
USGS	74	10/9/70	707	7.7	440		36.0	1.8	None	1,570	2.89	1.89	2.74	.10	None	2.98	.73	3.58
USGS	75	11/18/70	682	8.3	440		35.2	1.7	None	2,040	2.94	1.97	2.70	.06	.40	2.61	.62	3.60
USGS	76	12/9/70	700	8.3	463		33.8	1.7	None	1,740	3.14	1.97	2.65	.07	.50	3.16	.71	3.54
USGS	77	1/14/71	676	7.6	440	.08	33.4	1.6	None	2,300	2.89	1.81	2.39	.07	None	3.08	.73	3.75
USGS	78	2/22/71	663	8.0	430		38.9	1.9	None	1,430	2.64	1.73	2.83	.08	None	2.98	.85	3.33
USGS	79	3/30/71	487	7.5	301		37.9	1.5	None	5,640	1.90	1.07	1.87	.09	None	2.39	.28	2.50
USGS	80	4/20/71	321	7.5	194		25.6	.8	None	9,770	1.65	.90	.91	.10	None	1.90	.26	1.17
USGS	81	5/11/71	325	7.6	181		25.4	.8	None	10,700	1.55	.81	.83	.08	None	1.77	.31	1.12
USGS	82	6/3/71	301	8.1	179	.03	38.4	1.2	None	14,000	1.25	.59	1.17	.04	None	1.75	.19	1.21
USGS	83	7/1/71	242	8.0	147		28.5	.7	None	8,460	1.10	.63	.70	.03	None	1.52	.16	1.00
USGS	84	8/6/71	649	8.1	445		35.1	1.7	None	2,270	3.04	1.89	2.70	.07	None	2.77	.65	3.96
USGS	85	9/1/71	769	7.9	487	.15	34.5	1.7	None	2,060	3.14	2.06	2.78	.08	None	2.95	.73	4.37
USGS	86	10/4/71	763	8.1	480	.10	34.3	1.7	None	1,930	3.04	2.06	2.70	.07	None	3.36	.54	4.16
USGS	87	11/2/71	719	8.1	460	.09	35.0	1.7	None	2,040	3.04	1.81	2.65	.08	None	3.05	.65	3.96
USGS	88	12/1/71	703	8.1	441		34.8	1.7	None	4,290	2.84	1.89	2.57	.08	None	2.90	.56	3.96
USGS	89	1/4/72	713	8.0	447		32.6	1.6	None	1,340	3.14	1.89	2.48	.09	None	3.16	.68	3.75
USGS	90	2/8/72	706	8.3	447		30.9	1.5	None	3,350	3.29	1.89	2.35	.08	None	3.18	.68	3.75
USGS	91	3/13/72	636	7.9	407		34.2	1.6	None	3,450	2.79	1.56	2.31	.09	None	2.85	.51	3.54
USGS	92	4/18/72	471	8.0	305	.07	27.4	1.0	None	4,280	2.30	1.32	1.39	.06	None	2.44	.37	2.29
USGS	93	5/23/72	363	6.8	220	.05	26.3	.8	None	12,680	1.75	.90	.96	.04	None	1.90	.21	1.58
USGS	94	6/12/72	335	8.2	224	.07	26.8	.8	None	15,200	1.75	.82	.96	.05	None	1.90	.17	1.73
USGS	95	8/8/72	710	8.3	452	.10	30.2	1.4	None	2,290	3.29	1.97	2.31	.07	None	3.08	.51	3.96
USGS	96	9/5/72	730	8.2	456	.11	31.8	1.5	None	1,030	3.09	2.06	2.44	.08	None	3.21	.76	3.75
Equivalent Weights											200	12.2	230	39.1	300	61.0	35.5	48.0

Return Flow

Return flow from municipal and industrial use or from irrigation will not be available for reuse for project purposes; and, therefore, has not been considered as part of the project supply. Some irrigation return flows will be diverted from project drains to the Stewart Lake Waterfowl Management Area to enable more efficient operation of the refuge but will not constitute an increased refuge supply.

The return flow from municipal and industrial water delivered to the Vernal and Jensen areas after direct consumption, reuse, and nonproductive consumption is estimated to be about 60 percent.

About 805 acres of land along Brush Creek are served by several small diversions. It is assumed that the return flow from these lands will compensate for the channel losses from Tyzack Reservoir to the point of the main diversions near Jensen.

Most of the return flow from Burns Bench and Sunshine Canals and Burton and Murray Ditches will return to the Green River a short distance below the irrigated lands. It is estimated that about 40 percent of the diverted water will reappear as return flow to the Green River, except for about 440 acre-feet collected annually in project drains and transported to Stewart Lake Waterfowl Management Area.

Water Rights

Existing water rights

Interstate Compacts

The use of Colorado River water in Utah is limited to Utah's share of the river flow as apportioned by the Colorado River Compact of 1922 and the Upper Colorado River Compact of 1948. The additional depletion of the Colorado River system by the Jensen Unit of the Central Utah Project, together with present depletions and the depletions of other authorized projects, is within Utah's apportioned share of the Colorado River. Within the limits established by these two compacts, rights to the use of Colorado River water are subject to the Utah State water law. The Green River, principal tributary of the Colorado River in Utah, has been fully appropriated under existing water rights and applications for the Central Utah Project and other participating projects of the Upper Colorado River Project.

Utah State Water Law

The Utah water law was enacted in 1903. Lands irrigated at that time are recognized to hold the highest priority for use of water.

Since 1903, rights to water use have been and are obtained by appropriation in the manner prescribed by law. Beneficial use is the measure and the limit of a water right. Priority of a right is determined by the date of its initiation, and first in time is first in right.

Under Utah law, water rights may be initiated by filing appropriate applications with the State Engineer. If unappropriated water is in the stream and if the use of such water can be made under a feasible plan, which will not impair existing rights, it is the duty of the State Engineer to approve the application. The approval of an application gives the applicant the right to proceed with the construction of the necessary works and to use the water. A specified amount of time is allowed for the applicant to construct the works, apply the water to beneficial use, and file a written proof of appropriation with the State Engineer. Upon approval of the proof of appropriation, the State Engineer issues a certificate of appropriation, which is prima facie evidence of the water right described therein.

Pending Water Right Adjudication

The appropriation process in Utah has resulted in many streams becoming overappropriated, with "paper" rights far exceeding the available water in the stream. Many of the rights have never been exercised, while others have been developed and the water put to use, but proof of appropriation has not been made. Still other applications have been used for a time and then abandoned.

On March 20, 1956, in Civil Action No. 3070, the Fourth Judicial District Court ordered an adjudication proceeding intended to define all surface and ground water rights in the Uinta Basin in Utah. The area comprising this general determination proceedings included all of the water sources, both surface and subsurface, within the drainage area of the Green River and all of its tributaries below the confluence of Pot Creek and above the confluence of the Green River with the Colorado River but excluding therefrom the drainage area of the San Rafael River.

Pursuant to the court order, the State Engineer has served summonses, secured the filing of claims by the water users, completed hydrographic surveys, and prepared a priority schedule and a proposed determination of the perfected water rights within the drainage area covering the Jensen Unit. This proposed determination was submitted to the court by the State Engineer on June 1, 1969. The drainage area covering the Jensen Unit is known as the Uinta Basin, Ashley Division, Brush Creek Subdivision. Pending water rights are not included in the determination. The priority schedule has been affirmed by the court, but the proposed determination has not yet been affirmed.

Water Rights for Stewart Lake Waterfowl Management Area

The Utah Division of Wildlife Resources owns Water Right Application No. 28853 for the Stewart Lake Waterfowl Management Area. This approved application is for 5 second-feet to be pumped from Green River from April 15 to November 1 for irrigation of 350 acres in the management area and for waterfowl propagation. It has a priority date of February 24, 1958.

Project water rights

Project water right applications held by the Bureau of Reclamation for the Jensen Unit are Application Nos. 17558, 30414, 30415, and 30416.

Application No. 17558 covers the appropriation of 30 second-feet and 10,000 acre-feet of water from Big Brush Creek for storage in the proposed Tyzack Reservoir and irrigation of 5,000 acres of land in the Jensen area. This application was filed on April 23, 1946, and approved by the State Engineer on March 17, 1961. This application does not cover all of the capacity proposed for Tyzack Reservoir under the present plan. Application No. 30414-a, as amended by Change Application No. a-5679, has been filed with the State Engineer. This application will appropriate 40,000 acre-feet from Big Brush Creek for storage in Tyzack Reservoir. Application No. 30415 covers the appropriation of 50 second-feet from the Green River, and Application No. 30416, as amended by Change Application No. a-5767, covers the appropriation of 100 second-feet of water from Green River. Applications 30415 and 30416 were submitted to the State Engineer on August 7, 1958, and approved on March 17, 1961.

CHAPTER III

WATER REQUIREMENTS

Municipal and Industrial Requirements

Both high quality and low quality municipal and industrial water will be made available to the Jensen Unit as the needs require. The high quality municipal and industrial water will be delivered to the Ashley Valley Municipal System by exchange of project water for high quality Ashley Spring water. Water will be pumped from Tyzack Reservoir to Ashley Creek and released for downstream irrigation use with a like amount diverted at Ashley Spring for high quality municipal and industrial use. Low quality industrial water requirements can be met directly from Ashley Creek, Steinaker, or Tyzack reservoirs, or at other intermediate points along the Tyzack Aqueduct.

Existing Municipal and Industrial Water Supplies

At the present time, an average supply of 5,400 acre-feet and a firm (deliverable in a dry year) supply of 4,500 acre-feet is available for municipal, industrial, and stock water use in the Jensen Unit service area. Most of this water is delivered through the Ashley Valley Municipal System. Sources of the water include wells, springs, Ashley Creek direct flows, and storage water from Ashley Creek reservoirs and Steinaker Reservoir. The surface water supplies are exchanged for water diverted from Ashley Spring into the municipal system. Present diversions at the spring are only a fraction of the total exchangeable spring water. It may be possible to meet all high quality Jensen Unit municipal and industrial demands by exchange with the spring.

Existing municipal, industrial, and stock water supplies available to the Jensen Unit service area under average and dry year conditions are summarized below.

Existing supplies
(Unit--acre-feet)

Source	Average year	Dry year firm supply
Ashley Creek	2,345	1,274
Ashley reservoirs	655	218
Steinaker Reservoir	1,600	1,600
Stockwater rights	300	300
Wells (1½ c.f.s.)		
Pump 7 months	456	
Pump 12 months		1,095
Total	5,356	4,487
Rounded	5,400	4,500

In normal or near average water supply years, the above supplies are adequate to meet present needs. In a drought year, some shortages would occur.

New Municipal and Industrial Water Requirements

The future municipal and industrial water requirements for the Jensen Unit area, including those resulting from the rapidly expanding petroleum, oil shale, tar sands, and related industries in the area were estimated by the Bureau of Reclamation and are summarized in Table 20. The development of these requirements is discussed in detail in the Definite Plan Report, Chapter II, "Problems and Needs." Most demands are expected to be concentrated mainly in the area near Vernal and Jensen which will be served by the Ashley Valley Municipal System. Expansion of this system will be necessary.

Water used directly for mining and processing the oil shale will probably be obtained from either the White River or Green River. An additional requirement for industrial water in the Jensen Unit area is anticipated, however. Stauffer Chemical Company recently postponed plans for expansion of its operation located north of Vernal, but these plans could be revived at anytime in the future. Further development of natural crude oil from bituminous sands in the area is expected. Future production of the crude oil may warrant a refinery in the basin. Mining of gilsonite would be expanded if the demand for this mineral increases. The projected municipal and industrial water requirements are shown on the following page (Table 20).

The estimated monthly distribution of the new municipal and industrial demand as used in the water supply operation studies is shown below. This demand is a combined variable 10,000-acre-foot and uniform 8,000-acre-foot municipal and industrial demand.

The estimated monthly demand is as follows.

Estimated monthly demand for municipal and industrial water

Month	Percent	Acre-feet
January	6.7	1,200
February	5.6	1,000
March	6.7	1,200
April	7.8	1,400
May	10.5	1,900
June	11.7	2,100
July	11.1	2,000
August	10.0	1,800
September	9.4	1,700
October	8.3	1,500
November	6.1	1,100
December	6.1	1,100
Total	100.0	18,000

Table 20
Estimated new municipal and industrial water requirements and supply
(Unit--acre-feet)

Year	Level of oil shale development	Estimated new population	New municipal water 1/	New industrial water 2/	Total new municipal and industrial water	Available from Jensen Unit	Remaining requirement
1975	Prototype	2,200	600		600		600
	Moderate commercial	2,200	600		600		600
	Accelerated commercial	2,600	700		700		700
1980	Prototype	18,300	4,600	0	4,600	6,000	
	Moderate commercial	19,000	4,800	1,300	6,100	6,000	100
	Accelerated commercial	20,800	5,200	1,300	6,500	6,000	500
1985	Prototype	19,700	4,900	100	5,000	18,000	
	Moderate commercial	21,300	5,300	2,700	8,000	18,000	
	Accelerated commercial	28,100	7,000	4,900	11,900	18,000	
1990	Prototype	15,700	3,900	100	4,000	18,000	
	Moderate commercial	24,700	6,200	2,900	9,100	18,000	
	Accelerated commercial	32,600	8,200	5,100	13,300	18,000	
1995	Prototype	17,900	4,500	100	4,600	18,000	
	Moderate commercial	32,800	8,200	3,500	11,700	18,000	
	Accelerated commerical	34,800	8,700	5,700	14,400	18,000	
2000	Prototype	20,200	5,100	200	5,300	18,000	
	Moderate commercial	39,900	10,000	3,500	13,500	18,000	
	Accelerated commercial	41,800	10,500	5,700	16,200	18,000	

1/ Estimated at 0.25 acre-foot per capita.
2/ Industry other than oil shale.

Irrigation Requirements

The Jensen Unit will provide a supplemental supply of water to about 3,640 acres of presently irrigated land plus a full supply of water to about 440 acres of new lands. About 330 acres of class 6W lands do not qualify for project water but will continue to receive their present irrigation water delivered under existing water rights.

Consumptive use

Consumptive use is defined as the quantity of water used by the crops in the building of plant tissue together with that evaporated from the area. It includes the amount of water used by the crops from all sources, whether it be water from precipitation, irrigation, or ground water.

In determining the amount of the water requirement that could be supplied by precipitation, consideration was given to the effectiveness of single storms, carryover of winter precipitation in the form of soil moisture, and effective growing season precipitation. A conservative estimate for the net effective precipitation was considered as being 90 percent of the average precipitation occurring during the 10 driest growing seasons of record.

Consumptive use minus effective precipitation gives the irrigation requirement or the net amount of irrigation water that must be supplied to the crops. The consumptive use was computed using the procedure authorized in Soil Conservation Service Technical Release No. 21.

The average annual consumptive use by crops for the Jensen Unit is shown in Table 21. Also shown in this table is the weighted irrigation requirement and the distribution, by months, determined on the basis of the crops expected to be grown under project conditions.

Table 21
Consumptive use, irrigation requirement, and monthly distribution

Crop	Percent of total	Annual consumptive use in feet	
		Total	Weighted
Alfalfa	44	2.19	0.96
Small grains	16	1.29	.21
Corn silage	8	1.77	.14
Pasture	32	2.17	.70
Total	100		2.01
Weighted effective precipitation			.14
Weighted irrigation requirement			1.87

	October	April	May	June	July	August	September	Total
Irrigation requirement	0.03	0.09	0.30	0.45	0.52	0.40	0.08	1.87
Percent	1.6	4.8	16.0	24.1	27.8	21.4	4.3	100.0