

SEVENTH ANNUAL REPORT

BEAR RIVER  
COMMISSION

1964



For the Report Year October 1, 1963 to  
September 30, 1964

LOGAN, UTAH

April 1, 1965

**IN MEMORIAM**



**MELVIN LAURIDSEN**

**Commissioner from Idaho  
Bear River Compact Commission,  
1951-58  
Bear River Commission, 1958-64**

## BEAR RIVER COMMISSION

P. O. BOX 413  
LOGAN, UTAH

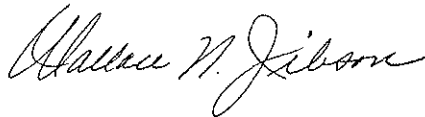
April 1 ,1965

Mr. President:

Submitted herewith is the Seventh Annual Report of the Bear River Commission, as required by Article III D 2 of the Bear River Compact.

A copy of the report is being transmitted to the Governor of each signatory State to the Bear River Compact.

Very truly yours,

A handwritten signature in cursive script, reading "Wallace N. Jibson".

Wallace N. Jibson  
Assistant Secretary

The President  
*The White House*  
*Washington, D. C.*

## CONTENTS

Letter of Transmittal .....	3
Introduction .....	9
Organization .....	9-10
Meetings .....	11
Budget and Fiscal Disbursements .....	11
Stream-Gaging Program .....	12
Water Supply .....	12
Administration of Bear River Compact .....	16
Streamflow Distribution .....	19
Upper Division .....	19
Central Division .....	19
Lower Division .....	20
Interstate Tributaries .....	20
Storage .....	21
New Storage .....	21
Bear Lake .....	21
Applications for Appropriation .....	22
Appendix A—Auditor's Report .....	33-37
Appendix B—Gaging-Station Records .....	38-63

## ILLUSTRATIONS AND TABLES

Frontispiece, Map of Bear River Basin .....	4-5
Figure 1. Comparative Flow at Three Gaging Stations .....	13
Figure 2-3. Water Supply Hydrographs .....	14-15
Figure 4. Bear Lake Bar Graph .....	17
Figure 5. Bear Lake Hydrograph .....	18
Figure 6-7. Upper Division Hydrographs .....	23-24
Figure 8. Woodruff Narrows Reservoir Hydrograph .....	25
Figure 9-10. Central Division Hydrographs .....	26-27
Tables 1-5. Central Division Tabulation of Diversions .....	28-32

# SEVENTH ANNUAL REPORT OF THE BEAR RIVER COMMISSION

April 1, 1965

## INTRODUCTION

The Bear River Compact determines the rights and obligations of the signatory States of Wyoming, Idaho, and Utah with respect to the waters of Bear River. Federal consent to the Compact was given by the Congress and signed by the President, March 17, 1958. The Bear River Commission was organized as an interstate agency to administer the Compact.

Article III D 2 of the Compact provides that the Bear River Commission shall compile annually a report covering the work of the Commission for the water year ending the previous September 30 and transmit it to the President of the United States and to the Governors of the signatory States on or before April 1 of each year.

Activities of the Bear River Commission during the water year ending September 30, 1964 are summarized in this report. Financial report of the auditors and daily streamflow records are shown in the appendixes.

## ORGANIZATION

Ten commissioners, three representing each State and one the United States, constitute the Bear River Commission. The Federal representative serves as Chairman without vote.

A long and dedicated career as a member of the Commission ended with the untimely passing in October 1964 of Melvin Lauridsen, Montpelier, Idaho. Commissioner Lauridsen had served since 1951, first with the negotiating Commission and since 1958 with the Bear River Commission.

**OFFICERS**

Chairman ..... E. O. Larson, Salt Lake City, Utah  
Vice-Chairman ..... Lawrence B. Johnson, Randolph, Utah  
Secretary-Treasurer ..... Jay R. Bingham, Bountiful, Utah  
Assistant Secretary ..... Wallace N. Jibson, Logan, Utah

**MEMBERS**

**Idaho**

Cleo L. Swenson ..... Preston, Idaho  
Melvin Lauridsen ..... Montpelier, Idaho  
Carl E. Tappan ..... Boise, Idaho

**Utah**

Jay R. Bingham ..... Bountiful, Utah  
Lawrence B. Johnson ..... Randolph, Utah  
A. V. Smoot ..... Corinne, Utah

**Wyoming**

Floyd A. Bishop ..... Cheyenne, Wyoming  
S. Reed Dayton ..... Cokeville, Wyoming  
J. W. Myers ..... Evanston, Wyoming

**United States**

E. O. Larson ..... Salt Lake City, Utah

**Budget**

A. V. Smoot ..... Corinne, Utah  
J. W. Myers ..... Evanston, Wyoming  
Melvin Lauridsen ..... Montpelier, Idaho

**Operations**

Cleo L. Swenson ..... Preston, Idaho  
Lawrence B. Johnson ..... Randolph, Utah  
S. Reed Dayton ..... Cokeville, Wyoming

## MEETINGS

Meetings of the Commission were held in accordance with the bylaws as follows:

Regular Meeting — November 26, 1963 — Salt Lake City, Utah  
Annual Meeting — April 28, 1964 — Salt Lake City, Utah

## BUDGET AND FISCAL DISBURSEMENTS

### ADOPTED BUDGET

	<i>Fiscal Year Ending 6-30-1964</i>	<i>Fiscal Year Ending 6-30-1965*</i>	<i>Total Biennium Ending 6-30-1965</i>
<b>Compact Administration</b>			
Personal Services .....	\$ 7,180	\$ 7,180	\$14,360
Travel and Subsistence .....	1,400	1,400	2,800
General Office Expense .....	450	450	900
Fiscal and Administrative .....	920	920	1,840
Washington Office Tech. Charge .....	400	400	800
Printing and Reproduction .....	700	700	1,400
Treasurer (Bond and Audit) .....	400	400	800
Transcribing Minutes .....	150	150	300
Legal Retainer Fee .....	300	300	600
Miscellaneous .....	100	100	200
Sub-Total .....	\$12,000	\$12,000	\$24,000
<b>Stream-Gaging Program</b>			
U.S. Geological Survey .....	\$37,500	\$38,344	\$75,844
Total .....	\$49,500	\$50,344	\$99,844

### ALLOCATION OF BUDGET

U .S. Geological Survey .....	\$18,750	\$19,594	\$38,344
State of Idaho .....	10,250	10,250	20,500
State of Utah .....	10,250	10,250	20,500
State of Wyoming .....	10,250	10,250	20,500
Total .....	\$49,500	\$50,344	\$99,844

\*Federal allocation revised

All disbursements of Commission funds are made by check on vouchers signed by the Secretary-Treasurer, and approved and countersigned by the Chairman or Vice-Chairman.

The audit of accounts and records, including balance sheet of June 30, 1964 and statement of budget revenue and appropriation accounts for the fiscal year ended June 30, 1964, are included in this report as appendix A.

## STREAM-GAGING PROGRAM

A cooperative, basin-wide program of stream gaging is administered by the Geological Survey project engineer at Logan, Utah. The Geological Survey and Bear River Commission contribute equally to finance the collection of daily streamflow records at about 40 gaging stations. An additional eight gaging stations in the basin are operated by Utah Power & Light Company in connection with Federal Power Commission projects. Streamflow records of significance to the Commission are published herein as appendix B.

Five gaging stations were installed in April 1964 on Bear River, Logan River, and Malad River in Cache and Box Elder Counties (Utah) to get streamflow records for Bureau of Reclamation development studies. Construction and operational charges for one year have been paid by the Bureau, but operation beyond this period will be paid under the cooperative program.

Seasonal daily or partial records were collected on about 130 diversions above Bear Lake by district water commissioners under the general supervision of the Geological Survey. These records include all of the diversions from Bear River main stem and Smiths Fork, as they are required to administer the Bear River Compact. Daily discharge records for canals in the Central Division (see frontispiece map) are listed in tables 1-5; those in the Upper Division are not published herein but are maintained in the Commission files.

## WATER SUPPLY

Runoff in the basin above Bear Lake in 1964 exceeded the long-time average for the second year in the past seven of river administration under the Bear River Compact. Bear River and Smiths Fork seasonal runoff was 113 percent of average and produced an adequate direct-flow supply for irrigation. Idaho tributaries below Bear Lake also were above average in runoff, but those in Utah were below average.

Monthly and yearly runoff in 1964 at three representative gaging stations is compared with a longtime average in the bar graphs (fig. 1) and is summarized for the irrigation season and water year in the table below. Runoff at two of these stations is the major supply to the Upper and Central Divisions so is plotted also as daily hydrographs in figures 2 and 3.

### *Runoff in Acre-feet May-September*

	Average 1943-64	1963	1964
Upper Bear River .....	109,700	87,200	120,600
Smiths Fork .....	101,700	89,700	117,600
Logan River .....	116,200	93,900	114,100



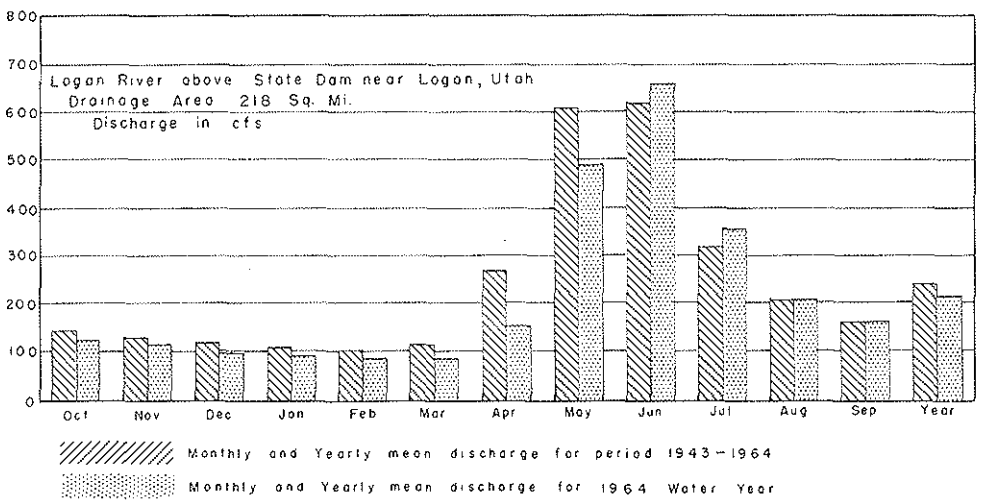
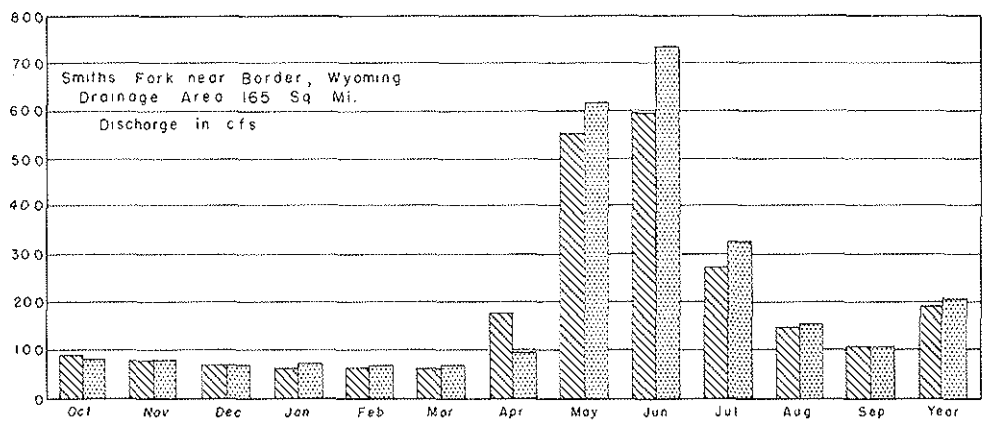
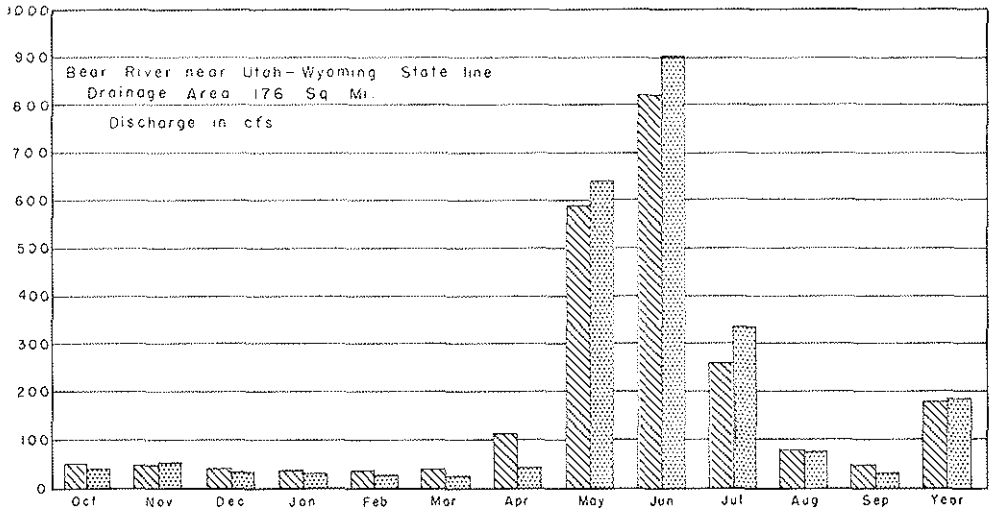
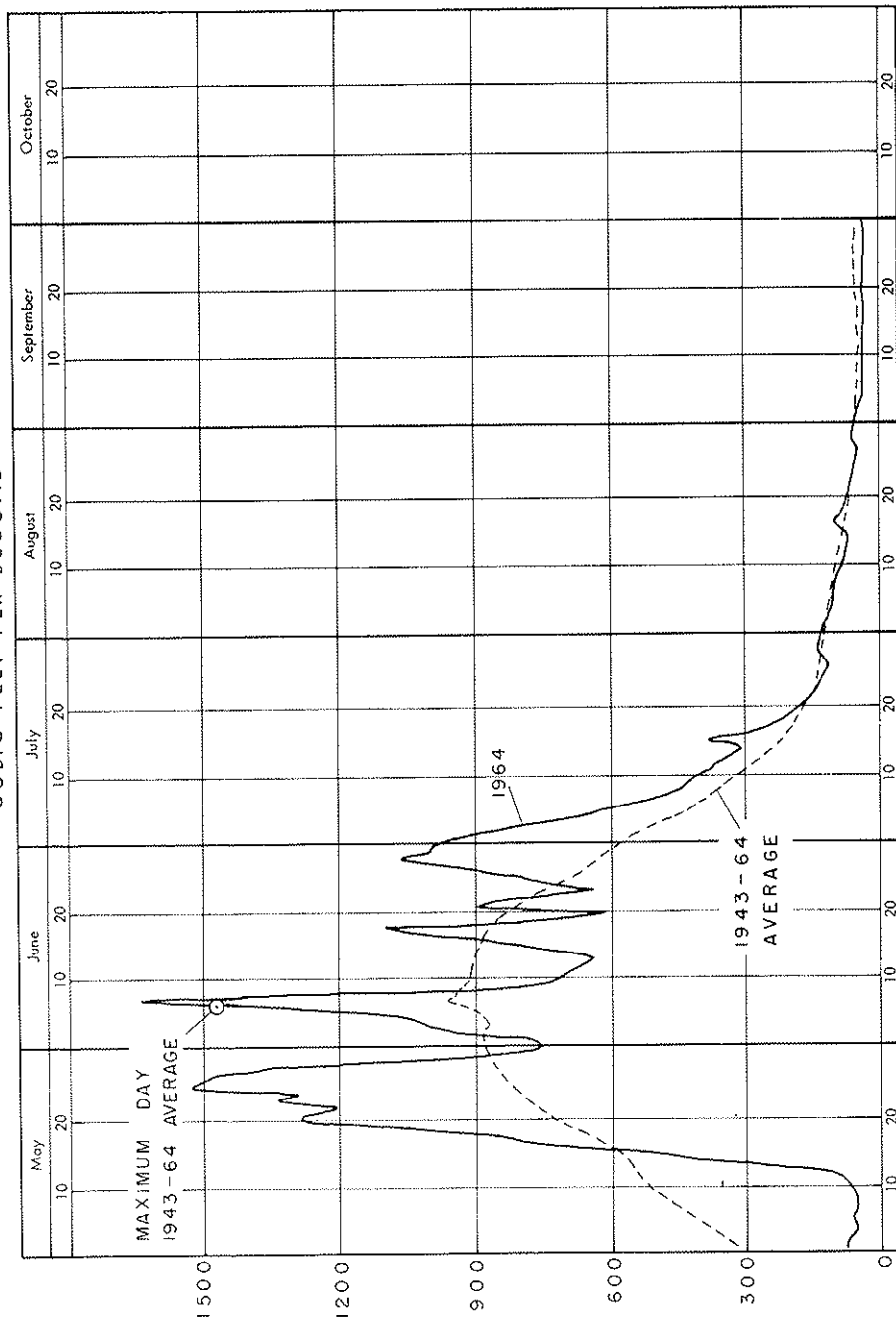


Figure 1 Comparison of discharge at three representative gaging stations during 1964 with average discharge for period 1943-64

UPPER DIVISION - BEAR RIVER SUPPLY \*

CUBIC FEET PER SECOND



\* BEAR RIVER NEAR UTAH-WYOMING STATE LINE

Figure 2

CENTRAL DIVISION - SMITHS FORK SUPPLY \*  
CUBIC FEET PER SECOND

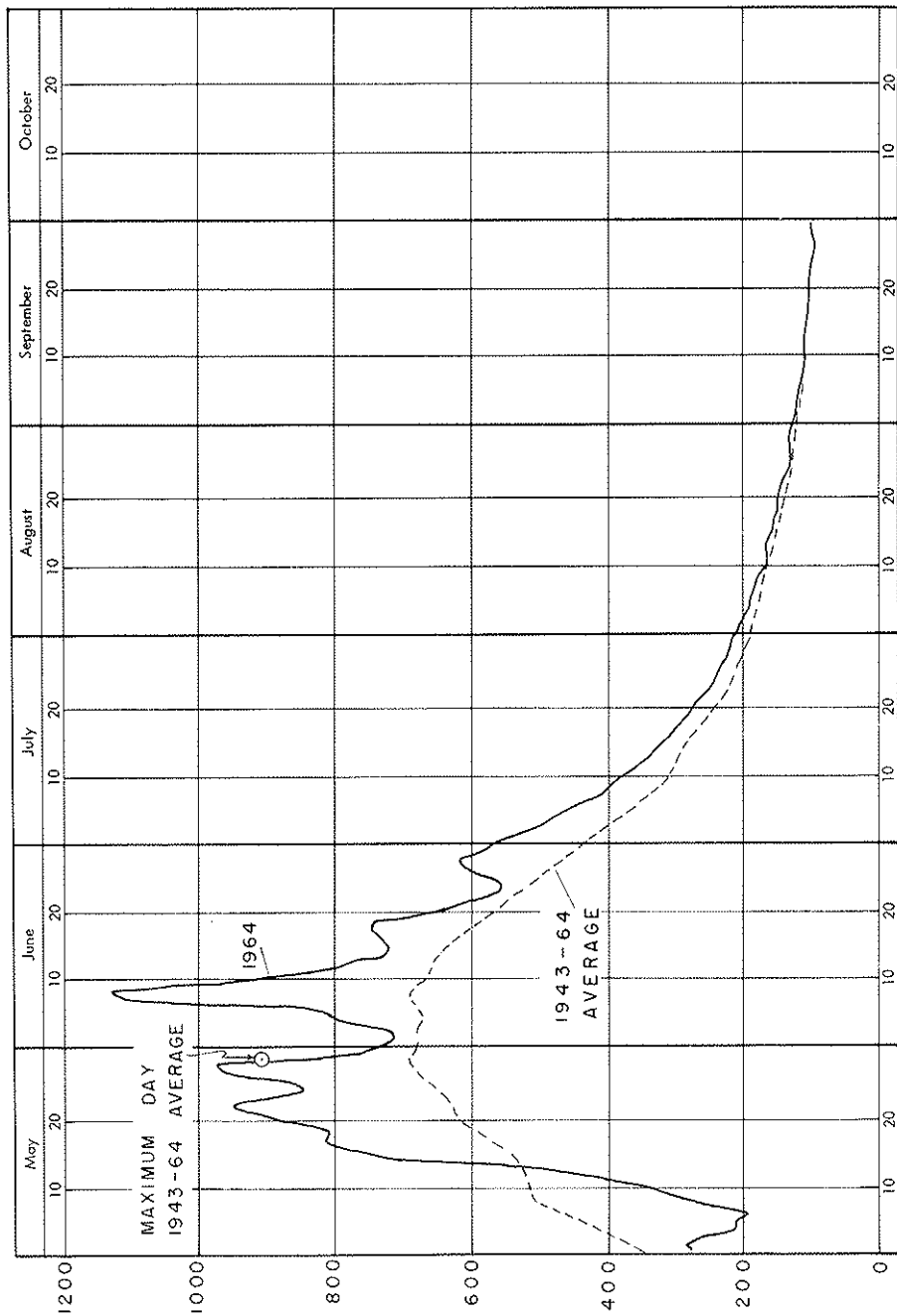


Figure 3

\* SMITHS FORK NEAR BORDER, WYOMING

*Runoff in Acre-feet  
Water Year*

	1943-64	1963	1964
Upper Bear River .....	131,400	102,400	135,600
Smiths Fork .....	137,800	120,700	149,500
Logan River .....	175,200	145,900	159,100

Bear Lake content increased 153,500 acre-feet in 1964 as shown in the bar graph (fig. 4) and in the hydrograph (fig. 5). Natural tributaries to the lake again accounted for a slight gain over evaporation losses, whereas Bear River inflow far exceeded the outflow and accounted for most of the gain. Daily content of the lake is tabulated with streamflow records in appendix B, and comparative elevations are shown in the following table:

*Bear Lake elevation  
Utah Power & Light Co. datum*

<i>Water Year</i>	<i>Beginning of Water Year</i>	<i>End of Storage Period</i>	<i>End of Water Year</i>
1962 .....	5,909.75	5,915.70	5,913.44
1963 .....	5,913.43	5,915.63	5,912.93
1964 .....	5,912.93	5,917.67	5,915.23

### ADMINISTRATION OF BEAR RIVER COMPACT

Provisions of the Compact are administered and enforced by direction of the Bear River Commission. However, water rights within each State are adjudicated and administered in accordance with State law subject to limitations provided in the Compact.

Cooperative stream-gaging agreements with the Geological Survey include a program of administrative and technical assistance to the Commission financed without matching Federal funds. This program is directed by the Geological Survey project engineer at Logan, and the project office is also the principal office of the Commission.

The project engineer is Assistant Secretary to the Commission with responsibility of providing technical assistance and current streamflow information required to administer the Compact. He establishes operational procedures, conducts hydrologic studies, compiles annual reports, and maintains the records of the Commission.

Expenses incurred by the Bear River Commission are paid equally by the signatory States. Compensation and expenses of the Federal representative, each commissioner, and each adviser are paid by the Government which he represents.

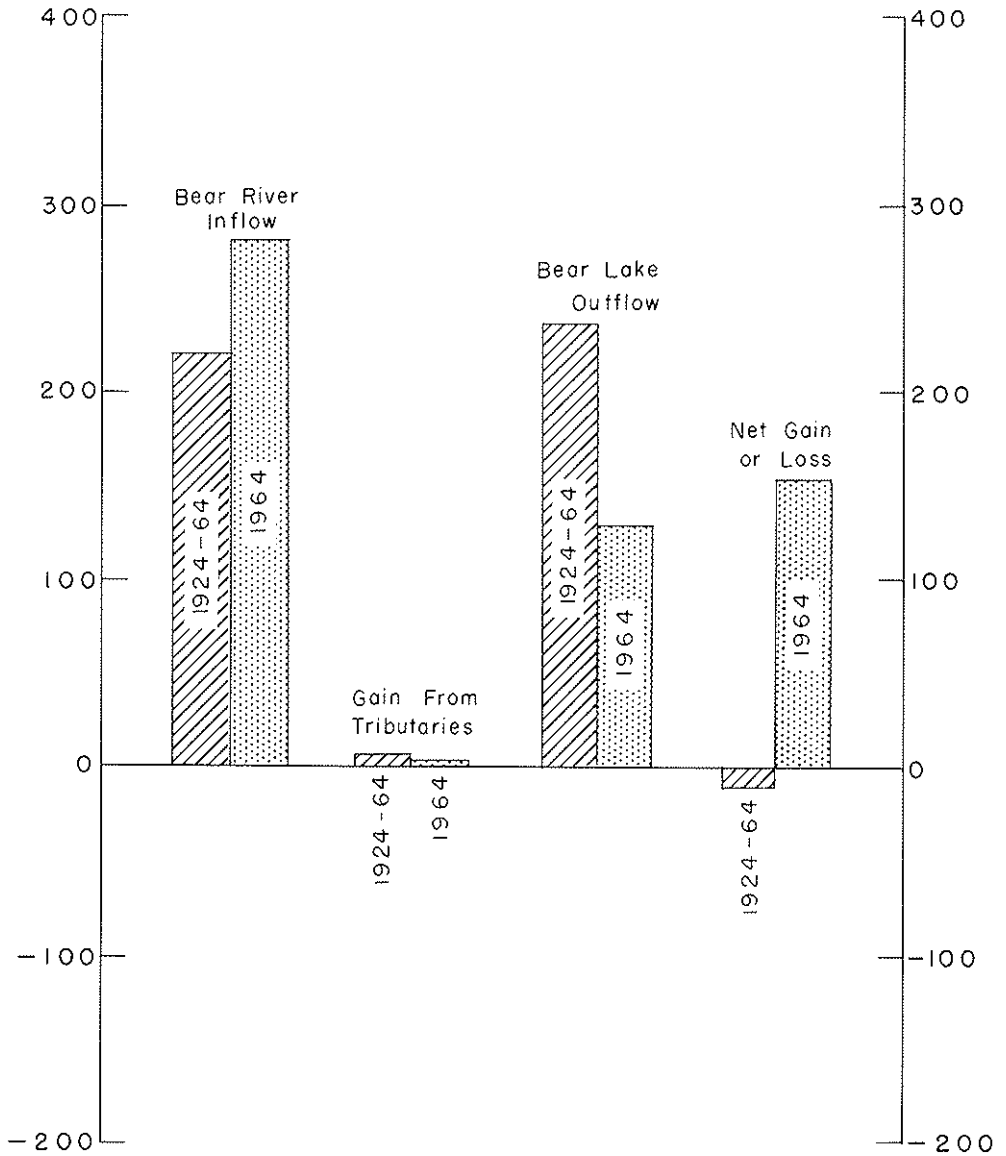


Fig 4. BEAR LAKE  
Annual Quantities in Thousands of Acre-Feet

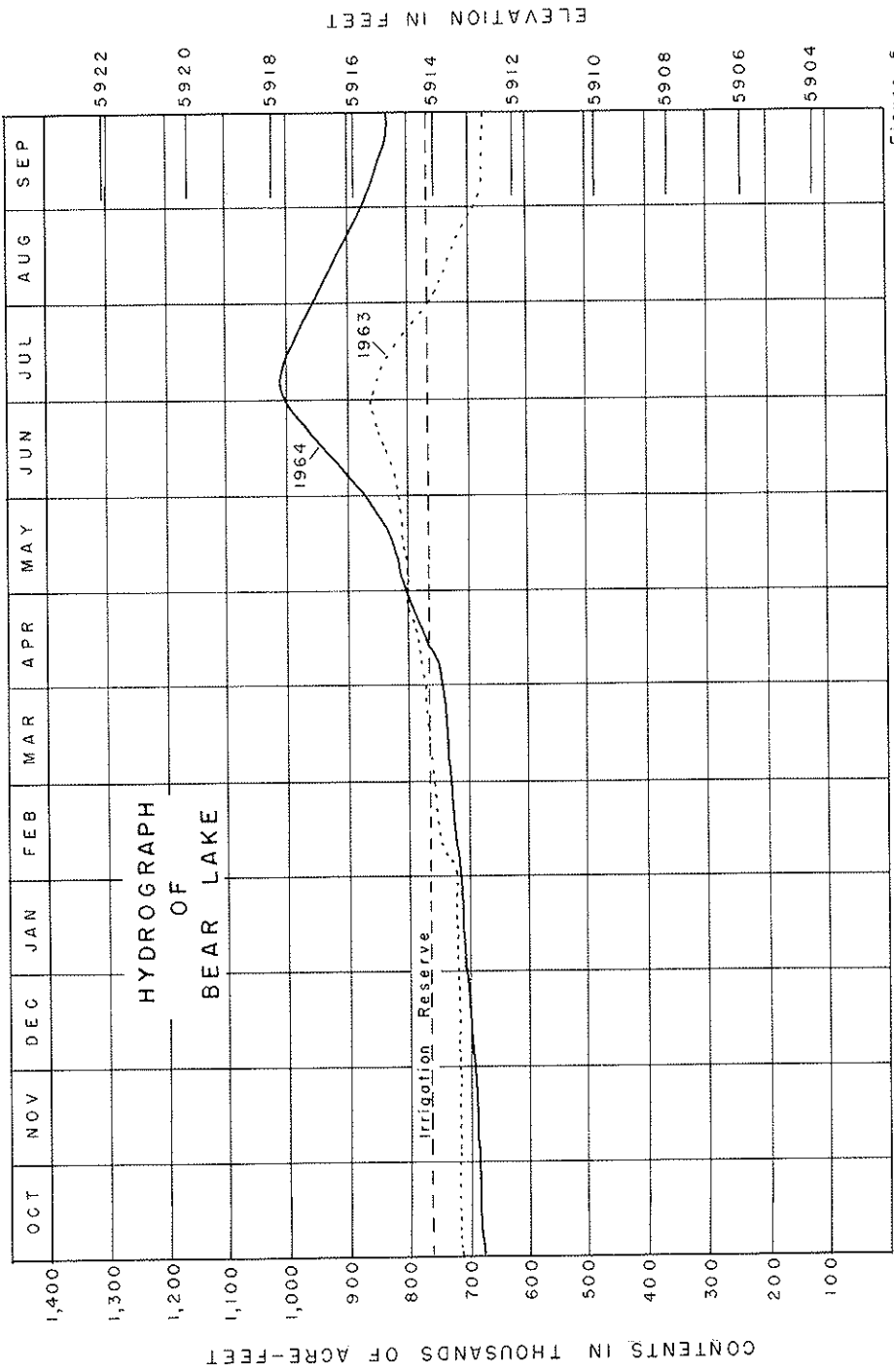


Figure 5

## STREAMFLOW DISTRIBUTION

Records of diversions from Bear River main stem above Bear Lake and from Smiths Fork were collected by district water commissioners and submitted weekly to the Assistant Secretary. He computed section diversions and allocations and informed these district commissioners and members of the Commission of the quantities diverted and of State section allocations, where applicable, for such regulatory action needed to comply with the Compact.

### Upper Division

The Upper Division comprises that part of the basin above and including Pixley Dam and includes two sections in Wyoming and two in Utah. The Compact provides that when the total diversions in the division plus the flow passing Pixley Dam is less than 1,250 cfs (divertible flow), a water emergency exists and such divertible flow is allocated to sections as follows:

Upper Utah Section Diversions .....	0.6 percent
Upper Wyoming Section Diversions .....	49.3 percent
Lower Utah Section Diversions .....	40.5 percent
Lower Wyoming Section Diversions .....	9.6 percent

Divertible flow was less than 1,250 cfs prior to May 18 and subsequent to July 9. Upper Wyoming Section diverted less than allocated (fig. 6) during most of the period of emergency. The Compact provides that an unused allocation in one section of a State in the Upper Division shall be available to the other section of the State; therefore, when Lower Wyoming Section ceased diverting during the first part of July (fig. 7) allocation to Upper Wyoming Section became 58.9 percent of the divertible flow. Thereafter, a normal or usual rate of diversion without Compact regulation did not exceed the allocation.

Water diverted in Lower Utah and Lower Wyoming sections of the Upper Division including that released from Woodruff Narrows Reservoir is shown in figure 7. A hydrograph of the reservoir (fig. 8) shows that it filled to spillway crest by April 17 and by regulation was maintained near the crest until about July 5 when natural flow was insufficient to meet irrigation demand and about 2,000 acre-feet was released. The principal draft however came in late August when 11,000 acre-feet was released in a period of 6 days for irrigation of fall pasture land. The reservoir was being maintained on September 30, 1964 near 9,760 acre-feet, including irrigation and fishery holdover storage, which would permit filling in 1965 to spillway crest with allocated storable flow.

### Central Division

The Central Division comprises that part of the basin from Pixley Dam down to and including Stewart Dam (the point of diversion to Bear Lake). It includes a section in Wyoming and one in Idaho.

Divertible flow in the Central Division is the sum of diversions from Smiths Fork and designated tributaries, diversions from Bear River in the division, and flow passing Stewart Dam. A water emergency shall exist when this divertible flow is less than 870 cfs, or when Bear River entering Idaho (gaging station at Border) is discharging less than 350 cfs. Wyoming diversions are limited to 43 percent of the divertible flow during a water emergency.

Divertible flow in this division was less than 870 cfs for 5 days in May and after July 21 for the balance of the season. (See figure 9 and tables 1-5.) Flow in Bear River entering Idaho was less than 350 cfs after July 24 for the balance of the season. Distribution of natural flow during these periods of water emergency was in accordance with Compact allocation, and only for a brief period did Wyoming diversion exceed the allocation and then by a negligible amount.

Similar hydrographs for those shown in figure 9 for Wyoming Section are shown in figure 10 for Idaho Section. In the table below is a comparison of water diverted to irrigated lands in the two sections for the past four years. The flow passing Stewart Dam and the flow diverted to Bear Lake have been excluded in computing the Idaho diversion rate, though these flows are included in the total divertible flow in the division.

*Diversion in acre-feet per acre*

*May-September*

	1961	1962	1963	1964
Wyoming Section .....	2.16	5.82	5.06	4.48
Idaho Section .....	1.72	3.26	3.28	2.91

**Lower Division**

Authority is given the Commission upon its own motion to declare a water emergency in any division, and in the Lower Division such a declaration may be made also upon petition of an aggrieved Utah user against an Idaho user. Upon declaration of an emergency, the Commission is required to enforce water-delivery schedules based on priority of rights without regard to State lines.

There were no petitions filed with the Commission or water emergencies declared in the Lower Division in 1964.

**Interstate Tributaries**

An aggrieved lower-State user on an interstate tributary may petition for declaration of a water emergency and distribution of flow under direction of the Commission. Interstate arbitration on tributaries was not requested in 1964.



## STORAGE

### New Storage

The Compact defines storage rights in existing reservoirs above Bear Lake and provides for an additional storage allowance of 36,500 acre-feet annually. Idaho users on Thomas Fork are allotted 1,000 acre-feet of this amount and the remainder is divided equally between Wyoming and Utah.

The reservoirs shown below have been constructed under additional storage provisions of the Compact, and all were filled to capacity in 1964. A total allocation to Woodruff Narrows Reservoir for storage of 18,240 acre-feet includes 15,240 acre-feet from Utah and 3,000 acre-feet from Wyoming.

<i>Reservoir</i>	<i>Allocation</i>
Sulphur Creek Reservoir (Wyoming) .....	4,615 ac-ft
J. L. Martin Reservoir, Sulphur Creek (Wyoming) .....	88 ac-ft
A. J. Barker Reservoir, Yellow Creek (Utah) .....	162 ac-ft
Hatch Brothers Reservoir (Utah) .....	350 ac-ft
Woodruff Narrows Reservoir (Utah-Wyoming) .....	18,240 ac-ft
Total Allocation .....	23,455 ac-ft

### Bear Lake

Article V of the Compact provides an irrigation reserve level in Bear Lake below which water shall not be released solely for generation of power, except in emergency, but after release for irrigation it may be used in generating power as it is conveyed to irrigation diversion works. The reserve is to be increased by designated amounts as additional storage, under terms of the Compact, is developed above Bear Lake. The irrigation reserve was increased by Commission resolution April 30, 1962 to include the water in the lake below elevation 5,914.15 feet (764,000 ac-ft).

Bear Lake was below the irrigation reserve level during the first half of the water year and until early spring runoff raised it above the reserve level on April 13, 1964. The lake remained above this level for the balance of the water year. (See hydrograph, figure 5.) Daily discharge of Bear Lake Outlet Canal (appendix B) shows that water was not released for power purposes during the October-April restrictive period. Further, daily discharge of Bear River near Collinston indicates that Bear Lake water was not used solely for power generation during the summer period of release.

## APPLICATIONS FOR APPROPRIATION

Article X of the Compact states, "Applications for appropriation, for change of point of diversion, place and nature of use, and for exchange of Bear River water shall be considered and acted upon in accordance with the law of the State in which the point of diversion is located, but no such application shall be approved if the effect thereof will be to deprive any water user in another State of water to which he is entitled. The official of each State in charge of water administration shall, upon the filing of an application affecting Bear River water, transmit a copy thereof to the Commission."

In general, applications for appropriation presented to the Commission in 1964 applied to ground water development to supplement irrigation supply in the basin below Bear Lake. Applications (excluding those for non-consumptive use) in the three States totaled 52 cfs, most of which applied to ground water in Cache and Box Elder Counties, Utah.

# UPPER DIVISION — UPPER WYOMING SECTION CUBIC FEET PER SECOND

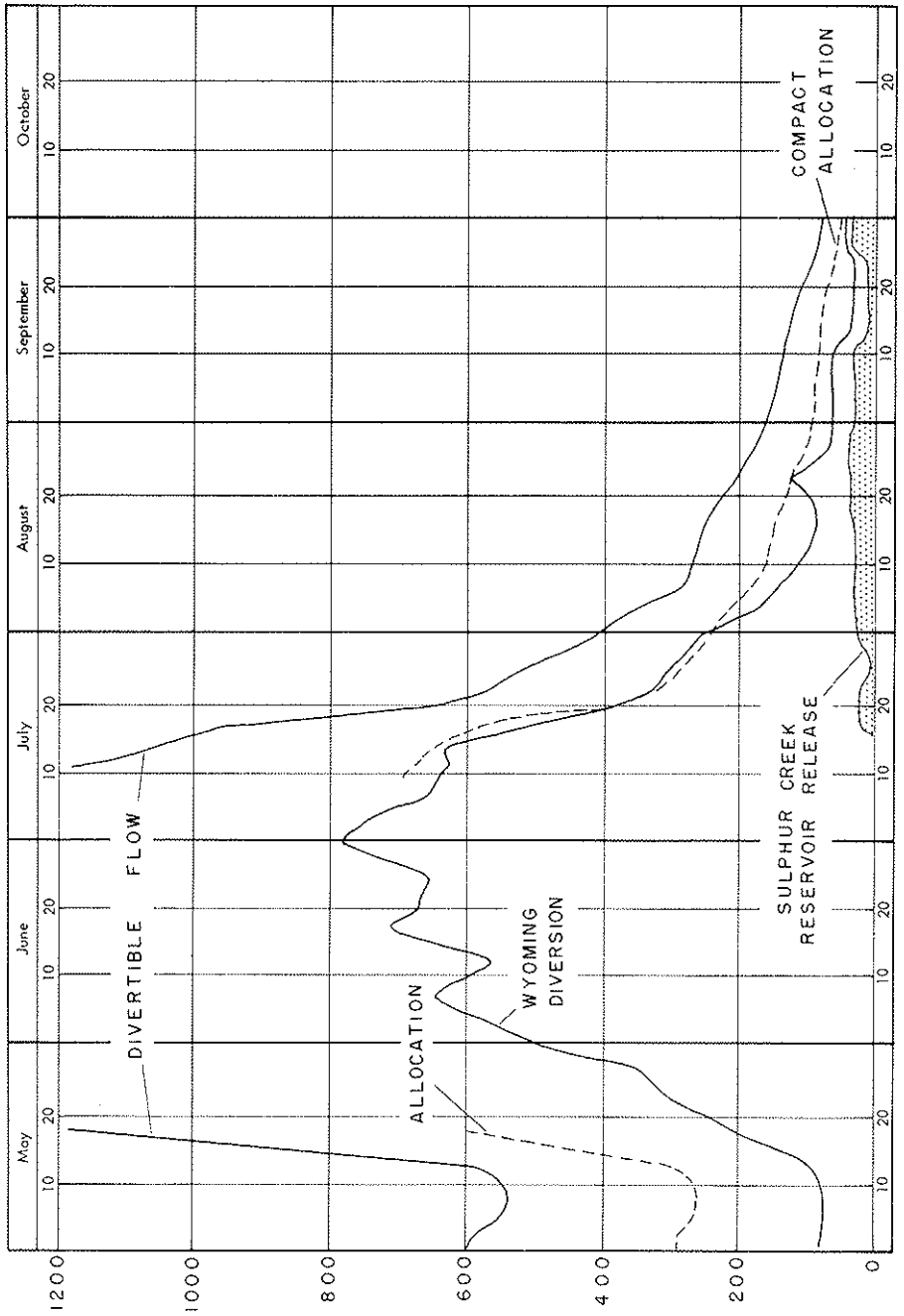


Figure 6

# UPPER DIVISION - LOWER SECTIONS CUBIC FEET PER SECOND

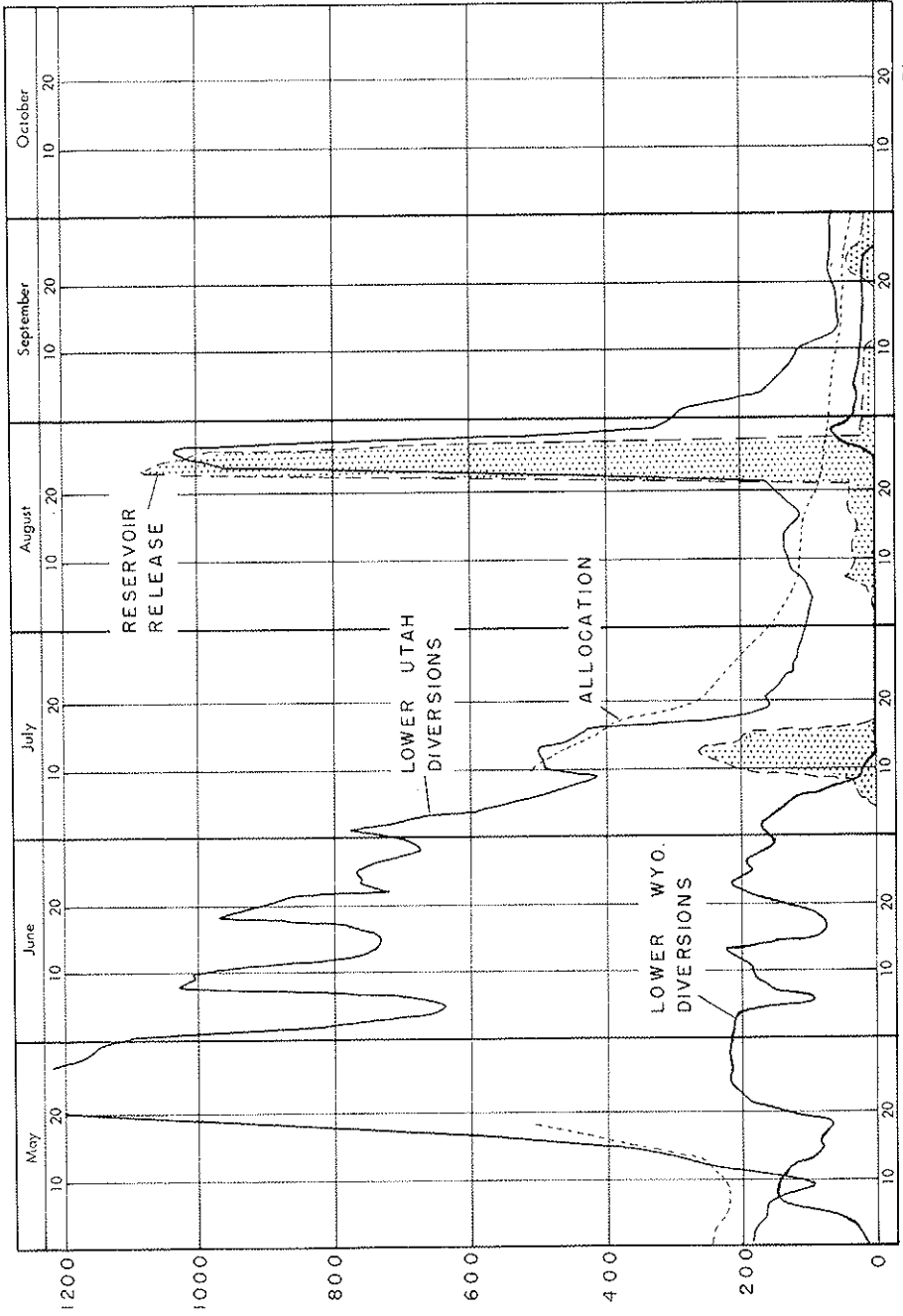


Figure 7

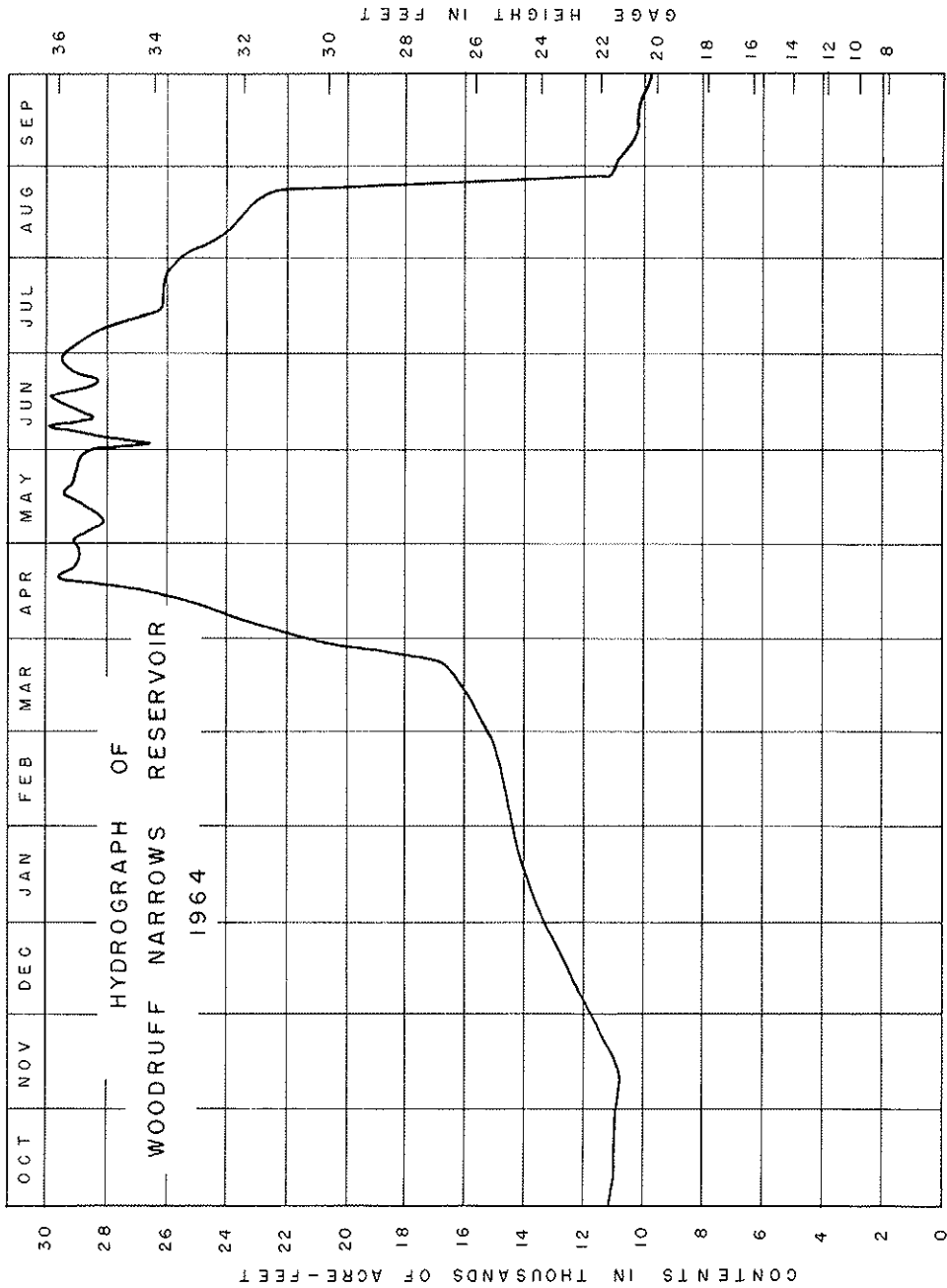


Figure 8

# CENTRAL DIVISION - WYOMING SECTION

## CUBIC FEET PER SECOND

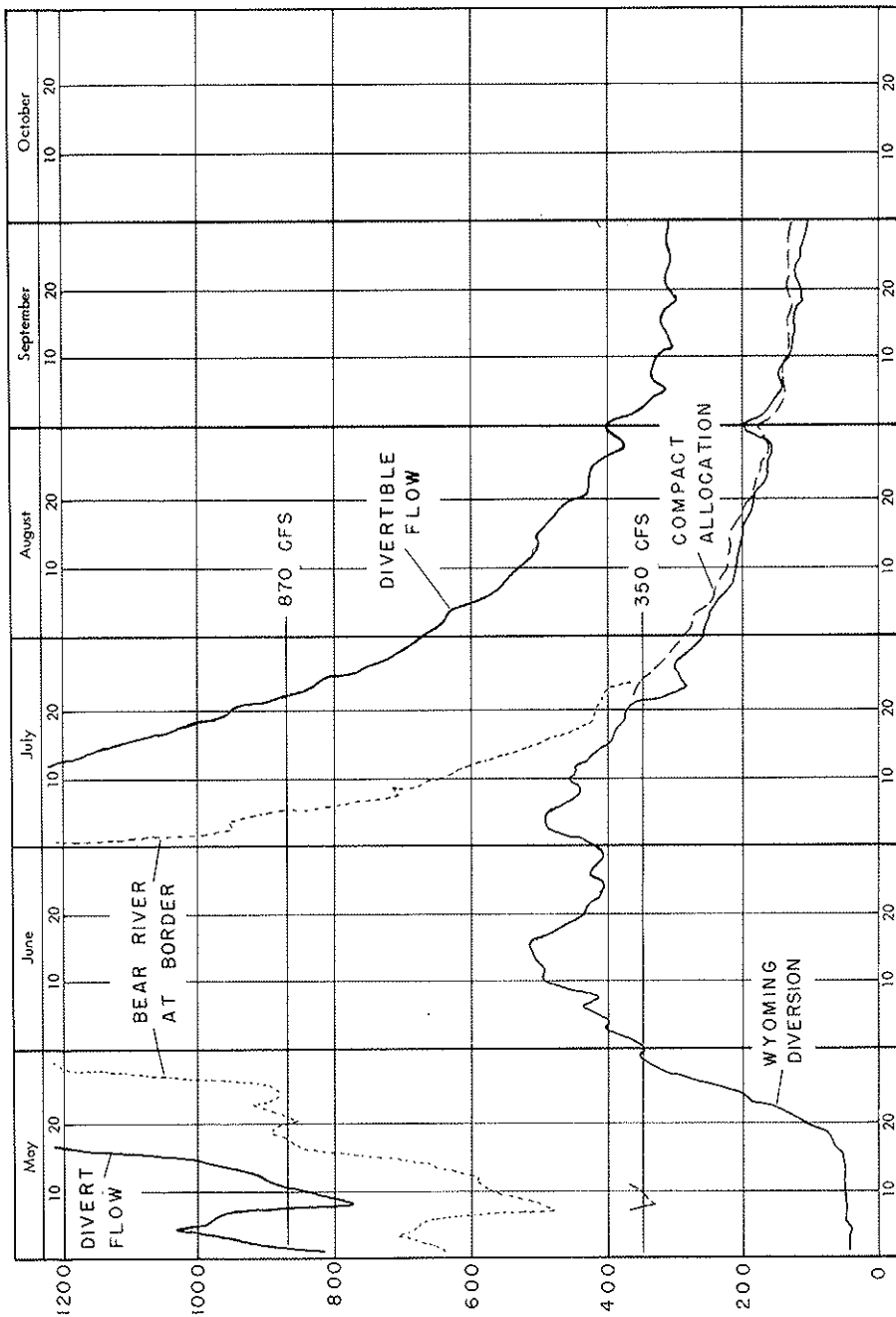


Figure 9

CENTRAL DIVISION - IDAHO SECTION  
CUBIC FEET PER SECOND

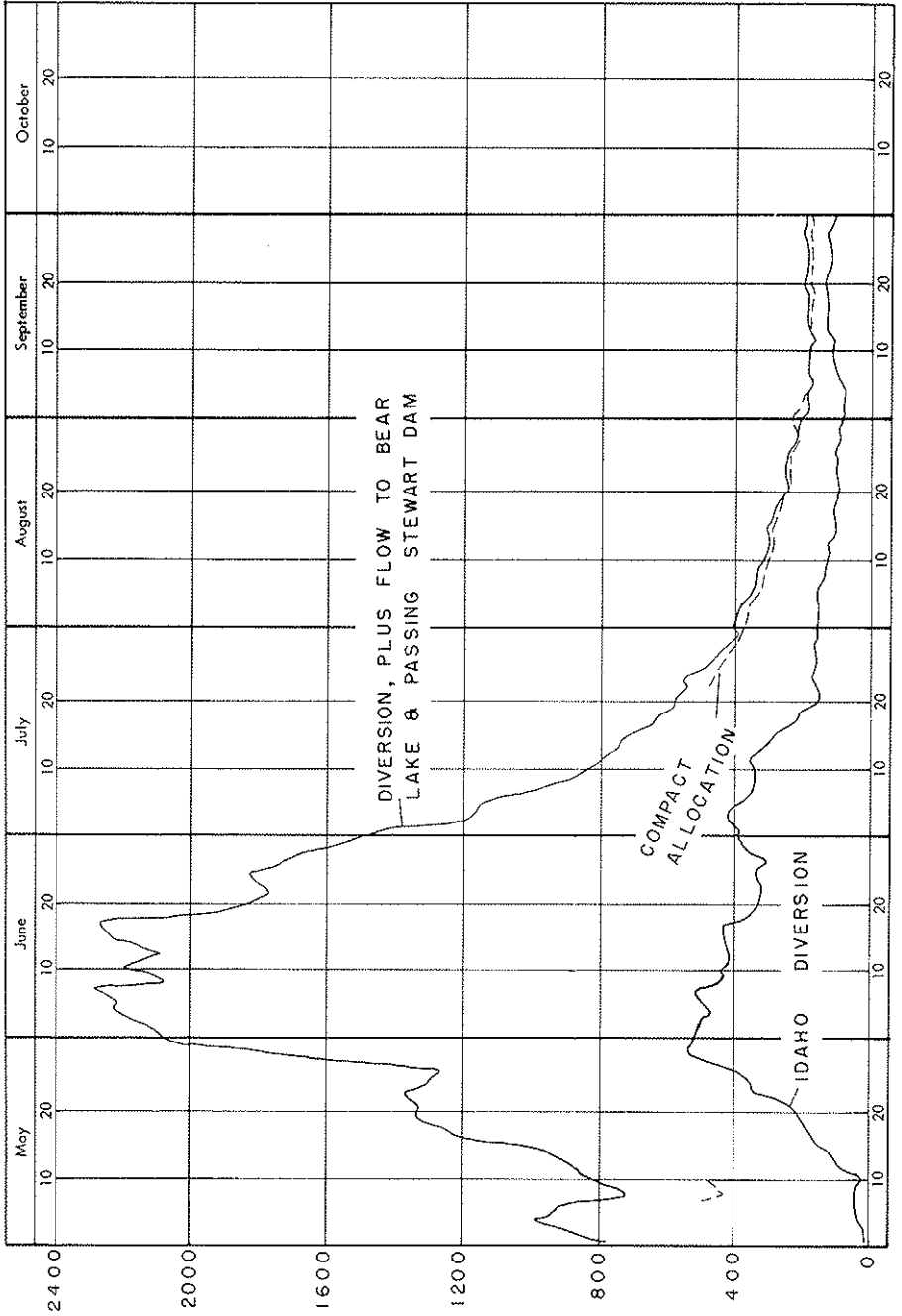


Figure 10

DAILY DISCHARGE IN CFS OF SMITHS FORK & BEAR RIVER CANALS  
WITH COMPACT ALLOCATION IN CENTRAL DIVISION

MAY 1964	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
<b>SMITHS FORK DIVISION</b>	...																														
Upper Smith Fork	...																														
Lower Smith Fork	...																														
Upper Bear River	...																														
Lower Bear River	...																														
<b>BEAR RIVER DIVISION</b>	...																														
Upper Bear River	...																														
Lower Bear River	...																														
<b>TOTAL</b>	...																														

TABLE 1





DAILY DISCHARGE IN CFS OF SMITHS FORK & BEAR RIVER CANALS  
WITH COMPACT ALLOCATION IN CENTRAL DIVISION

JULY 1964	CENTRAL DIVISION																														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
BEAR RIVER CANALS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SMITHS FORK CANALS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BEAR RIVER CANALS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SMITHS FORK CANALS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



# APPENDIX A

L. WILLIAM ANDERSON  
CERTIFIED PUBLIC ACCOUNTANT  
2870 EAST 3300 SOUTH • TELEPHONE 487-7176  
SALT LAKE CITY 9, UTAH

October 5, 1964

Bear River Commission  
Utah State Capitol Building  
Salt Lake City, Utah

Gentlemen:

In accordance with your instructions, I have examined the records and accounts of the Bear River Commission for the fiscal year ended June 30, 1964, and now submit my report thereon.

My audit included a review of the financial transactions, an examination of the statement of revenue and expenditures for the year and budget estimates and related expenditures. I confirmed the funds available at June 30, 1964, by direct correspondence with the depository. My examination was made in accordance with generally accepted auditing standards and accordingly included such tests of the accounting records and such other auditing procedures as I considered necessary in the circumstances. All cash receipts have been properly accounted for and all disbursements were duly authorized and appeared in order. Operational expenditures for the program are made directly by the United States Geological Survey and are set out in detail in my report. Administrative expenses disbursed by the local amounted to \$629.65.

The results of my examination are presented herewith and include comments and explanatory detail as appropriate in the following described statements:

Exhibit "A" - Statement of Revenue and expenditures for the fiscal year ended June 30, 1964.

Exhibit "B" - Statement of available revenue and appropriations thereof for the fiscal year, showing balances unexpended at June 30, 1964.

Schedule "A-1" - Statement of expenditures--stream-gauging program, allocated to the United States Geological Survey and to the Bear River Commission.

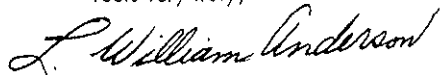
### GENERAL COMMENTS

The Bear River Compact is a tri-state agreement between the signatory States of Wyoming, Idaho and Utah with respect to the development and utilization of the waters of the Bear River. The Bear River Commission was organized April 5, 1958, and by-laws were adopted April 26, 1958, as an interstate administrative agency to carry out provisions of the Bear River Compact. The Commission is composed of ten Commissioners, three each with voting power, representing the States of Wyoming, Utah and Idaho, and one, the United States, without vote. All expenses are charged to and paid by the three States on an equal basis.

As in prior years, the Commission entered into a cooperative agreement with the Geological Survey, United States Department of the Interior, at the beginning of the year, for the operation and maintenance of a gauging-station network. The expenses pertaining to this work are shared equally by the Commission and the Geological Survey, while other expenses incurred by the United States Geological Survey, which pertain directly to the compact administration are wholly financed by the Commission. Details of the financial transactions relating to this agreement for the fiscal year ended June 30, 1964, are presented in Schedule "A-1".

In my opinion, the accompanying statements of revenue and expenditures and supplemental statement of budget appropriations and related disbursements present fairly the cash position of the Bear River Commission at June 30, 1964, and the results of the financial transactions for the period then ended, in conformity with generally accepted accounting principles applied on a consistent basis.

Yours very truly,

A handwritten signature in cursive script that reads "L. William Anderson". The signature is written in dark ink and is positioned to the right of the typed name "L. William Anderson".

BEAR RIVER COMMISSION

Statement of Revenue & Expenditures  
For the Fiscal Year Ended June 30, 1964

REVENUE:

State of Wyoming	\$10,250.00	
State of Utah	10,250.00	
State of Idaho	<u>10,250.00</u>	
		\$30,750.00

EXPENDITURES:

Commission's portion of direct expenses of the stream-gauging program, Exhibit "B":

Personal services	\$20,442.50	
Travel and subsistence	2,789.50	
General office	1,235.00	
Fiscal and administrative	1,144.50	
Washington office charges	<u>2,549.50</u>	
Total--Schedule "A-1"		\$28,161.00

Administrative expenses:

Stationery and postage	\$ 9.65	
Treasurer's bond and audit	250.00	
Transcript of minutes	70.00	
Legal fee	<u>300.00</u>	

629.65      28,790.65

EXCESS OF REVENUE OVER EXPENDITURES FOR  
THE FISCAL YEAR ENDED JUNE 30, 1964

\$ 1,959.35

FUNDS AVAILABLE AT JULY 1, 1963

3,745.95

FUNDS AVAILABLE AT JUNE 30, 1964

\$ 5,705.30

Expenditures as above

\$28,790.65

Portion of expenditures incurred through stream-gauging program allocated and paid direct by United States Geological Survey

18,210.00

Total expenditures as per Exhibit "B"

\$47,000.65

BEAR RIVER COMMISSION

Statement of Available Revenue and Appropriation Thereof  
For the Fiscal Year, Showing Balances Unexpended at June 30, 1964

<u>Cash Revenues:</u>	<u>Available Revenue and Budgeted Estimates of Expenditures</u>	<u>Revenue Expended</u>	<u>Balance or Deficit (-)</u>
Balance--funds on hand at July 1, 1963	\$ 3,745.95	\$ 3,745.95	\$ -0-
Revenue receipts:			
State of Wyoming	10,250.00	10,250.00	-0-
State of Utah	10,250.00	10,250.00	-0-
State of Idaho	10,250.00	10,250.00	-0-
	<u>\$34,495.95</u>	<u>\$34,495.95</u>	<u>\$ -0-</u>
<u>FUNDS FURNISHED DIRECT BY</u>			
<u>UNITED STATES GEOLOGICAL SURVEY</u>	<u>18,750.00</u>	<u>18,210.00</u>	<u>( 540.00)</u>
Total Funds Available	<u>\$53,245.95</u>	<u>\$52,705.95</u>	<u>(\$ 540.00)</u>
<u>Appropriation Accounts:</u>			
Stream-gauging--Schedule "A-1"	\$37,500.00	\$36,420.00	\$1,080.00
Personal services	7,180.00	7,121.00	59.00
Travel and subsistence	1,400.00	1,226.00	174.00
Fiscal unit charge	450.00	404.00	46.00
Washington office charge	920.00	900.00	20.00
General office expense	400.00	300.00	100.00
Printing annual report	700.00	-0-	700.00
Treasurer's bond audit	400.00	250.00	150.00
Transcribing minutes	150.00	70.00	80.00
Legal consultant	300.00	300.00	-0-
Miscellaneous	100.00	9.65	90.35
	<u>\$49,500.00</u>	<u>\$47,000.65</u>	<u>\$2,499.35</u>
Unappropriated at July 1, 1963	<u>3,745.95</u>	<u>-0-</u>	<u>3,745.95</u>
	<u>\$53,245.95</u>	<u>\$47,000.65</u>	<u>\$6,245.30</u>
<u>BALANCE</u>	<u>\$ -0-</u>	<u>\$ 5,705.30</u>	<u>\$5,705.30</u>
<u>FUNDS AVAILABLE AT JUNE 30, 1964</u>		<u>\$ 5,705.30</u>	<u>\$5,705.30</u>

BEAR RIVER COMMISSION

Statement of Expenditures--Stream-Gauging Program  
Allocated to the United States Geological Survey and to the  
Bear River Commission for the Fiscal Year Ended June 30, 1964

	Allocable Expenditures		Charged Direct to Bear River Commission	Total Expenses to Bear River Commission	
	Total	United States Geological Survey 50%			Bear River Commission 50%
Personal services	\$26,643.00	\$13,321.50	\$13,321.50	\$7,121.00	\$20,442.50
Travel and subsistance	3,127.00	1,563.50	1,563.50	1,226.00	2,789.50
General office	1,870.00	935.00	935.00	300.00	1,235.00
Fiscal and administrative	1,481.00	740.50	740.50	404.00	1,144.50
Washington office charge	3,299.00	1,649.50	1,649.50	900.00	2,549.50
	<u>\$36,420.00</u>	<u>\$18,210.00</u>	<u>\$18,210.00</u>	<u>\$9,951.00</u>	<u>\$28,161.00</u>



## APPENDIX B

### GAGING STATION RECORDS

Records of streamflow for State line and other key stations are included herein. The record consists of description of the station and a table showing the daily discharge in cubic feet per second and monthly and yearly runoff in acre-feet for the 1964 water year.

The description of the station gives the location, drainage area, records available, type and history of gage, average discharge, extremes of discharge, general remarks, and a statement of cooperation where applicable. This is essentially the same information published in annual water-supply papers of the Geological Survey.

In the table of daily discharge, the figures for the maximum day and the minimum day for each month are underlined. If the figure is repeated, it is underlined only on the first day of its occurrence.

In the monthly summary below the daily table, the line headed "Total" gives the sum of the daily figures; it is the total second-foot-days for the month. The line headed "Mean" gives the average flow in cubic feet per second (second-feet) during the month. Flow for the month is expressed in acre-feet (line-headed "Ac-ft").

Records included herein have been collected by the U. S. Geological Survey through cooperative agreement with the Bear River Commission and by the Utah Power & Light Company.

# BEAR RIVER BASIN

## 10-0112. West Fork Bear River at Whitney Dam site, near Oakley, Utah

Location.--Lat 40°50'30", long 110°55'20", in NS $\frac{1}{2}$  sec. 9, T.1 N., R.5 E., on left bank, 1,380 ft below proposed Whitney Dam, 7 miles upstream from Deer Creek, 21.6 miles northeast of Oakley.

Drainage area.--7.8 sq mi, approximately.

Records available.--October 1963 to September 1964.

Gage.--Water-stage recorder. Altitude of gage is 9,120 ft (from topographic map).

Extremes.--Maximum discharge during year, 108 cfs June 5 (gage height, 1.76 ft); minimum, 1.2 cfs Apr. 18.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are poor. No diversion stove station.

Discharge, in cubic feet per second, water year October 1963 to September 1964

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	AUG.	Sept.
1	1.4	52.2	1.4					1.3	35	35	3.3	1.8
2	1.4	52.2	1.3					1.3	44	34	3.5	2.1
3	*1.4	2.4	1.5					2.0	51	31	3.8	2.3
4	1.5	52.3	1.4					2.0	52	28	3.8	2.2
5	1.6	*52.3	1.6					2.0	56	27	3.9	2.0
6	1.6	2.3	1.6					2.1	51	24	3.9	2.1
7	1.7	52.3	2.4					2.2	47	21	3.5	2.2
8	1.7	52.2	1.4					2.3	47	19	3.3	2.1
9	1.7	2.2	1.3					2.2	35	19	3.3	1.9
10	1.7	2.2	1.3					3.5	32	18	3.0	1.7
11	1.7		1.3					5.8	31	15	2.8	1.9
12	1.8		1.3					7.9	32	16	2.9	1.7
13	3.3	52.0						16	33	14	2.7	1.7
14	3.2						1.3	27	35	14	2.6	1.7
15	3.3			1.3	1.3	1.3		35	40	16	2.7	2.2
16	3.3	51.9						40	45	12	3.6	2.2
17	3.0	51.8						45	48	10	3.0	1.8
18	2.7	1.6						50	40	9.3	2.4	2.1
19	2.5	1.6						55	39	8.4	2.9	2.3
20	3.2	1.5						50	34	8.2	2.4	2.2
21	2.9	1.4						*55	41	8.2	2.4	2.2
22	2.3	1.4	1.4					55	35	7.0	2.3	2.2
23	2.9	1.6						55	35	6.8	2.3	2.1
24	3.2	1.7						55	35	6.2	2.3	2.1
25	2.9	1.6						55	36	5.8	2.1	2.0
26	2.4	1.6						58	*39	5.8	2.1	2.1
27	2.3	1.6						55	44	5.4	*2.1	2.1
28	2.2	1.3						50	45	5.6	2.7	2.1
29	2.2	2.4						1.4	36	40	5.2	2.0
30	2.4	1.4						1.6	30	39	4.8	2.6
31	52.2			(*)				28		4.3	2.2	2.0
Total	72.2	55.9	43.3	40.3	37.7	40.3	39.4	934.2	1,275	444.5	90.5	51.8
Mean	2.33	1.86	1.40	1.3	1.3	1.3	1.31	30.1	42.5	14.3	2.92	2.05
Ac-ft	143	111	66	80	75	60	76	1,880	2,530	862	180	122

Calendar year 1963: Max -           Min -           Mean -           Ac-ft -  
 Water year 1963-64: Max 81       Min -           Mean 8.57       Ac-ft 6,220

\* Discharge measurement made on this day.  
 † Stage-discharge relation affected by ice.  
 Note.--No gage-height record Dec. 13 to Apr. 27.

# BEAR RIVER BASIN

## 10-0115. Bear River near Utah-Wyoming State Line.

Location.--Lat 40°56', long 110°51', in S&E sec.30, T.3 N., R.10 E., on left bank just downstream from West Fork, 2.8 miles upstream from Utah-Wyoming State line.

Drainage area.--176 sq mi.

Records available.--July 1942 to September 1964.

Gage.--Water-stage recorder. Altitude of gage is 7,985 ft (from river-profile map).

Average discharge.--22 years, 161 cfs (131,000 acre-ft per year).

Extremes.--Maximum discharge during year, 1,990 cfs June 7 (gage height, 3.47 ft); minimum, 23 cfs Mar. 2, but may have been less during periods of ice effect or no gage height record.

1942-64: Maximum discharge, 2,800 cfs June 6, 1947 (gage height, 4.27 ft); minimum determined, 16 cfs Apr. 11, 1951, Nov. 8, 1954, Nov. 1, 1958, Oct. 30, 1956.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are poor. Two diversions above station for irrigation of about 200 acres above and 2,000 acres below station.

Discharge, in cubic feet per second, water year October 1963 to September 1964

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	82	36				124		68	767	528	138	*47
2	77	40				28		82	910	825	170	44
3	44	47	*135			125		71	935	743	108	34
4	44	56			126			61	1,030	888	*108	34
5	44	*66						66	1,120	621	103	32
6	44	55						61	1,420	543	103	31
7	56	55					*30	58	1,280	*490	22	30
8	*31	51	120		128			86	1,110	440	20	30
9	30	52			28			56	*808	433	84	32
10	30	51			24			68	870	427	75	32
11	23	52	135		24			82	870	364	76	31
12	30	51	135		125	*25		*96	860	364	73	30
13	40	56	135		125			173	840	333	73	30
14	38	55	135		125		*433	298	860	298	88	31
15	42	56	58		125		35	452	870	387	86	32
16	58	58	136	*30	27		50	607	*900	268	101	32
17	35	58	38		24		22	800	21,000	244	68	31
18	38	56	*36		24		50	*841	21,100	218	74	32
19	35	56	38		24		44	1,000	2800	159	74	32
20	44	56	137		124		47	*1,260	860	180	68	34
21	42	55	36	(*)	124		51	1,300	900	168	66	34
22	38	54	135		24		55	1,200	870	149	64	35
23	40	54					*82	1,340	2640	140	62	34
24	44	55					51	1,280	870	134	56	33
25	44	55			(*)		44	1,530	*775	123	54	33
26	42		133		124	*28	42	1,500	867	118	51	32
27	40						44	1,480	874	123	50	32
28	38	180					50	1,290	1,060	137	51	32
29	40						56	1,030	862	134	61	32
30	34						73	850	892	123	52	32
31	46			(*)			75	751		120	50	
<b>Total</b>	<b>1,222</b>	<b>1,590</b>	<b>1,080</b>	<b>930</b>	<b>734</b>	<b>805</b>	<b>1,224</b>	<b>19,898</b>	<b>27,077</b>	<b>10,455</b>	<b>2,371</b>	<b>590</b>
<b>Mean</b>	<b>39.4</b>	<b>53.3</b>	<b>34.2</b>	<b>30</b>	<b>28.3</b>	<b>22.0</b>	<b>41.1</b>	<b>642</b>	<b>803</b>	<b>337</b>	<b>76.3</b>	<b>23.0</b>
<b>Ac-ft</b>	<b>2,420</b>	<b>3,170</b>	<b>2,100</b>	<b>1,840</b>	<b>1,460</b>	<b>1,600</b>	<b>2,450</b>	<b>39,450</b>	<b>53,710</b>	<b>20,740</b>	<b>4,700</b>	<b>1,900</b>

Calendar year 1963: Max 1,000 Min - Mean 143 Ac-ft 103,300  
 Water year 1963-64: Max 1,650 Min - Mean 187 Ac-ft 158,800

Peak discharge (base, 1,100 cfs).--May 21 (1100) 1,860 cfs (3.43 ft); June 7 (0100) 1,990 cfs (3.47 ft).

\* Discharge measurement made on this day.  
 a No gage-height record.  
 b Stage-discharge relation affected by ice.

# BEAR RIVER BASIN

## 10-0157. Sulphur Creek above reservoir, near Evanston, Wyo.

Location.--Lat 41°09', long 110°46', in SW¼ sec.35, T.14 N., R.119 W., on right bank 1½ miles downstream from Willow Creek, 2 miles upstream from Sulphur Creek Dam, and 1½ miles southeast of Evanston.

Drainage area.--64 sq mi, approximately.

Records available.--December 1957 to September 1964.

Gage.--Water-stage recorder. Altitude of gage is 7,170 ft (from river-profile map).

Average discharge.--6 years (1958-64), 8.70 cfs (8,200 acre-ft per year).

Extremes.--Maximum discharge during year, 248 cfs Apr. 29 (gage height, 4.22 ft); maximum gage height, 5.18 ft Apr. 1 (backwater from ice); no flow Aug. 18 to Sept. 30.  
1957-64: Maximum discharge, 560 cfs Apr. 18, 1958 (gage height, 5.07 ft), from rating curve extended above 200 cfs by logarithmic plotting; maximum gage height, 5.55 ft Apr. 8, 1962 (backwater from ice); no flow at 5:30 a. m. each year.

Remarks.--Records good except those for periods of ice effect, which are poor. Several diversions for irrigation above station.

Discharge, in cubic feet per second, water year October 1963 to September 1964

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	0.3	0.5						128	27	10	0.4	
2	.3	.5						69	27	8.3	.3	
3	.3	.5	(*)				30	83	47	6.7	.3	
4	.3	.5						76	31	6.1	*.2	
5	.3	.6						56	24	5.1	.2	
6	.3	.7						43	50	5.1	.2	
7	.3	.8						41	133	*4.5	.2	
8	**	.8	1.0	2	4	6	25	46	107	5.1	.2	
9	.3	.7						44	*57	4.5	.1	
10	.3	.5						47	35	3.0	.1	
11	.3	.5						23	24	6.9	.1	
12	.3	.4						*61	22	5.3	.1	
13	1.0	.4					35	55	29	7.2	.1	
14	.5	.4					(*)	115	35	6.1	.1	
15	.5	.4						116	31	6.3	.1	
16	.4	.5						80	124	26	4.7	.1
17	.4	.5						45	125	40	3.4	.1
18	.5	.5						50	*120	78	2.8	0
19	.4	.5						99	*126	168	1.6	0
20	.6	.5						62	*138	59	1.7	0
21	.5	.5		(*)				46	135	98	1.3	0
22	.5	.5						*52	121	119	1.1	0
23	.5	.5	1					31	87	68	1.1	0
24	.6	.5	1.5	3		(*)		67	74	44	1.1	0
25	.5	.5			(*)			51	64	30	1.1	0
26	.5	.5						46	52	23	1.0	0
27	.5	.5						41	44	18	1.0	0
28	.5	.5				15		64	40	25	.8	0
29	.5	.5						110	32	26	1.1	0
30	.5	.5						50	19	.6	.6	0
31	.6	.5						142	56	1	.5	0
Total	13.4	22.3	39.0	78	130	250	1,478	2,114	1,486	121.9	2.9	0
Mean	0.43	0.74	1.26	2.5	4.5	8.1	49.2	77.9	49.6	3.93	0.08	0
Ac-ft	27	44	77	155	258	498	2,930	4,790	2,950	242	5.8	0
Calendar year 1963: Max	96	Min	0	Mean	8.66	Ac-ft	4,620					
Water year 1963-64: Max	148	Min	0	Mean	16.5	Ac-ft	11,970					

\* Discharge measurement made on this day.

\*\* Field estimate made on this day.

Note.--Stage-discharge relation affected by ice Nov. 17 to Apr. 18 (no gage-height record Jan. 13 to Feb. 25, Mar. 5-24). No gage-height record Sept. 30-30.

# BEAR RIVER BASIN

## 10-0159. Sulphur Creek below reservoir, near Evanston, Wyo.

Location.--Lat 41°09', long 110°49', in SE1/4 sec. 28, T.14 N., R.119 W., on left bank 400 ft downstream from Sulphur Creek Dam, 6.3 miles upstream from mouth, and 10 1/2 miles southeast of Evanston.

Drainage area.--68 sq mi, approximately.

Records available.--March 1958 to September 1964.

Gage.--Water-stage recorder and concrete V-notch control. Altitude of gage is 7,110 ft (from river-profile map).

Average discharge.--6 years (1958-64), 11.2 cfs (8,110 acre-ft per year).

Extremes.--Maximum discharge during year, 100 cfs Apr. 22-23 (gage height, 3.80 ft); no flow Oct. 1 to Mar. 27. 1958-64: Maximum discharge, 164 cfs June 28, 1959 (gage height, 3.67 ft); no flow at times in each year.

Remarks.--Records good except those for period of no gage-height record, which are fair. Flow regulated by Sulphur Creek Reservoir (capacity, 4,600 acre-ft) completed December 1957. Records herein do not include flow over spillway of the dam.

Discharge, in cubic feet per second, water year October 1957 to September 1964

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1						0	30	92	68	5.5	22	28
2						0	30	91	66	2.0	22	28
3			(*)			0	30	91	66	2.0	22	28
4						0	30	90	66	2.0	*22	28
5		(*)				0	30	90	66	2.0	*22	28
6						0	30	90	66	2.0	22	28
7						0	30	92	66	*2.0	22	28
8	(*)					0	30	92	66	2.0	22	28
9						0	30	89	*66	2.0	22	28
10						0	30	88	65	2.0	22	27
11						0	48	68	76	2.0	22	27
12						0	60	*88	47	2.0	22	18
13						0	60	36	26	2.0	22	9.0
14						0	*60	49	25	2.0	22	9.0
15						0	60	90	25	2.2	22	9.0
16						0	60	92	25	6.8	30	9.0
17						0	60	93	25	20	36	9.0
18						0	60	*23	25	20	36	9.0
19						0	60	26	24	20	36	9.0
20						0	60	60	62	20	36	9.0
21				(*)		0	60	97	81	20	36	8.7
22						0	*100	66	90	20	36	8.7
23						0	100	98	66	20	36	8.7
24						*0	99	97	36	12	36	16
25					(*)	0	99	97	36	4.9	36	31
26						0	98	97	66	4.9	36	31
27						0	97	95	21	4.9	36	31
28						18	98	95	16	4.9	36	30
29						30	98	93	16	*21	36	29
30						30	96	93	11	*25	28	29
31						50	50	92		22	28	
Total	0	0	0	0	0	105	1,846	2,868	1,977	880.1	941	621.1
Mean	0	0	0	0	0	3.39	61.5	92.3	62.6	9.04	30.7	20.7
Ac-ft	0	0	0	0	0	203	3,660	5,690	3,720	556	1,890	1,250

Calendar year 1963: Max 84 Min 0 Mean 8.81 Ac-ft 4,930  
 Water year 1963-64: Max 100 Min 0 Mean 23.4 Ac-ft 16,950

\* Discharge measurement or observation of no flow made on this day.  
 Note.--No gage-height record Mar. 28 to Apr. 21.

# BEAR RIVER BASIN

## 10-0195. Chapman Canal at State Line, near Evanston, Wyo.

**Location.**--Lat 41°24', long 111°02', in S&E sec.36, T.17 N., R.121 W., on left bank at highway bridge, 6½ miles downstream from headgates and 10 miles northwest of Evanston.

**Records available.**--April 1942 to September 1964 (prior to October 1944 irrigation seasons only). Monthly discharge only for some periods, published in RSP 1944.

**Gage.**--Water-stage recorder. Altitude of gage is 8,870 ft (from river-profile map). Prior to Oct. 11, 1946, Staff gage and Oct. 11, 1946, to Aug. 2, 1961, water-stage recorder at site 20 ft downstream at same datum.

**Average discharge.**--20 years (1944-64), 16.9 cfs (13,680 acre-ft per year).

**Extremes.**--1942-64: Maximum daily discharge, 133 cfs June 15, 1964; no flow at times each year.

**Remarks.**--Records good except those for periods of ice effect or no gage-height record, which are poor. Canal diverts water from Bear River in S&E sec.36, T.16 N., R.121 W. Many diversions above station for irrigation in Wyoming. Flow at station is for storage in Nepowesset Reservoir, Utah, and irrigation in Sebecus basin, Utah.

Rating table, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used Oct. 15 to Nov. 17, Apr. 29 to May 27, June 20-26)

0.1	0	0.8	15
.2	.4	1.2	23
.3	1.3	1.5	50
.4	2.8	2.0	84
.5	6.6	2.5	143

Discharge, in cubic feet per second, water year October 1963 to September 1964

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Avg.	Sept.
1	4.1	41					0	74	73	112	1.1	0
2	3.3	36	(**)			(*)	0	74	74	112	.2	0
3	2.8	35					0	67	77	106	.2	0
4	2.6	43					0	65	76	98	.2	0
5	2.0	55					±10	63	80	63	*1.8	0
6	2.4	*61						61	100	76	9.4	0
7	3.0	72						55	117	69	15	0
8	5.0	72					s20	59	*116	*56	12	0
9	*5.6	67						67	101	48	7.4	0
10	4.0	77						56	62	51	4.5	0
11	2.6	74						*60	35	51	3.0	0
12	1.9	61						60	97	44	1.9	0
13	2.2	56					s25	64	92	43	1.6	0
14	11	60						69	108	39	2.5	0
15	12	59					(*)	75	111	33	.7	0
16	18	60						82	121	41	0	0
17	6.0	42						68	126	43	0	0
18	8.6	40					s40	88	133	36	0	0
19	16							*96	132	29	0	0
20	16							98	117	25	.3	0
21	16	b36					s42	130	98	17	0	0
22	20				(*)		*42	48	124	11	0	0
23	19						38	48	103	8.4	0	0
24	21	b5.0				(*)	40	39	91	5.6	0	0
25	25	b1.0					56	43	*61	4.2	0	0
26	26	b.6					52	73	69	3.3	0	0
27	27	b.6					50	87	102	2.6	0	0
28	26	b.4					51	74	120	2.5	0	4.0
29	26	b.2					50	44	119	1.4	0	8.4
30	29	b.1					73	66	104	.6	0	7.1
31	35						64	64		.3	*0	
Total	407.7	1,194.1	0	0	0	0	969	2,198	3,079	1,255.1	62.2	17.5
Mean	13.2	39.8	0	0	0	0	32.3	70.9	103	40.5	2.0	0.55
Ac-ft	809	2,370	0	0	0	0	1,920	4,380	6,110	2,490	123	35
Calendar year 1963	Max 108	Min 0	Mean 24.3	Ac-ft 17,220								
Water year 1963-64	Max 133	Min 0	Mean 25.1	Ac-ft 18,220								

\* Discharge measurement or observation of no flow made on this day.

\*\* Field estimate made on this day (less than 0.1 cfs).

a No gage-height record.

b Stage-discharge relation affected by ice.

# BEAR RIVER BASIN

## 10-0201. Bear River above reservoir, near Woodruff, Utah

Location.--Lat 41°28'05", long 111°01'00", in NW¼NW¼ sec.28, T.17 N., R.120 W., in Wyoming on right bank 8.3 miles upstream from Woodruff Narrows Dam and 10 miles southeast of Woodruff.

Drainage area.--780 sq mi, approximately.

Records available.--October 1961 to September 1964.

Gage.--Water-stage recorder. Altitude of gage is 8,488 ft (from river-profile map).

Extremes.--Maximum discharge during year, 2,030 cfs June 6 (gage height, 5.37 ft); minimum, 0.1 cfs Aug. 24, 1961-64; maximum discharge, that of June 6, 1964; maximum gage height, 5.88 ft Mar. 28, 1962 (backwater from ice jam); minimum discharge, that of Aug. 24, 1964.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Directions for irrigation of about 43,800 acres above station.

Rating table, except periods of ice effect (gage height, in feet, and discharge, in cubic feet per second)

0.66	0.2	1.5	43	4.0	1,130
.9	.7	1.8	82	4.3	1,330
1.0	2.3	2.1	170	6.0	1,810
1.1	6.0	2.8	318	8.2	1,920
1.2	12	3.0	546		

Discharge, in cubic feet per second, water year October 1963 to September 1964

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1.5	11	31					510	553	736	3.3	3.0
2	1.7	12	35					498	828	872	7.3	3.0
3	1.7	12	44				100	400	866	884	6.6	1.8
4	1.7	12	46					331	1,060	462	8.2	2.7
5	1.5	16	42					358	1,070	392	4.8	3.6
6	1.5	23	41					343	1,210	339	4.9	3.0
7	1.5	23	32					310	1,590	232	5.2	2.3
8	1.7	24	35			35	150	293	1,550	230	3.2	1.8
9	1.4	26	32					251	1,530	269	3.2	1.6
10	1.8	36	36					281	1,340	176	6.6	3.0
11	1.7	26	42				180	310	656	150	5.2	3.4
12	1.7	24	42				200	235	722	115	4.9	1.8
13	3.0	19	41				250	360	668	104	3.9	2.3
14	3.2	26	42				374	482	666	87	3.0	2.7
15	3.2	16	46				461	583	658	90	3.0	3.5
16	3.2	15		40	35			732	727	826	101	3.4
17	3.4	15						838	904	968	97	3.6
18	3.8	12				40		510	1,140	1,160	90	3.4
19	3.8	11						374	1,280	1,260	81	6.0
20	3.6	11						308	1,340	1,230	73	3.2
21	3.0	15	45					261	1,520	852	61	3.8
22	3.0	15						298	1,730	1,230	30	1.5
23	3.6	16				45		322	1,820	1,020	36	4
24	3.2	16						287	1,860	850	32	2.6
25	3.8	14						326	1,820	608	35	1.9
26	12	71						277	1,890	502	21	1.5
27	11	75						238	1,890	750	15	1.0
28	11	82	43			50		273	1,810	888	12	1.4
29	11	70						362	1,700	922	9.3	2.3
30	11	55						466	1,418	644	11	2.1
31	12								1,060		8.6	2.7
Total	221.4	936.2	1,351	1,240	1,015	1,230	6,595	25,596	30,687	5,400.5	123.1	89.9
Mean	7.14	31.2	43.6	40	35	40.3	266	955	1,023	174	4.25	3.23
Ac-ft	438	1,860	2,680	2,480	2,010	2,480	17,060	56,700	60,870	10,710	264	198

Calendar year 1963: Max 1,290 Min 1.4 Mean 118 Ac-ft 35,030  
 Water year 1963-64: Max 1,950 Min 0.2 Mean 220 Ac-ft 155,700

\* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Dec. 16 to Apr. 13 (no gage-height record Jan. 7-21, Feb. 2-25).

# BEAR RIVER BASIN

## 10-0203. Bear River below reservoir, near Woodruff, Utah

Location.--Lat 41°30'20", long 111°00'50", in NW¼NW¼ sec.32, T.18 N., R.120 W., in Wyoming, on right bank, 1,100 ft below Woodruff Narrows Dam, 1.6 miles upstream from Salt Creek, 5.4 miles upstream from Wyoming-Utah State line, and 7.7 miles east of Woodruff.

Drainage area.--610 sq mi, approximately.

Records available.--October 1961 to September 1964.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 6,400 ft (from river-profile map). Prior to Sept. 26, 1962, at site 175 ft upstream at same datum.

Extremes.--Maximum discharge during year, 2,300 cfs June 7 (gage height, 7.06 ft); minimum daily, 0.7 cfs Oct. 1-3.

1961-64: Maximum discharge, that of June 7, 1964; no flow July 4, 5, 1962.

Remarks.--Records excellent. Flow regulated by Woodruff Narrows Reservoir beginning January 1962 (capacity, 28,000 acre-ft). Diversions for irrigation of about 43,500 acres above station.

Rating table (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used May 24 to July 1, Aug. 22-27)

2.3	0.7	3.2	32
2.4	1.4	3.9	100
2.5	2.3	4.5	237
2.6	3.7	5.0	457
2.7	5.8	6.0	1,020
2.9	13	7.1	2,050

Discharge, in cubic feet per second, water year October 1963 to September 1964

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	0.7		12	17	18	18	18	488	1,420	830	13	18
2	7.7	14	22	17	18	18	18	408	561	692	12	18
3	7	14	10	18	17	19	18	537	561	832	12	18
4	8.4	14	10	18	17	18	19	453	561	458	12	18
5	15	24	10	18	17	18	19	409	813	409	12	18
6	13	*14	18	18	18	18	18	387	511	*370	20	18
7	11	14	18	18	18	18	18	362	1,320	325	51	18
8	11	14	20	18	18	18	18	242	*2,050	204	48	18
9	11	14	20	18	18	18	18	184	2,050	333	41	18
10	11	14	20	18	18	18	19	205	1,380	387	40	18
11	11	14	20	18	18	18	20	*219	804	379	40	*5.6
12	11	14	20	18	18	18	20	239	623	379	40	1.3
13	11	14	20	18	18	19	20	267	582	366	37	1.2
14	11	14	20	18	18	19	20	329	628	286	26	1.2
15	11	14	20	18	18	19	21	426	650	288	28	1.1
16	11	14	18	18	18	18	21	551	688	148	33	1.1
17	3.1	14	16	18	18	18	22	88	804	940	44	1.0
18	1.3	14	16	18	18	18	245	1,400	1,410	29	44	1.0
19	4.5	14	16	18	18	18	354	*1,400	1,350	63	44	1.0
20	4.5	14	16	18	18	18	368	1,470	1,220	71	44	20
21	7.7	11	16	18	18	19	321	1,810	815	48	44	44
22	14	2.7	16	18	18	19	302	1,850	745	17	752	44
23	14	17	16	18	18	19	288	1,900	*947	18	1,080	44
24	14	18	16	18	18	18	310	1,280	869	17	1,020	44
25	14	18	16	18	18	18	382	*1,380	824	17	1,020	30
26	14	12	17	18	18	18	377	1,950	817	17	958	20
27	14	12	17	18	18	18	337	1,950	732	16	627	20
28	14	12	17	18	18	18	288	1,920	732	14	21	20
29	14	12	17	18	18	18	302	1,880	689	14	20	20
30	14	12	17	18	18	18	383	1,790	954	13	20	20
31	14	-----	17	18	-----	18	-----	1,740	-----	13	19	-----
Total	310.3	597.7	512	556	521	574	4,716	30,818	28,638	6,832.6	6,220	520.7
Mean	10.0	18.3	16.5	17.5	18.0	18.5	157	894	985	220	203	17.4
Ac-ft	618	789	1,020	1,100	1,030	1,140	9,350	61,130	56,800	13,560	12,460	1,030
Calendar year 1963	Max	1,110	Min	0.7	Mean	112	Ac-ft	51,340				
Water year 1963-64	Max	2,050	Min	0.7	Mean	220	Ac-ft	160,000				

\* Discharge measurement made on this day.



# BEAR RIVER BASIN

## 10-0265. Bear River near Randolph, Utah

Location.--Lat 41°48', long 111°08', in SE1/4 sec. 7, T.12 N., R.8 E., on left bank 3.5 miles upstream from Twin Creek, 4.2 miles upstream from Utah-Myoming State line, and 11 miles northeast of Randolph.

Drainage area.--1,640 sq mi, approximately.

Records available.--October 1963 to September 1964. Monthly discharge only for some periods, published in WRP 1837.

Gage.--Water-stage recorder. Altitude of gage is 6,205 ft (from river-profile map).

Average discharge.--21 years, 174 cfs (126,000 acre-ft per year).

Extremes.--Maximum discharge during year, 1,730 cfs June 12 (gage height, 7.83 ft); minimum, 6.7 cfs Sept. 24-30, 1943-64; Maximum discharge, 2,680 cfs May 8, 1952 (gage height, 6.80 ft); minimum, 1.8 cfs Nov. 12, 1961.

Remarks.--Records good except those for period of ice effect, which are fair. Diversions for irrigation of about 94,500 acres above station. Flow regulated by Woodruff Narrows Reservoir beginning January 1962 (capacity 28,000 acre-ft).

Rating table, except period of ice effect (gage height, in feet, and discharge, in cubic feet per second)

1.5	8.1	4.0	370
1.6	15	5.0	502
2.0	44	6.0	585
2.3	103	7.0	1,290
3.0	186	7.8	1,720

Discharge, in cubic feet per second, water year October 1963 to September 1964

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	32	38						324	1,550	354	61	37
2	32	38	(*)					208	1,500	323	76	24
3	32	38	33					358	1,400	466	27	21
4	32	34					100	352	866	429	58	18
5	32	33						374	837	358	10	18
6	32	*35	35	35	28			386	443	312	48	16
7	31	35			(*)			346	486	282	47	13
8	32	41					180	358	682	*359	46	12
9	*32	42						167	326	906	45	11
10	32	32						181	260	*1,170	23	10
11	32	42	37			35		163	244	1,450	194	10
12	33	41						161	194	1,700	194	10
13	34	38			30			180	*134	1,200	175	10
14	37	38						142	162	898	124	10
15	35	35						*147	107	876	164	10
16	38	37						142	91	837	167	10
17	38	38						120	51	522	194	10
18	38					40		107	40	579	216	10
19	34							118	91	746	208	10
20	32							208	*200	961	165	10
21	30	38		30				242	275	1,100	183	10
22	30							248	310	1,160	144	10
23	28					33		244	322	1,060	133	10
24	28		35					246	411	854	102	10
25	29							248	571	621	116	8.7
26	29					*45		253	740	761	111	9.7
27	28							278	858	880	101	8.7
28	28	33						287	1,160	864	67	8.7
29	28							277	1,260	929	84	8.7
30	31							268	1,420	529	86	8.7
31	35								1,480		84	26
<b>Total</b>	1,004	1,050	1,098	960	692	1,210	3,244	13,800	26,474	6,776	1,446	368.8
<b>Mean</b>	32.4	36.3	35.3	31.8	30.6	38.0	175	435	832	219	46.6	12.3
<b>Ac-ft</b>	1,980	2,160	2,170	1,640	1,770	2,400	10,400	26,780	52,510	13,440	2,670	754
<b>Calendar year 1963</b>	<b>Max</b>	375	<b>Min</b>	8.8	<b>Mean</b>	64.8	<b>Ac-ft</b>	48,890				
<b>Water year 1963-64</b>	<b>Max</b>	1,700	<b>Min</b>	9.7	<b>Mean</b>	104	<b>Ac-ft</b>	119,300				

\* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 18 to Apr. 8.

# BEAR RIVER BASIN

## 10-0285. Bear River below Pixley Dam, near Cokeville, Wyo.

Location.--Lat 41°58'20", long 110°59'00", in SE¼SW¼ sec.35, T.23 N., R.12C W., 300 ft downstream from Pixley Dam, 11 miles south of Cokeville, and 17.8 miles downstream from Twin Creek.

Drainage area.--2,040 sq mi, approximately.

Records available.--October 1941 to November 1943 (published as Bear River near Cokeville), October 1952 to September 1959, May 1958 to September 1964 (irrigation seasons only). Monthly discharge only for some periods, published in WSP 1314.

Gage.--Water-stage recorder. Altitude of gage is 6,185 ft (from river-profile map). Oct. 31, 1941, to Nov. 30, 1943, at site 200 ft downstream at different datum.

Average discharge.--0 years (1941-43, 1952-59), 137 cfs (59,180 acre-ft per year).

Extremes.--Maximum discharge during season, 1,210 cfs June 14 (gage height, 7.78 ft); minimum daily recorded, 1.8 cfs Aug. 24-26.  
1941-43, 1952-59, 1958-64: Maximum daily discharge, 2,300 cfs Mar. 28, 1956; minimum daily recorded, 0.3 cfs Aug. 21, 1961.

Remarks.--Records good. Natural flow of stream affected by diversions for irrigation and return flow from irrigated areas. No diversion between station and Collett Creek Branch of Smiths Fork.

Rating table (gage height, in feet, and discharge, in cubic feet per second)

1.8	9.5	3.5	184
1.9	13	4.0	258
2.0	17	5.0	425
2.1	22	7.0	600
2.4	45	7.8	1,120
2.7	76		

Discharge, in cubic feet per second, May to September 1964

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	44							263	1,060	423	58	21
2	45							279	1,080	449	85	*19
3	44							373	1,100	463	89	19
4	43							351	1,060	477	82	20
5	42							304	940	365	75	35
6	42							165	628	332	*68	34
7	42							183	447	348	63	28
8	42							191	532	*348	61	22
9	42							190	658	304	59	20
10	*41							179	785	304	57	20
11	-							129	*926	376	54	20
12	-							110	992	255	50	20
13	-							*93	1,060	232	49	20
14	-							51	1,100	220	47	20
15	-							49	914	204	46	20
16	-							17	705	198	44	21
17	-							17	593	200	36	20
18	-							17	532	222	42	20
19	-							16	614	230	42	20
20	-							23	662	219	37	20
21	-							*26	755	167	31	20
22	-							54	803	177	28	19
23	-							51	851	156	20	30
24	-							126	839	151	12	42
25	-							197	755	145	12	26
26	-							383	706	134	12	23
27	-							541	658	123	15	23
28	-							682	533	114	19	23
29	-							817	543	169	19	24
30	-							914	463	169	45	23
31	-							1,020		101	39	
Total								7,529	23,505	7,623	1,426	682
Mean								235	764	246	46.0	23.1
Ac-ft								19,830	46,620	15,120	2,836	1,370

Calendar year : Max                    Min                    Mean                    Ac-ft  
The season     : Max                    Min                    Mean                    Ac-ft     81,470

\* Discharge measurement made on this day.

# BEAR RIVER BASIN

## 10-0320. Smiths Fork near Border, Wyo.

Location.--Lat 42°17', long 110°52', in NW¼ sec. 33, T.27 N., R.118 W., on left bank 4½ miles upstream from Howland Creek, 6 miles downstream from Hobble Creek, and 12 miles northeast of border.

Drainage area.--165 sq mi.

Records available.--May 1942 to September 1964.

Gage.--Water-stage recorder. Altitude of gage is 6,650 ft (from topographic map). Prior to Oct. 16, 1945, at site 0.5 mile downstream at different datum.

Average discharge.--22 years, 180 cfs (137,600 acre-ft per year).

Extremes.--Maximum discharge during year, 1,190 cfs June 6 (gage height, 4.17 ft); minimum, 54 cfs Mar. 25, 1942-54; Maximum discharge, 1,900 cfs June 7, 1957 (gage height, 4.86 ft); minimum recorded, 38 cfs Mar. 21, 1955, result of freezeup.

Remarks.--Records good except those for periods of ice effect, which are fair. One diversion for irrigation of about 200 acres above station.

Rating table, except periods of ice effect (gage height, in feet,  
and discharge, in cubic feet per second)

1.6	58	3.0	471
1.8	33	4.0	1,000
2.2	169	4.8	1,200
2.7	345		

Discharge, in cubic feet per second, water year October 1963 to September 1964

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	88	80					68	283	710	847	802	118
2	86	80					69	291	710	812	136	*115
3	86	80					69	296	748	494	135	117
4	88	85	(+)				66	212	740	480	127	115
5	89	85	b75			b65	70	212	809	482	127	113
6	85	85					68	199	854	437	*181	111
7	83	*83					68	219	1,110	418	178	109
8	83	80					68	264	1,130	*399	178	107
9	80	85					66	302	1,000	390	172	107
10	*80	82					75	333	*912	378	166	107
11	80	83				b65	73	370	854	362	164	107
12	80	83				69	71	429	784	349	163	107
13	80	82	b70			b65	68	417	753	337	161	106
14	80	82				b65	73	*678	722	333	156	105
15	80	83				b65	83	746	722	322	150	103
16	79	85	b72	b70	b65	b65	*97	790	726	310	150	103
17	79	80	*74			b65	101	816	746	298	150	101
18	79	b78	71			64	101	803	746	287	145	101
19	78	b75	73			b65	99	809	710	279	147	101
20	78	82	76			b65	111	850	856	278	142	99
21	79	80	71			b62	115	*919	827	264	140	97
22	79	76				63	109	852	854	257	137	97
23	83	76		(+)		63	115	919	808	246	135	96
24	83	78				63	125	861	852	243	130	94
25	82	76				62	117	841	872	235	128	94
26	80	76	b70			60	102	874	898	232	128	93
27	80	b75				62	107	865	818	223	126	94
28	79	b75				69	117	*372	818	219	128	93
29	80	b75				62	156	867	863	219	130	93
30	82	b75				62	232	772	867	216	126	91
31	85	---				65	---	734	---	208	121	---
Total	2,558	2,407	2,257	2,170	1,888	1,951	2,976	19,071	22,050	10,232	4,795	3,100
Mean	81.9	80.2	72.2	70	65	64.7	95.9	615	756	330	155	103
Ac-ft	5,030	4,770	4,440	4,300	3,740	3,650	5,700	37,850	43,800	20,290	9,510	6,130

Calendar year 1963: Max 897 Min - Mean 167 Ac-ft 120,700  
 Water year 1963-64: Max 1,130 Min - Mean 208 Ac-ft 149,500

\* Discharge measurement made on this day.  
 † Stage-discharge relation affected by ice.

# BEAR RIVER BASIN

## 10-0395. Bear River at Border, Wyo.

Location.--Lat 42°11', long 111°03', in NE¼NE¼ sec.15, T.14 S., R.46 E., in Idaho, on left bank a quarter of a mile west of Wyoming-Idaho State line, half a mile west of Border, and 2.1 miles upstream from Thomas Fork.

Drainage area.--2,490 sq mi, approximately.

Records available.--October 1937 to September 1964.

Gage.--Water-stage recorder. Datum of gage is 8,051.63 ft above mean sea level, unadjusted.

Average discharge.--27 years, 383 cfs (277,300 acre-ft per year).

Extremes.--Maximum discharge during year, 2,000 cfs June 8 (gage height, 6.73 ft); minimum not determined, occurred during period of ice effect.

1937-64: Maximum discharge, 3,680 cfs May 11, 1952 (gage height, 6.89 ft); minimum daily, 30 cfs Aug. 18-22, 1940.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Diver-sions for irrigation of about 122,000 acres above station.

Rating table, except periods of ice effect (gage height,  
in feet, and discharge, in cubic feet per second)  
(Shifting-control method used May 12 to June 25)

1.2	56	4.0	820
1.5	144	5.0	1,700
2.2	261	6.6	1,950
3.0	484		

Discharge, in cubic feet per second, water year October 1963 to September 1964

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	162	148					620	642	1,890		258	124
2	162	149					650	675	1,920	1,000	274	133
3	180	149	168	120			257	718	1,980	882	270	*118
4	170	173					299	682	1,970	916	236	116
5	188	166	(*)				343	678	1,980	920	232	114
6	186	167	140		(*)		345	603	1,830	758	*228	124
7	182	*136	135				326	473	1,880	704	216	137
8	151	174	130			125	331	493	1,750	711	214	124
9	144	162	128				377	533	1,810	*689	210	122
10	*139	158	128				438	577	1,840	689	203	117
11	132	193	125				444	593	*1,800	603	197	116
12	132	181	124				406	590	1,840	567	196	117
13	132	188	125				352	642	1,910	545	195	117
14	134	184	125				345	*669	1,980	517	190	116
15	137	182	135				377	779	1,980	464	184	116
16	139	183	140	100	150	130	*447	848	1,940	458	178	118
17	142	182	148	100		130	472	864	1,810	438	178	128
18	141	162	145	120		140	424	892	1,850	414	171	129
19	137	158	145	135		145	379	882	1,820	419	173	128
20	142	165	150	140		150	377	852	1,800	414	171	129
21	137	190	148	135			447	*880	1,820	400	167	130
22	129	185	148	135			475	920	1,870	405	162	130
23	142	140	145	130		155	407	864	1,860	387	180	125
24	134	168	135	130			475	890	1,860	340	153	125
25	124	158		130			469	888	1,480	322	136	131
26	122	148				(*)	470	980	1,430	305	132	134
27	121	140			(*)		452	1,330	1,370	296	132	130
28	122	140	130	135		160	458	*1,880	1,320	291	132	137
29	124	138					483	1,760	1,240	274	134	134
30	141	170					548	1,830	1,170	266	110	130
31	158							1,840		255	125	
<b>Total</b>	<b>4,536</b>	<b>5,014</b>	<b>4,320</b>	<b>3,765</b>	<b>3,770</b>	<b>4,305</b>	<b>11,897</b>	<b>27,498</b>	<b>50,480</b>	<b>16,480</b>	<b>5,649</b>	<b>3,748</b>
<b>Mean</b>	<b>140</b>	<b>167</b>	<b>135</b>	<b>121</b>	<b>130</b>	<b>139</b>	<b>387</b>	<b>887</b>	<b>1,683</b>	<b>532</b>	<b>162</b>	<b>125</b>
<b>Ac-ft</b>	<b>8,800</b>	<b>9,950</b>	<b>8,670</b>	<b>7,470</b>	<b>7,450</b>	<b>8,340</b>	<b>23,600</b>	<b>54,540</b>	<b>100,100</b>	<b>32,690</b>	<b>11,200</b>	<b>7,430</b>

Calendar year 1963: Max 888 Min 80 Mean 230 Ac-ft 165,900  
 Water year 1963-64: Max 1,960 Min - Mean 386 Ac-ft 280,200

\* Discharge measurement made on this day.

Note.--Stage-discharge relation affected by ice Nov. 19 to Apr. 1 (no gage-height record Jan. 21 to Feb. 5, Nov. 7-25).

# BEAR RIVER BASIN

## 10-0460. Rainbow inlet canal near Dingle, Idaho

Location.--Lat 42°13'00", long 111°17'30", in SE¼ sec.3, T.14 S., R.44 E., on left bank 1½ miles west of Dingle and 1-3/4 miles downstream from headworks at Stewart Dam.

Records available.--January 1922 to September 1964. Monthly discharge only prior to October 1945, published in WSP 1314.

Gage.--Water-stage recorder. Altitude of gage is 5,950 ft (from topographic map). Prior to Oct. 1, 1923, at site 300 ft downstream at different datum. Oct. 1, 1923, to Oct. 27, 1944, at site half a mile downstream at different datum.

Average discharge.--42 years, 297 cfs (215,000 acre-ft per year).

Extreme.--Maximum discharge during year, 1,830 cfs June 16 (gage height, 5.57 ft); minimum daily, 48 cfs Sept. 11.  
1922-64: Maximum discharge, 4,180 cfs May 7, 1952 (gage height, 8.62 ft); minimum daily, 1 cfs on several days in 1931, 1934, 1940, 1948.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are fair. Discharge measurements generally made three to six times a week. Canal diverts from Bear River at Stewart Dam in NE¼ sec.36, T.13 S., R.44 E., for storage in Bear Lake. At times flow in canal is augmented by surplus water from Black Otter Slough entering at the station and by seepage and wastage from irrigation lands on both sides of canal.

Cooperation.--Records collected by Utah Power & Light Co., under general supervision of Geological Survey, in connection with a Federal Power Commission project.

Rating table, except periods of ice effect (gage height, in feet,  
and discharge, in cubic feet per second)

(Shifting-control method used Nov. 29 to Dec. 5, Dec. 27  
to March 23, May 18, Aug. 30 to Sept. 1, Sept. 10-30)

Oct. 1 to Dec. 31		Jan. 1 to Sept. 30	
1.0	92	0.6	47
1.2	128	1.0	110
1.4	167	1.5	210
1.7	233	2.0	336
3.0	653	4.0	1,060
5.0	1,510	6.0	2,060

Discharge, in cubic feet per second, water year October 1963 to September 1964

Day	Oct.		1963												1964	
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1	184	169	a 132	106	105	95	171	749	1,580	980	231					
2	186	167	132	96	95	95	182	849	1,620	802	228					
3	184	165	134	a 110	110	105	219	892	1,690	741	231					
4	186	169	130	100	110	105	288	940	1,740	741	184					
5	184	184	135	a 95	110	105	387	684	1,710	730	173					
6	178	186	143	97	100	105	459	866	1,710	653	182					
7	174	197	135	95	a 90	135	465	772	1,740	604	199					
8	173	184	130	110	95	125	468	664	1,610	936	199					
9	173	188	130	115	95	110	510	708	1,660	510	192					
10	173	199	120	105	97	105	618	772	1,740	465	184					
11	167	208	110	89	95	105	600	787	1,710	429	180					
12	159	212	110	95	115	110	600	753	1,660	408	180					
13	165	222	105	95	110	115	539	791	1,700	420	190					
14	167	217	110	90	105	115	487	857	1,740	438	201					
15	165	208	120	80	105	110	519	904	1,790	408	182					
16	163	215	126	a 80	95	110	594	996	1,810	393	171					
17	161	210	132	a 75	101	115	719	1,050	1,780	423	165					
18	163	208	134	89	a 100	110	715	1,100	1,590	402	159					
19	163	178	132	89	a 100	110	657	1,120	1,540	390	149					
20	159	159	130	84	100	130	608	1,120	1,460	423	138					
21	161	182	123	84	105	125	611	1,080	1,420	414	136					
22	161	185	125	90	105	130	678	1,080	1,440	405	141					
23	159	173	120	105	110	124	667	1,020	1,460	376	143					
24	153	178	110	a 95	115	135	659	964	1,470	344	143					
25	143	165	115	100	100	145	678	924	1,410	304	143					
26	141	169	110	100	90	145	675	864	1,400	291	a 120					
27	141	157	112	110	95	141	646	892	1,340	273	a 115					
28	141	138	117	105	100	143	628	1,120	1,220	247	112					
29	145	119	123	105	90	155	625	1,270	1,340	238	110					
30	162	114	120	105	-----	157	675	1,450	1,070	226	114					
31	175	-----	117	105	-----	157	-----	1,570	-----	243	110					
Total	5,113	5,426	3,820	2,999	2,943	3,762	16,345	29,840	46,950	14,257	5,105					
Mean	165	181	123	96.7	101	121	545	963	1,565	460	165					
Ac-ft	1,0140	10,760	7,580	5,950	5,840	7,460	32,420	59,190	93,120	28,280	10,130					
Calendar year 1963:	Max	690	Min	14	Mean	176	Ac-ft	127,200								
Water year 1963-64:	Max	1,810	Min	48	Mean	379	Ac-ft	274,900								

a No gage-height record.

Note.--Stage-discharge relation affected by ice Dec. 4, 5, 7-15, 22-26, 30, Jan. 4, 7-10, 12-15, 22, 23, Jan. 25 to Feb. 6, Feb. 8, 9, 11-16, Feb. 20 to Mar. 22, Mar. 26-26.

# BEAR RIVER BASIN

## 10-0465. Bear River below Stewart Dam, near Montpelier, Idaho

Location--Lat 42-15'30", long 111°17'30", in NE¼ sec. 34, T.13 S., R.44 E., on right bank 300 ft downstream from Stewart Dam and 4½ miles south of Montpelier.

Drainage area--2,820 sq mi, approximately.

Records available--January 1922 to September 1964. Monthly discharge only January 1922 to September 1943, published in RSP 1314.

Gage--Water-stage recorder. Altitude of gage is 5,950 ft (from topographic map).

Average discharge--42 years, 58.2 cfs (42,140 acre-ft per year).

Extremes--Maximum daily discharge during year, 9.6 cfs Apr: 10 (gage height, 1.03 ft); minimum daily, 0.5 cfs Oct. 15, 23, 29, Nov. 1-3.  
1922-64: Maximum daily discharge, 3,050 cfs June 3, 1923; no flow July 15, 1956.

Remarks--Records good except those for periods of no gage-height record, which are fair. Discharge measurements generally made once a week. Water diverted at Stewart Dam through Rainbow Inlet canal (see station 10-460) for storage and regulation in Bear Lake. Many diversions above station for irrigation.

Cooperation--Records collected by Utah Power & Light Co., under general supervision of Geological Survey, in connection with a Federal Power Commission project.

Rating table (gage height, in feet, and discharge,  
in cubic feet per second)  
(Shifting-control method used  
Oct. 1 to Jan. 13, June 14 to Sept. 30)

0.4	6.4	0.8	3.0
.5	.6	.9	5.0
.6	1.0	1.0	8.0
.7	1.8	1.1	12

Discharge, in cubic feet per second, water year October 1963 to September 1964

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	2.9	0.5	0.6	0.8	1.5	1.8	4.6	4.6	4.6	4.2	2.6	2.2
2	2.9	.5	.6	.8	1.5	1.8	5.0	5.0	5.0	3.6	2.4	2.2
3	2.9	.5	.6	.8	1.5	1.8	5.6	4.8	5.1	3.2	2.5	2.3
4	2.8	.5	.6	.8	1.5	1.8	6.5	3.4	5.3	3.0	2.6	2.4
5	2.9	.5	.6	.6	1.6	1.9	5.0	1.5	5.3	3.0	3.0	2.4
6	2.8	.5	.6	.8	1.6	1.8	5.3	1.2	5.6	3.2	3.0	2.5
7	2.8	.5	.6	.8	1.6	2.0	6.8	1.2	6.5	3.0	3.6	2.4
8	2.8	.5	.6	.8	1.6	2.2	7.1	1.1	5.3	2.9	3.6	2.4
9	2.5	.5	.6	.8	1.6	2.2	6.8	1.3	5.0	2.5	3.6	2.3
10	2.2	.5	.6	1.0	1.6	2.2	2.2	1.6	5.3	2.8	3.0	2.3
11	1.9	.5	.6	1.0	1.6	2.2	9.2	1.8	5.3	3.0	2.9	2.3
12	1.8	.5	.6	1.2	1.7	2.3	9.2	1.6	5.0	3.0	2.9	2.2
13	1.6	.5	.6	1.2	1.7	2.4	6.8	1.7	5.0	3.2	3.4	2.2
14	.8	.5	.6	1.3	1.6	2.5	5.6	1.9	5.3	3.0	3.6	2.2
15	.5	.5	.6	1.3	1.6	2.6	5.9	2.2	5.6	2.9	3.4	2.2
16	.6	.6	.6	1.3	1.6	2.6	6.2	4.0	6.2	2.9	3.4	2.3
17	.6	.7	.6	1.3	1.7	2.8	6.8	5.6	6.8	2.9	3.4	2.4
18	.7	.6	.7	1.4	1.7	2.8	6.5	4.8	5.6	2.9	3.6	2.4
19	.6	.6	.7	1.5	1.7	3.0	5.9	3.8	5.3	3.2	3.4	2.4
20	.6	.5	.7	1.5	1.7	3.4	5.6	3.8	4.8	3.4	3.4	2.5
21	.6	.6	.8	1.5	1.7	3.8	5.3	3.4	4.6	3.2	3.6	2.6
22	.6	.6	.8	1.5	1.8	4.0	5.9	3.2	4.4	2.9	3.6	2.8
23	.5	.6	.7	1.5	1.8	4.2	5.9	3.0	4.4	2.8	3.8	2.9
24	.6	.6	.7	1.4	1.9	4.4	5.9	2.8	4.8	2.6	3.8	2.9
25	.6	.5	.7	1.5	1.9	4.4	5.6	2.8	4.4	2.5	3.8	2.9
26	.6	.6	.7	1.5	1.9	4.6	5.3	2.8	4.0	2.5	2.6	3.0
27	.6	.6	.7	1.5	1.9	4.4	5.0	3.0	4.2	2.6	2.5	3.2
28	.5	.6	.8	1.5	1.8	4.8	4.8	4.6	4.2	2.4	3.0	3.2
29	.5	.6	.8	1.4	1.9	5.0	4.4	4.4	4.4	2.3	2.8	3.4
30	.6	.6	.8	1.4	1.9	4.6	4.6	4.4	4.4	2.3	2.8	3.0
31	.8	.8	.8	1.4	1.4	4.2	4.8	4.8	4.8	2.5	2.3	2.8
Total	4 3.6	19.0	20.6	37.3	48.8	94.5	182.7	100.7	151.9	90.8	97.9	76.4
Mean	1.41	0.63	0.65	1.20	1.68	3.05	6.09	3.25	5.06	2.93	3.16	2.55
Ac-ft	86	36	41	74	97	187	362	200	301	180	194	152

Calendar year 1963: Max 10 Min 0.5 Mean 3.78 Ac-ft 2,740  
Water year 1963-64: Max 9.6 Min 0.5 Mean 2.63 Ac-ft 1,910

a No gage-height record.

# BEAR RIVER BASIN

## 10-0555. Bear Lake at Lifton, near St. Charles, Idaho

**Location.**--Lat 42°07'20", long 111°19'20", in NE¼ sec.16, T.15 S., R.44 E., in Lifton pumping plant of Utah Power & Light Company, 3½ miles east of St. Charles.

**Drainage area.**--435 sq mi, approximately (does not include Mud Lake drainage).

**Records available.**--October 1903 to June 1906 (gage heights only), January 1921 to September 1964. Monthly contents only January 1921 to September 1945 published in WSP 1314. Published as Bear Lake at Fish Haven 1903-6.

**Gage.**--Water-stage recorder. Datum of gage is 5,900 ft above mean sea level, unadjusted (levels by Utah Power & Light Company). October 1903 to June 1906, staff gage at different site and datum.

**Extremes.**--Maximum contents during year, 1,003,000 acre-ft July 5-8 (gage height, 17.67 ft); minimum, 681,600 acre-ft Oct. 28-30 (gage height, 12.91 ft).  
1921-64: Maximum contents, 1,423,000 acre-ft June 30, 1923 (gage height, 23.68 ft); no usable contents Nov. 9-19, 1935 (gage height, 2.00 ft, lower limit of pumps).

**Remarks.**--Outflow regulated by gates and pumps at Bear Lake and by gates in dike at north end of Mud Lake. Inflow to lake augmented by water diverted from Bear River through Rainbow inlet canal and Dingle inlet canal, which empty into Mud Lake (see station 10-460). Water from Mud Lake reaches Bear Lake by a sluice at purging plant or by gates in causeway at south end of Mud Lake. Capacity, 1,421,000 acre-ft between gage heights 2.00 (lower limit of pumps) and 23.65 ft (present feasible upper limit of storage with existing facilities). Storage water used for irrigation and power development. Figures given herein represent usable contents.

**Cooperation.**--Gage heights furnished by Utah Power & Light Company, under general supervision of Geological Survey, in connection with a Federal Power Commission project. Contents computed by Geological Survey from capacity table based on data furnished by Utah Power & Light Company.

Capacity table (gage height, in feet, and contents, in thousands of acre-feet)

12.0	621.8	16.0	888.6
13.0	687.5	17.0	956.9
14.0	754.0	18.0	1,025.8
15.0	821.0		

Contents, in thousands of acre-feet, at 0700, water year October 1963 to September 1964

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	682.9	682.2	696.7	700.0	709.3	724.0	745.3	802.9	871.6	996.1	956.2	878.4
2	682.5	682.2	697.4	700.0	709.3	725.3	745.3	804.9	875.7	996.9	954.2	876.4
3	683.5	682.2	698.1	700.0	710.6	726.0	746.0	806.9	879.1	998.2	951.5	873.6
4	683.5	682.2	698.1	700.0	711.3	726.6	746.6	808.9	883.2	1,001	949.4	870.9
5	683.5	682.2	698.1	700.0	711.3	727.3	747.3	810.3	887.2	1,003	944.6	868.2
6	683.5	682.9	698.1	700.7	712.0	728.0	748.6	811.6	891.3	1,003	941.2	865.5
7	683.5	682.9	698.1	700.7	712.7	728.6	748.6	813.0	898.2	1,003	938.4	862.6
8	683.5	683.5	698.1	700.7	712.7	729.9	749.3	814.3	904.3	1,003	937.1	860.0
9	683.5	684.2	698.1	700.7	712.7	730.6	751.3	815.6	911.1	1,002	935.0	857.3
10	683.5	685.5	698.1	700.7	713.3	731.3	754.0	817.6	918.6	1,002	933.0	854.6
11	683.5	686.8	698.1	700.7	714.0	731.9	758.0	819.7	923.4	1,000	931.6	851.9
12	683.5	688.2	698.1	700.7	714.7	731.9	762.0	821.7	926.8	999.6	928.9	849.2
13	683.5	689.5	698.1	701.4	715.3	732.6	765.4	823.7	930.3	999.6	926.2	846.5
14	683.5	690.8	698.1	701.4	716.0	733.2	766.7	825.7	933.7	998.9	923.7	844.4
15	683.5	691.5	698.7	701.4	717.3	733.9	767.4	827.0	936.4	998.2	920.0	843.1
16	683.5	692.8	698.7	701.4	718.0	733.9	768.7	828.4	939.1	996.8	917.3	841.8
17	683.5	693.4	698.7	702.0	718.6	734.6	770.1	830.4	943.9	994.1	913.9	840.4
18	683.5	693.4	698.7	702.0	719.3	734.6	772.1	832.4	948.7	991.3	911.8	839.1
19	683.5	694.1	698.7	702.7	719.3	735.2	774.1	834.4	956.7	988.2	910.5	838.4
20	683.5	694.1	698.7	703.3	719.9	735.2	776.8	835.7	961.0	986.5	907.7	838.4
21	683.5	694.8	698.7	703.3	720.6	735.9	779.5	837.8	964.5	983.7	905.0	837.8
22	683.5	694.8	698.7	704.0	720.6	736.6	782.1	840.4	969.2	981.0	902.3	837.8
23	683.5	695.4	699.4	706.0	721.3	737.2	784.8	843.1	974.0	977.5	899.5	837.6
24	683.5	695.4	699.4	706.6	721.9	737.9	788.2	845.8	977.5	975.4	896.8	837.8
25	682.9	696.1	699.4	706.6	721.9	738.6	790.8	848.5	981.0	972.7	894.0	837.8
26	682.9	696.1	699.4	706.6	722.6	739.9	792.9	851.2	985.1	970.6	891.3	837.8
27	682.2	696.1	699.4	707.3	722.6	740.6	794.9	854.6	987.8	967.2	889.3	837.8
28	681.6	696.1	699.4	707.3	723.3	741.9	796.9	858.7	990.6	964.5	886.6	837.1
29	681.6	696.7	699.4	708.0	723.3	742.6	798.9	861.4	994.1	962.4	884.5	837.1
30	681.6	696.7	700.0	708.0	724.0	744.0	800.9	864.8	995.4	960.4	882.5	836.4
31	682.2	-----	700.0	708.6	-----	744.6	-----	868.9	-----	958.3	880.4	-----
(†)	12.02	13.14	13.19	13.32	13.54	13.86	14.70	15.71	17.56	17.02	15.88	15.23
(‡)	-0.7	+1.45	+3.3	+8.6	+14.7	+21.3	+56.3	+68.0	+126.3	-37.1	-77.9	-44.0

Calendar year 1963..... † -17.3  
Water year 1963-64..... † +153.5

† Elevation, in feet, at end of month.  
‡ Change in contents, in thousands of acre-feet.

# BEAR RIVER BASIN

## 10-0586. Bloomington Creek at Bloomington, Idaho

Location.--Lat 42°11'05", long 111°25'30", in S1/4SE1/4 sec.21, T.14 S., R.43 E., on left bank 1 mile west of Bloomington.

Drainage area.--24.4 sq mi.

Records available.--October 1960 to September 1964.

Gage.--Water-stage recorder 4 feet above 6-foot concrete flume. Altitude of gage is 6,070 ft (from topographic map).

Extremes.--Maximum discharge during year, 181 cfs June 7 (gage height, 4.28 ft); minimum, 12 cfs Mar. 8. 1960-64: Maximum discharge, that of June 7, 1964; minimum, 5.4 cfs Jan. 27, 1961, Feb. 26, 1962.

Remarks.--Records good except those for periods of no gage-height record, which are fair. No diversion above station.

Rating table (gage height, in feet, and discharge, in cubic feet per second)

1.4	12
2.0	36
2.5	62
3.0	91
3.9	150

Discharge, in cubic feet per second, water year October 1963 to September 1964

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	19	18	16	15	15	14	14	20	33	50	28	21
2	18	18	16	15	15	14	14	28	36	48	28	21
3	18	18	16	15	15	14	14	25	33	46	28	21
4	18	18	16	15	15	14	14	23	34	45	27	21
5	18	18	*16	15	15	*14	14	23	37	44	27	21
6	18	18	16	15	14	13	13	22	33	43	27	20
7	*18	18	16	15	14	14	14	21	150	41	26	20
8	18	*18	16	15	14	14	14	22	118	40	26	21
9	18	22	16	15	14	14	14	18	22	35	40	26
10	18	18	16	15	14	14	20	24	63	*39	28	20
11	18	18	16	15	14	14	18	27	78	37	26	20
12	18	18	16	15	14	14	17	29	*72	36	26	20
13	18	18	16	15	14	14	16	32	71	36	25	20
14	18	18	16	15	14	14	20	40	67	36	25	20
15	18	18	16	15	14	14	25	*45	66	35	24	20
16	18	18	15	14	14	14	30	52	66	34	24	20
17	18	17	15	14	14	14	*23	58	74	34	24	20
18	18	18	15	14	14	14	21	60	78	32	24	20
19	18	18	15	14	14	14	21	57	72	31	24	20
20	18	17	15	14	14	14	26	*77	64	30	24	20
21	18	18	15	14	14	14	23	53	62	30	23	20
22	18	17	15	14	14	14	21	54	60	30	23	19
23	18	17	15	14	14	14	23	55	56	30	23	19
24	18	18	15	14	14	14	22	50	54	30	22	19
25	18	18	15	14	14	14	19	59	54	30	21	19
26	18	17	15	13	14	14	20	101	54	28	21	19
27	18	17	14	13	14	14	19	107	55	29	21	19
28	17	18	13	13	14	14	22	57	58	25	22	19
29	18	18	15	13	14	14	25	53	54	26	22	19
30	21	18	15	13	14	14	28	51	52	25	21	19
31	18	-----	15	13	-----	14	-----	51	-----	28	-----	-----
Total	564	527	473	442	403	432	597	1,738	2,228	1,098	755	538
Mean	18.2	17.6	15.3	14.3	13.9	13.9	19.9	56.1	74.3	35.4	24.4	19.9
Ac-ft	1,120	1,050	939	877	793	857	1,190	3,450	4,420	2,190	1,500	1,190

Calendar year 1963: Max 104 Min 14 Mean 24.7 Ac-ft 17,910

Water year 1963-64: Max 180 Min 13 Mean 26.9 Ac-ft 18,560

\* Discharge measurement made on this day.

Note.--No gage-height record Jan. 8-20, Feb. 24 to Mar. 3, Apr. 10-17.



# BEAR RIVER BASIN

## 10-0595. Bear Lake outlet canal near Paris, Idaho

Location.--Lat 42°12'00", long 111°20'30", in SW¼ sec. 8, T.14 S., R.44 E., on right bank 2,000 ft downstream from headgates (at dike) and 3 miles southeast of Paris.

Records available.--January 1922 to September 1964. Monthly discharge only January 1922 to September 1943, published in USP 1314.

Gage.--Water-stage re-order. Altitude of gage is 5,920 ft (from topographic map).

Average discharge.--42 years, 331 cfs (239,600 acre-ft per year).

Extremes.--Maximum discharge during year, 1,440 cfs July 23 (gage height, 28.76 ft); minimum daily, 1.0 cfs many days in January, March to July.

1922-64: Maximum daily discharge, 1,870 cfs Aug. 8, 1924; minimum daily, 1 cfs for many days in 1937, 1954, 1959, 1961, 1964.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Discharge measurements generally made six times a week during periods of release from Bear Lake.

Cooperation.--Records collected by Utah Power & Light Co., under general supervision of Geological Survey, in connection with a Federal Power Commission project.

Discharge, in cubic feet per second, water year October 1963 to September 1964

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1.4	1.4	1.4	1.0	1.3	1.2	1.0	1.0	1.0	1.0	1,122	556
2	1.4	1.4	1.4	1.0	1.3	1.2	1.0	1.0	1.0	1.0	1,040	484
3	1.4	1.4	1.4	1.0	1.3	1.2	1.0	1.0	1.0	1.0	84	487
4	1.4	1.4	1.4	1.0	1.3	1.2	1.0	1.0	1.0	206	1,020	477
5	1.4	1.4	1.4	1.0	1.3	1.2	1.0	1.0	1.0	205	977	480
6	1.4	1.4	1.4	1.0	1.3	1.2	1.0	1.0	1.0	348	830	477
7	1.4	1.4	1.4	1.1	1.3	1.1	1.0	1.0	1.0	646	663	475
8	1.4	1.4	1.4	1.1	1.3	1.1	1.0	1.0	1.0	896	660	475
9	1.4	1.4	1.4	1.1	1.3	1.1	1.0	1.0	1.0	1,060	653	470
10	1.4	1.4	1.4	1.1	1.4	1.1	1.0	1.0	1.0	1,050	666	497
11	1.4	1.4	1.4	1.3	1.4	1.1	1.0	1.0	1.0	1,020	763	512
12	1.4	1.4	1.4	1.3	1.4	1.1	1.0	1.0	1.0	1,000	893	517
13	1.4	1.4	1.4	1.3	1.4	1.0	1.0	1.0	1.0	980	893	527
14	1.4	1.4	1.4	1.1	1.4	1.0	1.0	1.0	1.0	980	905	537
15	1.4	1.4	1.4	1.1	1.4	1.0	1.0	1.0	1.0	987	880	382
16	1.4	1.4	1.4	1.1	1.4	1.0	1.0	1.0	1.0	1,050	890	487
17	1.4	1.4	1.4	1.1	1.4	1.0	1.0	1.0	1.0	1,230	843	637
18	1.4	1.4	1.4	1.2	1.4	1.0	1.0	1.0	1.0	1,290	762	351
19	1.4	1.4	1.4	1.2	1.4	1.0	1.0	1.0	1.0	1,290	709	248
20	1.4	1.4	1.4	1.2	1.3	1.0	1.0	1.0	1.0	1,320	744	198
21	1.4	1.4	1.4	1.2	1.3	1.0	1.0	1.0	1.0	1,430	756	176
22	1.4	1.4	1.4	1.2	1.3	1.0	1.0	1.0	1.0	1,430	744	98
23	1.4	1.4	1.4	1.2	1.3	1.0	1.0	1.0	1.0	1,410	750	74
24	1.4	1.4	1.4	1.2	1.3	1.0	1.0	1.0	1.0	1,390	750	49
25	1.4	1.4	1.4	1.2	1.3	1.0	1.0	1.0	1.0	1,400	736	48
26	1.4	1.4	1.4	1.2	1.3	1.0	1.0	1.0	1.0	1,380	718	47
27	1.4	1.4	1.4	1.2	1.3	1.0	1.0	1.0	1.0	1,360	718	47
28	1.4	1.4	1.4	1.2	1.3	1.0	1.0	1.0	1.0	1,350	675	46
29	1.4	1.4	1.4	1.3	1.2	1.0	1.0	1.0	1.0	1,320	624	43
30	1.4	1.4	1.4	1.3	1.2	1.0	1.0	1.0	1.0	1,320	629	45
31	1.4	-----	1.4	1.3	-----	1.0	-----	1.0	-----	1,170	632	-----
Total	43.4	42.0	43.4	35.2	38.5	32.7	30.0	31.0	30.0	3,050.40	24,683	9,588.1
Mean	1.40	1.40	1.40	1.14	1.33	1.05	1.00	1.00	1.00	984	796	320
Ac-ft	86	83	86	70	76	65	60	61	60	60,500	43,960	13,020

Calendar year 1963: Max 1,670 Min 1.4 Mean 228 Ac-ft 165,200  
 Water year 1963-64: Max 1,430 Min 1.0 Mean 178 Ac-ft 129,106

Note.--No gage-height record Oct. 1 to July 2, Sept. 24-30.

# BEAR RIVER BASIN

## 10-0905. Bear River near Preston, Idaho

**Location.**--Lat 42°16', long 111°51', in NW 1/4 sec. 35, T.14 S., R. 39 E., on left bank 800 ft downstream from head-gage of West Snake Canal, 5 miles downstream from Minx Creek, 5 miles north of Preston, and 5 1/2 miles upstream from Battle Creek.

**Drainage area.**--4,800 sq mi, approximately.

**Records available.**--October 1889 to December 1916, January to September 1917 (gage heights only), January 1941 to September 1964. Prior to 1906, published as "at Battlereek." Monthly discharge only for some periods, published in WSP 1011.

**Gage.**--Water-stage recorder. Altitude of gage is 4,540 ft (from topographic map). October 1889 to September 1917 staff or wire-weight gages at several sites within 5 miles downstream at different dates.

**Average discharge.**--21 years (1943-64), 777 cfs (862,500 acre-ft per year).

**Extreme.**--Maximum discharge during year, 3,150 cfs June 9 (gage height, 4.69 ft); minimum, 1.8 cfs Oct. 12 (gage height, 0.13 ft); minimum daily, 77 cfs Jan. 12. 1889-1917: Maximum discharge, about 3,100 cfs June 9, 10, 1907, estimated on basis of records for station near Collinston, Wash; maximum gage height observed, 5.04 ft Jan. 17, 18, 1917 (backwater from Ice), site and date then in use; minimum discharge not remembered. 1943-64: Maximum discharge, 4,420 cfs Apr. 17, 1950 (gage height, 5.81 ft); minimum, 0.6 cfs June 14, 1948; minimum daily, 9.5 cfs July 6, 1957.

**Remarks.**--Records good. Station is below all irrigation diversions from Bear River in Idaho except Cub River pumps in SE 1/4 sec. 20, T.16 S., R. 39 E. Natural flow of stream affected by storage reservoirs, power developments, diversions for irrigation, and return flow from irrigated areas.

Discharge, in cubic feet per second, water year October 1889 to September 1964												
Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	161	364	462	160	815	202	440	1,260	845	608	486	478
2	300	416	476	514	733	428	666	1,820	889	148	788	677
3	360	289	447	788	370	466	808	1,150	718	258	827	619
4	210	250	450	481	420	327	728	1,180	888	187	482	787
5	367	484	522	127	430	372	972	1,120	484	187	817	430
6	281	518	481	463	584	585	471	1,130	766	102	760	430
7	249	837	115	514	378	416	788	1,010	1,010	435	783	299
8	303	455	234	*817	482	166	767	948	1,800	*874	494	408
9	284	543	582	400	113	288	983	1,280	1,790	773	348	804
10	314	382	821	366	*222	477	1,250	649	1,350	388	440	582
11	253	428	457	240	334	356	1,230	867	1,530	511	557	502
12	223	408	827	77	848	607	1,140	804	1,230	698	882	389
13	277	466	522	353	368	421	1,040	1,350	1,140	889	837	692
14	202	410	333	337	808	487	1,120	1,810	1,330	675	733	327
15	*254	463	180	484	840	832	1,480	1,430	1,080	647	521	521
16	313	485	432	439	229	410	1,810	1,350	921	960	788	442
17	178	339	586	377	478	491	1,750	1,120	1,200	1,040	747	380
18	228	421	811	298	480	508	1,810	1,180	1,650	996	861	292
19	328	303	*686	143	898	468	1,900	1,280	1,430	1,510	800	460
20	138	827	812	804	600	489	1,380	1,390	1,810	1,100	708	428
21	261	548	330	528	580	468	1,740	1,420	1,330	668	748	307
22	315	527	37	519	480	286	1,740	1,380	1,840	688	847	388
23	327	260	577	582	437	282	*1,490	1,300	1,480	788	658	457
24	379	348	420	714	140	213	1,890	840	1,180	787	673	289
25	414	533	203	813	202	877	1,340	518	1,280	1,210	828	289
26	274	*348	408	182	495	473	1,170	584	1,060	889	571	217
27	228	404	592	506	347	481	1,120	*1,180	1,080	1,010	640	231
28	518	342	487	618	399	301	1,270	993	667	1,080	818	308
29	311	353	192	377	468	217	1,310	1,040	743	1,310	496	167
30	446	317	194	611	-----	309	1,300	383	451	717	188	317
31	223	-----	513	478	-----	483	-----	643	-----	514	410	-----
Total	9,297	12,611	12,208	18,595	11,390	13,004	38,804	34,611	34,252	22,978	19,411	12,606
Mean	300	420	426	438	413	418	1,183	1,118	1,142	741	626	420
Ac-ft	18,440	25,010	26,190	26,970	23,780	25,780	70,420	69,850	67,940	46,580	36,500	28,000

Calendar year 1963: Max 3,380 Min 73 Mean 380 Ac-ft 420,200  
 Water year 1963-64: Max 1,810 Min 77 Mean 637 Ac-ft 487,300

\* Discharge measurement made on this day.

# BEAR RIVER BASIN

## 10-0930. Cub River near Preston, Idaho

Location.--Lat 42°08', long 111°41', in SW¼ sec.5, T.15 S., R.41 E., on right bank 0.2 mile upstream from head-gates of Cub River-Warna Creek Canal, 0.7 mile upstream from Forest boundary, and 10 miles east of Preston.

Drainage area.--19.4 sq mi.

Records available.--March 1940 to September 1962, October 1965 to September 1964.

Gage.--Water-stage recorder. Altitude of gage is 5,320 ft (from topographic map).

Average discharge.--21 years, 82.3 cfs (89,560 acre-ft per year).

Extremes.--Maximum discharge during year, 692 cfs June 7 (gage height, 2.86 ft); minimum, 11 cfs Jan. 22, 1940-62, 1965-64; Maximum discharge, 716 cfs June 7, 1967 (gage height, 3.89 ft); maximum gage height, 3.83 ft June 2, 1943; minimum discharge, 11 cfs Jan. 22, 1961, Jan. 22, 1964.

Remarks.--Records good. No diversion above station.

Rating table, except periods of ice effect (gage height,  
in feet, and discharge, in cubic feet per second)

0.4	14	2.0	228
.7	27	2.5	415
1.0	50	3.0	708
1.5	118		

Discharge, in cubic feet per second, water year October 1963 to September 1964

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	25	22	21	18	17	17	36	89	384	260	65	39
2	24	22	21	18	17	17	39	94	425	241	64	38
3	24	22	21	18	b17	17	37	88	455	223	63	36
4	24	23	21	b16	b17	17	40	79	465	206	60	37
5	24	23	21	18	17	17	43	78	465	195	59	38
6	24	23	21	18	b17	17	40	78	480	181	57	37
7	24	23	20	b16	17	b17	35	75	*609	163	55	37
8	24	22	20	b18	b17	b17	37	72	653	153	54	36
9	24	24	20	b18	17	17	43	72	377	145	53	36
10	24	23	19	18	*17	17	33	78	480	137	54	36
11	24	22	19	18	17	17	47	96	406	132	53	35
12	24	22	19	b16	17	17	43	96	388	125	53	34
13	25	22	19	b16	18	17	38	*112	354	120	*51	34
14	24	22	19	b18	18	17	42	162	346	115	50	34
15	*24	22	19	b18	b16	17	60	226	354	110	48	34
16	24	22	19	b16	18	17	77	265	322	104	46	*34
17	24	22	18	b18	18	17	75	310	374	100	47	34
18	24	22	18	18	17	17	69	322	368	96	46	34
19	24	22	*19	18	18	17	63	342	375	94	46	34
20	23	22	19	18	b17	*17	62	379	342	94	46	34
21	23	22	19	18	17	17	68	*420	322	88	46	34
22	23	21	18	15	17	17	63	445	303	85	44	34
23	24	21	18	b18	17	17	*60	445	*277	83	43	33
24	23	21	18	16	17	17	59	425	274	81	42	33
25	23	21	18	16	17	17	58	435	281	78	42	32
26	23	*21	18	18	b17	18	53	490	303	77	42	32
27	23	21	18	17	b17	17	48	490	314	74	42	32
28	22	21	16	17	b17	18	53	485	322	72	41	32
29	23	21	16	b17	17	18	63	406	307	71	40	32
30	23	21	b16	17	-----	21	75	350	284	69	40	31
31	23	-----	18	17	-----	26	-----	362	-----	66	40	-----
Total	737	658	593	553	499	543	1,580	7,848	11,660	3,836	1,539	1,038
Mean	23.8	21.9	19.1	17.9	17.2	17.5	52.7	253	389	124	49.6	34.6
Ac-ft	1,460	1,310	1,160	1,100	990	1,080	3,130	15,580	23,150	7,610	3,050	2,080

Calendar year 1963: Max 429 Min 17 Mean 64.8 Ac-ft 46,820  
 Water year 1963-64: Max 683 Min 17 Mean 84.9 Ac-ft 61,660

\* Discharge measurement made on this day.  
 b Stage-discharge relation affected by ice.

# BEAR RIVER BASIN

## 10-1060. Little Bear River near Paradise, Utah

Location.--Lat 41°35'28", long 111°51'10", in SE¼ sec.20, T.10 N., R.1 E., on right bank 1 mile upstream from backwater of Hyrum Reservoir, 2 miles northwest of Paradise, and 5 miles downstream from East Fork.

Drainage area.--203 sq mi.

Records available.--January 1937 to September 1964. Monthly discharge only for some periods, published in WSP 1914.

Gage.--Water-stage recorder. Altitude of gage is 4,680 ft (from topographic map). Prior to Nov. 28, 1945, at site 180 ft upstream at different datum. Nov. 28, 1945 to May 19, 1952 at present site at datum 1.30 ft higher.

Average discharge.--87 years, 82.8 cfs (55,240 acre-ft per year).

Extremes.--Maximum discharge during year, 487 cfs Apr. 15 (gage height, 4.82 ft); minimum, 22 cfs Oct. 12.

1937-64: Maximum discharge, 2,630 cfs Feb. 11, 1962 (gage height, 6.52 ft), from rating curve extended above 600 cfs by logarithmic plotting; minimum, 4 cfs Aug. 14, 1940.

Remarks.--Records good except those for periods of ice effect, which are fair. Diversions above station for irrigation of about 10,000 acres most of which is below station. Flow regulated slightly by trout farm about 2 miles upstream and by Porcupine Reservoir (capacity, 12,600 acre-ft) completed 1902. No diversion between station and Hyrum Reservoir.

Cooperation.--Four discharge measurements furnished by Little Bear River water commissioner.

Discharge, in cubic feet per second, water year October1963 to September 1964

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	34	29	34	156	*32	37	120	199	*128	30	44	41
2	33	28	*32	38	32	37	140	210	120	30	38	42
3	32	28	33	33	33	38	96	182	140	30	44	41
4	30	26	33	133	132	36	127	176	123	30	44	42
5	30	34	33	34	132	36	156	229	114	32	47	42
6	29	36	34	33	132	34	137	198	160	22	47	39
7	29	37	34	33	132	32	103	178	*249	32	31	41
8	28	38	33	133	132	37	137	210	272	34	39	41
9	29	38	36	133	32	37	216	265	256	36	49	41
10	33	39	36	133	30	36	100	276	229	36	67	41
11	28	34	30	34	34	34	236	281	221	38	47	41
12	27	34	33	34	30	37	192	*276	199	37	47	39
13	49	34	36	34	39	34	143	288	189	27	46	37
14	28	34	37	34	32	34	*196	310	162	41	44	39
15	28	36	36	132	32	32	244	325	169	*49	*46	*38
16	34	42	37	133	130	34	286	355	*174	42	48	38
17	23	35	37	36	36	36	*179	236	233	42	48	39
18	25	36	36	36	36	36	131	300	265	41	49	42
19	30	34	36	36	36	36	126	244	276	39	48	42
20	30	36	37	33	33	34	171	340	333	33	48	39
21	30	39	37	33	32	36	140	250	217	44	44	39
22	30	38	37	32	32	37	123	225	210	62	46	38
23	30	37	137	32	22	36	149	276	171	64	47	39
24	34	41	137	32	25	36	126	225	186	44	46	38
25	32	42	137	33	32	36	100	202	95	44	46	38
26	30	42	36	33	132	36	103	199	82	48	44	37
27	33	42	37	30	132	38	98	217	87	43	44	36
28	29	46	37	132	*132	36	103	208	60	79	46	34
29	27	39	36	132	132	30	128	210	60	46	44	36
30	22	42	33	132	-----	34	*143	188	*48	44	46	36
31	*32	-----	*37	32	-----	*36	-----	137	-----	*49	*44	-----
Total	977	1,105	1,096	1,021	904	1,135	4,910	7,813	8,004	1,216	1,428	1,184
Mean	31.5	35.3	35.4	32.9	31.2	35.8	154	252	267	39.2	46.0	38.4
Ac-ft	1,690	2,190	2,170	2,030	1,790	2,250	9,140	15,500	9,980	2,410	2,830	2,340

Calendar year 1963: Max 700 Min 23 Mean 52.8 Ac-ft 36,100

Water year 1963-64: Max 368 Min 26 Mean 75.1 Ac-ft 84,520

\* Discharge measurement made on this day.  
 † Stage-discharge relation affected by ice.

# BEAR RIVER BASIN

## 10-1090. Logan River above State dam, near Logan, Utah

Location.--Lat 41°44'40", long 111°47'00", in NE¼ sec.36, T.18 N., R.1 E., on right bank at Logan plant of Utah Power & Light Co., 125 ft upstream from tailrace, half a mile upstream from State dam, and 2½ miles east of Logan.

Drainage area.--218 sq mi.

Records available.--June 1898 to September 1964. Published as Logan River near Logan prior to 1913. Records since May 1913 equivalent to earlier records if records for Utah Power & Light Co.'s tailrace near Logan are added. Monthly discharge only for some periods, published in WSP 1314.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 4,890 ft (from topographic map). Prior to May 7, 1913, staff gage at various sites within half a mile downstream, below confluence of tailrace, at different datums. May 7 to Sept. 30, 1913, water-stage recorder at present site at different datums and Oct. 1, 1913, to May 3, 1936, at datum about 2.3 ft lower than present datum.

Average discharge.--51 years (1913-64), 102 cfs (73,840 acre-ft per year). Average combined discharge of Logan River above State dam, Utah Power & Light Co.'s tailrace, and Logan, Hyde Park & Smithfield Canal, 65 years (1896-1964), 273 cfs (197,600 acre-ft per year).

Extremes.--Maximum discharge during year, 1,020 cfs June 7 (gage height 4.29 ft); minimum daily, 14 cfs for several days.

Maximum combined discharge during year (Logan River above State dam, Utah Power & Light Co.'s tailrace, and Logan, Hyde Park & Smithfield Canal) 1,330 cfs June 7; minimum daily, 73 cfs Jan. 15, Feb. 28, Mar. 8, 1933-64. Maximum discharge, 2,000 cfs Mar. 21, 1916 (gage height, 8.6 ft, datum then in use), from rating curve extended above 1,000 cfs; minimum daily, 8 cfs Nov. 7, 1940.

1896-1934: Maximum combined observed discharge (Logan River above State dam, Utah Power & Light Co.'s tailrace, and Logan, Hyde Park & Smithfield Canal), 2,480 cfs May 24, 1907; minimum daily, 80 cfs Jan. 21, 1935.

Remarks.--Records excellent. Water diverted from river and springs above station for power, irrigation, and municipal supply. Flow regulated by powerplants above station. For records of combined flow of Logan River, Utah Power & Light Co.'s tailrace, and Logan, Hyde Park & Smithfield Canal, see following page. Combined flow record excludes that in Logan City ordinary pipe lines and one small irrigation diversion from Power flows that siphons canyon 400 ft upstream from station. During 1963 site of gaging station for Logan, Hyde Park & Smithfield Canal was changed; records of combined flow for this year reflect that change but are still equivalent even though the records for the canal at different sites are not equivalent.

Computation.--Records collected in collaboration with Utah Power & Light Co. in connection with a Federal Power Commission project.

Discharge, in cubic feet per second, water year October 1963 to September 1964

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	18	16	16	16	15	16	*14	*104	368	310	22	17
2	18	16	16	16	15	*16	44	108	404	272	22	16
3	20	17	17	17	14	18	30	71	461	242	22	16
4	18	17	17	16	15	18	21	67	482	234	21	17
5	18	24	16	17	16	18	23	52	469	200	21	17
6	17	22	16	*16	16	14	21	46	492	188	21	17
7	*16	27	17	15	16	14	73	40	*827	168	22	23
8	16	27	17	15	16	16	73	70	732	*148	21	37
9	16	22	17	15	15	15	53	50	620	137	21	36
10	16	20	17	15	16	14	43	64	581	123	21	37
11	16	23	16	15	16	14	23	67	494	120	20	37
12	16	22	16	15	16	14	24	*102	444	102	*20	37
13	17	22	16	16	16	14	78	146	444	103	20	36
14	16	22	16	17	16	14	114	234	432	98	20	*36
15	16	20	15	16	16	13	38	237	440	87	20	37
16	*16	17	19	17	16	14	143	342	444	77	20	37
17	16	16	17	16	16	15	148	326	486	73	20	36
18	16	*16	16	16	16	14	79	412	420	66	20	37
19	16	16	16	16	16	14	64	326	427	60	19	28
20	16	16	16	17	15	14	128	436	392	55	19	37
21	16	16	16	16	*16	14	25	*461	368	67	19	37
22	16	16	16	15	15	16	42	507	360	40	20	36
23	17	16	17	15	15	15	49	507	324	46	20	34
24	16	17	16	15	15	14	50	473	*317	40	19	*34
25	16	16	16	15	15	14	30	477	*310	31	19	34
26	16	16	16	15	16	16	28	324	324	31	19	36
27	17	17	17	15	16	15	26	355	326	28	20	37
28	17	17	17	15	16	17	33	347	347	26	19	37
29	17	16	17	16	16	16	43	457	347	26	19	36
30	18	17	17	16	-----	*18	79	326	326	24	17	36
31	17	-----	16	18	-----	23	-----	358	-----	23	17	-----
Total	517	563	518	493	451	479	1,788	8,750	13,400	3,227	418	364
Mean	16.7	18.8	18.7	15.9	15.9	15.4	69.8	282	447	106	20.0	12.1
to-ft	1,020	1,130	1,030	978	895	850	3,580	17,580	26,660	6,320	1,220	1,410

alendar year 1863: Max 486 Min 18 Mean 66.7 Ac-ft 48,250  
 ster year 1863-64: Max 627 Min 14 Mean 67.0 Ac-ft 63,180

\* Discharge measurement made on this day.

# BEAR RIVER BASIN

## 10-1090. Logan River above State dam, near Logan, Utah — continued

Combined discharge, in cubic feet per second, of Logan River above State dam, Utah Power & Light Co.'s tailrace, and Logan, Hyde Park & Smithfield Canal at head, near Logan, Utah, water year October 1963 to September 1964

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	129	119	82	84	85	83	114	270	220	230	248	164
2	128	119	88	89	88	89	116	274	223	217	271	168
3	120	118	88	81	79	87	110	240	208	208	237	163
4	127	118	87	85	83	87	113	222	721	480	233	174
5	128	121	87	82	80	87	118	223	720	474	231	175
6	127	118	87	92	90	88	115	216	758	468	229	174
7	123	124	86	86	83	86	104	208	1,080	484	228	169
8	123	118	87	82	87	75	111	216	322	428	224	175
9	123	118	87	82	83	83	108	220	353	411	225	175
10	122	123	100	100	91	83	130	234	752	402	216	178
11	121	119	89	92	91	83	118	280	894	393	212	172
12	123	114	84	88	89	87	122	281	641	374	216	170
13	126	114	87	78	85	80	107	324	651	381	215	167
14	126	115	86	80	84	81	119	416	629	384	213	167
15	123	114	100	91	78	84	152	503	637	381	213	171
16	125	116	102	88	89	81	175	547	840	340	209	168
17	124	111	101	89	89	83	192	596	882	333	207	162
18	123	110	100	91	89	84	176	619	866	322	208	162
19	123	110	99	89	89	84	161	613	653	320	204	167
20	123	110	100	91	89	83	186	670	682	308	204	165
21	121	110	102	84	85	82	186	705	882	286	202	162
22	117	110	100	82	85	87	174	746	843	258	201	161
23	122	108	93	82	84	83	191	754	817	288	199	157
24	122	108	95	84	85	82	199	722	814	283	198	153
25	121	108	100	82	86	81	177	724	526	275	182	153
26	121	106	87	83	78	82	173	787	537	268	191	158
27	118	106	88	88	87	84	160	815	649	288	182	158
28	118	106	100	89	86	81	177	807	600	263	182	156
29	121	103	88	87	87	84	203	713	660	260	182	152
30	126	103	88	81	85	86	241	650	829	250	182	153
31	125	-----	82	81	-----	103	-----	811	-----	249	180	-----
<b>Total</b>	3,831	3,584	3,024	2,780	2,505	2,621	4,837	15,179	19,744	11,134	6,518	5,005
<b>Mean</b>	124	113	97.5	89.7	80.2	84.5	151	490	658	369	210	167
<b>Ac-ft</b>	7,600	6,710	6,000	5,510	4,970	5,200	9,600	30,110	39,180	22,680	12,940	9,930
<b>Calendar year 1963:</b>	Max	744	Min	78	Mean	107	Ac-ft	142,900				
<b>Water year 1963-64:</b>	Max	1,060	Min	78	Mean	215	Ac-ft	159,200				

# BEAR RIVER BASIN

## 10-1135. Blacksmith Fork above Utah Power & Light Co.'s dam near Hyrum, Utah

Location.--Lat 41°37'20", Long 111°44'25", in NE 1/4 sec. 8, T.16 N., R.2 E., on right bank three-quarters of a mile upstream from diversion dam, 2 1/2 miles upstream from powerplant of Utah Power & Light Co., and 6 miles east of Hyrum.

Drainage area.--260 sq mi.

Records available.--October 1913 to September 1964. Monthly discharge only for October 1913, published in WSP 1314.

Gage.--Water-stage recorder. Altitude of gage is 8,000 ft (from topographic map). Prior to Oct. 2, 1934, at site 1,000 ft upstream at different datum.

Average discharge.--51 years, 123 cfs (88,050 acre-ft per year).

Extremes.--Maximum discharge during year, 472 cfs May 15 (gage height, 3.77 ft); minimum daily, 44 cfs Mar. 24, 1913-64; Maximum discharge 1,800 cfs May 15, 1917 (gage height, 5.5 ft, from floodmarks, site and datum then in use), from rating curve extended above 500 cfs; minimum daily, 23 cfs Jan. 3, 1935.

Remarks.--Records good. A few small diversions for irrigation of about 200 acres above station. Low flow may be slightly regulated by powerplant above station.

Rating table, except periods of ice effect (gage height,  
in feet, and discharge, in cubic feet per second)  
(Shifting-control method used Apr. 27 to  
May 3, May 31 to June 3, July 16 to Sept. 30)

2.0	40	2.8	148
2.1	58	3.0	271
2.2	78	3.7	460

Discharge, in cubic feet per second, water year October 1963 to September 1964

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	60	63	58	58	54	53	75	319	1161	120	93	92
2	60	66	58	58	54	54	75	328	174	113	93	90
3	60	66	60	58	54	53	81	236	181	118	94	87
4	60	68	60	54	54	53	80	193	169	113	94	92
5	60	71	56	54	55	54	104	208	162	118	94	90
6	60	71	58	56	56	54	100	196	162	113	90	90
7	62	75	56	56	56	54	97	192	233	113	90	85
8	62	71	58	58	54	53	84	198	228	116	90	78
9	64	71	58	58	54	51	100	218	208	113	90	78
10	64	68	60	58	54	51	143	263	198	118	90	77
11	64	68	60	62	54	49	131	334	178	111	92	77
12	66	66	53	55	53	51	132	350	162	111	94	77
13	73	64	52	55	54	51	109	393	164	116	94	77
14	68	64	60	58	54	51	111	425	164	111	92	77
15	66	66	56	56	54	51	152	435	152	111	90	77
16	64	68	60	56	54	49	101	426	182	111	92	78
17	64	68	60	56	54	49	171	410	187	111	92	78
18	64	66	58	50	54	49	140	362	187	109	94	78
19	64	64	58	64	54	51	154	361	182	107	94	78
20	64	64	60	64	53	49	164	355	143	107	94	78
21	64	66	50	62	53	46	164	342	145	104	92	78
22	64	64	56	62	51	51	143	316	147	102	96	78
23	68	62	53	62	53	51	164	297	138	102	96	78
24	68	64	64	60	53	54	174	271	134	102	87	77
25	66	62	56	60	53	53	147	247	131	100	87	77
26	66	62	56	58	53	45	143	241	127	98	87	81
27	66	62	56	56	53	45	131	241	127	96	90	81
28	66	62	58	56	53	47	136	251	129	96	90	81
29	62	62	56	56	54	49	169	218	127	96	92	81
30	71	62	53	56	53	53	233	210	150	96	80	78
31	*71	---	*56	54	---	60	---	196	---	*96	*90	---
Total	2,001	1,973	1,783	1,806	1,560	1,567	4,032	9,059	4,802	3,332	2,626	2,433
Mean	64.5	63.8	57.5	58.3	53.8	50.5	134	292	160	103	91.5	81.1
Ac-ft	3,970	3,810	3,540	3,690	3,080	3,110	8,000	17,930	9,820	6,650	5,620	4,530

Calendar year 1963: Max 300 Min 35 Mean 85.7 Ac-ft 22,080  
 Water year 1963-64: Max 435 Min 44 Mean 102 Ac-ft 73,750

Peak discharge (base, 140 cfs)

Date	Time	Gage height	Discharge	Date	Time	Gage height	Discharge
5-2	0130	3.51	380	6-7	1800	3.10	271
5-15	0300	3.77	472				

\* Discharge measurement made on this day.  
 † Stage-discharge relation affected by ice.

# BEAR RIVER BASIN

## 10-1170. Hammond (East Side) Canal near Collinston, Utah

Location.--Lat 41°50', long 112°03', in SE¼ sec.27, T.13 N., R.2 W., on right bank 3,600 ft downstream from Culeer Dam and 4 miles north of Collinston.

Records available.--June 1912 to September 1964. Prior to 1916, published as Hammond ditch near Collinston. Monthly discharge only for some periods, published in MSP 1314.

Gage.--Water-stage recorder. Prior to May 22, 1934, staff gage at same site and datum.

Average discharge.--52 years, 50.5 cfs (50,500 acre-ft per year).

Extremes.--1912-64: Maximum daily discharge, 164 cfs June 29, 1963; no flow at times in each year.

Remarks.--Records good. Canal diverts from east side of Bear River in NW¼SE¼ sec.28, T.13 N., R.2 W., at dam at which West Side Canal and intake of Culeer powerplant also divert. Water from this canal and West Side Canal used for irrigation of about 56,000 acres below station in eastern Box Elder County.

Cooperation.--Gage-height record and seven discharge measurements furnished by Utah Power & Light Co.

Rating tables (gage height, in feet, and discharge, in cubic feet per second)  
(Shifting-control method used Nov. 19-21)

Oct. 1 to Apr. 30				May 1 to Sept. 30			
0.8	0	1.4	5.5	0.8	0	2.0	23
1.0	.7	2.0	19	1.0	1.2	2.5	44
1.1	1.6	2.8	36	1.1	2.2	3.0	70
1.2	2.7	2.2	54	1.3	3.1	4.0	136
				1.5	4.1	4.5	175

Discharge, in cubic feet per second, water year October 1963 to September 1964

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	33	18						0	93	137	162	147
2	33	19						0	87	132	161	145
3	39	19						0	*109	*187	161	142
4	46	16						0	121	167	189	142
5	49	11						0	120	160	187	142
6	48	12						0	115	161	166	137
7	49	12						0	46	139	169	133
8	*48	12						0	18	133	161	132
9	48	12						0	16	165	162	128
10	46	12						0	18	169	161	127
11	41	11						0	18	169	161	130
12	33	10						0	16	*171	*161	129
13	26	10						0	18	170	162	122
14	26	10						0	36	*161	160	116
15	22	10						0	65	165	155	*116
16	*17	9.8						3.7	66	169	158	114
17	16	9.8						4.2	64	169	158	114
18	16	7.8						78	66	169	157	108
19	16	*1.9						77	67	170	147	102
20	19	1.9						74	67	171	158	101
21	19	1.4						77	67	169	160	86
22	19	0						96	67	169	158	*90
23	19	0						110	*67	170	149	87
24	18	0						110	67	169	150	87
25	17	0						119	67	170	149	87
26	17	0						123	68	169	148	87
27	17	0						123	70	169	148	87
28	16	0						124	78	168	148	87
29	16	0						103	92	167	146	85
30	18	0						23	120	164	150	80
31	18							88		161	148	
Total	870	226.3	0	0	0	0	0	1,403.8	1,611	5,108	6,831	3,402
Mean	28.1	7.54	0	0	0	0	0	45.3	63.7	16.5	156	113
Ac-ft	1,730	448	0	0	0	0	0	2,780	3,780	10,130	9,560	6,750

Calendar year 1963: Max 184 Min 0 Mean 51.3 Ac-ft 27,120  
 Water year 1963-64: Max 171 Min 0 Mean 46.5 Ac-ft 35,210

\* Discharge measurement or observation of no flow made on this day.



# BEAR RIVER BASIN

## 10-1175. West Side Canal near Collinston, Utah

Location.--Lat 41°50', long 112°04', in SW<sup>1</sup> sec.27, T.13 N., R.2 W., on left bank 4,200 ft downstream from Cutler Dam and 4 miles north of Collinston.

Records available.--June 1912 to September 1964. Monthly discharge only for some periods, published in WSP 1914.

Gage.--Water-stage recorder. Prior to May 22, 1914 staff gage at same site and datum.

Average discharge.--52 years, 235 cfs (170,100 acre-ft per year).

Extremes.--1912-64: Maximum daily discharge, 755 cfs July 7, 1964; no flow for periods in every year except 1914.

Remarks.--Records good except those for periods of ice effect, which are fair. Canal diverts from west side of Bear River in NW<sup>1</sup>SW<sup>1</sup> sec.26, T.13 N., R.2 W., at dam at which Hammond (East Side) Canal and intake of Cutler powerplant also divert. Water from this canal and Hammond (East Side) Canal used for irrigation of about 56,000 acres below station in eastern Box Elder County.

Cooperation.--Gage-height record and 7 discharge measurements furnished by Utah Power & Light Co.

Rating table, except periods of ice effect (gage height,  
in feet, and discharge, in cubic feet per second)  
(Sluicing-control method used July 1-27)

0.2	0	2.0	82
.4	3.0	3.0	190
.6	6.9	4.0	229
.8	16	5.0	488
1.3	35	6.4	755

Discharge, in cubic feet per second, water year October 1963 to September 1964

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	242	31	56					0	415	625	675	641
2	242	30	56	(*)				0	435	637	687	654
3	271	31	56					0	462	719	661	652
4	226	27	55					0	521	731	683	605
5	226	21	49		229			0	560	725	643	598
6	226	25	45					0	575	743	623	638
7	226	24	46	(*)				0	577	755	675	584
8	226	26	47					0	115	743	623	596
9	227	28	45		18			0	50	749	659	612
10	277	29	45		4			0	80	749	659	619
11	259	29	56			0		0	50	749	659	608
12	235	29	54			0		0	71	747	637	599
13	205	29	43			0		0	132	747	635	601
14	195	28	44			0	(*)	0	123	747	659	590
15	191	28	44			0		0	219	749	671	657
16	164	29	44	125		0		0	219	745	671	563
17	146	29	44			0		0	220	737	663	644
18	159	29	44					252	211	735	665	617
19	123	28	43			0		241	210	733	661	498
20	119	29	40			0		199	210	733	645	450
21	115	26				0		245	210	733	649	488
22	112	28				0		231	210	729	629	477
23	107	22				0		268	210	729	677	478
24	95	23				0		379	210	729	671	475
25	95	23				0		425	207	725	669	461
26	94	22	130			0		425	221	725	673	449
27	94	22				0		425	225	725	675	444
28	94	22				0		424	225	713	662	428
29	95	20				0		447	227	699	625	413
30	91	16				0		418	224	667	621	408
31	91	16				0		410		679	621	
<b>Total</b>	<b>5,664</b>	<b>2,288</b>	<b>1,268</b>	<b>209</b>	<b>252</b>	<b>0</b>	<b>0</b>	<b>5,155</b>	<b>8,224</b>	<b>52,524</b>	<b>20,445</b>	<b>16,200</b>
<b>Mean</b>	<b>182</b>	<b>75.5</b>	<b>40.6</b>	<b>23</b>	<b>8.7</b>	<b>0</b>	<b>0</b>	<b>166</b>	<b>276</b>	<b>757</b>	<b>659</b>	<b>510</b>
<b>Ac-ft</b>	<b>11,730</b>	<b>4,430</b>	<b>2,510</b>	<b>1,730</b>	<b>500</b>	<b>0</b>	<b>0</b>	<b>10,230</b>	<b>16,430</b>	<b>44,690</b>	<b>10,550</b>	<b>32,150</b>
<b>Calendar year 1963:</b>	<b>Max 745</b>	<b>Min 0</b>	<b>Mean 251</b>	<b>Ac-ft 151,800</b>								
<b>Water year 1963-64:</b>	<b>Max 755</b>	<b>Min 0</b>	<b>Mean 227</b>	<b>Ac-ft 164,500</b>								

\* Discharge measurement or observation of no flow made on this day.

† Stage-discharge relation affected by ice.

# BEAR RIVER BASIN

## 10-1180. Bear River near Collinston, Utah

**Location.**--Lat 41°56', long 112°03', in NW1/4 sec. 27, T.13 N., R.2 W., on right bank 500 ft downstream from Culler plant of Utah Power & Light Co., 2,000 ft downstream from Culler Dam, and 5 1/2 miles north of Collinston.

**Drainage area.**--8,000 sq mi, approximately.

**Records available.**--July 1935 to September 1964. Published as "at Collinston" prior to 1900. Monthly discharge only for some periods, published in WSP 1914.

**Gage.**--Water-stage recorder. Datum of gage is 4,376.13 ft above mean sea level (levels by Bureau of Reclamation). Prior to Nov. 9, 1913, staff gage, and Nov. 8, 1913, to Sept. 10, 1935, water-stage recorder, at site three-quarters of a mile downstream at different datum.

**Extremes.**--Maximum discharge during year, 3,920 cfs May 13 (gage height, 4.61 ft); minimum daily, 20 cfs July 23, Sept. 18, 21.

1855-1864: Maximum discharge observed, 11,800 cfs June 7-10, 1869 (gage height, 7.70 ft, site and datum then in use); minimum daily, 10 cfs Aug. 4-12, 18-22, 1905; practically no flow at 12 p.m. Aug. 6, 1920.

**Remarks.**--Records excellent. Natural flow of stream affected by storage reservoirs, power developments, diversions for irrigation, and return flow from irrigated areas.

**Cooperation.**--Nine discharge measurements furnished by Utah Power & Light Co.

Discharge, in cubic feet per second, water year October 1963 to September 1964

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	470	1,200	470	23	928	32	*1,510	2,600	1,220	1,080	23	22
2	459	981	394	913	861	811	1,850	2,810	782	*873	23	23
3	355	451	1,320	1,260	1,140	8980	3,280	3,020	*1,800	166	23	23
4	23	304	1,000	878	1,180	1,020	3,800	3,060	1,490	335	23	22
5	178	915	350	25	*1,000	1,080	3,900	3,080	1,380	23	27	21
6	128	1,130	1,350	1,260	853	997	3,620	3,140	2,110	23	23	21
7	604	1,020	28	*1,270	920	1,020	3,780	3,200	2,320	23	23	21
8	*356	1,150	312	920	822	31	3,070	2,930	3,450	23	23	24
9	350	1,100	1,040	1,050	928	1,020	2,700	2,730	2,850	23	23	24
10	360	1,180	541	754	538	1,080	2,340	2,620	2,820	23	27	22
11	313	782	1,000	260	692	963	2,480	*2,850	3,850	23	24	22
12	330	822	1,080	231	1,000	1,160	2,970	2,810	3,850	23	*23	22
13	483	878	942	1,000	1,000	1,000	2,990	2,650	3,840	23	22	22
14	553	818	314	847	785	1,000	2,880	2,570	3,620	23	22	22
15	574	872	28	*731	680	916	2,780	3,130	3,100	23	21	*22
16	787	1,010	1,190	*785	42:	1,300	2,480	3,200	2,850	23	21	22
17	394	1,220	3,390	750	1,090	1,100	2,660	3,220	3,110	23	21	21
18	698	1,108	1,370	496	1,320	360	2,860	3,040	3,220	23	21	20
19	504	*1,480	1,520	43	1,230	1,220	2,970	3,590	3,150	23	21	21
20	163	1,350	1,260	1,090	*1,280	1,050	3,160	3,570	3,450	23	22	21
21	622	1,370	971	1,040	1,150	1,000	3,010	3,160	3,870	24	23	20
22	523	1,510	28	*1,340	818	290	*2,890	3,150	3,440	24	23	*308
23	811	828	1,240	*1,200	32	1,400	2,630	3,180	*3,840	20	22	21
24	814	482	333	*1,050	673	1,100	2,750	3,050	3,400	21	24	330
25	779	1,540	21	820	1,080	1,220	2,570	2,930	3,220	21	22	21
26	791	1,330	*1,390	282	921	1,040	2,720	2,100	2,980	21	23	182
27	342	1,060	*1,170	1,260	1,040	1,180	2,750	2,850	2,700	23	22	167
28	583	890	830	1,480	1,000	*1,100	2,460	1,920	2,570	26	21	246
29	658	*1,450	828	1,170	1,000	880	2,450	2,080	1,760	23	22	180
30	1,080	23	8000	977	-----	81,380	2,240	2,300	853	24	22	313
31	1,030	-----	651	395	-----	1,300	-----	2,840	-----	24	22	-----
Total	18,303	30,788	23,848	26,123	28,831	30,724	81,930	87,410	88,608	2,967	765	2,297
Mean	526	1,025	634	843	918	981	2,531	2,620	2,823	88.4	22.7	76.8
Ac-ft	32,340	26,970	31,280	31,510	32,320	60,840	168,900	178,400	168,200	5,320	1,400	4,860

Calendar year 1963: Max 3,840 Min 15 Mean 324 Ac-ft 538,500  
 Water year 1963-64: Max 3,860 Min 20 Mean 1,147 Ac-ft 538,500

\* Discharge measurement made on this day.  
 : No gage-height record.