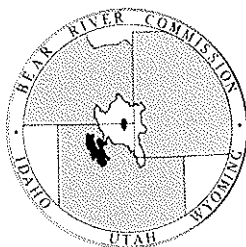


SECOND ANNUAL REPORT

BEAR RIVER
COMMISSION

1959



For the Report-Year October 1, 1958 to
September 30, 1959

LOGAN, UTAH

March 24, 1960

BEAR RIVER COMMISSION

P.O. BOX 413
LOGAN, UTAH

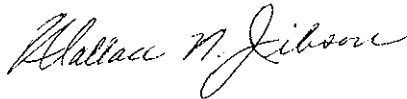
April 1, 1960

Mr. President:

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

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

Very truly yours,



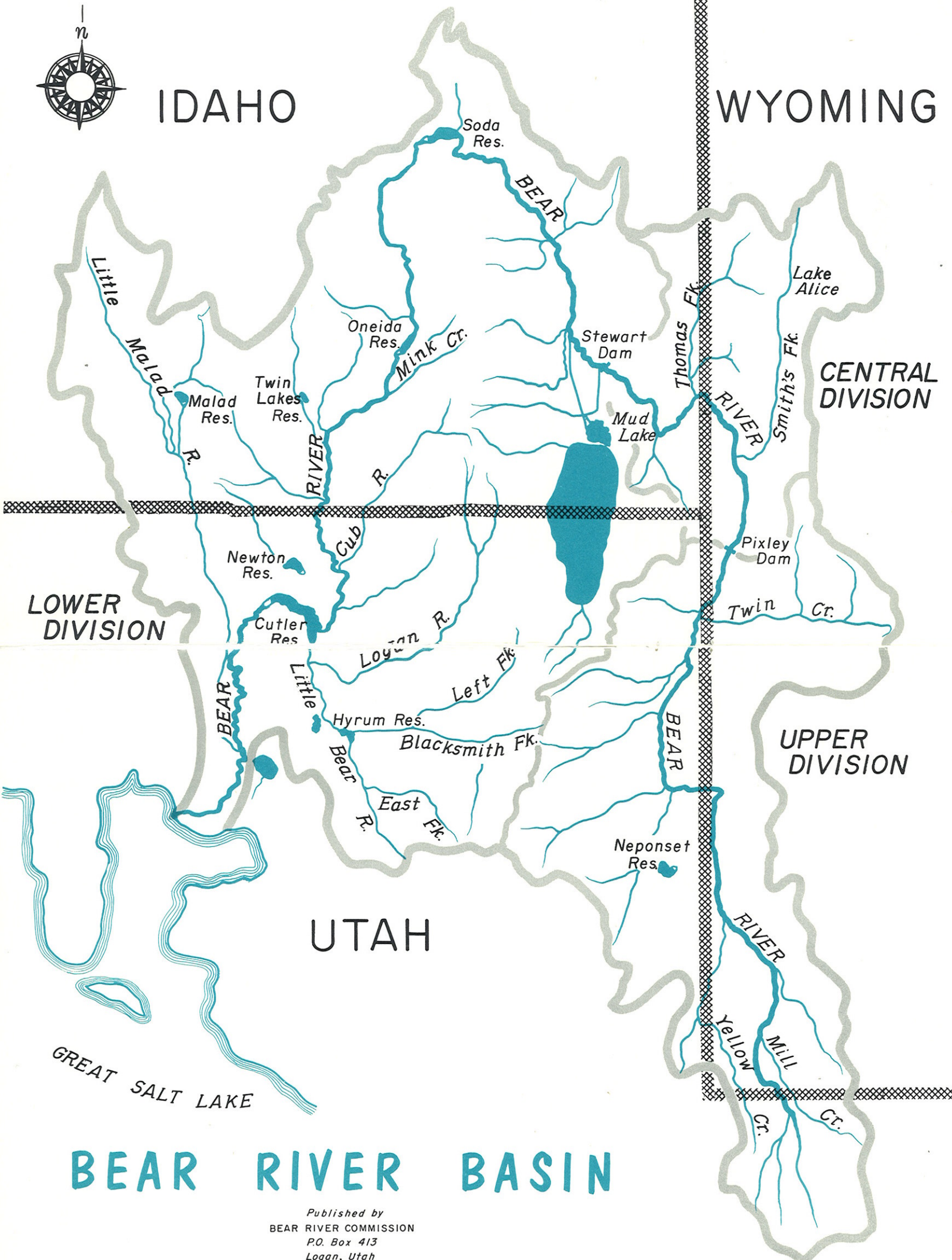
Wallace N. Jibson
Assistant Secretary

THE PRESIDENT
The White House
Washington, D.C.



IDAHO

WYOMING



LOWER DIVISION

CENTRAL DIVISION

UPPER DIVISION

UTAH

GREAT SALT LAKE

BEAR RIVER BASIN

Published by
BEAR RIVER COMMISSION
P.O. Box 413
Logan, Utah

TABLE OF CONTENTS

	Page
Letter of Transmittal	3
Frontispiece, Map of Bear River Basin	4-5
Introduction	9
Organization	9
Meetings	11
Budget and Fiscal Disbursements	11
Stream-Gaging Program	11
Hydrology	12
Water Supply	12
Weather Modification Program	14
Administration and Compact Operation	14
General	14
Distribution of Streamflow	14
Upper Division	15
Central Division	15
Lower Division	16
Interstate Tributaries	17
Storage	17
New Storage	17
Bear Lake	17
Applications for Appropriation	17
Upper Division Hydrographs (plates 1, 2)	19-20
Central Division Hydrographs (plates 3-5)	21-23
Bear Lake Hydrograph (plate 6)	24
Central Division Tabulation of Diversions (tables 1-4).....	25-28
Appendix A—Auditor's Report	29-33
Appendix B—Gaging-Station Records	35-46

SECOND ANNUAL REPORT
of the
BEAR RIVER COMMISSION

March 24, 1960

I. Introduction

The Bear River Compact is an interstate pact which divides Bear River flow among the signatory States of Wyoming, Idaho, and Utah. Federal consent was given by the Congress, and legislation was approved March 17, 1958 by the President. The Bear River Commission, an interstate agency, was established 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, 1959 are summarized in this report. Particular emphasis is placed on operational procedures during this second irrigation season of distribution under terms of the Compact. Stream-gaging records for key stations in the basin are shown in the appendix.

II. 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.

Organization of the Commission, which remains as originally constituted, is as follows:

OFFICERS

ChairmanE. O. Larson, Salt Lake City, Utah
Vice-ChairmanFred M. Cooper, Grace, Idaho
Secretary-TreasurerJay R. Bingham, Bountiful, Utah
Assistant SecretaryWallace N. Jibson, Logan, Utah

MEMBERS

Idaho

Fred M. CooperGrace, Idaho
Melvin LauridsenMontpelier, Idaho
George N. CarterBoise, Idaho

Utah

Jay R. BinghamBountiful, Utah
Lawrence B. JohnsonRandolph, Utah
A. V. SmootCorinne, Utah

Wyoming

Earl LloydCheyenne, Wyoming
S. Reed DaytonCokeville, Wyoming
J. W. MyersEvanston, Wyoming

United States

E. O. LarsonSalt Lake City, Utah

COMMITTEES

Budget

A. V. SmootCorinne, Utah
J. W. MyersEvanston, Wyoming
Melvin LauridsenMontpelier, Idaho

Operations

Fred M. CooperGrace, Idaho
Lawrence B. JohnsonRandolph, Utah
S. Reed DaytonCokeville, Wyoming

III. Meetings

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

Annual Meeting — April 20, 1959 — Salt Lake City, Utah

Regular Meeting — November 23, 1959 — Salt Lake City, Utah

IV. Budget and Fiscal Disbursements

ADOPTED BUDGET

	<i>Fiscal Year Ending 6-30-1960</i>	<i>Fiscal Year Ending 6-30-1961</i>	<i>Total Biennium Ending 6-30-1961</i>
Compact Administration			
Personal Services	\$ 6,900	\$ 7,200	\$14,100
Travel and Subsistence	1,200	1,200	2,400
General Office Expense	700	700	1,400
Printing and Reproduction	700	700	1,400
Treasurer (Bond and Audit)	400	400	800
Transcribing Minutes	150	150	300
Fiscal Unit Charge	400	400	800
Miscellaneous	300	300	600
Sub-Totals	\$10,750	\$11,050	\$21,800
Stream Gaging Program			
Geological Survey	29,500	30,100	59,600
Totals	\$40,250	\$41,150	\$81,400

ALLOCATION OF BUDGET

United States (Geo. Survey)	\$14,750	\$15,050	\$29,800
State of Idaho	8,500	8,700	17,200
State of Utah	8,500	8,700	17,200
State of Wyoming	8,500	8,700	17,200
Totals	\$40,250	\$41,150	\$81,400

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, 1959, statement of budget revenue and appropriation accounts for the fiscal year ended June 30, 1959, are included in this report as appendix A.

V. Stream-gaging Program

A cooperative, basin-wide program is administered from the Geological Survey Project office at Logan, Utah. This program is financed equally by the Geological Survey and Bear River Commission. Records

were secured at 33 gaging stations, most of which are operated for determination of water resources in the basin. Six of this group provide records needed to administer storage or direct-flow provisions of the Compact. Daily discharge records for several stations in the basin are published in appendix B of this report.

Utah Power & Light Company operates 11 gaging stations in Idaho under FPC license. Current records at most of these stations will be needed to administer Bear Lake irrigation reserve provisions of the Compact when the lake surface is below the reserve elevation.

Water commissioners, employed by irrigation district or State, collected seasonal daily or partial records on about 130 irrigation canals above Bear Lake. These records were made available currently to the Commission and were used to compute State-section allocations. Geological Survey personnel spot checked stream-gaging measurements and procedures for adherence to standards of the Commission. Daily discharge records for canals in the Central Division are shown in tables 1-4.

VI. Hydrology

A. Water Supply

The water year ending September 30, 1959 was marked by above-average precipitation on agricultural areas of the basin and below-average runoff from the basin. Surface-water supply was only 79 percent of the 1943-59 average; yet, good crop yield was secured because of timely rainfall. The following tables compare 1958 and 1959 runoff with an average for period of record:

Runoff in acre-feet May - September

	<i>Average 1943-59</i>	<i>1958</i>	<i>1959</i>
Upper Bear River	116,700	100,500	100,500
Smiths Fork	104,100	106,700	73,400
Total*	220,800	207,200	173,900

Runoff in acre-feet Water Year

	<i>Average 1943-59</i>	<i>1958</i>	<i>1959</i>
Upper Bear River	139,200	121,000	118,900
Smiths Fork	142,000	140,500	105,300
Total	281,200	261,500	224,200

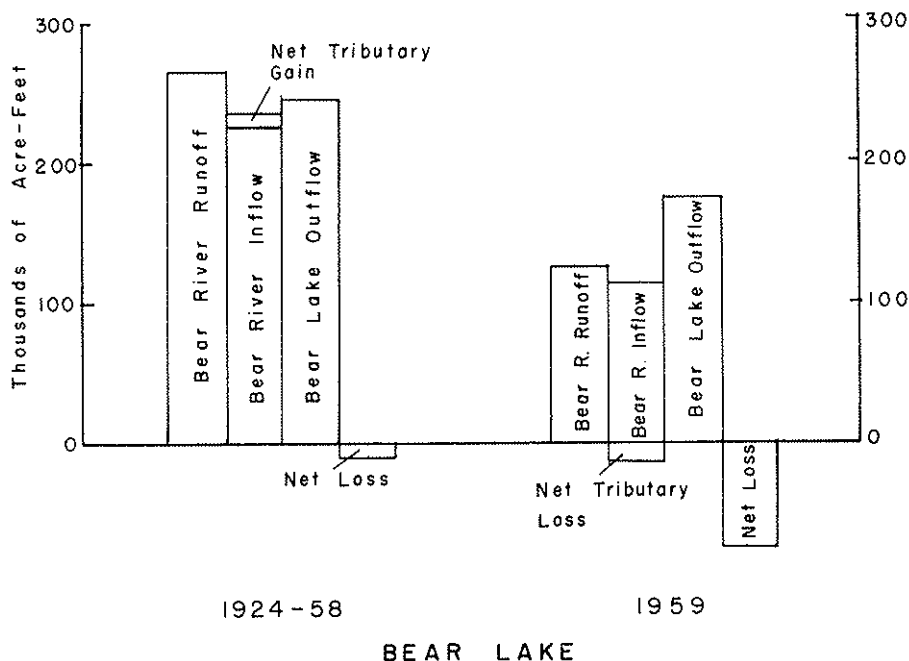
* *Approximate direct-flow supply to land irrigated from the main stem and Smiths Fork.*

Bear Lake gained 121,000 acre-feet during 1958-59 storage period compared with a corresponding gain for the previous year of 230,000 acre-feet. This decrease in storable runoff occurred in the May-September period. Annual peak flow was delayed by cold weather until mid-June when irrigators above Bear Lake used beneficially a larger than usual share of the runoff. Comparative elevations of Bear Lake are shown in the following table:

Bear Lake elevation
Utah Power & Light Co. datum

Water Year	Beginning of Water Year	End of Storage Period	End of Water Year
1958	5,917.66	5,920.48	5,917.37
1959	5,917.35	5,918.78	5,916.27

Bear Lake tributary inflow would result in a small average annual gain (loss in 1959) over evaporation and other losses if Bear River runoff bypassed the lake and stored water were not released. Relationship of this gain or loss to Bear River runoff and inflow, released storage water, and resulting lake gain or loss is shown below:



B. Weather Modification Program

A cloud-seeding program, started in 1955, was continued in 1959 by Utah Power & Light Company under agreement with a weather consultant firm. Silver iodide is used in smoke generators situated at several points in the drainage basin.

VII. Administration and Compact Operation

A. General

The Bear River Commission is charged with administration of the Compact. Administration of water rights within each signatory State is in accordance with State law, subject to limitations provided in the Compact.

Annual cooperative agreements with the Geological Survey for stream gaging provide for a supplemental program of administrative assistance to the Commission. The program, financed by the Commission without matching Federal funds, is under supervision of the Geological Survey Project Engineer at Logan, Utah. The Survey office also serves as principal office for the Commission.

The Project Engineer serves as Assistant Secretary to the Commission with responsibility to provide technical assistance and current streamflow data as required to operate under terms of the Compact. He establishes operational procedures, prepares hydrologic studies, and maintains the files and records of the Commission. Annual reports are compiled by the Assistant Secretary and Secretary-Treasurer.

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.

B. Distribution of Streamflow

Records needed by the Commission to compute interstate allocation of streamflow (direct flow) were collected by State or district commissioners and the Geological Survey. They were computed currently by the Assistant Secretary who reported diversion and allocation data, by State section, to Commission representatives.

Substantial progress during 1959 was made in improvement of headworks on Wyoming canals. A few, including three or four without diversion headworks, remain inadequate for effective regulation.

Eleven recorder shelters on canals have been replaced and relocated where necessary. A recorder shelter is recommended on each canal diverting in excess of about 15 cfs. Installation of shelters and recording equipment is progressing as labor and material are made available by individual users.

1. Upper Division

The Upper Division comprises that portion of the basin above and including Pixley Dam and includes two sections in each of the States of Wyoming and Utah. The Compact provides that when the sum of the amount diverted in the Division and flow past Pixley Dam is less than 1,250 cfs (divertible flow), a water emergency exists and such divertible flow is allocated to the State 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 below 1,250 cfs for a few days in the early part of the irrigation season when Lower Utah Section would have been obligated to reduce diversions for the benefit of Lower Wyoming Section. This condition was very temporary, and commissioners representing the two States agreed to forego regulation.

On July 9, 1959 divertible flow again decreased below 1,250 cfs and remained below for the balance of the season. Demand in the lower two sections had practically ceased at this time; therefore, interstate regulation was not required. Hydrographs showing divertible flow and diversions in the Division are shown on plates 1 and 2. Runoff increase, caused by heavy precipitation the latter part of June, is of interest in the 1959 hydrograph of divertible flow on plate 1.

Because interstate regulation was not required in 1959, canal records in the Upper Wyoming Section were adequate to determine compliance with terms of the Compact. Determination of total diversions was made at intervals during the season; however, gage-height observations should be made more frequently in the future to enable computation of daily discharge. Improvement is expected in 1960 with the addition of a part-time assistant to the water commissioner.

2. Central Division

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

Article IV of the Compact provides that when either the divertible flow in the Division is less than 870 cfs, or the flow passing Bear River at Border gaging station is less than 350 cfs, a water emergency shall be deemed to exist and total Wyoming diversions are limited to 43 percent of the divertible flow.

A water emergency, as defined above, existed throughout the irrigation season except June 10 to July 12. Hydrographs showing divertible flow, diversions, and Compact allocations are shown on plates 3, 4, and 5. Daily discharge records for canals, with Compact allocation, are shown in tables 1-4.

Late snowmelt delayed seasonal high water until irrigation demand was near maximum. Effect of interstate regulation prior to the high water period would have been rather minor in most years of record; however, in 1959 early regulation met with considerable apprehension and some resistance by Wyoming users who were fearful that seasonal high water would not materialize. Lack of cooperation by a few users resulted in an excessive diversion rate for the two-week period before June 10. (See plate 4.)

State and Commission officials met with Wyoming water users June 18, 1959, and discussed regulatory provisions of the Compact. A better understanding of the Compact resulted, and thereafter total diversions were maintained within practical limits of section allocation. Wyoming Section diverted about 75,000 acre-feet, May 15 to September 30, which is only slightly in excess of 43 percent of divertible flow.

The following table, which includes two years under Compact operation, shows comparative rates of diversion to sections in the Central Division:

*Diversion in acre-feet per acre
June - September*

	1954	1956	1958	1959
Wyoming Section	4.86	5.40	4.00	3.83
Idaho Section*	2.01	2.61	2.54	2.52

* *Excludes flow diverted to Bear Lake and flow passing Stewart Dam.*

3. 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 declaration also may be made upon petition of an aggrieved Utah user against an Idaho user. Upon declaration of an emergency, the Com-

mission is required to enforce water-delivery schedules based on priority of rights without regard to State lines.

Commission action to settle such grievances was not required in 1959. Below-average flow entering Utah caused temporary difficulty in operation at one or two pump diversions. Adequate flow was available at the points of diversion, but water level was below the pump inlets.

4. 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 required in 1959.

C. Storage

1. New Storage

The Compact defines storage rights in existing reservoirs above Bear Lake and provides for 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.

Sulphur Creek Dam, Wyoming, was constructed in 1958 with reservoir capacity of 4,614 acre-feet. In 1959 about 4,300 acre-feet of Sulphur Creek runoff was stored in this reservoir and 3,500 acre-feet withdrawn. A second Wyoming dam with reservoir capacity of 88 acre-feet was constructed on Bazoo Hollow, tributary to Sulphur Creek. A dam impounding 162 acre-feet was constructed on Yellow Creek in Utah to irrigate land in Utah and a small acreage in Wyoming.

2. Bear Lake

A Bear Lake irrigation reserve is provided by article V of the Compact. The present reserve is the capacity of Bear Lake below elevation 5,913.24 feet (703,300 acre-feet). Stored water shall not be released solely for power generation when the lake surface is below this elevation. Bear Lake elevation was maintained from 3.0 to 5.5 feet above the reserve; therefore, segregation analysis of released power and irrigation quantities was unnecessary. (See plate 6.)

D. Applications for Appropriation

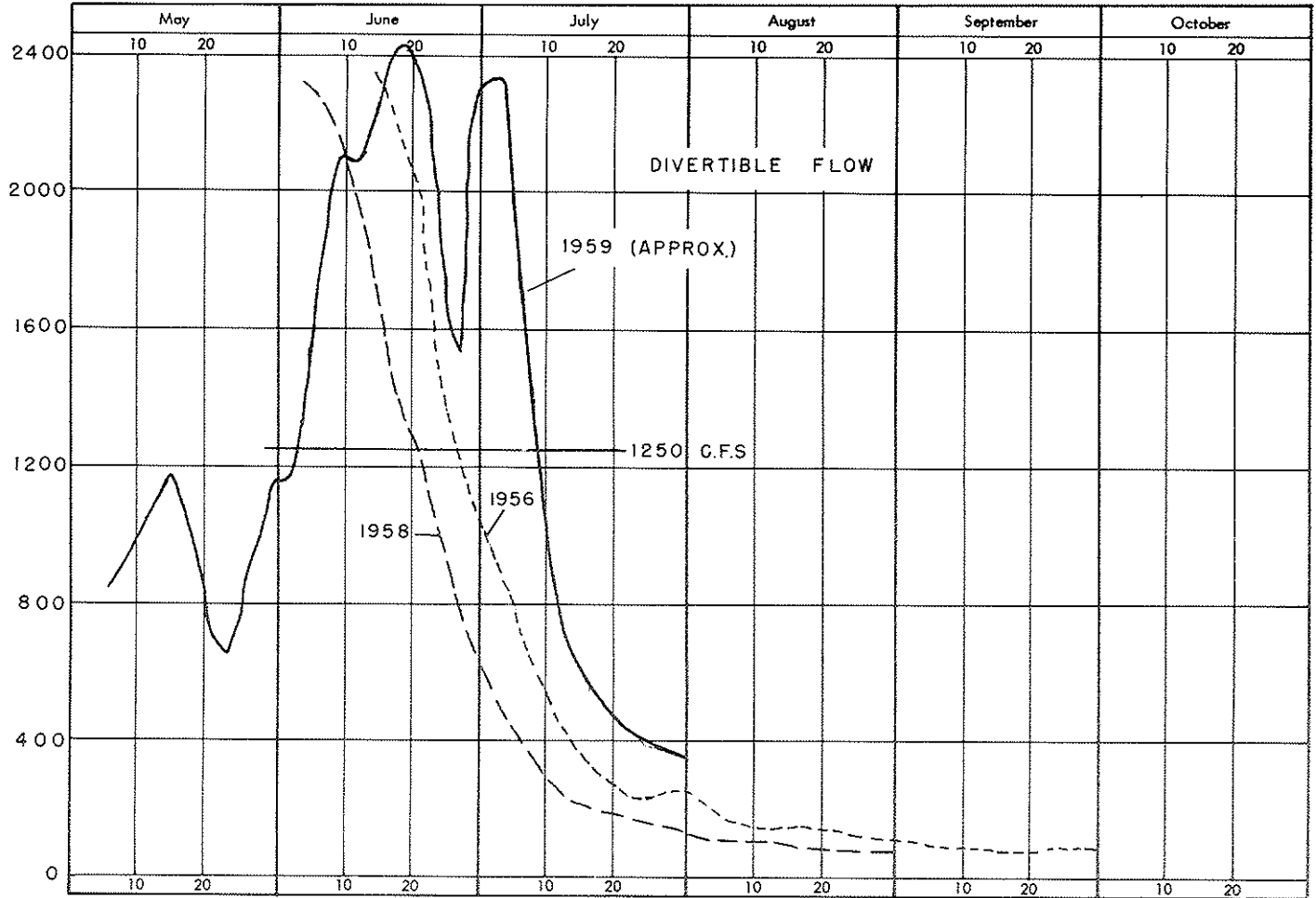
Article X of the Compact provides that copies of all applications for appropriation, for change of point of diversion, place and nature of use, and for exchange of Bear River water, shall be filed with the

Commission. These applications 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 deprive any water user in a lower State of water to which he is entitled.

Several applications for appropriation were submitted for Commission review in 1959. These include irrigation storage applications in Utah and Wyoming for the total amount of additional rights granted by the Compact. Engineering and economic studies of proposed dam sites and supplemental water requirements are being made by State officials in the two States. Results of the studies will be used as a guide in allocating storage rights to users.

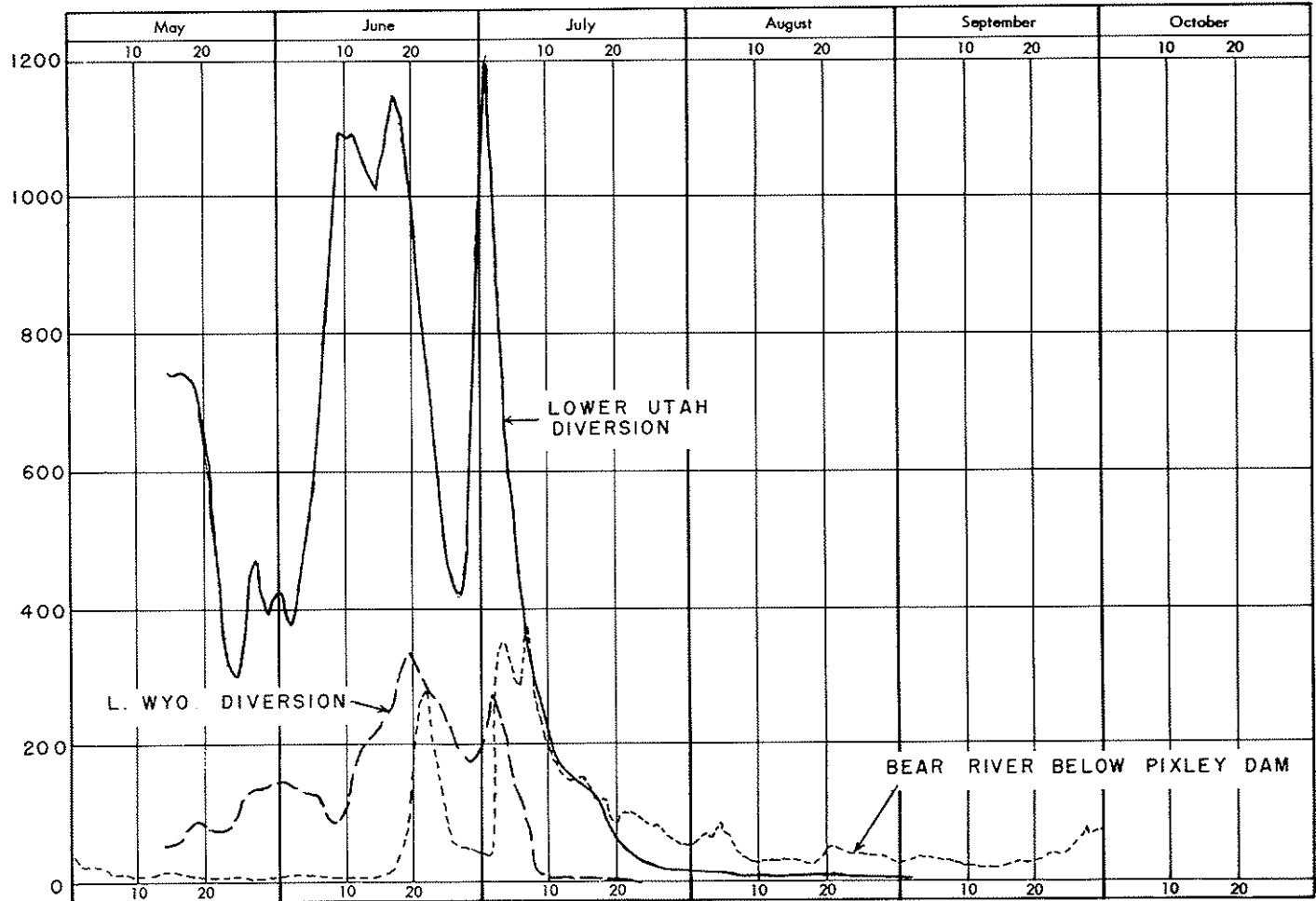
Other applications submitted to the Commission are primarily for stock-water reservoirs and ground water development. Appropriations of this nature have been discussed at length in recent Commission meetings. Ground water development, as with other types of appropriation, is subject to the above-stated limitations of article X. The right to impound runoff for stock watering purposes is granted up to 20 acre-feet in each reservoir without deduction from additional storage rights allotted by the Compact. The question of the extent of such new rights which might be granted without adverse effect on users in a lower State has been referred to the three State Engineers for study and recommendations.

UPPER DIVISION - TOTAL DIVERTIBLE FLOW CUBIC FEET PER SECOND



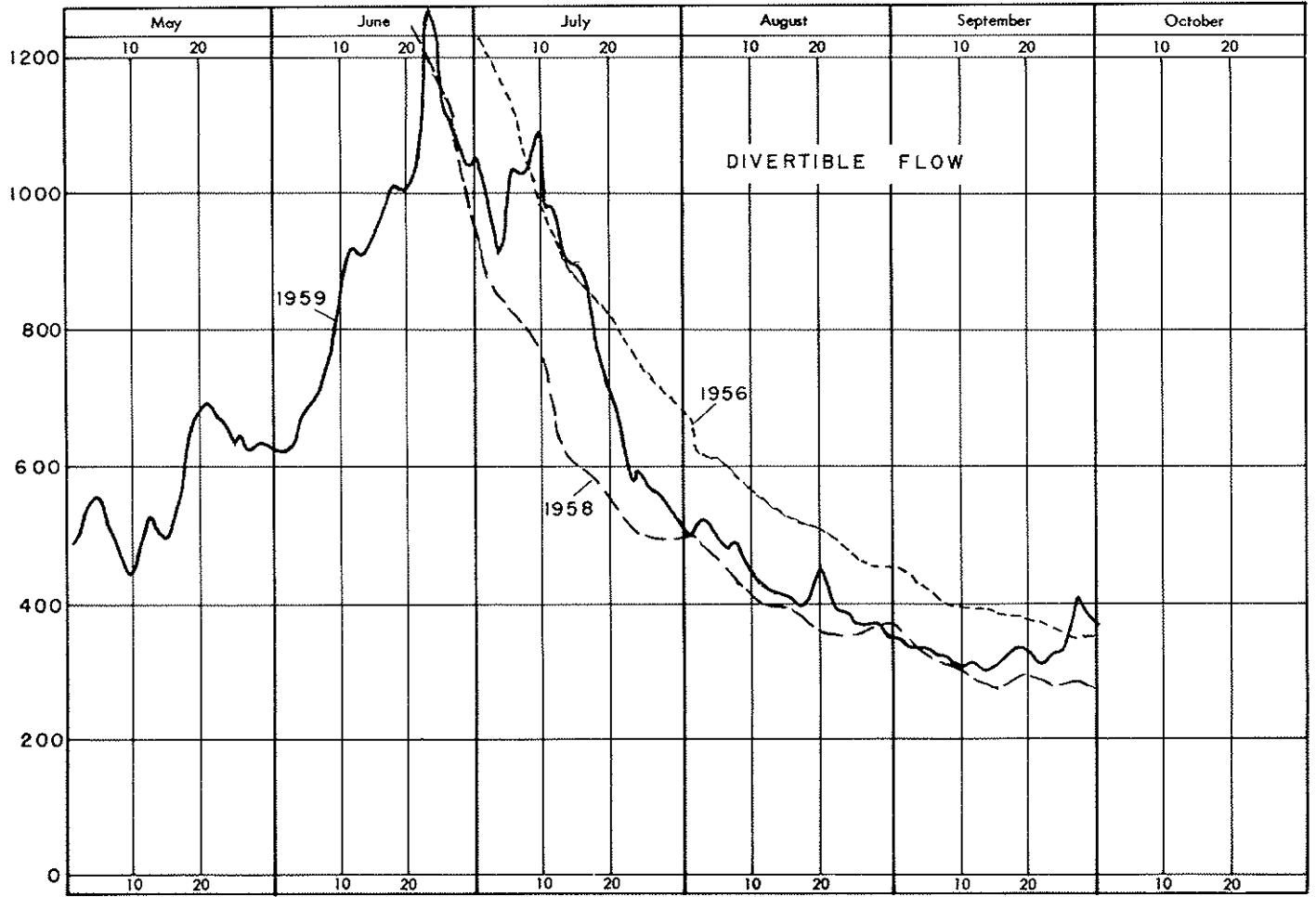
19

UPPER DIVISION - DIVERSION CUBIC FEET PER SECOND



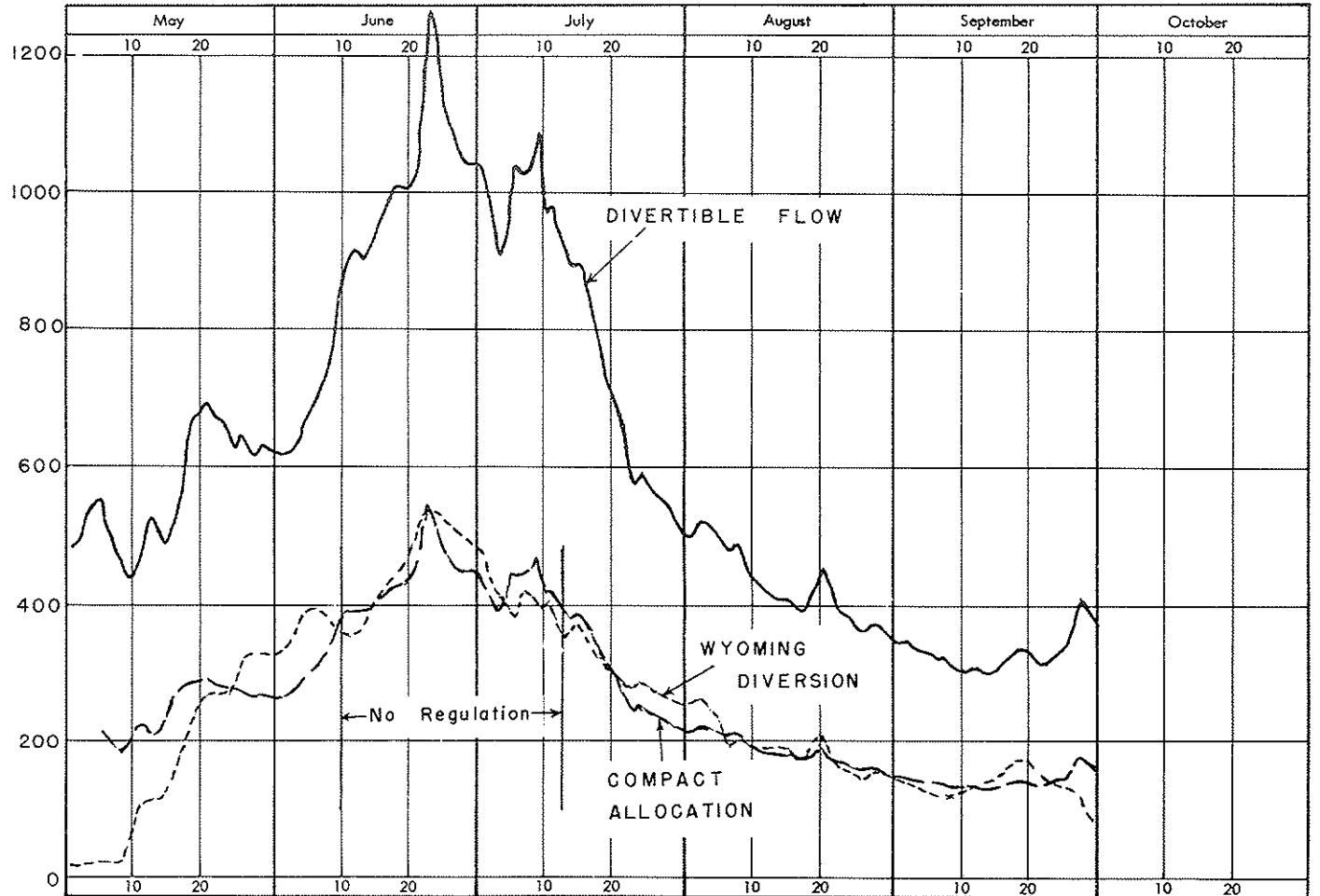
20

CENTRAL DIVISION - DIVERTIBLE FLOW CUBIC FEET PER SECOND



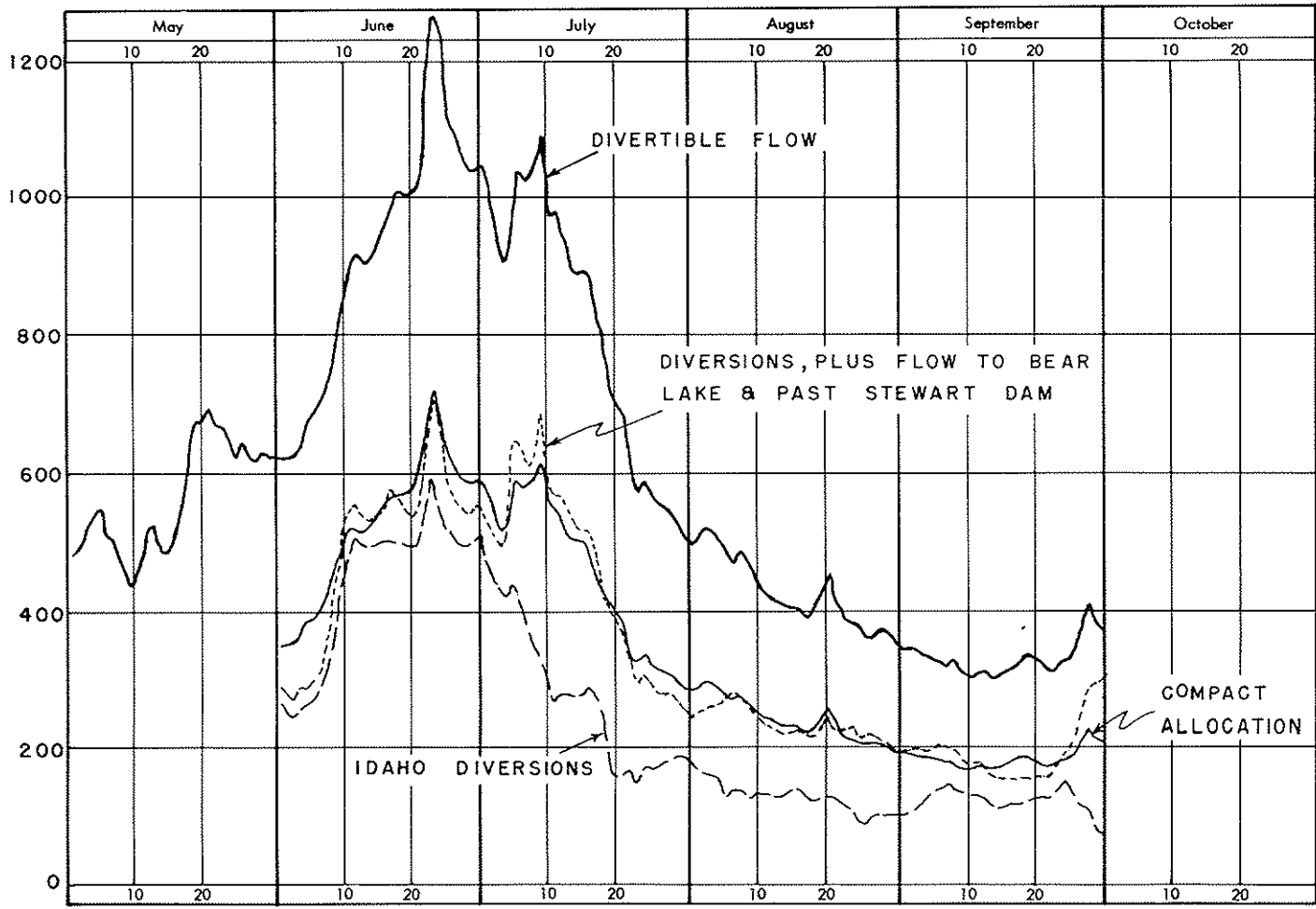
21

CENTRAL DIVISION - WYOMING ALLOCATION & DIVERSION
CUBIC FEET PER SECOND



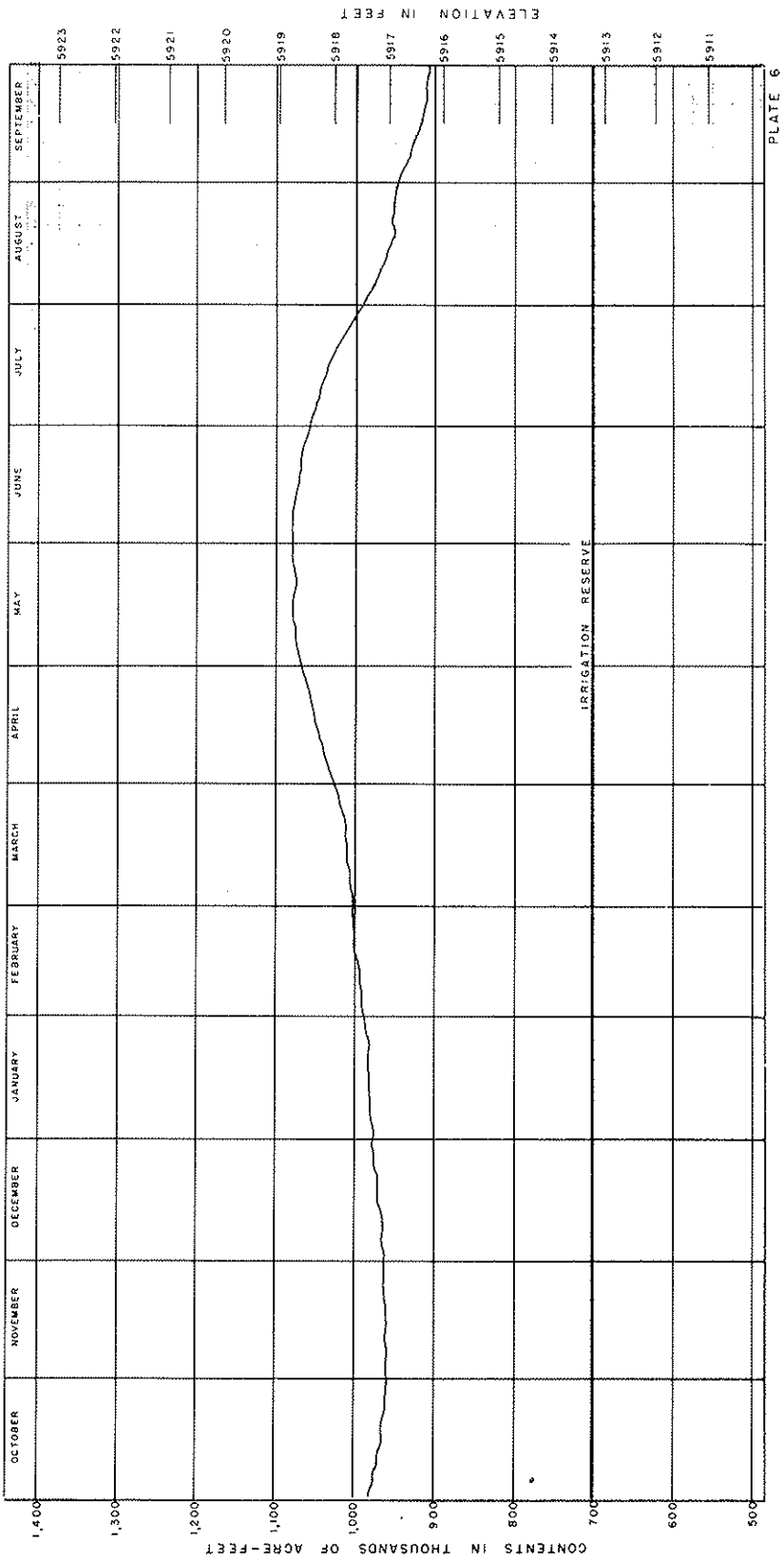
CENTRAL DIVISION - IDAHO ALLOCATION & DIVERSION

CUBIC FEET PER SECOND



23

BEAR LAKE - 1959



APPENDIX A

Lincoln G. Kelly and Company

Certified Public Accountants

SUITE 606-612 WALKER BANK BUILDING

TELEPHONE EMPIRE 3-4461

Salt Lake City, Utah

REPRESENTED IN THE PRINCIPAL
CITIES OF THE UNITED STATES, CANADA,
CUBA AND BY CORRESPONDENTS ABROAD

October 9, 1959

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

Gentlemen:

We have examined the balance sheet and financial records of the Bear River Commission for the fiscal year ended June 30, 1959, and the related statement of budget revenue and appropriation accounts for the year then ended. Our 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 we considered necessary in the circumstances.

As a result of our examination, we present this report which includes comments and explanatory detail and the following described statements:

Exhibit A--Balance sheet at June 30, 1959
Exhibit B--Statement of budget revenue and appropriation
accounts for the fiscal year ended June 30, 1959
Exhibit C--Statement of expenditures--United States
Geological Survey--for the fiscal year ended
June 30, 1959

Schedule B-1--Statement of revenue and expenses

GENERAL COMMENTS

The cash on deposit in the First Security Bank of Utah, N. A., was confirmed by direct communication with the depository.

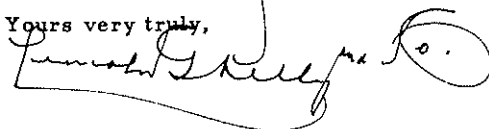
The account payable represents the fourth and final installment due to the United States Geological Survey in satisfaction of work performed during the fiscal year ended June 30, 1959.

The Bear River Commission, consisting of the three States of Wyoming, Idaho, and Utah, was duly organized in Salt Lake City April 5, 1958, and by-laws were adopted April 26, 1958. All expenses incurred by the Bear River Commission are to be charged to and paid by the three states on an equal basis.

On July 1, 1958, the Commission entered into a cooperative agreement with the Geological Survey, United States Department of the Interior, for the operation and maintenance of a gauging-station network. Expenses pertaining to this work are to be shared equally by the Commission and the Geological Survey, while other expenses incurred by the United States Geological Survey which directly relate to the compact administration will be wholly financed by the Commission. Details of the financial transactions relating to this agreement are presented in exhibit C.

In our opinion, the accompanying balance sheet and statement of budget revenue and appropriation accounts present fairly the financial position of the Bear River Commission at June 30, 1959, and the results of the financial transactions for the period then ended, in conformity with generally accepted accounting principles applicable in the circumstances.

Yours very truly,

A handwritten signature in cursive script, appearing to read "L. W. Kelly", with a large, stylized flourish at the end.

BEAR RIVER COMMISSION
Balance Sheet at June 30, 1959

ASSETS

CURRENT ASSETS:

Cash on deposit, First Security Bank
of Utah \$7,260.00

TOTAL ASSETS \$7,260.00

LIABILITIES

CURRENT LIABILITIES:

Accounts payable--United States Geological
Survey \$6,218.00

UNEXPENDED REVENUES --exhibit B 1,042.00

TOTAL LIABILITIES AND SURPLUS \$7,260.00

BEAR RIVER COMMISSION

Statement of Budget Revenue and Appropriation Accounts
for the Fiscal Year Ended June 30, 1959

	<u>Budget</u> <u>Estimates</u>	<u>Amount</u> <u>Realized or</u> <u>Expended</u>	<u>Balance or</u> <u>Deficit (-)</u>
<u>CASH REVENUES:</u>			
State of Wyoming	\$ 8,270.00	\$ 8,270.00	\$
State of Utah	8,270.00	8,270.00
State of Idaho	<u>8,270.00</u>	<u>8,270.00</u>	<u>.</u>
	24,810.00	24,810.00
<u>NON-CASH REVENUES:</u>			
United States Geological Survey .	<u>14,460.00</u>	<u>14,430.00</u>	<u>30.00-</u>
<u>TOTAL REVENUES</u>	<u>39,270.00</u>	<u>39,240.00</u>	<u>30.00-</u>
<u>APPROPRIATION ACCOUNTS:</u>			
Stream gauging	28,920.00	28,860.00	60.00
Personal services	6,640.00	6,888.00	248.00-
Travel and subsistence	1,200.00	848.00	352.00
General office expense	610.00	407.30	202.70
Printing	700.00	640.70	59.30
Treasurer's bond and audit	400.00	50.00	350.00
Transcript of minutes	150.00	150.00
Fiscal charge	350.00	304.00	46.00
Miscellaneous	<u>300.00</u>	<u>50.00</u>	<u>250.00</u>
	39,270.00	38,198.00	1,072.00
 <u>BALANCES</u>	 <u>\$</u>	 <u>\$ 1,042.00</u>	 <u>\$1,042.00</u>
 <u>FUNDS ON HAND AT JUNE 30,</u>			
1959:			
Cash on deposit		\$ 7,260.00	\$7,260.00
Less: Final payment due United States Geological Survey		<u>6,218.00</u>	<u>6,218.00</u>
 <u>UNEXPENDED REVENUES</u>		 <u>\$ 1,042.00</u>	 <u>\$1,042.00</u>

BEAR RIVER COMMISSION

Statement of Expenditures--United States Geological Survey Program.
for the Fiscal Year Ended June 30, 1959

	<u>STREAM-GAUGING PROGRAM</u>				<u>Total Expense to Bear River Commission</u>
	<u>Allocable Expenditures</u>	<u>Allocated</u>		<u>Non- allocable, Direct Ad- ministration</u>	
		<u>United States Geological Survey 50 %</u>	<u>Bear River Commission 50 %</u>		
Personal services	\$21,015.00	\$10,507.50	\$10,507.50	\$6,888.00	\$17,395.50
Travel and subsistence	2,297.00	1,148.50	1,148.50	848.00	1,996.50
General office expense	2,047.00	1,023.50	1,023.50	340.00	1,363.50
Fiscal charges	3,208.00	1,604.00	1,604.00	304.00	1,908.00
Miscellaneous	<u>293.00</u>	<u>146.50</u>	<u>146.50</u>	<u>50.00</u>	<u>196.50</u>
	<u>\$28,860.00</u>	<u>\$14,430.00</u>	<u>\$14,430.00</u>	<u>\$8,430.00</u>	<u>\$22,860.00</u>

Schedule B-1

BEAR RIVER COMMISSION

Statement of Revenue and Expenses
for the Fiscal Year Ended June 30, 1959

REVENUE:

State of Wyoming	\$ 8,270.00
State of Idaho	8,270.00
State of Utah	<u>8,270.00</u>
	24,810.00

EXPENSES:

Stream-gauging	\$14,430.00
Personal services	6,888.00
Travel and subsistence	848.00
General office expense	407.30
Printing	640.70
Treasurer's bond and audit	50.00
Transcript of minutes	150.00
Fiscal charges	304.00
Miscellaneous	<u>50.00</u>
	23,768.00

<u>UNEXPENDED REVENUES</u>	<u>\$ 1,042.00</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 1959 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 data as 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. Runoff for the month is expressed in acre-feet (line headed "Ac-ft").

Records included herein have been collected by the U. S. Geological Survey in accordance with cooperative agreement with the Bear River Commission. All streamflow records are to be considered as provisional pending final review by the Survey.

BEAR RIVER NEAR UTAH-WYOMING STATE LINE

Location. — Lat 40°58', long 110°51', in SE $\frac{1}{4}$ sec. 30, T. 3 N., R. 10 E., on left bank just downstream from West Fork and 2.8 miles upstream from Utah-Wyoming State line.

Drainage area. — 176 sq mi.

Records available. — July 1942 to September 1959.

Gage. — Water-stage recorder. Altitude of gage is 7,965 ft (from river-profile map).

Average discharge. — 17 years, 187 cfs (135,400 acre-ft per year).

Extremes. — Maximum discharge during year, 1,830 cfs June 16 (gage height, 3.53 ft); minimum, 22 cfs Nov. 1, but may have been less during periods of ice effect.

1942-59: Maximum discharge, 2,800 cfs June 6, 1957 (gage height, 4.27 ft); minimum determined, 16 cfs Apr. 11, 1951, Nov. 5, 1954, Nov. 1, 1955, Oct. 30, 1956.

Remarks. — Records good except those for periods of ice effect, which are fair. Two diversions above station for irrigation of about 200 acres above and 2,600 acres below station.

Discharge, in cubic feet per second, water year October 1958 to September 1959

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	30	31	b38			b37	40	265	458	510	98	30
2	31	32	b38			38	44	317	644	410	92	30
3	30	34	38				48	256	800	421	80	29
4	30	34	40				59	199	884	387	76	28
5	30	35	b39			b36	76	169	1,000	343	71	27
6	30	34	38				101	156	1,200	317	69	27
7	30	38	40				96	140	1,360	288	69	26
8	29	36	40	b38	b35		84	156	1,320	270	61	25
9	28	36	40			36	76	210	1,290	252	58	24
10	28	36	40			38	68	256	1,190	226	55	25
11	27	42	42			b38	68	298	1,190	218	55	24
12	27	42				b38	66	404	1,220	210	58	24
13	27	40				36	74	564	1,180	202	55	24
14	27	42				b36	82	696	1,220	195	52	24
15	27	36				b36	73	742	1,340	183	50	25
16	27	b35		36	36	b36	64	696	1,410	166	47	33
17	27	b36		36	35	b36	58	644	1,140	149	42	38
18	30	b37		36	b36	36	58	564	992	146	42	36
19	31	b39		36	b36	36	56	421	867	140	54	36
20	33	42	b40	b36	b36	b36	55	338	783	134	59	42
21	33	42		b36	b36	b36	48	307	783	140	52	40
22	34	40		b36	38	38	55	298	712	132	44	40
23	36	40		36	38	36	68	279	658	120	42	42
24	36	38		38	38	36	96	317	621	113	40	51
25	36	38		36	b38	36	126	404	586	108	42	54
26	36			38	38	38	143	348	537	106	44	69
27	36			b36	36	36	113	328	496	101	42	82
28	36	b38		38	36	40	94	307	490	92	38	66
29	33			b36		38	106	364	720	84	31	62
30	30			b36		36	162	458	712	82	30	56
31	31			b35		38		410		88	29	
Total	956	1,125	1,233	1,151	1,002	1,137	2,364	11,312	27,803	6,333	1,677	1,139
Mean	30.8	37.5	39.8	37.1	35.8	36.7	78.8	365	927	204	54.1	38.0
Ac-Ft	1,900	2,230	2,450	2,280	1,990	2,260	4,690	22,440	55,150	12,560	3,330	2,260

b Stage-discharge relation affected by ice.

Year _____ Mean _____ 157
Acre-Feet _____ 113,500

**SULPHUR CREEK ABOVE RESERVOIR,
NEAR EVANSTON, WYOMING**

Location. — Lat 41°09', long 110°48' in SW¼ sec. 35, T. 14 N., R. 119 W., on right bank 1¼ miles downstream from Willow Creek, 2 miles upstream from Sulphur Creek Dam, and 11½ miles southeast of Evanston.

Drainage area. — 64 sq mi, approximately.

Records available. — December 1957 to September 1959.

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

Extremes. — Maximum discharge during year, 436 cfs Apr. 5 (gage height, 4.67 ft); no flow many days.

1958-59: Maximum discharge, 560 cfs Apr. 18, 1958 (gage height, 5.07 ft), from rating curve extended above 100 cfs by logarithmic plotting; no flow at times each year.

Remarks. — Records good except those for periods of ice effect, which are fair.

Discharge, in cubic feet per second, water year October 1958 to September 1959

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	0.2	0.3					3.5	17	16	29	0.2	0
2	.2	.3					10	13	14	20	.1	0
3	.2	.3					25	9.8	17	20	.1	0
4	.2	.3					75	14	20	16	.1	0
5	.1	.3					160	14	19	15	.1	0
6	.1	.4					148	14	20	12	.1	0
7	.1	.4					45	19	18	8.1	0	0
8	.1	.3	0.6		0.9	2.0	20	12	16	6.7	0	0
9	.2	.3					21	8.9	18	4.8	0	0
10	.2	.2					16	7.2	14	3.1	0	0
11	.2	.3					19	7.2	12	2.6	0	0
12	.2	.5					24	9.5	13	2.6	0	0
13	.2	.5					21	15	40	3.6	0	0
14	.2	.5					17	19	12	4.8	0	0
15	.3	1.2		0.8			15	21	19	6.4	0	0
16	.3	1.0					12	16	40	6.2	0	0
17	.3	.8					11	12	20	6.4	0	0
18	.3				1.2	3.0	12	15	14	5.0	0	0
19	.2						11	15	11	5.4	.1	.1
20	.4						15	12	13	4.5	.1	.1
21	.4						22	9.8	11	3.6	.1	.4
22	.4						23	11	9.8	1.9	0	.1
23	.3						17	12	6.7	1.6	0	.1
24	.3	0.6	.7		1.5		14	9.5	5.9	1.3	0	.6
25	.3						14	12	6.2	1.0	0	.6
26	.3					3.2	17	19	6.7	.8	0	.7
27	.3						16	44	49	.7	0	1.2
28	.3						14	29	85	.7	0	.5
29	.3						11	20	235	.4	0	.5
30	.3						13	22	75	.2	0	.4
31	.3							22		.2	0	
Total	7.7	15.7	20.2	24.8	31.5	80.2	841.5	480.9	856.3	194.6	1.0	5.3
Mean	0.25	0.52	0.65	0.8	1.12	2.59	28.0	15.5	28.5	6.28	0.03	0.18
Ac-Ft	15	31	40	49	62	159	1,670	954	1,700	386	2.0	11

Note.--Stage-discharge relation affected by ice Nov. 18 to Apr. 4, Apr. 8, 9.

Year _____ Mean _____ 2.01
Acres-Foot _____ 5,080

SULPHUR CREEK BELOW RESERVOIR, NEAR EVANSTON, WYOMING

Location. — Lat 41°09', long 110°49', in SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 28, T. 14 N., R. 119 W., on left bank 6.3 miles upstream from mouth and 10 $\frac{1}{2}$ miles southeast of Evanston.

Drainage area. — 68 sq mi, approximately.

Records available. — March 1958 to September 1959.

Gage. — Water-stage recorder. Altitude of gage is 6,110 ft (from river-profile map).

Extremes. — Maximum discharge during year, 164 cfs June 29 (gage height, 3.67 ft); no flow Jan. 9 to May 27, July 2-12.

1958-59: Maximum discharge, that of June 29, 1959; no flow at times each year.

Remarks. — Records good. Flow regulated by Sulphur Creek reservoir (capacity, 4,600 acre-ft) completed December 1957.

Discharge, in cubic feet per second, water year October 1958 to September 1959

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1.3	0.3	0.6	0.4				0	27	12	38	17
2	1.1	.4	.6	.4				0	27	0	40	16
3	1.0	.4	.6	.3				0	26	0	40	14
4	.9	.5	.6	.4				0	26	0	39	15
5	.8	.6	.6	.3				0	26	0	39	16
6	.9	.6	.6	.3				0	27	0	39	16
7	.9	.7	.6	.3				0	29	0	40	16
8	.8	.6	.6	.1				0	29	0	42	15
9	.8	.6	.6	0				0	29	0	42	15
10	.8	.6	.6	0				0	29	0	42	15
11	.8	.6	.6	0				0	29	0	40	15
12	.8	.7	.6	0				0	29	0	40	15
13	.6	.8	.6	0				0	22	11	40	15
14	.3	.8	.6	0				0	5.0	34	40	14
15	.3	.8	.6	0				0	12	26	40	14
16	.3	.8	.6	0				0	38	12	40	13
17	.4	.8	.6	0				0	46	8.4	36	13
18	.3	.9	.6	0				0	46	4.7	31	17
19	.3	.8	.6	0				0	46	4.7	24	24
20	.4	.6	.6	0				0	42	5.0	19	23
21	.3	.6	.6	0				0	26	5.2	17	23
22	.3	.6	.6	0				0	17	10	15	21
23	.3	.6	.6	0				0	5.0	16	15	17
24	.3	.6	.6	0				0	5.2	16	15	16
25	.3	.6	.6	0				0	5.4	16	15	15
26	.3	.6	.6	0				0	5.4	16	15	15
27	.4	.6	.6	0				0	11	29	15	15
28	.4	.6	.6	0				19	50	40	15	7.2
29	.3	.6	.5	0				49	140	38	15	.5
30	.4	.6	.5	0				49	102	38	15	2.3
31	.4		.4	0				38		37	16	
Total	17.5	18.9	18.2	2.5	0	0	0	155	957.0	379.0	919	446.0
Mean	0.56	0.63	0.59	0.08	0	0	0	5.0	31.9	12.2	22.6	14.9
Ac-Ft	35	37	36	5.0	0	0	0	307	1,900	752	1,820	889

Year _____ Mean _____ 7.99
Acro-Foot _____ 5,280

CHAPMAN CANAL AT STATE LINE, NEAR EVANSTON, WYOMING

Location. — Lat $41^{\circ}24'$, long $111^{\circ}02'$, in SE $\frac{1}{4}$ sec. 36, T. 17 N., R. 121 W., on right bank at highway bridge, $6\frac{1}{2}$ miles downstream from headgates and 10 miles northwest of Evanston.

Records available. — October 1945 to September 1959 in reports of Geological Survey. April to September 1942 and May to September 1943 in upper Bear River Water Commissioner's reports, Utah; April 1944 to September 1948 in upper Bear River Water Commissioner's reports, Utah, and reports of Bear River Hydro-metric Data.

Gage. — Water-stage recorder.

Average discharge. — 14 years, (1945-59), 17.5 cfs (12,670 acre-ft per year).

Extremes. — 1942-59: Maximum daily discharge observed, 129 cfs Apr. 14, 1946; no flow at times each year.

Remarks. — Records good except those for periods of ice effect or no gage-height record, which are fair. Canal diverts water from Bear River in NW $\frac{1}{4}$ sec. 36, T. 16 N., R. 121 W. Many diversions above station for irrigation in Wyoming. Flow at station is for storage in Neponset Reservoir, Utah, and irrigation in Saleratus basin, Utah.

Discharge, in cubic feet per second, water year October 1958 to September 1959

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.		
1		0	}	a10		0	45	88	95	75	0.4	a4.5		
2		0					0	61	a40	86	75	2.2	a3.5	
3		0					0	84	a38	89	74	5.0	a3.0	
4		.1					0	90	a36	101	70	5.0	a2.5	
5		.6					0	88	a34	98	65	5.0	a2.0	
6		2.2		0		0	82	32	99	58	4.5	a1.5		
7		5.8		0		0	80	31	87	50	3.0	a1.0		
8		8.0		0		0	67	29	84	46	1.6	a .5		
9		7.7		0		0	65	28	87	40	.6	a0		
10		8.0		0		0	74	30	88	25	0	a0		
11		11	}	0		0	76	32	85	18	0	a0		
12		12		b25	0		0	76	32	85	9.4	0	a0	
13		14				0		0	75	36	89	5.0	.6	a0
14		25				0		b3.0	78	36	91	2.2	3.0	a0
15						0		b6.8	77	30	98	5.0	4.5	a0
16					0		b6.8	73	48	104	3.6	3.4	a0	
17				0		6.8	69	89	94	1.2	2.2	.5		
18				0		0	11	69	100	.1	1.9	.9		
19				0		8.8	72	95	78	0	11	1.8		
20				0		8.0	69	94	80	0	32	5.8		
21		}	b25	0		9.4	72	90	88	0	31	15		
22						0		7.7	75	93	93	0	17	18
23						0		8.0	77	92	81	0	8.8	17
24						0		13	78	90	69	0	8.2	15
25						0		25	84	85	58	0	9.1	34
26		}	b10	0		25	88	85	54	0	10	39		
27						0		29	88	88	63	0	a9.5	61
28						0		30	83	90	100	0	a8.0	74
29						0		47	78	92	100	0	a7.0	74
30						0		46	80	93	75	0	a6.0	66
31				0		46		95		0	a5.0			
Total	0	494.4	685	50	0	337.3	2,273	1,971	2,581	622.5	205.5	440.5		
Mean	0	16.5	22.1	1.6	0	10.9	75.8	63.6	86.0	20.1	6.63	14.7		
Ac-ft	0	981	1,360	99	0	669	4,510	3,910	5,120	1,230	408	874		

a No gage-height record; discharge estimated on basis of weather records, records for Bear River near Woodruff, Utah, engineer's notes, and information from water master.

Year _____ Mean _____ 26.5
Acre-Feet _____ 19,160

b Stage-discharge relation affected by ice.

BEAR RIVER NEAR WOODRUFF, UTAH

Location. — Lat 41°31'25", long 111°01'00", in SW¼ sec. 20, T. 18 N., R. 120 W., in Wyoming, on left bank 2.8 miles upstream from Wyoming-Utah State line and 7.6 miles east of Woodruff.

Drainage area. — 870 sq mi, approximately.

Records available. — April 1942 to September 1959.

Gage. — Water-stage recorder. Altitude of gage is 6,360 ft (from river-profile map).

Average discharge. — 17 years, 209 cfs (151,300 acre-ft per year).

Extremes. — Maximum discharge during year, 1,550 cfs June 30 (gage height, 4.03 ft); no flow Oct. 1-6.

1942-59: Maximum discharge, 3,010 cfs Apr. 28, 1952 (gage height, 5.32 ft); maximum gage height, 5.98 ft Mar. 21, 1951 (ice jam); no flow at times each year 1942-49, 1954-59.

Remarks. — Records good except those for periods of ice effect or no gage-height record, which are fair. Diversions for irrigation of about 45,000 acres above station.

Discharge, in cubic feet per second, water year October 1958 to September 1959

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	
1	0	3.2	}	} 15	} 35	}	67	138	266	1,000	5.9	2.9	
2	0	3.4					119	276	253	542	8.1	2.5	
3	0	3.4					268	382	316	303	5.9	2.3	
4	0	3.8					410	350	415	227	5.1	2.1	
5	0	3.8					481	299	503	196	6.3	2.1	
6	0	4.7	}	} 25	}	} 50	486	238	628	161	5.5	2.0	
7	1.6	4.7					492	234	790	132	5.5	1.8	
8	1.6	3.8					307	209	1,010	89	4.7	1.6	
9	1.3	3.8					213	186	972	70	4.2	1.3	
10	1.0	3.8					152	213	935	52	3.4	1.2	
11	1.2	3.2	} 7.0	}	} 40	}	124	264	885	41	3.2	.9	
12	1.2	2.9					124	291	830	35	3.2	.8	
13	1.2	2.9					126	391	844	28	2.5	.6	
14	1.2	3.0					141	572	817	24	2.3	.5	
15	1.0	3.0					141	698	830	33	3.0	.5	
16	.9	2.0	}	} 30	}	} 105	60	113	731	1,080	24	3.4	1.8
17	.8	2.0					70	82	647	1,190	22	4.2	2.5
18	.8	2.0					80	78	590	885	18	3.4	2.7
19	1.2	} 4.0					90	82	531	718	15	18	7.6
20	1.0						105	67	405	602	13	22	15
21	.8	} 4.0	}	}	} 50	}	115	76	316	486	11	13	33
22	.8						125	85	253	439	9.2	12	19
23	.9						135	96	209	350	6.8	9.8	19
24	1.0						140	92	177	272	5.1	8.1	30
25	1.0						145	108	161	234	3.8	6.8	30
26	1.5	} 6.0	} 15	} 35	}	}	130	149	234	203	3.0	6.3	51
27	2.3						115	189	280	206	3.0	5.5	49
28	2.5						100	158	280	346	2.7	5.5	52
29	2.7						80	116	234	892	2.1	4.7	49
30	2.9						61	98	230	1,470	2.3	4.2	35
31	3.0	56	307	307	2.9	3.4							
Total	35.4	117.4	265	835	1,150	2,357	5,240	10,326	19,669	3,076.9	199.1	419.7	
Mean	1.14	3.91	8.5	26.9	41.1	76.0	175	333	656	99.3	6.42	14.0	
Ac-Ft	70	233	526	1,660	2,280	4,680	10,390	20,480	39,010	6,100	395	832	

Note.—Stage-discharge relation affected by ice Nov. 14 to Mar. 29 (no gage-height record Jan. 6 to Mar. 20; discharge estimated on basis of 3 discharge measurements, weather records, and records for nearby stations on Bear River).

Year _____
 Mean _____
 Acra-Foot _____
120
86,660

BEAR RIVER BELOW PIXLEY DAM, NEAR COKEVILLE, WYOMING

Location. — Lat $41^{\circ}56'20''$, long $110^{\circ}59'05''$, in SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 25, T. 23 N., R. 120 W., 800 ft downstream from Pixley Dam, 17.5 miles downstream from Twin Creek, and 11 miles south of Cokeville.

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

Records available. — October 1941 to November 1943, October 1952 to September 1956, May to September 1958-59. Published as Bear River near Cokeville 1941-43.

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.

Extremes. — 1941-43, 1952-56, 1958-59: maximum daily discharge, 2,300 cfs Mar. 25, 1956; minimum daily recorded, 2.8 cfs Sept. 2, 1958.

Remarks. — Records good. No diversion between station and Collett Creek Branch of Smiths Fork.

Discharge, in cubic feet per second, water year October 1958 to September 1959

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1								42	11	44	59	31
2								27	13	47	76	32
3								27	14	274	64	38
4								26	13	352	88	34
5								26	12	301	71	33
6								17	12	282	60	31
7								13	11	377	42	31
8								13	10	265	30	27
9								12	10	222	28	24
10								10	10	193	31	21
11								11	10	174	32	21
12								11	11	164	36	21
13								12	11	148	37	21
14								16	12	150	36	20
15								14	12	155	34	21
16								14	14	134	32	26
17								12	20	116	31	30
18								11	34	122	27	28
19								11	66	99	31	28
20								11	119	88	55	28
21								12	266	103	57	38
22								12	272	103	44	43
23								10	176	103	42	40
24								9.0	151	91	37	40
25								9.0	98	86	39	46
26								9.0	55	82	41	59
27								9.0	56	80	40	80
28								8.6	54	61	39	65
29								8.6	52	57	39	74
30								8.6	48	49	26	74
31								9.0		51	26	
Total								440.8	1,653	4,573	1,330	1,105
Mean								14.2	55.1	148	42.9	36.8
Ac-Ft								874	3,280	9,070	2,640	2,190

Year _____ Mean 59.5
Acres-Foot 18,050

SMITHS FORK NEAR BORDER, WYOMING

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 1959.

Gage. — Water-stage recorder. Altitude of gage is 6,650 ft (from topographic map). Prior to Oct. 16, 1945, at site 0.8 mile downstream at different datum.

Average discharge. — 17 years, 196 cfs (141,900 acre-ft per year).

Extremes. — Maximum discharge during year, 697 cfs June 16 (gage height, 3.49 ft); minimum, 51 cfs Mar. 21, but may have been less during periods of ice effect.

1942-59: Maximum discharge, 1,500 cfs June 7, 1957 (gage height, 4.56 ft); minimum recorded, 35 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.

Discharge, in cubic feet per second, water year October 1958 to September 1959

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	93	76	b66	b67	b58	58	63	250	279	314	161	99
2	93	76	b66	b65	b57	57	68	302	314	295	153	97
3	91	80	b67	b63	b57	58	71	254	366	291	147	96
4	91	85	b67	b63	b61	b57	80	232	394	283	140	94
5	89	85	b68	b68	b60	b59	93	209	432	272	140	94
6	88	85	b68	b70	b62	b61	105	199	503	264	137	94
7	88	86	b68	b70	b64	63	105	199	578	250	133	94
8	88	83	b68	b68	b64	65	101	229	583	250	128	93
9	88	83	b68	b70	b64	63	91	261	578	250	124	93
10	88	82	b68	b70	b64	59	85	276	572	243	124	93
11	86	82	b76	b70	b64	62	85	261	537	232	124	91
12	85	80	b90	b70	b64	59	88	298	527	229	128	91
13	83	79	b78	b70	b64	59	97	366	542	229	124	91
14	82	83	b73	b70	b60	b59	105	411	552	232	124	91
15	80	79	b73	b68	b66	b59	105	411	599	246	121	94
16	80	b75	b73	b70	b66	b60	99	462	621	236	117	96
17	79	b75	b73	b70	b64	60	94	403	583	222	115	97
18	76	b75	b70	68	62	60	93	366	552	209	121	94
19	76	b80	b70	66	62	59	91	337	527	202	130	94
20	78	80	b70	b65	60	58	88	310	503	196	145	96
21	78	78	b70	b64	59	58	88	287	489	190	130	96
22	78	79	70	b67	60	60	93	276	471	187	121	93
23	79	78	70	b70	60	63	105	268	450	178	117	93
24	78	76	69	b68	58	62	121	272	428	175	113	96
25	79	75	b67	65	63	60	156	291	411	169	113	103
26	79	b70	b67	63	60	60	243	306	407	169	113	115
27	78	b67	b66	69	59	64	209	326	399	169	113	105
28	78	b66	b68	65	58	62	169	298	370	161	107	99
29	76	b66	b64	65		63	153	283	349	158	105	97
30	76	b68	b66	b63		62	181	287	337	156	103	99
31	75		b70	b60		62		276		156	103	
Total	2,556	2,332	2,167	2,080	1,720	1,871	3,325	9,206	14,253	6,813	3,874	2,878
Mean	82.5	77.7	69.9	67.1	61.4	60.4	111	297	475	220	125	95.9
Ac-Ft	5,070	4,630	4,300	4,130	3,410	3,710	6,600	18,260	28,270	13,510	7,680	5,710

b Stage-discharge relation affected by ice.

Year _____ Mean _____ 145
Acre-Feet _____ 105,300

BEAR RIVER BELOW SMITHS FORK, NEAR COKEVILLE, WYOMING

Location. — Lat 42°07'30", long 110°58'20", in SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 28, T. 25 N., R. 119 W., 1.1 miles upstream from Wyman Dam, 2.8 miles northwest of Cokeville, and 3.8 miles downstream from Smiths Fork.

Drainage area. — 2,460 sq mi, approximately.

Records available. — April 1954 to September 1959.

Gage. — Water-stage recorder. Altitude of gage is 6,140 ft.

Average discharge. — 5 years, 355 cfs (257,000 acre-ft per year).

Extremes. — Maximum discharge during year, 931 cfs Apr. 6 (gage height, 4.21 ft); minimum, 86 cfs Oct. 3.

1954-59: Maximum discharge, 3,780 cfs Mar. 26, 1956 (gage height, 7.54 ft); minimum, 68 cfs Sept. 12, 1954.

Remarks. — Records excellent except those for periods of ice effect, which are good.

Discharge, in cubic feet per second, water year October 1958 to September 1959

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	95	116	135	154	b165	183	398	371	240	389	160	123
2	89	116	128	b150	b160	b190	474	398	250	354	174	128
3	91	120	144	b140	b160	b195	653	380	274	398	169	138
4	93	128	152	b130	b160	b205	820	350	305	636	169	133
5	91	146	141	b120	b155	b210	874	338	321	597	180	125
6	93	141	154	b115	b150	b205	862	313	359	526	163	125
7	93	141	154	b125	b150	b195	767	282	416	564	149	123
8	96	149	160	b130	160	b205	669	268	464	597	123	120
9	135	160	160	b135	160	b200	586	278	479	479	113	116
10	144	152	160	b130	169	195	537	301	479	435	111	111
11	123	152	169	130	157	204	500	293	464	389	108	102
12	120	149	204	141	157	214	459	297	459	359	120	100
13	118	149	174	b145	b155	198	416	321	464	342	120	98
14	118	166	166	b143	b155	224	309	359	469	321	125	93
15	116	172	b160	b140	b155	217	346	367	761	338	123	91
16	113	135	149	b140	157	234	346	407	559	317	120	98
17	116	128	149	133	163	214	317	393	521	301	118	104
18	120	144	b150	146	169	211	257	354	526	274	120	102
19	116	152	b152	160	163	217	271	321	500	268	133	104
20	118	169	152	b150	163	250	271	282	510	240	146	108
21	125	166	157	b150	163	264	264	254	619	230	172	128
22	125	163	157	b150	b168	274	264	234	761	237	160	128
23	123	157	160	b150	b170	297	271	230	641	230	154	149
24	125	163	157	149	b172	338	274	224	532	217	152	163
25	130	157	177	160	172	385	293	230	484	207	144	169
26	130	135	163	157	180	416	350	237	421	201	144	201
27	128	141	b145	154	186	484	402	257	411	191	146	224
28	128	138	b138	163	180	500	376	257	407	183	146	220
29	128	123	b137	b160		474	342	247	430	166	141	220
30	128	135	b135	b170		440	363	243	425	163	138	207
31	125		133	b170		393		240		152	130	
Total	3,593	4,363	4,772	4,490	4,574	8,431	13,331	9,326	13,951	10,306	4,371	4,058
Mean	116	145	154	145	163	272	444	301	465	332	141	135
Ac-Ft	7,130	8,650	9,470	8,910	9,070	16,720	26,440	18,500	27,670	20,440	8,670	8,050

b Stage-discharge relation affected by ice.

Year _____ Mean _____ 234
Acre-Feet _____ 169,700

BEAR RIVER AT BORDER, WYOMING

Location. — Lat 42°11', long 111°03', in NE $\frac{1}{4}$ NE $\frac{1}{4}$ 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 1959.

Gage. — Water-stage recorder. Datum of gage is 6,051.63 ft above mean sea level, unadjusted.

Average discharge. — 22 years, 402 cfs (291,000 acre-ft per year).

Extremes. — Maximum discharge during year, 924 cfs Apr. 6 (gage height, 4.13 ft); minimum, 86 cfs Oct. 5.

1937-59: Maximum discharge, 3,680 cfs May 11, 1952 (gage height, 8.89 ft); minimum daily, 30 cfs Aug. 18-22, 1940.

Remarks. — Records good except those for period of ice effect, which are fair. Diversions for irrigation of about 124,000 acres above situation.

Discharge, in cubic feet per second, water year October 1958 to September 1959

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	96	129	145	160	170	195	374	372	166	357	153	134
2	95	129	140	155	170	205	427	397	180	333	164	136
3	89	129	150	145	165	205	558	400	210	350	162	139
4	89	134	160	140	165	210	743	372	220	533	157	146
5	88	149	150	130	165	215	832	355	234	545	190	142
6	89	155	160	125	155	210	876	333	266	496	176	137
7	90	151	165	130	155	205	787	312	312	458	167	125
8	92	155	165	135	165	210	697	285	362	558	146	122
9	121	166	170	145	170	210	616	290	416	461	132	121
10	124	162	170	140	175	210	548	310	408	424	127	117
11	113	160	185	145	170	220	511	312	408	382	129	108
12	113	158	205	150	165	220	470	301	392	355	129	99
13	111	158	190	150	160	220	444	285	403	343	124	98
14	113	171	175	150	160	230	350	303	400	319	127	95
15	113	190	165	145	160	225	360	328	416	343	127	95
16	111	160	160	145	170	245	367	345	470	322	122	93
17	117	140	150	140	175	230	348	357	452	301	119	98
18	119	150	155	155	170	225	301	328	447	283	122	95
19	121	165	160	155	170	245	294	305	427	272	137	96
20	119	170	160	155	175	250	299	285	424	251	153	99
21	125	170	165	155	175	260	292	261	461	240	175	108
22	130	170	165	155	180	270	285	236	596	236	188	113
23	139	165	170	155	190	280	290	232	530	228	176	132
24	141	170	170	155	180	303	292	222	430	218	176	151
25	142	165	175	170	180	345	301	218	416	201	167	162
26	142	155	165	165	185	382	340	182	377	193	167	180
27	139	150	155	170	190	416	408	175	367	190	160	220
28	141	145	145	175	190	458	400	184	367	180	153	212
29	141	135	140	175		430	367	175	379	162	146	236
30	139	140	140	180		419	364	167	387	158	142	238
31	137		145	175		377		166		148	146	
Total	3,639	4,646	5,915	4,725	4,790	8,325	13,541	8,793	11,323	9,840	4,659	4,027
Mean	117	155	162	152	171	269	451	284	377	317	150	134
Ac-Ft	7,220	9,220	9,250	9,370	9,500	16,510	26,860	17,440	22,460	19,520	9,240	7,990

Note.—Stage-discharge relation affected by ice Nov. 16 to Mar. 23.

Year Mean 228
 Acre-feet 165,300

BEAR RIVER NEAR PRESTON, IDAHO

Location. — Lat 42°10', long 111°51', in NW¼ sec. 36, T. 14 S., R. 39 E., on left bank 600 ft downstream from headgates of West Cache Canal, 5 miles downstream from Mink Creek, 5 miles north of Preston, and 5½ miles upstream from Battle Creek.

Drainage area. — 4,300 sq mi, approximately.

Records available. — October 1889 to September 1917 (gage heights only, January to September 1917), January 1944 to September 1959. Prior to 1903, published as "at Battlecreek."

Gage. — Water-stage recorder. Altitude of gage is 4,540 ft.

Average discharge. — 15 years (1944-59), 855 cfs (619,000 acre-ft per year).

Extremes. — Maximum recorded discharge during year, 2,710 cfs Apr. 4, 5 (gage height, 4.41 ft); minimum, 2.4 cfs Apr. 15 (gage height, 0.22 ft); minimum daily, 105 cfs July 2.

1944-59: Maximum discharge, 4,420 cfs Apr. 17, 1950 (gage height, 5.61 ft); minimum, 0.6 cfs June 14, 1949; 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 SE¼ sec. 20, T. 16 S., R. 39 E.

Discharge, in cubic feet per second, water year October 1958 to September 1959

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	588	404	405	462	398	531	946	673	a400	168	816	354
2	587	320	600	507	449	388	909	554	a300	105	881	432
3	626	393	553	a380	543	530	937	323	a280	427	688	418
4	340	502	582	a420	497	576	1,120	439	a230	428	984	392
5	426	429	546	a450	462	737	1,410	336	a160	389	987	541
6	611	404	579	a500	502	510	1,000	282	a170	366	1,060	460
7	456	452	527	a550	490	403	859	333	a180	335	943	702
8	515	411	633	576	380	471	979	270	a150	470	864	594
9	547	530	580	613	366	352	836	a350	a160	468	816	580
10	500	547	708	359	495	460	834	a300	a160	734	a800	684
11	545	500	652	413	449	450	734	a325	a170	514	a760	641
12	479	559	737	426	491	447	612	a280	a200	610	a800	708
13	423	459	804	494	465	532	677	174	a180	554	a600	581
14	453	662	564	549	508	617	463	215	a200	768	a475	842
15	520	693	623	555	423	404	549	173	a270	677	389	728
16	546	489	660	500	389	240	623	157	a225	922	514	728
17	434	529	616	472	510	524	733	138	a210	686	633	751
18	471	575	633	396	542	480	653	216	a350	741	588	742
19	607	426	565	399	560	697	542	236	247	801	510	325
20	558	457	747	546	426	615	641	225	246	670	400	153
21	646	543	477	487	687	580	570	240	161	785	244	314
22	648	559	657	423	610	504	600	121	367	791	194	342
23	467	432	549	423	682	646	562	249	424	670	445	319
24	456	360	644	523	314	564	582	251	573	768	235	432
25	407	522	422	459	489	866	582	223	852	724	376	418
26	430	707	366	442	516	739	546	282	715	784	407	493
27	508	575	471	225	468	904	662	446	822	735	422	500
28	551	567	498	516	466	694	694	a460	765	874	274	a470
29	455	711	451	370		897	640	a450	365	779	341	a430
30	511	418	530	465		927	597	a400	225	780	296	a375
31	466		483	417		985		a330		875	343	
Total	15,777	15,135	17,861	14,426	13,577	18,524	22,092	9,451	9,760	19,448	18,085	15,449
Mean	509	504	576	465	485	598	736	305	325	627	583	515
Ac-Ft	31,290	30,020	35,430	28,610	26,930	36,740	43,820	18,750	19,360	38,570	35,870	30,640

a No gage-height record; discharge estimated on basis of records for West Cache Canal, Mink Creek below Dry Fork, and powerplant output at Oneida.

Year _____ Mean _____ 519
Acres-Foot _____ 376,000

BEAR RIVER NEAR COLLINSTON, UTAH

Location. — Lat 41°50', long 112°03', in NW¼SE¼ sec. 27, T. 13 N., R. 2W., on right bank 800 ft. downstream from Cutler plant of Utah Power & Light Co., 2,000 ft. downstream from Cutler Dam, and 5½ miles north of Collinston.

Drainage area. — 6,000 sq mi, approximately.

Records available. — July 1889 to September 1959.

Gage. — Water-stage recorder. Datum of gage is 4,276.13 ft above mean sea level (levels by Bureau of Reclamation). Prior to Nov. 8, 1913, staff gage and Nov. 8, 1913, to Sept. 10, 1938, water-stage recorder, at site three-quarters of a mile downstream at different datums.

Extremes. — Maximum discharge during year, 3,640 cfs Apr. 16 (gage height, 4.67 ft); minimum daily, 20 cfs June 6.

1889-1959: Maximum discharge observed, 11,600 cfs June 7-10, 1909 (gage height, 7.70 ft, site and datum then in use); practically no flow at 12 p.m. Aug. 5, 1920.

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

Cooperation. — Seven discharge measurements furnished by Utah Power & Light Co.

Discharge, in cubic feet per second, water year October 1958 to September 1959

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	510	842	1,040	828	963	1,150	1,610	829	516	394	25	25
2	481	845	1,050	1,070	837	1,080	1,750	840	380	56	27	25
3	657	700	987	921	988	1,210	1,610	1,160	133	22	25	24
4	602	693	949	708	939	1,160	1,630	1,200	339	22	24	24
5	453	773	924	578	1,070	1,230	1,680	1,000	95	22	22	24
6	727	769	1,050	741	1,010	1,120	1,630	1,110	20	24	22	22
7	557	846	1,220	977	1,190	1,280	1,890	1,030	21	22	22	22
8	439	995	1,160	1,050	1,110	1,360	1,920	364	22	24	22	22
9	431	787	1,330	1,030	1,040	972	1,940	22	22	26	24	22
10	498	1,060	1,140	1,080	1,080	1,120	1,960	284	22	24	24	22
11	669	924	1,180	1,220	1,260	1,060	1,970	766	24	22	30	22
12	569	971	1,310	1,220	1,160	1,080	1,960	261	24	22	30	22
13	583	821	1,330	1,290	1,240	1,020	1,800	22	22	22	35	22
14	666	1,460	1,370	1,210	1,620	1,060	1,620	140	24	22	21	22
15	554	1,410	1,420	1,070	1,550	1,070	1,630	22	22	22	22	24
16	668	1,110	1,260	1,260	1,330	1,160	1,360	22	22	21	22	24
17	548	1,250	1,320	933	1,400	895	1,470	22	22	21	22	25
18	656	1,260	1,160	1,040	1,590	1,010	1,680	22	61	22	22	25
19	581	1,120	1,230	1,070	1,500	978	1,580	22	21	22	24	25
20	647	1,190	1,170	1,100	1,650	1,160	1,590	22	22	22	24	492
21	746	1,390	1,140	750	1,780	1,170	1,480	22	22	22	24	831
22	762	1,330	1,020	988	1,600	1,220	1,450	22	22	22	25	162
23	1,210	1,140	1,260	881	1,540	1,100	1,270	22	22	22	25	605
24	1,110	1,240	1,150	1,060	1,490	1,150	1,180	22	22	22	25	617
25	796	1,220	1,090	1,030	1,490	1,280	1,340	22	22	21	25	573
26	776	1,230	998	1,060	1,220	1,220	1,470	22	22	22	25	1,020
27	761	1,010	1,040	1,340	1,160	1,450	1,600	21	22	22	25	1,430
28	684	1,060	921	1,490	1,280	1,420	2,140	215	22	22	27	764
29	986	1,230	1,180	1,600	1,470	1,470	2,050	926	22	22	24	963
30	1,000	1,030	1,060	1,590	1,430	1,430	2,030	1,070	25	24	24	1,330
31	833		1,020	1,190		1,690		907		24	25	
Total	21,160	31,706	35,399	33,325	36,087	36,765	50,290	12,431	2,057	1,099	763	9,230
Mean	683	1,057	1,142	1,077	1,289	1,186	1,676	401	68.6	35.5	24.6	308
Ac-Ft	41,970	62,890	70,210	66,200	71,580	72,920	99,750	24,660	4,080	2,180	1,510	18,310

Year _____ Mean _____ 741
Acres-Foot _____ 536,300