

# FIFTEENTH BIENNIAL REPORT

# BEAR RIVER COMMISSION

2007 - 2008



For the Biennium October 1, 2006,  
to  
September 30, 2008

**BOUNTIFUL, UTAH**  
November 2011

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## **COVER**

The Bear River Compact was signed into law by President Dwight D. Eisenhower in 1958. This action created the Bear River Commission. The Commission is a ten-member body composed of a Federal Chairman appointed by the President and three members from each of the states, Idaho, Wyoming and Utah. The state members are appointed by the governors of the three states.

At the 2008 Commission meeting in Salt Lake City, the Commission reflected on the accomplishments of the last half century. Photographs were taken of those in attendance, members of the committees and of the Commission. The cover is a photograph taken of the Commission. The Commissioners are, from the top left: Commissioner David Tuthill (Boise, Idaho), Commissioner Rodney Wallentine (Paris, Idaho), Jack Barnett (Commission's Engineer-Manager), Don Barnett (Commission staff), Commissioner Marcus Gibbs (Grace, Idaho) and Alternate Commissioner Sue Lowry (Cheyenne, Wyoming, in place of Commissioner Pat Tyrrell).

Bottom row, starting at the left: Federal Commissioner and Chairman Dee Hansen (Centerville, Utah), Commissioner Charles Holmgren (Bear River City, Utah), Commissioner Sam Lowham (Evanston, Wyoming), Commissioner Blair Francis (Woodruff, Utah), Commissioner Gordon Thornock (Cokeville, Wyoming) and Commissioner Dennis Strong (Centerville, Utah).

Photo by Jen Barnett

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COMMISSION**

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**For the Biennium October 1, 2006,**

**to**

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**November 2011**





**BEAR RIVER  
COMMISSION**

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Bountiful, Utah 84010-6232  
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**CHAIR**  
Dee C. Hansen

**IDAHO  
COMMISSIONERS**  
Gary Spackman  
Kerry Romrell  
Marcus J. Gibbs

**UTAH  
COMMISSIONERS**  
Dennis J. Strong  
Blair Francis  
Charles W. Holmgren

**WYOMING  
COMMISSIONERS**  
Patrick T. Tyrrell  
Sam Lowham  
Gordon Thornock

**ENGINEER-MANAGER**  
Don A. Barnett

November 30, 2011

Barack Obama  
President of the United States  
Executive Office of the President  
The White House Office  
1600 Pennsylvania Avenue  
Washington, D.C. 20500

Dear President Obama:

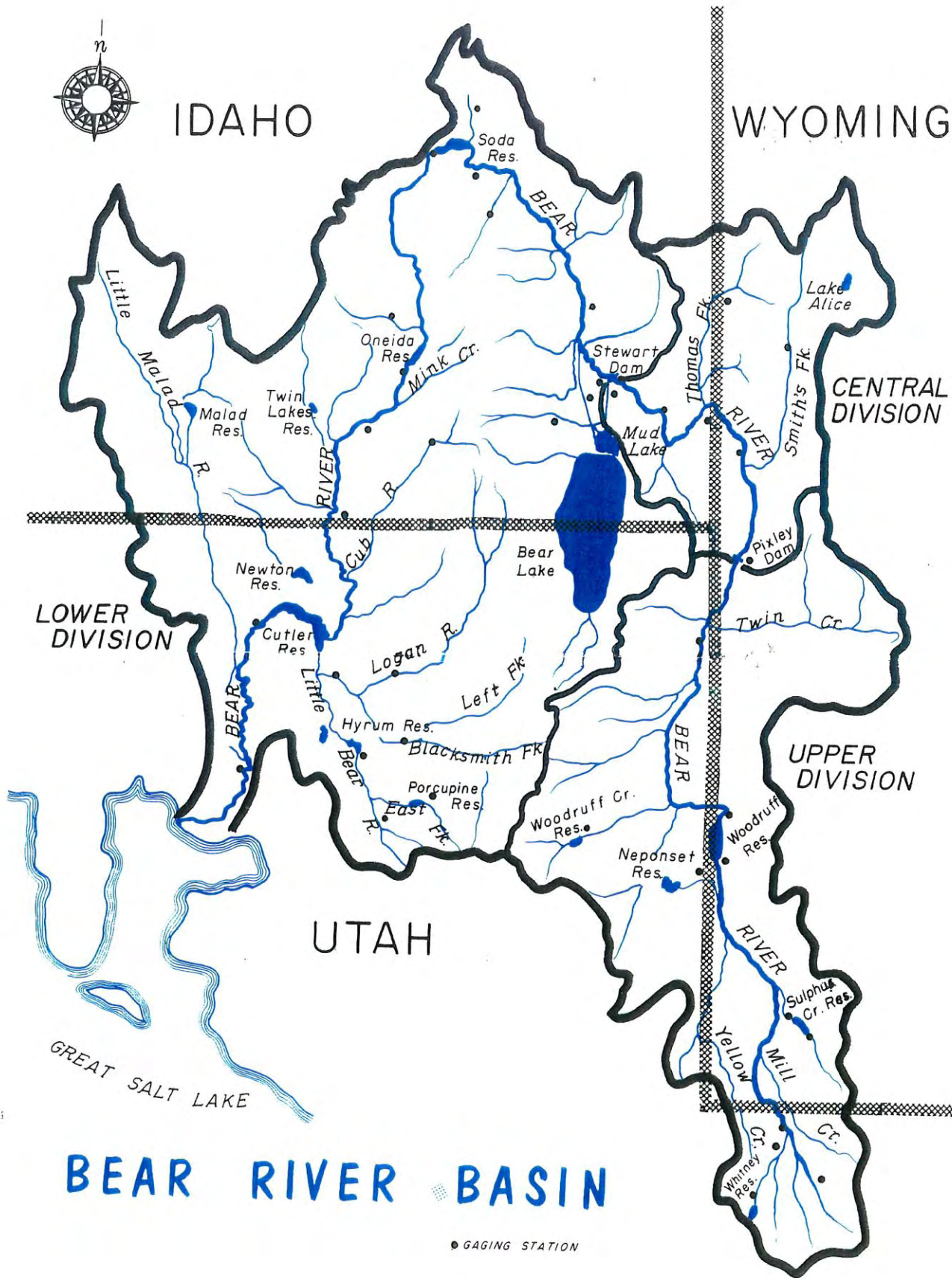
Submitted herewith is the Fifteenth Biennial Report of the Bear River Commission, as requested by Article III.D.2 of the Amended Bear River Compact.

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

Sincerely,

Don A. Barnett  
Engineer-Manager

enclosure



# BEAR RIVER BASIN

● GAGING STATION

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# **FIFTEENTH BIENNIAL REPORT BEAR RIVER COMMISSION**

## **Overview**

### **SYNOPSIS**

This biennial period saw two very different water years. After five straight wetter than normal years in the late 1990's, the first four years of this new century were extremely dry followed by normal to above normal years in 2005 and 2006. However, 2007 turned very dry with streamflow during the irrigation season near only 50 percent of normal. Interstate regulation pursuant to the Compact occurred in the Upper and Central Divisions and storage supplies were heavily depleted. In 2008 the water supply returned to near normal, there was not a declaration of a water emergency in any division and storage supplies increased, or at least were not depleted. During both years there was interstate cooperation in the distribution of the Bear River.

This biennial report is divided into three chapters. This first chapter, the Overview Chapter, provides a background of the Compact and the Commission and its general activities. The second and third chapters provide specific water supply and streamflow distribution information for the 2007 and 2008 water years, respectively.

### **BACKGROUND**

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

The Bear River Compact was amended in accordance with Article XIII of the Original Compact (Article XIV, Amended Compact) following several years of study and review of Compact provisions. Principal amendments and other changes are discussed elsewhere in this report. Amendments to the Compact were agreed to by representatives of the compacting states on December 22, 1978, and State Amending Legislation was approved in each state in the spring of 1979. Congressional consent was given by the 96th Congress by Public Law 96-189 and signed into law by President Carter on February 8, 1980.

Article III.D.2 of the Compact was amended to provide that the Bear River Commission compile a biennial report rather than an annual report as required in the original Compact. Annual reports were compiled in each of the 21 years (1958-78) and were transmitted to the President of the United States and to the Governors of the signatory states.

This is the Fifteenth Biennial Report covering the 2007 and 2008 water years (October 1, 2006, to September 30, 2008).

River operation under the Bear River Compact and activities of the Bear River Commission during the 2007 and 2008 water years are summarized in this report, by year, in the two chapters which follow. This biennial report is organized so that specific information for each water year is reported in separate chapters. Selected streamflow records are given in the chapters discussing each water year.

## **COMMISSION ORGANIZATION & MEMBERS**

Ten commissioners, three representing each state and one representing the United States, constitute the Bear River Commission. The Federal representative serves as chairperson without a vote, while each of the other nine Commissioners has one vote. Figure O.1 lists the Bear River Commission membership as of October 1, 2006.

The Commission amended its bylaws on April 16, 1990. The amendments allowed for the creation of three standing committees of the Commission: the Management Committee, the Operations Committee, and the Records Committee. On November 18, 1997, the Commission again amended its bylaws and changed the name of the Records Committee to the Records & Public Involvement Committee. A Water Quality Committee was also created on November 18, 1997. These standing committees have duties as assigned to them by the Commission. Each state is allowed to designate its representatives to the committees, and in all committees votes are taken by state, with each state having one vote. These four committees met from time to time on an as-needed basis throughout this biennium.

The bylaws also provide for the creation of special committees which may be assigned tasks as deemed necessary. The Technical Advisory Committee (TAC) has been created by the Commission and serves the Commission as a whole (and each of the standing committees) on technical matters. The TAC is composed of state water agency personnel and is chaired by the Engineer-Manager of the Commission.

# Bear River Commission Members

(as of October 1, 2006)

## Officers

Chair ..... Dee C. Hansen, Centerville, UT  
Vice-Chairman..... Charles W. Holmgren, Bear River City, UT  
Secretary-Treasurer.....Dennis J. Strong, Centerville, UT  
Engineer-Manager .....Jack A. Barnett, Bountiful, UT

## Members

### **Idaho**

Karl J. Dreher<sup>1)</sup> ..... Boise, ID  
Rodney Wallentine ..... Paris, ID  
Dean M. Mathews<sup>2)</sup> ..... Grace, ID

### **Utah**

Dennis J. Strong..... Centerville, UT  
Blair Francis..... Woodruff, UT  
Charles W. Holmgren .....Bear River City, UT

### **Wyoming**

Patrick T. Tyrrell .....Cheyenne, WY  
Sam Lowham .....Evanston, WY  
Gordon Thornock..... Cokeville, WY

### **United States**

Dee C. Hansen ..... Centerville, UT

### **Management Committee**

Karl J. Dreher<sup>1)</sup> ..... Boise, ID  
Dennis J. Strong..... Centerville, UT  
Patrick T. Tyrrell .....Cheyenne, WY

### **Operations Committee**

Sam Lowham .....Evanston, WY  
Blair Francis..... Woodruff, UT  
Rodney Wallentine ..... Paris, ID

### **Records & Public Involvement Committee**

Charles Holmgren .....Bear River City, UT  
Dean M. Mathews<sup>2)</sup> ..... Grace, ID  
Gordon Thornock ..... Cokeville, WY

1) Karl J. Dreher was replaced by David Tuthill on May 30, 2007  
2) Dean M. Mathews was replaced by Marcus Gibbs on May 5, 2007

**Figure O.1**

## MEETINGS

Four Regular or Annual Commission meetings were held during the biennium. The dates of the meetings are as follows:

November 21, 2006	Regular Meeting	Salt Lake City, Utah
April 17, 2007	Annual Meeting	Salt Lake City, Utah
November 27, 2007	Regular Meeting	Salt Lake City, Utah
April 22, 2008	Annual Meeting	Salt Lake City, Utah

The two regular meetings and one annual meeting of the Commission were held at the Utah Department of Natural Resources building in Salt Lake City, Utah. The April 22, 2008, annual meeting was held at the Rocky Mountain Power building in Salt Lake City, Utah. At the annual meetings held in April, elections were held and fiscal matters were addressed. A fiscal report for the biennial period, prepared by the Treasurer, has been made a part of this chapter. Formal minutes for all four of the Commission meetings have been approved and can be reviewed at the Commission offices for details concerning the Commission's actions.

## COMMISSION ACTION & ACTIVITIES

This section is to provide a brief accounting of significant actions or activities of the Commission during the biennial period separate and apart from specific streamflow measurement and distribution which are discussed elsewhere in this report. Greater details relative to specific actions or activities of the Commission are contained within the Commission's approved meeting minutes.

The first meeting of the biennial period was held as a regular meeting on November 21, 2006, in Salt Lake City. The Commission received financial reports, as it does at every meeting, and received reports from the Operations Committee, the Records and Public Involvement Committee and the Water Quality Committee. The Commission also learned of progress being made as provided for by a grant from EPA to the Commission under a Targeted Watersheds Grant Program. The Commission heard a report from the Utah State Engineer concerning many real-time measuring devices installed in the Cache Valley. The Twin Lakes Canal Company also gave a report as to plans it has to build new distribution facilities which include a dam on the Bear River below the existing Oneida Dam.

The second meeting of the Commission during this biennial period was an annual meeting and was held on April 17, 2007, in Salt Lake City. The regular reports referred to in the previous paragraph were made to the Commission, and the Commission adopted its budget for the fiscal year starting on July 1, 2007. Rodney Wallentine was elected as Vice Chairman of the Commission and Dennis Strong was designated to continue as Secretary-Treasurer. At this meeting, Idaho announced that Karl Dreher was not reappointed as the Director of the Idaho Department of Water Resources. Because of poor health, Dean Mathews did not plan to seek reappointment to the Commission. Idaho also announced that Rock Holbrook would be Idaho's new Watermaster on the Bear River.

The third meeting, a regular meeting of the Bear River Commission, was held in Salt Lake City on November 27, 2007. Traditional reports were received concerning Commission expenditures and reports from all committees. A report was given by Don Barnett about water banking in Idaho and a discussion followed. Federal Chairman Hansen was not able to attend this meeting, and the meeting was chaired by Vice Chairman Wallentine.

The fourth and last meeting of the Commission during this biennial period was an annual meeting which was held in Salt Lake City on April 22, 2008. A budget for the next fiscal year was adopted. The Commission spends about half of its budgeted funds each year to support the USGS stream gaging program. At this meeting the Commission learned that the long standing 50/50 cost sharing would be changed to 45/55, which will result in more costs to the Commission.

This meeting marked the fifty-year anniversary of the Commission. A special presentation was made by Engineer-Manager Barnett. Others then reflected on pre-Compact times and the first Compact meeting, and this was followed by a brief celebration.

## **FIFTY YEARS**

When President Eisenhower signed the original Compact into law on March 17, 1958, the action marked the end of negotiations by the three states that reached back many years. Those years of negotiations were filled with conflict, debate and compromise. The Compact states:

*The major purposes of this Compact are to remove the causes of present and future controversy over the distribution and use of the waters of the Bear River; to provide for efficient use of water for multiple purposes; to permit additional development of the water resources of Bear River; to promote interstate comity; and to accomplish an equitable apportionment of the waters of the Bear River among the compacting States. (Article I, A)*

In the early years of the Compact, it was to be expected that there would be times when states or water users would question the intent of some of the provisions of the Compact because the use of the waters of the Bear River (some of it had been occurring for almost a century) had never been regulated by interstate provisions as set forth in the Compact. Never, however, did any state threaten to step away from the agreement.

Within a few years, as the stakeholders became accustomed to the basin-wide commitments, a growing spirit of comity developed. There was a negotiated, but unanimously agreed to, amendment that modified the Compact when President Carter signed the accord in 1980. Recent years have led to enhanced sharing of information which has, in turn, resulted in more self regulation, rather than Commission regulation, and the spirit of comity identified in Article I of the Compact has grown.

In retrospect, it is difficult to conceive of how the waters of the river could have been effectively and equitably distributed without the Compact. The compacting option allowed by the Constitution appears to have been by far and away the best option available to the states more than half a century ago. It was timely that the Commission reflect on the efforts of those great statesmen who negotiated the resolve of so many contentious issues. These statesmen have now all passed.

And so, when the Commission met on April 22, 2008, it took time to reflect on the great heritage and the accomplishments of those early pioneers and of the many statesmen who have followed, as appointed by the Presidents and the Governors. There have been six Federal Chairs of the Commission and many state Commissioners. The Federal Chairs, listed in order of service, were E. O. Larson, Wallace N. Jibson, Kenneth T. Wright, Charles J. Heringer, Jr. and Denice Wheeler, with the current Chair being Dee Hansen.

Dee Hansen has been the Federal Chair from July 26, 2002 to the present. The cover photograph shows the Commissioners present at the April 22<sup>nd</sup> meeting, and Dee Hansen is seated at the lower left.

The three states, from 1958 to the present, have always been represented by their gubernatorial-appointed Commissioners. They have served many Governors. Those serving in 2008 are pictured below.



**IDAHO COMMISSIONERS**  
Standing: Rodney Wallentine  
Seated from left: David Tuthill, Marcus Gibbs



**UTAH COMMISSIONERS**  
Standing: Blair Francis  
Seated from left: Dennis Strong, Charles Holmgren





**WYOMING COMMISSIONERS**

Standing: Sue Lowry (alternate to Patrick Tyrrell)  
Seated from left: Sam Lowham, Gordon Thornock

If the Bear River Compact was an experiment in western water politics, one would judge the experiment a success.

## **FINANCIAL REPORT**

The fiscal year of the Commission begins on July 1 of a given year and ends on June 30 of the following year. Dennis J. Strong served as Secretary-Treasurer of the Commission throughout the biennium. The expenditures for the period are shown in Figure O.2 and were presented to the Commission by the Treasurer.

The Commission records were audited by an auditor. The audit of accounts and records, including a statement of budget revenue and disbursements for the biennium ending June 30, 2008, is a part of the formally accepted Commission minutes.

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 they represent.

**Financial Report  
June 30, 2008**

	ACTUAL FY 07	ACTUAL FY 08	PROPOSED FY 09	PROPOSED FY 10
Stream Gaging	\$0.00	\$56,550.00	\$52,300.00	\$59,155.00
Personal Services, Engineer-Manager	52,495.63	55,201.65	59,450.00	62,423.00
Travel Expenses	1,086.45	1,298.63	1,200.00	1,200.00
Office Expenses	924.51	1,615.84	1,600.00	1,600.00
Printing Biennial Report	0.00	0.00	2,000.00	1,000.00
Treasurer Bond & Audit	100.00	100.00	1,400.00	1,400.00
Printing	1,310.17	1,436.09	1,600.00	1,600.00
Web Page/Data	0.00	3,045.00	6,000.00	6,000.00
Contingency	0.00	0.00	5,000.00	5,000.00
<b>TOTAL</b>	<b>\$55,916.76</b>	<b>\$119,247.21</b>	<b>\$130,550.00</b>	<b>\$139,378.00</b>
<b>ASSESSMENTS – Each State</b>				
Idaho	\$35,000.00	\$35,000.00	\$40,000.00	\$40,000.00
Utah	35,000.00	35,000.00	40,000.00	40,000.00
Wyoming	35,000.00	35,000.00	40,000.00	40,000.00
<b>TOTAL</b>	<b>\$105,000.00</b>	<b>\$105,000.00</b>	<b>\$120,000.00</b>	<b>\$120,000.00</b>

**Figure O.2**

**THE BEAR RIVER**

The Bear River drains an area of 6,900 square miles in southwestern Wyoming, northern Utah and southeastern Idaho. Its headwaters are but 90 miles from its mouth, yet it meanders 500 miles in a circuitous course in reaching the Great Salt Lake. In its travels, it makes five state line crossings in three states. The map found on page ii shows the major features of the Bear River system.

The Bear River is not only the largest tributary to the Great Salt Lake, but is the largest stream in the North American Continent that does not flow to an ocean. Prior to settlement and irrigation development, the annual discharge of the river into the Great Salt Lake averaged an estimated 1,750,000 acre-feet. Settlement of lands adjacent to the Bear River began in about 1860, and power development began in 1907. In 1911, Bear Lake was converted into a storage reservoir by constructing inlet and outlet canals connecting the lake and the river.

Approximately 500 irrigation organizations own and operate separate irrigation systems in the Basin, supplying irrigation water for half a million acres of land. Six hydroelectric plants are in operation on the main stem of the Bear River.

In addition, a municipality, numerous communities, individual families, a variety of industrial and miscellaneous users, and waterfowl refuges withdraw water from the Bear River, its tributaries and its tributary ground water. Today, on an average, nearly a million acre-feet of water still flow annually into the Great Salt Lake from the Bear River.

## BEAR RIVER COMPACT

The Bear River Compact is a document voluntarily adopted by the states which establishes the rights and obligations of Idaho, Utah and Wyoming with respect to the waters of the Bear River. The Compact became effective on March 17, 1958.

The Original (1958) Compact provided the following:

- Divided the Bear River into three main divisions: the Upper Division, the Central Division, and the Lower Division, with subdivisions or sections created in the Upper and Central Divisions. The Compact specifically identified which river flows and canal diversions are to be assigned to each of the divisions.
- Apportioned the direct flows of the Bear River and its tributaries between Utah and Wyoming in the Upper Division (upstream of Pixley Dam) and between Idaho and Wyoming in the Central Division (Pixley Dam to Stewart Dam).
- Did not specifically allocate the water in the Lower Division between the states of Idaho and Utah. The Compact did, however, provide a mechanism wherein a Utah water user may allege that because of diversions within Idaho, he is being deprived of water to which he is justly entitled and request distribution across the state line. If the Commission finds this to be the case, the Commission may declare a water emergency and establish a water delivery schedule in the Lower Division based upon priority of rights without regard to the state line.
- Defined the pre-compact storage rights for each of the three states in reservoirs above Bear Lake and established additional rights to store above Stewart Dam 36,500 acre-feet of Bear River water in any water year. This 36,500 acre-feet of storage is referred to as "Original Compact Storage" and was allocated to each of the states as follows:

Utah	17,750 acre-feet
Wyoming	17,750 acre-feet
Idaho	1,000 acre-feet
- Reserved a portion of the storage capacity in Bear Lake for primary use by, and protection of, irrigation uses and rights downstream from Bear Lake. This compact-provided-for "irrigation reserve" establishes minimum Bear Lake levels which correspond to upstream storage development, below which Bear Lake cannot be drawn down only for power purposes.

## **AMENDED BEAR RIVER COMPACT**

Proposed amendments to the Bear River Compact were approved by the Commission in December 1978 and the Amended Compact became law on February 8, 1980. Amendments provide for the following principal changes to the 1958 Compact:

### **Amendment Highlights**

- The allocation and distribution of direct flow rights between the various sections in the Upper and Central Divisions are unchanged from the 1958 Compact.
- Additional storage is granted above Bear Lake for 74,500 acre-feet, of which 4,500 acre-feet is granted to Idaho and 35,000 acre-feet is granted each to Utah and Wyoming. This storage, plus water appropriated (including ground water) and applied to beneficial use after January 1, 1976, is limited to an annual depletion of 28,000 acre-feet, of which Idaho is allocated 2,000 acre-feet and Utah and Wyoming are allocated 13,000 acre-feet each. This additional storage in the Upper and Central Division will not be allowed when the elevation of Bear Lake is below 5911 feet (Utah Power and Light datum).
- Additional rights are granted to store water in the Upper and Central Divisions which would otherwise be spilled or bypassed from Bear Lake when all other direct flow and storage rights are satisfied. These storage rights are allocated with equal priority as follows: 6 percent to Idaho, 47 percent to Utah and 47 percent to Wyoming.
- The method for the declaration of a water emergency in the Lower Division and the distribution of direct flow diversions by priority without regard to state line is unchanged from the 1958 Compact.
- The water not applied to beneficial use prior to January 1, 1976, including ground water tributary to the Bear River, is allocated on a depletion basis.
- In the Lower Division, Idaho is granted the first right to develop and deplete 125,000 acre-feet. Utah is granted the second right to develop and deplete 275,000 acre-feet. The next 150,000 acre-feet of water depletion will be divided equally between Utah and Idaho. All water in excess of the above allocations will be divided between Utah and Idaho, with Idaho receiving 30 percent and Utah 70 percent.

### **Compact Required Depletion Estimates**

The Amended Bear River Compact, as referenced above, states several of the new provisions allowing for additional storage and use of waters subsequent to January 1, 1976, be administered based on depletions. The Compact provides that Commission-approved procedures shall be adopted to make such depletion estimates. Working under the direction of the Commission, the Technical Advisory Committee (TAC) was given the assignment to make these depletion estimates. First, at Commission meetings, the TAC presented base

maps delineating irrigation water usage up through January 1, 1976. The TAC then moved forward in their assignment to make estimates of depletions subsequent to January 1, 1976.

The depletion estimates submitted by the states represented changes from January 1, 1976, to January 1, 1990. At the November 1993 Commission meeting, the Commission formally adopted these Commission-approved procedures which allow for common depletion calculations. These Commission-approved procedures direct that the latest depletion estimates should be included in the Biennial Report. Figure O.3 represents the most recent depletion estimates.

**Bear River Commission  
Estimated Annual Depletions<sup>1</sup>  
Changes from January 1, 1976, to January 1, 1990**

ABOVE STEWART DAM

State	Allocation	Agricultural Depletions	M&I Depletions	Total Depletions	Remaining Allocation
Wyoming	13,000	1,996	781	2,777	10,223
Idaho	2,000	1,293	0	1,293	707
Utah	13,000	5,106	177	5,283	7,717

LOWER DIVISION

State	Allocation	Agricultural Depletions	M&I Depletions	Total Depletions	Remaining Allocation
Idaho	125,000 <sup>2</sup>	7,348	-48	7,300	117,700
Utah	275,000 <sup>3</sup>	2,936	1,178	4,114	270,886

<sup>1</sup>All values are in acre-feet. Data were obtained from the appendices of the April 22, 1992, Bear River Commission meeting minutes. Any reductions in pre-1976 depletions are reflected in the above numbers. With the exception of Woodruff Narrows Reservoir, reservoir evaporation was not calculated.

<sup>2</sup>First right under Compact - Compact grants additional rights.

<sup>3</sup>Second right under Compact - Compact grants additional rights.

**Figure O.3**

**ADMINISTRATION OF BEAR RIVER COMPACT**

**General**

Provisions of the Compact are generally administered and enforced under the 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.

Seasonal daily records are collected on about 130 diversions above Bear Lake by state river commissioners under the direction of their respective State Engineers and under the general supervision of the Commission's Engineer-Manager. These records include all of the diversions from Bear River main stem and Smith's Fork, as they are required to administer the Bear River Compact. Daily discharge records for canals in the Upper and Central Divisions are published in this biennial report and have been published in previous biennial reports.

The Engineer-Manager determines when, under provisions of the Compact, a water emergency exists in the Upper or Central Divisions. Once a determination has been made of a water emergency, the Engineer-Manager is in weekly phone contact with state river commissioners as to flows and diversions and, at least once a week, allocates the water within the Upper and Central Divisions as provided for under the Compact. The Engineer-Manager also inspects diversions in the field as needed to ensure the equitable apportionment of the water of the Bear River as provided for under the Compact.

## **Storage**

### New Storage

The original 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 listed in Figure O.4 have been constructed under the additional storage provisions of the original Compact.

### **Constructed Additional Storage Provided for Under the Original Compact**

<i>Reservoir</i>	<i>Allocation</i>
Sulphur Creek Reservoir (Wyoming) .....	4,614 ac-ft
Sulphur Creek Reservoir Enlargement (Wyoming).....	1,268 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 (Wyoming).....	3,250 ac-ft
Woodruff Narrows Reservoir (Utah) .....	15,240 ac-ft
Whitney Reservoir (Wyoming).....	4,200 ac-ft
Wyman Reservoir (Wyoming).....	22 ac-ft
Massae Reservoir (Wyoming) .....	107 ac-ft
Massae Reservoir Enlargement (Wyoming).....	51 ac-ft
Woodruff Creek Reservoir (Utah) .....	2,000 ac-ft
Coy Reservoir (Wyoming).....	50 ac-ft
<b>TOTAL ALLOCATION.....</b>	<b>31,402 ac-ft</b>

**Figure O.4**

Additional storage allowance is granted under the Amended Compact. Woodruff Narrows was enlarged in 1980 under this provision from a spillway capacity of 28,100 acre-feet to 57,300 acre-feet. Allocated to this enlargement is: Utah, 18,000 acre-feet, including 6,686 acre-feet depletion; and Wyoming, 2,960 acre-feet, including 871 acre-feet depletion.

Sulphur Creek Reservoir was enlarged in 1988 to a total capacity of 19,775 acre-feet. Allocated to this enlargement is 10,315 acre-feet (9,370 for municipal use), including 701 acre-feet for depletion.

### Bear Lake

Article VI 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, allocated by the original Compact, is developed above Bear Lake. Coy Reservoir was built during the biennium as well as additional original Compact storage was permanently allocated to the enlarged Sulphur Creek Reservoir. However, these additions did not increase the total to the next Compact increment and so the irrigation reserve elevation remained at 5914.61 feet with an active storage content in Bear Lake of 794,000 acre-feet. This irrigation reserve elevation corresponds to 30,000 acre-feet of developed additional original Compact storage allocation.

### **Water Supply**

The Commission uses three stream gages, one in each of the three river divisions, as general indicators of the water supply during a given year in the respective divisions. Each of these three gages has a period of record beginning in 1943 and continues to the present. There are not significant streamflow diversions above these three gages and, hence, they are used to approximate natural flow conditions.

In the Upper Division, most of the Bear River streamflow originates on the north slopes of the Uinta Mountains and flows northward across the state line into Wyoming. The USGS Utah-Wyoming State Line Gage has been used as a good indicator gage of the water supply generally available above Bear Lake and, in particular, to the Upper Division.

Inflow from the Smith's Fork to the Bear River in the Central Division often represents half, or more, of the combined flow of the Bear River at this location. Therefore, the USGS gage on Smith's Fork has been used by the Commission as an indicator of the available water supply in the Central Division.

A large amount of the available water supply in the Lower Division originates and is diverted in the Cache Valley. The major streams which are tributary to the Bear River in the Cache Valley originate in the mountains on the east side of the valley. One of these tributaries, the Logan River, has been used by the Commission as a good indicator gage of the water supply available for diversion in the Cache Valley and, in general, in the Lower Division. Several canals divert from the Logan River above the USGS gaging station. Hence, in order to gain a good record of approximate natural flow conditions, the canal

diversion data are added to the USGS stream gage data to generate a combined Logan River flow value. It is this combined Logan River data which is used as an indicator of the general water supply in the Lower Division.

### **Streamflow Distribution**

The administration of the distribution of the waters of the Bear River between the three Compact states and the various subdivisions of the river, as defined by the Compact (the river crosses state lines five times), is defined by the original Compact. When the flow of the river in the Upper and Central Divisions decreases to certain levels, the Engineer-Manager is to declare a "water emergency" and supervise the allocation of water between the sections within the divisions of the river as directed by the Compact.

The Compact provides that in the Upper Division, which comprises all of the Basin from its headwaters down to and including Pixley Dam, there shall be two sections administered in Wyoming and two sections administered in Utah. The Compact provides that when the total natural flow diversion 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 the sections as follows:

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

The Amended Compact further provides in Article IV.A.1.e. that:

*If for any reason the aggregate of all diversions in a river section of the Upper Division does not equal the allocation of water thereto, the unused portion of such allocation shall be available for use in the other river sections in the Upper Division in the following order: (1) In the other river section of the same State in which the unused allocation occurs; and (2) in the river sections of the other State. No permanent right of use shall be established by the distribution of water pursuant to this paragraph e.*

The Compact defines the Central Division as comprising that part of the Basin from Pixley Dam down to and including Stewart Dam (the point of diversion to Bear Lake). It includes one section in Wyoming and one in Idaho.

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

Interim procedures for the Lower Division Water Delivery were adopted several years ago. No formal requests for the declaration of a water emergency in the Lower Division were received by the Commission in this biennial period.



## **Stream Gaging Program**

The Commission has concluded a record of the streamflows in the Bear River drainage is most important as this record is needed: 1) for the measurement and subsequent distribution of waters during the irrigation season in compliance with the Compact; 2) to verify the compliance of diversions with the Compact; 3) for the review of the Compact, as is required from time to time; and 4) for the three states to plan for water resource use and development. As an indication of the Commission's commitment to the stream-gaging program, the Commission allocated in the biennium approximately 50 percent of its budget to the stream-gaging program. PacifiCorp, the individual states, and water user organizations maintain additional records of streamflows and canal diversions. A composite of all of the records is needed to accurately reflect the waters available for use in the Bear River drainage.

All of the stream gages supported by the Commission are operated and maintained by the U.S. Geological Survey (USGS). The USGS is well recognized as a leader in stream-gaging technologies, and their records are used as a standard for planning, water distribution and legal purposes. The cooperative agreement between the Bear River Commission and the USGS provides that both contribute to the funding of the program. The adequacy of the stream-gaging program is constantly reviewed by the Commission's TAC, by Commission members and by the USGS.

Lists of the individual gages supported during the biennium and the records of key gages during the biennium are made a part of this report, and respective detail is provided in the 2007 and 2008 chapters of this report. The locations of the gages that were in operation during the biennial period are shown on Figure O.5.

## **BIENNIUM STATE ADMINISTRATION**

Article XI of the Amended Compact provides that applications for appropriation or change in water use within each state shall be in accordance with individual state law, except no such application shall be approved if the effect will deprive water users within another state or increase the depletion beyond that which is provided for under the Compact. This article further requires that state officials report, in a format and at intervals established by the Commission, the status of their respective allocations and uses. The Commission has determined the best format for reporting such change in uses is the Biennial Report. Details of state water-related activities are shown in the respective years' write-ups.

## **WATER QUALITY EFFORTS**

For the first time in the Commission biennial reports, the Commission chose to report on water quality efforts in the Fourteenth Biennial Review. The history of the Commission's efforts to become involved in water quality issues was reported in that earlier biennial report. The reader is encouraged to refer to that report if more historic information is desired.

The Commission has no responsibility to administer water quality standards. This is an area of specific state and federal laws administered by the state agencies with jurisdiction concerning water quality and the federal Environmental Protection Agency (EPA). However, the Bear River Commission is the only entity recognized by the three states and the federal government that has responsibility throughout the entire river system without regard to state lines. The Commission has been encouraged by stakeholders to become involved in a coordinating way. Responding, the Commission created a Water Quality Committee.

At the urging of the Committee, the Commission applied for and obtained from EPA a significant Targeted Watershed Grant. During this biennial period, much was accomplished with respect to the tasks outlined in the grant by the Committee and Utah State University, as a contractor to the Commission.

With the Commission's Engineer-Manager providing staff support, the Committee met four times during this biennial period. A working group created by the Committee and called the Steering Committee met many times during this reporting period. The Chairman of the Committee reports the activities of the Committee to the Commission at each Commission meeting. The Committee established a three-state water quality monitoring network where personnel and resources are shared to measure water quality in the river at several locations without regard to state lines. These monitoring sites are located at stream gaging sites supported financially by the Commission.

Because water quality administration is an important part of water resource administration, the Commission felt it is important that it briefly include in each biennial report some of these water quality activities. Water quality and water quantity issues sometimes cannot be separated. However, because the Commission has no administrative role in the water quality area, the Commission chooses to report this activity in this overview chapter of the biennial report and not in the individual year chapters.

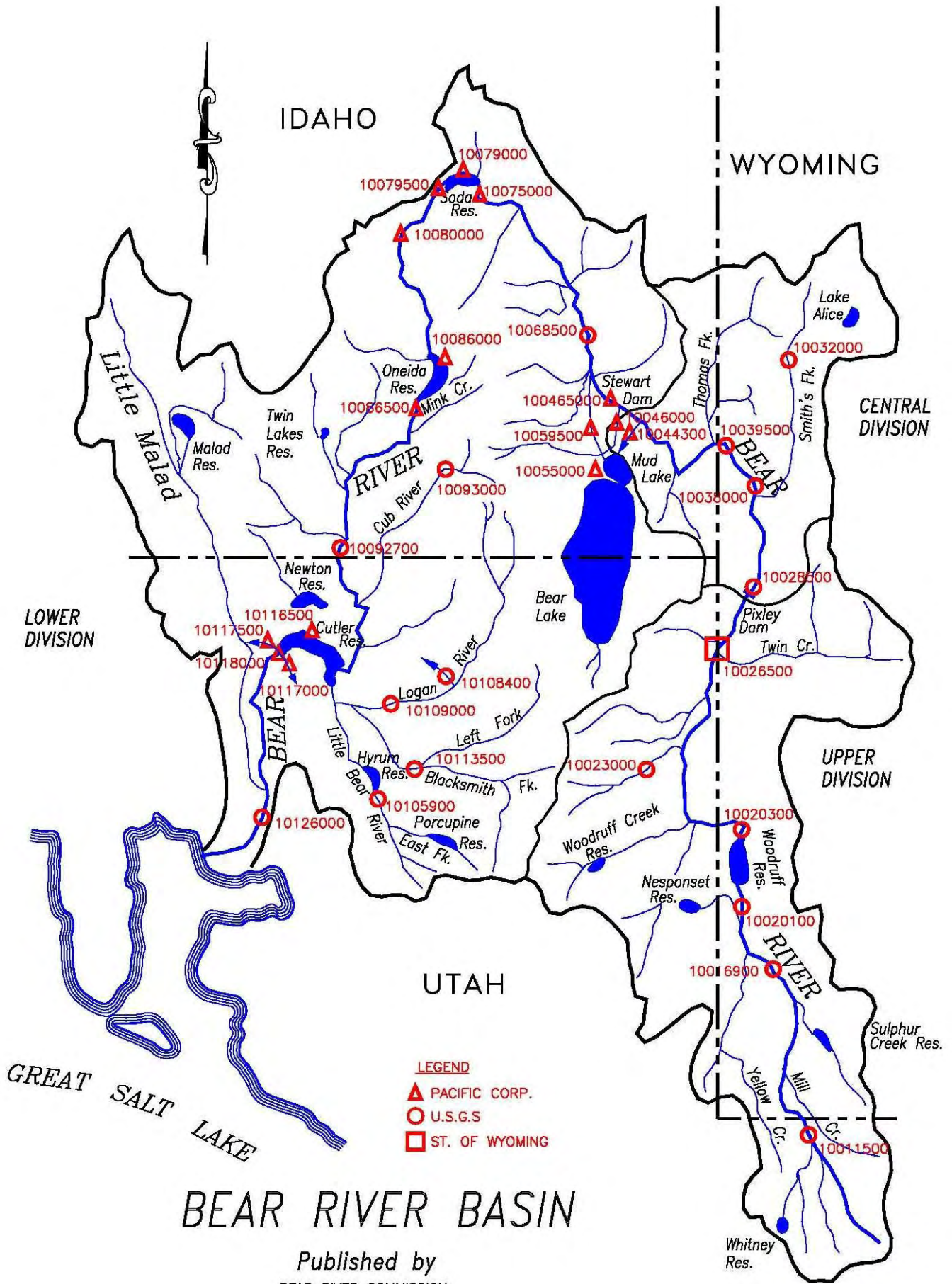


Figure O.5



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**2007 WATER SUPPLY AND DISTRIBUTION REPORT**



# 2007 Water Supply and Distribution Report

## OVERVIEW

The 2007 water year reversed the trend of the prior two years with only about 50 percent water supply in all divisions during the irrigation season. Streamflow was significantly below normal during most all of the irrigation season which led to distribution under the Compact in the Upper and Central Divisions. No calls for a water emergency were received in the Lower Division. The 2007 year ended with less water in storage than was in storage at the beginning of the year.

## WATER SUPPLY

Three stream gages, one in each division of the river, have been used by the Commission as indicator gages of the relative supply available for each of the divisions of the river (see Stream Gaging Program section in the Overview chapter). The Utah-Wyoming State Line and Smith's Fork gages measure a major portion of the streamflow in the Upper and Central Divisions, respectively. The Logan River is a major tributary to the Bear River in Cache Valley, which is in the Lower Division. Specific discharges, as measured by the USGS for the three gages during 2007, compared with the long-term averages, are summarized in Figure 2007.1 and are graphically illustrated in Figures 2007.2 through 2007.4 on the subsequent pages.

Figure 2007.1 illustrates a summary of the volumetric discharge for each of these gages for the water year. As the water supply available during the irrigation season is most critical for filling the natural flow rights, the discharge as measured at these gages during the irrigation season is also illustrated in Figure 2007.1.

Figures 2007.2 through 2007.4 show hydrographs for each of these three gaging stations. On each hydrograph, the mean daily flow during the irrigation season is plotted against the average of the mean daily flows for the period 1943 through 2007. The area between the 2007 hydrographs and the mean hydrographs represents the difference in volume of water discharged during 2007 versus the long-term average. This volumetric difference is illustrated by the bar charts shown on each of the figures.

As can be seen in Figure 2007.1, the annual discharge for the Upper Division (Utah-Wyoming State Line gage) was 76 percent of the long-term average, and streamflow on Smith's Fork and the Logan River were 60 and 75 percent, respectively. More important to the natural flow diversions than the streamflow during the water year is the streamflow during the irrigation season of May through September. During this period, the water

## 2007 Water Supply Summary by Division

### 2007 WATER YEAR

(Discharge in Acre-feet)

GAGE	AVERAGE (1943-07)	2007	PERCENT
Upper Division (UT-WY State Line)	138,600	104,800	76%
Central Division (Smith's Fork)	137,000	82,580	60%
Lower Division (Logan River)	182,500	136,100	75%

### 2007 IRRIGATION SEASON

#### MAY - SEPTEMBER

(Discharge in Acre-feet)

GAGE	AVERAGE (1943-07)	2007	PERCENT
Upper Division (UT-WY State Line)	114,400	72,000	63%
Central Division (Smith's Fork)	102,000	49,000	48%
Lower Division (Logan River)	122,000	68,700	56%

**Figure 2007.1**

supply was approximately 63 percent (Upper Division), 48 percent (Central Division), and 56 percent (Lower Division). These numbers lead one to quickly conclude that snowfall and rain were not distributed across the watershed in the normal proportions. The indicator gages tell us that the water supply for the 2007 irrigation season May through September was much below normal, with the Upper and Lower Division just over 50 percent of normal and the Central Division just under 50 percent of normal during the irrigation season.

A closer look at the three hydrographs (Figures 2007.2, 2007.3 and 2007.4) is also insightful when one is trying to understand the natural water supply in the spring and summer of 2007. The Upper Division gage (Figure 2007.2) indicates runoff peaked earlier than normal in mid-May for a short period at a rate slightly higher than the average peak flow for the Upper Division, but decreased rapidly through the end of May and leveled off beginning in July to a streamflow of just over half the average streamflow for the remaining irrigation season. The Central Division gage (Figure 2007.3) indicates runoff peaked briefly in mid-May at just over half the mean annual peak runoff and declined to approximately half of the normal streamflow through the irrigation season. The Lower Division gage (Figure 2007.4) indicates streamflow during the irrigation season was very similar to that in the Central Division, with flows peaking in mid-May for a short period at 50-60 percent of mean annual peak runoff and remaining well below normal through the irrigation season.



# 2007 - Upper Division Water Supply

## Flow at Utah-Wyoming State Line Gage

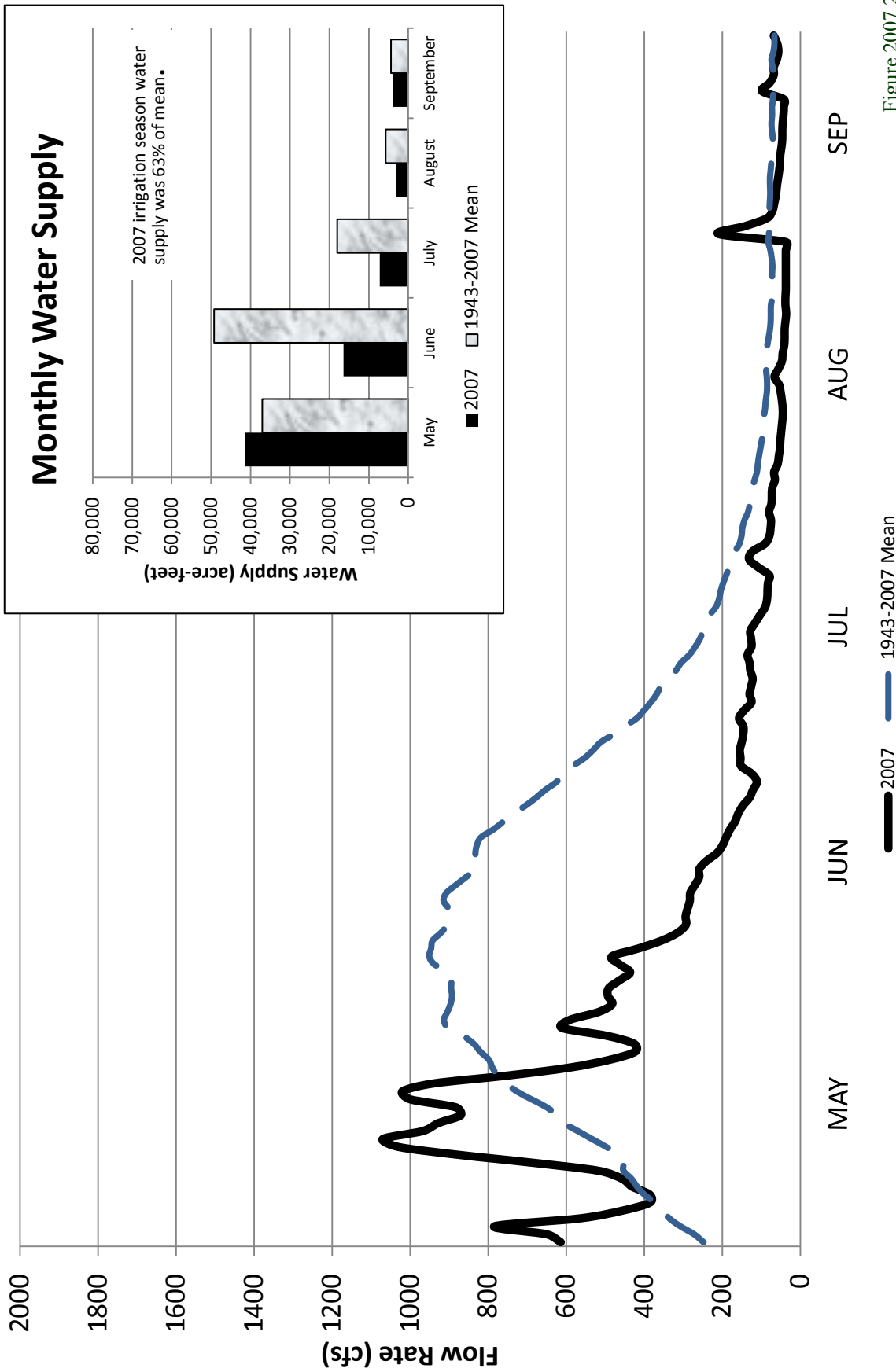


Figure 2007.2

# 2007 - Central Division Water Supply

Flow at Smiths Fork near Border, Wyoming Gage

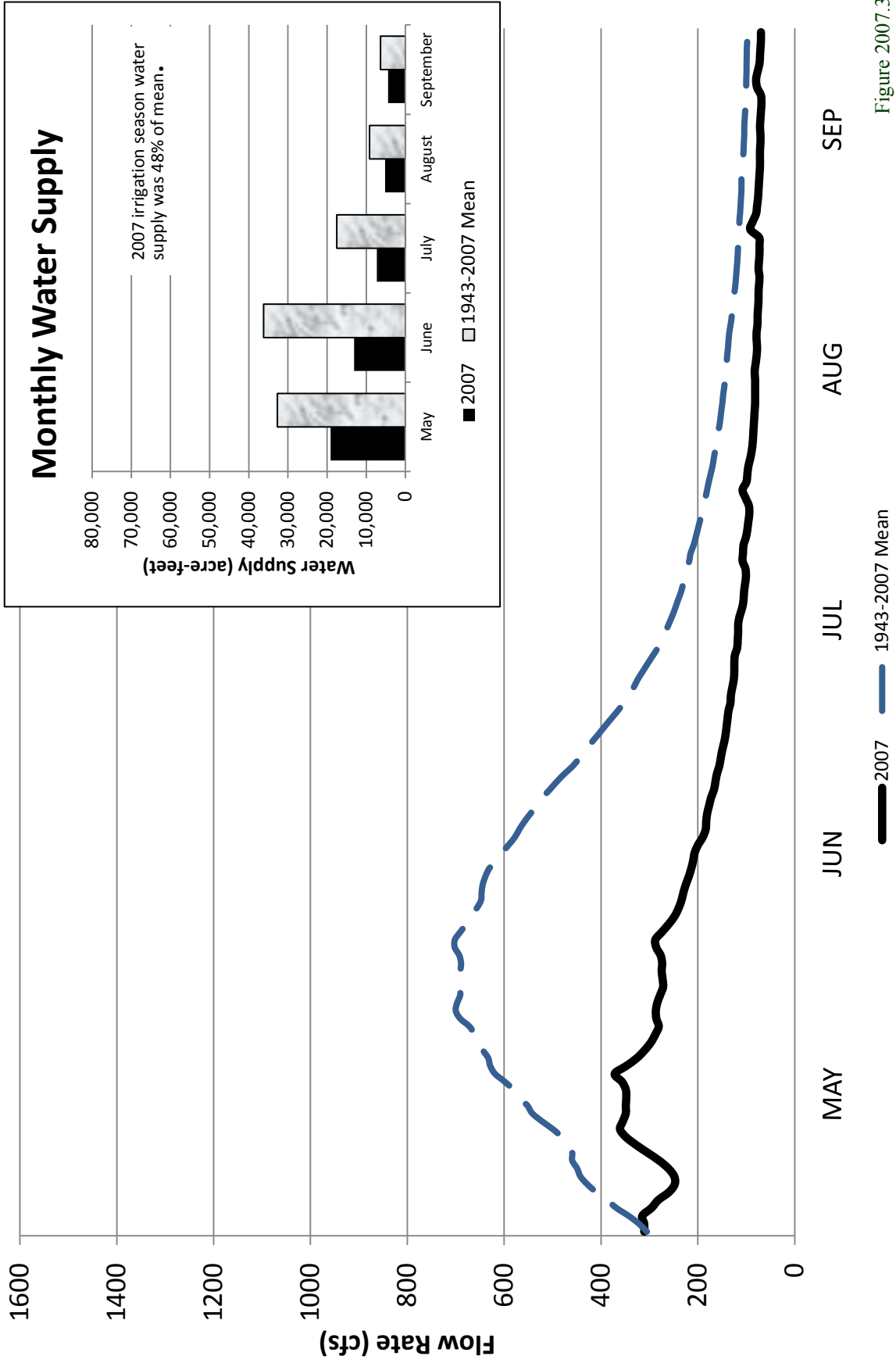


Figure 2007.3

# 2007 - Lower Division Water Supply

## Flow at Logan River Combined Gage

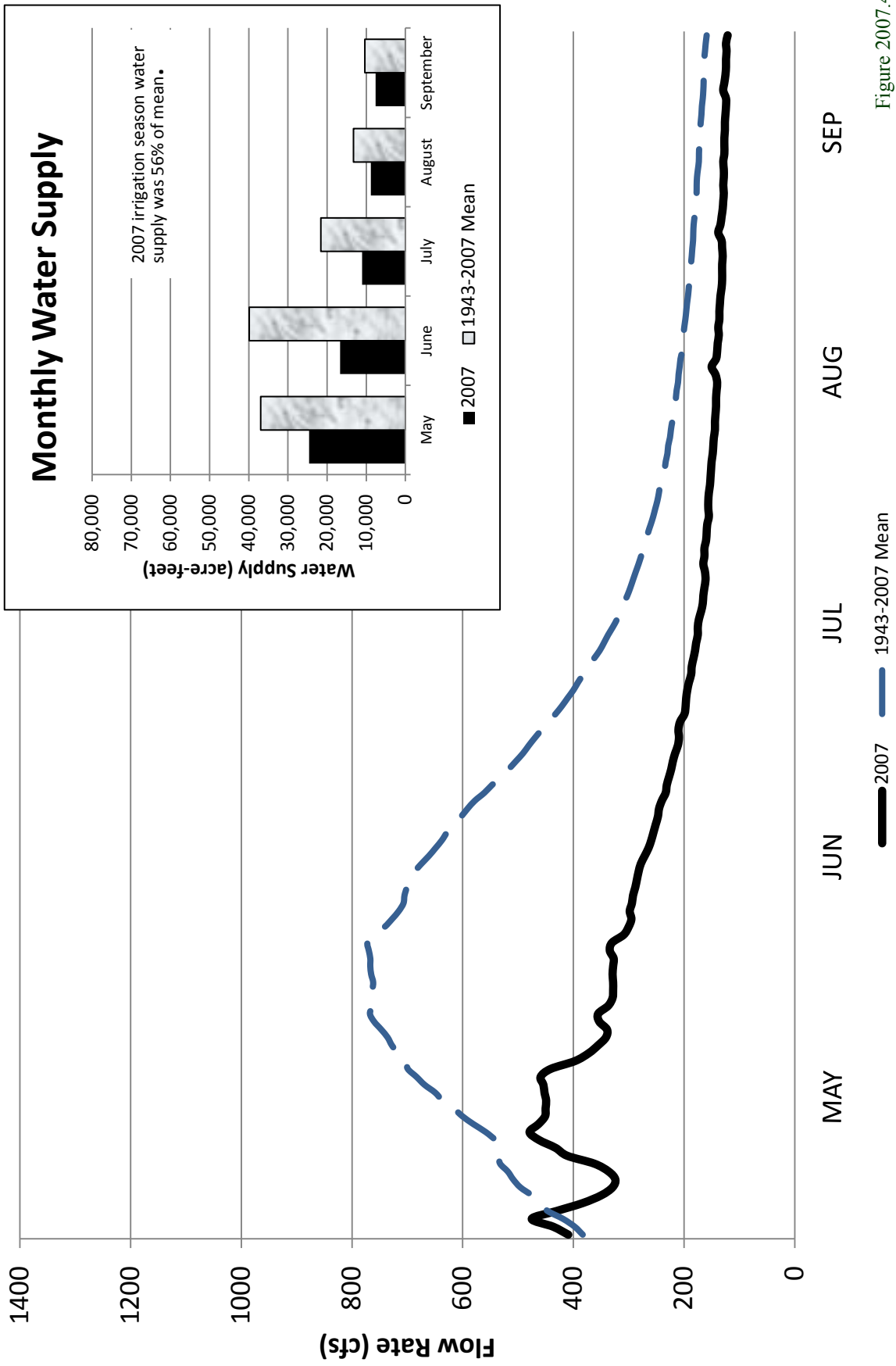


Figure 2007.4

## STORAGE

Storage supplies along the Bear River have a notable impact on the water resources available for irrigation each year. Because the prior water year was a decent water year, storage in the 2007 water year started with more carryover storage than had been the case in the preceding recent years. Woodruff Narrows Reservoir is the largest reservoir in the Upper Division. However, Whitney, Sulphur Creek, and Woodruff Creek Reservoirs also provide for notable amounts of winter storage.

Paragraph B of Article VI of the Amended Compact, which allows for additional storage rights above Stewart Dam, also has a provision which restricts storage to occur if the water surface elevation at Bear Lake is below an elevation of 5911.0 (UP&L Datum). About half of the storage which is assigned to Woodruff Narrows Reservoir, from both the States of Utah and Wyoming, fall under this provision of the Amended Compact. Bear Lake was below this storage restriction elevation at the start of the storage season, thus, this provision of the Compact was activated. However, with fairly large carryover amounts and the transfer of unbuilt original Compact storage allocations, Woodruff Narrows, Sulphur Creek and Whitney Reservoirs were all able to fill. Additionally, midway through the storage season, Bear Lake levels rose above 5911. Figure 2007.5 shows the filling of Woodruff Narrows. With the very dry year, Woodruff Narrows was heavily drafted and ended the year with a carryover of 22,600 acre-feet.

Prior to 1997, a gage was maintained, with Commission funding, by the USGS on Woodruff Narrows Reservoir. The gage included a recorder which allowed for preservation of daily values. Since this time, periodic measurements have been kept by the Woodruff Narrows Reservoir Company in coordination with the Wyoming State Engineer's Office. Figure 2007.5 shows the maximum and minimum contents for the Woodruff Narrows Reservoir since its enlargement in 1980. Values for 2007 are based on observations made by the Woodruff Narrows Reservoir Company.

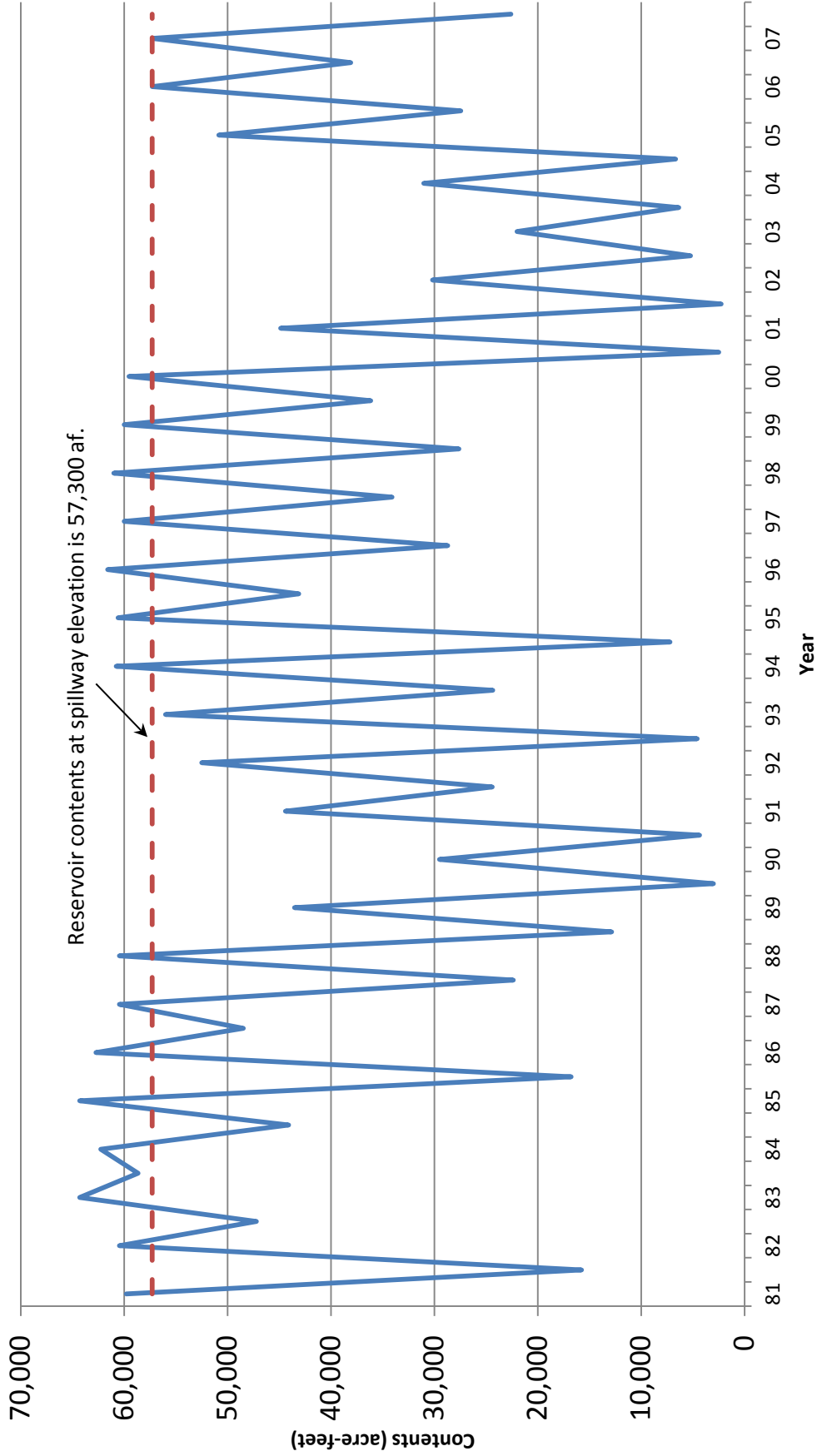
The spillway crest of Woodruff Narrows Dam is at an elevation of 6454.5 feet; contents of 57,300 acre-feet. Hence, contents above this amount represent uncontrolled storage as this storage is only temporary and cannot be controlled by the reservoir company. Generally, during spill periods, the reservoir company is often releasing significant flows through its outlet works as well. Hence, though the total contents are uncontrolled, the proportion of water discharging from the reservoir through the outlet works versus over the spillway is somewhat under the control of the reservoir company. Both discharge to the Bear River below the dam but above the stream gage and it makes no difference to the total discharge into the Bear River.

There is no significant storage in the Central Division.

The largest and most significant storage reservoir in the Lower Division, and in the entire watershed, is Bear Lake, which is at the very top of the Lower Division. Bear Lake is operated as a storage reservoir by PacifiCorp. The Compact regulates various aspects of how PacifiCorp can manage the storage of water within Bear Lake. Figure 2007.6 summarizes the 2007 Bear Lake hydrologic information and significant operational events.

# Woodruff Narrows Reservoir

## Annual Maximum and Minimum Contents



Note: Through the 1996 water year a gage with a recorder was maintained by the USGS on Woodruff Narrows Reservoir. Since this time, values are based on spot observations and estimates by the Woodruff Narrows Reservoir Company and the Wyoming State Engineer's Office. Contents above 57,300 af represent uncontrolled storage.

Figure 2007.5

**Summary of Significant  
2007 Bear Lake  
Hydrologic Information and Operational Events**

<u>Date</u>	<u>Hydrologic Information/Event</u>	<u>Contents (% of Full) Discharge (% of Normal)</u>
10-01-06	Bear Lake Beginning Elevation — 5910.00	492,320 af (35%)
10-12-06	Bear Lake Low Elevation <sup>1</sup> — 5909.97	490,395 af (35%)
	Rainbow Inlet Canal Discharge	134,049 af (51%)
	Bear River Discharge Below Stewart Dam	4,447 af
	Bear Lake Net Runoff (Computed Total Inflow less Lake Evaporation)	79,800 af (24%)
05-18-07	Bear Lake High Elevation — 5912.58	659,854 af (46%)
	Outlet Canal Releases: 5/12-9/24 (136 days)	214,462 af (72%)
07-03-07	Outlet Canal Maximum Releases – 1,440 cfs	
	Bear Lake Storage Release <sup>2</sup>	193,998 af
09-30-07	Bear Lake Ending Elevation — 5907.85	355,724 af (25%)

<sup>1</sup> Low contents prior to start of storage.

<sup>2</sup> Credited release from Bear Lake, subtracting Rainbow inflow and the decreed adjustment for the natural yield of Bear Lake and Mud Lake area.

**Figure 2007.6**

Figure 2007.6 provides much information as to the water stored in Bear Lake in 2007. Some of this information will be discussed in the “Lower Division” section of this report. It is important to note from Figure 2007.6 that the lake ended the 2007 water year with 10 percent less storage than at the beginning of the year. It can be noted that nearly 200,000 acre-feet was released to downstream irrigators and that the lake level only briefly went above the Compact storage restriction level of 5911 feet and ended the season more than three feet below this amount.

Figure 2007.7 is a graph which shows the annual maximum and minimum elevations of Bear Lake since 1915. With a beginning elevation well below the operating target, Bear Lake was operated in storage mode during the entire storage period. Figure 2007.8 is an area plot showing the daily contents in Bear Lake over the past ten years. This hydrograph and Figure 2007.7 show the initial low Bear Lake water levels in the mid-1990's, followed by rapid lake level gains in the late 1990's and then significant drops during the first four years of this century.

The important increase in storage in 2005 and 2006 is well illustrated in Figure 2007.8. Because of these improved water years, adherence to not only the letter, but the spirit of the Settlement Agreement and wise water management, the carryover storage at the beginning of 2007 was greater than it has been since 2002. However, the very dry water year in 2007 led to a significant draft on Bear Lake. Bear Lake has such a large storage capacity compared to average annual use that it greatly buffers the potential shortages in the Lower Division over a period of below-normal years, but for the same reason, recovery from a depleted reservoir can be slow.

# BEAR LAKE ELEVATION

Annual Maximum & Minimum Elevations

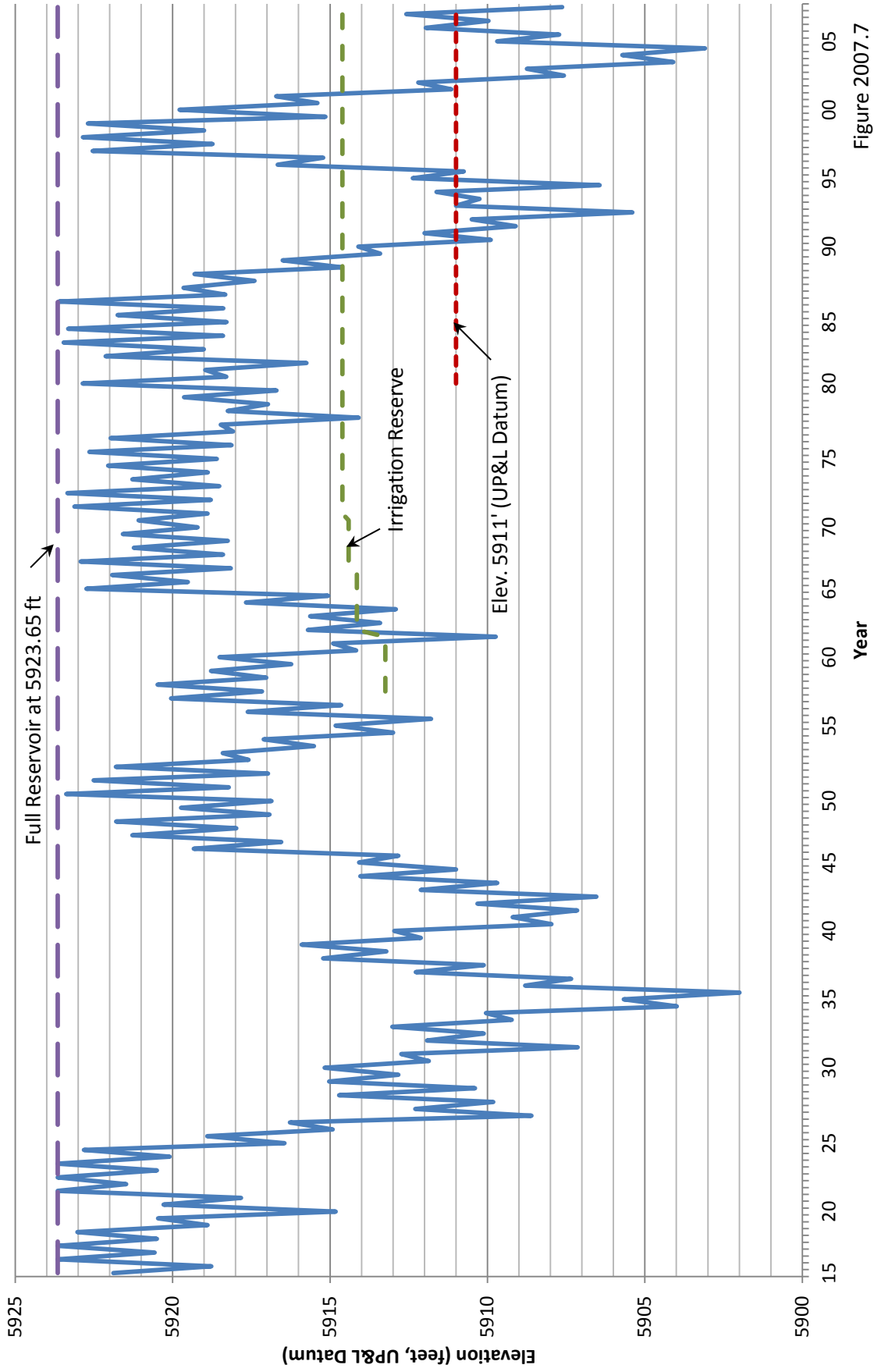
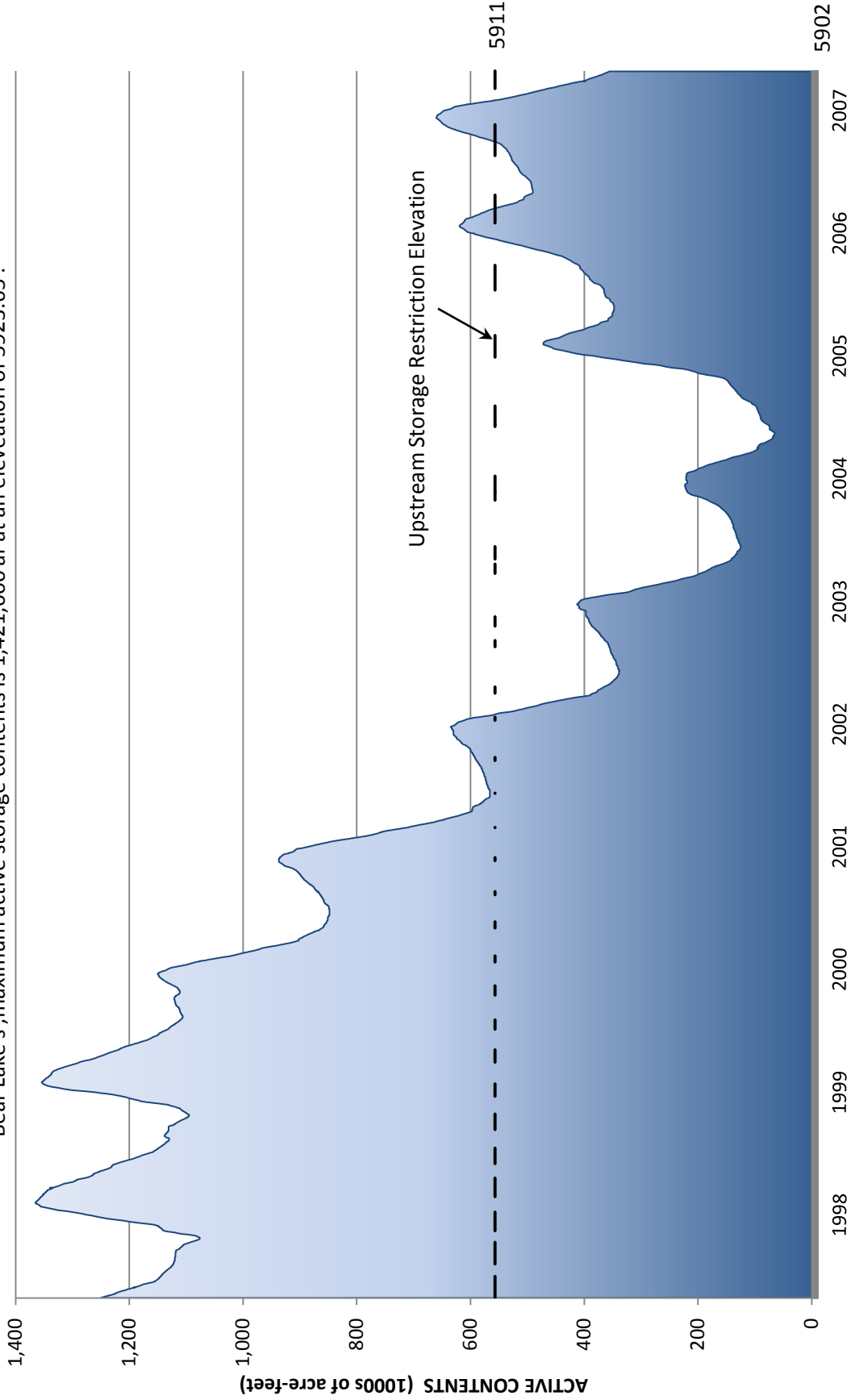


Figure 2007.7

# BEAR LAKE CONTENTS

## Water Years 1998 - 2007

Bear Lake's ,maximum active storage contents is 1,421,000 at an elevation of 5923.65' .



(year indicator centered on April 1)

Figure 2007.8



## STREAMFLOW DISTRIBUTION

### General

The water administration in 2007 in the three divisions remained similar to prior years. Rock Holbrook became Idaho's Watermaster in the Central and Lower Divisions. There were no other changes to the River Commissioners/Watermasters in each of the sections from the previous year. Jack A. Barnett continued to serve as Engineer-Manager of the Bear River Commission. Each River Commissioner/Watermaster works under the direction of the respective State Engineers' offices, but coordinates with the Commission's Engineer-Manager with regard to total diversions in each of the various sections as defined by the Compact.

During the 2007 irrigation season, the following River Commissioners/Watermasters measured water in their sections of the river:

<u>DIVISION</u>	<u>SECTION</u>	<u>RIVER COMMISSIONER/ WATERMASTER</u>
<u>Upper:</u>	Upper Utah	Don Shoemaker
	Upper Wyoming	Don Shoemaker
	Lower Utah	Ron Hoffman
	Lower Wyoming	Kevin Payne
<u>Central:</u>	Wyoming	Kevin Payne
	Idaho	Rock Holbrook
<u>Lower:</u>	Idaho	Rock Holbrook
	Utah	Jim Watterson

Water supply forecast information early in 2007 showed probability of a dry year. This turned out to be the case. The 2007 water year was dramatically below normal and only a limited supply of water was available in all divisions.

### Upper Division

The Upper Division divertible flow, as defined by the Compact, consists of a summation of the diversions of all of the canals in the four sections, plus waters bypassing Pixley Dam, less that portion of water diverted by the canals which is attributable to storage releases from Whitney, Sulphur Creek and Woodruff Narrows Reservoirs. The Compact provides that when the total divertible flow is less than 1250 cfs, a water emergency exists. In recent years, as the irrigation season begins, the divertible flow, as defined by the Compact, has been less than 1250 cfs. However, in 2007 by mid-May, when there began to be a demand for water, the divertible flow went above the 1250 cfs water emergency threshold and, as can be seen, remained there until early June. The magenta dashed lines on Figures 2007.9 and 2007.10 show the Wyoming and Utah allocations for the Upper

Wyoming Section and the Lower Utah Section at times when the divertible flow was less than 1250 cfs. Once the total divertible flow dropped below 1250 cfs in early June, the flows in the Upper Wyoming Section were such that the river was almost self regulating and so the users requested that the Engineer-Manager coordinate information between Watermasters/River Commissioners with more of an unofficial regulation which worked well during the remainder of the irrigation season.

During years when a water emergency has been declared, the regulation of the river is based on the weekly diversions as called in by the respective River Commissioners. At the end of each year, these River Commissioners submit to their respective State Engineers a complete written report of water deliveries. It is this information which is presented in the graphs and tables on the following pages and not the weekly totals called in during times of regulation. The weekly call-in totals, which are received during the irrigation season, differ slightly from the year-end data because of timing of call-ins and call-outs, shifts on canal ratings and other factors.

Figure 2007.11 (pages 07-15 through 07-19) represents a compilation of each of the canal diversions during 2007 in the Upper Division, based on year-end River Commissioners'/Watermasters' reports. The data are displayed with one month's data per page. Totals of the canal diversions for each of the sections are shown below each section. These totals show all water delivered to each canal and, therefore, include storage water. The summary boxes at the bottom of each page show divertible flow and allocations for each section of the Upper Division. It is important to note that the divertible flow, as defined by the Compact, consists of only natural flow diversions. The values for the individual canals represent total diversions, which include both natural flow and storage water. Therefore, storage uses out of Whitney, Sulphur Creek, and Woodruff Narrows Reservoirs have been subtracted from the total diversion amounts for the respective sections so that the totals tabulated in the box at the bottom of each page represent divertible flow as defined by the Compact. A positive number indicates the reservoir was releasing the shown value. A negative value shown for Woodruff Narrows storage indicates the reservoir was storing the indicated value. A negative value shown for storage in Woodruff Narrows Reservoir represents the amount of water which needs to be added into the total divertible flow for any given day, as this is water which would otherwise be available for diversion in the Lower Utah and Lower Wyoming Sections.

The flow at the Pixley gage is reported in Figure 2007.17 (page 07-38). Water users above the Pixley Dam, which are users in the Upper Division, are entitled to divert all of the flow of the river above Pixley Dam. When flows of significant magnitude pass Pixley, it is most often because there is more natural flow in the Upper Division than is needed. As can be seen from Figure 2007.17, there were not significant flows past the Pixley gage during the irrigation season of 2007.

## 2007 - UPPER DIVISION Upper Wyoming Section Diversion vs Allocation

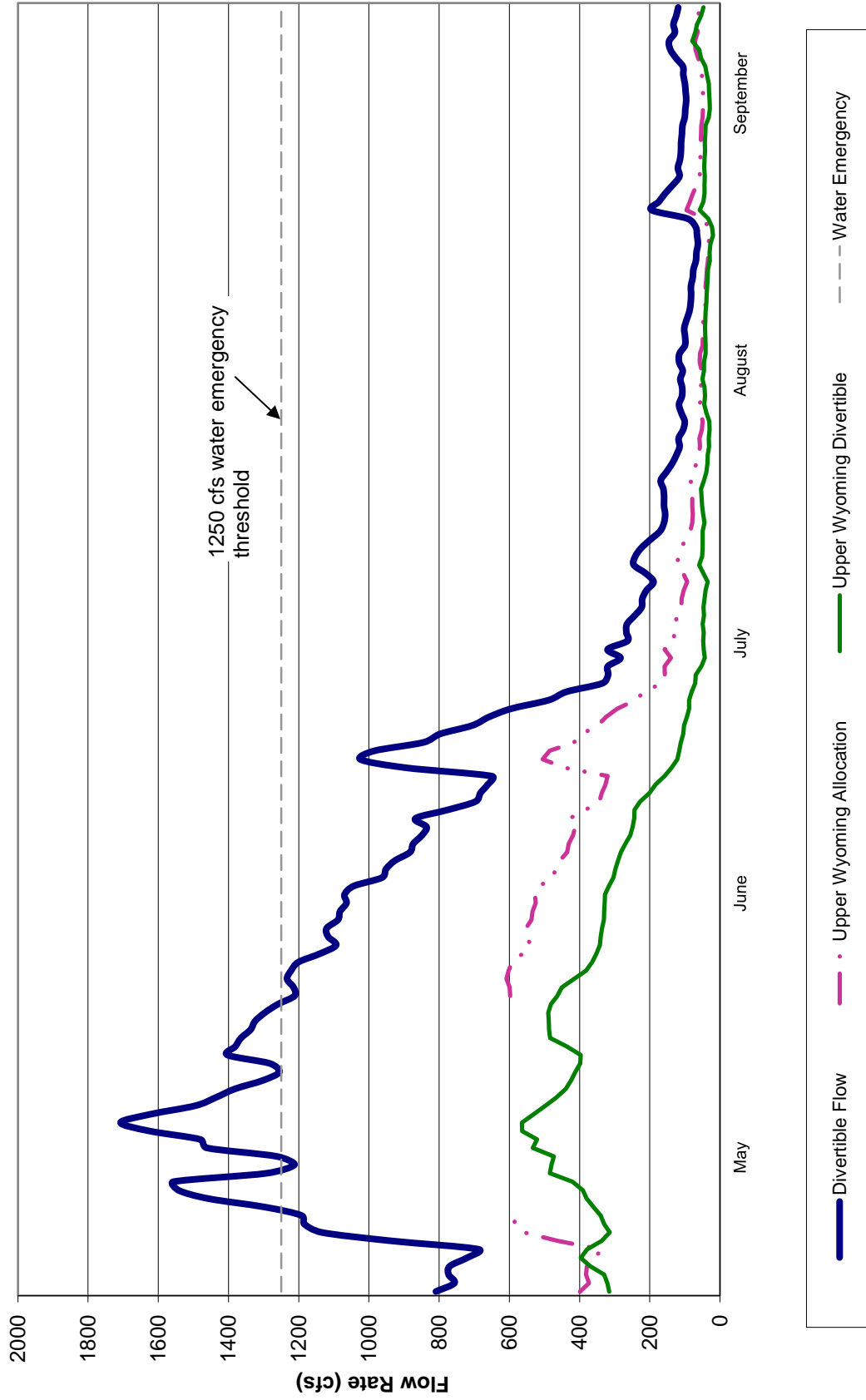


Figure 2007.9

**2007 - UPPER DIVISION  
Lower Utah Section Diversion vs Allocation**

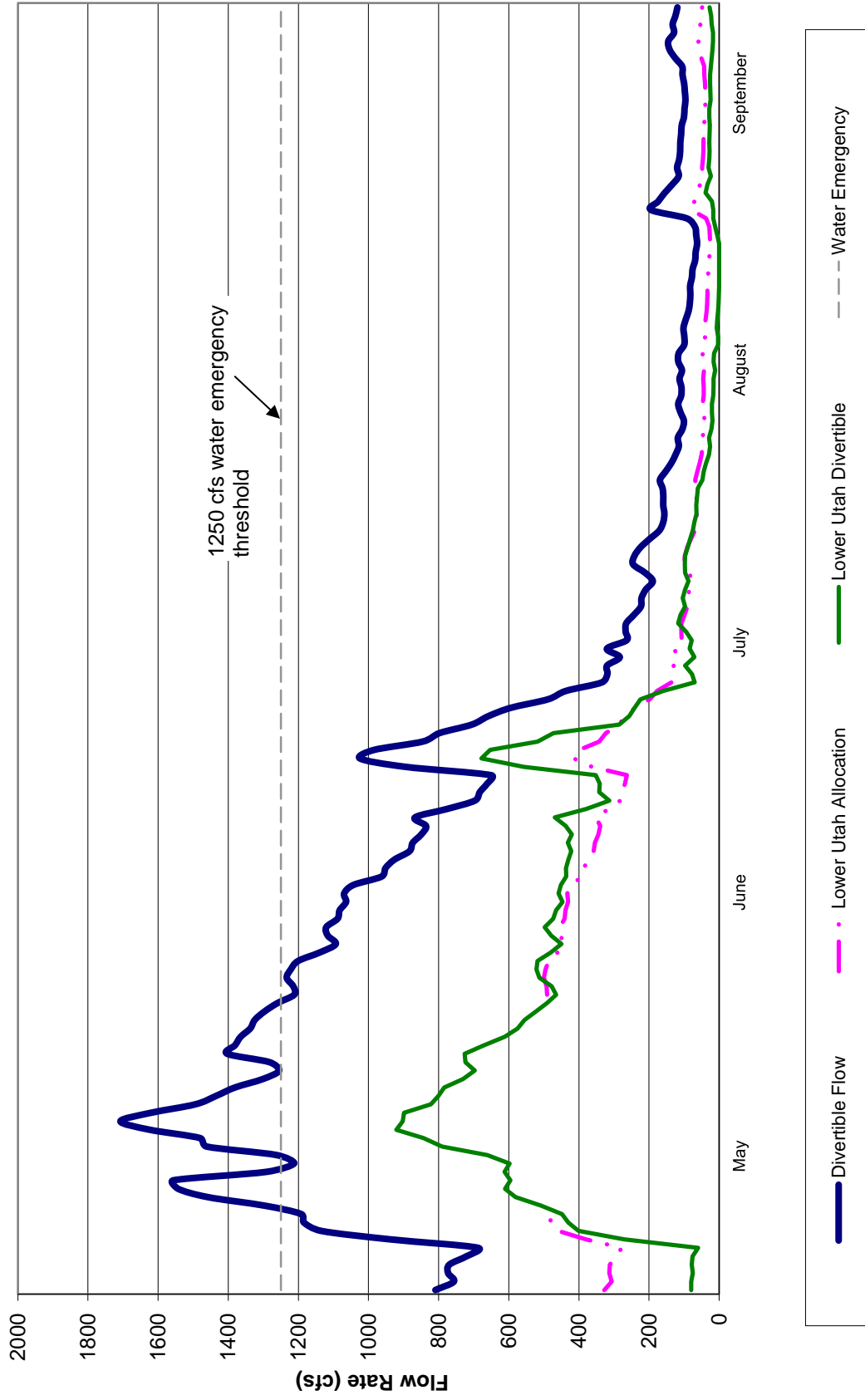


Figure 2007.10













## Central Division

The Compact provides that a water emergency may be declared when the divertible flow in the Central Division drops below 870 cfs. A water emergency may also be declared in the Central Division if the flow rate at the Border Gage drops below 350 cfs. The Compact provides that once a water emergency is deemed to exist, the State of Wyoming is to be restricted to 43 percent of the total divertible flow. The remaining 57 percent is available for use within Idaho.

Figures 2007.12 and 2007.13 graphically illustrate the Central Division's divertible flow and the respective allocations and diversions by the Wyoming and Idaho Sections under a water emergency. The flow past the Border Gage is not illustrated on these figures, as it never impacted river regulation this year. It is important to note that on Figure 2007.13, the line labeled as "Available to Idaho" represents the summation of diversions within the State of Idaho, as well as flow passing Stewart Dam and diversion to the Rainbow Inlet Canal. As the Compact provides that 57 percent of the Central Division's divertible flow shall be available for use within Idaho, this line is used to show whether such provision of the Compact was met. However, the Compact also provides that if Idaho elects to not divert into its canals its full entitlement, a portion of its allocation can pass into the Lower Division via the Rainbow Inlet Canal or Stewart Dam. Data for this hydrograph are based on the River Commissioners'/Watermasters' annual reports to their respective state water agencies.

Figure 2007.14 (pages 07-23 through 07-27) shows a compilation of daily canal diversions as provided by the respective River Commissioners/Watermasters. The Wyoming and Idaho Sections' diversions and allocations are tabulated and summarized at the bottom of each page. The pages are divided such that there is one month's data per page. As the flow of the Bear River at the Border Gage could also be critical to the declaration of a water emergency, as defined by the Compact, this gage's data are also shown in these tables.

As can be seen on the graphs and from the data, 2007 was an extremely dry water year in the Central Division. The divertible flow never made it above the minimum water emergency trigger of 870 cfs. At the request of the water users, a water emergency was declared in early June and the river remained in regulation until the end of September. There was good cooperation from the River Commissioners/Watermasters in appropriately dividing up the limited supply.

# 2007 - CENTRAL DIVISION

Wyoming Section Diversion vs Allocation

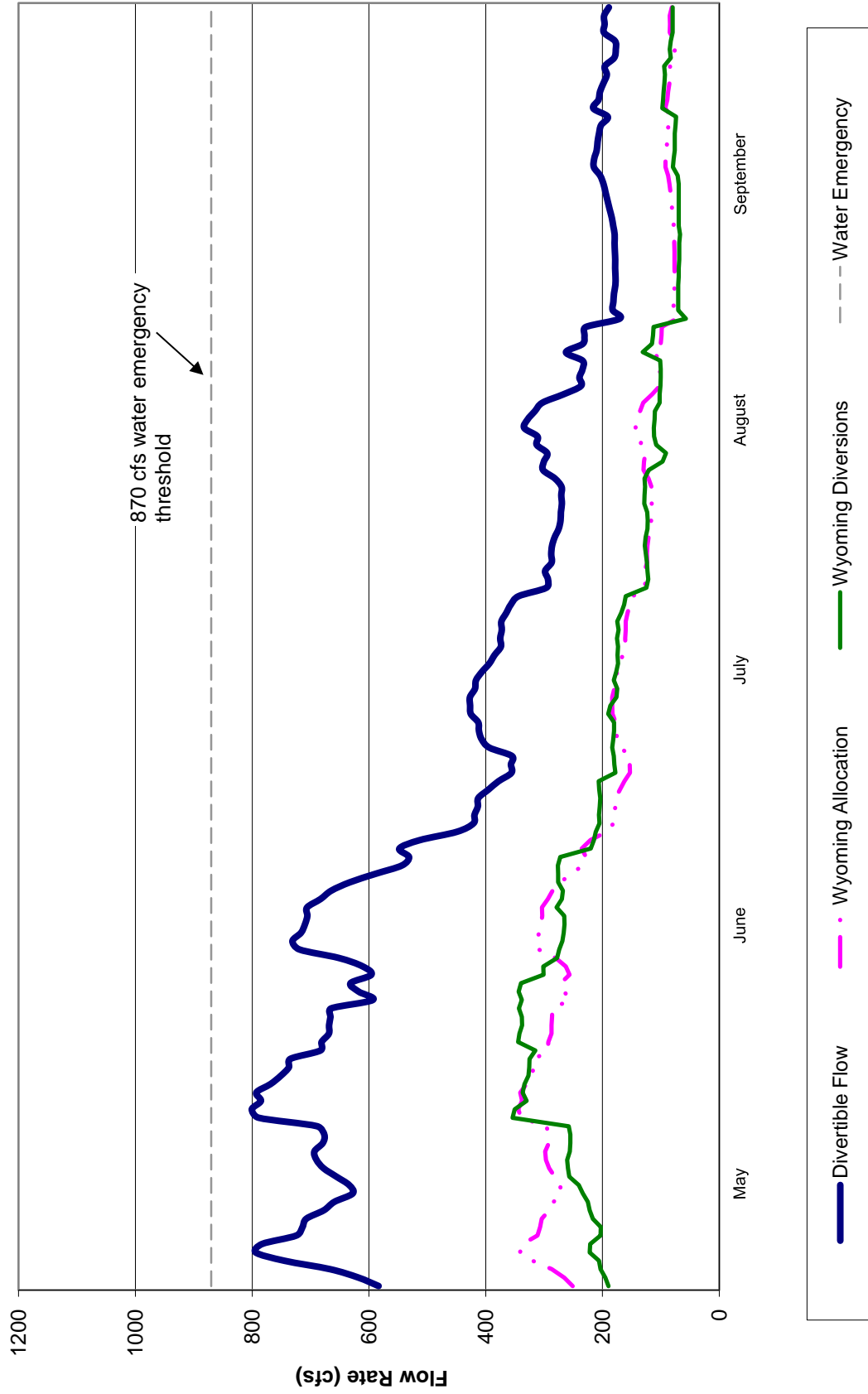
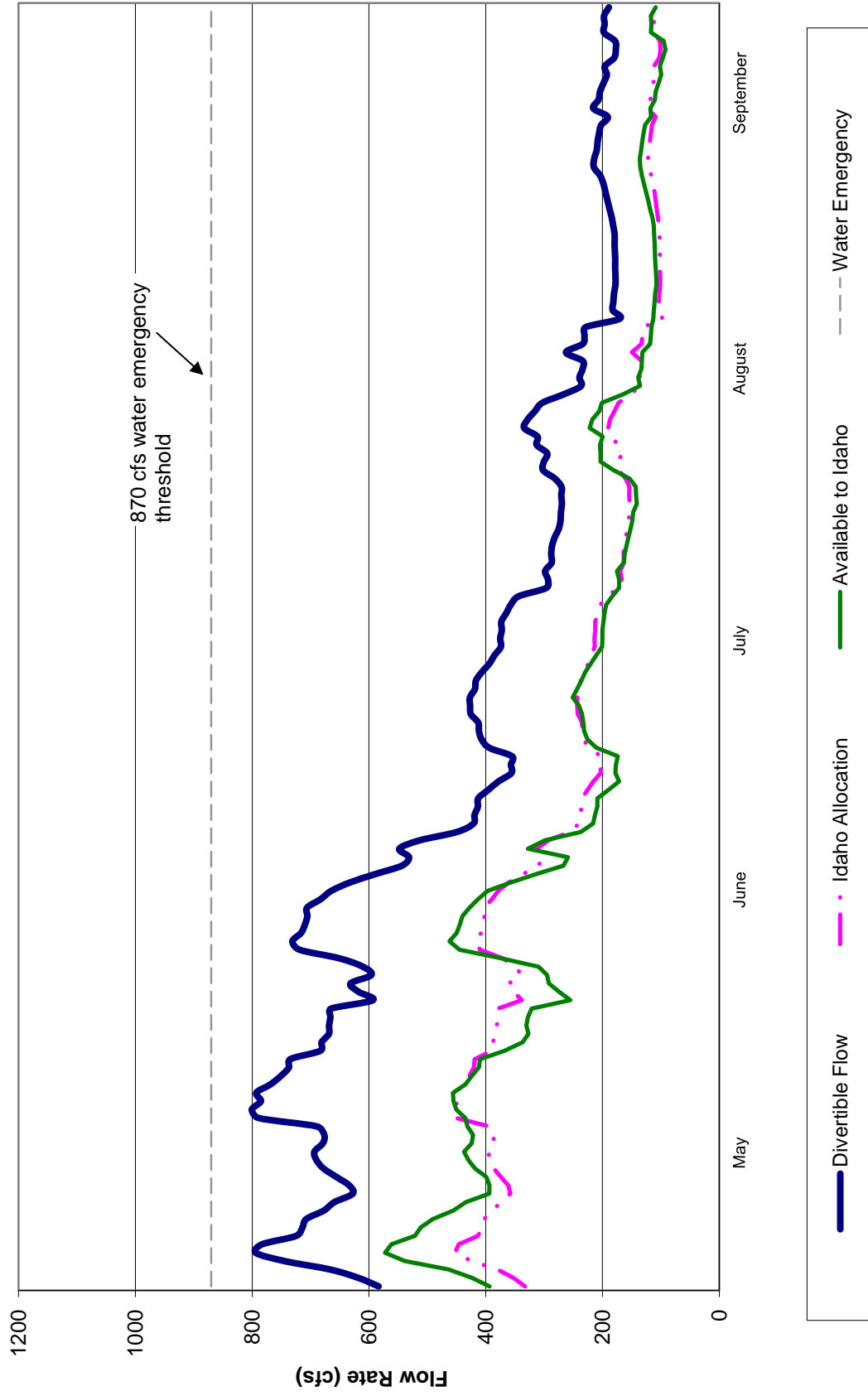


Figure 2007.12

# 2007 - CENTRAL DIVISION

## Idaho Section Diversion vs Allocation



07-22

Figure 2007.13

May 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

Table with columns for date (May 1-31) and rows for various diversion locations including Wyoming Diversions (Bear River Canals, Tributary Diversions), Idaho Diversions, and Total Wyoming Diversions. Each cell contains a numerical value representing discharge in cfs.

Table with columns for date (May 1-31) and rows for various diversion locations including Idaho Diversions, Wyoming Diversions, and Total Idaho Diversions. Each cell contains a numerical value representing discharge in cfs.

NOTE: Wyoming is limited to 45% of the total divertible flow. The remainder of the divertible flow is available for use within Idaho.

Figure 2007.14











## Lower Division

The Compact provides that a Utah Lower Division water user can petition the Commission for interstate regulation if he believes that he is being deprived of water to which he is justly entitled due to diversions in Idaho. If, upon review, the Commission finds such to be the case, then the Compact provides for the declaration of a water emergency and that it shall put into effect water delivery schedules based on priority of rights without regard to the state line. The Commission has never received such a petition. However, with growing concern for such a possibility, the Commission, over a several year period, determined how it would receive and review such a petition and implement water delivery should a water emergency be declared. At its November meeting in 1997 the Commission adopted *Interim Procedures for Lower Division Water Delivery*. Appendix B to the procedures, which was revised with the procedures in April, 2004, provides for the accounting and distribution method to be used in a water emergency.

Also appended to the procedures is *Water Delivery Schedule No. 1* which was revised by the Commission in 2006 and which includes the mainstem Lower Division water rights in both Idaho and Utah. After adoption of the water delivery schedule, both states began using this common schedule of water rights in their water right accounting programs. Hence, though not regulated by the Commission, the distribution in the Lower Division is cooperatively managed by the states of Idaho and Utah through their respective Watermasters and River Commissioners. Such distribution was facilitated in 2007 with weekly conference calls with the state agencies, large water users and PacifiCorp. Figure 2007.15 shows the delivery of water in the Lower Division as reported by the two state agencies.

### 2007 Lower Division Irrigation Water Deliveries

Canal/Group	Natural Flow (af)	Storage Use (af)	Total Diversion (af)
<b>Idaho</b>			
Gentile Valley	10,615	1,462	12,077
West Cache	21,479	25,307	46,786
Cub River Pumps	943	15,682	16,625
Last Chance and Bench B	44,242	25,968	70,210
Idaho Small Irrigators	7,865	2,304	10,169
<b>Utah</b>			
Bear River Canal Company	164,665	95,065	259,730
Utah Small Irrigators	2,246	8,100	10,346

Figure 2007.15

Allocation and deliveries of Bear Lake storage water are significant in most years to the total water diverted in the Lower Division. In 1995, PacifiCorp, the irrigators and Bear

Lake interests entered into a settlement agreement as to the allocation of storage water from Bear Lake. In 2004 the parties entered into an *Amended and Restated Bear Lake Settlement Agreement*. PacifiCorp tracks deliveries pursuant to the settlement agreement. Figure 2007.16 shows such deliveries in 2007.

**2007 Bear Lake Storage Deliveries**

Irrigation Storage Allocation	218,000 af
Bear Lake Storage Release	193,998 af
Lake Recovery Volume	24,002 af
Decreed Transit Losses	6,984 af
System Losses <sup>1</sup>	10,610 af
Delivered Bear Lake Storage	176,405 af

<sup>1</sup>Water that passes below Cutler Dam that is accounted for as storage water release.

**Figure 2007.16**

## STATE WATER ACTIVITIES

Article XI of the Amended Compact provides that applications for appropriation or change in water use within each state shall be in accordance with individual state law, except no such application shall be approved if the effect will deprive water users within another state or increase the depletion beyond that which is provided for under the Compact. This article further requires that state officials report, in a format and at intervals established by the Commission, the status of their respective allocations and uses. The Commission has determined the best format for reporting such changes in use is the Biennial Report. Figure 0.3 in the Overview section of this report provides the most recent depletion information. This portion of the Biennial Report provides a summary of major water and water right related activities in each of the states during the 2007 water year.

### **Idaho**

#### Water Activities

Rock Holbrook was elected Watermaster. Rock and IDWR staff have been working on inventorying the diversions in both the Central and Lower Divisions. The inventory will be used to determine the diversions needing improvements and what diversions to target for possible automation.

Twin Lakes Canal Company filed an application for 1,400 cfs for power and 30 cfs for irrigation on the Bear River. Twin Lake Canal Company proposes to build a dam in the Oneida Narrow reach of the Bear River. The storage water held in the reservoir will be used to generate power and will be re-diverted into a canal for irrigation.

#### Water Rights

Two water right permits were issued in Basin 13 for domestic use. One water right was issued in Basin 11 for stockwater from a spring. Fourteen groundwater permits were issued in the Malad Basin (Basin 15). The permits are for domestic, irrigation and stockwater purposes for a total of 26.29 cfs.

### **Utah**

#### Water Activities

The Division of Water Resources was in communication with the Idaho Department of Water Resources regarding storage issues on the Bear River. Utah looked for years at the Oneida site as a potential storage reservoir for Utah. Twin Lakes Canal Company brought up the issue as to whether or not Utah was interested in participating. Utah's answer was yes, but they were interested in an equal partnership that provides equity in storage and cost. Utah indicated it was not optimistic this joint venture would happen.

The Bear River Development Act, as authorized by the Utah State Legislature, directs the Division of Water Resources to pursue the development of 220,000 acre-feet on the Bear River. The Division of Water Resources is proceeding with this effort. Utah is looking at storage principally at Washakie, near the Idaho border near the Malad River, and hired a consulting engineer to do geotechnical studies to make sure this is a good reservoir site.

Woodruff Creek made application with the Board of Water Resources for funding feasibility to raise the Woodruff Creek Reservoir.

A new Procter & Gamble development manufacturing paper products will be built in Box Elder County. Procter & Gamble will employ about 1,000 people. The company is looking to find water for processing.

A cloud seeding project to increase snowpack has been ongoing since 1989 in the Lower Division in Eastern Box Elder County and Cache County. The winter storm systems in these areas are being seeded with ground-based generators using silver iodide. Bear River Water Conservancy District and Cache County cost shared approximately 63/37 with the Utah Board of Water Resources in the cloud seeding project during the 2007 water year.

At the end of the year, Bob Fotheringham, the regional engineer in Logan, retired from the Division of Water Rights to become the manager of the new water department for Cache County. He had served on the Commission's Technical Advisory Committee.

### Water Rights

There were 64 applications that were approved in Utah during 2007 for groundwater for ordinary "domestic and stock watering" purposes and associated irrigation use for 60 homes. In the Lower Division, in area 29, which is in Box Elder County below Cutler Dam, 2 applications were approved for a total of 66 acres of irrigation. There was also an application approved for Brigham City for 88 acre-feet of water to be stored during peak flows for wetland mitigation.

## **Wyoming**

### Water Activities

This is a budget year for Wyoming, and the State Engineer's Office is requesting resources to fund increasing budgets for interstate organizations, as well as an increase of about \$300,000 in Wyoming's cooperative agreement with the USGS. Wyoming has embarked on a relatively bold stream gaging automation program that was spawned, in some measure, from successes in the Bear and Wind River Basins. This is a \$1.6 million budget item between two separate budgets. The Wyoming legislative session, during budget years, begins in February. Money is also in the budget for additional groundwater monitoring.

Cost-share for expanding telemetry upstream in the Evanston area was awarded to the Wyoming State Engineer's Office from the Bureau of Reclamation. As Idaho and Pacific Power complete their planned telemetry immediately downstream, accuracy should improve in accounting for total divertible flow in the Central Division.

Water Rights

New water right permits with Compact depletions issued from Wyoming's allowances are as follows:

<u>Permit No.</u>	<u>Appropriator</u>	<u>Depletion Allocation</u>	<u>Priority Date</u>
33627	K-H Cornia Investments Limited Liability Company	1.02 acre-feet	December 22, 2000

## **STREAM GAGING**

As was indicated in the "Overview" chapter of this report under the subsection concerning the "Stream Gaging Program" (see page O-13), the Bear River Commission participates in a cooperative contract with the USGS for the maintenance of stream gages on the Bear River and significant tributaries. Also, some of the states participate with the USGS in additional Bear River gages, as does PacifiCorp, and Wyoming funds and operates one gage. The Commission believes the collection of data concerning stream flows in the Bear River system is very important and allocates about half of its annual budget in support of the cooperative stream gaging program with the U.S. Geological Survey. However, costs continue to increase and so the Commission is constantly reviewing the stream gaging program to determine if all of the stations supported are necessary for the Commission to help the Commission fulfill the responsibilities assigned to it by the Compact. There were no changes to the Commission's stream gaging program in 2007.

During 2007, a total of 32 gages were maintained on the Bear River system. Of these 32 gages, 9 were part of a cooperative effort between the Bear River Commission and the USGS and the USGS funded two gages under NSIP. PacifiCorp maintained 15 gages on the Bear River system during 2007. Five additional gages were maintained under the USGS Cooperative Program with the State of Utah (3 gages), the State of Idaho (1 gage) and Logan City (1 gage). Additionally, the State of Wyoming maintained one gage on the Bear River. Figure 2007.17 shows a tabulation of these gages and the entities which participated in the operation and funding of each gage. The approximate locations of the stream gages are shown on Figure O.5 in the Overview section of this report.

Publication of the streamflow records for 12 of the gages in this report were considered to be of significant value to the Commission and are included on pages 07-35 through 07-47.

**BEAR RIVER SYSTEM STREAM GAGING STATIONS**  
**STREAM GAGES MAINTAINED DURING THE 2007 WATER YEAR**

STATION #	STATION NAME	OPERATED BY	MEASUREMENT FUNDED BY	PUBLICATION FUNDED BY
<u>10011500</u> ▲	Bear River near UT-WY state line	USGS	Commission	Commission
10016900▲¥	Bear River at Evanston WY	USGS-WY	USGS	USGS
<u>10020100</u> ▲	Bear River above reservoir near Woodruff UT	USGS	Commission	Commission
<u>10020300</u> ▲	Bear River below reservoir near Woodruff UT	USGS	Commission	Commission
10023000▲	Big Creek near Randolph UT	USGS	State of UT	State of UT
10026500▲	Bear River near Randolph UT	WY	State of WY	not published
<u>10028500</u> *▲	Bear River below Pixley Dam near Cokeville WY	USGS	Commission	Commission
<u>10032000</u> ▲	Smiths Fork near Border WY	USGS	Commission	Commission
10038000▲¥	Bear River below Smiths Fork near Cokeville WY	USGS	USGS	USGS
<u>10039500</u> ▲¥	Bear River at Border WY	USGS	Commission <sup>1</sup>	Commission
10044300	Dingle Inlet Canal near Dingle ID	PacifiCorp	PacifiCorp	not published
<u>10046000</u>	Rainbow Inlet Canal near Dingle ID	PacifiCorp	PacifiCorp	PacifiCorp
10046500 <sup>2</sup>	Bear River below Stewart Dam near Montpelier ID	PacifiCorp	PacifiCorp	not published
<u>10055500</u>	Bear Lake at Lifton near St. Charles ID	PacifiCorp	PacifiCorp	PacifiCorp
<u>10059500</u>	Bear Lake Outlet Canal near Paris ID	PacifiCorp	PacifiCorp	PacifiCorp
10068500▲	Bear River at Pescadero ID	USGS	State of ID	State of ID
10075000	Bear River at Soda Springs ID	PacifiCorp	PacifiCorp	PacifiCorp
10079000	Soda Point Reservoir at Alexander ID	PacifiCorp	PacifiCorp	PacifiCorp
10079500	Bear River at Alexander ID	PacifiCorp	PacifiCorp	PacifiCorp
10080000	Bear River below Grace Dam near Grace ID	PacifiCorp	PacifiCorp	PacifiCorp
10086000	Oneida Narrows Reservoir at Oneida ID	PacifiCorp	PacifiCorp	PacifiCorp
10086500	Bear River below PacifiCorp Tailrace at Oneida ID	PacifiCorp	PacifiCorp	PacifiCorp
<u>10092700</u> ▲	Bear River at ID-UT state line	USGS	Commission	Commission
10105900▲	Little Bear River at Paradise UT	USGS	State of UT	State of UT
10108400	Logan, Hyde Park, Smithfield Canal near Logan UT	USGS	State of UT	State of UT
<u>10109000</u> <sup>3</sup>	Logan River above State Dam near Logan UT	USGS	Commission	Commission
10113500▲	Blacksmith Fork above Upper & Lower Dam Near Hyrum UT	USGS	Logan City	Logan City
10116500	Cutler Reservoir near Collinston UT	PacifiCorp	PacifiCorp	PacifiCorp
10117000	Hammond (east side) Canal near Collinston UT	PacifiCorp	PacifiCorp	PacifiCorp
10117500	West Side Canal near Collinston UT	PacifiCorp	PacifiCorp	PacifiCorp
10118000	Bear River near Collinston UT	PacifiCorp	PacifiCorp	PacifiCorp
<u>10126000</u> ▲	Bear River near Corinne UT	USGS	Commission	Commission

- ▲ Stations which are equipped with DCPs.
- \* Seasonal stations
- ¥ NSIP site

Note: Underlined station numbers indicate those gages for which stream flow data is published in this report.

<sup>1</sup> This gage is now maintained year-round. The Commission pays for approximately 8 months of gage maintenance and the USGS pays for the remaining 4 months

<sup>2</sup> Discharge measurements below Stewart Dam are required for interstate regulation pursuant to the Compact. However, flow is general only a few cfs. PacifiCorp maintains this gage and reports discharge to the Idaho watermaster. The data are included with the Central Division's canal diversion data herein.

<sup>3</sup> This gage represents a summation of the Logan River discharge and canal diversions upstream of the gage (see gage 10108400). Gage 10109000 is part of the cooperative program with the USGS and the BRC, while gage 10108400 is maintained under a cooperative program between the USGS and the State of Utah. Of importance to the Commission, and published herein, is the combined flow of these two gages.

**Figure 2007.17**



## 10011500 BEAR RIVER NEAR UTAH-WYOMING STATE LINE

LOCATION.--Lat 40°57'55", long 110°51'10" referenced to North American Datum of 1927, in SE ¼ NW ¼ SE ¼ sec.30, T.3 N., R.10 E., Summit County, UT, Hydrologic Unit 16010101, on left bank 400 ft downstream from West Fork and 2.8 mi upstream from Utah-Wyoming State line.  
 DRAINAGE AREA.--172 mi<sup>2</sup>.  
 PERIOD OF RECORD.--July 1942 to current year.  
 REVISED RECORDS.--WDR UT-74-1: Drainage area.  
 GAGE.--Water-stage recorder. Elevation of gage is 7,965 ft above NGVD of 1929, from river-profile map. Prior to October 1, 1986 at datum 3.0 ft lower.  
 REMARKS.--Records good except for estimated daily discharges, which are poor. Flow regulated slightly by Whitney Reservoir, total capacity, 4,700 acre-ft since 1966. Three diversions above station for irrigation of about 265 acres above and 2,600 acres below station.  
 EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,230 ft<sup>3</sup>/s, Jun 6, 1986, gage height, 4.05 ft, datum then in use; minimum, 6.8 ft<sup>3</sup>/s, Apr 12, 1984, result of upstream ice jam.  
 EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,100 ft<sup>3</sup>/s and (or) maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
May 14	0045	*1,260	*6.00

Minimum daily discharge, 23 ft<sup>3</sup>/s, on several days.

### DISCHARGE, CUBIC FEET PER SECOND WATER YEAR OCTOBER 2006 TO SEPTEMBER 2007 DAILY MEAN VALUES

[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	77	67	e40	e30	e24	e24	89	614	493	153	80	37
2	79	94	e33	e32	e23	e23	95	650	491	155	74	37
3	160	89	e28	e34	e25	e24	98	784	463	150	73	37
4	121	86	e24	e36	e27	e27	105	565	436	146	72	37
5	331	81	e23	e38	e31	e30	128	454	463	146	65	209
6	277	83	e23	e34	e34	e32	156	385	483	157	67	141
7	330	84	e28	e30	e37	e38	185	386	415	144	58	85
8	248	85	e27	e40	e40	e38	202	431	355	125	55	71
9	229	87	e29	e41	e38	e39	177	457	314	130	52	66
10	220	73	e31	e40	e37	e40	156	517	293	126	51	62
11	195	71	e33	e38	e36	e40	140	684	294	122	49	60
12	172	77	e35	e35	e33	e41	132	875	289	128	47	57
13	154	73	e38	e31	e32	e42	123	1,030	283	130	45	54
14	145	69	e41	e29	e32	e42	123	1,070	282	135	45	52
15	134	68	e43	e23	e32	e42	142	968	270	125	47	51
16	141	91	e44	e24	e35	e42	150	928	259	126	50	48
17	136	86	e41	e24	e33	e42	156	870	259	128	54	46
18	125	81	e37	e24	e31	e43	183	883	241	116	66	46
19	118	76	e33	e24	e30	e46	153	1,000	214	103	56	45
20	123	78	e29	e23	e30	e46	140	1,020	199	90	47	43
21	118	78	e30	e23	e35	e48	130	940	190	85	45	42
22	102	76	e31	e24	e39	e53	127	749	180	84	41	43
23	108	71	e31	e25	e36	e60	124	591	167	83	40	98
24	111	56	e32	e25	e35	102	122	487	159	79	40	79
25	113	71	e32	e25	e32	113	141	423	147	107	38	68
26	105	85	e33	e25	e31	121	178	426	130	131	36	68
27	100	67	e34	e24	e28	124	198	496	121	123	38	60
28	103	61	e33	e23	e26	107	268	611	111	90	38	56
29	102	e56	e31	e24	---	95	396	591	124	79	37	59
30	95	e50	e30	e24	---	88	551	517	152	76	37	68
31	84	---	e29	e25	---	88	---	482	---	75	37	---
<b>Total</b>	4,656	2,270	1,006	897	902	1,740	5,068	20,884	8,277	3,647	1,580	1,925
<b>Mean</b>	150	75.7	32.5	28.9	32.2	56.1	169	674	276	118	51.0	64.2
<b>Max</b>	331	94	44	41	40	124	551	1,070	493	157	80	209
<b>Min</b>	77	50	23	23	23	23	89	385	111	75	36	37
<b>Ac-ft</b>	9,240	4,500	2,000	1,780	1,790	3,450	10,050	41,420	16,420	7,230	3,130	3,820

### STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1943 - 2007, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
<b>Mean</b>	64.0	54.5	46.1	41.7	39.6	43.9	113	602	827	293	93.1	73.5
<b>Max</b>	208	106	94.9	72.4	64.3	69.0	316	1,044	1,990	1,105	244	229
<b>(WY)</b>	(1983)	(1984)	(1984)	(1984)	(1984)	(1986)	(1946)	(1984)	(1986)	(1995)	(1965)	(1983)
<b>Min</b>	30.8	32.5	27.7	28.9	21.1	26.0	37.2	162	204	67.4	31.0	23.9
<b>(WY)</b>	(1959)	(1955)	(1960)	(2007)	(2003)	(1964)	(1944)	(1977)	(1992)	(1961)	(2002)	(1956)

## 10020100 BEAR RIVER ABOVE RESERVOIR, NEAR WOODRUFF, UT

LOCATION.--Lat 41°26'04", long 111°01'01" referenced to North American Datum of 1927, in NE ¼ NW ¼ NW ¼ sec.29, T.17 N., R.120 W., Uinta County, WY, Hydrologic Unit 16010101, on right bank 9.3 mi upstream from Woodruff Narrows Dam and 10 mi southeast of Woodruff.

DRAINAGE AREA.--755 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1961 to current year.

REVISED RECORDS.--WDR UT-74-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 6,455 ft above NGVD of 1929, from river-profile map.

REMARKS.--Records good except for estimated daily discharges, which are fair. Diversion for irrigation of about 43,500 acres above station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,150 ft<sup>3</sup>/s, Jun 2, 1983, gage height, 6.17 ft; minimum, no flow several days during Aug, Sep 1988, and Sep 2002.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,240 ft<sup>3</sup>/s, May 14, gage height 4.30 ft; minimum daily discharge, 11 ft<sup>3</sup>/s, Aug 17,18, Sep 2-4.

### DISCHARGE, CUBIC FEET PER SECOND WATER YEAR OCTOBER 2006 TO SEPTEMBER 2007 DAILY MEAN VALUES

[e, estimated; &, affected value]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	32	79	e65	e54	e40	e40	191	458	201	25	23	12
2	29	73	e62	e56	e40	e39	191	490	206	37	23	11
3	29	81	e60	e59	e38	e38	179	574	211	41	23	11
4	66	91	e53	e62	e38	e42	170	657	189	44	25	11
5	66	90	e49	e66	e43	e47	180	560	175	41	24	22
6	199	83	e49	e68	e46	e50	205	496	188	43	23	99
7	202	88	e49	e64	e50	e52	241	518	230	45	21	86
8	216	84	e54	e57	e53	e54	279	619	245	46	20	51
9	156	94	e51	e63	e52	e56	304	657	229	50	19	36
10	145	111	e54	e69	e50	e58	276	661	179	48	19	30
11	139	95	e55	e65	e48	e60	231	702	145	41	17	28
12	107	89	e58	e63	e47	e60	220	828	145	40	17	26
13	93	93	e61	e57	e47	e65	199	958	135	40	16	25
14	79	102	e64	e53	e45	e70	181	1,060	118	39	15	25
15	73	96	e67	e48	e45	e80	176	993	111	33	13	24
16	71	73	e69	e41	e44	e100	195	900	111	32	12	23
17	81	116	e71	e38	e43	e120	199	780	114	31	11	22
18	87	120	e67	e39	e41	e170	198	e750	112	37	11	21
19	77	108	e64	e39	e40	e280	235	e800	105	33	23	20
20	75	93	e60	e39	e40	e390	215	e990	96	28	26	19
21	79	106	e56	e38	e40	e450	198	e1,000	83	24	22	19
22	70	111	e57	e39	e45	e520	184	838	70	33	20	18
23	56	112	e57	e40	e49	e460	175	639	71	32	19	17
24	55	101	e60	e40	e47	361	165	457	64	29	18	27
25	61	69	e60	e40	e46	324	150	348	63	37	17	47
26	69	73	e61	e40	e45	301	149	267	59	62	16	30
27	62	95	e62	e40	e45	272	161	242	54	70	15	19
28	55	93	e63	e39	e42	276	135	294	48	65	15	25
29	63	&79	e61	e37	---	244	182	319	35	46	14	25
30	62	e72	e58	e40	---	196	324	267	24	32	13	25
31	95	---	e54	e40	---	172	---	218	---	26	12	---
<b>Total</b>	2,749	2,770	1,831	1,533	1,249	5,447	6,088	19,340	3,816	1,230	562	854
<b>Mean</b>	88.7	92.3	59.1	49.5	44.6	176	203	624	127	39.7	18.1	28.5
<b>Max</b>	216	120	71	69	53	520	324	1,060	245	70	26	99
<b>Min</b>	29	69	49	37	38	38	135	218	24	24	11	11
<b>Ac-ft</b>	5,450	5,490	3,630	3,040	2,480	10,800	12,080	38,360	7,570	2,440	1,110	1,690

### STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1962 - 2007, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
<b>Mean</b>	68.7	69.8	68.0	64.8	78.7	160	318	783	794	182	48.1	46.5
<b>Max</b>	437	198	181	147	312	627	671	1,957	2,564	1,191	340	288
<b>(WY)</b>	(1983)	(1974)	(1984)	(1984)	(1986)	(1986)	(1969)	(1984)	(1986)	(1995)	(1983)	(1983)
<b>Min</b>	3.03	6.06	7.21	6.76	10.4	26.8	77.7	104	54.6	4.41	0.68	0.49
<b>(WY)</b>	(1965)	(1989)	(1989)	(1989)	(2003)	(1977)	(1977)	(1977)	(1992)	(2000)	(2000)	(1988)

## 10020300 BEAR RIVER BELOW RESERVOIR, NEAR WOODRUFF, UT

LOCATION.--Lat 41°30'20", long 111°00'50" referenced to North American Datum of 1927, in NE ¼ NE ¼ NW ¼ sec.32, T.18 N., R.120 W., Uinta County, WY, Hydrologic Unit 16010101, on right bank 1,100 ft downstream from Woodruff Narrows Dam, 1.6 mi upstream from Salt Creek, 5.4 mi upstream from Wyoming-Utah State line, and 7.7 mi east of Woodruff.

DRAINAGE AREA.--784 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1961 to current year.

REVISED RECORDS.--WDR UT-74-1: Drainage area.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 6,398.96 ft above NGVD of 1929. Prior to September 26, 1962, at site 175 ft upstream at same datum.

REMARKS.--Records good. Flow regulated by Woodruff Narrows Reservoir (station 10020200) beginning January 1962.

Diversions for irrigation of about 43,500 acres above station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,820 ft<sup>3</sup>/s, Jun 2, 1983, gage height, 8.26 ft; no flow Jul 4, 5, 1962, Aug 30, 31, Sep 1, 2, 6, 7, 1979, Oct 30, 1980.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,190 ft<sup>3</sup>/s, May 19, gage height, 5.94 ft; minimum daily discharge, 8.1 ft<sup>3</sup>/s, Sep 23.

### DISCHARGE, CUBIC FEET PER SECOND WATER YEAR OCTOBER 2006 TO SEPTEMBER 2007 DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	27	26	62	62	62	13	212	302	636	468	36	25
2	27	26	62	62	62	13	206	389	633	198	36	25
3	26	26	62	62	62	13	198	447	627	45	30	22
4	27	26	62	61	62	13	189	552	610	44	25	19
5	27	26	62	61	62	13	184	587	607	44	25	20
6	27	26	62	61	63	13	189	560	606	44	24	19
7	26	26	62	61	51	13	201	526	601	44	25	19
8	27	26	63	61	32	13	231	531	596	43	25	19
9	27	26	63	61	18	13	258	568	592	43	25	19
10	27	26	63	62	17	13	272	596	589	43	25	19
11	27	26	63	61	17	13	257	605	586	39	25	19
12	27	26	63	61	17	13	233	658	577	36	25	19
13	26	26	62	61	17	13	221	739	560	36	25	19
14	26	26	62	61	17	13	206	839	555	35	25	19
15	26	26	63	61	17	14	193	935	552	35	25	19
16	26	26	63	61	17	14	189	924	548	35	25	18
17	26	26	63	60	17	14	193	854	544	36	25	15
18	26	27	63	60	17	52	196	755	553	36	25	12
19	26	27	62	60	17	312	206	936	558	35	25	11
20	26	35	62	60	17	532	206	987	553	35	25	10
21	26	57	63	61	17	601	210	963	548	36	25	9.2
22	26	61	63	60	17	596	208	921	544	35	24	8.6
23	26	61	63	60	17	510	210	841	544	36	24	8.1
24	26	61	63	60	15	432	201	742	541	36	24	10
25	26	61	63	60	13	380	191	674	527	36	24	16
26	26	61	63	60	13	340	182	657	502	36	24	15
27	26	60	62	60	13	319	180	654	495	36	24	15
28	27	61	61	61	13	313	176	649	488	36	24	15
29	26	61	61	61	---	298	178	647	483	36	24	15
30	26	62	62	61	---	263	213	644	476	36	24	15
31	26	---	62	62	---	229	---	640	---	36	25	---
<b>Total</b>	817	1,137	1,935	1,886	779	5,401	6,189	21,322	16,831	1,769	792	493.9
<b>Mean</b>	26.4	37.9	62.4	60.8	27.8	174	206	688	561	57.1	25.5	16.5
<b>Max</b>	27	62	63	62	63	601	272	987	636	468	36	25
<b>Min</b>	26	26	61	60	13	13	176	302	476	35	24	8.1
<b>Ac-ft</b>	1,620	2,260	3,840	3,740	1,550	10,710	12,280	42,290	33,380	3,510	1,570	980

### STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1962 - 2007, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
<b>Mean</b>	54.0	50.3	44.6	42.5	44.4	91.5	258	752	946	268	74.0	56.8
<b>Max</b>	425	421	184	153	171	473	891	1,828	2,437	913	331	278
<b>(WY)</b>	(1983)	(1983)	(1983)	(1985)	(1971)	(1972)	(1985)	(1984)	(1983)	(1975)	(1983)	(1983)
<b>Min</b>	3.89	0.12	4.28	4.37	4.71	4.70	0.34	27.8	356	10.5	3.91	3.65
<b>(WY)</b>	(1990)	(1981)	(1978)	(1978)	(1978)	(1978)	(1977)	(1977)	(2002)	(2002)	(1979)	(1979)

## 10028500 BEAR RIVER BELOW PIXLEY DAM, NEAR COKEVILLE, WY

LOCATION.--Lat 41°56'20", long 110°59'05" referenced to North American Datum of 1927, in SW ¼ SE ¼ SE ¼ sec.25, T.23 N., R.120 W., Lincoln County, WY, Hydrologic Unit 16010102, 800 ft downstream from Pixley Dam, 11 mi south of Cokeville, and 17.5 mi downstream from Twin Creek.

DRAINAGE AREA.--2,032 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1941 to November 1943 (published as Bear River near Cokeville), October 1952 to September 1956, May 1958 to current year (seasonal only). Monthly discharge only for some periods, published in WSP 1314.

REVISED RECORDS.--WDR UT-74-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 6,185 ft above NGVD of 1929, from river-profile map. October 31, 1941 to November 30, 1943, at site 200 ft downstream at different datum. September 24, 1952 to August 31, 1994 at site 50 ft downstream at same datum.

REMARKS.--Records fair. Natural flow of stream affected by diversions for irrigation, return flow from irrigated areas, and regulation by upstream reservoirs.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 2,300 ft<sup>3</sup>/s, Mar 25, 1956; minimum daily discharge, 0.09 ft<sup>3</sup>/s, Sep 8, 2002.

### DISCHARGE, CUBIC FEET PER SECOND WATER YEAR OCTOBER 2006 TO SEPTEMBER 2007 DAILY MEAN VALUES

[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	53	81	---	---	---	---	387	88	69	26	35	33
2	55	82	---	---	---	---	383	85	74	25	35	31
3	53	86	---	---	---	---	368	65	75	24	34	30
4	53	88	---	---	---	---	348	36	78	24	36	29
5	54	86	---	---	---	---	318	47	70	24	65	33
6	56	84	---	---	---	---	304	55	71	29	59	33
7	59	83	---	---	---	---	294	57	81	126	54	33
8	61	82	---	---	---	---	291	58	92	114	51	34
9	61	106	---	---	---	---	271	58	93	108	49	33
10	59	106	---	---	---	---	267	58	90	111	48	33
11	81	95	---	---	---	---	279	51	89	136	45	32
12	82	92	---	---	---	---	254	46	84	131	43	32
13	72	94	---	---	---	---	263	42	77	108	43	33
14	71	99	---	---	---	---	260	39	77	105	44	32
15	70	99	---	---	---	---	249	37	81	110	41	31
16	71	97	---	---	---	---	233	34	81	131	40	30
17	70	102	---	---	---	---	213	32	75	120	40	29
18	70	104	---	---	---	---	157	31	71	106	42	29
19	71	102	---	---	---	---	152	31	66	81	46	28
20	72	e100	---	---	---	---	153	31	61	70	43	28
21	74	---	---	---	---	---	138	32	51	62	40	28
22	74	---	---	---	---	---	118	35	26	56	39	28
23	74	---	---	---	---	---	112	39	20	52	38	28
24	75	---	---	---	---	---	104	45	22	48	33	29
25	75	---	---	---	---	---	104	42	23	46	32	29
26	78	---	---	---	---	---	107	43	24	43	33	29
27	77	---	---	---	---	---	103	45	24	40	33	30
28	79	---	---	---	---	---	99	53	25	37	35	30
29	81	---	---	---	---	407	95	56	27	36	33	31
30	81	---	---	---	---	402	91	58	26	36	33	28
31	80	---	---	---	---	394	---	61	---	35	33	---
<b>Total</b>	2,142	---	---	---	---	---	6,515	1,490	1,823	2,200	1,275	916
<b>Mean</b>	69.1	---	---	---	---	---	217	48.1	60.8	71.0	41.1	30.5
<b>Max</b>	82	---	---	---	---	---	387	88	93	136	65	34
<b>Min</b>	53	---	---	---	---	---	91	31	20	24	32	28
<b>Ac-ft</b>	4,250	---	---	---	---	---	12,920	2,960	3,620	4,360	2,530	1,820

Figure 2007.17 (cont.)

## 10032000 SMITHS FORK NEAR BORDER, WY

LOCATION.--Lat 42°17'36", long 110°52'18" referenced to North American Datum of 1927, in NE ¼ SW ¼ SW ¼ sec.28, T.27 N., R.118 W., Lincoln County, WY, Hydrologic Unit 16010102, on left bank 4.9 mi upstream from Howland Creek, 5.6 mi downstream from Hobble Creek, and 12.4 mi northeast of Border.

DRAINAGE AREA.--165 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1942 to current year.

REVISED RECORDS.--WSP 1734: 1952(M).

GAGE.--Water-stage recorder. Elevation of gage is 6,720 ft above NGVD of 1929, from topographic map. Prior to October 16, 1945, at site 1.2 mi downstream at different datum. October 16, 1945 to November 1986 at site 0.4 mi downstream at different datum.

REMARKS.--Records good except for estimated daily discharges, which are poor. One diversion for irrigation of about 200 acres above station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,100 ft<sup>3</sup>/s, Jun 4, 1986, gage height, 5.66 ft; minimum, 19 ft<sup>3</sup>/s, Feb.28, 2007

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 392 ft<sup>3</sup>/s, May 21, gage height, 2.29 ft; minimum daily discharge, 42 ft<sup>3</sup>/s, Mar 3, 4.

### DISCHARGE, CUBIC FEET PER SECOND WATER YEAR OCTOBER 2006 TO SEPTEMBER 2007 DAILY MEAN VALUES

[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	82	e80	e63	e73	e52	e44	91	311	272	150	95	74
2	85	e82	e65	e73	e53	e43	93	311	273	146	102	73
3	86	80	e68	e71	e53	e42	85	315	275	143	108	73
4	85	77	e65	e67	e53	e42	91	296	274	141	100	74
5	88	76	e70	e68	e56	e47	100	282	277	139	98	92
6	88	76	e72	e69	56	53	118	260	286	137	96	87
7	91	76	e72	e68	64	53	132	248	288	133	92	80
8	88	76	e73	e67	55	54	136	249	274	132	89	78
9	85	85	e74	67	55	51	135	261	260	129	87	76
10	85	79	e75	100	55	53	126	280	248	126	86	75
11	83	e76	74	65	57	50	119	304	240	125	85	74
12	82	e78	69	e63	58	52	115	328	234	125	84	73
13	81	e70	68	e60	64	55	112	349	230	124	83	72
14	81	e76	69	e47	62	60	117	361	225	119	82	72
15	80	e82	68	e47	54	56	130	355	219	118	82	72
16	83	e80	e71	e48	53	55	141	349	214	117	82	71
17	81	81	e69	e49	54	60	163	349	210	117	82	71
18	79	80	e68	e50	56	66	179	348	207	114	83	72
19	79	75	e68	e50	55	74	160	349	200	109	81	71
20	87	78	e66	e50	56	81	148	357	190	106	79	70
21	82	76	e66	e52	53	89	145	372	184	105	78	69
22	81	74	e66	e50	52	88	146	348	183	103	79	70
23	79	74	e67	e52	52	88	151	326	181	101	79	78
24	80	e71	e68	e50	52	92	161	310	177	102	77	80
25	81	e70	e69	e50	50	99	183	297	173	108	77	77
26	e80	e70	e70	e50	51	106	193	288	167	107	76	73
27	e78	e69	e71	e50	50	117	206	281	164	106	75	72
28	e77	e67	e70	e49	45	113	233	286	161	101	75	71
29	e77	e63	e72	e49	---	99	264	287	156	98	74	70
30	e77	e60	e69	e50	---	93	292	284	153	96	73	70
31	e71	---	e72	e50	---	88	---	278	---	94	75	---
<b>Total</b>	2,542	2,257	2,147	1,804	1,526	2,163	4,465	9,619	6,595	3,671	2,614	2,230
<b>Mean</b>	82.0	75.2	69.3	58.2	54.5	69.8	149	310	220	118	84.3	74.3
<b>Max</b>	91	85	75	100	64	117	292	372	288	150	108	92
<b>Min</b>	71	60	63	47	45	42	85	248	153	94	73	69
<b>Ac-ft</b>	5,040	4,480	4,260	3,580	3,030	4,290	8,860	19,080	13,080	7,280	5,180	4,420

#### STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1943 - 2007, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
<b>Mean</b>	89.8	77.7	68.8	63.4	60.6	62.5	161	532	609	285	149	107
<b>Max</b>	156	113	88.4	85.0	82.8	99.4	385	1,072	1,377	602	242	166
<b>(WY)</b>	(1987)	(1986)	(1983)	(1983)	(1984)	(1986)	(1946)	(1997)	(1986)	(1975)	(1983)	(1986)
<b>Min</b>	51.0	50.7	41.5	40.1	34.7	39.5	58.6	99.1	96.2	61.4	55.1	52.1
<b>(WY)</b>	(1978)	(1978)	(2002)	(1988)	(2003)	(1988)	(1975)	(1977)	(1977)	(1977)	(1977)	(1977)

## 10039500 BEAR RIVER AT BORDER, WY

LOCATION.--Lat 42°12'40", long 111°03'11" referenced to North American Datum of 1927, in NE ¼ NE ¼ NE ¼ sec.15, T.14 S., R.46 E., Bear Lake County, ID, Hydrologic Unit 16010102, on left bank 0.2 mi west of Wyoming-Idaho State line, 0.5 mi west of Border, and 2.1 mi upstream from Thomas Fork.

DRAINAGE AREA.--2,480 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1937 to September 1996, October 1996 to September 2000 (seasonal), October 2000 to current year.

REVISED RECORDS.--WDR UT-74-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 6,051.63 ft above NGVD of 1929, unadjusted.

REMARKS.--Records good except for estimated daily discharges, which are poor. Natural flow of stream affected by regulation of upstream reservoirs, diversions for irrigation, and return flow from irrigated areas.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,880 ft<sup>3</sup>/s, Jun 7, 1983, gage height, 9.69 ft; minimum discharge, 24 ft<sup>3</sup>/s, Apr 29, 30, 1977.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 849 ft<sup>3</sup>/s, Mar 16, ; minimum daily discharge, 79 ft<sup>3</sup>/s, Aug 24, Sep 22.

### DISCHARGE, CUBIC FEET PER SECOND WATER YEAR OCTOBER 2006 TO SEPTEMBER 2007 DAILY MEAN VALUES

[e, estimated; &, affected value]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	112	186	e160	e160	e150	e150	561	368	228	138	109	90
2	113	191	e165	e160	e160	e150	564	380	226	136	130	89
3	116	202	e170	e160	e170	e150	553	384	239	132	136	88
4	114	204	e180	e160	e180	e160	526	367	246	142	130	86
5	115	204	e180	e170	e181	e160	506	333	250	139	129	96
6	140	201	e180	e170	e171	e170	467	340	251	137	149	107
7	192	200	e190	e180	e170	e190	460	327	281	140	154	101
8	192	199	e190	e180	e182	e192	458	318	321	201	141	96
9	190	213	e190	e170	e185	e270	464	310	352	190	133	95
10	187	237	e200	e180	e191	e389	448	294	327	172	119	93
11	184	232	e214	e170	e203	e540	441	290	305	171	110	93
12	198	221	e216	e160	e208	e616	431	303	296	186	106	89
13	208	220	e217	e150	e220	e704	412	321	279	184	104	87
14	197	231	e227	e130	e240	e784	412	335	258	170	100	87
15	196	221	e237	e130	e258	e845	413	337	244	163	99	86
16	195	214	e225	e130	e235	e849	409	318	231	162	98	86
17	198	241	e215	e130	e230	e622	406	304	224	177	96	84
18	195	235	e200	e130	e220	e528	396	299	212	174	94	83
19	193	233	e190	e130	e191	e510	360	294	194	163	98	82
20	197	225	e180	e130	e210	e486	341	289	185	142	96	83
21	206	226	e180	e135	e228	e453	329	295	174	128	91	81
22	200	229	e170	e135	e211	e568	306	321	163	120	84	79
23	197	225	e170	e135	e221	e676	298	305	148	113	81	83
24	198	211	e170	e135	e255	e751	277	278	142	120	79	88
25	198	&210	e180	e135	e256	e830	272	263	142	129	90	93
26	204	e210	e183	e140	e224	e730	282	246	141	132	93	90
27	203	e200	e188	e140	e200	e680	290	241	142	127	95	88
28	202	e180	e192	e140	e170	e620	299	238	143	119	93	88
29	199	e170	e192	e140	---	598	319	235	140	113	93	90
30	200	e160	e194	e140	---	582	338	239	144	111	92	89
31	198	---	e170	e140	---	576	---	237	---	109	90	---
<b>Total</b>	5,637	6,331	5,915	4,595	5,720	15,529	12,038	9,409	6,628	4,540	3,312	2,670
<b>Mean</b>	182	211	191	148	204	501	401	304	221	146	107	89.0
<b>Max</b>	208	241	237	180	258	849	564	384	352	201	154	107
<b>Min</b>	112	160	160	130	150	150	272	235	140	109	79	79
<b>Ac-ft</b>	11,180	12,560	11,730	9,110	11,350	30,800	23,880	18,660	13,150	9,010	6,570	5,300

#### STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1938-96, 2001-2007, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
<b>Mean</b>	202	219	192	177	201	370	720	984	1,118	513	219	173
<b>Max</b>	751	693	563	381	479	1,294	1,979	3,158	3,829	1,670	752	671
<b>(WY)</b>	(1983)	(1983)	(1983)	(1985)	(1986)	(1986)	(1985)	(1952)	(1983)	(1983)	(1983)	(1983)
<b>Min</b>	43.5	74.6	97.2	77.6	75.2	105	71.2	74.4	62.2	54.2	42.3	38.5
<b>(WY)</b>	(2002)	(2002)	(2002)	(1993)	(1993)	(1988)	(1977)	(1977)	(1977)	(1977)	(1940)	(1940)

**PacifiCorp Energy**  
**Stream Discharge Records**  
**Rainbow Inlet Canal (10046000) October 2006 - September 2007**  
**Daily Discharge (CFS)**

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Day
1	112	197	217	209	188	243	697	59	11	40	35	13	1
2	112	193	248	207	192	210	672	69	11	55	30	13	2
3	113	190	263	195	189	203	667	98	11	55	30	13	3
4	116	187	255	190	192	182	657	182	11	68	30	13	4
5	114	193	246	193	192	164	632	195	11	59	40	13	5
6	115	197	251	205	198	163	603	194	12	30	45	13	6
7	140	200	256	214	203	190	569	123	12	25	45	13	7
8	192	198	258	205	200	187	537	114	20	25	50	13	8
9	192	201	260	177	190	213	519	102	75	25	55	13	9
10	193	214	258	165	176	233	515	63	104	50	55	13	10
11	194	227	260	174	162	312	511	49	100	50	82	13	11
12	190	240	258	215	169	418	489	22	90	50	82	13	12
13	191	234	249	252	181	562	477	20	85	50	75	13	13
14	191	241	234	245	186	722	460	21	80	50	75	13	14
15	194	242	236	225	194	830	443	19	78	50	40	13	15
16	195	249	251	198	197	927	435	23	75	50	25	13	16
17	195	246	281	175	230	1020	403	29	70	59	25	10	17
18	192	248	294	155	246	922	392	30	70	59	25	10	18
19	199	253	285	151	242	725	352	33	15	59	25	10	19
20	196	251	269	163	209	678	356	53	15	59	25	10	20
21	199	246	243	160	194	663	344	67	15	59	13	10	21
22	206	244	225	168	171	638	358	79	15	50	13	10	22
23	209	243	207	172	183	654	363	74	15	40	13	10	23
24	213	248	200	168	203	740	346	73	10	40	13	10	24
25	210	226	201	173	205	809	296	60	10	40	13	10	25
26	208	218	197	177	226	884	213	57	10	35	13	10	26
27	208	210	189	186	291	898	140	55	10	35	13	25	27
28	208	251	191	186	325	848	109	54	10	35	13	25	28
29	209	233	204	196		806	74	47	10	35	13	30	29
30	200	225	194	188		767	57	24	10	35	13	25	30
31	192		204	191		729		10		35	13		31

Monthly Totals													
Total	5,598	6,745	7,384	5,878	5,734	17,540	12,686	2,094	1,071	1,407	1,037	413	Yearly Totals
Daily Mean	181.00	225.00	238.00	190.00	205.00	566.00	423.00	67.60	35.70	45.40	33.50	13.80	185.00
Daily Min	112.00	187.00	189.00	151.00	162.00	163.00	57.00	10.20	10.00	25.00	13.00	10.00	10.00
Daily Max	213.00	253.00	294.00	252.00	325.00	1,020.00	697.00	195.00	104.00	68.00	82.00	30.00	1,020.00
Ins. Min	112.00	184.00	186.00	149.00	158.00	153.00	57.00	8.74	10.00	25.00	13.00	10.00	8.74
Ins. Max	302.00	317.00	308.00	262.00	470.00	1,040.00	708.00	208.00	104.00	68.00	82.00	30.00	1,043.49
Acre Ft	11,100	13,380	14,650	11,660	11,370	34,790	25,160	4,150	2,120	2,790	2,060	819	134,049

Notes: Measurements were taken at the cable way and below the Rainbow dam according to the inflows in the Rainbow Inlet canal. Gage flows are used throughout the winter Except October 1-8, which were estimated from the upstream United States Geological Survey gage near Border, WY.

**PacifiCorp Energy  
Reservoir Records  
Bear Lake at Lifton (10055500) October 2006 - September 2007  
Daily Contents (Thousands of Acre Feet)**

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Day
1	492	494	511	523	533	551	612	651	650	577	485	398	1
2	491	494	511	524	534	553	614	651	649	572	483	401	2
3	491	494	511	524	534	554	616	652	649	567	480	398	3
4	490	494	512	525	535	556	617	653	648	563	478	396	4
5	490	494	513	526	535	558	619	653	647	559	475	395	5
6	490	494	514	526	535	560	621	654	645	559	472	394	6
7	490	495	514	526	535	562	623	655	642	552	470	392	7
8	490	495	514	527	536	563	625	655	640	549	468	391	8
9	490	496	514	527	536	565	626	656	638	545	466	389	9
10	490	496	514	527	537	567	628	657	636	543	463	387	10
11	490	497	515	528	537	569	630	657	634	540	460	385	11
12	490	497	515	528	538	571	632	659	633	537	457	383	12
13	491	498	515	528	539	573	634	660	632	534	454	382	13
14	491	499	515	528	539	575	635	660	631	531	451	380	14
15	491	499	515	528	540	577	636	660	630	528	449	378	15
16	492	500	516	528	541	579	638	660	628	525	448	376	16
17	492	501	516	528	541	582	639	660	627	523	446	375	17
18	492	501	516	528	542	585	640	660	624	520	442	373	18
19	492	502	517	529	543	586	641	659	621	518	439	371	19
20	492	503	518	529	543	587	642	659	618	515	437	370	20
21	492	503	518	530	544	589	643	659	615	513	434	368	21
22	492	504	518	530	544	591	643	659	611	510	432	366	22
23	492	505	519	530	545	592	645	658	607	507	428	365	23
24	492	505	519	531	546	594	645	657	607	504	426	364	24
25	492	506	520	531	547	596	647	656	599	501	424	363	25
26	492	507	521	531	548	598	648	655	596	499	422	361	26
27	492	508	521	532	549	600	649	653	592	497	419	359	27
28	493	509	522	532	550	602	649	653	588	495	416	358	28
29	493	510	522	532	604	604	650	652	584	492	413	357	29
30	493	510	523	532	607	607	651	651	580	490	409	356	30
31	493	510	523	532	609	609	651	651	488	488	406	356	31

Monthly Totals													
Mean	492	500	516	528	540	579	635	656	623	527	447	378	Yearly Totals
Min	490	494	511	523	533	551	612	651	649	572	483	401	535
Max	493	510	523	532	550	609	651	660	650	577	485	401	660

Notes:



**PacifiCorp Energy**  
**Reservoir Level Records**  
**Bear Lake at Lifton (10055500) October 2006 - September 2007**  
**Daily Stage (Ft) Add 5900 for Elevation**

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Day
1	10.00	10.02	10.29	10.48	10.63	10.91	11.85	12.44	12.43	11.31	9.89	8.52	1
2	9.98	10.02	10.29	10.49	10.64	10.93	11.88	12.45	12.42	11.23	9.85	8.57	2
3	9.98	10.02	10.29	10.50	10.65	10.96	11.91	12.46	12.41	11.16	9.81	8.52	3
4	9.97	10.02	10.30	10.51	10.66	10.99	11.93	12.47	12.40	11.10	9.77	8.49	4
5	9.97	10.03	10.31	10.52	10.66	11.02	11.96	12.48	12.38	11.03	9.73	8.47	5
6	9.97	10.03	10.32	10.52	10.67	11.05	11.99	12.49	12.35	11.03	9.69	8.45	6
7	9.97	10.04	10.32	10.53	10.67	11.08	12.02	12.50	12.31	10.92	9.65	8.43	7
8	9.97	10.04	10.33	10.54	10.68	11.10	12.05	12.51	12.28	10.87	9.62	8.41	8
9	9.97	10.05	10.33	10.54	10.68	11.13	12.07	12.52	12.25	10.82	9.59	8.38	9
10	9.97	10.06	10.33	10.54	10.69	11.16	12.09	12.53	12.21	10.78	9.55	8.35	10
11	9.97	10.07	10.34	10.55	10.70	11.19	12.12	12.54	12.18	10.74	9.50	8.32	11
12	9.97	10.08	10.34	10.55	10.71	11.22	12.15	12.56	12.17	10.70	9.45	8.29	12
13	9.98	10.09	10.35	10.55	10.72	11.25	12.18	12.58	12.16	10.64	9.40	8.26	13
14	9.98	10.10	10.35	10.55	10.73	11.28	12.20	12.58	12.14	10.60	9.35	8.23	14
15	9.98	10.11	10.35	10.56	10.74	11.31	12.22	12.58	12.12	10.56	9.32	8.20	15
16	9.99	10.12	10.36	10.56	10.75	11.35	12.24	12.58	12.10	10.51	9.30	8.17	16
17	9.99	10.13	10.36	10.56	10.76	11.39	12.26	12.58	12.08	10.47	9.27	8.15	17
18	9.99	10.14	10.37	10.56	10.77	11.43	12.28	12.58	12.04	10.43	9.22	8.13	18
19	9.99	10.15	10.38	10.57	10.78	11.45	12.30	12.57	11.99	10.39	9.17	8.10	19
20	10.00	10.16	10.39	10.57	10.79	11.47	12.31	12.56	11.94	10.35	9.13	8.07	20
21	10.00	10.17	10.39	10.58	10.80	11.49	12.32	12.56	11.89	10.31	9.09	8.04	21
22	10.00	10.18	10.40	10.59	10.81	11.52	12.33	12.56	11.83	10.27	9.05	8.02	22
23	10.00	10.19	10.41	10.59	10.82	11.55	12.35	12.55	11.77	10.23	9.00	8.00	23
24	10.00	10.20	10.42	10.60	10.83	11.58	12.36	12.54	11.77	10.18	8.96	7.98	24
25	10.00	10.22	10.43	10.60	10.84	11.61	12.38	12.52	11.65	10.13	8.93	7.96	25
26	10.00	10.23	10.44	10.60	10.85	11.64	12.40	12.50	11.60	10.10	8.90	7.94	26
27	10.00	10.25	10.45	10.61	10.87	11.67	12.41	12.48	11.55	10.07	8.85	7.91	27
28	10.01	10.26	10.46	10.61	10.89	11.70	12.42	12.47	11.48	10.04	8.80	7.89	28
29	10.01	10.27	10.46	10.61		11.73	12.43	12.46	11.42	10.00	8.75	7.87	29
30	10.01	10.28	10.47	10.62		11.77	12.44	12.45	11.36	9.97	8.70	7.85	30
31	10.01		10.48	10.62		11.81		12.44		9.93	8.65		31

**BEAR LAKE STATISTICS**

	Monthly												Yearly
Daily Mean	9.99	10.12	10.37	10.56	10.74	11.35	12.20	12.52	12.02	10.54	9.29	8.20	10.66
Daily Min	9.97	10.02	10.29	10.48	10.63	10.91	11.85	12.44	11.36	9.93	8.65	7.85	7.85
Daily Max	10.01	10.28	10.48	10.62	10.89	11.81	12.44	12.58	12.43	11.31	9.89	8.57	12.58

Notes: Readings taken from staff gage at Utah State Parks Marina:

**PacifiCorp Energy**  
**Stream Discharge Records**  
**Bear Lake Outlet Canal (10059500) October 2006 -September 2007**  
**Daily Discharge (CFS)**

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Day
1	5	5	5	5	5	5	5	5	487	1420	1050	756	1
2	5	5	5	5	5	5	5	5	600	1440	1010	754	2
3	5	5	5	5	5	5	5	5	648	1440	885	760	3
4	5	5	5	5	5	5	5	5	665	1420	860	760	4
5	5	5	5	5	5	5	5	5	716	1370	832	741	5
6	5	5	5	5	5	5	5	5	778	1370	837	610	6
7	5	5	5	5	5	5	5	5	881	1350	826	522	7
8	5	5	5	5	5	5	5	5	875	1330	759	497	8
9	5	5	5	5	5	5	5	5	803	1310	758	363	9
10	5	5	5	5	5	5	5	5	771	1260	760	276	10
11	5	5	5	5	5	5	5	5	778	1240	787	260	11
12	5	5	5	5	5	5	5	113	780	1210	878	210	12
13	5	5	5	5	5	5	5	167	758	1180	860	48	13
14	5	5	5	5	5	5	5	117	738	1130	920	61	14
15	5	5	5	5	5	5	5	122	732	1100	936	86	15
16	5	5	5	5	5	5	5	204	734	1030	930	84	16
17	5	5	5	5	5	5	5	227	772	1010	906	50	17
18	5	5	5	5	5	5	5	336	922	1050	919	5	18
19	5	5	5	5	5	5	5	399	994	1120	922	5	19
20	5	5	5	5	5	5	5	425	1090	1090	947	292	20
21	5	5	5	5	5	5	5	558	1140	1050	1030	360	21
22	5	5	5	5	5	5	5	516	1180	1060	1020	210	22
23	5	5	5	5	5	5	5	334	1220	1130	996	145	23
24	5	5	5	5	5	5	5	360	1270	1140	930	143	24
25	5	5	5	5	5	5	5	345	1310	1130	922	5	25
26	5	5	5	5	5	5	5	344	1330	1090	921	5	26
27	5	5	5	5	5	5	5	346	1350	1040	918	5	27
28	5	5	5	5	5	5	5	340	1370	973	884	5	28
29	5	5	5	5	5	5	5	362	1390	964	780	5	29
30	5	5	5	5	5	5	5	448	1400	977	741	5	30
31	5	5	5	5	5	5	5	459	1070	1070	761	5	31

**Monthly Statistics**

Vol. (SFD)	155	150	155	155	140	155	150	6,577	28,482	36,494	27,485	8,028	<b>Yearly Stats</b> <b>108,126</b>
Daily Mean	5.00	5.00	5.00	5.00	5.00	5.00	5.00	212.00	949.00	1,180.00	887.00	268.00	<b>294.00</b>
Daily Min	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	487.00	964.00	741.00	5.00	<b>5.00</b>
Daily Max	5.00	5.00	5.00	5.00	5.00	5.00	5.00	558.00	1,400.00	1,440.00	1,050.00	760.00	<b>1,440.00</b>
Ins. Min	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	451.00	956.00	721.00	5.00	<b>5.00</b>
Ins. Max	5.00	5.00	5.00	5.00	5.00	5.00	5.00	581.00	1,410.00	1,460.00	1,060.00	777.00	<b>1,460.00</b>
Vol. (AF)	307	298	307	307	278	307	298	13,050	56,490	72,380	54,520	15,920	<b>214,462</b>

Notes: Water was turned back into the Outlet Canal on May 12th to start the 2007 irrigation season. Flow measurements were taken on 5/13, 5/18, 5/20, 5/24, 6/2, 6/5, 6/8, 6/18, 6/20, 6/25, 7/12, 7/16, 7/23, 8/3, 8/21, 9/1, 9/8, 9/10, and 9/21. Water was turned out of the Outlet canal on September 24th, to end the 2007 irrigation season. Leakage of 5 cfs is estimated when gates are shut. Leakage assumed to be 5 cfs when all gates are shut.

## 10092700 BEAR RIVER AT IDAHO-UTAH STATE LINE

LOCATION.--Lat 42°00'47", long 111°55'14" referenced to North American Datum of 1927, in NE ¼ NW ¼ NE ¼ sec.29, T.16 S., R.39 E., Franklin County, ID, Hydrologic Unit 16010202, on left bank 1,050 ft downstream from inlet canal to Cub River pumps, 1.1 mi downstream from Weston Creek, 1.8 mi upstream from Idaho-Utah State line, and 3.5 mi southeast of Weston.

PERIOD OF RECORD.--October 1970 to current year.

REVISED RECORDS.--WDR UT-74-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 4,420 ft above NGVD of 1929, from topographic map. Prior to September 10, 1982 at datum 2.00 ft higher. September 10, 1982 to September 30, 1985 at datum 10.0 ft lower.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,870 ft<sup>3</sup>/s, Jun 14, 1984, gage height, 9.20 ft; minimum daily discharge, 24 ft<sup>3</sup>/s, May 16, 2004.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,230 ft<sup>3</sup>/s, Apr 12, gage height, 11.90 ft; minimum daily discharge, 114 ft<sup>3</sup>/s, Sep 16.

### DISCHARGE, CUBIC FEET PER SECOND WATER YEAR OCTOBER 2006 TO SEPTEMBER 2007 DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	389	516	453	500	667	599	747	471	161	913	727	553
2	429	503	451	498	628	646	705	455	181	909	649	572
3	450	472	457	501	618	575	794	642	252	749	610	581
4	459	518	467	540	612	551	757	685	268	729	612	607
5	457	509	479	528	643	567	703	642	409	733	619	690
6	489	504	616	496	658	578	705	621	474	726	620	643
7	935	467	590	549	565	611	739	494	631	736	617	612
8	647	483	540	573	564	750	758	411	571	751	608	530
9	517	566	551	611	585	754	751	538	502	766	589	545
10	507	556	613	667	634	871	755	490	600	756	544	398
11	509	586	596	650	792	845	875	373	572	731	543	324
12	584	594	527	522	951	772	1,170	373	611	729	526	293
13	723	624	587	616	750	837	1,060	247	600	727	569	224
14	549	590	636	643	538	728	1,000	212	544	725	604	174
15	525	478	704	648	515	948	962	208	594	755	593	135
16	554	523	633	564	545	1,010	572	187	506	763	596	114
17	611	584	564	650	614	1,110	549	130	283	775	625	119
18	595	630	554	719	571	1,090	536	183	477	768	623	120
19	553	608	604	658	682	1,110	558	177	596	744	620	122
20	588	580	594	646	620	1,060	555	203	900	726	647	124
21	495	594	580	667	577	1,090	675	299	880	721	679	187
22	412	615	600	678	665	1,140	555	453	869	713	702	217
23	348	615	601	662	527	1,100	543	304	864	747	711	215
24	332	629	581	612	484	1,100	526	356	871	743	632	229
25	550	582	535	623	498	1,000	479	449	863	749	634	230
26	655	554	531	661	625	996	468	511	901	777	559	235
27	631	556	539	668	521	1,060	457	416	1,060	792	552	235
28	628	456	551	625	537	1,060	436	396	1,060	821	519	236
29	577	505	579	574	---	895	448	339	988	810	516	238
30	549	518	559	596	---	811	469	349	911	788	523	233
31	523	---	520	605	---	816	---	228	---	773	536	---
<b>Total</b>	16,770	16,515	17,392	18,750	17,186	27,080	20,307	11,842	18,999	23,645	18,704	9,735
<b>Mean</b>	541	550	561	605	614	874	677	382	633	763	603	324
<b>Max</b>	935	630	704	719	951	1,140	1,170	685	1,060	913	727	690
<b>Min</b>	332	456	451	496	484	551	436	130	161	713	516	114
<b>Ac-ft</b>	33,260	32,760	34,500	37,190	34,090	53,710	40,280	23,490	37,680	46,900	37,100	19,310

### STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1971 - 2007, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
<b>Mean</b>	873	930	942	927	934	1,141	1,359	1,441	1,298	987	901	867
<b>Max</b>	2,850	2,983	2,552	1,904	2,556	3,264	3,594	3,968	4,263	3,442	2,416	2,545
<b>(WY)</b>	(1984)	(1984)	(1985)	(1984)	(1986)	(1986)	(1986)	(1986)	(1986)	(1983)	(1984)	(1986)
<b>Min</b>	223	298	310	269	296	351	351	158	301	368	461	192
<b>(WY)</b>	(2004)	(1993)	(1982)	(2004)	(2002)	(1991)	(2003)	(2003)	(2004)	(2006)	(1993)	(1992)

Figure 2007.17 (cont.)

**10109001 COMBINED DISCHARGE, IN CUBIC FEET PER SECOND, OF LOGAN RIVER  
ABOVE STATE DAM AND LOGAN, HYDE PARK AND SMITHFIELD CANAL NEAR LOGAN,  
UT**

REVISED RECORDS.--WDR UT-04-1: Discharge.

**DISCHARGE, CUBIC FEET PER SECOND  
WATER YEAR OCTOBER 2006 TO SEPTEMBER 2007  
DAILY MEAN VALUES**

<b>Day</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>
<b>1</b>	167	157	152	136	132	116	181	409	328	216	156	131
<b>2</b>	168	157	144	134	131	115	189	436	328	211	156	130
<b>3</b>	167	157	140	137	130	109	184	475	329	209	155	131
<b>4</b>	168	156	141	141	128	112	180	430	328	210	153	132
<b>5</b>	168	157	139	137	128	113	184	383	327	207	152	138
<b>6</b>	173	159	138	130	127	114	197	349	334	199	151	134
<b>7</b>	183	158	142	132	123	118	216	329	330	197	150	132
<b>8</b>	182	157	145	136	127	146	233	324	309	196	148	130
<b>9</b>	177	166	146	136	126	138	249	336	300	194	147	129
<b>10</b>	176	160	147	134	126	139	242	362	295	191	146	128
<b>11</b>	171	158	149	135	152	134	225	411	298	187	144	129
<b>12</b>	169	157	144	129	135	140	218	432	294	186	144	128
<b>13</b>	166	160	147	128	122	156	208	462	292	183	143	128
<b>14</b>	165	181	161	130	119	168	205	479	288	180	142	129
<b>15</b>	168	164	156	132	119	163	218	463	285	178	142	127
<b>16</b>	173	162	150	134	131	152	226	451	282	175	141	127
<b>17</b>	173	162	146	132	122	159	239	450	278	175	140	127
<b>18</b>	172	160	141	130	119	171	270	449	271	173	143	126
<b>19</b>	169	157	134	131	122	178	267	452	264	169	150	126
<b>20</b>	172	157	129	132	117	185	256	454	259	166	142	125
<b>21</b>	168	158	145	133	117	191	246	459	255	165	140	124
<b>22</b>	166	157	147	132	117	197	236	441	251	163	139	124
<b>23</b>	164	156	138	131	119	189	234	397	247	161	137	129
<b>24</b>	164	155	142	130	115	188	224	372	245	162	138	127
<b>25</b>	164	152	137	130	117	191	228	355	240	165	136	125
<b>26</b>	164	151	142	131	118	197	247	341	233	163	136	124
<b>27</b>	160	152	148	132	120	210	262	339	231	163	135	124
<b>28</b>	158	158	142	132	114	210	286	353	227	160	134	123
<b>29</b>	159	161	138	130	---	196	318	355	223	159	132	124
<b>30</b>	160	149	136	130	---	187	372	337	220	158	131	121
<b>31</b>	158	---	133	131	---	181	---	329	---	155	131	---
<b>Total</b>	5,212	4,751	4,439	4,108	3,473	4,963	7,040	12,414	8,391	5,576	4,434	3,832
<b>Mean</b>	168	158	143	133	124	160	235	400	280	180	143	128
<b>Max</b>	183	181	161	141	152	210	372	479	334	216	156	138
<b>Min</b>	158	149	129	128	114	109	180	324	220	155	131	121
<b>Ac-ft</b>	10,340	9,420	8,800	8,150	6,890	9,840	13,960	24,620	16,640	11,060	8,790	7,600

Figure 2007.17 (cont.)

## 10126000 BEAR RIVER NEAR CORINNE, UT

LOCATION.--Lat 41°34'35", long 112°06'00" referenced to North American Datum of 1927, in NE ¼ SE ¼ NE ¼ sec.30, T.10 N., R.2 W., Box Elder County, UT, Hydrologic Unit 16010204, on right bank 1.2 mi downstream from Salt Creek, 2.0 mi northeast of Corinne, and 2.8 mi downstream from Malad River.

DRAINAGE AREA.--7,029 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1949 to September 1957, October 1963 to current year.

REVISED RECORDS.--WRD UT-74-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 4,204.6 ft above NGVD of 1929, unadjusted. Auxiliary nonrecording gage 7,800 ft downstream July 27, 1950 to November 21, 1955.

REMARKS.--Records fair except for estimated daily discharges, which are poor. Natural flow of stream affected by Cutler Dam about 30 miles upstream of gage, diversions for irrigation, and return flow from irrigated areas and backwater from Bear River Bird Refuge about 5 miles downstream.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,770 ft<sup>3</sup>/s, May 19, 1984, gage height, 17.50 ft; minimum daily discharge, 23 ft<sup>3</sup>/s, Jul 30, 2004.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,840 ft<sup>3</sup>/s, Mar 12, gage height, 9.00 ft; minimum daily discharge, 68 ft<sup>3</sup>/s, Aug 11.

### DISCHARGE, CUBIC FEET PER SECOND WATER YEAR OCTOBER 2006 TO SEPTEMBER 2007 DAILY MEAN VALUES

[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	639	1,280	1,380	1,310	e1,200	1,120	2,060	e680	104	73	87	70
2	883	1,210	1,330	1,150	e1,150	1,290	1,480	e718	100	75	88	71
3	867	1,110	1,190	1,570	e1,180	1,420	2,020	852	98	74	88	72
4	884	1,100	e1,190	1,430	e1,140	e1,100	1,690	928	98	71	88	72
5	912	1,120	e1,400	1,260	e1,200	e1,880	1,530	886	97	72	85	85
6	1,170	1,020	e1,190	1,200	e1,240	e1,630	1,730	1,000	102	71	86	95
7	1,090	1,360	e1,250	754	e1,120	e1,650	1,470	1,130	125	72	85	95
8	1,060	1,120	1,280	759	e1,220	e1,260	1,340	1,030	135	73	76	94
9	1,040	1,150	e1,420	1,540	e1,400	1,320	1,300	931	126	75	74	143
10	1,480	1,230	e1,210	1,770	e1,300	1,860	1,700	838	123	75	73	371
11	1,270	1,090	1,050	1,460	e1,850	2,120	1,450	752	111	76	68	282
12	1,050	1,210	1,620	1,510	e1,600	2,590	1,800	547	162	79	73	119
13	1,070	1,340	e1,370	e1,590	1,910	2,130	2,400	385	227	79	74	89
14	1,130	1,630	e1,430	e1,210	2,010	2,320	1,950	282	149	79	72	91
15	991	1,480	1,450	1,600	2,080	1,830	1,760	e176	121	78	71	89
16	863	1,380	1,590	1,380	1,450	1,900	1,510	e169	109	81	70	88
17	1,300	1,450	1,540	1,250	1,160	1,890	1,970	e157	102	80	69	91
18	1,370	1,720	1,090	1,040	1,210	1,830	1,360	e145	99	80	70	102
19	1,340	1,100	1,650	1,280	1,360	1,880	1,140	137	95	80	75	110
20	1,110	1,330	1,690	1,390	1,960	2,200	1,250	123	96	78	73	116
21	1,060	1,530	1,540	1,420	1,700	2,010	1,190	118	93	75	69	118
22	1,020	1,350	1,670	1,400	1,780	2,290	e1,190	127	89	73	72	124
23	1,170	1,380	1,630	e1,420	1,680	2,050	e972	130	84	76	72	136
24	1,390	1,180	1,570	e1,390	1,620	2,140	1,250	134	86	76	73	136
25	1,160	1,500	1,270	e1,200	1,150	2,300	1,260	255	84	78	72	137
26	989	1,240	1,200	e1,220	1,660	2,170	e1,100	408	83	80	73	140
27	1,160	1,570	1,460	e1,180	1,720	2,030	e950	299	83	86	77	158
28	1,190	1,510	1,780	e1,200	1,750	2,130	e880	401	81	83	76	323
29	909	984	1,550	e1,180	---	2,000	e810	300	81	81	72	440
30	1,370	1,250	1,530	e1,240	---	2,090	e750	161	76	82	72	447
31	1,510	---	1,300	e1,180	---	2,070	---	118	---	85	71	---
<b>Total</b>	34,447	38,924	43,820	40,483	41,800	58,500	43,262	14,317	3,219	2,396	2,344	4,504
<b>Mean</b>	1,111	1,297	1,414	1,306	1,493	1,887	1,442	462	107	77.3	75.6	150
<b>Max</b>	1,510	1,720	1,780	1,770	2,080	2,590	2,400	1,130	227	86	88	447
<b>Min</b>	639	984	1,050	754	1,120	1,100	750	118	76	71	68	70
<b>Ac-ft</b>	68,330	77,210	86,920	80,300	82,910	116,000	85,810	28,400	6,380	4,750	4,650	8,930

#### STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1950-57, 1964-2007, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
<b>Mean</b>	1,310	1,577	1,652	1,777	1,812	2,302	2,822	2,878	2,132	681	591	879
<b>Max</b>	4,240	4,471	4,414	3,639	5,966	6,041	7,258	9,598	9,201	4,186	3,045	3,423
<b>(WY)</b>	(1984)	(1985)	(1984)	(1984)	(1986)	(1986)	(1985)	(1984)	(1984)	(1983)	(1983)	(1984)
<b>Min</b>	95.6	621	535	620	723	913	638	71.8	77.6	40.4	46.7	62.2
<b>(WY)</b>	(1993)	(2001)	(1995)	(1993)	(1993)	(1991)	(1992)	(1992)	(1992)	(2003)	(2004)	(1992)



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**2008 WATER SUPPLY AND DISTRIBUTION REPORT**





# **2008 Water Supply and Distribution Report**

## **OVERVIEW**

The 2008 water year reversed the trend started in 2007 with near or above average water supplies in all divisions. No calls for a water emergency were received in any of the three divisions and hence, no water emergencies were declared. The 2008 year ended with at least level or more water in storage than was in storage at the beginning of the year.

## **WATER SUPPLY**

Three stream gages, one in each division of the river, have been used by the Commission as indicator gages of the relative supply available for each of the divisions of the river (see Stream Gaging Program section in the Overview chapter). The Utah-Wyoming State Line and Smith's Fork gages measure a major portion of the streamflow in the Upper and Central Divisions, respectively. The Logan River is a major tributary to the Bear River in Cache Valley, which is in the Lower Division. Specific discharges, as measured by the USGS for the three gages during 2008, compared with the long-term averages, are summarized in Figure 2008.1 and are graphically illustrated in Figures 2008.2 through 2008.4 on the subsequent pages.

Figure 2008.1 illustrates a summary of the volumetric discharge for each of these gages for the water year. As the water supply available during the irrigation season is most critical for filling the natural flow rights, the discharge as measured at these gages during the irrigation season is also illustrated in Figure 2008.1.

Figures 2008.2 through 2008.4 show hydrographs for each of these three gaging stations. On each hydrograph, the mean daily flow during the irrigation season is plotted against the average of the mean daily flows for the period 1943 through 2008. The area between the 2008 hydrographs and the mean hydrographs represents the difference in volume of water discharged during 2008 versus the long-term average. This volumetric difference is illustrated by the bar charts shown on each of the figures.

## 2008 Water Supply Summary by Division

### 2008 WATER YEAR

(Discharge in Acre-feet)

GAGE	AVERAGE (1943-08)	2008	PERCENT
Upper Division (UT-WY State Line)	138,700	143,800	104%
Central Division (Smith's Fork)	136,600	112,500	82%
Lower Division (Logan River)	181,921	147,700	81%

### 2008 IRRIGATION SEASON

#### MAY - SEPTEMBER

(Discharge in Acre-feet)

GAGE	AVERAGE (1943-08)	2008	PERCENT
Upper Division (UT-WY State Line)	114,400	120,400	105%
Central Division (Smith's Fork)	101,800	90,880	89%
Lower Division (Logan River)	121,800	105,700	87%

**Figure 2008.1**

As can be seen in Figure 2008.1, the annual discharge for the Upper Division (Utah-Wyoming State Line gage) was 104 percent of the long-term average, and streamflow on Smith's Fork and the Logan River were 82 and 81 percent, respectively. More important to the natural flow diversions than the streamflow during the water year is the streamflow during the irrigation season of May through September. During this period, the water supply was approximately 105 percent (Upper Division), 89 percent (Central Division), and 87 percent (Lower Division). These indicator gages tell us that the available water supply in the Upper Division was above normal during the period when much of the storage in the system occurs. In both the Central and Lower Divisions, the available water supply was just under 90 percent of normal during the irrigation season.

A closer look at the three hydrographs (Figures 2008.2, 2008.3 and 2008.4) is also insightful when one is trying to understand the natural water supply in the spring and summer of 2008. The Upper Division gage (Figure 2008.2) indicates runoff following the normal trend of peak streamflow in the Upper Division with several large individual peaks during the runoff period in May and June, effectively creating above normal runoff in June. Peak runoff declined by the end of June with streamflow at or just below normal through the remaining irrigation season. The Central Division gage (Figure 2008.3) indicates runoff was below normal in May and June, with a late above-normal peak in early July, with streamflows remaining above normal through July, tapering off to normal through August and September. The Lower Division indicator gage (Figure 2008.4) indicates a very similar pattern as the Central Division, with runoff peaking below normal during May and June and streamflow remaining at or just below normal through the remainder of the irrigation season.

# 2008 - Upper Division Water Supply

## Flow at Utah-Wyoming State Line Gage

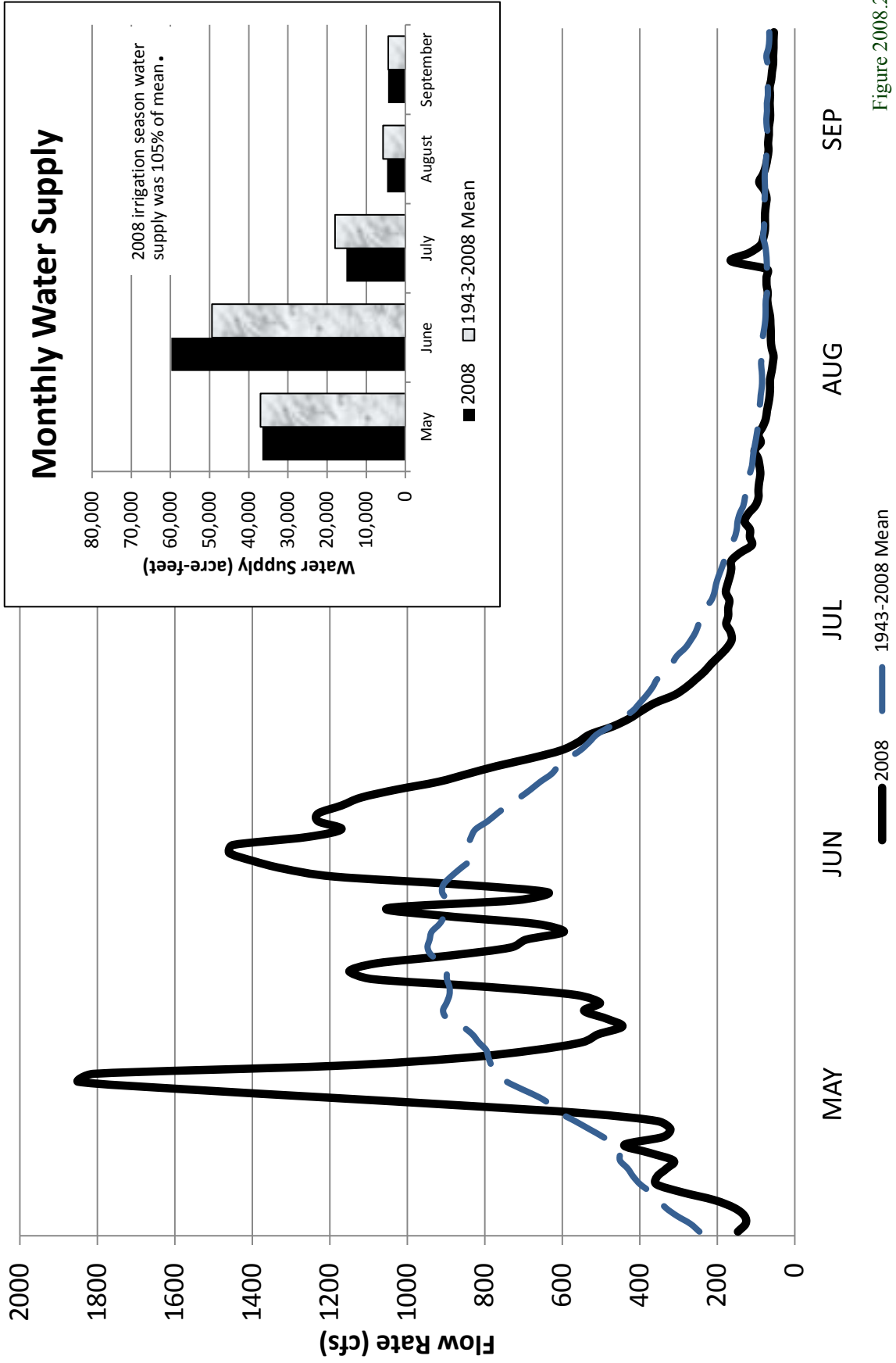


Figure 2008.2

# 2008 - Central Division Water Supply

Flow at Smiths Fork near Border, Wyoming Gage

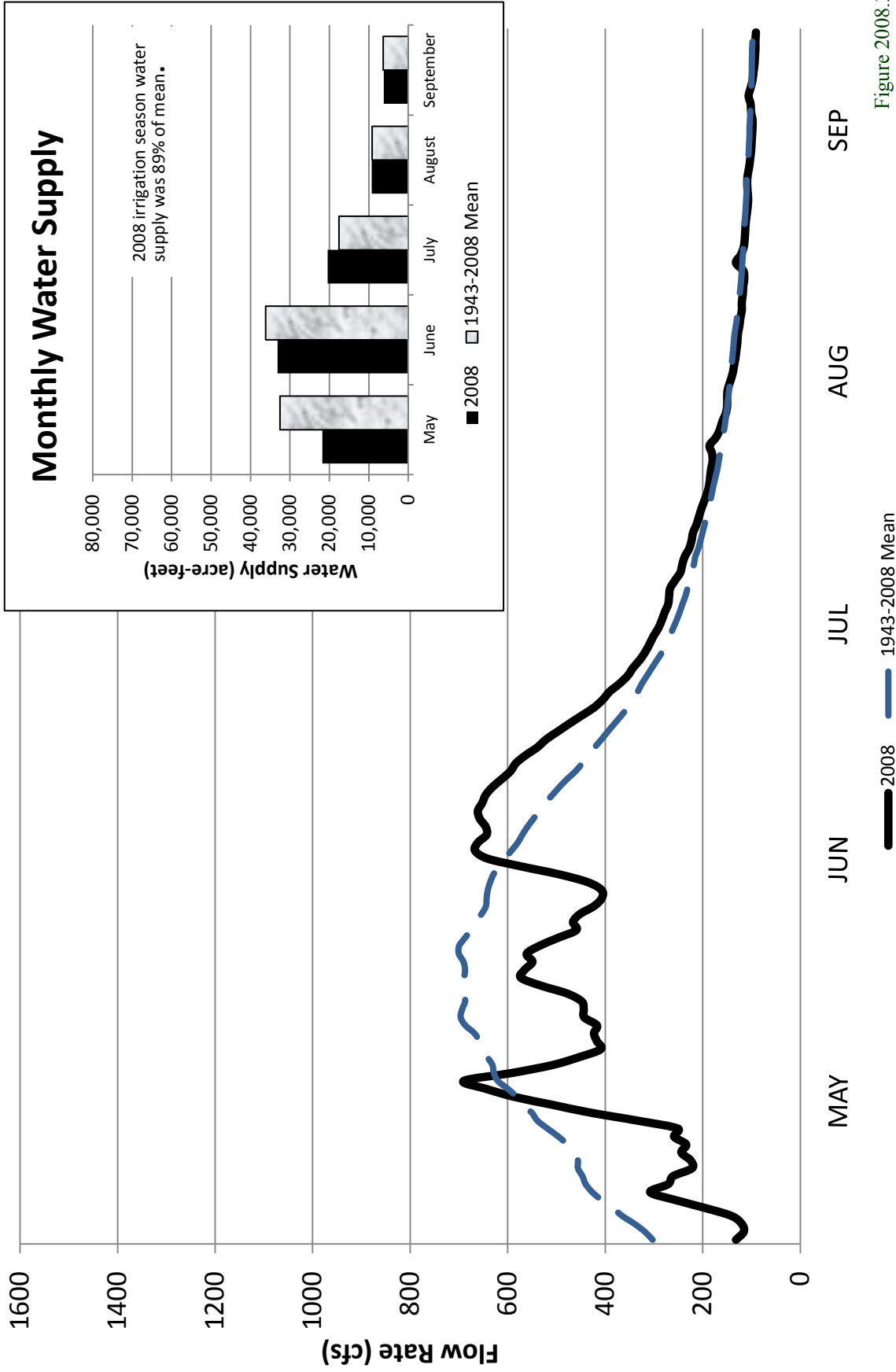


Figure 2008.3

# 2008 - Lower Division Water Supply

## Flow at Logan River Combined Gage

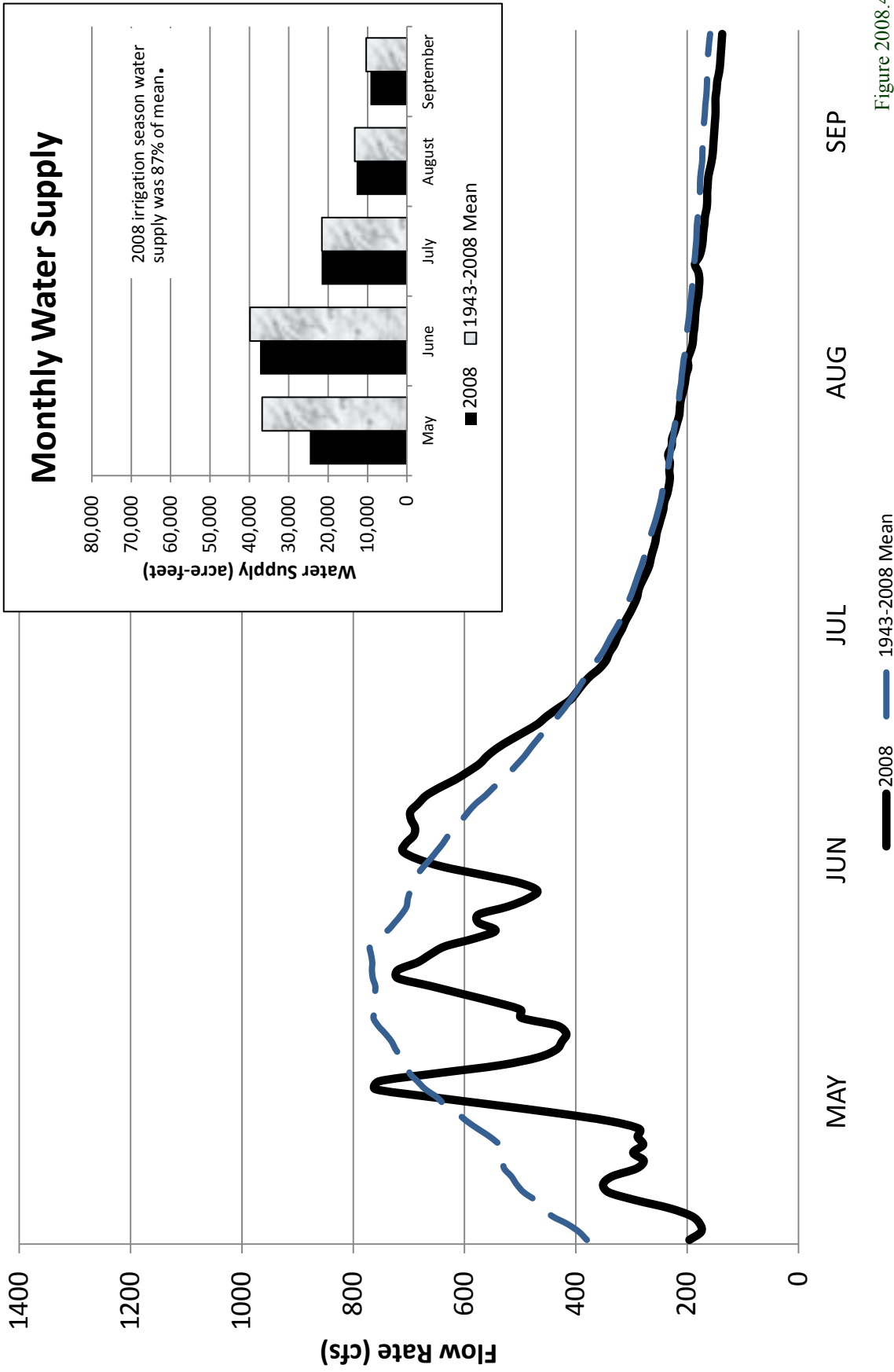


Figure 2008.4

## STORAGE

Storage supplies along the Bear River have a notable impact on the water resources available for irrigation each year. Because the prior water year was a dry water year, storage in the 2008 water year started with less carryover storage than had been the case in the preceding years. Woodruff Narrows Reservoir is the largest reservoir in the Upper Division. However, Whitney, Sulphur Creek, and Woodruff Creek Reservoirs also provide for notable amounts of winter storage.

Paragraph B of Article VI of the Amended Compact, which allows for additional storage rights above Stewart Dam, also has a provision which restricts storage to occur if the water surface elevation at Bear Lake is below an elevation of 5911.0 (UP&L Datum). About half of the storage which is assigned to Woodruff Narrows Reservoir, from both the States of Utah and Wyoming, fall under this provision of the Amended Compact. Bear Lake was below this storage restriction elevation during the entire storage season, thus, this provision of the Compact was activated and upstream storage restrictions were imposed and neither Woodruff Narrows nor Sulphur Creek Reservoirs were allowed to fill. However, with the above average runoff and conservation efforts by water users, very little storage was drafted from the reservoir and the 2008 water year ended with more carryover storage in the Woodruff Narrows Reservoir than had been stored and carried over in the previous two years.

Prior to 1997, a gage was maintained, with Commission funding, by the USGS on Woodruff Narrows Reservoir. The gage included a recorder which allowed for preservation of daily values. Since this time, periodic measurements have been kept by the Woodruff Narrows Reservoir Company in coordination with the Wyoming State Engineer's Office. Figure 2008.5 shows the maximum and minimum contents for the Woodruff Narrows Reservoir since its enlargement in 1980. Values for 2008 are based on observations made by the Woodruff Narrows Reservoir Company.

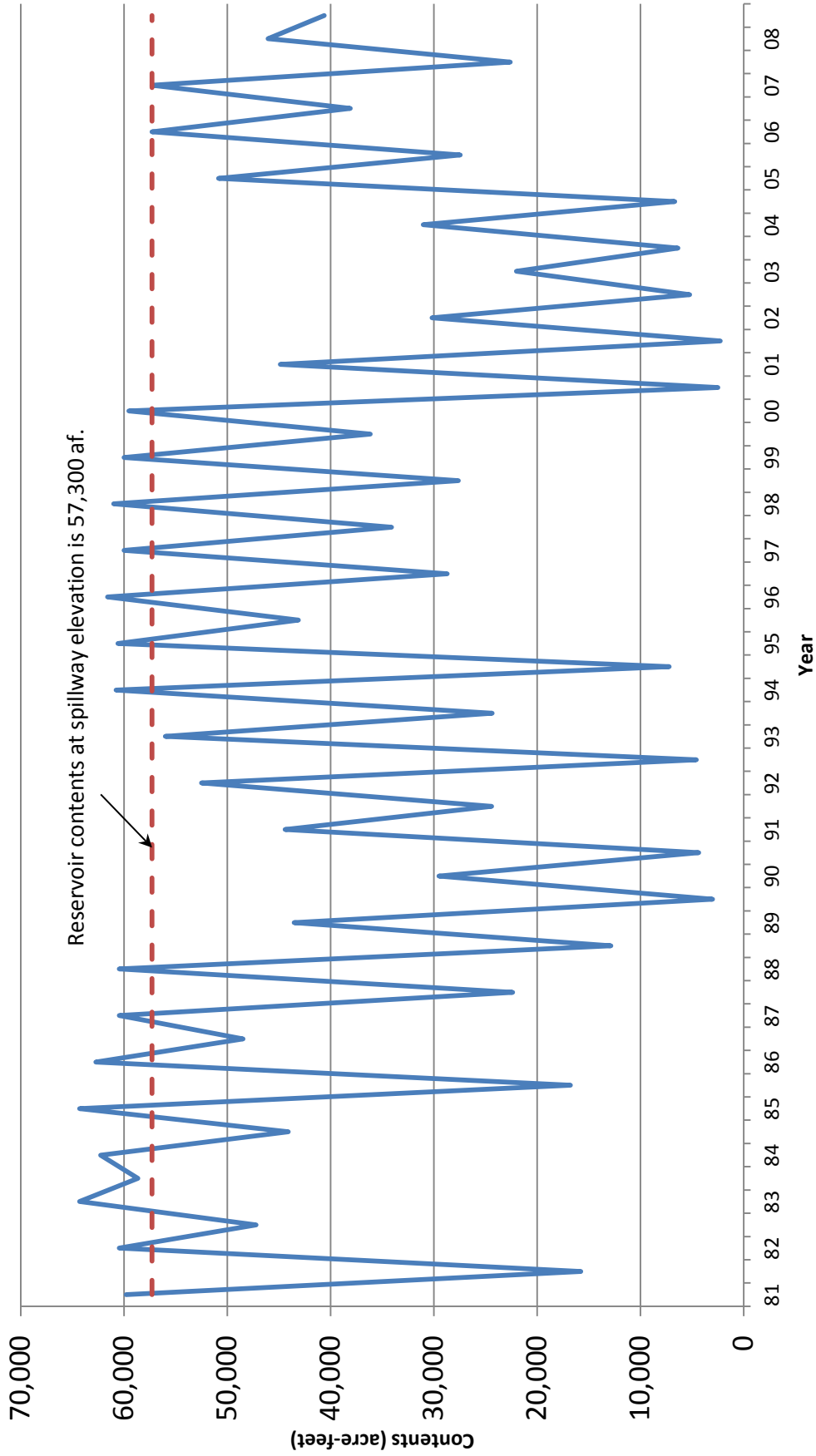
The spillway crest of Woodruff Narrows Dam is at an elevation of 6454.5 feet; contents of 57,300 acre-feet. Hence, contents above this amount represent uncontrolled storage as this storage is only temporary and cannot be controlled by the reservoir company. Generally, during spill periods, the reservoir company is often releasing significant flows through its outlet works as well. Hence, though the total contents are uncontrolled, the proportion of water discharging from the reservoir through the outlet works versus over the spillway is somewhat under the control of the reservoir company. Both discharge to the Bear River below the dam but above the stream gage and it makes no difference to the total discharge into the Bear River.

There is no significant storage in the Central Division.

The largest and most significant storage reservoir in the Lower Division, and in the entire watershed, is Bear Lake, which is at the very top of the Lower Division. Bear Lake is operated as a storage reservoir by PacifiCorp. The Compact regulates various aspects of how PacifiCorp can manage the storage of water within Bear Lake. Figure 2008.6 summarizes the 2008 Bear Lake hydrologic information and significant operational events.

# Woodruff Narrows Reservoir

## Annual Maximum and Minimum Contents



Note: Through the 1996 water year a gage with a recorder was maintained by the USGS on Woodruff Narrows Reservoir. Since this time, values are based on spot observations and estimates by the Woodruff Narrows Reservoir Company and the Wyoming State Engineer's Office. Contents above 57,300 af represent uncontrolled storage.

Figure 2008.5

**Summary of Significant  
2008 Bear Lake  
Hydrologic Information and Operational Events**

<u>Date</u>	<u>Hydrologic Information/Event</u>	<u>Contents (% of Full) Discharge (% of Normal)</u>
10-01-07	Bear Lake Beginning Elevation — 5907.84	355,096 af (25%)
11-11-07	Bear Lake Low Elevation <sup>1</sup> — 5907.63	341,920 af (24%)
	Rainbow Inlet Canal Discharge	164,799 af (63%)
	Bear River Discharge Below Stewart Dam	5,155 af
	Bear Lake Net Runoff (Computed Total Inflow less Lake Evaporation)	164,000 af (50%)
07-01-08	Bear Lake High Elevation — 5910.55	527,706 af (37%)
	Outlet Canal Releases: 6/22-9/30 (101 days)	166,179 af (56%)
07-12-08	Outlet Canal Maximum Release – 1,480 cfs	
	Bear Lake Storage Release <sup>2</sup>	110,176 af
09-30-08	Bear Lake Ending Elevation — 5907.77	350,700 af (25%)

<sup>1</sup> Low contents prior to start of storage.

<sup>2</sup> Credited release from Bear Lake, subtracting Rainbow inflow and the decreed adjustment for the natural yield of Bear Lake and Mud Lake area.

**Figure 2008.6**

Figure 2008.6 provides much information as to the water stored in Bear Lake in 2008. Some of this information will be discussed in the “Lower Division” section of this report. It is interesting to note from Figure 2008.6 that the lake ended the 2008 water year with almost exactly the same storage as at the beginning of the year. It can be noted that just over 110,000 acre-feet was released to downstream irrigators and that the lake level remained below the Compact storage restriction level of 5911 feet for the entire year.

Figure 2008.7 is a graph which shows the annual maximum and minimum elevations of Bear Lake since 1915. With a beginning elevation well below the operating target, Bear Lake was operated in storage mode during the entire storage period. Figure 2008.8 is an area plot showing the daily contents in Bear Lake over the past ten years. This hydrograph and Figure 2008.7 show the initial low Bear Lake water levels in the mid-1990s, followed by rapid lake level gains in the late 1990s and then significant drops during the first four years of this century, followed by gains in 2005 and 2006. However, the lake lost storage in 2007 and stayed about even in 2008.

Bear Lake has such a large storage capacity compared to average annual use that it greatly buffers the potential shortages in the Lower Division over a period of below-normal years, but for the same reason, recovery from a depleted reservoir can be slow.



# BEAR LAKE ELEVATION

## Annual Maximum & Minimum Elevations

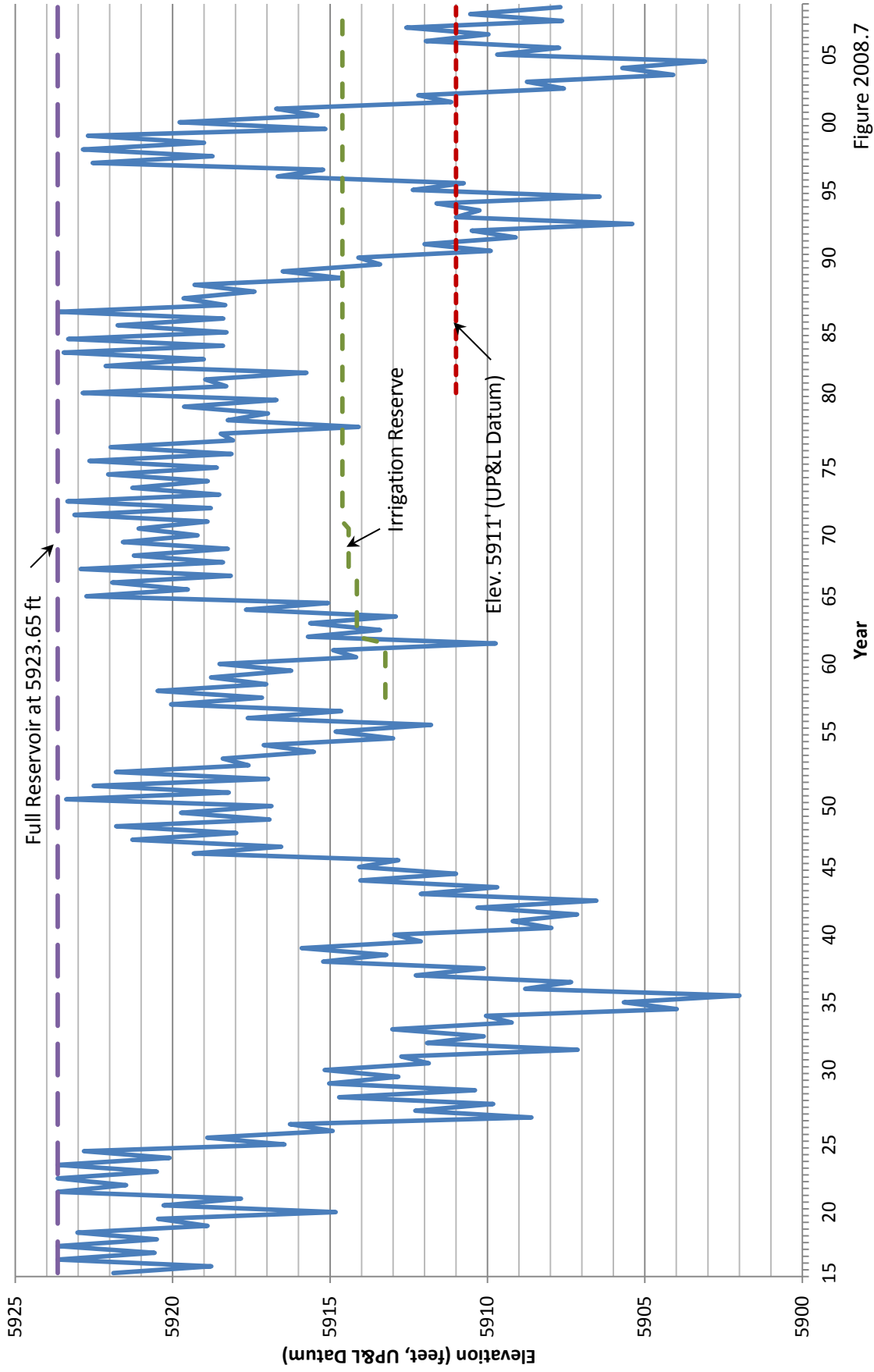


Figure 2008.7

# BEAR LAKE CONTENTS

## Water Years 1999 - 2008

Bear Lake's ,maximum active storage contents is 1,421,000 at an elevation of 5923.65' .

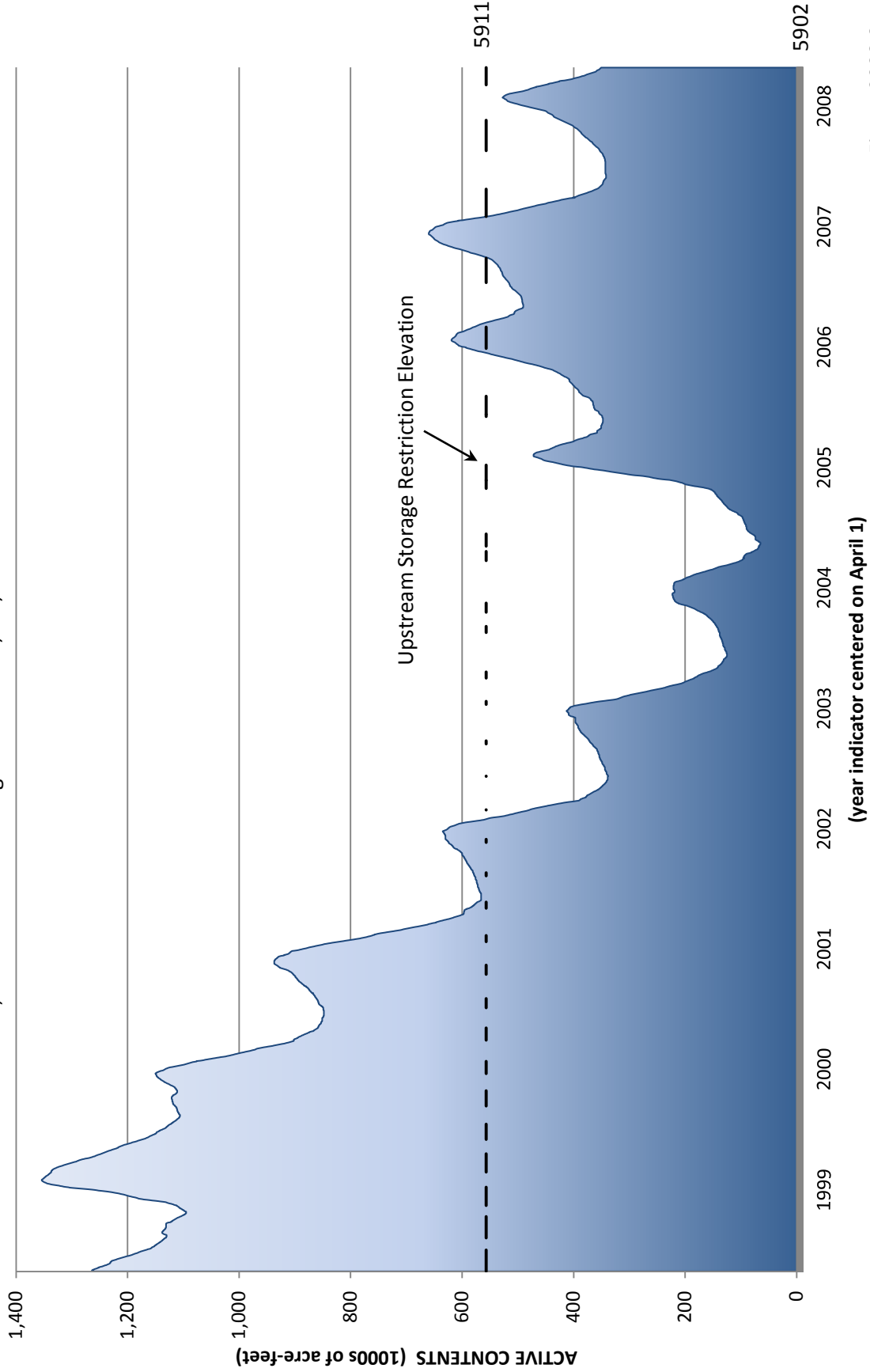


Figure 2008.8

# STREAMFLOW DISTRIBUTION

## General

The water administration in 2008 in the three divisions remained similar to prior years. In July 2008, Mike Johnson became Wyoming's Watermaster in the Lower Wyoming Section of the Upper Division and the Wyoming Section of the Central Division. There were no other changes to the River Commissioners/Watermasters in each of the sections from the previous year. Jack A. Barnett continued to serve as Engineer-Manager of the Bear River Commission. Each River Commissioner/Watermaster works under the direction of the respective State Engineers' offices, but coordinates with the Commission's Engineer-Manager with regard to total diversions in each of the various sections as defined by the Compact.

During the 2008 irrigation season, the following River Commissioners/Watermasters measured water in their sections of the river:

<u>DIVISION</u>	<u>SECTION</u>	<u>RIVER COMMISSIONER/ WATERMASTER</u>
<u>Upper:</u>	Upper Utah	Don Shoemaker
	Upper Wyoming	Don Shoemaker
	Lower Utah	Ron Hoffman
	Lower Wyoming	Kevin Payne/Mike Johnson
<u>Central:</u>	Wyoming	Kevin Payne/Mike Johnson
	Idaho	Rock Holbrook
<u>Lower:</u>	Idaho	Rock Holbrook
	Utah	Jim Watterson

Snow survey information early in 2008 was encouraging, and there was a hope that 2008 would be better than the prior water year. This turned out to be the case. The 2008 water year was near normal, especially during the irrigation season and sufficient water supplies were available in all divisions. No water emergencies were requested or declared.

## Upper Division

The Upper Division divertible flow, as defined by the Compact, consists of a summation of the diversions of all of the canals in the four sections, plus waters bypassing Pixley Dam, less that portion of water diverted by the canals which is attributable to storage releases from Whitney, Sulphur Creek and Woodruff Narrows Reservoirs. The Compact provides that when the total divertible flow is less than 1250 cfs, a water emergency exists. The text of the 2007 chapter of this report describes how divertible flows are calculated and how water is allocated in the Upper Division. The 2008 water supply in the Upper Division

was above normal and no new issues were raised. Hence, for general information, the reader is referred to that chapter.

Figures 2008.9 and 2008.10 show the divertible flow and natural flow diversions in the Upper Wyoming and Lower Utah Sections, respectively. Also shown on the graphs (magenta line) is what would have been the Compact allocation had a water emergency been imposed. However, in 2008, with coordination and communication between the River Commissioners and Watermasters, the available flows were distributed without the official declaration of a water emergency. Figure 2008.11 is a tabulation by month of canal diversions and shows the calculation of divertible flow and allocations to the respective sections, pursuant to the Compact, had a water emergency been declared.

## 2008 - UPPER DIVISION Upper Wyoming Section Diversion vs Allocation

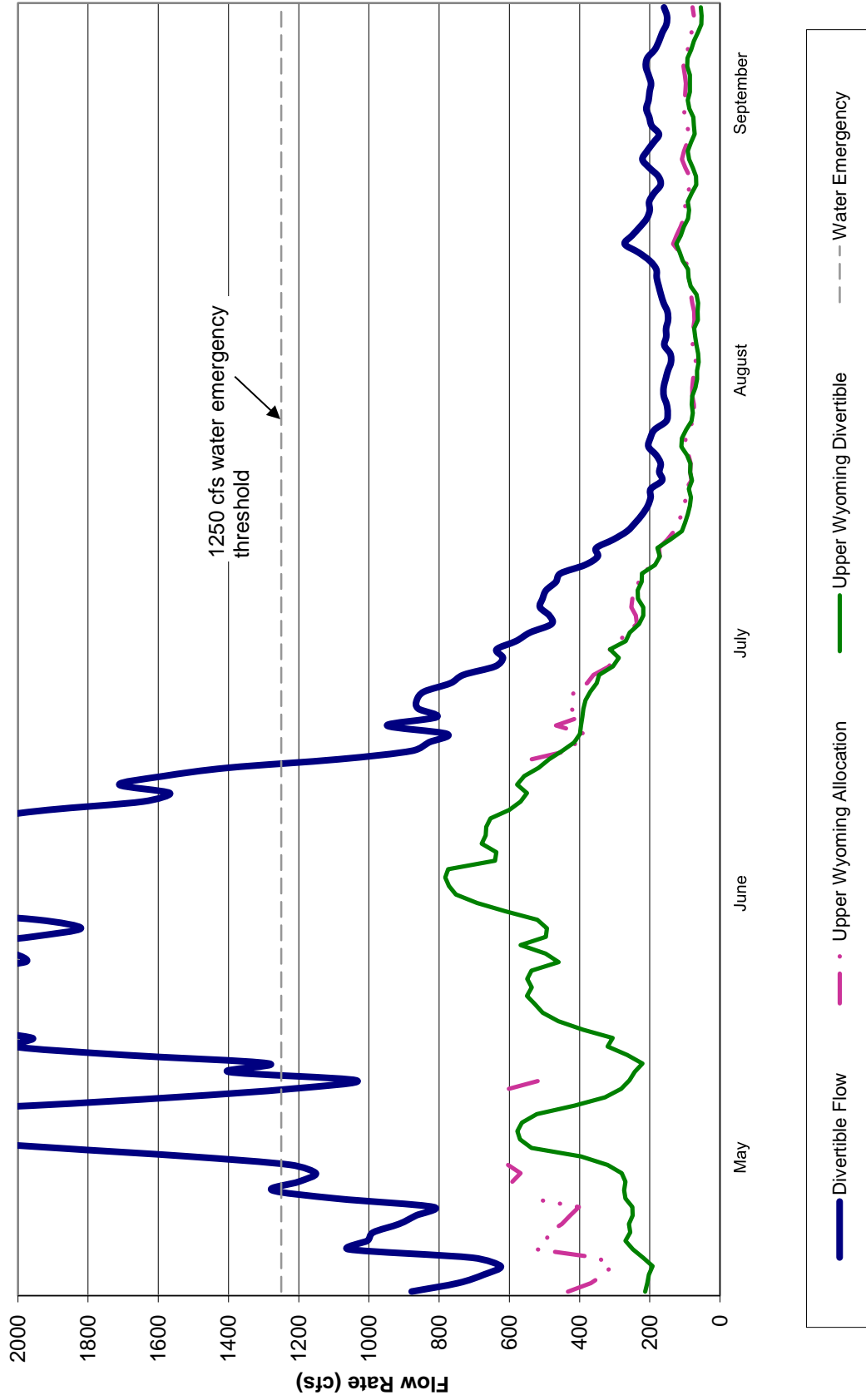


Figure 2008.9

# 2008 - UPPER DIVISION Lower Utah Section Diversion vs Allocation

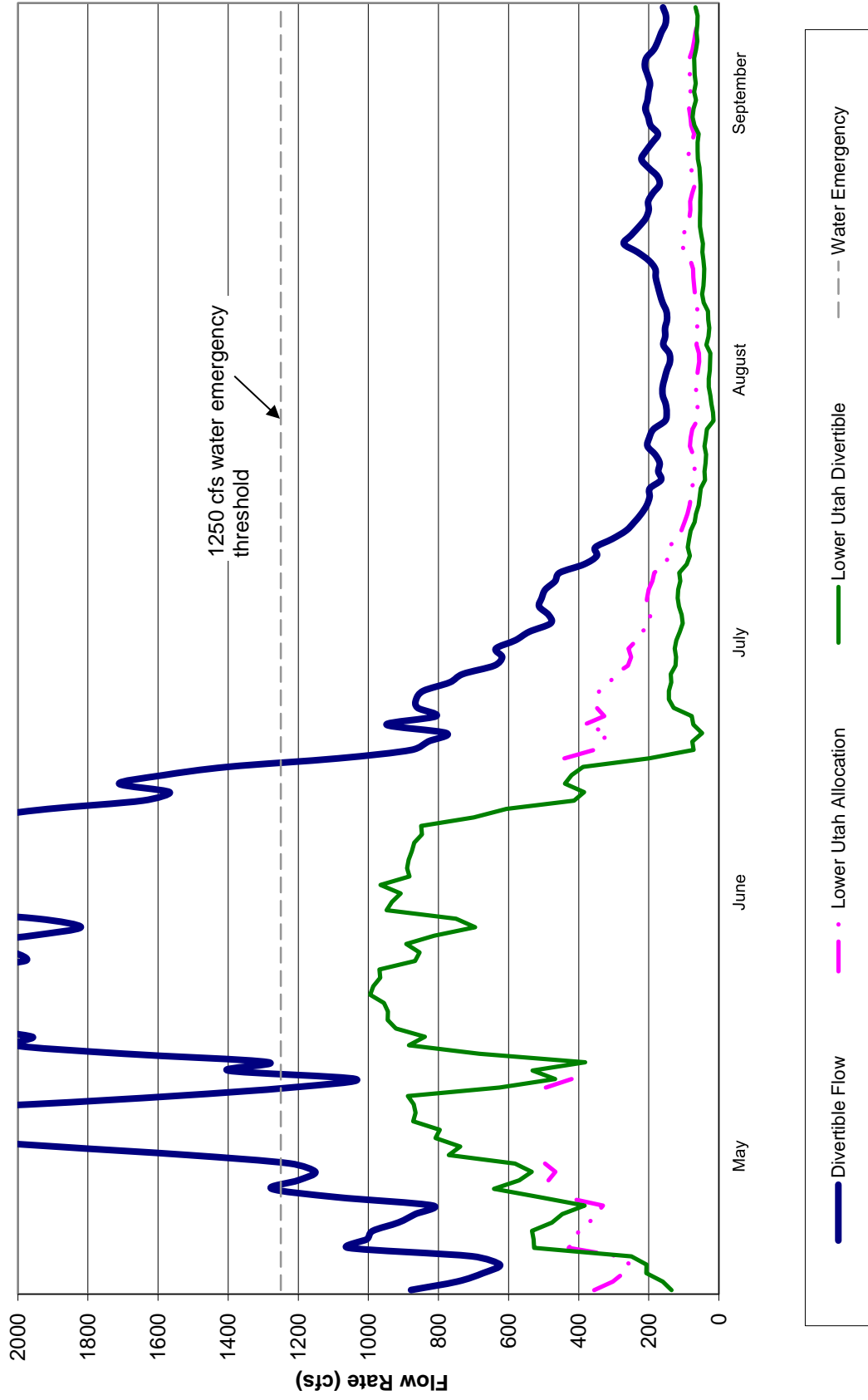


Figure 2008.10

DAILY DISCHARGE IN CFS OF BEAR RIVER CANALS WITH COMPACT ALLOCATIONS IN THE UPPER DIVISION

	May																																
	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>UPPER UTAH SECTION</b>																																	
Hovarka (E Fk)	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		
Hatch (W Fk)	0	0	1	1	1	2	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1		
<b>UPPER WYOMING SECTION</b>																																	
Hilliard East Fork (E Fk)	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			
Lannon & Lone Mtn	0	0	0	0	0	0	0	7	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	12	12	12	13	13			
Hilliard West Side	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	2			
Bear (Bear R)	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	16	16	16	16	16	16	16	16	16	16	15	14	14	14	32	50	50	
Tropic	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		
Kreider Domestic Pump	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		
Danielson	5	4	5	6	6	8	7	7	7	7	7	7	7	7	8	10	12	14	16	16	16	16	14	12	11	9	10	9	10	10	10		
Crown & Pine Grove	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	21	22	22	21	16	6	5	5	5	5	4	4	4	4	5		
McGraw (and Big Bend)	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	15	40	43	39	35	30	25	23	21	11	1	1	1	1			
Lewis (D4)	7	6	5	4	4	3	3	3	4	4	4	4	5	5	5	4	3	3	2	5	8	7	6	5	4	3	3	2	2	2			
Horner	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		
Lewis and Blanchard	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	3	4	3	2	1	1	1	2	4	4	
Myers No. 2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Hare	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	0	
Coffman	0	0	0	0	0	1	1	0	0	0	1	1	1	1	1	0	0	0	0	0	3	6	0	0	1	2	2	1	1	2	1	2	
Knoder	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5	6	6	7	2	0	0	0	0	0	0	0	0	2	
Myers No. 1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	3	3	3	4	4	4	4	4	3	3	3	3	3	3	3	3	3		
Myers Irr	0	0	0	1	2	2	2	2	2	2	4	4	3	4	4	4	3	3	3	4	3	2	1	1	1	1	1	1	1	1	1		
Evanston Pipeline	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	5	5	5	5	4	4	4	4	4	4	4	4	4	4	4		
Booth	3	2	2	2	3	4	3	4	2	2	2	2	2	2	2	3	4	4	7	6	3	2	2	2	2	2	2	2	2	3	3		
Anel Irr	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6	12	15	10	10	9	9	9	8	8	8	8	8	8		
Cornelison	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	7	13	13	13	13	12	8	5	1	1	1	1	1	1	1		
Ev Water Supply (and Anderson)	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		
Knight No. 2 (and No. 1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0		
*State Hospital Ditch	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	0	
Evanston Water	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	0	
Wilson Irr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	3	3	3	3	3	3	3	3	
Faulkner	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	
Rocky Mtn & Blyth (and Crompton)	5	3	2	2	2	2	3	3	4	8	10	10	10	9	9	9	11	19	33	34	35	33	30	29	28	28	28	22	15	15	14		
B.E.A.R. Project PL	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
File Irr	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	0	
Johnston & Narramore	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	0	
Fritz	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	3	3	3	3	3	4	4	4	4	3	0	0	0	0	0	0	
Bruce-Barton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5	5	5	5	5	5	3	0	0	0	0	0	0	0	0	0	0	
A.W. Sims	0	0	1	2	2	2	2	2	2	2	2	2	2	2	3	4	4	4	4	4	3	3	2	1	1	1	0	0	0	0	0	0	
Junction	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	
Morganson	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	
Fraser Irr (and Saxton-Thomas)	0	0	0	0	0	0	0	0	0	2	3	3	3	3	3	3	3	3	3	3	3	3	2	1	1	0	0	0	0	0	0	0	
John Sims	3	3	3	3	3	3	3	3	3	3	8	6	6	6	8	17	18	31	28	27	22	17	16	14	13	12	11	11	11	11	21	26	
Michael Sims	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	6	10	10	10	10	10	8	6	4	4	3	2	0	0	0	0	
S. P.	1	1	1	1	6	12	12	12	10	9	8	7	7	7	7	7	7	10	16	15	15	15	15	15	14	14	14	13	13	13	13		
Almy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	3	3	4	4	2	0	0	0	0	0	0	0	
Sims, Blight & Turner	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	0	
Bowns	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	0	0
Nixon West Side	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	0	0
Turner	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chapman (Headgate)	115	115	103	99	103	119	138	144	143	130	124	141	143	141	136	141	169	185	190	190	187	174	107	96	83	78	77	64	74	77	77		
Chapman (Stataline, incl'd above)	98	90	80	74	79	89	107	116	129	116	113	131	134	124	112	110	123	144	148	154	167	131	74	70	63	62	66	63	62	60	48		
Morris Bros Irr (Lower)	0	0	0	1	4	4	3	3	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Bowns & Bruce	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	3	3	2	1	1	0	0	0	0	0	
Olson No. 1 Pump	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	0	0
Tunnel	14	10	9	10	13	16	16	18	16	16	16	19	18	16	16	16	20	26	29	30	14	3	2	1	1	1	1	1	1	1	1	1	
Francis-Lee	20	20	19	17	17	18	21	22	25	27	29	33	33	33	33	33	33	34	27	31	34	34	36	36	36	36	36	36	33	25	21		
Bear River Canal	24	27	37	37	39	53	54	56	56	57	57	57	57	57	57	57	58	55	55	63	66	66	66	65	65	65	65	66	47	47	49		
TOTAL UPPER WY DIV.	213																																









DAILY DISCHARGE IN CFS OF BEAR RIVER CANALS WITH COMPACT ALLOCATIONS IN THE UPPER DIVISION

	September																														Total	
	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		
UPPER UTAH SECTION																																
Hovarka (E Fk)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	622
Hatch (W Fk)	1	1	1	1	1	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	393
UPPER WYOMING SECTION																																
Hilliard East Fork (E Fk)	25	29	25	23	21	19	19	18	15	15	15	15	15	15	15	15	15	15	15	15	15	15	11	11	5	0	0	0	0	0	1,572	
Lannon & Lone Mtn	5	5	5	5	5	5	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,610	
Hilliard West Side	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4	1,468	
Bear (Bear R)	15	15	15	14	14	14	14	10	6	6	6	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4,425	
Tropic	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	252	
Kreider Domestic Pump	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	5	
Danielson	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	742	
Crown & Pine Grove	6	6	6	6	6	6	7	8	8	8	8	8	8	8	8	8	8	6	6	6	6	5	4	4	3	2	2	2	2	2	1,395	
McGraw (and Big Bend)	9	8	6	6	6	6	6	6	6	7	8	7	7	6	7	6	6	6	6	6	6	7	7	6	4	2	2	2	2	3	1,509	
Lewis (D4)	3	3	3	3	3	3	3	2	1	1	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	539
Homer	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	174	
Lewis and Blanchard	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	315	
Myers No. 2	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	286	
Hare	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	121	
Coffman	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	223	
Knoder	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	441	
Myers No. 1	2	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	333	
Myers Irr	3	3	2	2	2	2	2	2	2	3	3	3	2	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	288	
Evanston Pipeline	10	10	9	9	8	8	8	8	8	8	7	7	7	7	7	7	7	7	7	7	7	7	6	6	6	6	6	6	7	7	1,252	
Booth	4	5	4	4	4	4	4	4	4	4	4	4	4	4	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1,116	
Anel Irr	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	590	
Cornelison	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	316	
Ev Water Supply (and Anderson)	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	131	
Knight No. 2 (and No. 1)	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	504	
"State Hospital Ditch"	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	
Evanston Water	10	10	10	8	7	7	6	5	5	4	4	6	6	6	6	6	6	6	5	5	5	5	5	5	5	5	5	5	4	3	5	1,443
Wilson Irr	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	175	
Faulkner	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	1	1	25	
Rocky Mtn & Blyth (and Crompton)	5	7	5	5	4	5	5	5	6	7	5	7	5	5	5	5	5	4	4	3	4	4	4	5	4	4	4	4	4	4	1,241	
B.E.A.R. Project PL	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	81	
Fife Irr	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	
Johnston & Narramore	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	119	
Fritz	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	120	
Bruce-Barton	3	5	5	4	3	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	203	
A.W. Sims	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	195	
Junction	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	49	
Morganson	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	27	
Fearms Irr (and Saxton-Thomas)	0	1	1	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	303	
John Sims	6	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	3	4	4	3	3	3	3	3	1,709	
Michael Sims	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	165	
S. P.	4	3	2	4	4	4	6	6	6	5	3	3	2	2	1	1	1	1	1	1	1	1	1	1	1	2	1	0	1	1	1,031	
Almy	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	2	2	0	0	0	0	0	0	0	0	0	0	0	269	
Sims, Blight & Turner	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	367	
Bowns	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	443	
Nixon West Side	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	12	
Turner	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	244	
Chapman (Headgate)	7	10	10	10	3	3	4	4	4	4	6	13	10	7	7	9	13	19	13	13	13	13	12	12	12	12	12	12	12	12	11,091	
Chapman (Stateline, incl'd above)	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	8	8	8	3	3	3	3	3	3	3	3	3	3	7,429	
Morris Bros Irr (Lower)	4	5	3	3	3	3	2	2	2	3	4	3	3	2	1	1	2	1	3	3	3	3	3	3	3	3	2	1	1	326		
Bowns & Bruce	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	134	
Olson No. 1 Pump	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	11	
Tunnel	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	1,614	
Francis-Lee	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	2,175	
Bear River Canal	19	19	19	19	19	19	19	19	20	19	19	20	22	22	22	22	22	22	23	23	23	23	23	23	23	22	11	2	2	2	4,801	
TOTAL UPPER WY DIV.	156	164	151	144	132	129	131	119	109	111	114	117	117	108	106	104	103	103	108	102	102	102	96	95	84	75	63	53	52	55	47,981	
Whit																																

## Central Division

The Compact provides that a water emergency may be declared when the divertible flow in the Central Division drops below 870 cfs. A water emergency may also be declared in the Central Division if the flow rate at the Border Gage drops below 350 cfs. The Compact provides that once a water emergency is deemed to exist, the State of Wyoming is to be restricted to 43 percent of the total divertible flow. The remaining 57 percent is available for use within Idaho.

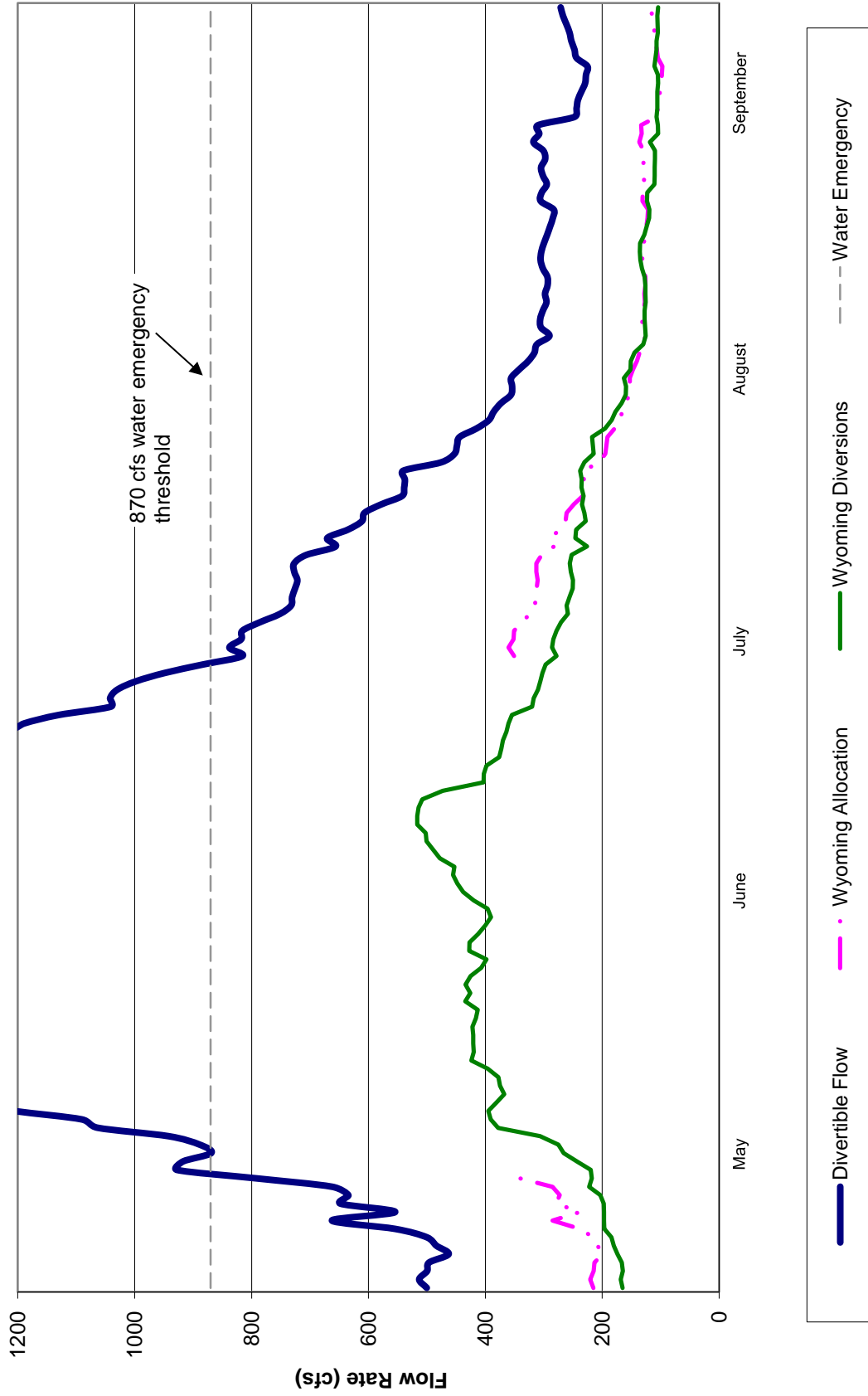
Figures 2008.12 and 2008.13 graphically illustrate the Central Division's divertible flow and the respective allocations and diversions by the Wyoming and Idaho Sections under a water emergency. The flow past the Border Gage is not illustrated on these figures, as it never impacted river regulation this year. It is important to note that on Figure 2008.13, the line labeled as "Available to Idaho" represents the summation of diversions within the State of Idaho, as well as flow passing Stewart Dam and diversion to the Rainbow Inlet Canal. As the Compact provides that 57 percent of the Central Division's divertible flow shall be available for use within Idaho, this line is used to show whether such provision of the Compact was met. However, the Compact also provides that if Idaho elects to not divert into its canals its full entitlement, a portion of its allocation can pass into the Lower Division via the Rainbow Inlet Canal or Stewart Dam. Data for this hydrograph are based on the River Commissioners'/Watermasters' annual reports to their respective state water agencies.

Figure 2008.14 (pages 08-23 through 08-27) shows a compilation of daily canal diversions as provided by the respective River Commissioners/Watermasters. The Wyoming and Idaho Sections' diversions and allocations are tabulated and summarized at the bottom of each page. The pages are divided such that there is one month's data per page. As the flow of the Bear River at the Border Gage could also be critical to the declaration of a water emergency, as defined by the Compact, this gage's data are also shown in these tables.

As can be seen on the graphs and from the data, the water supply in the Central Division in 2008 was much improved from the prior year, with natural stream flow near normal. Additionally, significant discharge from the Upper Division past Pixley Dam to the Central Division occurred during much of the irrigation season such that the divertible flow was above the minimum water emergency trigger of 870 cfs until mid-July. There was not a request from the water users for Compact distribution of the water supply and so a water emergency was not declared. There was good cooperation from the River Commissioners/Watermasters in appropriately distributing the water supply.

# 2008 - CENTRAL DIVISION

Wyoming Section Diversion vs Allocation

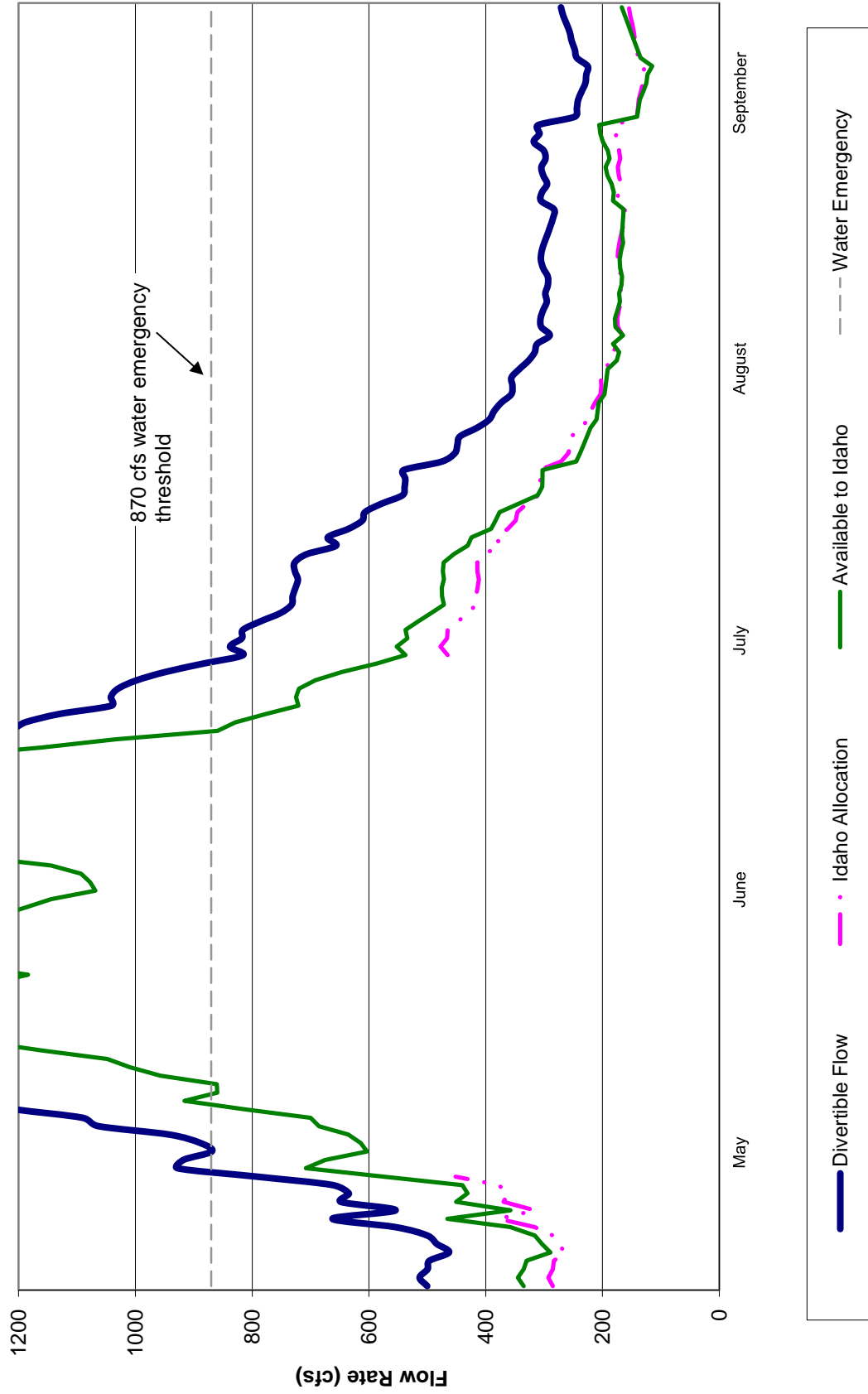


08-21

Figure 2008.12

# 2008 - CENTRAL DIVISION

Idaho Section Diversion vs Allocation



08-22

Figure 2008.13







DAILY DISCHARGE IN CFS OF BEAR RIVER CANALS WITH COMPACT ALLOCATIONS IN THE CENTRAL DIVISION

July

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## Lower Division

The Compact provides that a Utah Lower Division water user can petition the Commission for interstate regulation if he believes that he is being deprived of water to which he is justly entitled due to diversions in Idaho. If, upon review, the Commission finds such to be the case, then the Compact provides for the declaration of a water emergency and that it shall put into effect water delivery schedules based on priority of rights without regard to the state line. The Commission has never received such a petition. However, with growing concern for such a possibility, the Commission, over a several year period, determined how it would receive and review such a petition and implement water delivery should a water emergency be declared. At its November meeting in 1997 the Commission adopted *Interim Procedures for Lower Division Water Delivery*. Appendix B to the procedures, which was revised with the procedures in April, 2004, provides for the accounting and distribution method to be used in a water emergency.

Also appended to the procedures is *Water Delivery Schedule No. 1* which was revised by the Commission in 2006 and which includes the mainstem Lower Division water rights in both Idaho and Utah. After adoption of the water delivery schedule, both states began using this common schedule of water rights in their water right accounting programs. Hence, though not regulated by the Commission, the distribution in the Lower Division is cooperatively managed by the states of Idaho and Utah through their respective Watermasters and River Commissioners. Such distribution was facilitated in 2008 with weekly conference calls with the state agencies, large water users and PacifiCorp. Figure 2008.15 shows the delivery of water in the Lower Division as reported by the two state agencies.

### 2008 Lower Division Irrigation Water Deliveries

Canal/Group	Natural Flow (af)	Storage Use (af)	Total Diversion (af)
<b>Idaho</b>			
Gentile Valley	10,987	1,023	12,010
West Cache	37,829	8,757	46,586
Cub River Pumps	3,320	9,078	12,398
Last Chance and Bench B	66,114	6,318	72,432
Idaho Small Irrigators	7,624	1,402	9,026
<b>Utah</b>			
Bear River Canal Company	204,657	62,090	266,747
Utah Small Irrigators	4,670	4,632	9,302

Figure 2008.15

Allocation and deliveries of Bear Lake storage water are significant in most years to the total water diverted in the Lower Division. In 1995, PacifiCorp, the irrigators and Bear

Lake interests entered into a settlement agreement as to the allocation of storage water from Bear Lake. In 2004 the parties entered into an *Amended and Restated Bear Lake Settlement Agreement*. PacifiCorp tracks deliveries pursuant to the settlement agreement. Figure 2008.16 shows such deliveries in 2008.

**2008 Bear Lake Storage Deliveries**

Irrigation Storage Allocation	216,000 af
Bear Lake Storage Release	110,176 af
Lake Recovery Volume	105,824 af
Decreed Transit Losses	3,966 af
System Losses <sup>1</sup>	14,157 af
Delivered Bear Lake Storage	92,052 af

<sup>1</sup>Water that passes below Cutler Dam that is accounted for as storage water release.

**Figure 2008.16**

## STATE WATER ACTIVITIES

Article XI of the Amended Compact provides that applications for appropriation or change in water use within each state shall be in accordance with individual state law, except no such application shall be approved if the effect will deprive water users within another state or increase the depletion beyond that which is provided for under the Compact. This article further requires that state officials report, in a format and at intervals established by the Commission, the status of their respective allocations and uses. The Commission has determined the best format for reporting such changes in use is the Biennial Report. Figure 0.3 in the Overview section of this report provides the most recent depletion information. This portion of the Biennial Report provides a summary of major water and water right related activities in each of the states during the 2008 water year.

### **Idaho**

#### Water Activities

IDWR issued a water order requiring measuring devices and controlling works in the Central Division. IDWR staff and the Watermaster have been working extensively with irrigators to improve their diversions and their measuring devices. PacifiCorp and the Bear Watermaster are working towards adding telemetry to many of the diversions in both the Central and Lower Divisions. Telemetry will provide water managers with real-time data and aid in water management.

Black Bear Resort filed an application for 5 cfs of groundwater for municipal purposes. The proposed resort will be located on the west side of Bear Lake in the foothills south of Bloomington. The resort anticipates having both high and low density residential, a golf course, ski area and various other outdoor opportunities.

#### Water Rights

The City of Georgetown was issued a permit for 5 cfs for power use from a spring. Cisom Energy was issued a permit for 2 cfs from Wayland Hot Springs for power. Four additional permits were issued in Basin 11 and Basin 13 for domestic and stockwater purposes.

In Basin 15, the Malad drainage, one water right and six water right permits were issued. The water right was for 1.80 cfs of groundwater for irrigation. One permit was for municipal uses of 2 cfs from groundwater. The remaining permits totaled 10.95 cfs and were for irrigation and domestic uses from groundwater.

## Utah

### Water Activities

The Board of Water Resources took an action with regard to Procter & Gamble and provided a \$15 million loan to Brigham City to provide water for the first two units of the Procter & Gamble project. In addition to this water, Procter & Gamble is talking to the Bear River Canal Company for additional water for additional units. Utah's Governor and Legislature support and speak very positively of the Procter & Gamble facility.

Utah has two studies going on in the Bear River. One study looks at right-of-way issues in moving water from the Bear River south to the North Weber County area. The other study identifies the cost of constructing the Washakie Reservoir, a reservoir near Plymouth on the Malad River. The Malad River would be moved around and outside of the reservoir basin and Bear River water would be, by canal and pump, moved into that 160,000 acre-foot reservoir.

A cloud seeding project to increase snowpack has been ongoing since 1989 in the Lower Division in Eastern Box Elder County and Cache County. The winter storm systems in these areas are being seeded with ground-based generators using silver iodide. Bear River Water Conservancy District and Cache County cost shared (50/50) with the Utah Board of Water Resources in the cloud seeding project during the 2008 water year.

### Water Rights

There were 105 applications that were approved in Utah during 2008 for ground water for ordinary "domestic and stock watering" purposes and associated irrigation use for 120 homes.

In the Lower Division, in area 29, which is in Box Elder County below Cutler Dam, 5 applications were approved for a total of 35.6 acres of irrigation. An application by PacifiCorp for 800 cfs for hydropower at Cutler Dam was approved. A fixed-time application to fill a reservoir during the non-irrigation season was also approved and has since expired.

Change applications were also approved to change the nature and/or place of use of historic water rights. Most notably, a change application filed by the Bear River Canal Company was approved allowing changes in place of use of their water right to facilitate changes in land use. Permanent and temporary changes were also approved for irrigation companies in Rich County to facilitate changes in place of use to cover lands above canals, some of which have been irrigated for many years.

## Wyoming

### Water Activities

A mandatory licensing bill for well drillers has finally passed the Wyoming legislature. A Board will be established, and the daily administration of the Board will be handled through the Groundwater Division of the State Engineer's Office.

Due to the rising cost of supporting USGS stream gages, a request was made to the Wyoming legislature for \$1.6 million for expanding the in-house gaging program of the agency. Most of this money will go towards adding real-time gaging data at state supported stream gages and diversion gages across the state. This will address about 260 existing sites, including some in the upper Bear around Evanston.

Halfway through the water year, we all suffered a most difficult loss when Kevin Wilde passed away. We will miss him, his reliability, humor and infectious smile. Kevin will be remembered for his vision as he was involved in the installation of real-time data collection stations on the Bear River that will serve for decades. The Commission passed a Resolution of Appreciation expressing their appreciation and gratitude to Kevin's family for his generous and distinguished service and dedication.

Promotions and new hires in the Cokeville office include Kevin Payne, Assistant Superintendent and Mike Johnson, Hydrographer, lower Bear River drainage.

### Water Rights

New water right permits with Compact depletions issued from Wyoming's allowances are as follows:

<u>Permit No.</u>	<u>Appropriator</u>	<u>Depletion Allocation</u>	<u>Priority Date</u>
U.W. 187280	Teichert Brothers, LLC	2.50 acre-feet	May 27, 2008
12676R	Feathered Hook Properties, LLC	17.84 acre-feet	August 16, 2006

In addition to the depletion allocation, this reservoir was given a storage allocation of 41.39 acre-feet under the Amended Bear River Compact.

13176R	Kenneth C. Hansen	25.4 acre-feet	April 10, 2008
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In addition to the depletion allocation, this reservoir was given a storage allocation of 50 acre-feet under the 1958 Bear River Compact and 26.9 acre-feet under the Amended Bear River Compact. The 50 acre-feet of 1958 Bear River Compact allocation came from Needle Rock Reservoir, Permit No. 9603R, permitted by Kenneth C. Hansen. This permit was cancelled in February of 2008. Needle Rock Reservoir had been allocated 100.05 acre-feet of Original Compact storage, and now 50 acre-feet of that allocation has been transferred to this reservoir.



## **STREAM GAGING**

As was indicated in the "Overview" chapter of this report under the subsection concerning the "Stream Gaging Program" (see page O-13), the Bear River Commission participates in a cooperative contract with the USGS for the maintenance of stream gages on the Bear River and significant tributaries. Also, some of the states participate with the USGS in additional Bear River gages, as does PacifiCorp, and Wyoming funds and operates one gage. The Commission believes the collection of data concerning stream flows in the Bear River system is very important and allocates about half of its annual budget in support of the cooperative stream gaging program with the U.S. Geological Survey. However, costs continue to increase and so the Commission is constantly reviewing the stream gaging program to determine if all of the stations supported are necessary for the Commission to help the Commission fulfill the responsibilities assigned to it by the Compact. There were no changes to the Commission's stream gaging program in 2008.

During 2008, a total of 32 gages were maintained on the Bear River system. Of these 32 gages, 9 were part of a cooperative effort between the Bear River Commission and the USGS and the USGS funded two gages under NSIP. PacifiCorp maintained 15 gages on the Bear River system during 2008. Five additional gages were maintained under the USGS Cooperative Program with the State of Utah (3 gages), the State of Idaho (1 gage) and Logan City (1 gage). Additionally, the State of Wyoming maintained one gage on the Bear River. Figure 2008.17 shows a tabulation of these gages and the entities which participated in the operation and funding of each gage. The approximate locations of the stream gages are shown on Figure O.5 in the Overview section of this report.

Publication of the streamflow records for 12 of the gages in this report were considered to be of significant value to the Commission and are included on pages 08-35 through 08-47.

**BEAR RIVER SYSTEM STREAM GAGING STATIONS**  
**STREAM GAGES MAINTAINED DURING THE 2008 WATER YEAR**

STATION #	STATION NAME	OPERATED BY	MEASUREMENT FUNDED BY	PUBLICATION FUNDED BY
<u>10011500</u> ▲	Bear River near UT-WY state line	USGS	Commission	Commission
10016900▲¥	Bear River at Evanston WY	USGS-WY	USGS	USGS
<u>10020100</u> ▲	Bear River above reservoir near Woodruff UT	USGS	Commission	Commission
<u>10020300</u> ▲	Bear River below reservoir near Woodruff UT	USGS	Commission	Commission
10023000▲	Big Creek near Randolph UT	USGS	State of UT	State of UT
10026500▲	Bear River near Randolph UT	WY	State of WY	not published
<u>10028500</u> *▲	Bear River below Pixley Dam near Cokeville WY	USGS	Commission	Commission
<u>10032000</u> ▲	Smiths Fork near Border WY	USGS	Commission	Commission
10038000▲¥	Bear River below Smiths Fork near Cokeville WY	USGS	USGS	USGS
<u>10039500</u> ▲¥	Bear River at Border WY	USGS	Commission <sup>1</sup>	Commission
10044300	Dingle Inlet Canal near Dingle ID	PacifiCorp	PacifiCorp	not published
<u>10046000</u>	Rainbow Inlet Canal near Dingle ID	PacifiCorp	PacifiCorp	PacifiCorp
10046500 <sup>2</sup>	Bear River below Stewart Dam near Montpelier ID	PacifiCorp	PacifiCorp	not published
<u>10055500</u>	Bear Lake at Lifton near St. Charles ID	PacifiCorp	PacifiCorp	PacifiCorp
<u>10059500</u>	Bear Lake Outlet Canal near Paris ID	PacifiCorp	PacifiCorp	PacifiCorp
10068500▲	Bear River at Pescadero ID	USGS	State of ID	State of ID
10075000	Bear River at Soda Springs ID	PacifiCorp	PacifiCorp	PacifiCorp
10079000	Soda Point Reservoir at Alexander ID	PacifiCorp	PacifiCorp	PacifiCorp
10079500	Bear River at Alexander ID	PacifiCorp	PacifiCorp	PacifiCorp
10080000	Bear River below Grace Dam near Grace ID	PacifiCorp	PacifiCorp	PacifiCorp
10086000	Oneida Narrows Reservoir at Oneida ID	PacifiCorp	PacifiCorp	PacifiCorp
10086500	Bear River below PacifiCorp Tailrace at Oneida ID	PacifiCorp	PacifiCorp	PacifiCorp
<u>10092700</u> ▲	Bear River at ID-UT state line	USGS	Commission	Commission
10105900▲	Little Bear River at Paradise UT	USGS	State of UT	State of UT
10108400	Logan, Hyde Park, Smithfield Canal near Logan UT	USGS	State of UT	State of UT
<u>10109000</u> <sup>3</sup>	Logan River above State Dam near Logan UT	USGS	Commission	Commission
10113500▲	Blacksmith Fork above Upper & Lower Dam Near Hyrum UT	USGS	Logan City	Logan City
10116500	Cutler Reservoir near Collinston UT	PacifiCorp	PacifiCorp	PacifiCorp
10117000	Hammond (east side) Canal near Collinston UT	PacifiCorp	PacifiCorp	PacifiCorp
10117500	West Side Canal near Collinston UT	PacifiCorp	PacifiCorp	PacifiCorp
10118000	Bear River near Collinston UT	PacifiCorp	PacifiCorp	PacifiCorp
<u>10126000</u> ▲	Bear River near Corinne UT	USGS	Commission	Commission

- ▲ Stations which are equipped with DCPs.
- \* Seasonal stations
- ¥ NSIP site

Note: Underlined station numbers indicate those gages for which stream flow data is published in this report.

<sup>1</sup> This gage is now maintained year-round. The Commission pays for approximately 8 months of gage maintenance and the USGS pays for the remaining 4 months

<sup>2</sup> Discharge measurements below Stewart Dam are required for interstate regulation pursuant to the Compact. However, flow is general only a few cfs. PacifiCorp maintains this gage and reports discharge to the Idaho watermaster. The data are included with the Central Division's canal diversion data herein.

<sup>3</sup> This gage represents a summation of the Logan River discharge and canal diversions upstream of the gage (see gage 10108400). Gage 10109000 is part of the cooperative program with the USGS and the BRC, while gage 10108400 is maintained under a cooperative program between the USGS and the State of Utah. Of importance to the Commission, and published herein, is the combined flow of these two gages.

**Figure 2008.17**

## 10011500 BEAR RIVER NEAR UTAH-WYOMING STATE LINE

LOCATION.--Lat 40°57'55"□, long 110°51'10"□ referenced to North American Datum of 1927, in SE ¼ NW ¼ SE ¼ sec.30, T.3 N., R.10 E., Summit County, UT, Hydrologic Unit 16010101, on left bank 400 ft downstream from West Fork and 2.8 mi upstream from Utah-Wyoming State line.

DRAINAGE AREA.--172 mi<sup>2</sup>.

PERIOD OF RECORD.--July 1942 to current year.

REVISED RECORDS.--WDR UT-74-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 7,965 ft above NGVD of 1929, from river-profile map. Prior to October 1, 1986 at datum 3.0 ft lower.

REMARKS.--Records good except for estimated daily discharges, which are poor. Flow regulated slightly by Whitney Reservoir, total capacity, 4,700 acre-ft since 1966. Three diversions above station for irrigation of about 265 acres above and 2,600 acres below station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,230 ft<sup>3</sup>/s, Jun 6, 1986, gage height, 4.05 ft, datum then in use; minimum, 6.8 ft<sup>3</sup>/s, Apr 12, 1984, result of upstream ice jam.

Minimum daily discharge, 28 ft<sup>3</sup>/s, Apr 11.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,100 ft<sup>3</sup>/s and (or) maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
May 21	0015	*2,250	*6.83

Minimum daily discharge, 28 ft<sup>3</sup>/s, Apr. 11

### DISCHARGE, CUBIC FEET PER SECOND WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008 DAILY MEAN VALUES

[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	75	90	47	e36	e42	e54	e32	147	790	603	102	165
2	86	82	50	e36	e42	e52	e32	127	1,090	560	94	119
3	76	76	51	e37	e42	e50	e32	130	1,150	529	94	89
4	69	84	49	e37	e42	e48	e33	156	1,080	471	92	81
5	77	78	48	e37	e41	e46	e32	208	888	428	89	77
6	179	74	48	e35	e41	e44	e33	292	734	396	91	77
7	118	73	48	e37	e43	e42	e31	357	694	361	95	77
8	103	71	47	e40	e43	e41	e32	355	596	311	104	75
9	111	71	51	e40	e44	e41	30	331	668	280	88	73
10	109	73	e54	e41	e44	e41	29	313	902	256	94	79
11	105	70	e55	e41	e44	e43	28	376	1,050	233	83	92
12	98	63	e55	e41	e45	e42	29	440	718	215	75	82
13	94	72	e51	e43	e47	e41	34	340	637	194	72	75
14	95	59	e51	e45	e45	e40	39	321	868	175	68	71
15	90	e62	e50	e44	e44	e39	49	354	1,190	163	65	68
16	85	66	e49	e43	e45	e38	42	543	1,320	166	64	69
17	96	66	e48	e42	e45	e38	41	863	1,400	177	64	67
18	90	61	e48	e41	e45	e38	47	1,210	1,460	172	60	67
19	96	58	e48	e42	e45	e39	60	1,560	1,450	172	57	64
20	111	56	e48	e43	e46	e38	64	1,850	1,260	169	55	64
21	97	e52	e44	e42	e46	e37	57	1,810	1,170	178	60	65
22	94	50	e43	e41	e46	e36	62	1,190	1,230	174	62	64
23	102	52	e43	e41	e46	e37	70	862	1,230	168	62	65
24	103	e50	e40	e42	e48	e38	73	673	1,170	164	63	61
25	106	e44	e40	e43	e47	e40	59	549	1,120	164	64	59
26	108	42	e37	e43	e46	e41	57	508	1,030	142	68	56
27	103	41	e37	e44	e47	e38	59	445	921	111	71	56
28	99	42	e37	e44	e48	e38	80	487	845	116	70	55
29	96	47	e37	e43	e50	e38	130	544	769	116	73	55
30	98	47	e36	e43	---	e35	175	503	680	130	73	54
31	104	---	e35	e42	---	e35	---	566	---	120	73	---
<b>Total</b>	3,073	1,872	1,425	1,269	1,299	1,268	1,571	18,410	30,110	7,614	2,345	2,221
<b>Mean</b>	99.1	62.4	46.0	40.9	44.8	40.9	52.4	594	1,004	246	75.6	74.0
<b>Max</b>	179	90	55	45	50	54	175	1,850	1,460	603	104	165
<b>Min</b>	69	41	35	35	41	35	28	127	596	111	55	54
<b>Ac-ft</b>	6,100	3,710	2,830	2,520	2,580	2,520	3,120	36,520	59,720	15,100	4,650	4,410

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1943-2008, BY WATER YEAR (WY)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
<b>Mean</b>	64.6	54.6	46.1	41.6	39.7	43.8	112	602	830	292	92.8	73.5
<b>Max</b>	208	106	94.9	72.4	64.3	69.0	316	1,044	1,990	1,105	244	229
<b>(WY)</b>	(1983)	(1984)	(1984)	(1984)	(1984)	(1986)	(1946)	(1984)	(1986)	(1995)	(1965)	(1983)
<b>Min</b>	30.8	32.5	27.7	28.9	21.1	26.0	37.2	162	204	67.4	31.0	23.9
<b>(WY)</b>	(1959)	(1955)	(1960)	(2007)	(2003)	(1964)	(1944)	(1977)	(1992)	(1961)	(2002)	(1956)

## 10020100 BEAR RIVER ABOVE RESERVOIR, NEAR WOODRUFF, UT

LOCATION.--Lat 41°26'04" N, long 111°01'01" W referenced to North American Datum of 1927, in NE ¼ NW ¼ NW ¼ sec.29, T.17 N., R.120 W., Uinta County, WY, Hydrologic Unit 16010101, on right bank 9.3 mi upstream from Woodruff Narrows Dam and 10 mi southeast of Woodruff.

DRAINAGE AREA.--755 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1961 to current year.

REVISED RECORDS.--WDR UT-74-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 6,455 ft above NGVD of 1929, from river-profile map.

REMARKS.--Records good except for estimated daily discharges, which are fair. Diversion for irrigation of about 43,500 acres above station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,150 ft<sup>3</sup>/s, Jun 2, 1983, gage height, 6.17 ft; minimum, no flow several days during Aug, Sep 1988, and Sep 2002.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,630 ft<sup>3</sup>/s, May 22, gage height, 5.45 ft; minimum daily discharge, 5.6 ft<sup>3</sup>/s, Nov 25, 26.

### DISCHARGE, CUBIC FEET PER SECOND WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008 DAILY MEAN VALUES

[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	26	40	28	e34	e35	e40	e38	394	732	478	23	44
2	31	39	26	e34	e32	e38	e38	263	969	417	25	69
3	40	34	34	e35	e34	e37	e38	208	1,250	364	29	54
4	32	23	41	e37	e32	e37	e40	202	1,270	316	36	36
5	27	25	44	e37	e31	e37	e41	234	1,340	278	34	37
6	34	34	45	e36	e31	e37	e42	293	1,340	249	32	35
7	76	e34	47	e34	e34	e38	e43	418	1,040	221	32	34
8	58	e31	46	e35	e35	e38	e62	494	872	179	31	36
9	45	e36	40	e35	e34	e38	83	470	713	155	31	35
10	48	e36	32	e35	e35	e40	83	412	718	135	31	39
11	40	e35	31	e36	e35	e40	52	370	963	130	31	52
12	38	e34	e31	e36	e35	e39	46	483	1,030	113	30	58
13	34	e34	e31	e35	e37	e39	50	541	721	94	30	47
14	37	35	e30	e36	e35	e38	63	458	652	e80	31	42
15	38	39	e31	e37	e34	e38	129	398	854	75	26	39
16	36	27	e35	e32	e35	e37	142	419	1,160	77	28	38
17	36	33	e36	e33	e35	e37	108	641	1,320	72	31	40
18	44	38	e36	e35	e36	e37	101	989	1,420	61	31	40
19	29	35	e36	e36	e36	e40	136	1,310	1,470	51	26	31
20	25	29	e36	e37	e36	e39	248	1,550	1,430	49	23	33
21	41	23	e37	e35	e36	e39	199	1,860	1,180	50	27	33
22	36	24	e36	e34	e35	e39	168	2,340	1,070	50	26	40
23	29	9.7	e36	e33	e37	e40	203	1,870	1,120	50	29	46
24	38	7.4	e39	e33	e38	e41	312	1,360	1,120	50	30	42
25	53	5.6	e36	e34	e36	e41	274	1,030	989	42	27	35
26	53	5.6	e34	e35	e36	e41	203	819	892	36	25	31
27	47	9.3	e33	e36	e38	e38	191	883	783	30	25	34
28	45	13	e33	e37	e37	e38	214	741	657	31	22	33
29	43	22	e34	e34	e39	e39	313	720	599	33	22	34
30	39	21	e34	e33	---	e39	420	733	555	31	22	38
31	35	---	e35	e34	---	e38	---	646	---	35	25	---
<b>Total</b>	1,233	811.6	1,103	1,083	1,019	1,197	4,080	23,549	30,229	4,032	871	1,205
<b>Mean</b>	39.8	27.1	35.6	34.9	35.1	38.6	136	760	1,008	130	28.1	40.2
<b>Max</b>	76	40	47	37	39	41	420	2,340	1,470	478	36	69
<b>Min</b>	25	5.6	26	32	31	37	38	202	555	30	22	31
<b>Ac-ft</b>	2,450	1,610	2,190	2,150	2,020	2,370	8,090	46,710	59,960	8,000	1,730	2,390

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1962-2008, BY WATER YEAR (WY)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
<b>Mean</b>	68.1	68.9	67.4	64.2	77.7	157	314	783	798	181	47.6	46.4
<b>Max</b>	437	198	181	147	312	627	671	1,957	2,564	1,191	340	288
<b>(WY)</b>	(1983)	(1974)	(1984)	(1984)	(1986)	(1986)	(1969)	(1984)	(1986)	(1995)	(1983)	(1983)
<b>Min</b>	3.03	6.06	7.21	6.76	10.4	26.8	77.7	104	54.6	4.41	0.68	0.49
<b>(WY)</b>	(1965)	(1989)	(1989)	(1989)	(2003)	(1977)	(1977)	(1977)	(1992)	(2000)	(2000)	(1988)

### 10020300 BEAR RIVER BELOW RESERVOIR, NEAR WOODRUFF, UT

LOCATION.--Lat 41°30'20", long 111°00'50" referenced to North American Datum of 1927, in NE ¼ NE ¼ sec.32, T.18 N., R.120 W., Uinta County, WY, Hydrologic Unit 16010101, on right bank 1,100 ft downstream from Woodruff Narrows Dam, 1.6 mi upstream from Salt Creek, 5.4 mi upstream from Wyoming-Utah State line, and 7.7 mi east of Woodruff.

DRAINAGE AREA.--784 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1961 to current year.

REVISED RECORDS.--WDR UT-74-1: Drainage area.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 6,398.96 ft above NGVD of 1929. Prior to September 26, 1962, at site 175 ft upstream at same datum.

REMARKS.--Records good. Flow regulated by Woodruff Narrows Reservoir (station 10020200) beginning January 1962. Diversions for irrigation of about 43,500 acres above station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,820 ft<sup>3</sup>/s, Jun 2, 1983, gage height, 8.26 ft; no flow Jul 4, 5, 1962, Aug 30, 31, Sep 1, 2, 6, 7, 1979, Oct 30, 1980.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,460 ft<sup>3</sup>/s, May 23, gage height, 6.23 ft; minimum daily discharge, 13 ft<sup>3</sup>/s, on many days.

#### DISCHARGE, CUBIC FEET PER SECOND WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008 DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	15	14	13	13	13	14	14	122	716	451	43	28
2	15	14	13	13	13	14	14	125	688	449	43	27
3	15	14	13	13	13	14	14	166	694	447	43	27
4	15	15	13	13	13	14	14	213	751	446	43	27
5	15	15	13	13	13	14	14	215	809	444	43	27
6	15	15	13	13	13	14	14	218	814	391	43	27
7	15	15	13	14	13	14	14	432	817	88	43	27
8	15	14	13	14	13	14	14	555	859	88	43	27
9	15	14	13	13	13	14	14	674	892	88	43	28
10	15	14	14	13	13	14	14	723	892	88	43	28
11	15	14	14	13	13	14	14	722	991	88	43	27
12	15	14	14	13	13	14	14	722	1,240	88	43	27
13	15	14	13	13	13	14	14	722	1,070	72	42	33
14	15	14	13	13	13	14	14	722	922	55	42	38
15	15	14	13	13	13	14	14	718	903	55	33	37
16	15	14	13	13	13	14	14	715	904	55	25	38
17	15	14	13	13	13	14	13	715	1,170	54	25	38
18	15	14	13	13	13	14	13	710	1,360	54	25	38
19	15	14	13	13	13	14	13	732	1,360	52	24	38
20	15	14	13	13	13	14	13	991	1,360	46	25	39
21	15	14	13	13	13	14	13	1,400	1,300	46	25	38
22	14	14	13	13	13	14	13	1,420	1,140	46	26	39
23	14	14	13	13	13	14	13	1,430	1,050	45	28	38
24	14	14	13	13	13	14	13	1,430	977	45	27	38
25	14	14	13	13	13	14	13	1,430	976	45	27	39
26	14	14	13	13	13	14	13	1,420	878	45	28	38
27	14	13	13	13	13	14	69	1,410	811	45	27	39
28	14	13	13	13	13	14	116	1,400	810	45	28	38
29	14	13	13	13	14	14	117	1,010	716	43	28	39
30	14	13	13	13	---	14	119	750	455	43	27	38
31	14	---	13	13	---	14	---	749	---	43	28	---
<b>Total</b>	455	420	406	405	378	434	775	24,761	28,325	4,090	1,056	1,010
<b>Mean</b>	14.7	14.0	13.1	13.1	13.0	14.0	25.8	799	944	132	34.1	33.7
<b>Max</b>	15	15	14	14	14	14	119	1,430	1,360	451	43	39
<b>Min</b>	14	13	13	13	13	14	13	122	455	43	24	27
<b>Ac-ft</b>	902	833	805	803	750	861	1,540	49,110	56,180	8,110	2,090	2,000

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1962-2008, BY WATER YEAR (WY)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
<b>Mean</b>	53.2	49.6	43.9	41.9	43.7	89.8	254	753	946	265	73.1	56.3
<b>Max</b>	425	421	184	153	171	473	891	1,828	2,437	913	331	278
<b>(WY)</b>	(1983)	(1983)	(1983)	(1985)	(1971)	(1972)	(1985)	(1984)	(1983)	(1975)	(1983)	(1983)
<b>Min</b>	3.89	0.12	4.28	4.37	4.71	4.70	0.34	27.8	356	10.5	3.91	3.65
<b>(WY)</b>	(1990)	(1981)	(1978)	(1978)	(1978)	(1978)	(1977)	(1977)	(2002)	(2002)	(1979)	(1979)

## 10028500 BEAR RIVER BELOW PIXLEY DAM, NEAR COKEVILLE, WY

LOCATION.--Lat 41°56'20", long 110°59'05" referenced to North American Datum of 1927, in SW ¼ SE ¼ SE ¼ sec.25, T.23 N., R.120 W., Lincoln County, WY, Hydrologic Unit 16010102, 800 ft downstream from Pixley Dam, 11 mi south of Cokeville, and 17.5 mi downstream from Twin Creek.

DRAINAGE AREA.--2,032 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1941 to November 1943 (published as Bear River near Cokeville), October 1952 to September 1956, May 1958 to current year (seasonal only). Monthly discharge only for some periods, published in WSP 1314.

REVISED RECORDS.--WDR UT-74-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 6,185 ft above NGVD of 1929, from river-profile map. October 31, 1941 to November 30, 1943, at site 200 ft downstream at different datum. September 24, 1952 to August 31, 1994 at site 50 ft downstream at same datum.

REMARKS.--Records fair. Natural flow of stream affected by diversions for irrigation, return flow from irrigated areas, and regulation by upstream reservoirs.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 2,300 ft<sup>3</sup>/s, Mar 25, 1956; minimum daily discharge, 0.09 ft<sup>3</sup>/s, Sep 8, 2002.

### DISCHARGE, CUBIC FEET PER SECOND WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008 DAILY MEAN VALUES

[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	26	---	---	---	---	---	---	101	565	417	46	42
2	26	---	---	---	---	---	---	84	522	337	44	47
3	27	---	---	---	---	---	---	64	475	250	41	50
4	29	---	---	---	---	---	---	70	442	214	36	50
5	31	---	---	---	---	---	---	60	436	202	37	48
6	35	---	---	---	---	---	---	49	441	191	39	45
7	38	---	---	---	---	---	---	51	446	184	39	43
8	42	---	---	---	---	---	---	51	456	200	43	40
9	43	---	---	---	---	---	e103	54	459	228	45	36
10	42	---	---	---	---	---	104	65	467	244	44	34
11	---	---	---	---	---	---	104	84	468	243	46	34
12	---	---	---	---	---	---	105	191	460	210	47	34
13	---	---	---	---	---	---	109	241	463	180	45	33
14	---	---	---	---	---	---	123	225	470	169	40	34
15	---	---	---	---	---	---	152	211	477	171	47	34
16	---	---	---	---	---	---	164	192	478	158	48	31
17	---	---	---	---	---	---	167	182	485	155	44	29
18	---	---	---	---	---	---	153	157	483	148	41	29
19	---	---	---	---	---	---	122	123	471	129	41	28
20	---	---	---	---	---	---	145	87	472	141	39	26
21	---	---	---	---	---	---	147	63	479	158	38	26
22	---	---	---	---	---	---	128	58	484	132	37	28
23	---	---	---	---	---	---	106	102	489	121	36	30
24	---	---	---	---	---	---	109	209	502	111	36	30
25	---	---	---	---	---	---	115	242	508	101	39	29
26	---	---	---	---	---	---	106	275	495	91	40	29
27	---	---	---	---	---	---	98	450	465	79	38	29
28	---	---	---	---	---	---	93	533	439	70	36	29
29	---	---	---	---	---	---	89	536	404	62	38	29
30	---	---	---	---	---	---	82	547	379	56	38	28
31	---	---	---	---	---	---	---	569	---	52	38	---
<b>Total</b>	---	---	---	---	---	---	---	5,926	14,080	5,204	1,266	1,034
<b>Mean</b>	---	---	---	---	---	---	---	191	469	168	40.8	34.5
<b>Max</b>	---	---	---	---	---	---	---	569	565	417	48	50
<b>Min</b>	---	---	---	---	---	---	---	49	379	52	36	26
<b>Ac-ft</b>	---	---	---	---	---	---	---	11,750	27,930	10,320	2,510	2,050

Figure 2008.17 (cont.)

## 10032000 SMITHS FORK NEAR BORDER, WY

LOCATION.--Lat 42°17'36", long 110°52'18" referenced to North American Datum of 1927, in NE ¼ SW ¼ SW ¼ sec.28, T.27 N., R.118 W., Lincoln County, WY, Hydrologic Unit 16010102, on left bank 4.9 mi upstream from Howland Creek, 5.6 mi downstream from Hobble Creek, and 12.4 mi northeast of Border.

DRAINAGE AREA.--165 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1942 to current year.

REVISED RECORDS.--WSP 1734: 1952(M).

GAGE.--Water-stage recorder. Elevation of gage is 6,720 ft above NGVD of 1929, from topographic map. Prior to October 16, 1945, at site 1.2 mi downstream at different datum. October 16, 1945 to November 1986 at site 0.4 mi downstream at different datum.

REMARKS.--Records good except for estimated daily discharges, which are poor. One diversion for irrigation of about 200 acres above station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,100 ft<sup>3</sup>/s, Jun 4, 1986, gage height, 5.66 ft; minimum, 19 ft<sup>3</sup>/s, Feb.28, 2007

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 733 ft<sup>3</sup>/s, May 21, gage height, 2.98 ft; minimum daily discharge 36 ft<sup>3</sup>/s, Dec 12.

### DISCHARGE, CUBIC FEET PER SECOND WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008 DAILY MEAN VALUES

[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	70	64	e52	e37	e40	e49	38	132	478	563	203	132
2	70	62	e52	e37	e40	e45	41	116	532	539	197	122
3	69	62	e53	e38	e41	e44	43	120	573	521	191	116
4	69	63	53	e42	e40	e43	41	141	565	497	187	114
5	70	62	52	e43	e39	e42	43	195	549	473	185	113
6	83	62	52	e41	e40	e42	40	256	561	448	183	112
7	78	60	53	e40	e41	e41	42	308	535	423	180	110
8	74	61	52	e41	e40	e41	41	271	497	405	181	108
9	74	61	51	e41	e41	e41	42	261	459	391	186	107
10	71	61	e47	e41	e43	e40	42	222	466	371	173	108
11	70	62	e40	e42	e42	e41	40	225	452	354	165	109
12	69	60	e36	e41	e42	43	41	244	423	343	160	108
13	70	63	e37	e40	e45	43	45	234	407	329	153	105
14	69	58	e37	e42	e43	43	54	259	407	318	150	103
15	68	60	e37	e42	e41	42	64	251	435	309	150	101
16	67	61	e38	e37	e42	40	60	334	494	301	149	100
17	73	62	e39	e38	e43	39	56	430	572	291	144	99
18	70	61	e40	e38	e43	43	61	509	642	284	139	98
19	73	59	e41	e39	e43	44	71	587	667	278	136	98
20	77	59	e40	e40	e44	45	85	644	661	271	133	101
21	74	e58	e39	e39	e43	43	72	690	643	269	131	102
22	68	e58	e37	e37	e43	39	70	591	645	267	129	106
23	70	e57	e37	e38	e42	38	75	508	657	257	128	102
24	70	e57	e40	e38	e44	43	79	453	661	246	125	98
25	70	e56	e39	e39	e43	45	73	409	652	242	123	96
26	69	e54	e38	e40	e43	44	68	417	645	237	120	94
27	68	e54	e37	e41	e43	43	70	423	631	228	120	93
28	67	e53	e38	e41	e43	37	84	417	612	223	118	92
29	67	e53	e39	e40	e47	43	115	443	594	220	117	92
30	67	e52	e40	e39	---	40	147	444	583	213	115	91
31	67	---	e38	e40	---	41	---	448	---	208	117	---
<b>Total</b>	2,191	1,775	1,324	1,232	1,224	1,307	1,843	10,982	16,698	10,319	4,688	3,130
<b>Mean</b>	70.7	59.2	42.7	39.7	42.2	42.2	61.4	354	557	333	151	104
<b>Max</b>	83	64	53	43	47	49	147	690	667	563	203	132
<b>Min</b>	67	52	36	37	39	37	38	116	407	208	115	91
<b>Ac-ft</b>	4,350	3,520	2,630	2,440	2,430	2,590	3,660	21,780	33,120	20,470	9,300	6,210

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1943-2008, BY WATER YEAR (WY)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
<b>Mean</b>	89.5	77.4	68.4	63.1	60.3	62.2	159	529	608	286	149	107
<b>Max</b>	156	113	88.4	85.0	82.8	99.4	385	1,072	1,377	602	242	166
<b>(WY)</b>	(1987)	(1986)	(1983)	(1983)	(1984)	(1986)	(1946)	(1997)	(1986)	(1975)	(1983)	(1986)
<b>Min</b>	51.0	50.7	41.5	39.7	34.7	39.5	58.6	99.1	96.2	61.4	55.1	52.1
<b>(WY)</b>	(1978)	(1978)	(2002)	(2008)	(2003)	(1988)	(1975)	(1977)	(1977)	(1977)	(1977)	(1977)

## 10039500 BEAR RIVER AT BORDER, WY

LOCATION.--Lat 42°12'40", long 111°03'11" referenced to North American Datum of 1927, in NE ¼ NE ¼ NE ¼ sec.15, T.14 S., R.46 E., Bear Lake County, ID, Hydrologic Unit 16010102, on left bank 0.2 mi west of Wyoming-Idaho State line, 0.5 mi west of Border, and 2.1 mi upstream from Thomas Fork.

DRAINAGE AREA.--2,480 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1937 to September 1996, October 1996 to September 2000 (seasonal), October 2000 to current year.

REVISED RECORDS.--WDR UT-74-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 6,051.63 ft above NGVD of 1929, unadjusted.

REMARKS.--Records good except for estimated daily discharges, which are poor. Natural flow of stream affected by regulation of upstream reservoirs, diversions for irrigation, and return flow from irrigated areas.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,880 ft<sup>3</sup>/s, Jun 7, 1983, gage height, 9.69 ft; minimum discharge, 24 ft<sup>3</sup>/s, Apr 29, 30, 1977.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1420 ft<sup>3</sup>/s, Jun 2, gage height, 5.16 ft.; minimum daily discharge, 81 ft<sup>3</sup>/s, several days in Jan and Feb.

### DISCHARGE, CUBIC FEET PER SECOND WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008 DAILY MEAN VALUES

[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	89	102	e110	e101	e82	e112	e126	298	1,390	973	207	136
2	86	107	e110	e103	e83	e111	e127	285	1,390	951	192	140
3	87	104	e111	e112	e84	e110	e126	260	1,370	804	182	137
4	88	104	e112	e110	e84	e110	e132	245	1,340	713	180	135
5	92	105	e109	e105	e82	e110	e122	275	1,260	657	174	136
6	104	107	e108	e102	e81	e110	e135	321	1,270	609	174	134
7	105	107	e110	e100	e83	e110	e149	376	1,280	579	176	130
8	103	106	e104	e99	e84	e110	e168	413	1,230	549	180	128
9	103	106	e98	e99	e84	e113	e190	391	1,190	558	182	126
10	104	107	e100	e99	e86	e115	197	387	1,150	560	188	124
11	98	107	e105	e98	e88	e120	202	365	1,190	547	185	123
12	98	108	e113	e96	e90	e110	204	411	1,130	519	181	123
13	95	107	e110	e92	e92	e110	218	603	1,060	466	182	118
14	94	107	e110	e87	e90	e111	239	614	1,020	427	e170	115
15	95	99	e108	e81	e88	e110	277	585	1,020	401	e158	113
16	94	103	e107	e81	e88	e112	294	564	1,040	392	158	112
17	97	122	e106	e81	e88	e115	300	614	1,090	381	162	109
18	98	117	e110	e81	e86	e118	319	685	1,150	374	159	107
19	98	117	e112	e82	e86	e120	334	741	1,200	355	153	107
20	101	112	e111	e83	e88	e122	346	774	1,210	330	149	108
21	105	103	e108	e82	e86	e125	340	791	1,220	336	146	110
22	108	e98	e108	e81	e86	e118	317	856	1,200	349	146	113
23	108	e98	e107	e83	e86	e120	304	767	1,190	334	145	116
24	108	e104	e110	e84	e90	e130	296	756	1,180	334	144	114
25	108	e106	e108	e84	e91	e140	294	807	1,170	314	143	111
26	108	e108	e107	e85	e90	e132	283	830	1,150	294	141	107
27	105	e110	e105	e86	e92	e125	269	970	1,150	274	137	107
28	102	e103	e104	e86	e95	e126	267	1,220	1,100	258	135	107
29	101	e95	e102	e85	e103	e128	264	1,330	1,020	248	134	107
30	101	e99	e100	e83	---	e133	286	1,360	981	234	125	105
31	101	---	e100	e83	---	e129	---	1,370	---	222	124	---
<b>Total</b>	3,084	3,178	3,323	2,814	2,536	3,665	7,125	20,264	35,341	14,342	5,012	3,558
<b>Mean</b>	99.5	106	107	90.8	87.4	118	238	654	1,178	463	162	119
<b>Max</b>	108	122	113	112	103	140	346	1,370	1,390	973	207	140
<b>Min</b>	86	95	98	81	81	110	122	245	981	222	124	105
<b>Ac-ft</b>	6,120	6,300	6,590	5,580	5,030	7,270	14,130	40,190	70,100	28,450	9,940	7,060

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1938-96, 2001-08, BY WATER YEAR (WY)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
<b>Mean</b>	201	218	191	176	199	366	713	980	1,118	513	218	172
<b>Max</b>	751	693	563	381	479	1,294	1,979	3,158	3,829	1,670	752	671
<b>(WY)</b>	(1983)	(1983)	(1983)	(1985)	(1986)	(1986)	(1985)	(1952)	(1983)	(1983)	(1983)	(1983)
<b>Min</b>	43.5	74.6	97.2	77.6	75.2	105	71.2	74.4	62.2	54.2	42.3	38.5
<b>(WY)</b>	(2002)	(2002)	(2002)	(1993)	(1993)	(1988)	(1977)	(1977)	(1977)	(1977)	(1940)	(1940)



**PacifiCorp Energy  
Stream Discharge Records  
Rainbow Inlet Canal 2007 - 2008  
Daily Discharge (CFS)**

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Day
1	25	104	110	86	96	119	125	315	958	924	200	85	1
2	30	105	109	84	97	118	125	325	965	904	175	85	2
3	32	108	108	83	98	117	125	305	952	884	150	85	3
4	34	110	107	82	99	117	130	300	932	797	150	85	4
5	35	111	106	80	100	116	130	260	925	681	150	85	5
6	36	111	105	79	101	115	125	260	874	618	150	85	6
7	40	112	105	78	102	114	125	260	812	607	93	104	7
8	42	112	104	77	103	114	125	300	906	568	93	104	8
9	44	113	103	75	104	113	125	400	874	535	93	104	9
10	46	113	102	74	105	112	125	276	895	544	93	110	10
11	48	114	101	75	106	111	125	200	891	544	93	110	11
12	50	114	100	76	106	111	150	176	907	521	93	100	12
13	55	115	110	77	107	110	150	175	858	480	93	100	13
14	60	120	109	78	108	109	175	275	777	425	93	100	14
15	63	119	107	79	109	108	210	410	717	377	85	90	15
16	67	118	106	80	110	108	225	375	660	370	85	90	16
17	70	116	105	81	111	107	303	300	626	350	85	29	17
18	116	115	104	82	112	106	330	305	607	350	85	29	18
19	117	113	102	83	113	110	380	320	618	325	40	29	19
20	118	110	101	84	114	120	410	350	665	300	40	25	20
21	119	108	100	85	115	125	400	350	781	275	60	25	21
22	120	105	98	86	116	125	400	450	855	275	60	25	22
23	118	108	97	87	117	120	400	400	905	273	75	25	23
24	115	110	96	88	118	125	400	500	937	272	80	40	24
25	100	113	95	89	119	125	350	500	949	270	85	40	25
26	101	115	93	90	120	150	350	600	962	268	85	40	26
27	101	113	92	91	121	150	350	660	995	250	85	40	27
28	102	110	91	92	120	150	325	700	1010	226	80	40	28
29	103	115	89	93	120	150	310	810	1000	226	80	40	29
30	103	106	88	94	120	150	300	900	972	200	80	40	30
31	104		87	95		150		954		200	80		31

Monthly Totals													
Total	2,314	3,356	3,130	2,578	3,166	3,775	7,303	12,861	25,785	13,839	2,989	1,989	Yearly Totals
Daily Mean	74.60	112.00	101.00	83.20	109.00	122.00	243.00	415.00	860.00	446.00	96.40	66.30	227.00
Daily Min	25.00	104.00	86.90	74.00	95.80	106.00	125.00	175.00	607.00	200.00	40.00	25.00	25.00
Daily Max	120.00	120.00	110.00	94.60	121.00	150.00	410.00	954.00	1,010.00	924.00	200.00	110.00	1,010.00
Ins. Min	25.00	104.00	86.90	74.00	95.80	106.00	125.00	175.00	597.00	200.00	40.00	25.00	25.00
Ins. Max	120.00	120.00	110.00	94.60	121.00	150.00	410.00	954.00	1,020.00	944.00	200.00	110.00	1,015.33
Acre Ft	4,590	6,660	6,210	5,110	6,280	7,490	14,490	25,510	51,140	27,450	5,930	3,950	164,810

Notes: Measurements were taken at the cable way and below the Rainbow dam according to the inflows in the Rainbow Inlet canal. See Shift Summary description. Comparison between these flows and the Bear River at Border, Wyoming USGS gage confirmed the validity of these values. The gage is influenced by backwater flows, so during low flow periods, the daily operator estimates of flow are used.

**PacifiCorp Energy  
Reservoir Level Records  
Bear Lake at Lifton (1005500) October 2007 - September 2008  
Daily Contents (Thousands of Acre Feet)**

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Day
1	355	342	343	345	358	377	397	432	477	528	470	390	1
2	354	342	343	345	359	378	399	434	479	527	467	388	2
3	354	342	343	345	359	379	399	435	481	526	467	387	3
4	353	342	343	346	360	380	400	435	484	526	463	385	4
5	353	342	343	346	361	380	401	436	487	525	460	382	5
6	352	342	343	347	361	381	401	436	489	524	458	380	6
7	351	342	343	347	362	382	402	437	492	523	455	379	7
8	351	342	343	347	363	382	403	437	494	523	453	378	8
9	350	342	343	348	363	383	404	438	496	521	450	376	9
10	349	342	343	348	364	383	406	439	498	520	448	375	10
11	349	343	343	348	365	384	407	440	500	518	445	373	11
12	348	343	343	348	365	385	408	441	502	516	445	371	12
13	348	343	343	348	366	385	409	442	505	515	442	369	13
14	348	343	343	349	366	386	411	444	507	511	438	367	14
15	348	343	343	349	366	386	412	445	509	508	436	365	15
16	348	343	343	350	366	387	413	446	511	505	434	363	16
17	348	343	343	351	368	387	414	447	514	502	431	361	17
18	347	343	343	351	368	387	416	448	515	499	428	360	18
19	347	343	343	352	370	388	417	448	516	496	426	359	19
20	347	343	343	353	370	388	418	449	518	492	426	359	20
21	346	343	343	353	371	389	420	450	519	490	423	358	21
22	346	343	344	353	371	390	421	451	519	488	416	358	22
23	346	343	344	353	372	390	422	454	520	486	413	356	23
24	346	343	344	354	373	391	423	456	521	483	410	354	24
25	345	343	344	354	373	392	425	459	521	481	407	354	25
26	344	343	344	354	374	392	426	462	523	480	404	353	26
27	344	343	344	354	375	393	427	464	524	479	402	353	27
28	344	343	344	355	375	394	428	467	524	478	400	352	28
29	343	343	344	356	376	394	430	469	525	476	398	351	29
30	343	343	344	356	376	395	431	472	526	474	395	351	30
31	342		345	357		397		474		472	393		31

<b>Monthly Totals</b>													
	Mean	Min	Max	350	367	387	413	448	507	503	432	367	Yearly Totals
	348	343	343	350	367	387	413	448	507	503	432	367	401
	342	342	343	345	358	377	397	432	477	472	393	351	342
	355	343	345	357	375	397	431	474	526	528	470	390	528

Notes:

**PacifiCorp Energy  
Reservoir Level Records  
Bear Lake at Lifton (10055500) October 2007 - September 2008  
Daily Stage (Ft) Add 5900 for Elevation**

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Day
1	7.84	7.63	7.65	7.68	7.88	8.19	8.51	9.06	9.76	10.55	9.65	8.40	1
2	7.83	7.63	7.65	7.68	7.90	8.21	8.53	9.08	9.80	10.54	9.61	8.37	2
3	7.82	7.63	7.65	7.68	7.91	8.22	8.54	9.10	9.83	10.53	9.61	8.34	3
4	7.81	7.63	7.65	7.70	7.92	8.23	8.55	9.11	9.87	10.52	9.55	8.32	4
5	7.80	7.63	7.65	7.70	7.93	8.23	8.56	9.12	9.91	10.51	9.50	8.27	5
6	7.79	7.63	7.65	7.71	7.94	8.25	8.57	9.12	9.95	10.50	9.46	8.24	6
7	7.78	7.63	7.65	7.71	7.95	8.26	8.58	9.13	9.99	10.48	9.42	8.22	7
8	7.77	7.63	7.65	7.71	7.96	8.27	8.60	9.14	10.03	10.47	9.38	8.20	8
9	7.76	7.63	7.65	7.72	7.97	8.28	8.62	9.15	10.06	10.45	9.34	8.18	9
10	7.75	7.63	7.65	7.72	7.98	8.29	8.64	9.16	10.09	10.43	9.30	8.15	10
11	7.74	7.64	7.65	7.72	7.99	8.30	8.66	9.18	10.12	10.40	9.26	8.12	11
12	7.73	7.64	7.65	7.73	8.00	8.31	8.68	9.20	10.15	10.37	9.26	8.09	12
13	7.73	7.64	7.65	7.73	8.01	8.32	8.70	9.22	10.19	10.34	9.22	8.06	13
14	7.72	7.65	7.65	7.74	8.01	8.33	8.72	9.24	10.23	10.29	9.15	8.03	14
15	7.72	7.65	7.65	7.75	8.02	8.33	8.74	9.26	10.26	10.25	9.12	8.00	15
16	7.72	7.65	7.65	7.76	8.02	8.34	8.76	9.28	10.29	10.20	9.08	7.97	16
17	7.72	7.65	7.65	7.77	8.04	8.34	8.78	9.29	10.32	10.15	9.04	7.94	17
18	7.71	7.65	7.65	7.78	8.04	8.35	8.80	9.30	10.34	10.10	9.00	7.92	18
19	7.71	7.65	7.65	7.79	8.07	8.36	8.82	9.31	10.37	10.05	8.96	7.91	19
20	7.71	7.65	7.65	7.80	8.08	8.37	8.84	9.32	10.40	10.00	8.96	7.90	20
21	7.70	7.65	7.65	7.80	8.09	8.38	8.86	9.34	10.41	9.96	8.91	7.89	21
22	7.70	7.65	7.66	7.81	8.10	8.39	8.88	9.36	10.42	9.93	8.81	7.88	22
23	7.70	7.65	7.66	7.81	8.11	8.40	8.90	9.40	10.43	9.90	8.76	7.85	23
24	7.69	7.65	7.66	7.82	8.12	8.41	8.92	9.44	10.44	9.86	8.71	7.83	24
25	7.68	7.65	7.66	7.82	8.13	8.42	8.94	9.48	10.45	9.83	8.66	7.82	25
26	7.67	7.65	7.66	7.83	8.14	8.43	8.96	9.52	10.47	9.81	8.61	7.81	26
27	7.67	7.65	7.66	7.83	8.15	8.44	8.98	9.56	10.49	9.79	8.58	7.80	27
28	7.66	7.65	7.67	7.84	8.16	8.45	9.00	9.60	10.50	9.77	8.55	7.79	28
29	7.65	7.65	7.67	7.85	8.17	8.46	9.02	9.64	10.51	9.74	8.52	7.78	29
30	7.64	7.65	7.67	7.86	8.18	8.48	9.04	9.68	10.53	9.71	8.48	7.77	30
31	7.63		7.68	7.87		8.50		9.72		9.68	8.44		31

**BEAR LAKE STATISTICS**

	Monthly												Yearly
Daily Mean	7.73	7.64	7.65	7.77	8.03	8.34	8.76	9.31	10.22	10.16	9.06	8.03	8.56
Daily Min	7.63	7.63	7.65	7.68	7.88	8.19	8.51	9.06	9.76	9.68	8.44	7.77	7.63
Daily Max	7.84	7.65	7.68	7.87	8.17	8.50	9.04	9.72	10.53	10.55	9.65	8.40	10.55

Notes: Readings taken from staff gage at Utah State Parks Marina;

**PacifiCorp Energy**  
**Stream Discharge Records**  
**Bear Lake Outlet Canal 2007 - 2008**  
**Daily Discharge (CFS)**

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Day
1	5	5	5	5	5	5	5	5	5	833	929	872	1
2	5	5	5	5	5	5	5	5	5	872	1190	856	2
3	5	5	5	5	5	5	5	5	5	910	1180	756	3
4	5	5	5	5	5	5	5	5	5	917	1160	684	4
5	5	5	5	5	5	5	5	5	5	942	1140	684	5
6	5	5	5	5	5	5	5	5	5	1010	1250	641	6
7	5	5	5	5	5	5	5	5	5	1010	1250	500	7
8	5	5	5	5	5	5	5	5	5	1150	1280	500	8
9	5	5	5	5	5	5	5	5	5	1280	1290	469	9
10	5	5	5	5	5	5	5	5	5	1270	1220	270	10
11	5	5	5	5	5	5	5	5	5	1390	1020	295	11
12	5	5	5	5	5	5	5	5	5	1480	1130	382	12
13	5	5	5	5	5	5	5	5	5	1470	1120	312	13
14	5	5	5	5	5	5	5	5	5	1300	1020	308	14
15	5	5	5	5	5	5	5	5	5	1180	1010	304	15
16	5	5	5	5	5	5	5	5	5	1160	916	304	16
17	5	5	5	5	5	5	5	5	260	1200	888	273	17
18	5	5	5	5	5	5	5	5	386	1320	904	176	18
19	5	5	5	5	5	5	5	5	424	1290	882	184	19
20	5	5	5	5	5	5	5	5	491	1230	867	226	20
21	5	5	5	5	5	5	5	5	497	1190	925	229	21
22	5	5	5	5	5	5	5	5	444	1170	945	188	22
23	5	5	5	5	5	5	5	5	351	924	1030	100	23
24	5	5	5	5	5	5	5	5	356	899	1070	100	24
25	5	5	5	5	5	5	5	5	359	887	1090	100	25
26	5	5	5	5	5	5	5	5	377	783	1070	100	26
27	5	5	5	5	5	5	5	5	476	796	1010	100	27
28	5	5	5	5	5	5	5	5	523	793	996	100	28
29	5	5	5	5	5	5	5	5	695	794	964	100	29
30	5	5	5	5	5	5	5	5	810	824	942	100	30
31	5	5	5	5	5	5	5	5	936	936	920	100	31

**Monthly Statistics**

Vol. (SFD)	155	150	155	155	145	155	150	155	6,529	33,210	32,608	10,213	<b>Yearly Stats</b> <b>83,780</b>
Daily Mean	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	218.00	1,070.00	1,050.00	340.00	<b>227.00</b>
Daily Min	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	783.00	867.00	100.00	<b>5.00</b>
Daily Max	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	810.00	1,480.00	1,290.00	872.00	<b>1,480.00</b>
Ins. Min	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	773.00	843.00	45.80	<b>5.00</b>
Ins. Max	5.00	5.00	5.00	5.00	5.00	5.00	5.00	581.00	823.00	1,510.00	1,290.00	907.00	<b>1,510.00</b>
Vol. (AF)	307	298	307	307	288	307	298	307	12,950	65,870	64,680	20,260	<b>166,179</b>

Notes: Water was turned back into the Outlet canal on June 17th, to begin the 2008 irrigation season. The first flow measurement was taken on June 28th, 2008

## 10092700 BEAR RIVER AT IDAHO-UTAH STATE LINE

LOCATION.--Lat 42°00'47", long 111°55'14" referenced to North American Datum of 1927, in NE ¼ NW ¼ sec.29, T.16 S., R.39 E., Franklin County, ID, Hydrologic Unit 16010202, on left bank 1,050 ft downstream from inlet canal to Cub River pumps, 1.1 mi downstream from Weston Creek, 1.8 mi upstream from Idaho-Utah State line, and 3.5 mi southeast of Weston.

PERIOD OF RECORD.--October 1970 to current year.

REVISED RECORDS.--WDR UT-74-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 4,420 ft above NGVD of 1929, from topographic map. Prior to September 10, 1982 at datum 2.00 ft higher. September 10, 1982 to September 30, 1985 at datum 10.0 ft lower. Crest stage gage since Oct 17, 2008.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,870 ft<sup>3</sup>/s, Jun 14, 1984, gage height, 9.20 ft; minimum daily discharge, 24 ft<sup>3</sup>/s, May 16, 2004.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,210 ft<sup>3</sup>/s, May 26, gage height, 11.85 ft; minimum daily discharge, 153 ft<sup>3</sup>/s, Sep 28.

### DISCHARGE, CUBIC FEET PER SECOND WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008 DAILY MEAN VALUES

[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	236	294	323	e369	e350	469	576	e924	867	394	457	970
2	243	273	365	e370	e305	449	616	e832	847	438	582	943
3	261	251	365	e380	e340	501	553	e810	921	499	596	797
4	263	263	364	e390	e340	561	536	e818	876	534	660	768
5	281	264	368	e390	e340	538	480	e687	940	537	710	745
6	303	267	407	e400	e310	494	363	e504	1,050	603	819	664
7	301	268	432	e380	e310	548	350	e481	879	667	874	622
8	309	284	433	e340	e340	476	357	e524	673	741	876	496
9	310	289	422	e320	e350	529	379	e591	653	719	802	464
10	310	306	367	e319	e370	538	365	e655	737	784	771	434
11	306	345	408	e330	e360	511	480	e562	727	782	703	436
12	302	346	400	e340	e360	495	523	e500	609	743	697	337
13	304	322	311	e350	e355	505	589	e470	421	746	685	257
14	307	299	402	e300	e555	462	668	350	611	775	626	220
15	303	400	448	e250	e295	432	621	326	396	742	612	210
16	307	368	428	e250	e275	419	809	385	474	749	601	217
17	376	370	393	e250	277	436	745	524	408	755	599	216
18	422	352	392	e250	289	464	797	535	295	764	602	213
19	464	371	401	e270	318	464	738	526	291	753	605	220
20	523	360	404	e330	418	574	763	398	244	722	602	245
21	435	313	426	e380	399	466	1,060	478	243	700	595	227
22	415	320	384	e330	320	400	1,080	562	217	593	619	345
23	317	348	377	e280	304	383	1,030	624	225	618	651	294
24	280	353	315	e330	486	374	1,060	759	206	533	741	201
25	296	353	450	e390	591	397	1,090	977	262	531	754	196
26	324	339	e390	e400	431	421	1,080	970	250	457	746	174
27	307	338	e360	e370	436	417	e1,110	662	212	443	857	158
28	308	319	e388	e310	447	403	e1,100	769	198	419	863	153
29	306	330	e330	e310	472	438	e1,060	813	262	299	801	175
30	308	361	e329	e310	---	504	e1,000	812	297	363	767	277
31	304	---	e350	e360	---	658	---	837	---	461	799	---
<b>Total</b>	10,031	9,666	11,932	10,348	10,743	14,726	21,978	19,665	15,291	18,864	21,672	11,674
<b>Mean</b>	324	322	385	334	370	475	733	634	510	609	699	389
<b>Max</b>	523	400	450	400	591	658	1,110	977	1,050	784	876	970
<b>Min</b>	236	251	311	250	275	374	350	326	198	299	457	153
<b>Ac-ft</b>	19,900	19,170	23,670	20,530	21,310	29,210	43,590	39,010	30,330	37,420	42,990	23,160

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1971-2008, BY WATER YEAR (WY)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
<b>Mean</b>	859	914	927	911	919	1,123	1,342	1,419	1,277	977	895	855
<b>Max</b>	2,850	2,983	2,552	1,904	2,556	3,264	3,594	3,968	4,263	3,442	2,416	2,545
<b>(WY)</b>	(1984)	(1984)	(1985)	(1984)	(1986)	(1986)	(1986)	(1986)	(1986)	(1983)	(1984)	(1986)
<b>Min</b>	223	298	310	269	296	351	351	158	301	368	461	192
<b>(WY)</b>	(2004)	(1993)	(1982)	(2004)	(2002)	(1991)	(2003)	(2003)	(2004)	(2006)	(1993)	(1992)

**10109001 COMBINED DISCHARGE, IN CUBIC FEET PER SECOND, OF LOGAN RIVER  
ABOVE STATE DAM AND LOGAN, HYDE PARK AND SMITHFIELD CANAL NEAR LOGAN,  
UT**

REVISED RECORDS.--WDR UT-04-1: Discharge.

**DISCHARGE, CUBIC FEET PER SECOND  
WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008  
DAILY MEAN VALUES**

<b>Day</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>
<b>1</b>	120	104	99	87	91	87	90	196	604	559	243	186
<b>2</b>	120	102	97	92	89	85	91	175	661	541	241	178
<b>3</b>	119	102	96	97	91	82	91	177	720	518	236	174
<b>4</b>	117	101	98	99	88	86	91	192	720	493	233	172
<b>5</b>	117	101	99	105	85	83	93	232	684	469	231	171
<b>6</b>	120	101	98	98	87	83	93	292	661	452	232	169
<b>7</b>	119	102	99	95	89	83	94	341	635	432	231	168
<b>8</b>	117	103	99	98	87	85	94	351	582	411	234	165
<b>9</b>	114	103	99	100	87	85	94	335	544	399	228	164
<b>10</b>	113	103	98	97	87	86	92	291	575	388	227	164
<b>11</b>	114	104	96	98	86	87	92	278	575	375	222	163
<b>12</b>	114	102	90	97	85	89	93	297	523	358	218	162
<b>13</b>	114	100	99	97	87	91	100	279	487	346	214	159
<b>14</b>	111	100	96	95	86	91	116	289	469	340	213	156
<b>15</b>	109	99	90	96	83	90	135	286	501	331	211	154
<b>16</b>	108	99	97	87	82	89	125	341	567	325	207	153
<b>17</b>	114	100	95	89	86	87	115	436	637	317	204	152
<b>18</b>	112	98	97	89	82	88	115	546	684	311	202	151
<b>19</b>	111	98	98	90	83	89	136	659	711	303	198	150
<b>20</b>	112	97	102	91	86	101	166	760	705	296	199	149
<b>21</b>	110	96	98	92	85	95	139	753	691	290	194	149
<b>22</b>	108	94	89	84	84	91	127	650	689	287	190	149
<b>23</b>	106	95	97	87	83	90	133	538	696	281	189	147
<b>24</b>	105	93	99	89	86	92	148	468	697	274	187	146
<b>25</b>	105	94	96	91	85	96	134	435	683	268	186	143
<b>26</b>	104	96	91	91	84	98	126	425	669	265	185	141
<b>27</b>	103	96	84	91	84	97	130	417	645	261	183	140
<b>28</b>	103	95	90	92	85	93	160	433	617	257	180	139
<b>29</b>	103	96	98	90	86	94	205	498	594	255	179	138
<b>30</b>	103	97	97	91	---	93	231	499	573	251	178	137
<b>31</b>	103	---	95	91	---	93	---	547	---	247	180	---
<b>Total</b>	3,448	2,971	2,976	2,886	2,489	2,779	3,649	12,416	18,799	10,900	6,455	4,689
<b>Mean</b>	111	99.0	96.0	93.1	85.8	89.6	122	401	627	352	208	156
<b>Max</b>	120	104	102	105	91	101	231	760	720	559	243	186
<b>Min</b>	103	93	84	84	82	82	90	175	469	247	178	137
<b>Ac-ft</b>	6,840	5,890	5,900	5,720	4,940	5,510	7,240	24,630	37,290	21,620	12,800	9,300

Figure 2008.17 (cont.)

## 10126000 BEAR RIVER NEAR CORINNE, UT

LOCATION.--Lat 41°34'35", long 112°06'00" referenced to North American Datum of 1927, in NE ¼ SE ¼ NE ¼ sec.30, T.10 N., R.2 W., Box Elder County, UT, Hydrologic Unit 16010204, on right bank 1.2 mi downstream from Salt Creek, 2.0 mi northeast of Corinne, and 2.8 mi downstream from Malad River.

DRAINAGE AREA.--7,029 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1949 to September 1957, October 1963 to current year.

REVISED RECORDS.--WRD UT-74-1: Drainage area.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 4,204.6 ft above NGVD of 1929, unadjusted. Auxiliary nonrecording gage 7,800 ft downstream July 27, 1950 to November 21, 1955.

REMARKS.--Records good except for estimated daily discharges, which are poor. Natural flow of stream affected by Cutler Dam many miles upstream of gage, power development, diversions for irrigation, and return flow from irrigated areas and backwater from Bear River Bird Refuge about 5 miles downstream.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,770 ft<sup>3</sup>/s, May 19, 1984, gage height, 17.50 ft; minimum daily discharge, 23 ft<sup>3</sup>/s, Jul 30, 2004.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,530 ft<sup>3</sup>/s, May 24, gage height, 8.86 ft; minimum daily discharge, 68 ft<sup>3</sup>/s, Jul 8.

### DISCHARGE, CUBIC FEET PER SECOND WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008

#### DAILY MEAN VALUES

[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	419	540	466	e793	e1,310	1,240	1,410	1,390	1,620	102	77	121
2	463	597	276	e573	e1,040	948	1,290	1,290	1,660	100	76	252
3	371	647	850	e632	e648	1,160	1,290	1,100	1,690	94	79	212
4	235	427	909	e844	e547	1,220	1,270	1,050	1,820	88	81	328
5	294	286	840	e869	e1,190	1,080	1,200	1,140	1,970	83	82	455
6	475	547	816	e788	e1,350	1,010	486	1,150	2,010	77	84	335
7	341	526	810	e791	e1,300	e1,050	1,340	747	1,800	74	82	182
8	208	702	741	e1,120	e1,200	e1,020	1,240	766	1,980	68	81	219
9	262	588	434	e1,350	e1,140	e1,070	984	975	1,950	69	81	279
10	525	625	505	e971	e700	e1,070	842	1,370	2,010	69	87	213
11	504	520	1,090	e1,010	e610	e1,040	848	1,410	2,030	70	89	137
12	481	407	806	e921	e1,370	e1,060	885	1,330	2,030	70	86	124
13	497	642	684	e756	e1,280	e1,120	1,070	1,360	1,930	75	85	129
14	430	809	623	e745	e1,300	e1,270	1,130	1,430	1,630	74	79	189
15	292	807	588	e990	e1,130	e1,710	854	1,340	1,030	71	79	163
16	357	580	e800	e969	e1,320	e1,840	1,170	1,200	864	79	80	143
17	472	556	e550	e980	e1,000	e1,640	1,370	1,120	943	85	84	138
18	584	596	e770	e799	e790	e1,730	1,610	971	759	86	91	137
19	588	529	e920	e681	e1,480	1,490	1,710	1,020	738	83	94	132
20	576	772	e769	e551	e1,410	1,490	1,740	1,490	891	86	95	144
21	596	900	e759	e379	e1,180	e1,670	1,400	1,620	767	92	99	138
22	606	890	e789	e757	e1,130	1,690	1,800	1,890	488	98	94	144
23	641	506	e920	e600	e1,180	1,680	1,870	2,080	590	102	95	153
24	630	678	e773	e1,180	e1,090	1,900	1,760	2,310	631	100	89	152
25	581	505	e850	e980	e754	1,610	1,970	2,240	596	101	92	151
26	486	359	e581	e803	1,240	1,470	1,460	1,950	395	105	87	146
27	532	884	e696	e582	1,220	969	1,800	1,950	357	99	81	130
28	439	866	e831	e736	1,280	1,170	1,510	1,770	263	94	83	276
29	454	761	e839	e883	1,430	1,520	1,620	1,470	143	84	81	219
30	628	745	e759	e1,100	---	1,150	1,270	1,530	116	83	83	373
31	554	---	e580	e1,160	---	1,360	---	1,590	---	80	95	---
<b>Total</b>	14,521	18,797	22,624	26,293	32,619	41,447	40,199	44,049	35,701	2,641	2,651	5,914
<b>Mean</b>	468	627	730	848	1,125	1,337	1,340	1,421	1,190	85.2	85.5	197
<b>Max</b>	641	900	1,090	1,350	1,480	1,900	1,970	2,310	2,030	105	99	455
<b>Min</b>	208	286	276	379	547	948	486	747	116	68	76	121
<b>Ac-ft</b>	28,800	37,280	44,870	52,150	64,700	82,210	79,730	87,370	70,810	5,240	5,260	11,730

#### STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1950-57, 1964-2008, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
<b>Mean</b>	1,294	1,559	1,635	1,760	1,799	2,284	2,794	2,850	2,114	669	581	866
<b>Max</b>	4,240	4,471	4,414	3,639	5,966	6,041	7,258	9,598	9,201	4,186	3,045	3,423
<b>(WY)</b>	(1984)	(1985)	(1984)	(1984)	(1986)	(1986)	(1985)	(1984)	(1984)	(1983)	(1983)	(1984)
<b>Min</b>	95.6	621	535	620	723	913	638	71.8	77.6	40.4	46.7	62.2
<b>(WY)</b>	(1993)	(2001)	(1995)	(1993)	(1993)	(1991)	(1992)	(1992)	(1992)	(2003)	(2004)	(1992)