

WATER DEVELOPMENT OPPORTUNITIES IN THE LOWER BEAR RIVER BASIN

**House Concurrent
Resolution – 34
September 2026**



IDAHO WATER RESOURCE BOARD

Bear River

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IDAHO WATER RESOURCE BOARD

September 30, 2026

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Idaho Legislature
State Capitol, 700 W. Jefferson St.
P.O. Box 83720
Boise, Idaho 83720

SUBJECT: House Concurrent Resolution No. 34: Second Report on Water Development Opportunities in the Lower Bear River Basin

Dear Members of the Legislature:

Please find enclosed the second of two reports prepared by the Idaho Water Resource Board in accordance with the 2026 Idaho Legislature's House Concurrent Resolution No. 34 regarding the allocation and development of water resources in the Lower Division of the Bear River under the Amended Bear River Compact of 1980.

This report updates the previous report to include recommendations and priorities of potential opportunities for further development of Idaho's Compact allocation. The report identifies areas that may warrant additional evaluation, and it outlines the necessary steps for the Idaho Water Resource Board, the Idaho Department of Water Resources, and the Idaho Legislature to support further consideration of Idaho's Compact allocation waters. Given the importance of the Bear River to agriculture, communities, and economic stability in the region, careful management of this shared resource remains essential.

We would welcome the opportunity to discuss the report's findings or provide any additional information that may assist in your review.

Sincerely,

Jeff Raybould, Chairman
Idaho Water Resource Board

Cc: Governor Brad Little
Idaho Legislature
Bear River Commission
Idaho Water Resource Board Members
Mat Weaver, Director, Idaho Department of Water Resources

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Executive Summary

The Idaho Water Resource Board (IWRB/Board) identified the following four projects as potential opportunities for pursuing additional development of Idaho's Compact allocation:

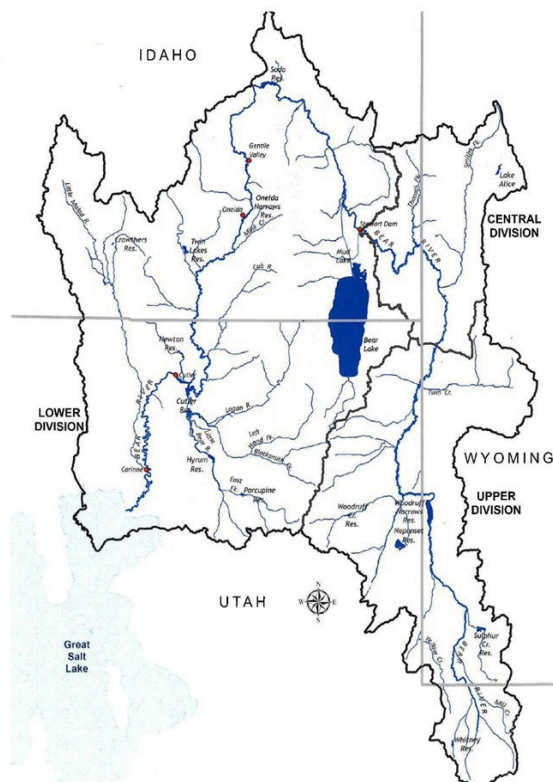
1. Increase Bear Lake Target Elevation
2. Small Reservoir Infrastructure Projects
3. Managed Aquifer Recharge
4. Bear-Portneuf Interconnect with Additional Storage

Caribou Dam was removed from consideration as a stand-alone project; however, given its location on the Bear River, it could provide the storage needed to enable the Bear-Portneuf Interconnect, or alternatively, it could provide buffer capacity that could enable an increase in Bear Lake Target Elevation. Therefore, the proposed Caribou Dam project should be evaluated in conjunction with the proposal to Increase Bear Lake Target Elevation and the proposed Bear-Portneuf Interconnect.

A preliminary analysis conducted by the Idaho Water Resource Board (IWRB/Board) determined that during the driest years, an additional 60,000 acre-feet of water could have been used by crops. Given typical delivery and application losses, this would have required a water supply increase of approximately 100,000-acre feet.



Bear River



Map of the Bear River Basin showing the Divisions within Wyoming, Idaho, and Utah.

As of 2019, there are approximately 108,000 AF of remaining Compact allocation waters that could be developed in the Lower Division of the Bear River in Idaho; however, the full compact allocation is seldom available. On average, only about 35,000 AF (32%) of excess water is available from the Bear River at the Idaho-Utah border.

Based on the timing of water availability, additional opportunities for consumptive use are most reliably present during the winter and spring, primarily during flood-risk management releases and excess runoff in wet years. Once the irrigation season begins, surplus water for additional consumptive use is generally unavailable. Additional storage could allow this excess water to remain in the Lower Division for use later in the season, or it could be held for use in subsequent years. Thus, securing and be held for use in subsequent years. Thus, securing and developing additional storage is likely to be a key

part of any strategy to fully develop Idaho's Compact allocation waters.

Increases in storage capacity will not, of themselves, increase Idaho's ability to consume water from the Bear River; however, increased storage will enable more arable land to be put into production, and it will enable cultivation of more water intensive, but higher value crops.

Increase Bear Lake Target Elevation: Current efforts to make more efficient use of Bear Lake's storage capacity could make Idaho's entire compact allocation available for agricultural use. These efforts could enable an average 138,000 AF increase in storage water that could be carried over from one year to the next but enabling these efforts requires the purchase of property and easements and the modification of existing roads and bridges to mitigate the risks of flooding in the Gentile Valley.

This particular project is relatively inexpensive and the additional storage it will provide would benefit agriculture in Idaho's Bear River Basin even if no additional Compact Allocation were available.

Small Reservoir Infrastructure Projects: There are numerous small, privately owned reservoirs along the Lower Bear River and its tributaries. These are connected to the Bear River via a system of canals. With some modification, it is possible that some of these reservoirs and their associated canals could be used to store and distribute a portion of Idaho's Bear River Compact Allocation.

Managed Aquifer Recharge (MAR) is a promising use for Idaho's remaining Compact allocation waters. Water can be recharged any time excess water is available on the Bear River, and recharged water could be used to enable development of new ground water rights for new acres of agricultural land as required by the Bear River Ground Water Management Plan.



Geologic maps and well driller logs indicate that the valley bottoms near the Bear River in the Lower Division consist of gravel, sand, silt, and clay deposited in river and lake environments, as well as basalt and cinders erupted from volcanic vents in the area. Recharge sites constructed in these types of geologic deposits on the Eastern Snake Plain Aquifer (ESPA) have proven capable of infiltrating at least 10 cubic feet per second (CFS) per day or 600 acre-feet per month for MAR.

IWRB Members and staff touring the Bear Lake System, 2024

However, because there currently is no ground water model for the Lower Division, detailed geological and hydrologic studies will be needed to confirm the geological setting and infiltration capacity of sites selected for MAR.

Bear-Portneuf Interconnect with Additional Storage: There currently exists a need for additional water in the Snake River Basin. The Board examined the feasibility of transferring Idaho Compact Allocation waters from the Bear River to the Snake River via either the Portneuf or Blackfoot Rivers. Although possible, it is unlikely that either river has sufficient capacity to carry enough water to make the project economically viable; however, when coupled with increased storage, it may be possible to reduce the costs of conveying all of Idaho's excess Compact allocation waters to the American Falls Reservoir via the Portneuf River.

It should be understood that diverting Idaho's excess Compact allocation waters into the Portneuf River makes them unavailable for any other use in the Bear River Basin, so it will be necessary to determine whether this project represents the most beneficial use of Compact allocation waters to Idaho.

To make this decision, the Board should conduct full feasibility studies, including Level IV engineering studies and economic cost-benefit analyses, for each of the four projects prioritized in this report. In particular, the Board should develop a hydrologic map of the aquifer between Grace and the Idaho-Utah Border. And, of course, the Board should engage with stakeholders in the Bear River Basin and in the ESPA.

Conducting these studies and developing a groundwater flow model will require technical expertise and support from the IDWR. The Board will require IDWR's assistance developing and calibrating a groundwater flow model for the Lower Division of the Bear River Basin, assistance evaluating each project, assistance evaluating water availability and water rights that may be impacted by each project, and assistance determining the impact that transporting water from the Bear River to the ESPA would have on the ESPA.

This report identifies projects that appear to warrant further evaluation based on the preliminary screening factors described in the report. The legislature should provide clear guidance regarding development of Idaho's remaining Bear River Compact Allocation, and as appropriate, direct additional appropriations for project planning, feasibility studies, engineering, environmental compliance, and construction of the projects ultimately determined to be the highest priority.

Introduction

Purpose

This is the second of two reports submitted by the IWRB to the leadership of the House and Senate in accordance with House Concurrent Resolution No. 34 (HCR-34), passed by the 2026 Idaho Legislature. The first report provided an overview of the Bear River and the Bear River Compact ("Compact"), and it included a description of current Idaho and Utah allocations under the Compact. The first report also included information about the frequency and timing of developable Lower Division water supplies and it summarized projects that could be used to develop those waters. This report revises and updates the first report and will:

- I. Recommend and prioritize projects for further development of Idaho's compact allocation; and
- II. Outline the necessary steps for the Idaho Water Resource Board, Idaho Department of Water Resources, and the Idaho Legislature to secure future development of Idaho's Compact allocation waters.

Background

The Bear River (the "River" or "The Bear") originates in Utah's Uinta mountains and meanders over 500 miles, crossing state lines five times before emptying into the Great Salt Lake at a point just 90 miles from the River's headwaters. The Bear supplies approximately 60% of all the freshwater flowing into the Great Salt Lake. It has the distinction of being the longest North American river that does not ultimately flow into an ocean.

Until the late Pleistocene epoch, the Bear River was a tributary of the Portneuf River, which flows northward into the Snake River. About 60,000 years ago, a series of orogenic and volcanic events blocked the Bear River's northward flow, causing it to be diverted southward into Old Lake Bonneville, a precursor to today's Great Salt Lake.

The Bear River is a vital water source for Idaho, Wyoming, and Utah. Its distribution is governed by the Amended Bear River Compact of 1980 (the Compact), which was ratified by all three states and approved by the United States Congress. For administrative purposes, the Compact divides the river into three segments: the Upper Division, the Central Division, and the Lower Division. This report focuses on the allocation and development of water in the Lower Division, which extends from Stewart Dam, just north of Bear Lake in Idaho, to the Great Salt Lake in Utah.

Diversion of water from the Bear River for irrigation began in the 1860s, and irrigation is still by far the largest consumptive use of water taken from the River. By the early 1900s, electric utilities had begun construction of a series of hydroelectric dams and reservoirs that now control flow through the entire Lower Division. Today, PacifiCorp operates these dams to produce inexpensive electricity, and although power generation is not a consumptive use of water, PacifiCorp has entered into several storage agreements with agricultural users that obligate the company to deliver water when required by contract

holders. The Board notes that the timing of water deliveries needed for agricultural users is not always optimal for power generation.

Bear River Ground Water Management Area

The Idaho Department of Water Resources (IDWR) designated the Bear River Basin in Idaho as a Ground Water Management Area in 2001. Excluded from this designation is the Bancroft-Lund Ground Water Management Area near Grace, Idaho. A Ground Water Management Area is defined as any ground water basin that the director of IDWR has determined may be approaching the conditions of a Critical Ground Water Area. A Critical Ground Water Area is defined as any ground water basin not having sufficient ground water to provide a reasonably safe supply for irrigation of cultivated lands, or other uses in the basin at the then current rates of withdrawal, or rates of withdrawal projected by consideration of valid and outstanding applications and permits.

IDWR determined that management of water appropriations within the Bear River Ground Water Management Area would be guided by a management plan adopted by IDWR in 2003. The plan requires that the impact on senior water rights of proposed new ground water use must be determined before a water right permit is issued. If the new use depletes the supply of water available to senior water rights when water is needed, the new use cannot be permitted unless the injury to the senior water right is fully alleviated.



IWRB Members and Staff Touring the Bear Lake System, 2024

Bear River Compact Water Allocations

Remaining Compact Allocation Waters Available for Development

Some 108,000 AF remain of Idaho's compact allocation waters; however, it should be remembered that actual flows in the Bear River seldom approach this value. Idaho would have been able to use its full compact allocation in only 4 of the 27 years between 2000 and 2026 (15%). The average compact allocation water available to Idaho over this period would have been 34,848 AF, or 32% of Idaho's full compact allocation.

Even if the exceptionally wet period between 1990 and 1999 is included in this analysis, in only 7 of the past 37 years (19%) would Idaho's full compact allocation have been available, and the average volume of compact allocation waters would have been 40,159 AF (37%).

Note that to include all compact allocation waters potentially available to Idaho, the preceding hydrologic analysis was conducted using stream flows at the Idaho-Utah border. It is possible that the available water up-river from the Idaho-Utah border could vary somewhat from these values, and it will be necessary to conduct an in-depth hydrologic analysis for each of the projects prioritized in this report.

Despite only a fraction of Idaho's compact allocation being available in most years, fully developing these waters will still require transmission and conveyance infrastructure capable of handling the full 108,000 Acre-Feet during the relatively brief spring season when most of Idaho's available compact waters flow through the Bear River.

In some cases, it may be desirable to oversize storage facilities to fully take advantage of instances when two or more abnormally wet years occur back-to-back; however, we note that such a coincidence occurred only once during the period between 2000 and 2026, and only three times during the 1990-2026 period. Determining the optimal size of storage facilities will require a site-specific hydrologic analysis and engineering-economic analysis.



Idaho, Wyoming, and Utah Bear River Basin Map Illustration

State Allocations in the Bear River Compact

The Amended Bear River Compact (Compact) allocates the waters of the Bear River among Idaho, Utah, and Wyoming and divides the river into three segments: the Upper Division (headwaters to Pixley Dam), the Central Division (Pixley Dam to Stewart Dam), and the Lower Division (Stewart Dam to the Great Salt Lake). The Compact recognizes and grandfathers all consumptive use in the basin developed prior to January 1, 1976, and establishes the allowable consumptive use in acre-feet (AF) to be developed after January 1, 1976, that is available to each state in each division.

The Compact authorizes Idaho, Utah, and Wyoming to develop consumptive use after January 1, 1976, in the Upper Division and Central Division as follows:

- Idaho 2,000 AF
- Utah 13,000 AF
- Wyoming 13,000 AF

The Compact also authorizes Idaho and Utah to develop consumptive use after January 1, 1976, in the Lower Division in a tiered priority system:

- Idaho holds the first right to use remaining water, resulting in an annual consumptive use of not more than 125,000 AF.
- Utah holds the second right to use remaining water, resulting in an annual consumptive use of not more than 275,000 AF, satisfied only after Idaho's first right has been met.
- Idaho and Utah each hold additional right to annual consumptive use, on an equal basis, of 75,000 AF of the remaining water after the first and second rights have been satisfied.
- Any water remaining after the above allocations are satisfied is divided 30% to Idaho and 70% to Utah.

Use of Allocations by States

The Bear River Commission periodically determines the development of Compact Allocations by each state in the Bear River Basin. Studies are completed by the Technical Advisory Committee (TAC) of the Bear River Commission. The TAC is composed of technical staff from each state. Under the Bear River Commission's adopted Depletion Procedures, consumptive use estimates since January 1, 1979, are updated every 10 years in the Lower Division and every five years in the Upper and Central Divisions. Studies were completed for 1990, 2009, and 2019.

The current development of Compact Allocations was last analyzed in the 2019 Depletion Update¹. The TAC evaluated changes in consumptive use since January 1, 1976; to quantify the amount each state has developed of its allocation in the Bear River Basin (Table 1). Idaho has approximately 800 AF of its allocation remaining to be developed in the Central Division and approximately 108,000 AF of its allocation remaining to be developed in the Lower Division. Due to the minimal remaining allocation in

¹ 2019 Bear River Commission Depletion Update:
[https://www.bearrivercommission.org/docs/BRC%202019%20Depletions%20Report%20\(Final%20Adopted%202023-04-18\)%20\(w%20appendices\).pdf](https://www.bearrivercommission.org/docs/BRC%202019%20Depletions%20Report%20(Final%20Adopted%202023-04-18)%20(w%20appendices).pdf)

the Central Division, this report will focus on opportunities for developing consumptive use in the Lower Division in Idaho.

Bear River Commission
Estimated Annual Depletions (Acre-Feet)¹
Changes from January 1, 1976, to December 31, 2019

ABOVE STEWART DAM

State	Allocation	Agricultural Depletions	M&I Depletions	Reservoir Evaporation	Total Depletions	Remaining Allocation
Utah	13,000	5,839	-8	582	6,413	6,587
Wyoming	13,000	5,058	826	140	6,024	6,976
Idaho	2,000	1,150	3	0	1,153	847

LOWER DIVISION

State	Allocation	Agricultural Depletions	M&I Depletions	Reservoir Evaporation	Total Depletions	Remaining Allocation
Idaho	125,000 ²	16,387	245	11	16,643	108,357
Utah	275,000 ³	-16,879	11,543	0	-5,336	275,000

¹Any reductions in pre-1976 depletions are reflected in the above numbers.

²First right under Compact. Compact grants additional rights.

³Second right under Compact. Compact grants additional rights.

Table 1. Summary table of depletion amounts from the Bear River Commission's 2019 Depletion Update.

Bear River Basin Adjudication

The Bear River Basin Adjudication (BRBA), initiated on June 15, 2021, is a general stream adjudication to determine the nature, extent, and priority of all surface-water and ground water rights in IDWR Administrative Basins 11, 13, 15, and 17 (portions of Bannock, Bear Lake, Caribou, Cassia, Franklin, Oneida, and Power Counties). Approximately 14,000 water-right claims are expected. Water right partial decrees for Basins 11 and 13 are anticipated to be complete in 2031, with Basins 15 and 17 scheduled for 2034.

The consumptive use (depletion) values in Table 1 provide the best available estimates of annual consumptive use developed in the Bear River Basin since January 1, 1976. The BRBA introduces uncertainty into these consumptive use estimates because water rights in the Bear River Basin have not been adjudicated for many years. The review process during the BRBA may confirm or revise individual water rights which could impact consumptive use estimates.

Frequency and Timing of Developable Water in the Lower Division

A preliminary estimate of Idaho's remaining water development potential in the Lower Division was completed using historical daily streamflow records from 1990 to 2026 for the streamflow gage on the Bear River near Collinston, Utah² and the Bear River at the Idaho-Utah State Line³. The analysis calculated the minimum daily flow between the two gages. The Collinston stream gage represents outflow from Cutler Reservoir and is effectively the end of the regulated system for Lower Division deliveries. This gage is assumed to represent surplus streamflow that exited the Bear River system. Based on Water Delivery Schedule No. 1, the only senior water right downstream of Cutler Reservoir and the Collinston stream gage is the Bear River Migratory Bird Refuge water right (29-1014), which has a 1928 priority date and diverts before the river enters the Great Salt Lake. To account for this senior obligation, the method subtracts 1,000 CFS from the surplus flow.

The surplus was calculated on a daily timestep and converted to an annual volume for each water year (October–September) (Table 2, Table 3, Figure 1). It represents a preliminary estimate of water that could be available for upstream storage or development during high-flow periods, absent additional legal, operational, or infrastructure constraints. This estimate at the Idaho-Utah State line may exceed the amount available for upstream development due to ground water or tributary inputs to the Bear River.



Aerial View of Bear Lake

² Daily streamflow data for the Bear River near Collinston: <https://waterdata.usgs.gov/monitoring-location/USGS-10118000/#dataTypeId=daily-00060-0&period=periodOfRecord&showFieldMeasurements=false> Data were only available through the end of the 2022 water year.

³ Daily streamflow data for the Bear River at the Idaho-Utah State Line: <https://waterdata.usgs.gov/monitoring-location/USGS-10092700/#dataTypeId=daily-00060-0&period=periodOfRecord&showFieldMeasurements=true>

Table 2. Bear River water available at the Idaho-Utah State Line, Water Years 1990–2026

Water Year	Bear River Water Available (AF)	Water Year	Bear River Water Available (AF)
1990	200	2008	1,400
1991	17,500	2009	35,800
1992	0	2010	0
1993	86,100	2011	176,500
1994	3,000	2012	73,700
1995	28,400	2013	0
1996	85,800	2014	0
1997	350,900	2015	7,400
1998	421,800	2016	12,000
1999	326,800	2017	285,600
2000	64,900	2018	166,400
2001	300	2019	48,100
2002	100	2020	39,100
2003	0	2021	0
2004	1,000	2022	0
2005	78,100	2023	154,400
2006	95,700	2024	45,400
2007	2,300	2025	3600
		2026	0

Note: Water Years 1990 through 1999 were excluded from subsequent analyses.

Table 3. Likelihood that new reservoir space fills based on water available at the Idaho-Utah State line.

Reservoir Space (AF)	Number of Years Space Would Have Filled (2000 - 2026)	% of Years Filled (2000 - 2026)
0	27	100%
20,000	12	44%
40,000	10	37%
60,000	8	30%
80,000	5	19%
108,000	4	15%

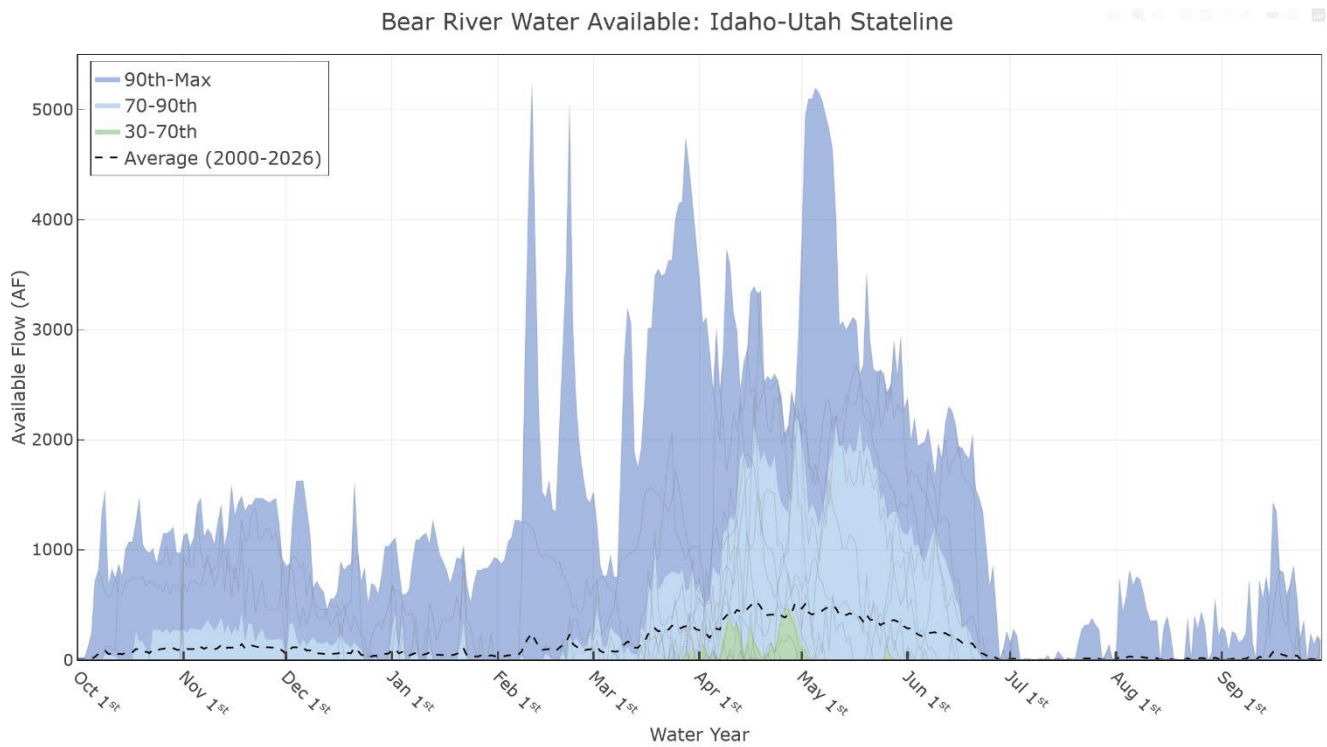


Figure 1. Hydrograph of Bear River Water Available at the Idaho-Utah State Line by water year, 2000 to 2026 (amount in acre-feet and timing of availability).

Water Deficit in the Lower Division in Idaho

The IWRB completed a preliminary analysis to estimate the amount of additional water that could be utilized by water users in the Lower Division in Idaho. The analysis compared the amount of water used in a year with a full water supply to that used in the year with the lowest water supply. The resulting estimate is that in the driest year, an additional 60,000 AF of water supply could have been used by crops to eliminate stress.

The United States Geological Survey estimated that in 2015, crops in Idaho consumed 58% of the total water withdrawn for irrigation. The remaining 42% were returned to the water cycle by conveyance losses, surface runoff, and infiltration. Assuming that losses for irrigation water deliveries in the Lower Division in Idaho are roughly the same as the statewide average, it would take approximately 40,000 AF to deliver the 60,000 AF of additional water that could be used by crops.

A “ballpark” estimate of approximately 100,000 AF could be utilized by water users in the Lower Division in Idaho to meet full crop requirements in years with the lowest water supply. This consists of approximately 60,000 AF for crop use and approximately 40,000 AF for delivery and application losses.

Utilizing the Remaining Compact Allocation in the Lower Division

Idaho has approximately 108,000 acre-feet (AF) remaining of its 125,000 AF of Bear River Compact allocation in the Lower Division in Idaho. The rural nature of this area of Idaho means that new uses for this water will primarily be for irrigating agricultural crops. Several options exist for utilizing Idaho’s remaining allocation:

- Irrigate existing or new agricultural acres using new surface water rights:

Water users would develop new surface water rights for irrigation. These new water rights would have very junior priority dates. They would accrue natural flow during spring months in some years and then be curtailed nearly every year during the summer months. These water rights would provide an unreliable water supply for irrigating agricultural crops.

- Irrigate existing or new agricultural acres using new reservoir storage:

An entity would develop a new water right for reservoir storage. This new water right would have a relatively junior priority date. It would accrue natural flow during spring runoff events and outside the irrigation season when there is excess water flowing in the Bear River. The new storage water would be delivered during the irrigation season to water users for the irrigation of new acres of agricultural land.

- Enable development of new ground water rights for existing or new agricultural acres using new reservoir storage:

An entity would develop a new water right for reservoir storage. This new water right would have a relatively junior priority date. It would accrue natural flow during spring runoff events and outside the irrigation season when there is excess water flowing in the Bear River. Storage

water would be delivered to senior water right holders during the irrigation season to enable new ground water rights as required by the Bear River Ground Water Management Plan.

- Enable new ground water rights for existing or new agricultural acres using managed aquifer recharge:

The water recharged would be used to enable ground water rights for new acres of agricultural land, as required by the Bear River Ground Water Management Plan.

Value of Storage

Aside from evaporative losses, new storage will not consume a significant portion of Idaho's allocation under the Bear River Compact; however, properly managed storage can enable development of additional agricultural lands and enable cultivation of high-value, water-intensive crops on lands that are already under cultivation. As discussed in the previous section, new storage can also be used to enable aquifer recharge and enable new ground water rights.

As a general rule, there are more opportunities to use water stored at higher river elevations than there are for water stored at lower elevations: Water stored in Bear Lake could, potentially, be delivered at any point between Stewart Dam and the Idaho-Utah border and is thus the most flexible location for storage in the Lower Bear River.



*Bear River at Idaho-Utah State Line
Photo Courtesy of NOAA*

Evaluation and Prioritization of Development Opportunities in the Lower Division

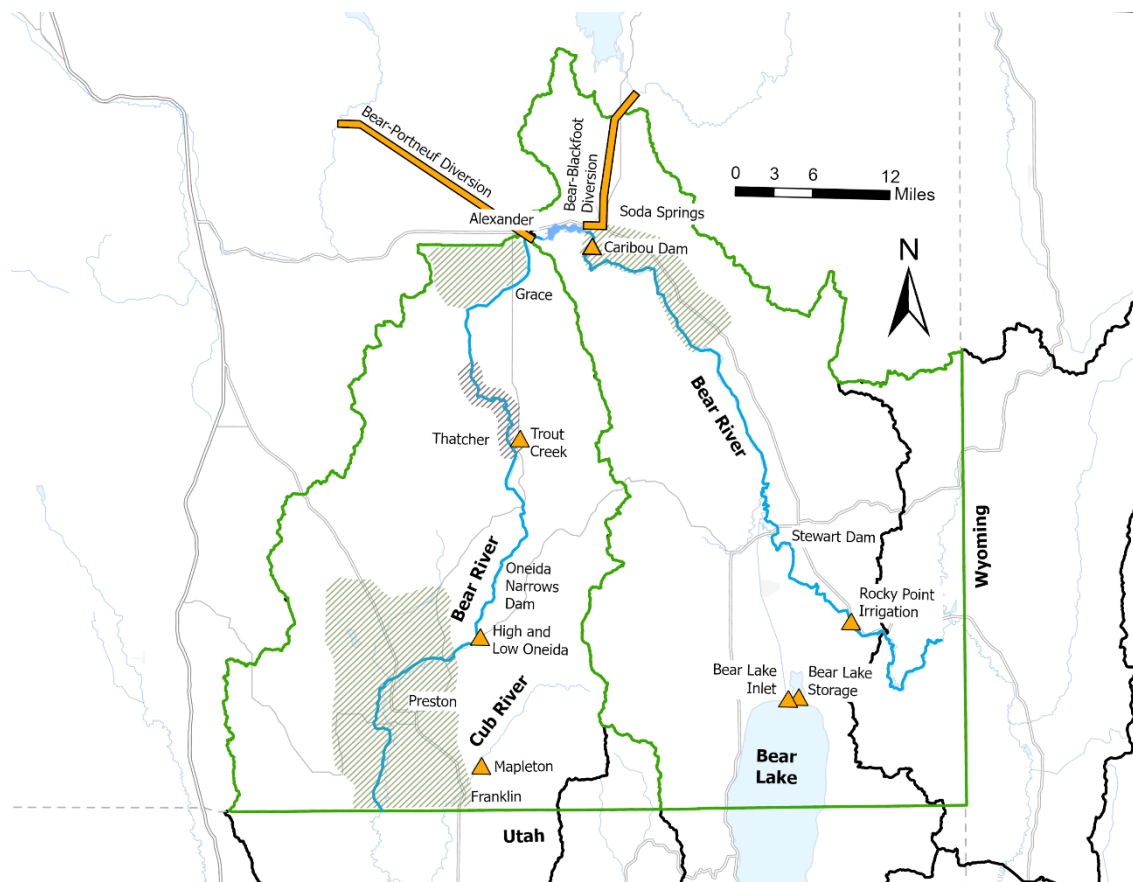


Figure 2. Development Opportunities in the Lower Division in Idaho.

Project Evaluation and Prioritization

Evaluation Factors

The IWRB considered the following factors when evaluating and prioritizing potential projects for further development of Idaho's Compact allocation: Effectiveness, Cost per Acre-Foot, Timeline, and Risk. Each of these factors is discussed more fully below:

Effectiveness: The IWRB considered the ability of each project to fully develop Idaho's remaining 108,000 Acre-Foot Compact allocation. Projects capable of using the full allocation were rated ahead of projects that could not. Projects that were unable to develop a significant portion of Idaho's remaining compact allocation were removed from further consideration.

Cost per Average Acre-Foot: The IWRB considered project cost per Acre-foot of average available compact allocation waters for the period 2000 – 2026. This simple analysis allows the relative cost of projects to be ranked, but it does not consider whether a project will be cost effective. The distinction between cost effectiveness and cost per Acre-Foot is discussed more fully below.

Timeline: The IWRB ranked projects that could be implemented quickly over projects that would require long lead times. All other things being equal, it is desirable to obtain the benefits of using Compact allocation waters sooner rather than later.

Risk: The IWRB considered the risks of environmental review, land acquisition, permitting, litigation, and obtaining needed agreements from stakeholders. The IWRB removed from further consideration projects deemed extremely risky.

Cost Effectiveness

Broadly speaking, a project can be considered cost effective if its lifetime benefits exceed its lifetime costs. The simple cost per acre-foot analysis conducted for this report considers only the unit costs of each project, but not each project's benefits. Thus, cost per acre-foot is not an absolute indicator of whether-or-not a particular project is cost effective.

The State of Idaho has not adopted a uniform method for analyzing the costs and benefits of state-funded water projects; however, it should be possible to adapt a simplified variant of the rubric used by the U.S. Bureau of Reclamation to Idaho's needs. Such an analysis would inform the IWRB, Legislature, and other stakeholders of a project's benefits, beneficiaries, and economic viability, and it would identify those stakeholders who would bear the costs of proposed projects. If there is interest in pursuing any of the opportunities identified in this report, the Board recommends that the applicable projects in Table 5 on the following page undergo a thorough cost-benefit analysis before decisions are made regarding further development or implementation.

Table 5. Summary: Projects Evaluated by the Idaho Water Resource Board

Project Name	Type	Project Capacity* Note: Average available water is 34,848 AF/Yr	Timeline (yrs)	Cost \$Millions (2025)	\$/AF of Annual Average Available Compact Allocation Water**		Risk
					Capital Cost \$/AF	Annualized Cost \$/AF ***	
Increase Bear Lake Target Elevation	Storage	450,000	5	10.3	285	23	Moderate
Small Reservoir Infrastructure Projects	Storage	Varies	5	Varies	Varies	Varies	Low
Aquifer Recharge	Recharge	108,000	10	85	2,349	136	Low
Bear-Portneuf with Storage	Diversion	77,252	10	112	3,095	177	High
<i>Caribou Dam</i>	<i>Storage</i>	<i>47,500</i>	<i>10</i>	<i>50</i>	<i>1,382</i>	<i>83</i>	<i>Moderate</i>
<i>Trout Creek</i>	<i>Storage</i>	<i>18,000</i>	<i>7</i>	<i>40</i>	<i>1,105</i>	<i>68</i>	<i>Low</i>
<i>Mapleton Dam Project</i>	<i>Storage</i>	<i>34,500</i>	<i>20</i>	<i>120</i>	<i>3,316</i>	<i>189</i>	<i>High</i>
<i>High Oneida Dam</i>	<i>Storage</i>	<i>435,000</i>	<i>10</i>	<i>220</i>	<i>6,079</i>	<i>341</i>	<i>Moderate</i>
<i>Low Oneida Dam</i>	<i>Storage</i>	<i>140,000</i>	<i>10</i>	<i>320</i>	<i>8,843</i>	<i>492</i>	<i>Moderate</i>
<i>Pumped Storage Projects</i>	<i>Pumped Storage</i>	<i>Small</i>	<i>10</i>	<i>unk</i>	<i>unk</i>	<i>unk</i>	<i>Low</i>
<i>Bear-Portneuf Diversion Project</i>	<i>Diversion</i>	<i>108,000</i>	<i>20</i>	<i>380</i>	<i>10,501</i>	<i>583</i>	<i>Very High</i>
<i>Bear Lake Inlet Modification</i>	<i>Storage</i>	<i>100,000</i>	<i>5</i>	<i>4</i>	<i>111</i>	<i>14</i>	<i>Extreme</i>
<i>Rocky Point Dam</i>	<i>Storage</i>	<i>300,000</i>	<i>20</i>	<i>350</i>	<i>9,672</i>	<i>537</i>	<i>Extreme</i>
<i>Bear-BlackFoot Diversion Project</i>	<i>Diversion</i>	<i>108,000</i>	<i>20</i>	<i>500 - 1,000</i>	<i>13,817 - 27,634</i>	<i>764 - 1,521</i>	<i>Extreme</i>

Projects recommended for further consideration in **Bold** font.

Recommend that the Board take no further action on projects in *Italicized* font.

*Actual used capacity in storage facility is limited to the lesser of actual available water or Idaho's remaining 108,000 AF Compact Allocation Waters.

The estimated average annual available water supply is 34,848 AF.

**Cost per AF of project capacity or annual average available compact allocation water, whichever is lower.

***Annualized Costs assume a 50-year project life, 5% discount factor, and include a \$7.50/AF transportation charge

Recommended Potential Projects

Increase Bear Lake Target Elevation (PTE):

This is the lowest cost project investigated by the Board that is capable of fully utilizing Idaho's Compact allocation waters. It does not require the construction of any additional infrastructure, and the estimated \$10.3 Million needed to implement it would be spent on flood easements in the Gentile Valley, development and implementation of improved techniques for forecasting springtime flows, and other permits and permissions needed to implement the plan.

We should note that even without the imperative to develop Idaho's remaining Compact allocation waters, increasing Bear Lake storage can provide considerable benefit to existing water right holders by assuring the continued availability of water during dry years, and the Board has been working with stakeholders to enable increased Target Elevation for several years.

There are moderate risks to this project: There is no guarantee that all critical stakeholders will grant the necessary permissions to enable increased storage, and as explained below, ownership and allocation of storage water rights in Bear Lake is complicated.

Increasing storage efficiency in Bear Lake is the largest opportunity for increasing storage in the Lower Division of the Bear River System. The lake could be filled to an elevation of 5923.65'; however, the 1968 Bear Lake National Refuge Operations Agreement sets an upper operating height of 5920.5 +/-

0.5 feet. To minimize the risk of flooding the Gentile Valley, PacifiCorp's March 31st target elevation is two and a half feet less (5918.0'), providing reserve capacity capable of absorbing higher-than-expected springtime flows. This practice has successfully precluded flooding in the Gentile Valley, but it has also resulted in reduced water storage during dry years.

It is estimated that increasing PacifiCorp's Target Elevation (PTE) by 1.5 feet (5919.5') would result in an increase of 455,000 acre-feet of storage, with an average of 84,000 acre-feet available for carryover from one year to the next. Increasing the PTE by 2.5 feet to the 5920.5-foot operating limit imposed by the 1968 Bear Lake Refuge Operations Agreement would permit storage of 680,000 acre-feet with an average of 138,000 acre-feet available for carryover.

Questions regarding the potential for additional storage in Bear Lake were addressed through a joint modeling effort involving the Utah Division of Water Resources, the Idaho Department of Water Resources (on behalf of the IWRB), and PacifiCorp. The 2020 study, *Impacts on Bear Lake Storage Under Alternative High-Runoff Management Operations*⁴, evaluated changes to PacifiCorp's high-runoff management operations at Bear Lake and concluded that modest adjustments to the March 31 Target

⁴ Impacts on Bear Lake Storage Under Alternative High-Runoff Management Operations: <https://water.utah.gov/wp-content/uploads/2020/12/BearLakeReport.pdf>

Elevation and Gentile Valley flow targets could allow for substantial additional storage without exceeding the lake's Ordinary High-Water Mark. Implementation of any such operational changes would require continued coordination with PacifiCorp, Utah, Wyoming, and the Bear River Commission.

PacifiCorp has existing reservoir storage water rights in Bear Lake. Any additional water captured by changing flood control operations and accrued to these existing water rights will be allocated to existing PacifiCorp storage contracts. Since the storage allocations are limited each year by the 2004 Amended and Restated Bear Lake Settlement Agreement⁵. New water would not count against Idaho's allocation under the Bear River Compact.

Small Reservoir Infrastructure Projects

There are numerous small, privately owned reservoirs along the Lower Bear River and its tributaries. These are connected to the Bear River via a system of canals. With some modification, it is possible that some of these reservoirs and their associated canals could be used to store a portion of Idaho's Bear River Compact Allocation; however, this option has not been studied in-depth.

It is unlikely that the aggregated available storage volume from all small reservoirs in the Lower Division would be able to enable full utilization of Idaho's Compact allocation waters; however, because the storage and transport infrastructure already exists, it is likely that these projects will be very cost effective.

We should note that even without the imperative to develop Idaho's remaining Compact allocation waters, making efficient use of existing small reservoirs can provide considerable benefit to existing water right holders by maximizing water stored throughout the Lower Division.

Aquifer Recharge Opportunities

Since 2003, much of the Lower Division of the Bear River Basin has been subject to a Ground Water Management Plan (GWMP) under which the impact on senior water rights of any proposed new groundwater use must be determined and alleviated before any new water right permit may be issued. By alleviating injury to senior water rights, Managed Aquifer Recharge could enable new groundwater use in the Lower Bear River Basin in Idaho.

⁵ 2004 Amended and Restated Bear Lake Settlement Agreement:
<https://bearrivercommission.org/docs/Amended%20and%20Restated%20Bear%20Lake%20Settlement%20Agreement.pdf>
f

In 1997, PacifiCorp and the Bear River Water Users Association filed petitions with the Idaho Department of Water Resources (IDWR) seeking the establishment of a moratorium on the issuance of permits or applications to appropriate ground water or surface water in the Bear River Basin. IDWR determined that unappropriated surface water and groundwater exist in the basin, but nearly every year, the flow of the Bear River is insufficient to satisfy all existing water rights. Studies found that groundwater and surface water in the Bear River Basin are interconnected, and that groundwater withdrawals in some areas reduced the flow of the Bear River.

The present analysis was conducted assuming a Managed Aquifer Recharge Plan similar to that currently operated on the Eastern Snake Plain Aquifer (ESPA) by the IWRB. Under the ESPA Managed Aquifer Recharge (MAR) Program, the Board owns no infrastructure but instead uses existing private infrastructure such as canals to transport water to aquifer recharge sites. Recharge sites and other infrastructure that are unique to the IWRB's MAR are funded through contracts with canal companies that actually operate the program on behalf of the IWRB. By maximizing the use of existing infrastructure, MAR can reliably supply low-cost groundwater.

Depending on local and regional site conditions, recharged groundwater may be retained in the aquifer for days, months, or years before it is either consumed by local groundwater users or until it flows out of the aquifer. Aquifers with very short retention times are usually undesirable since water may flow out of them before it can be withdrawn by groundwater users. Similarly, low permeability aquifers may retain water near the recharge site for many years before the benefits of recharge become apparent to groundwater users. It will be necessary to create a detailed model of the aquifer to determine retention times and permeability to identify suitable recharge sites.

A cursory survey of Lower Division infrastructure has found that infrastructure suitable for a MAR exists in many areas, so it should be possible for MAR to fully use Idaho's remaining compact allocation. Based on the Board's experience in the ESPA, it should be possible to implement a significant recharge program within 5 years. Because most of the infrastructure for MAR in the Lower Bear River Basin already exists, risks to project implementation are quite low.

Bear-Portneuf Diversion and Bear-Portneuf Diversion with Storage

Bear-Portneuf Diversion: The Board explored the possibility of using Idaho's excess Bear River Compact Allocation to relieve water shortages in the Snake River Basin. The idea of diverting flow from the Bear River northward into the Snake River has been studied several times, most recently in 1985 by the State of Utah's Division of Water Resources, *Bear River to Portneuf River Diversion Project Feasibility Study* ("Utah Study"). At that time, the Great Salt Lake was rising and threatening proposed development along the shores of the Great Salt Lake. The Utah Study looked at several alternatives including various canal and pipeline routes. Not all the alternatives explored in the Utah Study would fully utilize Idaho's compact allocation waters. The shortest and likely the most cost-effective method of transporting water from the Bear to the Portneuf would require a lift station at or near Grace Dam. Water would then be pumped to a point 1 mile West of Alexander, Idaho from which the water would flow via gravity canal to the Portneuf River near Bancroft. The difference in elevation between the proposed lift station location and the delivery point near Alexander is less than 20 feet. The terrain slopes gently downward between this point and Bancroft. The Board notes that this alignment is quite close to the route that was most likely taken by the Ancestral Bear River until approximately 60,000 years ago, when it is believed that a shield volcano in the Alexander area blocked the river's northward flow, diverting it southward into what was then Lake Bonneville.

Most compact allocation waters are available each year in April. Diverting Idaho's entire unused 108,000 AF allocation during one month would require extensive channelization of the Portneuf River, relocation of roads, and reconstruction of more than 20 road and railroad bridges at a construction cost of approximately \$380 Million, not including the costs of obtaining the necessary easements and permissions. The environmental impacts of such large increases in springtime flows are unknown. The Board conservatively estimates that conducting the required environmental studies and obtaining the necessary permits and easements will require two or more decades. It is also quite likely that this project would face substantial legal challenges. Overall, there is a Very High risk that this project would not ever be realized.

Bear-Portneuf Diversion with Storage: Adding storage to the Bear River above the proposed Grace Dam diversion point would allow water to be diverted over a longer period, eliminating the need for costly and potentially disruptive channelization and infrastructure relocation along the Portneuf River. This would also reduce, but not eliminate, project risks due to environmental concerns, so the Board rated this as a High-Risk project.

For this analysis, we assumed a reduced version of the Bear-Portneuf Diversion project described above in conjunction with construction of a dam at Caribou; however, storage for this project could also be obtained by increasing Bear Lake's Target Elevation. The decrease in required volumetric flow rate would allow considerable reduction in the sizes of the lift station and canal between Alexander and Bancroft. As already noted, little or no alteration of the Portneuf River would be required. Construction costs, including the costs of constructing the Caribou Dam, would be about \$112 Million.

Projects Evaluated but Not Recommended

Caribou Dam

This is a plan to build a storage reservoir approximately 2 miles upstream from Soda Springs, Idaho. The cost of the dam itself is estimated at approximately \$50 Million. This does not include the costs of compensating PacifiCorp for lost Power Generation at its downstream hydroelectric facilities. Not only would Caribou Dam provide additional storage, but if operated in conjunction with Bear Lake Dam, it could enable Pacificorp to increase its March 31st target elevation. Also, as noted previously, Caribou Dam could enable a substantial cost reduction to the Bear-Portneuf diversion project.

By itself, this project will not accommodate Idaho's full compact allocation, and so it was removed from consideration as a stand-alone project; however, this project should be considered as a means for enabling either the Bear-Portneuf Diversion project or an increase in the Bear Lake Target Elevation.

Trout Creek Reservoir

The Trout Creek Reservoir is a water storage project proposed by the Last Chance Canal Company. The proposed 18,000 AF reservoir would be located about 1 mile northeast of Thatcher, Idaho and it would store water from the Last Chance Canal Company's East Branch and Bench B's Canals. No formal design study has been completed; however, construction costs could be \$40 Million or more. This project is relatively expensive and would not be able to accommodate Idaho's full compact allocation, so it was removed from further consideration.

Mapleton Dam Project

The Mapleton Dam site is located approximately 3 miles northeast of the town of Franklin on the Cub River. The proposed 160-foot dam would have a total storage capacity of 34,500 AF. Construction costs are estimated to be \$120 Million. This does not include the costs of relocating East Cub River Road and purchasing the numerous homes and commercial businesses that have been built in the location of the proposed reservoir. This project will not accommodate Idaho's full compact allocation, and it is relatively expensive. Because of its location near the Utah Border, there is relatively little opportunity to use water from this project in Idaho. This project was removed from further consideration.

High Oneida and Low Oneida Dam Projects

The High Oneida and Low Oneida Dam Projects are two different proposals to build dams at the same site downstream from the existing Oneida Narrows Dam. The High Oneida Dam proposal is for a 315-foot dam with a total capacity of 435,000 AF and 295,000 AF of active capacity. The estimated construction cost is \$320 Million.

The Low Oneida Dam proposal is for a 265-foot-high dam with a total storage capacity of 140,000 AF and an active storage capacity of 120,000 AF. The estimated construction cost is \$220 Million.

These storage projects could accommodate Idaho's entire excess compact allocation waters; however, they are expensive, and because of their proposed location, may not be able to fully enable consumptive use of Idaho's Compact allocation waters within the state of Idaho. The Board excluded both projects from further consideration.

Pumped Storage

Pumped storage facilities store excess electrical energy by pumping water uphill into a reservoir when system demand is low and excess energy is available. This water can then be used to generate electricity during times of peak demand. By its nature, however, pumped storage is not a consumptive use of water and would not consume a significant portion of Idaho's Bear River Compact allocation, so pumped storage was removed from further consideration.

Bear Lake Inlet Modification

The Lifton Pumping Station can draw water from lake levels as low as 5902.0 feet. Modifying the Lifton pumps by extending the penstocks deeper into the lake would permit greater usable capacity of the lake without the need to increase PacifiCorp's target elevation. It is likely that this modification will require larger pumps than currently exist at Lifton. Reducing lake levels below 5902 feet would violate the 2004 Amended and Restated Bear Lake Settlement Agreement and it would violate the minimum lake level water right held by the Idaho Water Resource Board (Water Right 11-7406). It should also be noted that reducing lake elevation below 5902.0 feet would reduce marina drafts to the point that some boats would no longer be able to operate, and this reduction is likely to have substantial negative environmental impacts. The Board determined that the risks to this project were extreme and excluded it from further consideration.

Rocky Point Dam

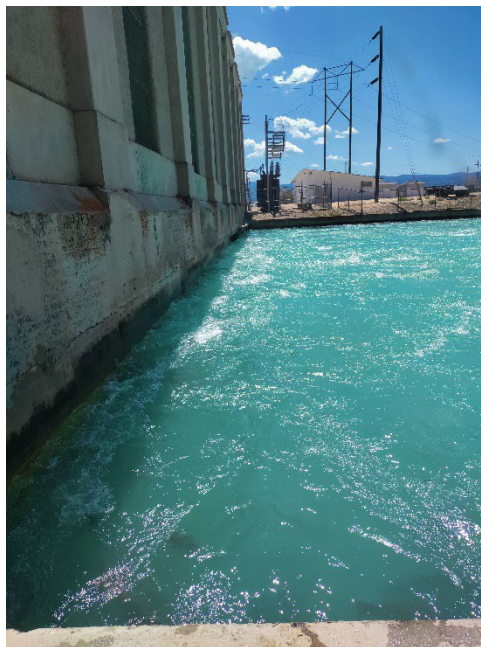
The proposed Rocky Point Dam project would replace the storage volume lost when PacifiCorp decreased Bear Lake target elevations from 5920.5' to 5918.0'. The 90-foot tall rockfill dam would be located about 3 miles north of Bear Lake Dam and have a total storage capacity of 300,000 AF. It should be noted that substantial infrastructure would need to be relocated for this project, including portions of Highway 30, a railroad, power transmission lines, a natural gas pipeline, and numerous homes and farms. It should also be noted that in the event that PacifiCorp resumes use of the 5920.5' target elevation in Bear Lake, the additional storage capacity of the Rocky Point Dam would be rendered superfluous. This project is extremely risky and was removed from further consideration.

Bear-Blackfoot Diversion Project

The Bear-Blackfoot Diversion project would divert water from the Bear River to the Blackfoot River. The Blackfoot River ultimately empties into the Snake River near Blackfoot, Idaho. The additional water provided from the Bear River could be used to augment the water supply in the Snake River.

This project has not received as much attention as the Bear-Portneuf diversion project; however, a preliminary investigation has revealed two significant challenges that this project would face. First, it is unlikely that the Blackfoot River could accommodate the additional flow from the Bear River, and so there would need to be substantial modification of the existing river channel and nearby highway infrastructure. The second challenge would be the need to pump water over a 400-foot elevation between the two rivers. This would require the construction of substantial lift stations and would also consume substantial amounts of electric power.

As with the Bear-Portneuf diversion project, any diversion of water from the Bear is likely to negatively impact PacifiCorp's electrical production at dams below the point of diversion. The proposed Bear-Portneuf diversion is a much less expensive way to divert water from the Bear to the ESPA and given the necessary modifications to the Blackfoot River and associated infrastructure, there is an extreme risk that the project would never be started. This project was removed from further consideration.



Bear River System

Next Steps

Next Steps for the Idaho Water Resource Board

As has already been discussed, the actual volume of water available for any of the projects recommended by the Board is 34,848 AF/year. Far less than the 108,000 remaining Compact Allocation, so it is important that the relative costs and benefits of each project be carefully weighed. Subject to legislative direction regarding development of Idaho's remaining Bear River Compact allocation, the IWRB's next step would be to identify a recommended plan for development. This should include evaluating the relative benefits, beneficiaries, costs, and practicability of the opportunities identified in this report, including whether each uses the remaining allocation in a manner that provides the greatest overall benefit to Idaho. The proposed Bear-Portneuf project illustrates the importance of this evaluation because it would commit water to the Snake River and render Idaho's remaining Compact allocation waters unavailable for any other use in the Bear River Basin. This project would also be relatively expensive. Thus, it will be necessary to determine whether-or-not this project uses remaining Compact allocation waters in a way that is most beneficial to Idaho.

The information required to compare the four projects prioritized in this report and make this determination can best be obtained by conducting full feasibility studies of all four projects. These feasibility studies should include Level IV engineering studies, economic cost-benefit analyses, and input obtained by engaging stakeholders from the Bear River Basin and, in the case of the proposed Bear-Portneuf project, stakeholders from the ESPA.

Specific next steps for each of the four prioritized projects are enumerated below:

Increase Bear Lake Target Elevation

- Continue current efforts to obtain easements within the Gentile Valley.
- Continue discussions with PacifiCorp to maximize available storage in Bear Lake.
- Complete engineering, environmental, and economic feasibility evaluations necessary to determine long-term implementation options.

This effort currently is underway. The estimated incremental costs of the engineering, environmental, and economic feasibility evaluations needed to fully implement this project are minimal. Total project cost is estimated at \$10.3 Million.

Small Reservoir Infrastructure Projects

- Develop criteria for determining suitability of existing small reservoirs and canals to store additional water.
- Engage with potential stakeholders to identify opportunities and constraints.
- Identify and prioritize potential sites for further development.
- Conduct feasibility assessments of the most promising candidate sites including engineering, permitting, environmental, cost evaluations, and water right considerations.

- Construct necessary upgrades and infrastructure modifications to enable existing small reservoirs and canals to store additional water.

The estimated cost of stakeholder engagement and identifying and prioritizing promising candidate sites is \$200,000. The costs of conducting feasibility assessments of the most promising candidate sites will depend on the specific sites under consideration. Construction costs will depend on which sites are selected.

Aquifer Recharge

- Determine the extent to which Managed Aquifer Recharge would allow more groundwater use under the GWMP.
- Work with stakeholders to determine whether a Managed Aquifer Recharge program could be an effective management tool and determine how it could be implemented.
- Implement a Managed Aquifer recharge program and construct necessary infrastructure if hydrologic conditions are satisfactory and there is stakeholder support.
- Work with IDWR to develop a groundwater model of the Bear River Aquifer between Grace and the Idaho/Utah border.
- Evaluate recharge feasibility, expected water supply benefits, operational constraints (including Water Rights Considerations), and costs.

It is assumed that a Managed Aquifer Recharge program in the Bear River basin would resemble the program currently in-place in the ESPA; however, designing a program that optimizes the use of available water in the Bear River Basin will be an iterative process requiring the Board to work with stakeholders. During the first iteration, the Board would need to determine the potential to allow more groundwater use under the GWMP, work with stakeholders to outline a recharge program tailored for the Bear and develop the framework for a Groundwater model of the Bear River Aquifer between Grace and the Idaho/Utah Border. Estimated cost for the first iteration of this work is \$300,000. Based on the experience with the Managed Aquifer Recharge program in the ESPA, the cost of a managed Aquifer Recharge program in the Bear are estimated to be approximately \$85 Million.

Bear-Portneuf Diversion with Storage

- Refine timing and quantities of water to be delivered to the Snake River and determine the benefits of such a project to the Snake Plain Aquifer
- Evaluation of alternatives that involve a regulating reservoir in the Bear River Basin to allow Idaho to move the same volume of water using a much smaller diversion system, reducing costs, environmental impacts, and implementation risk while improving operational flexibility.
- Complete a comprehensive feasibility study, including alternatives analysis, engineering, environmental review, permitting requirements, stakeholder coordination, and Level IV engineering cost estimates, and a comprehensive project implementation plan.

This project will be subject to complicated regulatory and environmental compliance requirements requiring long lead-times to fulfill. A Level IV engineering study will be required to identify permitting and easement requirements. It is estimated that this study will cost approximately \$1 Million. Subsequent construction costs will likely cost more than \$100 Million.

Next Steps for the Idaho Department of Water Resources

The Board will require the expertise of the Idaho Department of Water Resources. In particular, the Board will require the following support from the IDWR:

- Provide technical and hydrologic expertise for evaluation of prioritized projects.
- Assist IWRB in development and calibration of a Bear River groundwater flow model.
- Evaluate water availability, water rights administration, and operational considerations.
- Support feasibility studies through hydrologic analysis and modeling.
- Quantify expected groundwater recharge and ESPA benefits associated with priority projects.
- Assist with environmental review and permitting coordination as appropriate.
- Solicit and manage contract support as needed.

Next Steps for the Idaho Legislature

- Provide clear guidance regarding development of Idaho's remaining Bear River Compact allocation and continue appropriations, as appropriate, for planning, comparative analysis, feasibility studies, engineering, and environmental compliance necessary to identify and evaluate a recommended path forward and, following that evaluation, consider additional appropriations for construction of projects determined to be the highest priority.