RECLAMATION

Managing Water in the West

2016 Salmon Flow Augmentation Program and Other Activities Associated with the NOAA Fisheries Service 2008 Biological Opinion and Incidental Take Statement for Operations and Maintenance of Bureau of Reclamation Projects in the Snake River Basin above Brownlee Reservoir

Annual Progress Report

U.S. Department of the Interior
Bureau of Reclamation
Pacific Northwest Region

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INTRODUCTION

On May 5, 2008, National Oceanic Atmospheric Administration (NOAA) Fisheries released a new biological opinion (2008 Upper Snake BiOp) for the continued operation and maintenance of Bureau of Reclamation projects in the Snake River basin above Brownlee Reservoir. The incidental take statement included reasonable and prudent measures (RPMs) and associated terms and conditions to minimize incidental take to 13 listed salmon and steelhead Evolutionary Significant Units (ESUs).

This document reports the status of activities related to the incidental take statement, including Reclamation's flow augmentation program, status of new contracts, coordination activities, and conservation activities. This report meets Reclamation's responsibility to submit an annual progress report by December 31 of each year.

RECLAMATION'S 2016 SALMON FLOW AUGMENTATION PROGRAM

Basin Conditions

Early in water year 2016, the water supply conditions were below average in most of the Snake River basin above Brownlee Reservoir, with below average carryover following the drought year of 2015. In the Payette, Boise, and Upper Snake basins, November carryover storage from 2015 was 79, 91, and 78 percent of average, respectively.

Fortunately, above to near normal precipitation fell throughout the early winter across the basin, resulting in an above or near average snowpack on January 1, 2016. Snowpack on January 1 in the Payette, Boise, and Upper Snake basins was 134, 143, and 97 percent of average, respectively. By April 1, snowpack in these three basins were at near average conditions with 106, 105, and 102 percent of average, respectively.

Near average precipitation in the basins south and west of the Boise basin helped to counter the dry pattern of the last few years which caused historic drought conditions. However, below average carryover conditions again resulted in below average reservoir fill, with the reservoirs in the Malheur basin essentially empty by the end of September.

Observed unregulated runoff for the April through July period was below average with 93 percent of average for the Payette River at Horseshoe Bend, 93 percent for the Boise River near Boise, and 81 percent for the Snake River at Heise. Flood control releases were required in the Boise basin in 2016, starting at the end of March and running through the end of May. In the Upper Snake, no excess flows passed Milner once irrigation began in early March until flow augmentation began in late May.

The Upper Snake above Milner reservoir system reached a maximum combined physical storage content of 3,601,119 acre-feet, approximately 585,000 acre-feet below full capacity of 4,185,695 acre-feet. The Boise system nearly filled reaching a maximum storage content of 930,232 acre-feet and would have filled but for early flow augmentation releases. The Boise system maximum storage content peaked at

approximately 19,500 acre-feet below its full capacity of 949,700 acre-feet. The Payette reservoir system would have filled but for early flow augmentation releases but still managed to reach a maximum combined storage content of 784,408 acre-feet, 24,000 acre-feet short of the full storage of 808,500 acre-feet.

The near average precipitation in the Boise and Snake basins allowed the lower threshold flow augmentation of 427,000 acre-feet to be targeted despite the below average reservoir carryover conditions at the start of the season.

In-Season Management Considerations for Meeting Augmentation Targets

Reclamation manages its in-season storage releases for flow augmentation relying on the best data available at the time in order to set release rates. Reclamation utilizes preliminary water rights accounting provided by the state of Idaho to estimate volumes available in storage accounts and amounts delivered. This accounting is provisional and subject to change at a later date when data are finalized and after-the-fact accounting is completed. Therefore, while it is difficult to deliver the precise targeted volume on a real time basis, Reclamation strives to come as close as possible, with a typical margin of error of less than one percent.

Reclamation made a concerted effort to provide early timing flow augmentation, including foregoing final fill of the Payette and Boise reservoir systems in order to initiate flow augmentation releases in those systems as early as possible.

Reclamation was able to provide 427,000 acre-feet of water for flow augmentation in 2016. Table 1 summarizes the source, amount, and timing for Reclamation's 2016 salmon flow augmentation program.

Table 1. Summary of Reclamation's 2016 Salmon Flow Augmentation Releases

SOURCE	AMOUNT (acre-feet)	DATES OF DELIVERY
Upper Snake above Milner Dam		
Reclamation Uncontracted Space	520	May 23 – June 20
Reclamation Powerhead Space	33,443	
Rentals – Water District 01	60,000	
Rentals – Tribes	0	
Subtotal	***93,963***	
Payette		
Reclamation Uncontracted Space	95,000	June 16 – August 31
Rentals	70,000	
Subtotal	***165,000***	
Boise		
Reclamation Uncontracted Space	40,932	June 1 – July 11
Reclamation Powerhead Space	36,956	
Rentals	12,500	
Subtotal	***90,388***	
Natural Flows		
IWRB Lease (Idaho)	60,000[A]	April 3 – August 31[B]
Skyline Farms (Oregon)	17,649	
Subtotal	***77,649***	
TOTAL	**427,000**	

[A] See section titled "Lease of Natural Flow Water Rights Below Milner Dam."
[B] The IWRB Lease of 60,000 acre-feet is comprised of 49,500 acre-feet estimated to occur within the Apri1 3 to August 31 period, and 10,500 acre-feet estimated to occur before and after the migration period. See section titled "Lease of Natural Flow Water Rights Below Milner Dam" for further explanation.

Uncontracted Space and Space Reacquired for Flow Augmentation

Reclamation's 95,000 acre-feet of uncontracted space assigned to flow augmentation in the Payette system fully refilled, as did the full 40,932 acre-feet in the Boise system. The entire accrual to these accounts was provided to the 2016 flow augmentation program. In the Upper Snake above Milner, 520 acre-feet of uncontracted storage was allocated (out of a total possible of 22,896 acre-feet of space) and was provided for the flow augmentation program. The reason for the low allocation was due to this storage being used in 2015 for flow augmentation, causing it to be subject to last to fill in the storage system for 2016. Last to fill space in the Upper Snake did not receive any allocation in 2016.

The 17,649 acre-feet of natural flow rights Reclamation has acquired in Oregon (Skyline Farms) were fully available again in 2016.

Annual Rentals

Reclamation relies heavily each year on annual rentals from water users to acquire water for its flow augmentation program. Water availability from the Water District 01 Rental Pool (Upper Snake above Milner Dam) is determined by a chart (Attachment 1) that considers carryover storage on November 1 and the April 1 runoff forecast for the Snake River at Heise (for the April through September period) to determine contributions to the rental pool for the flow augmentation program. Use of this chart was enacted after negotiation of the Nez Perce Water Rights Settlement and is fully consistent with Reclamation's description of its flow augmentation program in its 2004 and 2007 Upper Snake Biological Assessments.

In 2016, the chart specified that Water District 1 would provide 60,000 acre-feet of rental water. Carryover from the 2015 water year on November 1, 2015 was 1,387,766 acre-feet, and the April 1 runoff forecast was 3,744,800 acre-feet (99 percent of average) for the April through September period. The 2016 April through September observed runoff was 3,007,460 acre-feet, which is 80% of average.

In the Payette basin 70,000 acre-feet was made available and rented by Reclamation, and 12,500 acre-feet of rental water was made available from the Boise basin in 2016.

Powerhead Space

As part of the Nez Perce Water Rights Settlement, Reclamation may utilize powerhead space in Palisades Reservoir and Anderson Ranch Reservoir for flow augmentation. In order for Palisades Reservoir powerhead space to be used, the sum from all other sources must be less than 427,000 acre-feet, and this powerhead space cannot be used to exceed a flow augmentation total of 427,000 acre-feet. In 2016 Palisades Reservoir powerhead space filled to 128,585 of the 157,000 acre-feet, and 33,443 acre-feet was used for flow augmentation.

Use of powerhead space from Anderson Ranch Reservoir is less restrictive, and can be used to provide flow augmentation volumes in excess of 427,000, if available. Reclamation considers use of this powerhead space to be undesirable due to the difficulty in refilling the water right the following year and the potential for shutting down the powerplant during a continuing drought. In 2016, it was necessary to use 36,956 acre-feet of Anderson Ranch powerhead/inactive space to attain the 427,000 acre-feet target.

Lease of Natural Flow Water Rights below Milner Dam

The Nez Perce Water Rights Settlement authorized the use of up to 60,000 acre-feet of Idaho natural flow rights downstream of Milner Dam for the purpose of flow augmentation. In better water years, this will increase the volume of water available for augmentation. In 2005 the Idaho Water Resources Board (IWRB) purchased approximately 98,000 acre-feet of water rights from the Bell Rapids Mutual Irrigation Company; this is water that served roughly 25,000 acres via high-lift pumps.

Reclamation then entered into a 30-year lease with the State for 60,000 acre-feet of this water for salmon augmentation (IWRB Lease in Table 1).

Flow augmentation from natural flow rights downstream of Milner Dam occurs during the entire irrigation season, roughly April 1 to October 31. The IWRB Lease of 60,000 acre-feet is comprised of 49,500 acre-feet estimated to occur within the Apri1 3 to August 31 period, and 10,500 acre-feet estimated to occur before and after the migration period. Even though these 10,500 acre-feet are delivered outside the April 3 to August 31 period, it provides an instream benefit and continued flow augmentation.

Rentals from Shoshone–Bannock Tribes

The Shoshone-Bannock Tribes have contract space in American Falls Reservoir. They are able to rent water from this space for downstream uses in accordance with the terms of the Fort Hall Water Rights Settlement of 1990. Tribal policy requires that on-reservation water needs are served first. The Tribes' space in Palisades Reservoir is usually adequate to meet their irrigation requirements, freeing up the space in American Falls Reservoir for potential rental. Reclamation did not negotiate rental of Tribal storage water in 2016. However, Idaho Power Company executed a lease with the Tribe for storage water and released this volume, along with other Idaho Power owned storage water, between June 20 and July 5 at an average rate of approximately 1,435 cubic feet per second (cfs) for the release period; this water is not included in Reclamation's 427,000 acre-foot volume.

Timing Considerations for Flow Augmentation Releases

The timing of flow augmentation releases depends on the individual basin and source of water. Flow augmentation releases in 2016 mark the eighth year of operations under the 2008 BiOp, in which Reclamation committed to shifting releases to earlier in the migration season when Snake River flows are more beneficial to Federally listed fish. The primary goal of the earlier releases is to minimize the amount of warmer water provided in August and to shift it into July or earlier. The opportunity and ability to shift the releases will vary depending on the water year type, total augmentation volume available, and by which basin the augmentation originates from. Consistent with the 2008 BiOp, not all water can be shifted from August releases, particularly in the Payette basin. The changes in release patterns for 2016 will be highlighted in the following discussion for each basin.

As discussed in the previous sections, the 60,000 acre-feet of Idaho natural flow rights from the IWRB was provided for augmentation during the irrigation season, which ends on October 31.

To the extent possible, Reclamation will strive to benefit local resources when implementing its proposed actions while also meeting its obligations under the BiOp and corresponding incidental take statement.

Upper Snake Basin:

The primary strategy for shifting augmentation releases in the Upper Snake basin above Milner involves higher release rates and a relaxation of down-ramping criteria at the conclusion of augmentation. Formerly, the down-ramping rate of 100 cfs per day was very restrictive and forced lower release rates to avoid a protracted down-ramping period. With the restrictive rate, it was necessary to extend augmentation releases past Milner into mid to late August in most years. The BiOp anticipated that augmentation releases can be provided in May or June in most average or lower water years, and by the end of July in most wet years. Flow augmentation releases in 2016 at Milner commenced on May 23, ramping up to approximately 1,500 cfs by May 24 and lasting until June 20. At the conclusion of flow augmentation, releases continued at an average rate of approximately 1,435 cfs to deliver water owned or leased by Idaho Power Company. The Idaho Power releases continued through July 5; they were not counted toward Reclamation's flow augmentation volumes.

Boise Basin:

Augmentation flows began on the Boise system on June 1 and lasted until July 11. The shift to earlier delivery of flow augmentation in the Boise basin relies on a combination of two strategies. First, in flood control years when the system is assured to fill, some portion of the augmentation volume will be delivered by reserving an equivalent amount of system space that is not allowed to refill. In other words, as flood control operations near their end, releases are not cut in order to fill the last remaining space; that vacant space is considered to have been delivered as flow augmentation instead.

The second strategy for shifting augmentation timing from the Boise basin is to increase the rate of releases. This relies on the opportunity to make higher releases before the recreational floating (floating) season begins on the river. Floating season typically begins once streamflows through the city of Boise drop below 1,500 cfs, the weather warms up, the river is inspected and hazards removed, and the county officially opens the launch facilities. Once floating season begins, flows are limited to approximately 500 cfs above irrigation demand for public safety concerns. Reclamation will look for opportunities to make higher releases; in flood control years this can easily be accomplished by maintaining higher releases rather than immediately ramping down at the end of flood control. In non-flood control years, it can likely be accomplished by releasing in May (or early June) before the floating season begins.

Flood releases began in late March and continued through the end of May when sufficient water was evacuated from the system to reduce the risk of flooding. Flow was maintained at a high release rate for flow augmentation, approximately 1,000 to 1,700 cfs above irrigation requirements, until the middle of June when floating season began. Flows were then maintained near 1,500 cfs until the remainder of the flow augmentation water had been released by early July.

Payette Basin:

Augmentation releases from the Payette system began on June 16 as the reservoir system neared full; releases ended by August 31. Due to water quality concerns in Lake Cascade, some amount of flow augmentation water will continue to be released in August. Strategies for shifting the timing of flow augmentation from the Payette basin include a combination of deliberately foregoing an amount of refill during years when the reservoirs would otherwise fill (similar to the Boise strategy), and by increasing the initial rate of release in order to "front load" a portion of the augmentation volume, primarily by holding higher releases following flood control.

Both strategies were employed in 2016. Inflows were easily sufficient to top off the reservoir system but a minor amount of refill in Lake Cascade (approximately 15,000 acre-feet) was deliberately not refilled by allowing inflows to pass downstream for flow augmentation. Releases from both reservoirs were increased to invoke drafting. The release from Lake Cascade ranged from 1,500 cfs up to 2,000 cfs, slightly less than the maximum powerhouse capacity of approximately 2,200 cfs, in order to "front load" augmentation releases in June and July. No drafting of reservoir storage for irrigation would have been necessary prior to June 29[1], so all reservoir draft (including Deadwood Reservoir) up to that point (41,546 acre-feet) was for release of flow augmentation water. The flow rate credited towards augmentation water was variable depending on unregulated tributary runoff and irrigation demands, but averaged approximately 1,300 cfs in June and July, and approximately 800 cfs in August.

Mean Monthly Inflows to Brownlee Reservoir[2]

April	20,679 cfs
May	21,094 cfs
June	15,057 cfs
July	8,870 cfs
August	7,429 cfs

November 1 Carryover

At the end of the 2016 irrigation season (November 1, 2016), the carryover storage into the 2017 water year was as follows:

Upper Snake above Milner Dam	1,255,251 acre-feet
Boise River system	356,816 acre-feet
Payette River system	431,633 acre-feet

[1] Unregulated runoff in the basin was sufficient to meet irrigation demands through June 28 according to preliminary State water accounting.
[2] Source: http://www.nwrfc.noaa.gov/runoff/runoff_summary.php?date=10/01/2016

Attachment 1

Stipulated Augmentation Rental -Water District 01

November 1 Carryover 1000s AF	<---------- April 1 to Sept 30 Heise Forecast 1000s Acre-Feet---------->						
	< 2,450	< 2,920	< 3,450	< 4,208	< 5,042	< 5,670	> 5,670
0	0	0	0	0	150000	185000	185000
100	0	0	0	0	150000	185000	185000
200	0	0	0	0	150000	185000	185000
300	0	0	0	0	150000	185000	185000
400	0	0	0	0	150000	185000	185000
500	0	0	0	0	150000	185000	185000
600	0	0	0	60000	150000	185000	185000
700	0	0	0	60000	150000	185000	185000
800	0	0	0	60000	150000	185000	185000
900	0	0	60000	60000	150000	185000	185000
1,000	0	0	60000	60000	150000	185000	185000
1,100	0	0	60000	60000	150000	185000	185000
1,200	0	0	60000	60000	150000	185000	185000
1,300	0	0	60000	60000	150000	185000	185000
1,400	0	0	60000	60000	150000	185000	185000
1,500	0	0	100000	150000	185000	185000	185000
1,600	0	0	100000	150000	185000	185000	185000
1,700	0	0	100000	150000	185000	185000	185000
1,800	0	0	100000	150000	185000	185000	185000
1,900	0	0	100000	150000	185000	185000	185000
2,000	0	0	100000	150000	185000	185000	185000
2,100	0	0	100000	150000	205000	205000	205000
2,200	0	0	100000	150000	205000	205000	205000
2,300	0	0	100000	150000	205000	205000	205000
2,400	0	0	100000	150000	205000	205000	205000
2,500	0	0	100000	150000	205000	205000	205000
2,600	0	0	185000	185000	205000	205000	205000
2,700	0	0	185000	185000	205000	205000	205000
2,800	0	0	185000	185000	205000	205000	205000
2,900	0	0	185000	185000	205000	205000	205000
3,000	60000	60000	185000	185000	205000	205000	205000
3,100	60000	60000	185000	185000	205000	205000	205000
3,200	100000	100000	185000	185000	205000	205000	205000
3,300	100000	100000	185000	185000	205000	205000	205000
3,400	100000	100000	185000	185000	205000	205000	205000
3,500	100000	100000	185000	185000	205000	205000	205000
3,600	100000	100000	185000	185000	205000	205000	205000