

RECLAMATION

Managing Water in the West

**2018 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



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 and coordination activities. This report meets Reclamation's responsibility to submit an annual progress report by December 31 of each year.

Flow augmentation releases in 2018 mark the tenth 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 salmon and steelhead.

RECLAMATION'S 2018 SALMON FLOW AUGMENTATION PROGRAM

Reclamation was able to provide 487,000 acre-feet of water for flow augmentation in water year 2018 (Table 1). The water supply and operational conditions in 2018 are summarized below.

Basin Conditions

Early in water year 2018, the water supply conditions were near average to below average in the Snake River basin above Brownlee Reservoir. In the Payette, Boise, and Upper Snake basins, November carryover storage from 2017 was 117, 142, and 176 percent of average, respectively.

In the early winter and through February, below normal precipitation fell in the Payette and Boise basins, while the Upper Snake Basin, above Milner Dam, experienced normal precipitation. Snowpack at the beginning of March was well below average in the Payette and Boise basins, but the Upper Snake basin was at 109 percent of average. During the month of March precipitation totals in all three basins were average to above average with the Boise basin getting 136 percent of average precipitation. During March the snowpack increased and by April 1 was 114 percent of average in the Upper Snake but still below average in the Boise and Payette basins which were 82 and 86 percent of average respectively.

Below average precipitation in Central and Eastern Oregon resulted in drought conditions for 2018 with most of the reservoirs missing refill in eastern Oregon.

Observed unregulated runoff in the Boise and Payette basins for the April through July period was below average with the natural flows being 94 percent of average for the Payette River at Horseshoe Bend, and 90 percent of average for the Boise River near Boise. Due to above average snowpack in the Upper Snake Basin and late season storms, natural runoff in the Upper Snake basin was well above average at 131 percent of average for the Snake River at Heise. Even though the Payette and Boise basins had below average runoff during the spring and early summer, flood control releases were required in the in those basins in during the late winter and early spring of 2018.

Refill in all three of the basins was either achieved (Upper Snake) or deliberately missed (Payette and Boise) to provide flow augmentation water as earlier as possible. The Upper Snake reservoir system essentially filled and reached a maximum combined physical storage content of 4,179,456 acre-feet, approximately 6,239 acre-feet below full capacity of 4,185,695 acre-feet. The Boise reservoir system nearly filled reaching a maximum storage content of 935,434 acre-feet and would have filled but for early flow augmentation releases. The Boise reservoir system maximum storage content peaked at approximately 14,266 acre-feet below its full capacity of 949,700 acre-feet. The Payette reservoir system also nearly filled reaching a maximum storage content of 791,226 acre-feet and also would have filled but for early flow augmentation releases. The Payette reservoir system maximum storage content peaked at approximately 9,226 acre-feet below its full capacity of 800,452 acre-feet.

Despite below average water years in the Payette and Boise basins, the above average precipitation in the Upper Snake basin coupled with high carryover from 2017 allowed the higher threshold flow augmentation of 487,000 acre-feet to be targeted.

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 preliminary 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 487,000 acre-feet of water for flow augmentation in 2018. Table 1 summarizes the source, amount, and timing for Reclamation's 2018 salmon flow augmentation program.

Table 1. Summary of Reclamation’s 2018 Salmon Flow Augmentation Releases

SOURCE	AMOUNT (acre-feet)	DATES OF DELIVERY
Upper Snake above Milner Dam		
Reclamation Uncontracted Space	22,463	July 2 – July 31
Reclamation Powerhead Space	0	
Rentals – Water District 01	205,000	
<i>Subtotal</i>	227,463	
Payette		
Reclamation Uncontracted Space	95,000	June 14 – August 30
Rentals	25,202	
<i>Subtotal</i>	120,202	
Boise		
Reclamation Uncontracted Space	40,932	May 28 – June 22
Reclamation Powerhead Space	0	
Rentals	20,754	
<i>Subtotal</i>	61,686	
Natural Flows		
IWRB Lease (Idaho)	60,000 ^A	April 3 – August 31 ^B
Skyline Farms (Oregon)	17,649	
<i>Subtotal</i>	77,649	
TOTAL	487,000	

^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 April 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 2018 flow augmentation program. In the Upper Snake above Milner, 22,463 acre-feet of uncontracted storage was allocated (out of a total possible of 22,896 acre-feet of space) and 22,463 acre-feet was provided for the flow augmentation program. Last to fill space in the Upper Snake received a full allocation in 2018.

The 17,649 acre-feet of natural flow rights Reclamation has acquired in Oregon (Skyline Farms) were fully available again in 2018.

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 water year 2018, the chart specified that Water District 1 would provide 205,000 acre-feet of rental water. Carryover from the 2017 water year on November 1, 2017 was 3,148,716 acre-feet, and the April 1 runoff forecast was 4,327,000 acre-feet (114 percent of average) for the April through September period. The 2018 April through September observed runoff was 4,790,800 acre-feet, which is 127% of average.

In the Payette basin 25,202 acre-feet was made available and rented by Reclamation, and 20,754 acre-feet of rental water was made available from the Boise basin in 2018.

Powerhead Space

As part of the Nez Perce Water Rights Settlement, Reclamation may utilize powerhead space in Anderson Ranch and Palisades Reservoirs for flow augmentation. In order for powerhead space to be used, the sum from all other sources must be less than 427,000 acre-feet, and powerhead space cannot be used to exceed a flow augmentation total of 427,000 acre-feet. In addition, Palisades Reservoir powerhead space may only be used after all other sources have been exhausted including Anderson Ranch Reservoir powerhead space. The use of powerhead space was not necessary in 2018, and the accounts remain full.

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 April 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.

Timing Considerations for Flow Augmentation Releases

The timing of flow augmentation releases depends on the individual basin and source of water. 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 2018 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 strategy for augmentation releases in the Upper Snake Basin is to increase flows past Milner advantageous to salmon and steelhead. 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 2018 at Milner commenced on July 2 following the end of flood control operations, ramping up to approximately 4,000 cfs by July 3 and lasting until July 30. At the conclusion of flow augmentation, releases continued at an average rate of approximately 3,000 to 3,500 cfs to deliver water owned or leased by Idaho Power Company. The Idaho Power releases continued through August 17; they were not counted toward Reclamation's flow augmentation volumes.

Boise Basin:

Augmentation flows began on the Boise system on May 28 and lasted until June 22. Delivering water earlier in the Boise basin for flow augmentation 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 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.

In 2018, flood releases began in the middle of March and continued through early June when sufficient water was evacuated from the system to reduce the risk of flooding. Releases from the Boise system were maintained at a high release rate for flow augmentation, approximately 1,200 cfs above irrigation requirements, until late June when all flow augmentation water had been released and floating season began.

Payette Basin:

Augmentation releases from the Payette system began on June 14 as the reservoir system neared full with releases ending by August 30. 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 2018. Inflows were easily sufficient to fill the reservoir system but refill was deliberately missed to allow for inflows to pass downstream for flow augmentation. Releases from both reservoirs were increased to invoke drafting. The release from Lake Cascade averaged around 1,500 cfs, less than the maximum powerhouse capacity of approximately 2,200 cfs. The flow rate credited towards augmentation water was variable depending upon unregulated tributary runoff and irrigation demands, but averaged approximately 1,400 cfs from June through July, and approximately 600 cfs in July and August.

Mean Monthly Inflows to Brownlee Reservoir¹

April	32,976 cfs
May	30,731 cfs
June	20,866 cfs
July	10,736 cfs
August	10,677 cfs

November 1 Carryover

At the end of the 2018 irrigation season (November 1, 2018), the carryover storage into the 2018 water year was as follows:

Upper Snake above Milner Dam	2,146,977 acre-feet ²
Boise River system	371,675 acre-feet
Payette River system	455,712 acre-feet

¹ Source: http://www.nwrhc.noaa.gov/runoff/runoff_summary.php?date=10/01/2018

² This number reflects the actual November 1 carryover in the Upper Snake above Milner. For purposes of determining the quantity of storage available for flow-augmentation rental in 2019 from the Water District 01 Rental Pool (Upper Snake above Milner Dam), 70,000 acre-feet will be added to actual carryover (totaling 2,216,977 acre-feet of calculated carryover) to mitigate against any impacts to flow augmentation reliability resulting from rentals for hydropower purposes in 2018.

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