RECLAMATION

Managing Water in the West

2017 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 and coordination activities. This report meets Reclamation's responsibility to submit an annual progress report by December 31 of each year.

RECLAMATION'S 2017 SALMON FLOW AUGMENTATION PROGRAM

Basin Conditions

Early in water year 2017, 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 2016 was 91, 98, and 70 percent of average, respectively.

In the early winter, near normal precipitation fell in the Payette and Boise basins, while much above normal precipitation fell in the Upper Snake basin. However, much of the very early season precipitation in October fell as rain which did not add to the snowpack. This resulted in a below average snowpack in the Payette, a near average snowpack in the Boise, and an above average snowpack in the Upper Snake on January 1, 2017. Snowpack on January 1 in the Payette, Boise, and Upper Snake basins was 82, 94, and 118 percent of average, respectively. Wet conditions continued in January, February and March, and by April 1, snowpack in all three basins was above average with 123, 140, and 137 percent of average, respectively.

Above average precipitation in the basins south and west of the Boise basin continued to help counter recent drought conditions and resulted in full reservoir systems in eastern Oregon.

Observed unregulated runoff for the April through July period was above average with 168 percent of average for the Payette River at Horseshoe Bend, 185 percent for the Boise River near Boise, and 166 percent for the Snake River at Heise. Flood control releases were required in the Payette, Boise, and Upper Snake basins in 2017. Flood control releases on the Payette began in early March and ran through late June. In the Boise, flood control began in the middle of February and ran through the end of June. In the Upper Snake, flood control releases were required starting the end of February and ran through early July.

The Upper Snake reservoir system above Milner essentially filled and reached a maximum combined physical storage content of 4,185,535 acre-feet, approximately 160 acre-feet below full capacity of 4,185,695 acre-feet. The Boise reservoir system nearly filled reaching a maximum storage content of 925,232 acre-feet and would have filled but for early flow augmentation releases. The Boise reservoir system maximum storage content peaked at approximately 24,500 acre-feet below its full capacity of 949,700 acre-feet. The Payette reservoir system also nearly filled reaching a maximum storage content of 780,875 acre-feet and also would have filled but for early flow augmentation releases. The Payette reservoir system maximum storage content peaked at approximately 19,600 acre-feet below its full capacity of 800,452 acre-feet.

The above average precipitation in the Payette, Boise and Snake basins allowed the higher threshold flow augmentation of 487,000 acre-feet to be targeted despite the near average to below average reservoir carryover conditions at the start of the water year.

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 2017. Table 1 summarizes the source, amount, and timing for Reclamation's 2017 salmon flow augmentation program.

Table 1. Summary of Reclamation's 2017 Salmon Flow Augmentation Releases

SOURCE	AMOUNT (acre-feet)	DATES OF DELIVERY
Upper Snake above Milner Dam		
Reclamation Uncontracted Space	22,500	July 11 – August 3
Reclamation Powerhead Space	0	
Rentals – Water District 01	185,000	
Subtotal	***207,500***	
Payette		
Reclamation Uncontracted Space	95,000	June 30 – August 29
Rentals	44,039	
Subtotal	***139,039***	
Boise		
Reclamation Uncontracted Space	40,932	June 28 – July 27
Reclamation Powerhead Space	0	
Rentals	21,880	
Subtotal	***62,812***	
Natural Flows		
IWRB Lease (Idaho)	60,000[A]	April 3 – August 31[B]
Skyline Farms (Oregon)	17,649	
Subtotal	***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 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 2017 flow augmentation program. In the Upper Snake above Milner, 22,564 acre-feet of uncontracted storage was allocated (out of a total possible of 22,896 acre-feet of space) and 22,500 acre-feet was provided for the flow augmentation program. Last to fill space in the Upper Snake received a full allocation in 2017.

The 17,649 acre-feet of natural flow rights Reclamation has acquired in Oregon (Skyline Farms) were fully available again in 2017.

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 2017, the chart specified that Water District 1 would provide 185,000 acre-feet of rental water. Carryover from the 2016 water year on November 1, 2016 was 1,793,376 acre-feet, and the April 1 runoff forecast was 5,614,200 acre-feet (148 percent of average) for the April through September period. The 2017 April through September observed runoff was 6,114,300 acre-feet, which is 162% of average.

In the Payette basin 44,039 acre-feet was made available and rented by Reclamation, and 21,880 acre-feet of rental water was made available from the Boise basin in 2017.

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. No use of powerhead space was necessary in 2017, 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 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.

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 2017 mark the ninth 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 2017 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 2017 at Milner commenced on July 11 following the end of flood control operations, ramping up to approximately 5,000 cfs by July 13 and lasting until August 3. At the conclusion of flow augmentation, releases continued at an average rate of approximately 1,500 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 June 28 and lasted until July 27. 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 the middle of February and continued through late June 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 900 to 2,300 cfs above irrigation requirements, until late July when all flow augmentation water had been released and floating season began.

Payette Basin:

Augmentation releases from the Payette system began on June 30 as the reservoir system neared full; releases ended by August 29. 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 2017. Inflows were easily sufficient to top off the reservoir system but the reservoirs were 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 1,300 cfs up to 1,900 cfs, slightly less than the maximum powerhouse capacity of approximately 2,200 cfs, in order to "front load" augmentation releases in late June and July. No drafting of reservoir storage for irrigation would have been necessary prior to July 22[1], so all reservoir draft (including Deadwood Reservoir) up to that point (47,797 acre-feet) was for release of flow augmentation water. The flow rate credited towards augmentation water was variable depending upon unregulated tributary runoff and irrigation demands, but averaged approximately 1,100 cfs in June and July, and approximately 1,200 cfs in August.

Mean Monthly Inflows to Brownlee Reservoir[2]

April	62,678 cfs
May	50,031 cfs
June	38,313 cfs
July	15,175 cfs
August	11,428 cfs

November 1 Carryover

At the end of the 2017 irrigation season (November 1, 2017), the carryover storage into the 2018 water year was as follows:

Upper Snake above Milner Dam	3,148,716 acre-feet
Boise River system	519,091 acre-feet
Payette River system	554,518 acre-feet

[1] Unregulated runoff in the basin was sufficient to meet irrigation demands through July 21 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