RECLAMATION

Managing Water in the West

2015 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

***With Errata to supersede version dated December 3, 2015*.**

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

April 5, 2016

ERRATA SHEET

(April 5, 2016)

for the Document Titled:

2015 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 (December 3, 2015)

Prepared by U.S. Department of the Interior, Pacific Northwest Region, Boise, Idaho

As of April 5, the following errata to the *Annual Progress Report* are corrected below.

Page 3, Table 1
Replaced Total 487,000 with Total 427,000

Page 5, Annual Rentals section paragraph 2
Replaced 2013 with 2014

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 2015 SALMON FLOW AUGMENTATION PROGRAM

Overview of Salmon Flow Augmentation Program

Reclamation was able to provide 427,000 acre-feet of water for flow augmentation in 2015 (See Table 1). Water supply conditions in early water year 2015 were near average in much of the Snake River basin above Brownlee Reservoir, with above average carryover. Unfortunately, a shift to much drier and warmer conditions in mid-February resulted in well below average snowpack and water supply conditions. Snowpack on January 1 in the Payette, Boise, and upper Snake basins was 87, 95, and 123 percent of average, respectively. But by April 1, snowpack in these three basins had dramatically decreased to 49, 61, and 75 percent, respectively.

Basins south and west of the Boise basin continued the dry pattern of the last couple of years and suffered severe to historic drought conditions due to the lack of reservoir carryover storage from the previous year (which also saw severe drought). Reservoirs were essentially empty by early August in the Owyhee and Malheur basins.

Reservoir carryover storage coming out of the 2014 water year was above average in the Upper Snake and Boise projects. November carryover storage from 2014 was 99% of average in the Payette, 101% of average in the Boise basin, and 111% in the upper Snake basin above Milner.

Observed unregulated runoff for the April through July period was well below average, with 45 percent of average for the Payette River at Horseshoe Bend, 53 percent for the Boise River near Boise, and 84 percent for the Snake River at Heise (the seasonal flows at Heise were buoyed by May rain events). There were only minor flood control releases required in the Boise basin in 2015. In the upper Snake, no excess flows passed Milner once irrigation began in late March until flow augmentation began in early June.

Due to the above average carryover storage from the previous year, the upper Snake above Milner reservoir system reached a maximum combined physical storage content of

3,685,336 acre-feet, about 360,000 acre-feet below full capacity of 4,045,695 acre-feet. The Boise system nearly filled reaching a maximum storage content of 888,831 acre-feet (61,000 acre-feet below its full capacity of 949,700 acre-feet) and would have filled approximately an additional 37,000 acre feet but for early flow augmentation releases. The Payette reservoir system reached a maximum combined storage content of 798,136 acre-feet, 10,000 short of the full storage of 808,500 acre-feet, and would have filled but for early flow augmentation releases.

Insufficient water was available to Reclamation to provide 487,000 acre-feet, the upper limit of flow augmentation to be provided in any given year. However, 427,000 acre-feet was made available for flow augmentation by taking extraordinary measures in accordance with the terms of the Nez Perce Water Rights Settlement, namely by releasing water stored in powerhead space in Anderson Ranch and using additional uncontracted space in Deadwood Reservoir.

The 427,000 acre-feet volume includes 60,000 acre-feet of natural flow rights, a small portion (10,500 acre-feet) of which is considered to occur outside of the April 3 to August 31 migration period.

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 for flow augmentation in May and June, including foregoing final fill of Cascade Reservoir to initiate flow augmentation releases in the Payette River system in May.

Table 1 summarizes the source, amount, and timing for Reclamation's 2015 salmon flow augmentation program.

Table 1. Summary of Reclamation's 2015 Salmon Flow Augmentation Program.

SOURCE	AMOUNT (acre-feet)	DATES OF DELIVERY
Upper Snake above Milner Dam		
Reclamation Uncontracted Space	22,362	May 11 – June 11
Reclamation Powerhead Space	0	
Rentals – Water District 01	100,000	
Rentals – Tribes	0	
Subtotal	***122,362***	
Payette		
Reclamation Space	95,608	May 28 – August 29
Additional Reclamation Space	23,435[1]	
Rentals	44,964	
Subtotal	***164,007***	
Boise		
Reclamation Uncontracted Space	40,932	May 1 – July 22
Reclamation Powerhead Space	20,000	
Rentals	2,050	
Subtotal	***62,982***	
Natural Flows		
IWRB Lease (Idaho)	60,000[2]	April 3 – August 31
Skyline Farms (Oregon)	17,649	
Subtotal	***77,649***	
TOTAL	**427,000**	

Uncontracted Space and Space Reacquired for Flow Augmentation

Reclamation's 95,608[3] 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 2015 flow augmentation program. In the upper Snake above Milner, 22,362 acre-feet of uncontracted space (out of a total possible of 22,896) was accrued and provided for the flow augmentation program.

The 17,649 acre-feet of natural flow rights Reclamation has acquired in Oregon (Skyline Farms) were fully available again in 2015.

[1] The 23,435 acre-feet is from the Deadwood Reservoir instream flow account provided in lieu of Palisades Powerhead. See section title "Powerhead Space"
[2] See section titled "Lease of Natural Flow Water Rights below Milner Dam."
[3] Reclamation was able to reacquire 608 acre-feet of formerly contracted space in 2012, increasing the total uncontracted storage assigned for flow augmentation in the Payette system to 95,608 acre-feet.

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 2015. 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 26 and July 27 at various rates, but targeted about 750 cubic feet per second (cfs) for much of July; this water is not included in Reclamation's 427,000 acre-foot volume.

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 2015, the chart specified that Water District 1 would provide 100,000 acre-feet of rental water. Carryover from 2014 on November 1 was 1,970,313 acre-feet, and the April 1 runoff forecast was 2,940,945 acre-feet (78 percent of average) for the April through September period. The 2015 April through September observed runoff was 85% of average, which was due to the above average May precipitation.

In the Payette basin 44,964 acre-feet was made available and rented by Reclamation, and 2,050 acre-feet of rental water was made available from the Boise basin in 2015.

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 2015 the Palisades Reservoir powerhead space filled to 133,210 of the 157,000 acre-feet. It is anticipated that this powerhead space will be used relatively infrequently, and it was not necessary to use any in 2015 because of the use of Anderson Ranch Reservoir inactive space and Deadwood Reservoir uncontracted space.

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 2015, it was necessary to use 20,000 acre-feet of Anderson Ranch powerhead/inactive space to attain the 427,000 acre-feet target. Additionally, Reclamation took the extraordinary measure of using uncontracted accounts in Deadwood Reservoir, which are difficult to refill, to reach the augmentation 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 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 2015 mark the seventh 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 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 2015 will be highlighted in the following discussion for each basin.

As discussed in the previous section, the 60,000 acre-feet of 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 biological opinion and 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 2015 at Milner commenced on May 11, ramping up to about 2,000 cfs by May 12 and lasting until June 26. At the conclusion of flow augmentation, releases were reduced to about 1,500 cfs to deliver water owned or leased by Idaho Power Company. The Idaho Power releases continued at various rates through August 12; they were not counted toward Reclamation's flow augmentation volumes.

Boise Basin:

Augmentation flows began on the Boise system on May 1 and by May 29 approximately 37,000 acre-feet were released. The remainder of the flow augmentation delivery from the Boise occurred between June 8 and July 23rd. 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 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 about 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 float season begins.

There may be years when the above options are not available; such was the case in 2015. There were only minor flood control releases required in 2015, and these March releases were primarily due to the distribution of space between the three reservoirs. Much of the space to refill in the system resided in the furthest upstream reservoir, Anderson Ranch, yet releases were required from Lucky Peak and Arrowrock to maintain adequate flood protection. The flood releases were short in duration and limited quantity. The

remainder of the spring was relatively dry and there was insufficient inflow available to top off the system. Therefore the miss in refill was primarily due to hydrologic conditions, however approximately 37,000 acre-feet was released in May and lowered the maximum fill level. Since this water was released before the recreational floating season on the Boise River, the releases ranged from 700 to 1000 cfs above the irrigation requirements. The final portion of augmentation from the Boise River which came from Anderson Ranch inactive storage, was released from June 29 through July 23rd.

Payette Basin:

Augmentation releases from the Payette system began on May 28 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 2015. Inflows were easily sufficient to top off the reservoir system but a minor amount of refill in Cascade Reservoir (about 10,000 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 Cascade Reservoir ranged from 1,800 cfs to the maximum powerhouse capacity of approximately 2,200 cfs in order to "front load" augmentation releases in June and July. These releases were reduced in August, as accounting information was made available by Idaho Department of Water Resources No drafting of reservoir storage for irrigation would have been necessary prior to June 15[4], so all reservoir draft (including Deadwood Reservoir) up to that point (30,899 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 about 900 to 1,000 cfs in June and July, and about 800 cfs in August.

Mean Monthly Inflows to Brownlee Reservoir[5]

April	9,041 cfs
May	12,978 cfs
June	9,814 cfs
July	8,603 cfs
August	8,798 cfs

[4] Unregulated runoff in the basin was sufficient to meet irrigation demands through June 14 according to preliminary State water accounting.
[5] Source: http://www.nwrfc.noaa.gov/runoff/runoff_summary.php?date=10/01/2015

November 1 Carryover

At the end of the 2015 irrigation season (November 1, 2015), the carryover storage into the 2016 water year was as follows:

Upper Snake above Milner Dam	1,299,975 acre-feet
Boise River system	331,960 acre-feet
Payette River system	375,157 acre-feet

Attachment 1
Stipulated Augmentation Rental -Water District 01

Stipulated Augmentation Rental Dist 01

November 1 Carryover 1000s af	<---------- April 1 Heise Forecast (Apr-Sep) 1000s af ---------->						
	< 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