RECLAMATION
Managing Water in the West

2011 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 2011 SALMON FLOW AUGMENTATION PROGRAM

Overview of Salmon Flow Augmentation Program

Reclamation was able to provide 487,000 acre-feet of water for flow augmentation in 2011, the upper limit to be provided in any given year (See Table 1). Water supply conditions in 2011 were extremely abundant, characterized not only by above average snowpacks, but more so by an anomalously cool and wet spring that continued to build snowpack well into May and resulted in one of the latest runoff cycles on record. Late season snowpacks were near or at record levels, and the potential flood threat was extremely elevated throughout the Snake River Basin. Fortunately, no sudden hot spells or heavy rain events occurred and the snow melted in an orderly fashion, and with very slow late season recessions. Nonetheless, significant flood control operations were required and large volumes of water were released for an extended period from April through mid to late July.

November carryover storage from 2010 was near average in the Payette Basin (99%) and in the Boise Basin (99%), and slightly below average in the Upper Snake Basin above Milner (86%). After a wet fall, snowpacks accumulated at a fairly average rate during the winter, although a dry period from mid January to mid February threatened that trend. March, however, was very snow-laden and made up for the lag, so that by April 1 snowpacks in these three basins were 105%, 99%, and 119% of average, respectively. April was significantly wet (over 200% of average in places) and cold and added substantially to the snowpack, with May 1 values well exceeding the normal April 1 peaks, especially in the Upper Snake above Milner where May 1 snowpack was 160% of average for the date, and 142% of its average April 1 value. Cool temperatures continued throughout the remainder of spring and early summer, allowing for a drawn out, but high, runoff season. Observed unregulated runoff for the April through July period was 130 percent for the Payette River at Horseshoe Bend, 130 percent for the Boise River near Boise, and 150 percent of average for the Snake River at Heise. While the seasonal volume at Heise was not a record, the amount of runoff in the June through July period

set a new record going back over 100 years. The unprecedented late runoff, along with the fact no major flooding occurred, is the most notable feature of the 2011 water year.

The Upper Snake reservoir system refilled completely in 2011. The Boise and Payette reservoir systems had sufficient water to refill completely, but were deliberately held slightly below full (39,900 acre-feet on the Boise system, and 2,900 acre-feet on the Payette) in order to move the flow augmentation release to an earlier timeframe as outlined in the 2008 BiOp. See **Timing Considerations for Flow Augmentation Releases** section for more detail.

The 487,000 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

Table 1 summarizes the source, amount, and timing for Reclamation's 2011 salmon flow augmentation program.

Table 1. Summary of Reclamation's 2011 Salmon Flow Augmentation Program.

SOURCE	AMOUNT (acre-feet)	DATES OF DELIVERY
Upper Snake above Milner Dam		
Reclamation Uncontracted Space	22,500	July 28 – August 26
Reclamation Powerhead Space	0	
Rentals – Water District 01	185,000	
Rentals – Tribes	0	
Subtotal	***207,500***	
Payette		
Reclamation Space	95,000	July 8 – August 27
Rentals	65,000	
Subtotal	***160,000***	
Boise		
Reclamation Uncontracted Space	37,551	July 7 – July 19
Reclamation Powerhead Space	0	
Rentals	4,300	
Subtotal	***41,851***	

Natural Flows		
IWRB Lease (Idaho)	60,000[1]	April 3 – August 31
Skyline Farms (Oregon)	17,649	
Subtotal	***77,649***	
TOTAL	**487,000**	

[1] See section titled "Lease of Natural Flow Water Rights Below Milner Dam."

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 22,895 acre-feet of uncontracted space in the Upper Snake above Milner. The 40,932 acre-feet of space reacquired for flow augmentation in the Boise system reservoirs completely refilled as well.

In the Payette basin all 95,000 acre-feet was provided. In the Upper Snake above Milner, Reclamation released 22,500 acre-feet, the estimated amount available after evaporation is charged to all storage accounts. Reclamation provided 37,551 acre-feet from the Boise Basin to the 2011 flow augmentation program; ample rental water was available to allow the remaining 3,381 acre-feet to be carried over into 2012 while still meeting the flow augmentation target.

The 17,649 acre-feet of natural flow rights Reclamation has acquired in Oregon (Skyline Farms) were fully available again in 2011.

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. It was not necessary for Reclamation to negotiate rental of Tribal storage water in 2011. However, Idaho Power Company executed a lease with the Tribe for 45,716 acre-feet and released this volume, along with other leased and storage water, between August 1 and September 5 at a rate of about 500 cubic feet per second (cfs) while it was being released concurrently with Reclamation flow augmentation water (August 1 to August 26), and at a higher rate thereafter. This water is not included in Reclamation's 487,000 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 2011, the chart specified that Water District 1 would provide 185,000 acre-feet of rental water. Carryover from 2010 on November 1 was 1,853,700 acre-feet, and the April 1 runoff forecast was 4,978,000 acre-feet (120 percent of average) for the April through September period. Actual observed runoff turned out to be much higher at 151%.

Additional water (50,000 acre-feet) was also rented from Water District 1 by Idaho Power and released from August 23 to September 5, after flow augmentation releases were concluded, at a rate of approximately 4000 cfs. This water is not included in Reclamation's 487,000 acre-foot volume.

In the Payette Basin, 65,000 acre-feet was made available and rented by Reclamation, and 4,300 acre-feet was rented from the Boise Basin in 2011, marking the fourth year in a row that rental water has been made available from this basin.

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. It is anticipated that this powerhead space will be used relatively infrequently, and it was not necessary to use any in 2011. The account remains full.

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. No use was necessary in 2011, and the account remains 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 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 2011 mark the third 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 2011 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. It is 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. However, the unprecedented late timing and record June-July runoff volume created a situation which was not anticipated: flood control releases which lasted until the end of July, with downstream flow targets being easily met. Flood control releases past Milner from April 3 to July 27 amounted to nearly 2.7 million acre-feet of water. Given the anomalous conditions it was necessary to extend flow augmentation releases into August in 2011. Excess flood flows were passing Milner in mid-July at a rate of 9,000 cfs, and had tapered down to about 3,300 cfs by July 27, at which point

American Falls Reservoir began drafting below full pool and releases would have otherwise been reduced to minimum. Flow augmentation releases at Milner; therefore, commenced on July 28 and lasted until August 26, beginning at a rate of about 3,300 cfs through the end of July. Starting August 1, Idaho Power requested release of their rental water at a rate of 500 cfs, which when added to a small increase in the augmentation flow brought the total flow at Milner up to about 4,000 cfs, where it remained until the delivery of flow augmentation water concluded on August 26. The flows at Milner; however, continued at 4,000 cfs through September 10 as Idaho Power continued to release water they had rented or had in storage (which, along with the earlier 500 cfs, was not counted toward flow augmentation volumes).

Boise Basin:

Augmentation flows began on the Boise system on July 7 and ended by July 19. 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.

In 2011, the Boise reservoir system was actively operated for flood control from late March through early July, with the river flowing at or just below flood stage continuously for two of those months. Under the first strategy outlined above, the system was deliberately operated to not refill completely, with about 39,940 acre-feet of space left vacant by July 16 credited to flow augmentation. The remainder of the flow augmentation volume was released from July 17 to July 19 as flows ramped down from flood control to irrigation release only. By leaving a portion of the storage system unfilled, the starting date of flow augmentation is somewhat subjective. The system reached its maximum capacity for the year on July 7, while still making flood control releases, and began to slowly draft. It is at this point that flows would have otherwise been reduced in order to refill the remaining space, but were deliberately left higher to provide augmentation water. Reclamation therefore considers that flow augmentation occurred from July 7 to July 19, at an average rate of about 1,625 cfs.

Payette Basin:

Augmentation releases from the Payette system began on July 8 and ended by August 27. 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), or by increasing the initial rate of release in order to "front load" a portion of the augmentation volume. This latter strategy was primarily employed in 2011, although a small amount of storage was also deliberately left unfilled in Cascade Reservoir (about 2,900 acre-feet) under the first strategy. Due to water quality concerns in Cascade Lake, some amount of flow augmentation water will continue to be released in August. Substantial flood control releases were made from Cascade Reservoir on a continuous basis from the end of March until early July; the pool reached maximum content and began to draft on July 7, and rather than cut back outflows to fill the remaining space this marks the beginning date of flow augmentation. No drafting of reservoir storage for irrigation would have been necessary prior to July 31[1], so all reservoir draft (including Deadwood Reservoir) up to that point (62,857 acre-feet) was for release of flow augmentation water. Although the release rate from Cascade Reservoir remained constant at about 2,000 cfs during the second half of July, the flow rate credited towards augmentation water was variable, starting off low and steadily increasing throughout July as natural inflows dropped off (and hence the reservoir began to draft faster.) By the end of July the flow rate credited toward augmentation had peaked at about 2,000 cfs. This flow rate varied in August between about 1,500 cfs and 2,000 cfs due to changes in unregulated inflow and irrigation demand, averaging about 1,770 cfs until delivery was completed on August 27. Augmentation releases actually continued for several more days due to significant gaging error, discovered after-the-fact, that under reported the actual streamflow and led to an over-delivery of augmentation water by several thousand acre-feet. No more than the full 487,000 acre-feet of augmentation water is being claimed, however, and no impact to the 2012 water supply is anticipated.

Mean Monthly Inflows to Brownlee Reservoir[2]

April	46,686 cfs
May	55,702 cfs
June	50,635 cfs
July	21,663 cfs
August	14,231 cfs

[1] Unregulated runoff in the basin was sufficient to meet irrigation demands through July 30 according to preliminary State water accounting.
[2] Source: http://www.nwrfc.noaa.gov/runoff/runoff_product.cgi?year=2011

November 1 Carryover

At the end of the 2011 irrigation season (November 1, 2011), the carryover storage into the 2012 water year was as follows:

Upper Snake above Milner Dam	2,680,735 acre-feet
Boise River system	512,151 acre-feet
Payette River system	522,427 acre-feet

OTHER REASONABLE AND PRUDENT MEASURES

National Marine Fisheries Service's (NMFS) incidental take statement contains two other RPMs and associated terms and conditions to ensure that Reclamation implements its salmon flow augmentation program as described in its Upper Snake Biological Assessment (BA) and supporting documents.

New Contracts for Water Stored in Reclamation Projects

RPM 13.3.1 states:

> "Because Reclamation's salmon flow augmentation program is heavily dependent on annual water rentals from Idaho's water rental pools, which are variable and insecure sources. Due to this variability Reclamation must consult with NOAA Fisheries prior to issuing a new contract that would reduce streamflows or reduce Reclamation's ability to meet salmon flow augmentation commitments, as described in its proposed actions, or whenever Reclamation otherwise determines that listed salmon or steelhead species or critical habitat may be affected."

NMFS Upper Snake BiOp at page 13-4.

NMFS's intent is to ensure that any contract actions taken by Reclamation result in "an improvement or 'zero net impact' on Snake River flows and on Reclamation's ability to provide up to 487,000 acre-feet for salmon flow augmentation."

Reclamation committed in its March 2009 Decision Document to consult with NMFS before entering into new, renewed, or supplemental contracts for storage water, if Reclamation determined that it would affect its ability to provide salmon flow augmentation water as described in the Upper Snake BA, or if it determined that listed species or critical habitat may be adversely affected.

In the past year, Reclamation has not entered into any new contracts for uncontracted space in any of the reservoirs covered in the Upper Snake BiOp. Further, Reclamation has not entered into any renewed or supplemental contracts for storage water that would result in reduced streamflows or affect Reclamation's ability to meet its salmon flow augmentation commitments.

Annual Coordination of the Salmon Flow Augmentation Program

RPM 13.3.2 states:

> "Reclamation must continue to coordinate annually with the Technical Management Team (TMT) and Regional Forum when planning and implementing its annual salmon flow augmentation program."

NMFS Upper Snake BiOp at page 13-4.

Reclamation continued to coordinate with the TMT and Regional Forum when planning and implementing its 2011 annual salmon flow augmentation program. Reclamation staff regularly attended these meetings and provided estimates and updates of the salmon flow augmentation program acquisitions and delivery.

CONSERVATION RECOMMENDATIONS

NMFS included voluntary conservation recommendations in its Upper Snake BiOp at page 12-3, recommending Reclamation's participation in Total Maximum Daily Load (TMDL) planning efforts in the Upper Snake River Basin. In its March 2009 Decision Document, Reclamation noted that it was generally amenable to implementing the conservation recommendations to the extent funding and staffing can be made available within its existing authorities. The following summarizes relevant activities that Reclamation has been involved over the past year.

As part of the Idaho and Oregon's on-going TMDL development and implementation activities, Snake River Area Office and/or Pacific Northwest Region Reclamation staff continued to participate in all appropriate watershed advisory group and watershed council meetings in the Upper Snake River Basin. These included activities in the Lower Boise River, North Fork Payette River, Lower Payette River, Mid Snake River, Lake Walcott, and American Falls Reservoir Watershed Advisory Groups, as well as the Owyhee/Malheur Watershed Council.

Reclamation continued to provide technical assistance to irrigation system operators and other appropriate entities throughout its project areas in the Upper Snake River Basin. Reclamation's Pacific Northwest Region Laboratory also provided financial assistance for analytical laboratory services to several entities in the basin in 2011. These entities included:

- Idaho Department of Environmental Quality – Twin Falls Region
- Idaho Department of Environmental Quality – Pocatello Region
- Oregon Department of Environmental Quality
- U.S. Geological Survey
- Aberdeen Springfield Irrigation District
- Owyhee Watershed Council
- A & B Irrigation District

- Minidoka Irrigation District
- Lake Walcott Watershed Advisory Group
- Malheur Soil & Water Conservation District

Upper Snake Temperature Monitoring - Project Summary

In coordination with the U.S. Geological Survey, Reclamation continued to operate a comprehensive basin-wide temperature monitoring study for the Upper Snake River Basin. Data collection at 52 sites in the Upper Snake River and major tributaries was initiated in 2004 and will continue through at least 2015. An interim summary of the data collected thus far was prepared in 2007 and further updated in 2008. Reclamation is currently preparing a summary report that compiles temperature trends at Snake River main-stem sites from 2004-2011. Annual reports will be compiled starting in 2012. The project will culminate with a completion report describing temperature conditions in the Upper Snake River and relationships to storage, irrigation, and hydropower facilities in the basin.

Attachment 1
Stipulated Augmentation Rental -Water District 01

Stipulated Augmentation Rental Dist 01

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