

**DRAFT FPP Change Request Form**

**\*\*This draft FPP change form format is only intended to assist in the facilitation of conversations with the FPOM subgroup regarding 2012 BON PH1/PH2 Special Operations. A final FPP change based on discussions in the subgroup regarding this issue will be significantly revised prior to discussions at FPOM.**

**Change Request Number:** (to be filled in by COE District or Division FPP coordinator)

**Date Submitted:** July 3, 2012

**Project:** BON

**Requester Name, Agency:** Doug Baus

**Location of Change - FPP Project and Section:**

Section 2 – Bonneville Dam 5.2.1 page BON-34

**Proposed Change** (in track changes to existing section):

**5.2.1. Turbine units at PH2 will operate at the mid to lower 1% range (unless total dissolved gas waivers are exceeded in the tailrace) of best efficiency and within cavitation limits at various head ranges as shown in Table BON-16.**

**From April 10 to August 31 operate PH1 and PH2 in accordance with the following prioritized order:**

- 1) PH 2 up to the 25% of 1% of Best Efficiency Operating Range**
- 2) PH 1 up to the upper limit (100%) of 1%**
- 3) PH 2 within the 25-50% range of 1%**
- 4) As needed to remain flow neutral, operate PH 1 up to best geometry**
- 5) Manage spill rates as described in Appendix E (Operations Related to Project Spill for Fish Passage Fish Operations Plan) of the Fish Passage Plan**

**This operation is intended to be flow neutral. Limiting PH2 to the 50% of the 1% operation results in approximately 28 kcfs (this rate changes based on real time conditions) of flow that is reallocated to PH1 and passes PH1 by operating units at best geometry.**

**Refer to Appendix E for spill specific discussions regarding Bonneville Dam spring summer spill rates as well as gauges associated with spill management at Bonneville Dam.**

**Justification for Change:**

As discussed in the June 14, 2012, FPOM meeting section 5.2.1 (“Turbine units at PH2 will operate at the mid to lower 1% range (unless total dissolved gas waivers are exceeded in the tailrace) of best efficiency and within cavitation limits at various head ranges as shown in **Table BON-16.**”) was inadvertently included in the FPP in 2011. Operationally, Bonneville Dam is not currently configured (AGC) to operate in this manner furthermore additional policy discussion needs to be completed prior to implementing 5.2.1 as currently worded in the FPP as it could result in voluntarily spilling in excess of the spill rate identified in the FOP. In 2012 the flow neutral operation intended to reallocated flow from PH2 resulting from limiting PH2 to the 50% of the 1% range to PH1 and passed via operating units at best geometry was coordinated during numerous TMT meetings and more information may be found in the TMT meeting minutes (discussed on the following dates: March 28; April 13 (SOR 2012-1), 18, 25, 27; May 2, 4, 16, 23, 30 (SOR 2012-2), and; June 6) on the following website:

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Comment [DB1]: My intent is not to have a predetermined outcome prior to coordination as identified in the following operation. I look forward to gaining insight from BON, BPA, and NWP and others coming up with a regionally coordinated operation that makes sense. Having said that my intent was to start the conversation with an operation that was more in line with what we implemented in 2012.

<http://www.nwd-wc.usace.army.mil/tmt/agendas/2012/>

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## **Review of the 2012 Operation**

A complete summary of the 2012 Bonneville Dam special operations that involved limiting PH2 to the 50% of the 1% operation and operating PH1 at best geometry is attached. Summary includes: 1) Dates of the special operations, 2) PH1 and PH2 hourly data, 3) juvenile descaling/mortality information, 4) adult passage data, 5) water quality information, and 6) next steps. The discussion points below are intended to be used as a starting point to facilitate discussion with the FPOM subgroup on the BON PH1/PH2 special operation implemented in 2012. Additional discussion points are welcome.

### **1. Dates of Special Operations BON PH2 Regarding Limitations to the 50% of the 1% Operation.**

See attachment for detailed information but a brief summary is included below:

- a. April 14 at 0600 hours to April 18 at 1700 hours. BON R 041312 1221 Operation for Spring Creek Hatchery Release 1. Hard Constraint. Soft constraint issued outside the specified hours.
- b. April 30 at 1700 hours to May 4 at 1700 hours. BON R 042712 1643 Operation for Spring Creek Hatchery. Hard constraint.
- c. May 16 at 1122 hours to May 21 at 1800 hours. BON R 051612 1122 Limit PH2 Operating Range to 50% of 1% Range (sockeye).
- d. May 23 at 1210 hours to May 29 at 1800 hours. Extended to May 30 at 1800 hours. Extended to June 4 at 1800 hours. Extended to June 6 at 1800 hours. BON R 052312 1210 Powerhouse Operations for Juvenile Sockeye Migration.

### **2. PH1 and PH1 Hourly Data**

See attached data summary.

### **3. Juvenile Descaling/Mortality Information.**

See attachment for a detailed data summary.

Discussion Points

- a. What is the rationale being used to correlate the special operation with descaling / mortality data?
- b. What impacts this operation has on current juvenile survival data, "Table 1. Passage and survival at Bonneville Dam in 2010. Survival estimate represent survival from passage at Bonneville to mouth of the Willamette River."
- c. FPC memo. Attached.
- d. Others?

#### 4. Adult Passage Data

See attached data summary.

Discussion Points:

- a. What could be the impact on adults from the implementation of this operation?

Review of current information:

Perry, Chris. Memo to David Clugston. 27 October 2005. Bonneville spill and salmon behavior.

“ We concluded that fish are attracted into the spillway channel during periods of spill, but relatively fewer fish proceed close enough to the dam to be detected near fishway entrances during periods of high spill. This behavior could partially explain the significantly longer passage times seen for fish during high spill periods.”

Boggs, C.T., Keffer, M.L., and Peery, C.A. 2005. Fallback, Reascension and Adjusted Fishway Escapement Estimates for Adult Chinook Salmon and Steelhead at Columbia and Snake River Dams, 1996-2003. Idaho Cooperative Fish and Wildlife Research Unit. Technical Report 2005-6. [http://www.nwd-wc.usace.army.mil/tmt/agendas/2012/0427\\_U\\_of\\_Idaho\\_Report\\_96-03\\_Fallback\\_Summary\\_FINAL.pdf](http://www.nwd-wc.usace.army.mil/tmt/agendas/2012/0427_U_of_Idaho_Report_96-03_Fallback_Summary_FINAL.pdf)

2012 FPP “2.2.3. Adult Fish. To reduce adult fallback from June 16 through August, whenever PH1 is in operation, daytime spill will be limited to 100 kcfs or less (see also 2.2.2). Normally, this restriction will be from 1 hour before sunrise to ½ hour after sunset (Table BON-5). During that portion of the sockeye run that occurs from June 16 through July 15, the cap will apply until 1 hour after sunset only when PH1 is in operation.”

- b. With sea lion predation in the tailrace what operational flexibility should the project have to minimize pinniped predation?

Stansel, R. Van der Leeuw, B., Gibbons. 2012. Status Report – Pinniped Predation and Deterrent Activities at Bonneville Dam, 2012. May 25.

“Average daily SSL numbers are similar to last year (Figure 2). The maximum number of Pinnipeds seen any day this year was 38 (on April 25). The maximum number of SSL seen any day so far this year was 29 and 14 for CSL (Figure 1). Average CSL numbers present per day this year is lower than last year (Figures 2), which is the lowest for CSL since 2002.”

<http://www.nwd-wc.usace.army.mil/tmt/documents/fish/2012/update20120525.pdf>

- c. Others?

#### 5. Water Quality Data

Data summary attached.

Discussion points:

- a. Review of the 2012 water quality information and impacts of this operation on Camas/Washougal (CWMW) and Cascade Island (CCIW). Review of the WA/OR waiver requirements. The Washington State TDG requirements waiver states: “A maximum TDG one hour average of 125% must not be exceeded during spillage

for fish passage.” The Oregon State TDG requirements waiver states: “TDG may not exceed 125% of saturation for more than 2 hours in every 24 hours in the forebay and tailrace.” During the 2012 operations the Corps managed spill rate per the FOP. Spring spill operations April 10 through June 15 100 kcfs spill 24 hours per day managing spill at Bonneville Dam to 120%/115% TDG limits as measured at CCIW and CWMW. Summer Spill Operation June 16 through August 31 as measured at CCIW. Summer spill operations will alternate every two days between 85 kcfs/121 kcfs and 95 kcfs 24 hours per day. The alternating operation will begin at 0430 hours approximately June 16 and continue through July 20. Following the alternating spill operation, a 75 kcfs/Gas Cap operation (managed using the Camas/Washougal fixed monitoring TDG station) will begin on July 21 and continue through August 31.

Maintaining language in the Bonneville section of the FPP regarding managing spill at BON per CCIW only perpetuates confusion and frustration as this policy level operational decision (use of CWMW vs CCIW) that has been made and included in the FOP. This discussion needs to be addressed in Appendix E (FOP) of the FPP and not the Bonneville Dam narrative section.

b. Others?

## **6. Next Steps**

a. What is the strategy moving forward to ameliorate regional concerns associated with descaling and mortality at PH2? What is the strategy to deal with this discussion in various regional forums FFDRWG, SCT, SRWG, FPOM, and TMT.

b. Others?

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**Comments from others:**

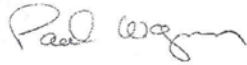
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**Record of Final Action:**

# SYSTEM OPERATIONAL REQUEST: #2012-1

*The following State, Federal, and Tribal Salmon Managers have participated in the preparation and support this SOR: National Marine Fisheries Service, US Fish and Wildlife Service, Nez Perce Tribe, the Columbia River Inter-Tribal Fish Commission, Washington Department of Fish and Wildlife, and the Idaho Department of Fish and Game.*

<b>TO:</b>	<b>Brigadier General McMahon</b>	<b>COE-NWD</b>
	<b>James D. Barton</b>	<b>COE-Water Management</b>
	<b>Doug Baus</b>	<b>COE-RCC</b>
	<b>David Poganis</b>	<b>COE-PDD</b>
	<b>Karl Kanbergs</b>	<b>COE-NWD-NP-WM-RCC</b>
	<b>Col. Bruce A. Estok</b>	<b>COE-Seattle District</b>
	<b>Karl Wirkus</b>	<b>USBR-Boise Regional Director</b>
	<b>Steven Wright</b>	<b>BPA-Administrator</b>
	<b>Tony Norris</b>	<b>BPA-PGPO-5</b>
	<b>Scott Bettin</b>	<b>BPA- KEWR-4</b>
	<b>Steve Oliver</b>	<b>BPA-PG-5</b>
	<b>Lori Bodi</b>	<b>BPA-KE-4</b>



**FROM:** Paul Wagner, FPAC Chair

**DATE:** April 13<sup>th</sup>, 2012

**SUBJECT:** Bonneville Operation over next Five Days to Facilitate Spring Creek Release

**OBJECTIVE:** To improve the survival of Subyearling Chinook Salmon at Bonneville Dam over the next five-day period.

## **SPECIFICATIONS:**

Beginning immediately and maintaining for duration of five days:

- i. Operate Powerhouse Two at the mid-point of the 1% best efficiency range. With all available units operational, at the above operational ranges, this would be the powerhouse capacity over the next five days; any flows above this powerhouse capacity would be spilled.
- ii. If powerhouse capacity is reached with the above operational criteria, and spill amounts lead to TDG exceedences below Bonneville Dam, then operate Powerhouse One at Open

Geometry outside of the 1% best efficiency range, while maintaining operations at Powerhouse Two at the mid-point of the of 1% range.

**JUSTIFICATION:**

Spring Creek National Fish Hatchery (Spring Creek NFH), located upstream of Bonneville Dam on the Columbia River, annually produces tule fall Chinook (*Oncorhynchus tshawytscha*) that are released in the spring of each year as subyearlings. Although Spring Creek NFH Chinook salmon are listed under the Endangered Species Act (ESA) as part of the Lower Columbia River Chinook ESU, they are deemed not necessary for recovery and therefore are available for harvest. Spring Creek NFH tule salmon are important components of Columbia River treaty Indian and non Indian sport and commercial fisheries. Every additional adult salmon available for tribal harvest is critical from a tribal use and cultural perspective. Tribal members are dependent on these salmon for ceremonial and subsistence uses. These fish are also part of the U.S.-Canada treaty production and provide a significant benefit for West Coast fisheries. This includes Canada, Alaska, Oregon and Washington.

On Wednesday, April 11<sup>th</sup>, 2012 the Spring Creek NFH released approximately 925,000 subyearling fall Chinook tules. These subyearling fall Chinook first arrived at the Bonneville Dam Smolt Monitoring Juvenile Facility at approximately 0040 on April 12, 2012. Since this time, the SMP personnel at Bonneville Dam have been providing updates of mortality for Spring Creek subyearlings during their sub-samples on April 12<sup>th</sup> and April 13<sup>th</sup>.

April 12 (0040) – April 12 (0700) → 1,303 CH0 sampled, 68 mortalities → 5.2% mortality rate  
 April 12 (0700) – April 12 (1200) → 318 CH0 sampled, 56 mortalities → 17.6% mortality rate  
 April 12 (1200) – April 12 (1500) → 105 CH0 sampled, 31 mortalities → 29.5% mortality rate\*

\* increased amounts of debris and mortalities observed during this time period was associated with screen cleaning

April 12 (1500) – April 13 (0700) → 274 CH0 sampled, 25 mortalities → 9.1% mortality rate

**Table 1.** Estimated passage index and sample mortality of subyearling Chinook over past week from SMP data\*

Date	CH0 Passage Index	Sample Mortality (%)
Apr 6	3,117	12.6
Apr 7	3,375	4.2
Apr 8	2,700	6.7
Apr 9	1,219	3.4
Apr 10	2,170	2.0
Apr 11	3,446	2.1
Apr 12	104,842	5.6
Apr 13	73,614	15.2

\*Prior to April 12<sup>th</sup>, samples of subyearling Chinook at Bonneville Dam were mostly of Chinook fry (98-100%).

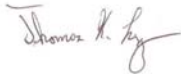
On April 13, 2012, Spring Creek NFH released approximately 5.25 million subyearling fall Chinook tules and Little White Salmon NFH released approximately 1.6 million subyearling fall Chinook tules. Juveniles from Spring Creek NFH typically arrive at Bonneville Dam within 12-24 hours of release.

The 1% efficiency range for turbine operations during the fish passage season at all projects was selected based on fish condition sampling showing low injury and mortality of collected fish in this operation range. Under the original gateway construction conditions, the operation of Powerhouse Two Units within the 1% Efficiency range was consistent with other projects of resulting in low injury and mortality. However, in recent years, the gateway environment at Powerhouse Two has changed. Based on observations of turbine operations and fish condition sampling, it appears the operating range at Bonneville Powerhouse two that results in BiOp anticipated low injury and mortality for subyearling fish is now in the low to Mid-Point of the 1% Range. The Salmon Managers recommend that Powerhouse Two operate at the Mid-Point of the 1% Range for the five day duration of this request. If additional powerhouse capacity is not needed, Powerhouse One should be operated within its typical 1% range. However, if additional powerhouse capacity is needed to reduce TDG below Bonneville Dam, Powerhouse One operations can be modified to the Open Geometry outside of the 1% range.

## **SYSTEM OPERATIONAL REQUEST: #2012-2**

*The following State, Federal, and Tribal Salmon Managers have participated in the preparation and support this SOR: US Fish and Wildlife Service, Oregon Department of Fish and Wildlife, Washington Department of Fish and Wildlife, the Idaho Department of Fish and Game, the Colville Tribes, and the Columbia River Inter-Tribal Fish Commission.*

<b>TO:</b>	<b>Brigadier General McMahon</b>	<b>COE-NWD</b>
	<b>James D. Barton</b>	<b>COE-Water Management</b>
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	<b>Steve Oliver</b>	<b>BPA-PG-5</b>
	<b>Lori Bodi</b>	<b>BPA-KE-4</b>



**FROM:** Tom Lorz, FPAC Vice-Chair

**DATE:** May 29, 2012

**SUBJECT:** Bonneville Operations

**OBJECTIVE:** To Reduce Descaling of Sockeye at Bonneville Dam

**SPECIFICATIONS:** In accordance with the 2012 Fish Passage Plan, Section 5.2.1, the Salmon Managers are requesting that Bonneville Powerhouse Two be operated to the lower end (25%) of the 1% range in an effort to minimize sockeye descaling and potential future mortality associated with that descaling. Operate Bonneville Dam Powerhouse Two at the lower 1% range (25% of the 1% range) while operating Powerhouse One within the 1% Efficiency Range, and spilling the balance of water up to Bonneville Tailrace Total Dissolved Gas Cap. This operation should be implemented immediately and remain in place until the Salmon Managers have reviewed the available Smolt Monitoring Data to determine the juvenile sockeye run has passed Bonneville Dam.



## JUSTIFICATION:

Previously, the Salmon Managers requested Bonneville to limit the operation of PH2 to 25% and not more than 50% of the 1% efficiency range in conjunction with trying to operate PH1 within the 1% efficiency range to protect Sockeye at Bonneville Dam. Given prior flows and TDG constraints, the Action Agencies were unable to fully implement the Managers request, but the steps taken did help reduce mortality and descaling. However, at this point in time the Salmon Managers believe that present flows and TDG should not be a significant constraint to meeting the proposed objectives to protect Sockeye.

The operations begun last week at Bonneville following the TMT discussion reduced mortality at Bonneville Dam; however descaling rates remained elevated. Mortality rates for juvenile Sockeye sampled at Bonneville Dam have been lower over the past 5 days of sampling (Table 1). However, descaling percentages have remained elevated with descaling rates at or above 14% in the sample on May 28 and May 29. Descaling does impact subsequent juvenile survival as research studies have shown decreased survival in migrating juvenile salmon (Hostetter et al. 2011). In addition, descaling has been associated with delayed mortality of fish sampled at juvenile bypass systems (Hawkes et al. 1992).

**Table 1. Sockeye Mortality and Descaling in Bonneville Powerhouse Two samples for the dates May 20 to May 29, 2012.**

Sampledate	Sample count	Morts	Pct. Morts	Exams Descaling	Descaled	Pct. Descaled
5/20/2012	44	0	0.00%	44	10	22.7%
5/21/2012	29	0	0.00%	29	7	24.1%
5/22/2012	58	4	6.90%	54	9	16.7%
5/23/2012	65	6	9.23%	59	14	23.7%
5/24/2012	64	5	7.81%	59	12	20.3%
5/25/2012	28	0	0.00%	28	2	7.1%
5/26/2012	53	0	0.00%	53	6	11.3%
5/27/2012	81	2	2.47%	79	6	7.6%
5/28/2012	58	1	1.72%	57	9	15.8%
5/29/2012	34	0	0.00%	34	5	14.7%

The 2012 Fish Passage Plan stipulates in Bonneville section 5.2.1 that “Turbine units at PH2 will operate at the mid to lower 1% range (unless total dissolved gas waivers are exceeded in the tailrace) of best efficiency and within cavitation limits at various head ranges as shown in **Table BON-16.**” Therefore, this requested operation is in accordance with the 2012 Fish Passage Plan.

## **Literature Cited**

Hawkes, L.A., R.D. Martinson, and W.W. Smith. 1992. Monitoring of downstream salmon and steelhead at federal hydroelectric facilities – 1991. Annual Report to Bonneville Power Administration, Contract No. DE-AI79-85BP20733.

Hostetter, N.J, A. F. Evans, D. D. Roby, K. Collis, M. Hawbecker, B. P. Sandford, D. E. Thompson & F. J. Loge (2011): Relationship of External Fish Condition to Pathogen Prevalence and Out-Migration Survival in Juvenile Steelhead, Transactions of the American Fisheries Society, 140:5, 1158-1171

Summary of 15 Operational Changes Provide to the Control Room to Implement the PH2 50% of the 1% Operation During the Spring of 2012

Change 1

Sent to: CO

XX  
BON R 040912 1156 CO BON TDA JDA MCN BPA BPC NPD NPC NPP

ATTENTION: BONNEVILLE AND BPA

SUBJECT: OPERATE FOR SPRING CREEK HATCHERY RELEASES

REFERENCE TTY: BON R 040912 1142 SPRING SPILL FOR JUVENILE FISH PASSAGE

1. EFFECTIVE AS A HARD CONSTRAINT FROM 0600 HOURS THURSDAY, APRIL 12, THROUGH 1700 HOURS MONDAY, APRIL 16, AND AS A SOFT CONSTRAINT FROM 1700 HOURS MONDAY, APRIL 16, THROUGH 1700 HOURS FRIDAY, APRIL 20, OPERATE AS DEFINED BELOW TO IMPROVE PASSAGE CONDITIONS THROUGH POWERHOUSE 2 GATEWELLS DURING THE DOWNSTREAM MIGRATION OF APPROXIMATELY 8 MILLION JUVENILE TULE FALL CHINOOK RELEASED ON APRIL 11 FROM THE SPRING CREEK AND LITTLE WHITE SALMON NATIONAL FISH HATCHERIES. THE START AND END DATES AND TIMES MAY BE MODIFIED AT THE DIRECTION OF PROJECT FISHERIES (BEN HAUSMANN 541-347-4598) BASED ON OBSERVED PASSAGE NUMBERS AT THE SMOLT MONITORING FACILITY.

2. CONTINUE TO OPERATE CONSISTENT WITH THE REFERENCE TTY AND MAINTAIN THE SPRING SPILL RATE DEFINED IN THE 2012 FISH OPERATIONS PLAN (FOP) OF 100 KCFS 24 HOURS/DAY. HOWEVER, DO NOT EXCEED THE CURRENT 120/115% TDG SPILL CAP DEFINED IN THE MOST RECENT TTY "SPILL PRIORITY LIST" WHICH MAY AT TIMES BE LESS THAN 100 KCFS DEPENDING ON FLOW CONDITIONS.

3. CONTINUE TO OPERATE IN ACCORDANCE WITH THE 2012 FISH PASSAGE PLAN (FPP) FOR POWERHOUSE AND UNIT PRIORITY ORDER (TABLE BON-14) AND FOR UNIT OPERATING RANGES WITHIN 1% OF BEST EFFICIENCY (TABLES BON-15 AND BON-16). PRIORITY ORDER IS AS FOLLOWS:

UNITS 11,18,12,17,13,14,15,16,1,10,3,6,2,4,5,8,7,9

4. OPERATE PH2 UNITS AT 25% OF THE 1% OPERATING RANGE.

5. IF ADDITIONAL GENERATION IS NEEDED, OPERATE PH1 UNITS UP TO 100% (FULL CAPACITY) OF THE 1% OPERATING RANGE.

6. IF ADDITIONAL GENERATION IS NEEDED AFTER PH1 IS FULLY LOADED, INCREASE PH2 UNITS ONE AT A TIME IN THE ORDER OF PRIORITY WITHIN 25-50% OF THE 1% OPERATING RANGE.

7. IF ADDITIONAL GENERATION IS STILL NEEDED, INCREASE PH2 UNITS ONE AT A TIME IN THE ORDER OF PRIORITY WITHIN 50-100% OF THE 1% OPERATING RANGE.

8. IF STEPS 2-7 ABOVE ARE INSUFFICIENT TO PASS FLOW, INCREASE SPILL AS NECESSARY CONSISTENT WITH THE MOST RECENT SPILL PRIORITY LIST TTY.

9. IF IT IS NECESSARY TO PUT UNITS ON LOCAL CONTROL TO ACHIEVE THESE TARGETS, NOTIFY BPA REAL TIME (503-230-4374) PRIOR TO GOING TO LOCAL CONTROL.

10. UPON COMPLETION OF THIS OPERATION, RESUME OPERATING IN ACCORDANCE WITH THE 2012 FPP AND REFERENCE TTY. SPECIFICALLY, OPERATE ALL AVAILABLE UNITS WITHIN THE FULL 1% OPERATING RANGE.

11. THE 2012 FPP IS AVAILABLE ONLINE AT:  
<http://www.nwd-wc.usace.army.mil/tmt/documents/fpp/2012/>

12. THIS OPERATION WAS REQUESTED BY DAVE WILLS (USFWS), AND COORDINATED WITH BEN HAUSMANN (COE-BON), DON FAULKNER (COE-RCC), KARL KANBERGS (COE-RCC), JEFF FAUTH (COE-BON), SCOTT BETTIN (BPA), AND WITH TMT AT THE MEETING ON MARCH 28.

LISA WRIGHT  
CENWD/RCC10  
XX

Change 2

Sent to: CO

XX

BON R 041112 1611 CO BON TDA JDA MCN BPA BPC NPD NPC NPP

ATTENTION: BONNEVILLE AND BPA

SUBJECT: CANCEL OPERATION FOR SPRING CREEK HATCHERY RELEASES

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CANCELS TTY: BON R 040912 1156 OPERATE FOR SPRING CREEK  
HATCHERY RELEASES

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1. EFFECTIVE IMMEDIATELY, CANCEL THE OPERATION REQUESTED IN THE REFERENCE TELETYPE BON R 040912 1156 "OPERATE FOR SPRING CREEK HATCHERY RELEASES".

2. THE HATCHERY RELEASE HAS BEEN POSTPONED UNTIL THE PROJECT CAN REMOVE A TREE THAT HAS BEEN LODGED IN THE POWERHOUSE 1 ICE AND TRASH SLUICeway. RCC WILL ISSUE A NEW TELETYPE FOR THIS OPERATION AS SOON AS A NEW HATCHERY RELEASE DATE HAS BEEN SCHEDULED.

3. THE POSTPONEMENT OF THIS OPERATION HAS BEEN COORDINATED WITH DAVE WILLS (USFWS), JEFF FAUTH (COE-BON), AND WITH TMT AT THE MEETING ON APRIL 11.

LISA WRIGHT  
CENWD/RCC10

XX

Change 3

Sent to: CO

XX  
BON R 041112 1907 CO BON TDA JDA MCN BPA BPC NPD NPC NPP

ATTENTION: BONNEVILLE AND BPA

SUBJECT: OPERATE FOR SPRING CREEK HATCHERY RELEASE

REFERENCE TTY: BON R 040912 1142 SPRING SPILL FOR JUVENILE FISH PASSAGE

1. EFFECTIVE AS A SOFT CONSTRAINT FROM 0600 HOURS THURSDAY, APRIL 12, THROUGH 1700 HOURS WEDNESDAY, APRIL 18, OPERATE AS DEFINED BELOW TO IMPROVE PASSAGE CONDITIONS THROUGH POWERHOUSE 2 GATEWELLS DURING THE DOWNSTREAM MIGRATION OF APPROXIMATELY 1 MILLION JUVENILE TULE FALL CHINOOK RELEASED FROM THE SPRING CREEK NATIONAL FISH HATCHERY ON WEDNESDAY, APRIL 11. THE START AND END DATES AND TIMES MAY BE MODIFIED AT THE DIRECTION OF PROJECT FISHERIES (BEN HAUSMANN 541-347-4598) BASED ON OBSERVED PASSAGE NUMBERS AT THE SMOLT MONITORING FACILITY.

2. CONTINUE TO OPERATE CONSISTENT WITH THE REFERENCE TTY AND MAINTAIN THE SPRING SPILL RATE DEFINED IN THE 2012 FISH OPERATIONS PLAN (FOP) OF 100 KCFS 24 HOURS/DAY. HOWEVER, DO NOT VOLUNTARILY EXCEED THE CURRENT 120/115% TDG SPILL CAP DEFINED IN THE MOST RECENT TTY "SPILL PRIORITY LIST" WHICH MAY AT TIMES BE LESS THAN 100 KCFS DEPENDING ON FLOW CONDITIONS.

3. CONTINUE TO OPERATE IN ACCORDANCE WITH THE 2012 FISH PASSAGE PLAN (FPP) FOR POWERHOUSE AND UNIT PRIORITY ORDER (TABLE BON-14) AND FOR UNIT OPERATING RANGES WITHIN 1% OF BEST EFFICIENCY (TABLES BON-15 AND BON-16). PRIORITY ORDER IS AS FOLLOWS:

UNITS 11,18,12,17,13,14,15,16,1,10,3,6,2,4,5,8,7,9

4. OPERATE PH2 UNITS AT 25% OF THE 1% OPERATING RANGE.

5. IF ADDITIONAL GENERATION IS NEEDED, OPERATE PH1 UNITS UP TO 100% (FULL CAPACITY) OF THE 1% OPERATING RANGE.

6. IF ADDITIONAL GENERATION IS NEEDED AFTER PH1 IS FULLY LOADED, INCREASE PH2 UNITS ONE AT A TIME IN THE ORDER OF PRIORITY WITHIN 25-50% OF THE 1% OPERATING RANGE.

7. IF ADDITIONAL GENERATION IS STILL NEEDED, INCREASE PH2 UNITS ONE AT A TIME IN THE ORDER OF PRIORITY WITHIN 50-100% OF THE 1% OPERATING RANGE.

8. IF STEPS 2-7 ABOVE ARE INSUFFICIENT TO PASS FLOW, INCREASE SPILL AS NECESSARY CONSISTENT WITH THE MOST RECENT SPILL PRIORITY LIST TTY.

9. IF IT IS NECESSARY TO PUT UNITS ON LOCAL CONTROL TO ACHIEVE THESE TARGETS, NOTIFY BPA REAL TIME (503-230-4374) PRIOR TO GOING TO LOCAL CONTROL.

10. THE DURATION OF THIS OPERATION WILL BE MODIFIED AS NECESSARY TO ACCOMMODATE AN UPCOMING RELEASE OF THE REMAINING 7 MILLION HATCHERY SMOLTS FROM SPRING CREEK AND LITTLE WHITE SALMON HATCHERIES. THE RELEASE HAS BEEN DELAYED UNTIL SUCH TIME THAT THE PROJECT CAN REMOVE A TREE THAT HAS BECOME LODGED IN THE POWERHOUSE 1 ICE AND TRASH SLUICeway.

11. UPON COMPLETION OF THIS OPERATION, RESUME OPERATING IN ACCORDANCE WITH THE 2012 FPP AND REFERENCE TTY.

12. THE 2012 FPP IS AVAILABLE ONLINE AT:  
<http://www.nwd-wc.usace.army.mil/tmt/documents/fpp/2012/>

13. THIS OPERATION WAS REQUESTED BY DAVE WILLS (USFWS), AND COORDINATED WITH SCOTT BETTIN (BPA), BEN HAUSMANN (COE-BON), DONOVAN MCNEALE (COE-BON), AND WITH TMT AT THE MEETINGS ON MARCH 28 AND APRIL 11.

LISA WRIGHT  
CENWD/RCC10  
XX

Change 4

Sent to: CO

XX  
BON R 041312 1221 CO BON TDA JDA MCN BPA BPC NPD NPC NPP

ATTENTION: BONNEVILLE AND BPA

SUBJECT: OPERATE FOR SPRING CREEK HATCHERY RELEASE

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REPLACES TTY: BON R 041112 1907 OPERATE FOR SPRING CREEK  
HATCHERY RELEASES

\*\*\*CHANGED PARAGRAPH 1 - HATCHERY RELEASE IS COMPLETE\*\*\*  
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REFERENCE TTY: BON R 040912 1142 SPRING SPILL FOR JUVENILE  
FISH PASSAGE

1. OPERATE AS DEFINED BELOW TO IMPROVE PASSAGE CONDITIONS  
THROUGH POWERHOUSE 2 GATEWELLS DURING THE DOWNSTREAM  
MIGRATION OF APPROXIMATELY 8 MILLION JUVENILE TULE FALL  
CHINOOK RELEASED FROM THE SPRING CREEK NATIONAL FISH  
HATCHERY ON APRIL 11 AND APRIL 13. THE DURATION MAY BE  
MODIFIED AT THE DIRECTION OF PROJECT FISHERIES (BEN  
HAUSMANN 541-347-4598) BASED ON OBSERVED PASSAGE NUMBERS  
AT THE SMOLT MONITORING FACILITY.

==>SOFT CONSTRAINT: THROUGH 0600 HOURS SATURDAY, APRIL 14  
==>HARD CONSTRAINT: FROM 0600 HOURS SATURDAY, APRIL 14  
THROUGH 1700 HOURS WEDNESDAY, APRIL 18  
==>SOFT CONSTRAINT: FROM 1700 HOURS WEDNESDAY, APRIL 18  
THROUGH 1700 HOURS SUNDAY, APRIL 22

2. CONTINUE TO OPERATE CONSISTENT WITH THE REFERENCE TTY AND  
MAINTAIN THE SPRING SPILL RATE DEFINED IN THE 2012 FISH  
OPERATIONS PLAN (FOP) OF 100 KCFS 24 HOURS/DAY. HOWEVER,  
DO NOT VOLUNTARILY EXCEED THE CURRENT 120/115% TDG SPILL CAP  
DEFINED IN THE MOST RECENT TTY "SPILL PRIORITY LIST" WHICH  
MAY AT TIMES BE LESS THAN 100 KCFS DEPENDING ON FLOW  
CONDITIONS.

3. CONTINUE TO OPERATE IN ACCORDANCE WITH THE 2012 FISH  
PASSAGE PLAN (FPP) FOR POWERHOUSE AND UNIT PRIORITY ORDER  
(TABLE BON-14) AND FOR UNIT OPERATING RANGES WITHIN 1% OF  
BEST EFFICIENCY (TABLES BON-15 AND BON-16). PRIORITY  
ORDER IS AS FOLLOWS:

UNITS 11,18,12,17,13,14,15,16,1,10,3,6,2,4,5,8,7,9

4. OPERATE PH2 UNITS AT 25% OF THE 1% OPERATING RANGE.



5. IF ADDITIONAL GENERATION IS NEEDED, OPERATE PH1 UNITS UP TO 100% (FULL CAPACITY) OF THE 1% OPERATING RANGE.

6. IF ADDITIONAL GENERATION IS NEEDED AFTER PH1 IS FULLY LOADED, INCREASE PH2 UNITS ONE AT A TIME IN THE ORDER OF PRIORITY WITHIN 25-50% OF THE 1% OPERATING RANGE.

7. IF ADDITIONAL GENERATION IS STILL NEEDED, INCREASE PH2 UNITS ONE AT A TIME IN THE ORDER OF PRIORITY WITHIN 50-100% OF THE 1% OPERATING RANGE.

8. IF STEPS 2-7 ABOVE ARE INSUFFICIENT TO PASS FLOW, INCREASE SPILL AS NECESSARY CONSISTENT WITH THE MOST RECENT SPILL PRIORITY LIST TTY.

9. IF IT IS NECESSARY TO PUT UNITS ON LOCAL CONTROL TO ACHIEVE THESE TARGETS, NOTIFY BPA REAL TIME (503-230-4374) PRIOR TO GOING TO LOCAL CONTROL.

10. UPON COMPLETION OF THIS OPERATION, RESUME OPERATING IN ACCORDANCE WITH THE 2012 FPP AND REFERENCE TTY.

11. APPROXIMATELY 1 MILLION HATCHERY SMOLTS WERE RELEASED ON WEDNESDAY, APRIL 11. THE RELEASE OF THE REMAINING 7 MILLION SMOLTS WAS DELAYED UNTIL THE PROJECT CLEARED A TREE THAT WAS STUCK IN THE POWERHOUSE 1 ICE AND TRASH SLUICeway (ITS). THE ITS WAS CLEARED AND RE-OPENED ON THURSDAY, APRIL 12, AND THE HATCHERY RELEASE WAS COMPLETED ON FRIDAY, APRIL 13.

12. THE 2012 FPP IS AVAILABLE ONLINE AT:  
<http://www.nwd-wc.usace.army.mil/tmt/documents/fpp/2012/>

13. THIS OPERATION WAS REQUESTED BY DAVE WILLS (USFWS), AND COORDINATED WITH SCOTT BETTIN (BPA), BEN HAUSMANN (COE-BON), BRAD SHARP (COE-BON), AND WITH TMT AT THE MEETINGS ON MARCH 28 AND APRIL 11.

LISA WRIGHT  
CENWD/RCC10  
XX

Change 5

Sent to: CO

XX  
BON R 041312 1743 CO BON TDA JDA MCN BPA BPC NPD NPC NPP

ATTENTION: BONNEVILLE AND BPA

SUBJECT: OPERATE FOR SPRING CREEK HATCHERY RELEASE

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REPLACES TTY: BON R 041312 1221 OPERATE FOR SPRING CREEK  
HATCHERY RELEASES

\*\*ADDED STEPS TO OPERATE PH1 ABOVE THE 1% RANGE  
(PARAGRAPH 7) AND OPERATE PH2 WITHIN 50-75% OF THE 1% RANGE  
(PARAGRAPHS 8-9)\*\*  
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REFERENCE TTY: BON R 040912 1142 SPRING SPILL FOR JUVENILE  
FISH PASSAGE

1. EFFECTIVE IMMEDIATELY AND EXTENDING THROUGH 1700 HOURS ON WEDNESDAY, APRIL 18, OPERATE AS DEFINED BELOW TO IMPROVE PASSAGE CONDITIONS THROUGH POWERHOUSE ROUGH2 GATEWELLS DURING THE DOWNSTREAM MIGRATION OF APPROXIMATELY 8 MILLION JUVENILE TULE FALL CHINOOK RELEASED FROM THE SPRING CREEK NATIONAL FISH HATCHERY ON APRIL 11 AND APRIL 13. THE DURATION MAY BE MODIFIED AT THE DIRECTION OF PROJECT FISHERIES (BEN HAUSMANN 541-347-4598) BASED ON OBSERVED PASSAGE NUMBERS AT THE SMOLT MONITORING FACILITY.
2. CONTINUE TO OPERATE CONSISTENT WITH THE REFERENCE TTY AND MAINTAIN THE SPRING SPILL RATE DEFINED IN THE 2012 FISH OPERATIONS PLAN (FOP) OF 100 KCFS 24 HOURS/DAY. HOWEVER, DO NOT VOLUNTARILY EXCEED THE CURRENT 120/115% TDG SPILL CAP DEFINED IN THE MOST RECENT TTY "SPILL PRIORITY LIST" WHICH MAY AT TIMES BE LESS THAN 100 KCFS DEPENDING ON FLOW CONDITIONS.
3. CONTINUE TO OPERATE IN ACCORDANCE WITH THE 2012 FISH PASSAGE PLAN (FPP) FOR POWERHOUSE AND UNIT PRIORITY ORDER (TABLE BON-14). PRIORITY ORDER IS AS FOLLOWS:  
UNITS 11,18,12,17,13,14,15,16,1,10,3,6,2,4,5,8,7,9
4. OPERATE PH2 UNITS AT 25% OF THE 1% OPERATING RANGE.
5. TO PASS ADDITIONAL FLOWS, OPERATE PH1 UNITS UP TO 100% (FULL CAPACITY) OF THE 1% OPERATING RANGE.
6. TO PASS ADDITIONAL FLOWS AFTER PH1 IS OPERATING AT 100%, INCREASE PH2 UNITS ONE AT A TIME IN THE ORDER OF PRIORITY WITHIN 25-50% OF THE 1% OPERATING RANGE.

7. TO PASS ADDITIONAL FLOWS AFTER ALL AVAILABLE PH2 UNITS ARE OPERATING AT 50%, INCREASE OPERATION OF PH1 UNITS ABOVE THE 1% RANGE TO BEST GEOMETRY (UP TO THE MAXIMUM LOAD WITHIN CAVITATION LIMITS).

8. TO PASS ADDITIONAL FLOWS AFTER ALL AVAILABLE PH1 UNITS ARE OPERATING AT BEST GEOMETRY, INCREASE PH2 UNITS ONE AT A TIME IN THE ORDER OF PRIORITY WITHIN 50-75% OF THE 1% OPERATING RANGE.

9. TO PASS ADDITIONAL FLOWS AFTER ALL AVAILABLE PH2 UNITS ARE OPERATING AT 75%, DECREASE PH1 UNIT OPERATION TO 100% (FULL CAPACITY) OF THE 1% OPERATING RANGE, THEN INCREASE PH2 UNITS ONE AT A TIME IN THE ORDER OF PRIORITY WITHIN 75-100% OF THE 1% OPERATING RANGE.

10. IF STEPS 2-9 ABOVE ARE INSUFFICIENT TO PASS FLOW, INCREASE SPILL INVOLUNTARILY AS NECESSARY CONSISTENT WITH THE MOST RECENT SPILL PRIORITY LIST TTY.

11. IF IT IS NECESSARY TO PUT UNITS ON LOCAL CONTROL TO ACHIEVE THESE TARGETS, NOTIFY BPA REAL TIME (503-230-4374) PRIOR TO GOING TO LOCAL CONTROL.

12. UPON COMPLETION OF THIS OPERATION, RESUME OPERATING IN ACCORDANCE WITH THE 2012 FPP AND REFERENCE TTY.

13. APPROXIMATELY 1 MILLION HATCHERY SMOLTS WERE RELEASED ON WEDNESDAY, APRIL 11. THE RELEASE OF THE REMAINING 7 MILLION SMOLTS WAS DELAYED UNTIL THE PROJECT CLEARED A TREE THAT WAS STUCK IN THE POWERHOUSE 1 ICE AND TRASH SLUICeway (ITS). THE ITS WAS CLEARED AND RE-OPENED ON THURSDAY, APRIL 12, AND THE HATCHERY RELEASE WAS COMPLETED ON FRIDAY, APRIL 13.

14. THE 2012 FPP IS AVAILABLE ONLINE AT:  
<http://www.nwd-wc.usace.army.mil/tmt/documents/fpp/2012/>

15. THIS OPERATION WAS REQUESTED BY DAVE WILLS (USFWS), AND COORDINATED WITH SCOTT BETTIN (BPA), BEN HAUSMANN (COE-BON), BRAD SHARP (COE-BON), AND WITH TMT AT THE MEETINGS ON MARCH 28 AND APRIL 11, AND THE CONFERENCE CALL ON APRIL 13.

LISA WRIGHT  
CENWD/RCC10  
XX

Change 6

Sent to: CO

XX  
BON R 042712 1643 CO BON TDA JDA MCN BPA BPC NPD NPC NPP

ATTENTION: BONNEVILLE AND BPA

SUBJECT: OPERATE FOR SPRING CREEK HATCHERY RELEASE #2

REFERENCE TTY: BON R 040912 1142 SPRING SPILL FOR JUVENILE FISH PASSAGE

1. EFFECTIVE FROM 1700 HOURS MONDAY, APRIL 30, THROUGH 1700 HOURS FRIDAY, MAY 4, OPERATE AS DEFINED BELOW TO IMPROVE PASSAGE CONDITIONS THROUGH POWERHOUSE 2 (PH2) GATEWELLS DURING THE DOWNSTREAM MIGRATION OF APPROXIMATELY 4 MILLION JUVENILE TULE FALL CHINOOK RELEASED FROM THE SPRING CREEK NATIONAL FISH HATCHERY ON APRIL 30. THE DURATION MAY BE MODIFIED AT THE DIRECTION OF PROJECT FISHERIES (BEN HAUSMANN 541-347-4598) BASED ON OBSERVED PASSAGE NUMBERS AT THE SMOLT MONITORING FACILITY.

2. CONTINUE TO OPERATE CONSISTENT WITH THE REFERENCE TTY FOR SPRING SPILL OPERATIONS AS DEFINED IN THE 2012 FISH OPERATIONS PLAN (FOP).

3. AS A SOFT CONSTRAINT, OPERATE THE FOREBAY TO NOT EXCEED AN ELEVATION OF 73.0 FEET. THE FOREBAY ELEVATION OPERATING RANGE FOR THIS OPERATION IS 71.5-73.0 FEET.

4. OPERATE ALL AVAILABLE PH1 UNITS UP TO THE UPPER LIMIT (100%) OF THE 1% OPERATING RANGE AND ALL AVAILABLE PH2 UNITS UP TO THE MID-POINT (50%) OF THE 1% OPERATING RANGE. UNIT OPERATING RANGES WITHIN 1% OF BEST EFFICIENCY AT VARIOUS HEADS ARE DEFINED IN THE FISH PASSAGE PLAN (FPP) TABLES BON-15 (PH1) AND BON-16 (PH2).

5. TO PASS ADDITIONAL FLOW AFTER STEP 4 ABOVE, INCREASE OPERATION OF PH1 UNITS ONE AT A TIME IN THE ORDER OF PRIORITY UP TO BUT NOT TO EXCEED THE BEST GEOMETRY POINT, DEFINED AS 40-41 MW PER UNIT AT JUST BELOW THE CAVITATION LIMIT. FOR MORE INFORMATION REGARDING BEST GEOMETRY OPERATIONS, CONTACT DENNIS SCHWARTZ, BONNEVILLE CHIEF OF OPERATIONS, AT (541) 374-4567.

6. THE GOAL OF THIS OPERATION IS TO REDUCE FLOW THROUGH AS MANY PH2 UNITS AS POSSIBLE TO THE MID-POINT OF THE 1% RANGE BY INCREASING FLOW AN EQUIVALENT AMOUNT THROUGH PH1 UNITS UP TO THE BEST GEOMETRY POINT. THERE WILL BE NO INCREASE IN TOTAL PROJECT GENERATION WITH THIS OPERATION. ANY INCREASE IN PH1 GENERATION WILL BE OFFSET BY AN

EQUIVALENT DECREASE IN PH2 GENERATION.

7. TO PASS FLOW IN EXCESS OF POWERHOUSE CAPACITY, INCREASE SPILL INVOLUNTARILY CONSISTENT WITH THE MOST RECENT SPILL PRIORITY LIST TTY.

8. IF IT IS NECESSARY TO PUT UNITS ON LOCAL CONTROL TO ACHIEVE THESE TARGETS, NOTIFY BPA REAL TIME (503-230-4374) PRIOR TO GOING TO LOCAL CONTROL.

9. UPON COMPLETION OF THIS OPERATION, RESUME OPERATING IN ACCORDANCE WITH THE 2012 FPP AND REFERENCE TTY.

10. THE 2012 FPP AND FOP ARE AVAILABLE ONLINE AT:  
<http://www.nwd-wc.usace.army.mil/tmt/documents/fpp/2012/>

11. THIS OPERATION WAS REQUESTED BY DAVE WILLS (USFWS), AND COORDINATED WITH DOUG BAUS (COE-RCC), SCOTT BETTIN (BPA), DENNIS SCHWARTZ (COE-BON), BEN HAUSMANN (COE-BON), RAY GUAJARDO (COE-BON), JEFF FAUTH (COE-BON), BILL PROCTOR (COE-RCC), DEAN BALLINGER (PSMFC) AND WITH TMT AT THE MEETING ON APRIL 25 AND THE CONFERENCE CALL ON APRIL 27.

LISA WRIGHT  
CENWD/RCC10

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Change 7

Sent to: CO

XX  
BON R 043012 1451 CO BON TDA JDA MCN BPA BPC NPD NPC NPP

ATTENTION: BONNEVILLE AND BPA

SUBJECT: OPERATE FOR SPRING CREEK HATCHERY RELEASE #2

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REPLACE TTY: BON R 042712 1643 OPERATE FOR SPRING CREEK  
HATCHERY RELEASE #2. CLARIFICATION OF OPERATION IN  
PARAGRAPHS 4 AND 5.  
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REFERENCE TTY: BON R 040912 1142 SPRING SPILL FOR JUVENILE  
FISH PASSAGE

1. EFFECTIVE FROM 1700 HOURS MONDAY, APRIL 30, THROUGH  
1700 HOURS FRIDAY, MAY 4, OPERATE AS DEFINED BELOW TO  
IMPROVE PASSAGE CONDITIONS THROUGH POWERHOUSE 2 (PH2)  
GATEWELLS DURING THE DOWNSTREAM MIGRATION OF APPROXIMATELY  
4 MILLION JUVENILE TULE FALL CHINOOK RELEASED FROM THE  
SPRING CREEK NATIONAL FISH HATCHERY ON APRIL 30. THE  
DURATION MAY BE MODIFIED AT THE DIRECTION OF PROJECT  
FISHERIES (BEN HAUSMANN 541-347-4598) BASED ON OBSERVED  
PASSAGE NUMBERS AT THE SMOLT MONITORING FACILITY.

2. CONTINUE TO OPERATE CONSISTENT WITH THE REFERENCE TTY  
FOR SPRING SPILL OPERATIONS AS DEFINED IN THE 2012 FISH  
OPERATIONS PLAN (FOP).

3. AS A SOFT CONSTRAINT, OPERATE THE FOREBAY TO NOT EXCEED  
AN ELEVATION OF 73.0 FEET. THE FOREBAY ELEVATION OPERATING  
RANGE FOR THIS OPERATION IS 71.5-73.0 FEET.

4. TO PASS FLOW, INCREASE OPERATION OF UNITS SEQUENTIALLY  
AS FOLLOWS:  
---A) PH2: OPERATE ALL AVAILABLE UNITS UP TO 25% OF THE 1%  
OF BEST EFFICIENCY OPERATING RANGE;  
---B) PH1: OPERATE ALL AVAILABLE UNITS UP TO 100% (UPPER  
LIMIT) OF THE 1% OPERATING RANGE;  
---C) PH2: OPERATE ALL AVAILABLE UNITS WITHIN 25-50% OF  
THE 1% OPERATING RANGE;  
---D) FOR ADDITIONAL FLOW THAT WOULD NORMALLY BE PASSED  
THROUGH PH2 UNITS ABOVE THE 50% POINT OF THE 1% RANGE,  
INSTEAD INCREASE OPERATION OF PH1 UNITS ONE UNIT AT A TIME  
IN THE ORDER OF PRIORITY UP TO BUT NOT TO EXCEED THE BEST  
GEOMETRY POINT, DEFINED AS 40-41 MW PER UNIT AT JUST BELOW  
THE CAVITATION LIMIT. FOR MORE INFORMATION REGARDING BEST  
GEOMETRY OPERATIONS, CONTACT DENNIS SCHWARTZ, BONNEVILLE

CHIEF OF OPERATIONS, AT (541) 374-4567.

---E) IF OPERATING PH1 TO BEST GEOMETRY DOES NOT COMPENSATE FOR FLOW THAT COULD HAVE PASSED THROUGH PH2 UNITS ABOVE 50%, THEN INCREMENTALLY INCREASE OPERATION OF UP TO FOUR PH2 UNITS ONE UNIT AT A TIME IN THE ORDER OF PRIORITY UP TO 100% OF THE 1% RANGE. DO NOT EXCEED 50% OF THE 1% RANGE AT A MINIMUM OF THREE PH2 UNITS.

---F) TO PASS FLOW IN EXCESS OF POWERHOUSE CAPACITY, INCREASE SPILL INVOLUNTARILY CONSISTENT WITH THE MOST RECENT SPILL PRIORITY LIST TTY.

5. THE GOAL OF THIS OPERATION IS TO LIMIT FLOW THROUGH AS MANY PH2 UNITS AS POSSIBLE TO THE MID-POINT OF THE 1% RANGE BY INCREASING FLOW THROUGH PH1 UNITS UP TO THE BEST GEOMETRY POINT. FLOW THAT WOULD NORMALLY BE PASSED THROUGH PH2 UNITS BY OPERATING ABOVE 50% OF THE 1% RANGE WILL INSTEAD BE PASSED THROUGH PH1 UNITS TO THE EXTENT POSSIBLE BY OPERATING TO BEST GEOMETRY. THEREFORE THERE WILL BE NO NET CHANGE IN TOTAL PROJECT GENERATION WITH THIS OPERATION.

6. IF IT IS NECESSARY TO PUT UNITS ON LOCAL CONTROL TO ACHIEVE THESE TARGETS, NOTIFY BPA REAL TIME (503-230-4374) PRIOR TO GOING TO LOCAL CONTROL.

7. UPON COMPLETION OF THIS OPERATION, RESUME OPERATING IN ACCORDANCE WITH THE 2012 FPP AND REFERENCE TTY.

8. THE 2012 FPP AND FOP ARE AVAILABLE ONLINE AT:  
<http://www.nwd-wc.usace.army.mil/tmt/documents/fpp/2012/>

9. THIS OPERATION WAS REQUESTED BY DAVE WILLS (USFWS), AND COORDINATED WITH DOUG BAUS (COE-RCC), SCOTT BETTIN (BPA), DENNIS SCHWARTZ (COE-BON), BEN HAUSMANN (COE-BON), RAY GUAJARDO (COE-BON), JEFF FAUTH (COE-BON), BILL PROCTOR (COE-RCC), DEAN BALLINGER (PSMFC) AND WITH TMT AT THE MEETING ON APRIL 25 AND THE CONFERENCE CALL ON APRIL 27.

LISA WRIGHT  
CENWD/RCC10

XX

Change 8

Sent to: CO

XX  
BON R 050112 0816 CO BON TDA JDA MCN BPA BPC NPD NPC NPP

ATTENTION: BONNEVILLE AND BPA

SUBJECT: OPERATE FOR SPRING CREEK HATCHERY RELEASE #2

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REPLACE TTY: BON R 043012 1451 OPERATE FOR SPRING CREEK  
HATCHERY RELEASE #2.

REMOVED STEP 4E AND INSERTED NEW PARAGRAPH 4 FOR  
CLARIFICATION.  
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REFERENCE TTY: BON R 040912 1142 SPRING SPILL FOR JUVENILE  
FISH PASSAGE

1. EFFECTIVE FROM 1700 HOURS MONDAY, APRIL 30, THROUGH 1700 HOURS FRIDAY, MAY 4, OPERATE AS DEFINED BELOW TO IMPROVE PASSAGE CONDITIONS THROUGH POWERHOUSE 2 (PH2) GATEWELLS DURING THE DOWNSTREAM MIGRATION OF APPROXIMATELY 4 MILLION JUVENILE TULE FALL CHINOOK RELEASED FROM THE SPRING CREEK NATIONAL FISH HATCHERY ON APRIL 30. THE DURATION MAY BE MODIFIED AT THE DIRECTION OF PROJECT FISHERIES (BEN HAUSMANN 541-347-4598) BASED ON OBSERVED PASSAGE NUMBERS AT THE SMOLT MONITORING FACILITY.
2. CONTINUE TO OPERATE CONSISTENT WITH THE REFERENCE TTY FOR SPRING SPILL OPERATIONS AS DEFINED IN THE 2012 FISH OPERATIONS PLAN (FOP).
3. AS A SOFT CONSTRAINT, OPERATE THE FOREBAY TO NOT EXCEED AN ELEVATION OF 73.0 FEET. THE FOREBAY ELEVATION OPERATING RANGE FOR THIS OPERATION IS 71.5-73.0 FEET.
4. TOTAL PROJECT POWER OUTFLOW FOR THIS SPECIAL OPERATION WILL NOT CHANGE FROM POWER OUTFLOW UNDER NORMAL OPERATIONS. THE ONLY CHANGE WILL BE TO MOVE FLOW THAT WOULD NORMALLY PASS THROUGH PH2 UNITS ABOVE THE MID-POINT (50%) OF THE 1% OPERATING RANGE TO PASS INSTEAD THROUGH PH1 UNITS OPERATING ABOVE THE 1% RANGE TO THE BEST GEOMETRY POINT. FOR EXAMPLE, AT A HEAD OF 43 FT, THE UPPER LIMIT (100%) OF THE 1% RANGE FOR PH2 UNITS IS 18.3 KCFS (56.4 MW) AND THE MID-POINT (50%) IS 14.7 KCFS (45.5 MW); THEREFORE OPERATING AT THE MID-POINT RESULTS IN A NET OF 3.6 KCFS (10.9 MW) PER UNIT THAT WOULD BE SHIFTED TO PH1 UNITS. \*\*\*HOWEVER, IF PH2 UNIT CAPACITY IS LIMITED DUE TO DEBRIS LOADING AND MAINTAINING THE VBS WITHIN FPP CRITERIA, THE NET DIFFERENCE WOULD BE SMALLER. FOR EXAMPLE, IF A PH2 UNIT COULD ONLY BE OPERATED UP TO 15 KCFS, THE NET SHIFT TO PH1 WOULD BE 0.3 KCFS.



THEREFORE, TOTAL PROJECT POWER OUTFLOW (PH1+PH2) THAT WOULD BE ACHIEVED UNDER NORMAL OPERATING CONDITIONS WILL BE MAINTAINED THROUGHOUT THIS SPECIAL OPERATION.

5. TO PASS FLOW, INCREASE OPERATION OF UNITS SEQUENTIALLY AS FOLLOWS:

---A) PH2: OPERATE ALL AVAILABLE UNITS UP TO 25% OF THE 1% OF BEST EFFICIENCY OPERATING RANGE;

---B) PH1: OPERATE ALL AVAILABLE UNITS UP TO 100% (UPPER LIMIT) OF THE 1% OPERATING RANGE;

---C) PH2: OPERATE ALL AVAILABLE UNITS WITHIN 25-50% OF THE 1% OPERATING RANGE;

---D) FOR ADDITIONAL FLOW THAT WOULD NORMALLY BE PASSED THROUGH PH2 UNITS ABOVE THE MID-POINT OF THE 1% RANGE, INSTEAD INCREASE OPERATION OF PH1 UNITS ONE UNIT AT A TIME IN THE ORDER OF PRIORITY UP TO BUT NOT TO EXCEED THE BEST GEOMETRY POINT, DEFINED AS 40-41 MW PER UNIT AT JUST BELOW THE CAVITATION LIMIT. FOR MORE INFORMATION REGARDING BEST GEOMETRY OPERATIONS, CONTACT DENNIS SCHWARTZ, BONNEVILLE CHIEF OF OPERATIONS, AT (541) 374-4567.

---E) TO PASS FLOW IN EXCESS OF POWERHOUSE CAPACITY, INCREASE SPILL INVOLUNTARILY CONSISTENT WITH THE MOST RECENT SPILL PRIORITY LIST TTY.

6. THE GOAL OF THIS OPERATION IS TO LIMIT FLOW THROUGH AS MANY PH2 UNITS AS POSSIBLE TO THE MID-POINT OF THE 1% RANGE BY INCREASING FLOW THROUGH PH1 UNITS UP TO THE BEST GEOMETRY POINT.

7. IF IT IS NECESSARY TO PUT UNITS ON LOCAL CONTROL TO ACHIEVE THESE TARGETS, NOTIFY BPA REAL TIME (503-230-4374) PRIOR TO GOING TO LOCAL CONTROL.

8. UPON COMPLETION OF THIS OPERATION, RESUME OPERATING IN ACCORDANCE WITH THE 2012 FPP AND REFERENCE TTY.

9. THE 2012 FPP AND FOP ARE AVAILABLE ONLINE AT:  
<http://www.nwd-wc.usace.army.mil/tmt/documents/fpp/2012/>

10. THIS OPERATION WAS REQUESTED BY DAVE WILLS (USFWS), AND COORDINATED WITH DOUG BAUS (COE-RCC), SCOTT BETTIN (BPA), TONY NORRIS (BPA), BPA REAL TIME, DENNIS SCHWARTZ (COE-BON), BEN HAUSMANN (COE-BON), RAY GUAJARDO (COE-BON), JEFF FAUTH (COE-BON), BRAD SHARP (COE-BON), BILL PROCTOR (COE-RCC), DEAN BALLINGER (PSMFC) AND WITH TMT AT THE MEETING ON APRIL 25 AND THE CONFERENCE CALL ON APRIL 27.

LISA WRIGHT  
CENWD/RCC10

XX

Change 9

Sent to: CO

XX  
BON R 051612 1122 CO BON TDA JDA MCN BPA BPC NPD NPC NPP

ATTENTION: BONNEVILLE AND BPA

SUBJECT: LIMIT PH2 OPERATING RANGE TO 50% OF 1% RANGE

REFERENCE TTY: BON R 040912 1142 SPRING SPILL FOR JUVENILE FISH PASSAGE

1. EFFECTIVE IMMEDIATELY THROUGH 1800 HOURS ON MONDAY, MAY 21, OPERATE AS DEFINED BELOW TO IMPROVE PASSAGE CONDITIONS THROUGH POWERHOUSE 2 (PH2) GATEWELLS DURING THE DOWNSTREAM MIGRATION OF SOCKEYE SALMON.
2. CONTINUE TO OPERATE CONSISTENT WITH THE REFERENCE TTY FOR SPRING SPILL OPERATIONS AS DEFINED IN THE 2012 FISH OPERATIONS PLAN (FOP).
3. TOTAL PROJECT POWER OUTFLOW FOR THIS SPECIAL OPERATION WILL NOT CHANGE FROM POWER OUTFLOW UNDER NORMAL OPERATIONS. THE ONLY CHANGE WILL BE TO MOVE FLOW THAT WOULD NORMALLY PASS THROUGH PH2 UNITS ABOVE THE MID-POINT (50%) OF THE 1% OPERATING RANGE TO PASS INSTEAD THROUGH PH1 UNITS OPERATING ABOVE THE 1% RANGE TO THE BEST GEOMETRY POINT. FOR EXAMPLE, AT A HEAD OF 43 FT, THE UPPER LIMIT (100%) OF THE 1% RANGE FOR PH2 UNITS IS 18.3 KCFS (56.4 MW) AND THE MID-POINT (50%) IS 14.7 KCFS (45.5 MW). THEREFORE OPERATING AT THE MID-POINT RESULTS IN A NET OF 3.6 KCFS (10.9 MW) PER UNIT THAT WOULD BE SHIFTED TO PH1 UNITS. \*\*\*HOWEVER, IF PH2 UNIT CAPACITY IS LIMITED DUE TO DEBRIS LOADING AND MAINTAINING THE VBS WITHIN FPP CRITERIA, THE NET DIFFERENCE WOULD BE SMALLER. FOR EXAMPLE, IF A PH2 UNIT COULD ONLY BE OPERATED UP TO 15 KCFS, THE NET SHIFT TO PH1 WOULD BE 0.3 KCFS. THEREFORE, TOTAL PROJECT POWER OUTFLOW (PH1+PH2) THAT WOULD BE ACHIEVED UNDER NORMAL OPERATING CONDITIONS WILL BE MAINTAINED THROUGHOUT THIS SPECIAL OPERATION.
4. TO PASS FLOW, INCREASE OPERATION OF UNITS INCREMENTALLY AS FOLLOWS:
  - A) PH2: OPERATE ALL AVAILABLE UNITS UP TO 25% OF THE 1% OF BEST EFFICIENCY OPERATING RANGE;
  - B) PH1: OPERATE ALL AVAILABLE UNITS UP TO 100% (UPPER LIMIT) OF THE 1% OPERATING RANGE;
  - C) PH2: OPERATE ALL AVAILABLE UNITS WITHIN 25-50% OF THE 1% OPERATING RANGE;
  - D) FOR ADDITIONAL FLOW THAT WOULD NORMALLY BE PASSED THROUGH PH2 UNITS ABOVE THE MID-POINT OF THE 1% RANGE, INSTEAD INCREASE OPERATION OF PH1 UNITS ONE UNIT AT A TIME

IN THE ORDER OF PRIORITY UP TO BUT NOT TO EXCEED THE BEST GEOMETRY POINT, DEFINED AS 40-41 MW PER UNIT AT JUST BELOW THE CAVITATION LIMIT. FOR MORE INFORMATION REGARDING BEST GEOMETRY OPERATIONS, CONTACT DENNIS SCHWARTZ, BONNEVILLE CHIEF OF OPERATIONS, AT (541) 374-4567.

---E) TO PASS FLOW IN EXCESS OF POWERHOUSE CAPACITY, INCREASE SPILL INVOLUNTARILY CONSISTENT WITH THE MOST RECENT SPILL PRIORITY LIST TTY.

5. THE GOAL OF THIS OPERATION IS TO LIMIT FLOW THROUGH PH2 UNITS TO THE MID-POINT OF THE 1% RANGE BY INCREASING FLOW THROUGH PH1 UNITS UP TO THE BEST GEOMETRY POINT.

6. IF IT IS NECESSARY TO PUT UNITS ON LOCAL CONTROL TO ACHIEVE THESE TARGETS, NOTIFY BPA REAL TIME (503-230-4374) PRIOR TO GOING TO LOCAL CONTROL.

7. UPON COMPLETION OF THIS OPERATION, RESUME OPERATING IN ACCORDANCE WITH THE 2012 FPP AND REFERENCE TTY.

8. THE 2012 FPP AND FOP ARE AVAILABLE ONLINE AT:  
<http://www.nwd-wc.usace.army.mil/tmt/documents/fpp/2012/>

9. THIS OPERATION WAS REQUESTED BY PAUL WAGNER (NOAA FISHERIES) ON BEHALF OF THE FISH PASSAGE ADVISORY COMMITTEE (FPAC), AND COORDINATED WITH RAY GUAJARDO (COE-BON) AND WITH TMT AT THE MEETING ON MAY 16.

LISA WRIGHT  
CENWD/RCC10

XX

Change 10

Sent to: CO

XX  
BON R 052312 1210 CO BON TDA JDA MCN BPA BPC NPD NPC NPP

ATTENTION: BONNEVILLE AND BPA

SUBJECT: POWERHOUSE OPERATIONS FOR JUVENILE SOCKEYE  
MIGRATION

REFERENCE TTY: BON R 040912 1142 SPRING SPILL FOR JUVENILE  
FISH PASSAGE

1. EFFECTIVE IMMEDIATELY THROUGH 1800 HOURS ON TUESDAY,  
MAY 29, OPERATE AS DEFINED BELOW TO IMPROVE PASSAGE  
CONDITIONS THROUGH POWERHOUSE 2 (PH2) GATEWELLS DURING THE  
DOWNSTREAM MIGRATION OF SNAKE RIVER SOCKEYE SALMON.

2. CONTINUE TO OPERATE CONSISTENT WITH THE REFERENCE TTY  
FOR SPRING SPILL OPERATIONS AS DEFINED IN THE 2012 FISH  
OPERATIONS PLAN (FOP).

3. TOTAL PROJECT POWER OUTFLOW FOR THIS SPECIAL  
OPERATION WILL NOT CHANGE FROM POWER OUTFLOW UNDER NORMAL  
OPERATIONS. THE ONLY CHANGE WILL BE TO MOVE FLOW THAT WOULD  
NORMALLY PASS THROUGH PH2 UNITS ABOVE THE MID-POINT (50%)  
OF THE 1% OPERATING RANGE TO PASS INSTEAD THROUGH PH1 UNITS  
OPERATING ABOVE THE 1% RANGE UP TO THE BEST GEOMETRY POINT.  
FOR EXAMPLE, AT A HEAD OF 46 FT, THE UPPER LIMIT (100%) OF  
THE 1% RANGE FOR PH2 UNITS IS 18.4 KCFS (61 MW) AND THE  
MID-POINT (50%) IS 14.8 KCFS (49 MW). THEREFORE OPERATING  
PH2 AT THE MID-POINT RESULTS IN A NET OF 3.6 KCFS (10.9 MW)  
PER UNIT THAT WOULD BE SHIFTED TO PH1 UNITS.

\*\*\*HOWEVER, IF PH2 UNIT CAPACITY IS LIMITED DUE TO DEBRIS  
LOADING AND MAINTAINING THE VBS WITHIN FPP CRITERIA, THE  
NET DIFFERENCE WOULD BE SMALLER. FOR EXAMPLE, IF A PH2  
UNIT COULD ONLY BE OPERATED UP TO 15 KCFS, THE NET SHIFT  
TO PH1 WOULD BE 0.2 KCFS PER UNIT. IN SUMMARY, TOTAL  
PROJECT POWER OUTFLOW (PH1+PH2) THAT WOULD BE ACHIEVED  
UNDER NORMAL OPERATING CONDITIONS WILL BE MAINTAINED  
THROUGHOUT THIS SPECIAL OPERATION.

4. TO PASS FLOW, INCREASE OPERATION OF UNITS INCREMENTALLY  
AS FOLLOWS:

- A) PH2: OPERATE ALL AVAILABLE UNITS UP TO 25% OF THE 1%  
OF BEST EFFICIENCY OPERATING RANGE;
- B) PH1: OPERATE ALL AVAILABLE UNITS UP TO 100% (UPPER  
LIMIT) OF THE 1% OPERATING RANGE;
- C) PH2: OPERATE ALL AVAILABLE UNITS WITHIN 25-50% OF

THE 1% OPERATING RANGE;

---D) FOR ADDITIONAL FLOW THAT WOULD NORMALLY BE PASSED THROUGH PH2 UNITS ABOVE THE MID-POINT OF THE 1% RANGE, INSTEAD INCREASE OPERATION OF PH1 UNITS ONE UNIT AT A TIME IN THE ORDER OF PRIORITY UP TO BUT NOT TO EXCEED THE BEST GEOMETRY POINT, DEFINED AS 40-41 MW PER UNIT AT JUST BELOW THE CAVITATION LIMIT. FOR MORE INFORMATION REGARDING BEST GEOMETRY OPERATIONS, CONTACT DENNIS SCHWARTZ, BONNEVILLE CHIEF OF OPERATIONS, AT (541) 374-4567.

---E) TO PASS FLOW IN EXCESS OF POWERHOUSE CAPACITY, INCREASE SPILL INVOLUNTARILY CONSISTENT WITH THE MOST RECENT SPILL PRIORITY LIST TTY.

5. THE GOAL OF THIS OPERATION IS TO LIMIT FLOW THROUGH PH2 UNITS TO THE MID-POINT (50%) OF THE 1% OPERATING RANGE BY INCREASING FLOW THROUGH PH1 UNITS UP TO THE BEST GEOMETRY POINT.

6. IF IT IS NECESSARY TO PUT UNITS ON LOCAL CONTROL TO ACHIEVE THESE TARGETS, NOTIFY BPA REAL TIME (503-230-4374) PRIOR TO GOING TO LOCAL CONTROL.

7. UPON COMPLETION OF THIS OPERATION, RESUME OPERATING IN ACCORDANCE WITH THE 2012 FPP AND REFERENCE TTY.

8. THE 2012 FPP AND FOP ARE AVAILABLE ONLINE AT:  
<http://www.nwd-wc.usace.army.mil/tmt/documents/fpp/2012/>

9. THIS OPERATION WAS REQUESTED BY PAUL WAGNER (NOAA FISHERIES) ON BEHALF OF THE FISH PASSAGE ADVISORY COMMITTEE (FPAC), AND COORDINATED WITH SCOTT ENGLISH (COE-RCC), LAURA HAMILTON (COE-RCC), RAY GUAJARDO (COE-BON), AND WITH TMT AT THE MEETING ON MAY 23.

LISA WRIGHT  
CENWD/RCC10

XX

Change 11

Sent to: CO

XX  
BON R 052912 1452 CO BON TDA JDA MCN BPA BPC NPD NPC NPP

ATTENTION: BONNEVILLE AND BPA

SUBJECT: POWERHOUSE OPERATIONS FOR JUVENILE SOCKEYE  
MIGRATION

-----  
REPLACES TTY: BON R 052312 1210 POWERHOUSE OPERATIONS FOR  
JUVENILE SOCKEYE MIGRATION.  
MODIFIED PARAGRAPH 1 TO EXTEND OPERATION THROUGH 1800 HOURS  
ON MAY 30.  
-----

REFERENCE TTY: BON R 040912 1142 SPRING SPILL FOR JUVENILE  
FISH PASSAGE

1. EFFECTIVE IMMEDIATELY THROUGH 1800 HOURS ON WEDNESDAY,  
MAY 30, OPERATE AS DEFINED BELOW TO IMPROVE PASSAGE  
CONDITIONS THROUGH POWERHOUSE 2 (PH2) GATEWELLS DURING THE  
DOWNSTREAM MIGRATION OF SNAKE RIVER SOCKEYE SALMON.
2. CONTINUE TO OPERATE CONSISTENT WITH THE REFERENCE TTY  
FOR SPRING SPILL OPERATIONS AS DEFINED IN THE 2012 FISH  
OPERATIONS PLAN (FOP).
3. TOTAL PROJECT POWER OUTFLOW FOR THIS SPECIAL  
OPERATION WILL NOT CHANGE FROM POWER OUTFLOW UNDER NORMAL  
OPERATIONS. THE ONLY CHANGE WILL BE TO MOVE FLOW THAT WOULD  
NORMALLY PASS THROUGH PH2 UNITS ABOVE THE MID-POINT (50%)  
OF THE 1% OPERATING RANGE TO PASS INSTEAD THROUGH PH1 UNITS  
OPERATING ABOVE THE 1% RANGE UP TO THE BEST GEOMETRY POINT.  
FOR EXAMPLE, AT A HEAD OF 46 FT, THE UPPER LIMIT (100%) OF  
THE 1% RANGE FOR PH2 UNITS IS 18.4 KCFS (61 MW) AND THE  
MID-POINT (50%) IS 14.8 KCFS (49 MW). THEREFORE OPERATING  
PH2 AT THE MID-POINT RESULTS IN A NET OF 3.6 KCFS (10.9 MW)  
PER UNIT THAT WOULD BE SHIFTED TO PH1 UNITS.  
  
\*\*\*HOWEVER, IF PH2 UNIT CAPACITY IS LIMITED DUE TO DEBRIS  
LOADING AND MAINTAINING THE VBS WITHIN FPP CRITERIA, THE  
NET DIFFERENCE WOULD BE SMALLER. FOR EXAMPLE, IF A PH2  
UNIT COULD ONLY BE OPERATED UP TO 15 KCFS, THE NET SHIFT  
TO PH1 WOULD BE 0.2 KCFS PER UNIT. IN SUMMARY, TOTAL  
PROJECT POWER OUTFLOW (PH1+PH2) THAT WOULD BE ACHIEVED  
UNDER NORMAL OPERATING CONDITIONS WILL BE MAINTAINED  
THROUGHOUT THIS SPECIAL OPERATION.
4. TO PASS FLOW, INCREASE OPERATION OF UNITS INCREMENTALLY

AS FOLLOWS:

- A) PH2: OPERATE ALL AVAILABLE UNITS UP TO 25% OF THE 1% OF BEST EFFICIENCY OPERATING RANGE;
- B) PH1: OPERATE ALL AVAILABLE UNITS UP TO 100% (UPPER LIMIT) OF THE 1% OPERATING RANGE;
- C) PH2: OPERATE ALL AVAILABLE UNITS WITHIN 25-50% OF THE 1% OPERATING RANGE;
- D) FOR ADDITIONAL FLOW THAT WOULD NORMALLY BE PASSED THROUGH PH2 UNITS ABOVE THE MID-POINT OF THE 1% RANGE, INSTEAD INCREASE OPERATION OF PH1 UNITS ONE UNIT AT A TIME IN THE ORDER OF PRIORITY UP TO BUT NOT TO EXCEED THE BEST GEOMETRY POINT, DEFINED AS 40-41 MW PER UNIT AT JUST BELOW THE CAVITATION LIMIT. FOR MORE INFORMATION REGARDING BEST GEOMETRY OPERATIONS, CONTACT DENNIS SCHWARTZ, BONNEVILLE CHIEF OF OPERATIONS, AT (541) 374-4567.
- E) TO PASS FLOW IN EXCESS OF POWERHOUSE CAPACITY, INCREASE SPILL INVOLUNTARILY CONSISTENT WITH THE MOST RECENT SPILL PRIORITY LIST TTY.

5. THE GOAL OF THIS OPERATION IS TO LIMIT FLOW THROUGH PH2 UNITS TO THE MID-POINT (50%) OF THE 1% OPERATING RANGE BY INCREASING FLOW THROUGH PH1 UNITS UP TO THE BEST GEOMETRY POINT.

6. IF IT IS NECESSARY TO PUT UNITS ON LOCAL CONTROL TO ACHIEVE THESE TARGETS, NOTIFY BPA REAL TIME (503-230-4374) PRIOR TO GOING TO LOCAL CONTROL.

7. UPON COMPLETION OF THIS OPERATION, RESUME OPERATING IN ACCORDANCE WITH THE 2012 FPP AND REFERENCE TTY.

8. THE 2012 FPP AND FOP ARE AVAILABLE ONLINE AT:  
<http://www.nwd-wc.usace.army.mil/tmt/documents/fpp/2012/>

9. THIS OPERATION WAS REQUESTED BY PAUL WAGNER (NOAA FISHERIES) ON BEHALF OF THE FISH PASSAGE ADVISORY COMMITTEE (FPAC), AND COORDINATED WITH SCOTT ENGLISH (COE-RCC), LAURA HAMILTON (COE-RCC), RAY GUAJARDO(COE-BON), DAVE SMITH (COE-BON), AND WITH TMT AT THE MEETING ON MAY 23.

LISA WRIGHT  
CENWD/RCC10

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Change 12

Sent to: CO

XX  
BON R 053012 1321 CO BON TDA JDA MCN BPA BPC NPD NPC NPP

ATTENTION: BONNEVILLE AND BPA

SUBJECT: POWERHOUSE OPERATIONS FOR JUVENILE SOCKEYE  
MIGRATION

-----  
REPLACES TTY: BON R 052912 1452 POWERHOUSE OPERATIONS FOR  
JUVENILE SOCKEYE MIGRATION  
MODIFIED PARAGRAPH 1 TO EXTEND OPERATION THROUGH 1800 HOURS  
ON JUNE 4.  
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REFERENCE TTY: BON R 040912 1142 SPRING SPILL FOR JUVENILE  
FISH PASSAGE

1. EFFECTIVE IMMEDIATELY THROUGH 1800 HOURS ON MONDAY,  
JUNE 4, OPERATE AS DEFINED BELOW TO IMPROVE PASSAGE  
CONDITIONS THROUGH POWERHOUSE 2 (PH2) GATEWELLS DURING THE  
DOWNSTREAM MIGRATION OF SNAKE RIVER SOCKEYE SALMON.
2. CONTINUE TO OPERATE CONSISTENT WITH THE REFERENCE TTY  
FOR SPRING SPILL OPERATIONS AS DEFINED IN THE 2012 FISH  
OPERATIONS PLAN (FOP).
3. TOTAL PROJECT POWER OUTFLOW FOR THIS SPECIAL  
OPERATION WILL NOT CHANGE FROM POWER OUTFLOW UNDER NORMAL  
OPERATIONS. THE ONLY CHANGE WILL BE TO MOVE FLOW THAT WOULD  
NORMALLY PASS THROUGH PH2 UNITS ABOVE THE MID-POINT (50%)  
OF THE 1% OPERATING RANGE TO PASS INSTEAD THROUGH PH1 UNITS  
OPERATING ABOVE THE 1% RANGE UP TO THE BEST GEOMETRY POINT.  
FOR EXAMPLE, AT A HEAD OF 46 FT, THE UPPER LIMIT (100%) OF  
THE 1% RANGE FOR PH2 UNITS IS 18.4 KCFS (61 MW) AND THE  
MID-POINT (50%) IS 14.8 KCFS (49 MW). THEREFORE OPERATING  
PH2 AT THE MID-POINT RESULTS IN A NET OF 3.6 KCFS (10.9 MW)  
PER UNIT THAT WOULD BE SHIFTED TO PH1 UNITS.

\*\*\*HOWEVER, IF PH2 UNIT CAPACITY IS LIMITED DUE TO DEBRIS  
LOADING AND MAINTAINING THE VBS WITHIN FPP CRITERIA, THE  
NET DIFFERENCE WOULD BE SMALLER. FOR EXAMPLE, IF A PH2  
UNIT COULD ONLY BE OPERATED UP TO 15 KCFS, THE NET SHIFT  
TO PH1 WOULD BE 0.2 KCFS PER UNIT. IN SUMMARY, TOTAL  
PROJECT POWER OUTFLOW (PH1+PH2) THAT WOULD BE ACHIEVED  
UNDER NORMAL OPERATING CONDITIONS WILL BE MAINTAINED  
THROUGHOUT THIS SPECIAL OPERATION.



4. TO PASS FLOW, INCREASE OPERATION OF UNITS INCREMENTALLY AS FOLLOWS:

---A) PH2: OPERATE ALL AVAILABLE UNITS UP TO 25% OF THE 1% OF BEST EFFICIENCY OPERATING RANGE;

---B) PH1: OPERATE ALL AVAILABLE UNITS UP TO 100% (UPPER LIMIT) OF THE 1% OPERATING RANGE;

---C) PH2: OPERATE ALL AVAILABLE UNITS WITHIN 25-50% OF THE 1% OPERATING RANGE;

---D) FOR ADDITIONAL FLOW THAT WOULD NORMALLY BE PASSED THROUGH PH2 UNITS ABOVE THE MID-POINT OF THE 1% RANGE, INSTEAD INCREASE OPERATION OF PH1 UNITS ONE UNIT AT A TIME IN THE ORDER OF PRIORITY UP TO BUT NOT TO EXCEED THE BEST GEOMETRY POINT, DEFINED AS 40-41 MW PER UNIT AT JUST BELOW THE CAVITATION LIMIT. FOR MORE INFORMATION REGARDING BEST GEOMETRY OPERATIONS, CONTACT DENNIS SCHWARTZ, BONNEVILLE CHIEF OF OPERATIONS, AT (541) 374-4567.

---E) TO PASS FLOW IN EXCESS OF POWERHOUSE CAPACITY, INCREASE SPILL INVOLUNTARILY CONSISTENT WITH THE MOST RECENT SPILL PRIORITY LIST TTY.

5. THE GOAL OF THIS OPERATION IS TO LIMIT FLOW THROUGH PH2 UNITS TO THE MID-POINT (50%) OF THE 1% OPERATING RANGE BY INCREASING FLOW THROUGH PH1 UNITS UP TO THE BEST GEOMETRY POINT.

6. IF IT IS NECESSARY TO PUT UNITS ON LOCAL CONTROL TO ACHIEVE THESE TARGETS, NOTIFY BPA REAL TIME (503-230-4374) PRIOR TO GOING TO LOCAL CONTROL.

7. UPON COMPLETION OF THIS OPERATION, RESUME OPERATING IN ACCORDANCE WITH THE 2012 FPP AND REFERENCE TTY.

8. THE 2012 FPP AND FOP ARE AVAILABLE ONLINE AT:  
<http://www.nwd-wc.usace.army.mil/tmt/documents/fpp/2012/>

9. THIS OPERATION WAS REQUESTED BY TOM LORZ (CRITFC) VIA A SYSTEMS OPERATIONS REQUEST (SOR) PRESENTED TO TMT AT THE MEETING ON MAY 30, AND COORDINATED WITH RAY GUAJARDO(COE-BON) AND DAVE SMITH (COE-BON).

LISA WRIGHT  
CENWD/RCC10

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Change 13

Sent to: CO

XX  
BON R 060412 1350 CO BON TDA JDA MCN BPA BPC NPD NPC NPP

ATTENTION: BONNEVILLE AND BPA

SUBJECT: POWERHOUSE OPERATIONS FOR JUVENILE SOCKEYE  
MIGRATION

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REPLACES TTY: BON R 053012 1321 POWERHOUSE OPERATIONS FOR  
JUVENILE SOCKEYE MIGRATION  
MODIFIED PARAGRAPH 1 TO EXTEND OPERATION THROUGH 1800 HOURS  
ON JUNE 6.  
-----

REFERENCE TTY: BON R 040912 1142 SPRING SPILL FOR JUVENILE  
FISH PASSAGE

1. EFFECTIVE IMMEDIATELY THROUGH 1800 HOURS ON WEDNESDAY,  
JUNE 6, OPERATE AS DEFINED BELOW TO IMPROVE PASSAGE  
CONDITIONS THROUGH POWERHOUSE 2 (PH2) GATEWELLS DURING THE  
DOWNSTREAM MIGRATION OF SNAKE RIVER SOCKEYE SALMON.
2. CONTINUE TO OPERATE CONSISTENT WITH THE REFERENCE TTY  
FOR SPRING SPILL OPERATIONS AS DEFINED IN THE 2012 FISH  
OPERATIONS PLAN (FOP).
3. TOTAL PROJECT POWER OUTFLOW FOR THIS SPECIAL  
OPERATION WILL NOT CHANGE FROM POWER OUTFLOW UNDER NORMAL  
OPERATIONS. THE ONLY CHANGE WILL BE TO MOVE FLOW THAT WOULD  
NORMALLY PASS THROUGH PH2 UNITS ABOVE THE MID-POINT (50%)  
OF THE 1% OPERATING RANGE TO PASS INSTEAD THROUGH PH1 UNITS  
OPERATING ABOVE THE 1% RANGE UP TO THE BEST GEOMETRY POINT.  
FOR EXAMPLE, AT A HEAD OF 46 FT, THE UPPER LIMIT (100%) OF  
THE 1% RANGE FOR PH2 UNITS IS 18.4 KCFS (61 MW) AND THE  
MID-POINT (50%) IS 14.8 KCFS (49 MW). THEREFORE OPERATING  
PH2 AT THE MID-POINT RESULTS IN A NET OF 3.6 KCFS (10.9 MW)  
PER UNIT THAT WOULD BE SHIFTED TO PH1 UNITS.  
  
\*\*\*HOWEVER, IF PH2 UNIT CAPACITY IS LIMITED DUE TO DEBRIS  
LOADING AND MAINTAINING THE VBS WITHIN FPP CRITERIA, THE  
NET DIFFERENCE WOULD BE SMALLER. FOR EXAMPLE, IF A PH2  
UNIT COULD ONLY BE OPERATED UP TO 15 KCFS, THE NET SHIFT  
TO PH1 WOULD BE 0.2 KCFS PER UNIT. IN SUMMARY, TOTAL  
PROJECT POWER OUTFLOW (PH1+PH2) THAT WOULD BE ACHIEVED  
UNDER NORMAL OPERATING CONDITIONS WILL BE MAINTAINED  
THROUGHOUT THIS SPECIAL OPERATION.
4. TO PASS FLOW, INCREASE OPERATION OF UNITS INCREMENTALLY

AS FOLLOWS:

- A) PH2: OPERATE ALL AVAILABLE UNITS UP TO 25% OF THE 1% OF BEST EFFICIENCY OPERATING RANGE;
- B) PH1: OPERATE ALL AVAILABLE UNITS UP TO 100% (UPPER LIMIT) OF THE 1% OPERATING RANGE;
- C) PH2: OPERATE ALL AVAILABLE UNITS WITHIN 25-50% OF THE 1% OPERATING RANGE;
- D) FOR ADDITIONAL FLOW THAT WOULD NORMALLY BE PASSED THROUGH PH2 UNITS ABOVE THE MID-POINT OF THE 1% RANGE, INSTEAD INCREASE OPERATION OF PH1 UNITS ONE UNIT AT A TIME IN THE ORDER OF PRIORITY UP TO BUT NOT TO EXCEED THE BEST GEOMETRY POINT, DEFINED AS 40-41 MW PER UNIT AT JUST BELOW THE CAVITATION LIMIT. FOR MORE INFORMATION REGARDING BEST GEOMETRY OPERATIONS, CONTACT DENNIS SCHWARTZ, BONNEVILLE CHIEF OF OPERATIONS, AT (541) 374-4567.
- E) TO PASS FLOW IN EXCESS OF POWERHOUSE CAPACITY, INCREASE SPILL INVOLUNTARILY CONSISTENT WITH THE MOST RECENT SPILL PRIORITY LIST TTY.

5. THE GOAL OF THIS OPERATION IS TO LIMIT FLOW THROUGH PH2 UNITS TO THE MID-POINT (50%) OF THE 1% OPERATING RANGE BY INCREASING FLOW THROUGH PH1 UNITS UP TO THE BEST GEOMETRY POINT.

6. IF IT IS NECESSARY TO PUT UNITS ON LOCAL CONTROL TO ACHIEVE THESE TARGETS, NOTIFY BPA REAL TIME (503-230-4374) PRIOR TO GOING TO LOCAL CONTROL.

7. UPON COMPLETION OF THIS OPERATION, RESUME OPERATING IN ACCORDANCE WITH THE 2012 FPP AND REFERENCE TTY.

8. THE 2012 FPP AND FOP ARE AVAILABLE ONLINE AT:  
<http://www.nwd-wc.usace.army.mil/tmt/documents/fpp/2012/>

9. THIS OPERATION WAS REQUESTED BY TOM LORZ (CRITFC) VIA A SYSTEMS OPERATIONS REQUEST (SOR) PRESENTED TO TMT AT THE MEETING ON MAY 30, AND COORDINATED WITH RAY GUAJARDO(COE-BON) AND DAVE SMITH (COE-BON).

DOUG BAUS  
CENWD/RCC12

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Change 14

Sent to: CO

XX  
BON R 060612 1440 CO BON TDA JDA MCN BPA BPC NPD NPC NPP

ATTENTION: BONNEVILLE AND BPA

SUBJECT: POWERHOUSE OPERATIONS FOR JUVENILE SOCKEYE  
MIGRATION

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REPLACES TTY: BON R 060412 1530 POWERHOUSE OPERATIONS FOR  
JUVENILE SOCKEYE MIGRATION  
MODIFIED PARAGRAPH 1 TO EXTEND OPERATION THROUGH 1800 HOURS  
ON JUNE 11.  
-----

REFERENCE TTY: BON R 040912 1142 SPRING SPILL FOR JUVENILE  
FISH PASSAGE

1. EFFECTIVE IMMEDIATELY THROUGH 1800 HOURS ON MONDAY,  
JUNE 11, OPERATE AS DEFINED BELOW TO IMPROVE PASSAGE  
CONDITIONS THROUGH POWERHOUSE 2 (PH2) GATEWELLS DURING THE  
DOWNSTREAM MIGRATION OF SNAKE RIVER SOCKEYE SALMON.
2. CONTINUE TO OPERATE CONSISTENT WITH THE REFERENCE TTY  
FOR SPRING SPILL OPERATIONS AS DEFINED IN THE 2012 FISH  
OPERATIONS PLAN (FOP).
3. TOTAL PROJECT POWER OUTFLOW FOR THIS SPECIAL  
OPERATION WILL NOT CHANGE FROM POWER OUTFLOW UNDER NORMAL  
OPERATIONS. THE ONLY CHANGE WILL BE TO MOVE FLOW THAT WOULD  
NORMALLY PASS THROUGH PH2 UNITS ABOVE THE MID-POINT (50%)  
OF THE 1% OPERATING RANGE TO PASS INSTEAD THROUGH PH1 UNITS  
OPERATING ABOVE THE 1% RANGE UP TO THE BEST GEOMETRY POINT.  
FOR EXAMPLE, AT A HEAD OF 46 FT, THE UPPER LIMIT (100%) OF  
THE 1% RANGE FOR PH2 UNITS IS 18.4 KCFS (61 MW) AND THE  
MID-POINT (50%) IS 14.8 KCFS (49 MW). THEREFORE OPERATING  
PH2 AT THE MID-POINT RESULTS IN A NET OF 3.6 KCFS (10.9 MW)  
PER UNIT THAT WOULD BE SHIFTED TO PH1 UNITS. \*\*\*HOWEVER, IF  
PH2 UNIT CAPACITY IS LIMITED DUE TO DEBRIS LOADING AND  
MAINTAINING THE VBS WITHIN FPP CRITERIA, THE NET DIFFERENCE  
WOULD BE SMALLER. FOR EXAMPLE, IF A PH2 UNIT COULD ONLY BE  
OPERATED UP TO 15 KCFS, THE NET SHIFT TO PH1 WOULD BE 0.2  
KCFS PER UNIT. IN SUMMARY, TOTAL PROJECT POWER OUTFLOW  
(PH1+PH2) THAT WOULD BE ACHIEVED UNDER NORMAL OPERATING  
CONDITIONS WILL BE MAINTAINED THROUGHOUT THIS SPECIAL  
OPERATION.
4. TO PASS FLOW, INCREASE OPERATION OF UNITS INCREMENTALLY  
AS FOLLOWS:

- A) PH2: OPERATE ALL AVAILABLE UNITS UP TO 25% OF THE 1% OF BEST EFFICIENCY OPERATING RANGE;
- B) PH1: OPERATE ALL AVAILABLE UNITS UP TO 100% (UPPER LIMIT) OF THE 1% OPERATING RANGE;
- C) PH2: OPERATE ALL AVAILABLE UNITS WITHIN 25-50% OF THE 1% OPERATING RANGE;
- D) FOR ADDITIONAL FLOW THAT WOULD NORMALLY BE PASSED THROUGH PH2 UNITS ABOVE THE MID-POINT OF THE 1% RANGE, INSTEAD INCREASE OPERATION OF PH1 UNITS ONE UNIT AT A TIME IN THE ORDER OF PRIORITY UP TO BUT NOT TO EXCEED THE BEST GEOMETRY POINT, DEFINED AS 40-41 MW PER UNIT AT JUST BELOW THE CAVITATION LIMIT. FOR MORE INFORMATION REGARDING BEST GEOMETRY OPERATIONS, CONTACT DENNIS SCHWARTZ, BONNEVILLE CHIEF OF OPERATIONS, AT (541) 374-4567.
- E) TO PASS FLOW IN EXCESS OF POWERHOUSE CAPACITY, INCREASE SPILL INVOLUNTARILY CONSISTENT WITH THE MOST RECENT SPILL PRIORITY LIST TTY.

5. THE GOAL OF THIS OPERATION IS TO LIMIT FLOW THROUGH PH2 UNITS TO THE MID-POINT (50%) OF THE 1% OPERATING RANGE BY INCREASING FLOW THROUGH PH1 UNITS UP TO THE BEST GEOMETRY POINT.

6. IF IT IS NECESSARY TO PUT UNITS ON LOCAL CONTROL TO ACHIEVE THESE TARGETS, NOTIFY BPA REAL TIME (503-230-4374) PRIOR TO GOING TO LOCAL CONTROL.

7. UPON COMPLETION OF THIS OPERATION, RESUME OPERATING IN ACCORDANCE WITH THE 2012 FPP AND REFERENCE TTY.

8. THE 2012 FPP AND FOP ARE AVAILABLE ONLINE AT:  
<http://www.nwd-wc.usace.army.mil/tmt/documents/fpp/2012/>

9. THIS OPERATION WAS REQUESTED BY TOM LORZ (CRITFC-UMATILLA) VIA A SYSTEMS OPERATIONS REQUEST (SOR) SUBMITTED TO THE TMT ON MAY 30. THE OPERATION WAS COORDINATED WITH TMT AT THE MEETINGS ON MAY 30 AND JUNE 6, AND WITH RAY GUAJARDO (COE-BON) AND DAVE SMITH (COE-BON).

LISA WRIGHT  
 CENWD/RCC10  
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Change 15

Sent to: CO

XX  
BON R 061112 1213 CO BON TDA JDA MCN BPA BPC NPD NPC NPP

ATTENTION: BONNEVILLE AND BPA

SUBJECT: POWERHOUSE OPERATIONS FOR JUVENILE SOCKEYE  
MIGRATION

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REPLACES TTY: BON R 060612 1440 POWERHOUSE OPERATIONS FOR  
JUVENILE SOCKEYE MIGRATION  
MODIFIED PARAGRAPH 1 TO EXTEND OPERATION THROUGH 1800 HOURS  
ON JUNE 13.  
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REFERENCE TTY: BON R 040912 1142 SPRING SPILL FOR JUVENILE  
FISH PASSAGE

1. EFFECTIVE IMMEDIATELY THROUGH 1800 HOURS ON WEDNESDAY,  
JUNE 13, OPERATE AS DEFINED BELOW TO IMPROVE PASSAGE  
CONDITIONS THROUGH POWERHOUSE 2 (PH2) GATEWELLS DURING THE  
DOWNSTREAM MIGRATION OF SNAKE RIVER SOCKEYE SALMON.
2. CONTINUE TO OPERATE CONSISTENT WITH THE REFERENCE TTY  
FOR SPRING SPILL OPERATIONS AS DEFINED IN THE 2012 FISH  
OPERATIONS PLAN (FOP).
3. TOTAL PROJECT POWER OUTFLOW FOR THIS SPECIAL OPERATION  
WILL NOT CHANGE FROM POWER OUTFLOW UNDER NORMAL OPERATIONS.  
THE ONLY CHANGE WILL BE TO MOVE FLOW THAT WOULD NORMALLY  
PASS THROUGH PH2 UNITS ABOVE THE MID-POINT (50%) OF THE 1%  
OPERATING RANGE TO PASS INSTEAD THROUGH PH1 UNITS OPERATING  
ABOVE THE 1% RANGE UP TO THE BEST GEOMETRY POINT. FOR EXAMPLE,  
AT A HEAD OF 46 FT, THE UPPER LIMIT (100%) OF THE 1% RANGE  
FOR PH2 UNITS IS 18.4 KCFS (61 MW) AND THE MID-POINT (50%)  
IS 14.8 KCFS (49 MW). THEREFORE OPERATING PH2 AT THE MID-POINT  
RESULTS IN A NET OF 3.6 KCFS (10.9 MW) PER UNIT THAT WOULD  
BE SHIFTED TO PH1 UNITS. \*\*\*HOWEVER, IF PH2 UNIT CAPACITY  
IS LIMITED DUE TO DEBRIS LOADING AND MAINTAINING THE VBS  
WITHIN FPP CRITERIA, THE NET DIFFERENCE WOULD BE SMALLER.  
FOR EXAMPLE, IF A PH2 UNIT COULD ONLY BE OPERATED UP TO  
15 KCFS, THE NET SHIFT TO PH1 WOULD BE 0.2 KCFS PER UNIT.  
IN SUMMARY, TOTAL PROJECT POWER OUTFLOW (PH1+PH2) THAT WOULD  
BE ACHIEVED UNDER NORMAL OPERATING CONDITIONS WILL BE  
MAINTAINED THROUGHOUT THIS SPECIAL OPERATION.
4. TO PASS FLOW, INCREASE OPERATION OF UNITS INCREMENTALLY  
AS FOLLOWS:  
---A) PH2: OPERATE ALL AVAILABLE UNITS UP TO 25% OF THE 1%  
OF BEST EFFICIENCY OPERATING RANGE;

---B) PH1: OPERATE ALL AVAILABLE UNITS UP TO 100% (UPPER LIMIT) OF THE 1% OPERATING RANGE;  
---C) PH2: OPERATE ALL AVAILABLE UNITS WITHIN 25-50% OF THE 1% OPERATING RANGE;  
---D) FOR ADDITIONAL FLOW THAT WOULD NORMALLY BE PASSED THROUGH PH2 UNITS ABOVE THE MID-POINT OF THE 1% RANGE, INSTEAD INCREASE OPERATION OF PH1 UNITS ONE UNIT AT A TIME IN THE ORDER OF PRIORITY UP TO BUT NOT TO EXCEED THE BEST GEOMETRY POINT, DEFINED AS 40-41 MW PER UNIT AT JUST BELOW THE CAVITATION LIMIT. FOR MORE INFORMATION REGARDING BEST GEOMETRY OPERATIONS, CONTACT DENNIS SCHWARTZ, BONNEVILLE CHIEF OF OPERATIONS, AT (541) 374-4567.  
---E) TO PASS FLOW IN EXCESS OF POWERHOUSE CAPACITY, INCREASE SPILL INVOLUNTARILY CONSISTENT WITH THE MOST RECENT SPILL PRIORITY LIST TTY.

5. THE GOAL OF THIS OPERATION IS TO LIMIT FLOW THROUGH PH2 UNITS TO THE MID-POINT (50%) OF THE 1% OPERATING RANGE BY INCREASING FLOW THROUGH PH1 UNITS UP TO THE BEST GEOMETRY POINT.

6. IF IT IS NECESSARY TO PUT UNITS ON LOCAL CONTROL TO ACHIEVE THESE TARGETS, NOTIFY BPA REAL TIME (503-230-4374) PRIOR TO GOING TO LOCAL CONTROL.

7. UPON COMPLETION OF THIS OPERATION, RESUME OPERATING IN ACCORDANCE WITH THE 2012 FPP AND REFERENCE TTY.

8. THE 2012 FPP AND FOP ARE AVAILABLE ONLINE AT:  
<http://www.nwd-wc.usace.army.mil/tmt/documents/fpp/2012/>

9. THIS OPERATION WAS REQUESTED BY PAUL WAGNER (NOAA FISHERIES) ON BEHALF OF THE FISH PASSAGE ADVISORIES COMMITTEE (FPAC), AND COORDINATED WITH TMT AT THE MEETINGS ON MAY 30 AND JUNE 6, AND WITH RAY GUAJARDO (COE-BON) AND DAVE SMITH (COE-BON).

LISA WRIGHT  
CENWD/RCC10  
XX

1 NPD RESERVOIR CONTROL CENTER PROJECT- BON BONNEVILLE DAM & LAKE HOURLY OPERATION DATA REPORT WEDNESDAY MAY 16, 2012																
	GROSS GEN MW	STA USE MW	----- -- IN KCFS -- TOTAL	OUTFLOW POWER	----- -- SPILL --	EL AT IN FEET	POWERHOUSE + MSL TAILWATR	AVG HEAD FT	SUPR CAP MW	UNIT ON RMT	STATUS ON LINE	AVL	PROJECT FOREBAY ELEV	STEVENSON GAGE ELEV	PROJECT TAILWATER ELEV	HR
1	739	3	334.10	202.80	118.90	74.20	24.90	49.30	0	14	16	16	74.30	76.70	24.40	1
2	742	3	334.70	203.30	119.00	74.40	24.90	49.50	0	14	16	16	74.40	76.80	24.40	2
3	741	3	334.30	202.90	119.00	74.20	24.90	49.30	0	14	16	16	74.30	76.70	24.30	3
4	746	3	335.80	204.90	118.50	74.30	24.90	49.40	0	14	16	16	74.30	76.70	24.40	4
5	747	3	336.60	206.30	117.90	74.00	25.00	49.00	0	14	16	16	74.00	76.50	24.50	5
6	741	3	335.30	205.20	117.70	73.90	24.90	49.00	0	14	16	16	73.80	76.40	24.30	6
7	744	3	336.70	206.70	117.60	73.50	25.00	48.50	0	14	16	16	73.80	76.30	24.40	7
8	754	3	340.80	211.00	117.40	73.70	25.20	48.50	0	14	16	16	73.70	76.30	24.60	8
9	758	3	342.50	212.70	117.40	73.60	25.30	48.30	0	14	16	16	73.60	76.20	24.60	9
10	757	3	343.20	213.50	117.30	73.50	25.40	48.10	0	14	16	16	73.50	76.20	24.70	10
11	696	3	341.80	196.10	133.30	73.50	25.30	48.20	0	13	15	15	73.50	76.20	24.80	11
12	697	3	342.30	196.60	133.30	73.10	25.40	47.70	0	14	16	16	73.50	76.10	24.70	12
13	755	3	341.50	216.50	112.60	73.20	25.20	48.00	0	7	16	16	73.50	76.10	24.60	13
14	765	3	333.10	216.30	104.40	73.60	24.60	49.00	0	7	16	16	73.80	76.20	24.10	14
15	765	3	327.20	212.20	102.60	73.60	24.40	49.20	0	7	16	16	73.90	76.20	24.00	15
16	769	3	328.50	213.20	102.90	73.60	24.40	49.20	0	7	16	16	73.90	76.30	24.00	16
17	767	3	328.50	213.20	102.90	73.80	24.40	49.40	0	7	16	16	74.00	76.30	23.90	17
18	766	3	326.30	210.10	103.80	74.00	24.20	49.80	0	7	16	16	74.20	76.40	23.80	18
19	759	3	324.10	207.60	104.10	74.00	24.40	49.60	0	7	16	16	74.20	76.40	23.90	19
20	762	3	325.90	209.10	104.40	74.10	24.50	49.60	0	7	16	16	74.20	76.40	24.00	20
21	761	3	325.40	208.50	104.50	74.10	24.40	49.70	0	7	16	16	74.30	76.50	23.90	21
22	763	3	325.10	208.10	104.60	74.00	24.40	49.60	0	7	16	16	74.20	76.60	23.90	22
23	759	3	323.90	206.90	104.60	74.10	24.30	49.80	0	7	16	16	74.30	76.60	23.90	23
24	765	3	324.90	207.80	104.70	74.00	24.40	49.60	0	7	16	16	74.20	76.60	23.90	24
TOT	18018	72														
AVG	751	3	333.02	207.98	112.64	73.83	24.78	49.05					73.97	76.40	24.25	
MAX	769		343.20	216.50	133.30	74.40	25.40	49.80					74.40	76.80	24.80	
MIN	696		323.90	196.10	102.60	73.10	24.20	47.70					73.50	76.10	23.80	

1 NPD RESERVOIR CONTROL CENTER PROJECT- BON BONNEVILLE DAM & LAKE HOURLY OPERATION DATA REPORT WEDNESDAY MAY 16, 2012															
	----- GROSS GEN MW	BONNEVILLE POWER FLOW KCFS	PH 1 UNIT ON RMT	PH 1 STATUS ON LINE	AVL	PH 1 FOREBAY EL FT	----- PROJECT FOREBAY EL FT	BONNEVILLE GROSS GEN MW	PH 2 POWER FLOW KCFS	UNIT ON RMT	STATUS ON LINE	AVL	----- PROJECT SPWY GATES IN USE	MISC FLOW KCFS	HR
1	317	83.80	7	09	09	74.2	74.3	422	119.00	7	07	07	18	12.4	1
2	321	84.90	7	09	09	74.4	74.4	421	118.40	7	07	07	18	12.4	2
3	321	85.10	7	09	09	74.2	74.3	420	117.80	7	07	07	18	12.4	3
4	324	86.10	7	09	09	74.3	74.3	422	118.80	7	07	07	18	12.4	4
5	322	85.80	7	09	09	74.0	74.0	425	120.50	7	07	07	18	12.4	5
6	318	85.00	7	09	09	73.9	73.8	423	120.20	7	07	07	18	12.4	6
7	318	85.40	7	09	09	73.5	73.8	426	121.30	7	07	07	18	12.4	7
8	315	84.80	7	09	09	73.7	73.7	439	126.20	7	07	07	18	12.4	8
9	313	84.50	7	09	09	73.6	73.6	445	128.20	7	07	07	18	12.4	9
10	313	84.80	7	09	09	73.5	73.5	444	128.70	7	07	07	18	12.4	10
11	310	84.30	7	09	09	73.5	73.5	386	111.80	6	06	06	18	12.4	11
12	324	88.60	7	09	09	73.1	73.5	373	108.00	7	07	07	18	12.4	12



13	393	113.10	0	9	09	73.2	73.5	362	103.40	7	07	07	18	12.4	13
14	404	114.50	0	9	09	73.6	73.8	361	101.80	7	07	07	18	12.4	14
15	405	112.10	0	9	09	73.6	73.9	360	100.10	7	07	07	18	12.4	15
16	409	112.90	0	9	09	73.6	73.9	360	100.30	7	07	07	18	12.4	16
17	407	113.00	0	9	09	73.8	74.0	360	100.20	7	07	07	18	12.4	17
18	404	109.90	0	9	09	74.0	74.2	362	100.20	7	07	07	18	12.4	18
19	394	106.40	0	9	09	74.0	74.2	365	101.20	7	07	07	18	12.4	19
20	396	107.40	0	9	09	74.1	74.2	366	101.70	7	07	07	18	12.4	20
21	396	107.20	0	9	09	74.1	74.3	365	101.30	7	07	07	18	12.4	21
22	398	107.10	0	9	09	74.0	74.2	365	101.00	7	07	07	18	12.4	22
23	397	106.80	0	9	09	74.1	74.3	362	100.10	7	07	07	18	12.4	23
24	397	107.20	0	9	09	74.0	74.2	368	100.60	7	07	07	18	12.4	24
TOT	8616							9402							
AVE	359	97.53				73.8	74.0	392	110.45				18	12.4	
MAX	409	114.50				74.4	74.4	445	128.70				18	12.4	
MIN	310	83.80				73.1	73.5	360	100.10				18	12.4	

1 NPD RESERVOIR CONTROL CENTER PROJECT- BON BONNEVILLE DAM & LAKE HOURLY OPERATION DATA REPORT THURSDAY MAY 17, 2012																
	GROSS GEN MW	STA USE MW	----- TOTAL	OUTFLOW -- IN KCFS	----- POWER	EL AT IN FEET	POWERHOUSE + MSL	AVG HEAD FT	SUPR CAP MW	UNIT ON	STATUS ON	PROJECT FOREBAY ELEV	STEVENSON GAGE ELEV	PROJECT TAILWATER ELEV	HR	
1	763	3	326.50	209.40	104.70	74.20	24.40	49.80	0	7	16	16	74.40	76.60	23.90	1
2	763	3	325.10	208.00	104.70	74.20	24.40	49.80	0	7	16	16	74.30	76.60	23.90	2
3	762	3	323.40	206.10	104.90	74.40	24.30	50.10	0	7	16	16	74.50	76.70	23.80	3
4	765	3	324.20	206.90	104.90	74.50	24.30	50.20	0	7	16	16	74.60	76.80	23.80	4
5	765	3	323.70	206.30	105.00	74.60	24.30	50.30	0	7	16	16	74.70	76.90	23.80	5
6	770	3	336.30	210.80	113.10	74.00	24.90	49.10	0	7	16	16	74.10	76.70	24.30	6
7	771	3	341.80	214.60	114.80	74.20	25.00	49.20	0	7	16	16	74.40	76.80	24.40	7
8	769	3	340.90	213.70	114.80	73.90	25.10	48.80	0	7	16	16	74.10	76.70	24.50	8
9	770	3	344.00	216.90	114.70	73.80	25.20	48.60	0	7	16	16	74.10	76.70	24.50	9
10	779	3	346.10	219.00	114.70	73.60	25.50	48.10	0	8	17	17	73.90	76.60	24.80	10
11	800	3	356.80	229.90	114.50	73.50	25.50	48.00	0	8	17	17	73.80	76.60	24.80	11
12	800	3	357.10	230.30	114.40	73.40	25.60	47.80	0	8	17	17	73.80	76.50	24.90	12
13	798	3	356.00	229.20	114.40	73.40	25.60	47.80	0	8	17	17	73.70	76.50	24.90	13
14	793	3	355.70	229.10	114.20	73.20	25.70	47.50	0	8	17	17	73.60	76.40	25.00	14
15	798	3	359.40	233.00	114.00	73.20	25.70	47.50	0	8	17	17	73.50	76.30	25.10	15
16	800	3	360.00	233.40	114.20	73.30	25.70	47.60	0	8	17	17	73.70	76.40	25.00	16
17	797	3	359.30	232.10	114.80	73.30	25.70	47.60	0	8	17	17	73.70	76.40	25.00	17
18	793	3	358.00	229.60	116.00	73.30	25.70	47.60	0	7	17	17	73.70	76.50	24.90	18
19	791	3	355.70	227.00	116.30	73.70	25.70	48.00	0	7	17	17	74.00	76.60	25.00	19
20	797	3	358.70	229.90	116.40	73.70	25.80	47.90	0	7	17	17	74.00	76.70	25.10	20
21	794	3	356.70	227.80	116.50	74.00	25.70	48.30	0	7	17	17	74.30	76.80	25.00	21
22	793	3	354.40	225.30	116.70	74.00	25.70	48.30	0	7	17	17	74.30	76.90	25.00	22
23	796	3	355.90	226.80	116.70	74.10	25.80	48.30	0	7	17	17	74.30	77.00	25.10	23
24	795	3	355.20	226.00	116.80	74.20	25.70	48.50	0	7	17	17	74.50	77.10	25.00	24
TOT	24	18822	72													
AVG	784	3	347.12	221.71	113.01	73.82	25.29	48.53					74.08	76.66	24.65	
MAX	800		360.00	233.40	116.80	74.60	25.80	50.30					74.70	77.10	25.10	
MIN	762		323.40	206.10	104.70	73.20	24.30	47.50					73.50	76.30	23.80	

1 NPD RESERVOIR CONTROL CENTER PROJECT- BON BONNEVILLE DAM & LAKE HOURLY OPERATION DATA REPORT THURSDAY MAY 17, 2012															
	----- GROSS GEN MW	BONNEVILLE POWER FLOW KCFS	PH 1 UNIT ON	PH 1 STATUS ON	PH 1 AVL	PH 1 FOREBAY EL FT	----- PROJECT FOREBAY EL FT	BONNEVILLE GROSS GEN MW	PH 2 POWER FLOW KCFS	PH 2 UNIT ON	PH 2 STATUS ON	PH 2 AVL	----- PROJECT SPWY GATES IN USE	MISC FLOW KCFS	HR
1	406	110.70	0	9	09	74.2	74.4	357	98.70	7	07	07	18	12.4	1
2	405	109.20	0	9	09	74.2	74.3	358	98.80	7	07	07	18	12.4	2
3	401	106.80	0	9	09	74.4	74.5	361	99.30	7	07	07	18	12.4	3
4	401	106.90	0	9	09	74.5	74.6	364	100.00	7	07	07	18	12.4	4
5	400	106.20	0	9	09	74.6	74.7	365	100.10	7	07	07	18	12.4	5
6	402	109.00	0	9	09	74.0	74.1	368	101.80	7	07	07	18	12.4	6
7	402	111.50	0	9	09	74.2	74.4	369	103.10	7	07	07	18	12.4	7
8	401	110.80	0	9	09	73.9	74.1	368	102.90	7	07	07	18	12.4	8
9	405	114.30	0	9	09	73.8	74.1	365	102.60	7	07	07	18	12.4	9
10	433	121.70	1	10	10	73.6	73.9	346	97.30	7	07	07	18	12.4	10
11	441	127.80	1	10	10	73.5	73.8	359	102.10	7	07	07	18	12.4	11
12	438	127.00	1	10	10	73.4	73.8	362	103.30	7	07	07	18	12.4	12

13	436	125.80	1	10	10	73.4	73.7	362	103.40	7	07	07	18	12.4	13
14	433	125.80	1	10	10	73.2	73.6	360	103.30	7	07	07	18	12.4	14
15	437	128.80	1	10	10	73.2	73.5	361	104.20	7	07	07	18	12.4	15
16	441	130.40	1	10	10	73.3	73.7	359	103.00	7	07	07	18	12.4	16
17	441	129.90	1	10	10	73.3	73.7	356	102.20	7	07	07	18	12.4	17
18	434	126.40	0	10	10	73.3	73.7	359	103.20	7	07	07	18	12.4	18
19	430	123.70	0	10	10	73.7	74.0	361	103.30	7	07	07	18	12.4	19
20	435	126.40	0	10	10	73.7	74.0	362	103.50	7	07	07	18	12.4	20
21	434	125.10	0	10	10	74.0	74.3	360	102.70	7	07	07	18	12.4	21
22	433	123.40	0	10	10	74.0	74.3	360	101.90	7	07	07	18	12.4	22
23	434	124.10	0	10	10	74.1	74.3	362	102.70	7	07	07	18	12.4	23
24	435	123.60	0	10	10	74.2	74.5	360	102.40	7	07	07	18	12.4	24
TOT	10158							8664							
AVE	423	119.80				73.8	74.1	361	101.91				18	12.4	
MAX	441	130.40				74.6	74.7	369	104.20				18	12.4	
MIN	400	106.20				73.2	73.5	346	97.30				18	12.4	

1 NPD RESERVOIR CONTROL CENTER PROJECT- BON BONNEVILLE DAM & LAKE HOURLY OPERATION DATA REPORT MONDAY MAY 21, 2012																	
	GROSS GEN MW	STA USE MW	----- -- IN KCFS -- TOTAL	OUTFLOW POWER	----- -- SPILL --	EL AT IN FEET FOREBAY	POWERHOUSE + MSL TAILWATR	AVG HEAD FT	SUPR CAP MW	UNIT ON RMT	STATUS ON LINE	AVL	PROJECT FOREBAY ELEV	STEVENSON GAGE ELEV	PROJECT TAILWATER ELEV	16 17 18 19 20 21 22 23 24	HOUR
1	730	3	373.30	216.10	144.80	73.80	26.60	47.20	0	6	16	16	74.00	76.80	26.00	1	
2	724	3	370.30	213.00	144.90	73.50	26.60	46.90	0	6	16	16	73.90	76.80	26.10	2	
3	726	3	371.70	214.50	144.80	73.80	26.60	47.20	0	6	16	16	73.90	76.80	26.10	3	
4	727	3	371.50	214.30	144.80	73.70	26.50	47.20	0	6	16	16	73.90	76.80	26.00	4	
5	731	3	373.10	216.00	144.70	73.70	26.50	47.20	0	6	16	16	73.90	76.80	26.00	5	
6	728	3	373.00	215.80	144.80	73.80	26.50	47.30	0	6	16	16	74.00	76.90	26.00	6	
7	730	3	373.20	215.90	144.90	73.80	26.60	47.20	0	6	16	16	74.00	76.80	26.00	7	
8	741	3	376.80	219.70	144.70	73.60	26.80	46.80	0	7	16	16	73.70	76.80	26.20	8	
9	748	3	380.70	223.90	144.40	73.40	26.80	46.60	0	7	16	16	73.60	76.60	26.20	9	
10	744	3	378.70	221.90	144.40	73.60	26.70	46.90	0	7	16	16	73.70	76.60	26.20	10	
11	746	3	377.70	222.70	142.60	73.40	26.90	46.50	0	7	16	16	73.60	76.60	26.30	11	
12	741	3	376.70	221.50	142.80	73.20	26.80	46.40	0	7	16	16	73.40	76.60	26.30	12	
13	743	3	379.70	223.20	144.10	73.20	26.90	46.30	0	7	16	16	73.40	76.50	26.30	13	
14	736	3	376.50	220.00	144.10	73.10	26.80	46.30	0	7	16	16	73.40	76.40	26.20	14	
15	739	3	380.00	222.50	145.10	73.00	26.90	46.10	0	7	16	16	73.20	76.40	26.40	15	
16	741	3	381.20	224.00	144.80	72.80	27.00	45.80	0	7	16	16	73.00	76.30	26.40	16	
17	736	3	380.50	223.40	144.70	72.80	27.00	45.80	0	7	16	16	73.10	76.20	26.40	17	
18	731	3	378.20	221.10	144.70	73.30	26.70	46.60	0	7	16	16	73.00	76.20	26.20	18	
19	721	3	370.10	213.00	144.70	73.10	26.70	46.40	0	16	16	16	73.10	76.10	26.10	19	
20	716	3	368.50	211.40	144.70	72.90	26.80	46.10	0	16	16	16	72.90	76.10	26.30	20	
21	718	3	369.90	213.10	144.40	72.80	26.90	45.90	0	16	16	16	72.80	75.90	26.20	21	
22	715	3	369.60	213.00	144.20	72.60	26.80	45.80	0	16	16	16	72.70	75.80	26.20	22	
23	713	3	367.20	211.40	143.40	73.10	26.60	46.50	0	16	16	16	73.00	75.90	26.00	23	
24	720	3	339.50	205.30	121.80	73.50	25.90	47.60	0	16	16	16	73.50	76.10	25.30	24	
TOT	17545	72															
AVG	731	3	373.23	217.36	143.47	73.31	26.70	46.61					73.45	76.45	26.14		
MAX	748		381.20	224.00	145.10	73.80	27.00	47.60					74.00	76.90	26.40		
MIN	713		339.50	205.30	121.80	72.60	25.90	45.80					72.70	75.80	25.30		

1 NPD RESERVOIR CONTROL CENTER PROJECT- BON BONNEVILLE DAM & LAKE HOURLY OPERATION DATA REPORT MONDAY MAY 21, 2012																
	----- GROSS GEN MW	BONNEVILLE POWER FLOW KCFS	PH 1 UNIT ON RMT	STATUS ON ON LINE	AVL	PH 1 FOREBAY EL FT	----- PROJECT FOREBAY EL FT	BONNEVILLE GROSS GEN MW	PH 2 POWER FLOW KCFS	UNIT ON ON RMT	STATUS ON ON LINE	AVL	----- PROJECT GATES IN USE	MISC FLOW KCFS	16 17 18 19 20 21 22 23 24	HOUR
1	394	117.30	0	9	09	73.8	74.0	336	98.80	6	07	07	18	12.4	1	
2	393	116.20	0	9	09	73.5	73.9	331	96.80	6	07	07	18	12.4	2	
3	393	117.00	0	9	09	73.8	73.9	333	97.50	6	07	07	18	12.4	3	
4	393	116.50	0	9	09	73.7	73.9	334	97.80	6	07	07	18	12.4	4	
5	395	117.60	0	9	09	73.7	73.9	336	98.40	6	07	07	18	12.4	5	
6	398	119.30	0	9	09	73.8	74.0	330	96.50	6	07	07	18	12.4	6	
7	397	118.70	0	9	09	73.8	74.0	333	97.20	6	07	07	18	12.4	7	
8	396	118.30	0	9	09	73.6	73.7	345	101.40	7	07	07	18	12.4	8	
9	396	119.70	0	9	09	73.4	73.6	352	104.20	7	07	07	18	12.4	9	
10	394	118.30	0	9	09	73.6	73.7	350	103.60	7	07	07	18	12.4	10	
11	392	117.90	0	9	09	73.4	73.6	354	104.80	7	07	07	18	12.4	11	
12	391	117.90	0	9	09	73.2	73.4	350	103.60	7	07	07	18	12.4	12	

13	391	118.50	0	9	09	73.2	73.4	352	104.70	7	07	07	18	12.4	13
14	387	116.40	0	9	09	73.1	73.4	349	103.60	7	07	07	18	12.4	14
15	389	118.10	0	9	09	73.0	73.2	350	104.40	7	07	07	18	12.4	15
16	392	119.20	0	9	09	72.8	73.0	349	104.80	7	07	07	18	12.4	16
17	390	119.30	0	9	09	72.8	73.1	346	104.10	7	07	07	18	12.4	17
18	386	117.60	0	9	09	73.3	73.0	345	103.50	7	07	07	18	12.4	18
19	298	84.60	9	09	09	73.1	73.1	423	128.40	7	07	07	18	12.4	19
20	294	83.50	9	09	09	72.9	72.9	422	127.90	7	07	07	18	12.4	20
21	296	84.40	9	09	09	72.8	72.8	422	128.70	7	07	07	18	12.4	21
22	294	84.20	9	09	09	72.6	72.7	421	128.80	7	07	07	18	12.4	22
23	294	83.60	9	09	09	73.1	73.0	419	127.80	7	07	07	18	12.4	23
24	302	83.30	9	09	09	73.5	73.5	418	122.00	7	07	07	18	12.4	24
TOT	8845							8700							
AVE	369	109.48				73.3	73.4	362	107.89				18	12.4	
MAX	398	119.70				73.8	74.0	423	128.80				18	12.4	
MIN	294	83.30				72.6	72.7	330	96.50				18	12.4	

NPD RESERVOIR CONTROL CENTER HOURLY OPERATION DATA REPORT						PROJECT- BON BONNEVILLE DAM & LAKE WEDNESDAY MAY 23, 2012										
GROSS GEN MW	STA USE MW	----- OUTFLOW ----- -- IN KCFS --			EL AT IN FEET FOREBAY	POWERHOUSE + MSL TAILWATR	AVG HEAD FT	SUPR CAP MW	UNIT ON RMT	STATUS ON LINE	AVL	PROJECT FOREBAY ELEV	STEVENSON GAGE ELEV	PROJECT TAILWATER ELEV	HOUR	
		TOTAL	POWER	SPILL												
1	749	3	377.30	213.00	151.90	74.50	27.00	47.50	0	16	16	16	74.40	77.40	26.30	1
2	750	3	382.30	217.00	152.90	73.80	27.10	46.70	0	16	16	16	73.80	77.10	26.40	2
3	742	3	381.20	216.50	152.30	73.80	27.20	46.60	0	16	16	16	73.80	77.00	26.50	3
4	741	3	381.60	217.00	152.20	73.70	27.20	46.50	0	16	16	16	73.70	76.90	26.50	4
5	738	3	382.20	216.90	152.90	73.70	27.20	46.50	0	16	16	16	73.50	76.70	26.50	5
6	732	3	382.30	216.50	153.40	73.60	27.20	46.40	0	16	16	16	73.40	76.60	26.50	6
7	724	3	378.30	212.40	153.50	73.60	27.10	46.50	0	16	16	16	73.50	76.70	26.50	7
8	723	3	378.20	212.10	153.70	73.50	27.10	46.40	0	16	16	16	73.40	76.70	26.40	8
9	722	3	377.80	211.80	153.60	73.60	27.20	46.40	0	16	16	16	73.50	76.70	26.60	9
10	729	3	380.50	214.40	153.70	73.70	27.30	46.40	0	16	16	16	73.50	76.70	26.60	10
11	727	3	380.00	213.90	153.70	73.80	27.20	46.60	0	16	16	16	73.60	76.80	26.60	11
12	725	3	378.90	212.80	153.70	73.60	27.30	46.30	0	16	16	16	73.50	76.80	26.70	12
13	736	3	384.30	219.90	152.00	73.90	27.10	46.80	0	7	16	16	73.90	76.80	26.60	13
14	734	3	360.90	212.10	136.40	74.50	26.40	48.10	0	7	16	16	74.40	77.10	26.00	14
15	734	3	361.50	210.20	138.90	74.10	26.70	47.40	0	7	16	16	74.30	77.30	26.20	15
16	753	3	379.50	223.40	143.70	74.00	27.00	47.00	0	7	16	16	74.10	77.30	26.40	16
17	751	3	379.20	223.10	143.70	74.00	26.90	47.10	0	7	16	16	74.20	77.90	26.40	17
18	748	3	378.20	221.90	143.90	74.00	26.80	47.20	0	7	16	16	74.30	77.10	26.30	18
19	747	3	376.90	220.60	143.90	74.10	26.90	47.20	0	7	16	16	74.30	77.20	26.30	19
20	757	3	380.70	224.60	143.70	73.90	26.40	47.50	0	7	16	16	74.20	77.10	26.40	20
21	754	3	380.60	224.50	143.70	73.90	26.90	47.00	0	7	16	16	74.20	77.00	26.40	21
22	747	3	378.10	222.00	143.70	73.90	26.80	47.10	0	7	16	16	74.10	77.10	26.30	22
23	745	3	377.80	221.70	143.70	73.90	26.80	47.10	0	7	16	16	74.20	77.10	26.30	23
24	742	3	377.40	221.30	143.70	73.90	26.90	47.00	0	7	16	16	74.10	77.10	26.40	24
TOT	24	17750	72													
AVG		740	3	378.15	217.48	148.27	73.88	26.99	46.89				73.91	77.01	26.42	
MAX		757		384.30	224.60	153.70	74.50	27.30	48.10				74.40	77.90	26.70	
MIN		722		360.90	210.20	136.40	73.50	26.40	46.30				73.40	76.60	26.00	

NPD RESERVOIR CONTROL CENTER HOURLY OPERATION DATA REPORT						PROJECT- BON BONNEVILLE DAM & LAKE WEDNESDAY MAY 23, 2012									
GROSS GEN MW	BONNEVILLE PH 1			PH 1 FOREBAY EL FT	PROJECT FOREBAY EL FT	BONNEVILLE PH 2			UNIT ON RMT	STATUS ON LINE	AVL	----PROJECT----		HOUR	
	POWER FLOW KCFS	ON RMT	ON LINE			GROSS GEN MW	POWER FLOW KCFS	SPWY GATES IN USE				MISC FLOW KCFS			
1	313	84.90	9	09	09	74.5	74.4	436	128.10	7	07	07	18	12.4	1
2	309	85.20	9	09	09	73.8	73.8	441	131.80	7	07	07	18	12.4	2
3	305	84.80	9	09	09	73.8	73.8	437	131.70	7	07	07	18	12.4	3
4	305	85.20	9	09	09	73.7	73.7	436	131.80	7	07	07	18	12.4	4
5	305	85.50	9	09	09	73.7	73.5	433	131.40	7	07	07	18	12.4	5
6	301	85.10	9	09	09	73.6	73.4	431	131.40	7	07	07	18	12.4	6
7	300	83.80	9	09	09	73.6	73.5	424	128.60	7	07	07	18	12.4	7
8	300	84.00	9	09	09	73.5	73.4	423	128.10	7	07	07	18	12.4	8
9	298	83.20	9	09	09	73.6	73.5	424	128.60	7	07	07	18	12.4	9
10	302	84.70	9	09	09	73.7	73.5	427	129.70	7	07	07	18	12.4	10
11	301	84.50	9	09	09	73.8	73.6	426	129.40	7	07	07	18	12.4	11
12	300	84.00	9	09	09	73.6	73.5	425	128.80	7	07	07	18	12.4	12

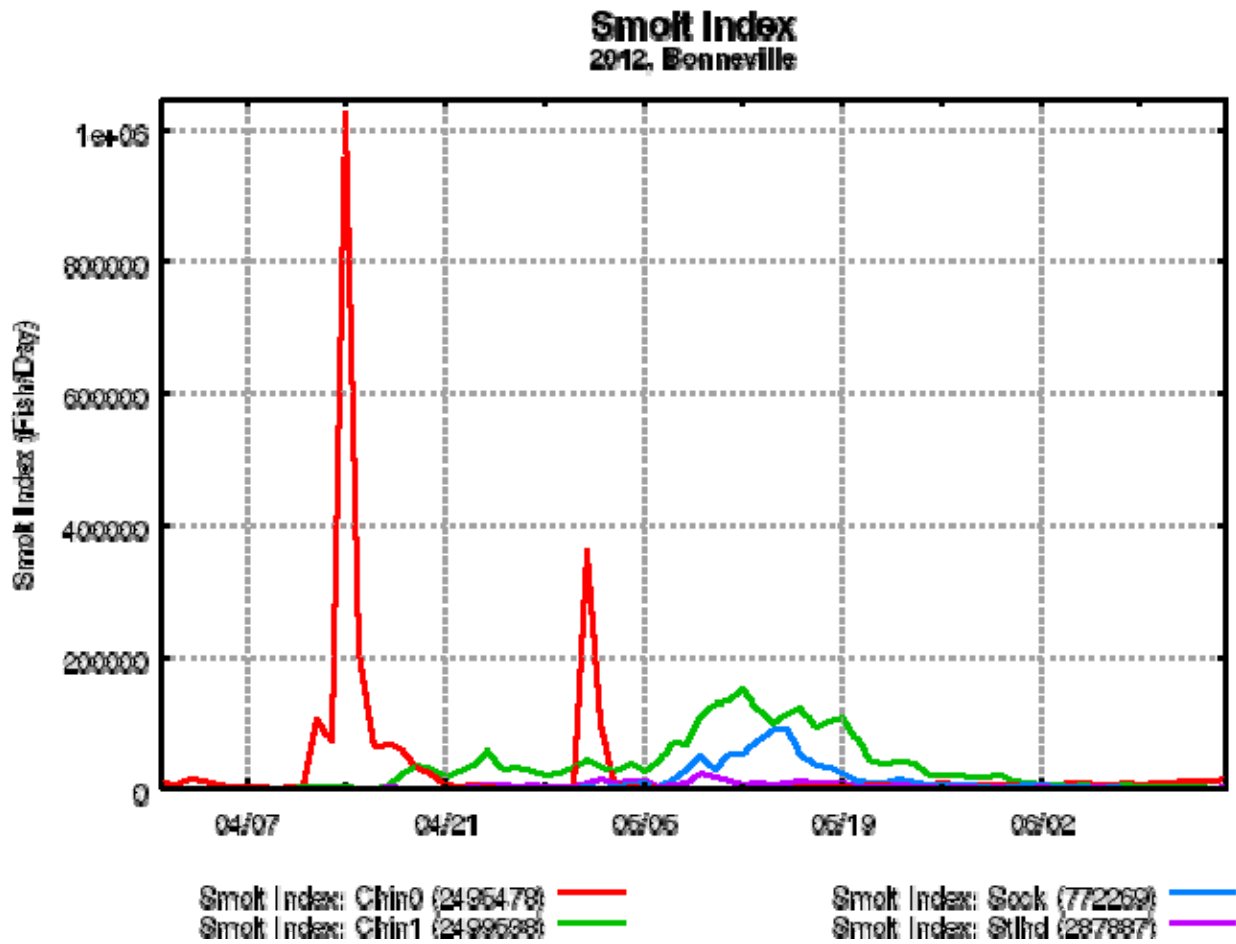
13	362	107.20	0	9	09	73.9	73.9	374	112.70	7	07	07	18	12.4	13
14	387	111.30	0	9	09	74.5	74.4	347	100.80	7	07	07	18	12.4	14
15	391	111.60	0	9	09	74.1	74.3	343	98.60	7	07	07	18	12.4	15
16	407	121.60	0	9	09	74.0	74.1	346	101.80	7	07	07	18	12.4	16
17	405	121.70	0	9	09	74.0	74.2	346	101.40	7	07	07	18	12.4	17
18	401	120.40	0	9	09	74.0	74.3	347	101.50	7	07	07	18	12.4	18
19	400	119.20	0	9	09	74.1	74.3	347	101.40	7	07	07	18	12.4	19
20	405	121.20	0	9	09	73.9	74.2	352	103.40	7	07	07	18	12.4	20
21	403	121.30	0	9	09	73.9	74.2	351	103.20	7	07	07	18	12.4	21
22	399	119.80	0	9	09	73.9	74.1	348	102.20	7	07	07	18	12.4	22
23	399	120.20	0	9	09	73.9	74.2	346	101.50	7	07	07	18	12.4	23
24	397	119.80	0	9	09	73.9	74.1	345	101.50	7	07	07	18	12.4	24
TOT	8395							9355							
AVE	350	101.26				73.9	73.9	390	116.22				18	12.4	
MAX	407	121.70				74.5	74.4	441	131.80				18	12.4	
MIN	298	83.20				73.5	73.4	343	98.60				18	12.4	

1 NPD RESERVOIR CONTROL CENTER PROJECT- BON BONNEVILLE DAM & LAKE																
HOURLY OPERATION DATA REPORT WEDNESDAY JUNE 13, 2012																
	GROSS GEN MW	STA USE MW	----- TOTAL	OUTFLOW -- IN KCFS	----- POWER -- SPILL	EL AT IN FEET	POWERHOUSE + MSL	AVG HEAD FT	SUPR CAP MW	UNIT ON	STATUS ON	PROJECT FOREBAY ELEV	STEVENSON GAGE ELEV	PROJECT TAILWATER ELEV	HR	
1	648	3	350.60	184.90	153.30	74.30	25.60	48.70	0	5	14	14	74.50	77.00	25.10	1
2	644	3	350.10	184.50	153.20	74.20	25.60	48.60	0	5	14	14	74.40	77.00	25.10	2
3	643	3	350.20	184.70	153.10	74.10	25.70	48.40	0	5	14	14	74.10	76.90	25.10	3
4	645	3	351.80	186.50	152.90	74.00	25.60	48.40	0	5	14	14	74.10	76.80	25.20	4
5	643	3	351.20	185.90	152.90	73.90	25.80	48.10	0	5	14	14	74.10	76.80	25.10	5
6	646	3	353.30	188.20	152.70	73.80	25.70	48.10	0	5	14	14	74.00	76.70	25.20	6
7	645	3	354.00	187.80	153.80	73.50	25.90	47.60	0	5	14	14	73.80	76.60	25.30	7
8	640	3	358.50	187.60	158.50	73.50	25.90	47.60	0	5	14	14	73.70	76.50	25.40	8
9	639	3	356.50	185.70	158.40	73.30	25.90	47.40	0	5	14	14	73.70	76.40	25.50	9
10	636	3	356.70	186.20	158.10	73.20	25.90	47.30	0	5	14	14	73.50	76.30	25.50	10
11	625	3	354.00	183.40	158.20	73.90	25.60	48.30	0	4	13	13	74.00	76.50	25.00	11
12	586	3	333.90	163.80	157.70	74.00	25.40	48.60	0	4	13	13	74.20	76.70	24.90	12
13	591	3	337.80	167.20	158.20	74.00	25.50	48.50	0	5	14	14	74.20	76.80	25.00	13
14	627	3	351.40	181.10	157.90	73.90	25.70	48.20	0	5	14	14	74.10	76.80	25.20	14
15	628	3	348.40	178.00	158.00	74.10	25.60	48.50	0	5	14	14	74.20	76.80	25.10	15
16	628	3	346.50	176.10	158.00	74.10	25.60	48.50	0	5	14	14	74.20	76.80	25.10	16
17	630	3	347.50	177.10	158.00	74.10	25.70	48.40	0	5	14	14	74.20	76.80	25.20	17
18	630	3	347.30	176.90	158.00	74.10	25.60	48.50	0	5	14	14	74.20	76.80	25.10	18
19	622	4	342.10	171.60	158.10	74.30	25.50	48.80	0	14	14	14	74.30	76.90	25.10	19
20	622	4	341.50	170.60	158.50	74.50	25.50	49.00	0	14	14	14	74.50	77.00	25.00	20
21	630	4	343.70	172.60	158.70	74.60	25.60	49.00	0	14	14	14	74.60	77.10	25.10	21
22	631	4	344.40	173.20	158.80	74.70	25.70	49.00	70	15	15	15	74.60	77.20	25.20	22
23	681	4	343.50	186.40	144.70	74.60	25.60	49.00	0	15	15	15	74.60	77.20	25.00	23
24	699	4	345.50	193.70	139.40	74.60	25.60	49.00	0	15	15	15	74.70	77.20	25.00	24
TOT	24	15259	78													
AVG		636	3	348.35	180.57	155.38	74.05	25.66	48.40				74.19	76.82	25.15	
MAX		699		358.50	193.70	158.80	74.70	25.90	49.00				74.70	77.20	25.50	
MIN		586		333.90	163.80	139.40	73.20	25.40	47.30				73.50	76.30	24.90	

1 NPD RESERVOIR CONTROL CENTER PROJECT- BON BONNEVILLE DAM & LAKE															
HOURLY OPERATION DATA REPORT WEDNESDAY JUNE 13, 2012															
	----- GROSS GEN MW	BONNEVILLE POWER FLOW KCFS	PH 1 UNIT ON	STATUS ON	PH 1 AVL	PH 1 FOREBAY EL FT	----- PROJECT FOREBAY EL FT	BONNEVILLE GROSS GEN MW	PH 2 POWER FLOW KCFS	UNIT ON	STATUS ON	AVL	----- PROJECT SPWY GATES IN USE	MISC FLOW KCFS	HR
1	412	118.30	0	9	09	74.3	74.5	236	66.60	5	05	05	18	12.4	1
2	411	118.60	0	9	09	74.2	74.4	233	65.90	5	05	05	18	12.4	2
3	410	118.70	0	9	09	74.1	74.1	233	66.00	5	05	05	18	12.4	3
4	410	119.60	0	9	09	74.0	74.1	235	66.90	5	05	05	18	12.4	4
5	409	119.50	0	9	09	73.9	74.1	234	66.40	5	05	05	18	12.4	5
6	410	121.00	0	9	09	73.8	74.0	236	67.20	5	05	05	18	12.4	6
7	412	121.20	0	9	09	73.5	73.8	233	66.60	5	05	05	18	12.4	7
8	411	121.70	0	9	09	73.5	73.7	229	65.90	5	05	05	18	12.4	8
9	414	120.70	0	9	09	73.3	73.7	225	65.00	5	05	05	18	12.4	9
10	413	121.50	0	9	09	73.2	73.5	223	64.70	5	05	05	18	12.4	10
11	405	119.80	0	9	09	73.9	74.0	220	63.60	4	04	04	18	12.4	11
12	403	111.90	0	9	09	74.0	74.2	183	51.90	4	04	04	18	12.4	12



13	402	113.00	0	9	09	74.0	74.2	189	54.20	5	05	05	18	12.4	13
14	405	117.80	0	9	09	73.9	74.1	222	63.30	5	05	05	18	12.4	14
15	394	111.70	0	9	09	74.1	74.2	234	66.30	5	05	05	18	12.4	15
16	384	107.10	0	9	09	74.1	74.2	244	69.00	5	05	05	18	12.4	16
17	386	107.90	0	9	09	74.1	74.2	244	69.20	5	05	05	18	12.4	17
18	384	107.20	0	9	09	74.1	74.2	246	69.70	5	05	05	18	12.4	18
19	319	85.60	9	09	09	74.3	74.3	303	86.00	5	05	05	18	12.4	19
20	316	84.30	9	09	09	74.5	74.5	306	86.30	5	05	05	18	12.4	20
21	321	85.50	9	09	09	74.6	74.6	309	87.10	5	05	05	18	12.4	21
22	318	84.80	9	09	09	74.7	74.6	313	88.40	6	06	06	18	12.4	22
23	315	83.50	9	09	09	74.6	74.6	366	102.90	6	06	06	18	12.4	23
24	317	84.70	9	09	09	74.6	74.7	382	109.00	6	06	06	18	12.4	24
TOT	9181							6078							
AVE	383	108.57				74.1	74.2	253	72.00				18	12.4	
MAX	414	121.70				74.7	74.7	382	109.00				18	12.4	
MIN	315	83.50				73.2	73.5	183	51.90				18	12.4	



Columbia River DART  
School of Aquatic & Fishery Sciences  
University of Washington  
<http://www.cbr.washington.edu/dart/dart.html>

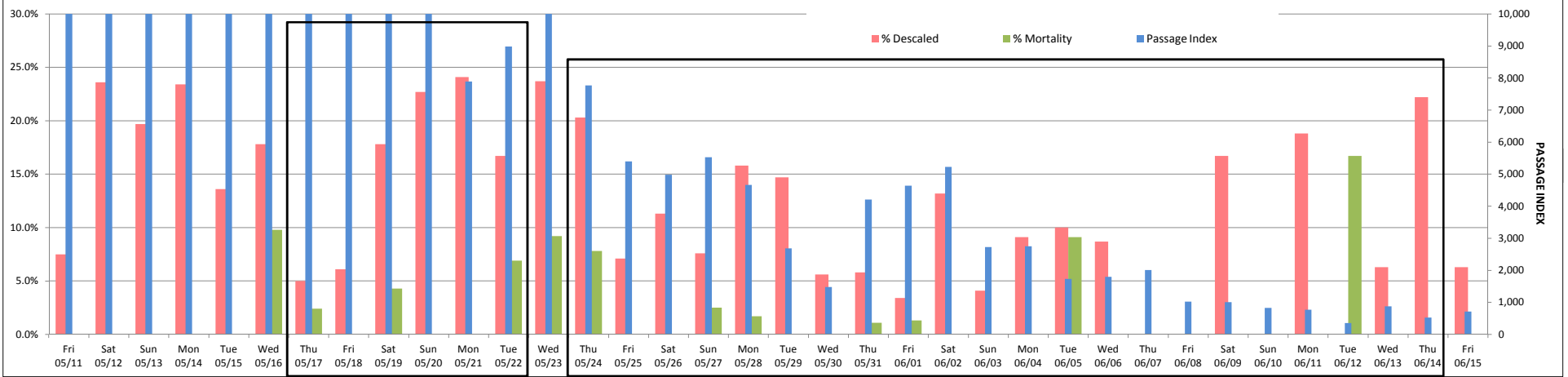
**Sockeye**

JDA					BON				
Sample Date	Passage Index	Sample Size	% Descaled	% Mortality	Passage Index	Sample Size	% Descaled	% Mortality	Fish Passed PH2 @ ≤ Mid-Point of 1% Operating Range?
Fri 05/11/12	33,897	294	3.1%		55,338	134	7.5%		No
Sat 05/12/12	38,141	297	2.7%		55,150	127	23.6%		No
Sun 05/13/12	36,443	287	9.1%		70,663	178	19.7%		No
Mon 05/14/12	20,103	171	2.9%		89,476	201	23.4%		No
Tue 05/15/12	15,389	133	6.0%		91,626	206	13.6%		No
Wed 05/16/12	27,847	564	8.3%	1.2%	53,803	185	17.8%	9.8%	No
Thu 05/17/12	33,120	332	6.3%	1.2%	36,158	80	5.0%	2.4%	Partial Op began on 5/16 at 12:00 = 19 of 24 hours sampled at ≤ mid-point (12:00 5/16-07:00 5/17)
Fri 05/18/12	34,894	566	8.1%	0.4%	32,081	66	6.1%	0.0%	Yes
Sat 05/19/12	25,782	289	9.7%	0.3%	24,739	45	17.8%	4.3%	Yes
Sun 05/20/12	11,903	140	7.9%	1.4%	13,558	44	22.7%	0.0%	Yes
Mon 05/21/12	15,998	186	11.3%	0.5%	7,892	29	24.1%	0.0%	Yes
Tue 05/22/12	14,200	346	7.5%	1.1%	8,987	54	16.7%	6.9%	Partial Op ended on 5/21 at 18:00 = 11 of 24 hours sampled at ≤ mid-point (07:00-18:00)
Wed 05/23/12	15,472	259	10.0%	1.1%	13,699	59	23.7%	9.2%	No
Thu 05/24/12	13,827	381	5.0%	1.6%	7,774	59	20.3%	7.8%	Partial Op began on 5/23 at 12:00 = 19 of 24 hours sampled at ≤ mid-point (12:00 5/23-07:00 5/24)
Fri 05/25/12	12,714	198	7.1%	2.9%	5,402	28	7.1%	0.0%	Yes
Sat 05/26/12	9,997	182	4.9%	1.6%	4,981	53	11.3%	0.0%	Yes
Sun 05/27/12	6,520	124	5.6%	0.8%	5,527	79	7.6%	2.5%	Yes
Mon 05/28/12	5,421	122	3.3%	1.6%	4,662	57	15.8%	1.7%	Yes
Tue 05/29/12	4,128	186	7.0%	2.6%	2,683	34	14.7%	0.0%	Yes
Wed 05/30/12	7,784	137	2.9%	0.0%	1,483	36	5.6%	0.0%	Yes
Thu 05/31/12	4,891	78	10.3%	1.3%	4,208	52	5.8%	1.1%	Yes
Fri 06/01/12	4,930	93	7.5%	2.1%	4,637	59	3.4%	1.3%	Yes
Sat 06/02/12	2,871	59	10.2%	1.7%	5,228	68	13.2%	0.0%	Yes
Sun 06/03/12	2,811	55	9.1%	0.0%	2,724	73	4.1%	0.0%	Yes
Mon 06/04/12	1,948	35	14.3%	0.0%	2,752	22	9.1%	0.0%	Yes
Tue 06/05/12	3,479	66	4.5%	1.5%	1,731	10	10.0%	9.1%	Yes
Wed 06/06/12	2,605	60	6.7%	1.6%	1,800	23	8.7%	0.0%	Yes
Thu 06/07/12	1,837	42	11.9%	0.0%	2,006	21	0.0%	0.0%	Yes
Fri 06/08/12	1,399	31	9.7%	3.1%	1,027	12	0.0%	0.0%	Yes
Sat 06/09/12	690	16	0.0%	0.0%	1,007	12	16.7%	0.0%	Yes
Sun 06/10/12	1,084	23	4.4%	0.0%	829	15	0.0%	0.0%	Yes
Mon 06/11/12	849	27	18.5%	6.9%	773	16	18.8%	0.0%	Yes
Tue 06/12/12	784	25	12.0%	3.8%	355	5	0.0%	16.7%	Yes
Wed 06/13/12	532	14	7.1%	6.7%	875	16	6.3%	0.0%	Yes
Thu 06/14/12	621	20	5.0%	4.8%	523	9	22.2%	0.0%	Partial Op ended on 6/13 at 18:00 = 11 of 24 hours sampled at ≤ mid-point (07:00-18:00)
Fri 06/15/12	331	8	0.0%	0.0%	716	16	6.3%	0.0%	
Sat 06/16/12	656	20	15.0%	0.0%	65	1	na	100.0%	
Sun 06/17/12	337	8	12.5%	0.0%	397	9	0.0%	0.0%	
Mon 06/18/12	292	16	6.3%	5.9%	312	5	20.0%	0.0%	
Tue 06/19/12	50	1	0.0%	0.0%	189	3	33.3%	0.0%	
Wed 06/20/12	151	9	11.1%	0.0%	340	4	0.0%	0.0%	
Thu 06/21/12	29	1	0.0%	0.0%	84	1	0.0%	0.0%	
Fri 06/22/12	56	3	0.0%	0.0%	106	1	0.0%	0.0%	
Sat 06/23/12	117	4			0				
Sun 06/24/12	137	4			0				

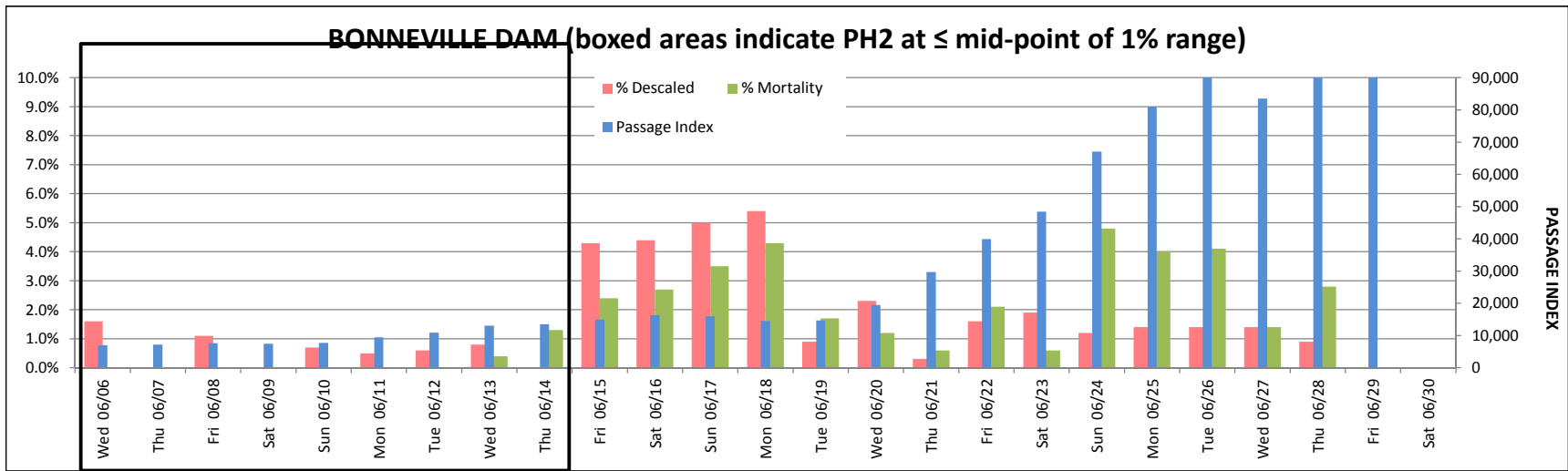
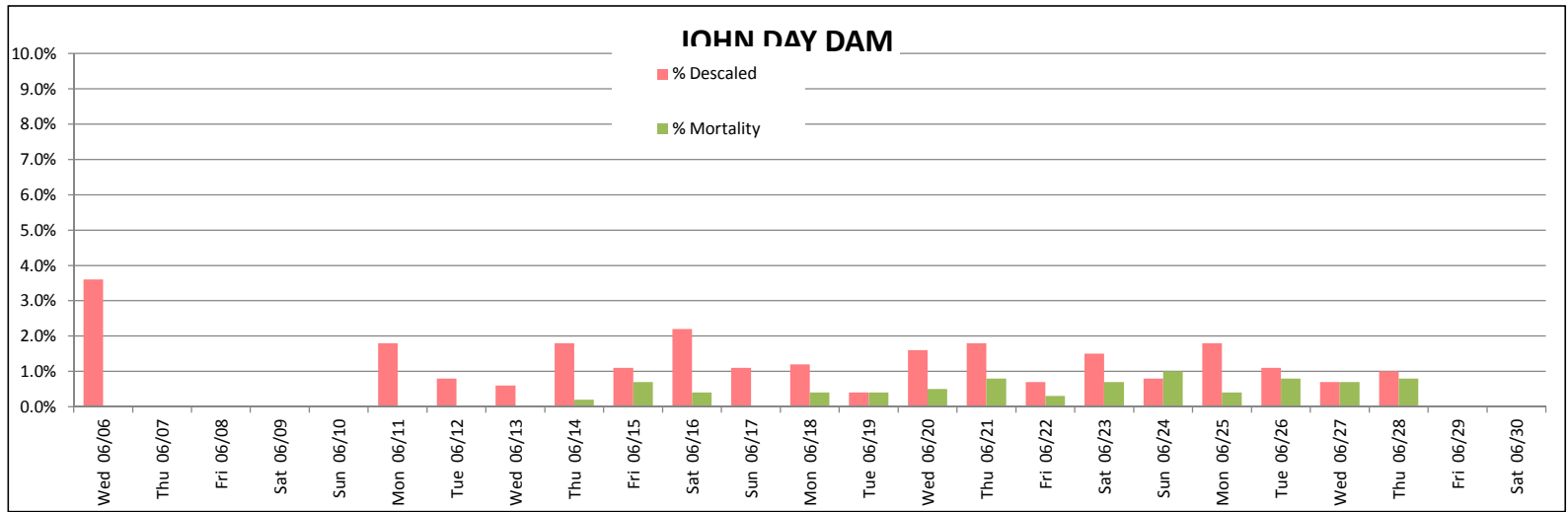
### JOHN DAY DAM



### BONNEVILLE DAM (boxed areas indicate PH2 at ≤ mid-point of 1% range)







## Smolt Index (Fish/Day)

proj:Bonneville year:2012

Date,	Chin0,	Chin1,	Sock,	Stlhd,
04/01,	9155,	962,	,	11,
04/02,	6322,	509,	,	24,
04/03,	15505,	651,	,	,
04/04,	11203,	516,	,	76,
04/05,	4969,	538,	,	61,
04/06,	3117,	434,	,	111,
04/07,	3375,	529,	11,	121,
04/08,	2700,	818,	,	74,
04/09,	1219,	872,	,	158,
04/10,	2170,	1185,	22,	210,
04/11,	3446,	1588,	,	160,
04/12,	104842,	2267,	,	249,
04/13,	73614,	2356,	,	286,
04/14,	1024655,	1549,	,	,
04/15,	205979,	611,	,	611,
04/16,	62483,	1096,	,	783,
04/17,	65909,	5794,	,	1593,
04/18,	58668,	24805,	,	557,
04/19,	32317,	36696,	,	580,
04/20,	21229,	30809,	,	388,
04/21,	4853,	17314,	131,	262,
04/22,	4077,	25752,	134,	563,
04/23,	4827,	37098,	138,	3034,
04/24,	2596,	58994,	144,	4616,
04/25,	1415,	29596,	144,	5024,
04/26,	1727,	34532,	,	4317,
04/27,	797,	28094,	199,	4981,
04/28,	3209,	22265,	201,	2006,
04/29,	1172,	24107,	,	3774,
04/30,	759,	34236,	1043,	4457,
05/01,	359100,	45317,	1972,	9430,
05/02,	100995,	31953,	571,	13696,
05/03,	8716,	28052,	2842,	10481,
05/04,	3907,	38562,	7135,	11891,
05/05,	1486,	27243,	9081,	13209,
05/06,	4033,	41071,	3697,	1781,
05/07,	990,	68283,	14349,	5938,
05/08,	1339,	66807,	31692,	9820,
05/09,	1506,	109478,	51186,	24110,
05/10,	384,	131269,	30704,	18039,
05/11,	387,	132350,	55338,	13545,
05/12,	403,	152162,	55150,	5636,
05/13,	1115,	124734,	70663,	8478,
05/14,	1221,	100050,	89476,	6508,
05/15,	,	116247,	91626,	8072,
05/16,	2459,	123519,	53803,	11773,
05/17,	1766,	95248,	36158,	8381,
05/18,	2433,	102070,	32081,	9234,
05/19,	3158,	110540,	24739,	8950,
05/20,	3355,	75693,	13558,	2897,
05/21,	5147,	43496,	7892,	3406,
05/22,	5681,	39513,	8987,	4494,
05/23,	6318,	41097,	13699,	5200,
05/24,	4059,	39629,	7774,	3646,
05/25,	5787,	22378,	5402,	1543,
05/26,	7840,	20753,	4981,	1384,

05/27,	5429,	20384,	5527,	3625,
05/28,	4904,	18168,	4662,	2170,
05/29,	5129,	17045,	2683,	1105,
05/30,	5840,	20696,	1483,	1735,
05/31,	7384,	12704,	4208,	1509,
06/01,	6052,	8253,	4637,	1493,
06/02,	6612,	6996,	5228,	1691,
06/03,	5941,	6933,	2724,	1491,
06/04,	8038,	3911,	2752,	797,
06/05,	9440,	4563,	1731,	629,
06/06,	6996,	3397,	1800,	1519,
06/07,	7187,	4262,	2006,	585,
06/08,	7616,	4792,	1027,	1284,
06/09,	7468,	2098,	1007,	1091,
06/10,	7738,	1910,	829,	1194,
06/11,	9440,	2662,	773,	1486,
06/12,	10897,	1707,	355,	705,
06/13,	13063,	1898,	875,	613,
06/14,	13487,	1508,	523,	928,
06/15,	14923,	1564,	716,	1608,



Table 1. Passage and survival at Bonneville Dam in 2010. Survival estimates represent survival from passage at Bonneville to the mouth of the Willamette River.

Route of Passage	Yearling Chinook		Steelhead		Subyearling Chinook	
	Survival	Passage	Survival	Passage	Survival	Passage
B2-JBS	0.992	0.081	0.988	0.078	0.976	0.042
B2CC	1.003	0.186	0.988	0.300	0.970	0.090
B2-Turb	0.969	0.157	0.923	0.167	0.936	0.127
B1-Turb	0.999	0.038	0.910	0.034	0.967	0.165
B1-ITS	0.991	0.019	0.974	0.023	0.942	0.057
Spillway	0.947	0.519	0.951	0.398	0.930	0.519
Dam	0.967		0.959		0.943	



## FISH PASSAGE CENTER

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### MEMORANDUM

TO: Dave Statler, NPT  
Dave Wills, USFWS  
Charles Morrill, WDFW

FROM: Michele DeHart

DATE: June 7, 2012

RE: Juvenile Fish Mortality Estimates for Bonneville Second Powerhouse Bypass

In response to your request we have used the smolt monitoring information collected at the Bonneville PH2 bypass system to calculate the total mortality and descaling that has occurred in the juvenile salmon population passing through this bypass system thus far this year. The estimates were developed for the time period from March 2, 2012 to May 30, 2012 for the real-time project operations.

- A total of 52,496 juvenile salmonid mortalities occurred during the operation of the Bonneville PH2 juvenile bypass system through May 30, 2012. The passage through the PH2 juvenile bypass system represents a subset of the total mortality of juvenile salmonids that died as a result of passing Bonneville Dam.
- An additional total of 73,299 juvenile salmonids were descaled during the operation of the Bonneville PH2 juvenile bypass system through May 30, 2012. The expected mortality on these fish could be as high as 75%, converting to a loss of an additional 54,974 juvenile salmon.
- Based on average Bonneville to Bonneville smolt to adult returns collected since 2000, the juvenile mortalities at Bonneville PH2 convert to an expected loss of 1,106 adults

and up to an additional 1,169 adults from the descaled juveniles using the 75% loss conversion estimate.

- To provide a relative perspective, this represents an equivalent percentage of the adult population passing through May 30<sup>th</sup> that was estimated to be removed by sea lions below Bonneville Dam in 2012.
- Although the action agencies routinely exceeded the FOP TDG criteria for the purpose of involuntary spill (lack of market or excess hydraulic capacity), the Action Agencies would not agree to additional voluntary spill to avoid powerhouse passage (to improve fish survival) during the Spring Creek National Fish Hatchery releases, or during passage of juvenile sockeye.
- Adopting a strategy of provision of additional spill for fish passage and decreasing the operation of the turbines at the powerhouse to the mid to low end of the 1% efficiency, could have improved juvenile survival, and adult return, by reducing the number of fish passing through the Bonneville PH2.

## **Background**

Some level of mortality and descaling occurs at every hydro-electric project bypass system. However, over the past years the mortality and descaling rates have been elevated at Bonneville PH2. The high juvenile mortality and descaling rates were first noted in 2008 after changes were made to the juvenile bypass system at PH2 to improve the proportion of fish passing through the system. A study conducted by Hughes et al. (2011) obtained information on velocity measurements near the screens. The study revealed approach velocities exceeding recommended criteria intended to improve fish passage conditions. The authors concluded that the turbulence in the gate well region in proximity to the VBS when PH2 was operated at the upper 1% efficiency range could be expected to result in suboptimal fish passage conditions. The high velocities and turbulent conditions could cause impingement, impact, or descaling of juvenile salmonids before they exit through the orifice into the juvenile fish bypass channel. In addition, the powerhouse turbine unit discharge rate directly affected the velocity distribution as well as the turbulence conditions in the gate well. Both the velocity and the turbulence increase as the operation within the 1% efficiency range increases. Results of this COE funded study revealed that the approach velocities in the gate wells exceeded criteria intended to improve fish passage conditions recommended by National Marine Fisheries Service and the Washington State Department of Fish and Wildlife.

Based on what is known about the hydraulic turbulence in the bypass of Bonneville PH2, the best condition for fish passage survival would be to operate PH2 at the low end of the 1% operating range. In 2012, the fishery agencies and tribes recognized the high flows this year and addressed the potential for mortality at Bonneville PH2, which increases as operation includes the upper range of the 1% efficiency, by requesting that the Action Agencies cap PH2 at the mid-point of the 1% best efficiency range. The Action Agencies would not implement the request because the operation would result in additional voluntary spill in excess of the involuntary spill that was already exceeding the gas cap. The Action Agencies implemented the following flow neutral operations that at times resulted in operation near the midpoint of

the 1% efficiency, but also included operating above the 50% range of the 1% and operating PH1 above the 1% efficiency range:

1. Bonneville (BON) PH2 units will be operated at the 25% of the 1% operating range;
2. To pass additional flows, operate powerhouse 1 (PH1) units up to the 100% (full capacity) of the 1% operating range;
3. To pass additional flows after PH1 is fully loaded, increase PH2 units one at a time in the order of priority within 25-50% of the 1% operating range;
4. To pass additional flow after PH1 is fully loaded and all available PH2 units are operating at 50%, increase operation of PH1 units up to best geometry;
5. To pass additional flow after all available PH1 units are operating at best geometry; increase PH2 units one at a time in the order of priority within 50-75% of the 1% operating range;
6. To pass additional flow after all available PH2 units are operating at 75%, decrease PH1 unit operation to 100% of the 1% operating range and increase PH2 units one at a time in the order of priority within 75-100% of the 1% operating range.

### **Juvenile Mortality and Descaling**

The mortality and descaling measurements described in this memo were obtained during the implementation of the Action Agencies recommended flow neutral operation of Bonneville Dam. The daily mortality estimates have ranged from 0% to 33%, and the descaling estimates have ranged from 0% to 25%.

Condition sampling occurs daily as part of the SMP sampling. The primary role of the condition monitoring is to identify the proportion of each species of migrant juvenile salmon that are descaled or have significant injuries indicative of problems in fish passage at dams such as debris in the fish bypass apparatus or mechanical issues. In the condition monitoring, a distinction is made between fish that are descaled and fish that are descaled with concurrent injuries or predator marks. While a fish that is descaled while passing through the bypass system can also display injuries or predation marks that are independent of its descaling, the distinction is made in the SMP condition monitoring to be conservative. In addition, effort is made to assure that only recent injury and descaling data are reported to eliminate descaling or injuries that were likely not to have occurred at the dam where the fish are being examined.

In order to determine the mortality that occurred by species for fish passing through the Bonneville PH2 bypass system, the daily sample was expanded by the daily sample rate to obtain a daily collection (number of fish passing Bonneville PH2 bypass). The daily collection was then multiplied by the daily sample mortality rate and the estimates were summed over the time period. (Daily collection, mortality and descaling data are available at [www.fpc.org](http://www.fpc.org)). Table 1 displays the total mortalities in the Bonneville Powerhouse 2 bypass collection when mortality rate from the sample was expanded to the total collection on a daily basis.

**Table 1.** Expanded juvenile fish mortalities at Bonneville Dam PH2 bypass in 2012.

<b>Species</b>	Average Percent Mortality	PH 2 Bypass Mortalities
<b>Chinook subyearling</b>	2.4%	18,221
<b>Chinook yearling</b>	1.9%	14,958
<b>Coho</b>	0.7%	1,028
<b>Sockeye</b>	7.2%	17,976
<b>Steelhead</b>	0.4%	313

A total of 52,496 juvenile salmon mortalities occurred in the Bonneville PH2 juvenile bypass system thus far in 2012.

Table 2 displays the total number of descaled fish that were estimated passing through the PH2 bypass system after the daily estimates were summed over the time period in the same way that mortalities were estimated. It is difficult to assess the impact of descaling on the future survival of juvenile salmonids. However, there is considerable evidence stating that descaling injuries have serious implications to stress related indicators and osmoregulatory ability (Congleton et al., 1998; Zydlewski et al., 2010). Evidence suggests that impairing the osmoregulatory performance during smolting compromises the long-term survival of descaled smolts subsequently entering seawater.

Bouck and Smith (1979) concluded that the loss of scales during or immediately before a saltwater challenge is a very real threat to the life of a salmonid smolt. Removal of slime and scales from 25% of the body area of coho smolts caused no deaths in fresh water, but 75% mortality within 10 days in seawater. Since smolts at Bonneville will generally enter seawater within a few days of leaving the project, this 75% mortality estimate could be used to describe the potential mortality associated with this descaled population from Bonneville PH2 bypass system.

**Table 2.** Expanded juvenile fish descaled at Bonneville Dam PH2 bypass in 2012.

<b>Species</b>	Average Percent Descaled	PH 2 Bypass Descaled
<b>Chinook subyearling</b>	0.1%	686
<b>Chinook yearling</b>	4.3%	30,729
<b>Coho</b>	2.3%	2,053
<b>Sockeye</b>	15.2%	38,042
<b>Steelhead</b>	2.8%	1,789

Therefore, using the 75% mortality estimate and applying it to the total number of descaled fish yields the possibility that an estimated 54,974 additional juvenile salmonid mortalities could be attributed to the passage through the Bonneville PH2 bypass.

### Conversion to Adult Equivalents

The Bonneville to Bonneville smolt to adult return estimates were calculated for PIT tagged spring Chinook and steelhead smolts arriving at Bonneville dam for seven years between 2000 and 2009; with the exception of 2001, 2004 and 2005. These years were not included because: 1) there were relatively few detections of fish at BON in those years and, 2) the smolt hydrosystem experiences (i.e., number of bypass events) was higher in those years due to the elimination of spill. In these analyses, adult returns are all adults, including jacks. The SARs for wild and hatchery combined spring Chinook ranged from 1 to 4.1%, with an average of 2.1% and, for wild and hatchery combined steelhead the SARs ranged from 1.4 to 6.0%, with an average of 3.2%. (Table 3 and 4, Steve Haeseker, USFWS, personal communication).

**Table 3.** Estimated smolt to adult return rates for PIT tagged juvenile wild and hatchery Chinook detected at Bonneville Dam.

Wild and hatchery Chinook			
Year	Smolts	Adults	SAR
2000	10436	382	0.037
2002	15363	231	0.015
2003	15551	123	0.008
2006	8385	113	0.013
2007	17373	222	0.013
2008	8135	336	0.041
2009	15971	274	0.017
Average			0.021

**Table 4.** Estimated smolt to adult return rates for PIT tagged juvenile wild and hatchery Chinook detected at Bonneville Dam.

Wild and hatchery steelhead			
Year	Smolts	Adults	SAR
2000	2957	115	0.039
2002	3335	87	0.026
2003	3801	52	0.014
2006	1201	30	0.025
2007	2170	68	0.031
2008	11491	687	0.060
2009	16232	473	0.029
Average			0.032

For this analysis the average Chinook SAR was applied to yearling Chinook, subyearling Chinook, coho and sockeye and the combined steelhead SAR was applied to the juvenile population of steelhead. Table 5 shows the loss of fish in terms of adult equivalents that would be expected based on the juvenile mortality estimates at Bonneville PH2.

**Table 5.** Expanded juvenile fish mortalities to adult equivalents at Bonneville Dam PH2 bypass in 2012.

Species	Juvenile Mortalities	Adult Equivalents
<b>Subyearling Chinook</b>	18,221	383
<b>Yearling Chinook</b>	14,958	314
<b>Coho</b>	1,028	22
<b>Sockeye</b>	17,976	377
<b>Steelhead</b>	313	10
<b>Total</b>		<b>1,106</b>

A total of 1106 adult equivalents could be lost from the returning adult population to Bonneville Dam of spring/summer and fall Chinook, coho, sockeye and steelhead combined based on the juvenile mortalities at this project through May 30, 2012. The impact of juvenile passage at Bonneville PH2 bypass system will have the greatest impact on the returning adult populations of Chinook and sockeye.

Table 6 shows the loss of fish in terms of adult equivalents that would be expected based on the juvenile descaling estimates at Bonneville PH2 bypass system, with a conversion rate of 75% mortalities based on Bouck and Smith (1979). The same average smolt to adult conversion rates were then applied to the juvenile mortalities to yields the adult equivalents.

**Table 6.** The number juvenile fish descaled expanded to adult equivalents at Bonneville Dam PH2 bypass in 2012, using a 75% conversion of descaling to mortality.

<b>Species</b>	<b>Juvenile Mortalities</b>	<b>Adult Equivalents</b>
<b>Subyearling Chinook</b>	686	11
<b>Yearling Chinook</b>	30,729	484
<b>Coho</b>	2,053	32
<b>Sockeye</b>	38,042	599
<b>Steelhead</b>	1,789	43
<b>Total</b>		<b>1,169</b>

A total of 1,169 adult equivalents could be lost from the returning adult population to Bonneville Dam of spring/summer and fall Chinook, coho, sockeye and steelhead combined based on the juvenile descaling rates and projected mortalities at this project through May 30, 2012. The impact of juvenile passage at Bonneville PH2 bypass system will have the greatest impact on the returning adult populations of spring/summer Chinook and sockeye due to the high descaling rates on these populations.

To put the number of adult equivalents that will not return to Bonneville Dam based on the juvenile mortality data in 2012 from PH2 bypass system passage, we used the percentage of adult salmonids consumed by sea lions below Bonneville Dam in 2012. Although the data are still preliminary the *Columbia Basin Bulletin (June 1, 2012)*, reports that it appears the overall predation expanded estimate will be about 1.3 percent of the January 1 through May 31 salmonid run. The expected final adjusted estimate (for unidentified prey and night time predation) will be slightly higher. While the juvenile salmon represents more species, if we were for illustrative purposes to take the total number of adult equivalents from both mortalities and descaling (2,275) at the Bonneville PH2 juvenile bypass system and divide it to the total number of



salmonid adults that have passed Bonneville Dam through May 30<sup>th</sup> (169,219) it would also equal 1.3% of the 2012 adult salmon run to May 30, 2012.

### **Total Dissolved Gas Effects**

You also requested that we attempt to quantify what the change in total dissolved gas levels would have been if the COE did not reject the recommendation based on the need to provide a flow neutral implementation of operations. You also asked if we could translate those effects into estimated juvenile mortalities that might have occurred from such an operation of increased spill levels. It is difficult to estimate the exact change in flow that would have had to be added to spill in order to operate PH2 at the middle and lower end of the 1% efficiency range, since it is dependent on the project head (the difference in elevation between the forebay and tailwater). A lower head characterizes the condition when there is high flow through the project and at a lower head; it requires that less water be spilled. We chose to do the analysis based on the information shared by the COE at the Technical Management Team call on May 30<sup>th</sup>, operating at the mid-point of the 50% range requires a reduction in flow of 25 Kcfs, while operating to the 25% of the 1% operating range reduces flow through the powerhouse by 36 Kcfs. These data are for a lower flow than occurred in late April to mid-May, but should mean that the analysis is very conservative.

The analysis used the Cascade Island tailrace gage to measure water quality compliance. We recognize that the COE uses both the Camas/Washougal and Cascade Island tailrace gage to measure compliance, however, neither the State of Oregon nor the State of Washington require the use of the Camas/Washougal gage. The use of the Camas/Washougal gage as mimicking the next downstream forebay is recognized as being problematic because other factors, such as temperature and biological processes that produce oxygen, affect the concentration of TDG at this gage. While reductions of spill upstream will decrease the TDG at this gage, the spill itself is not responsible for the excursions beyond 115%.

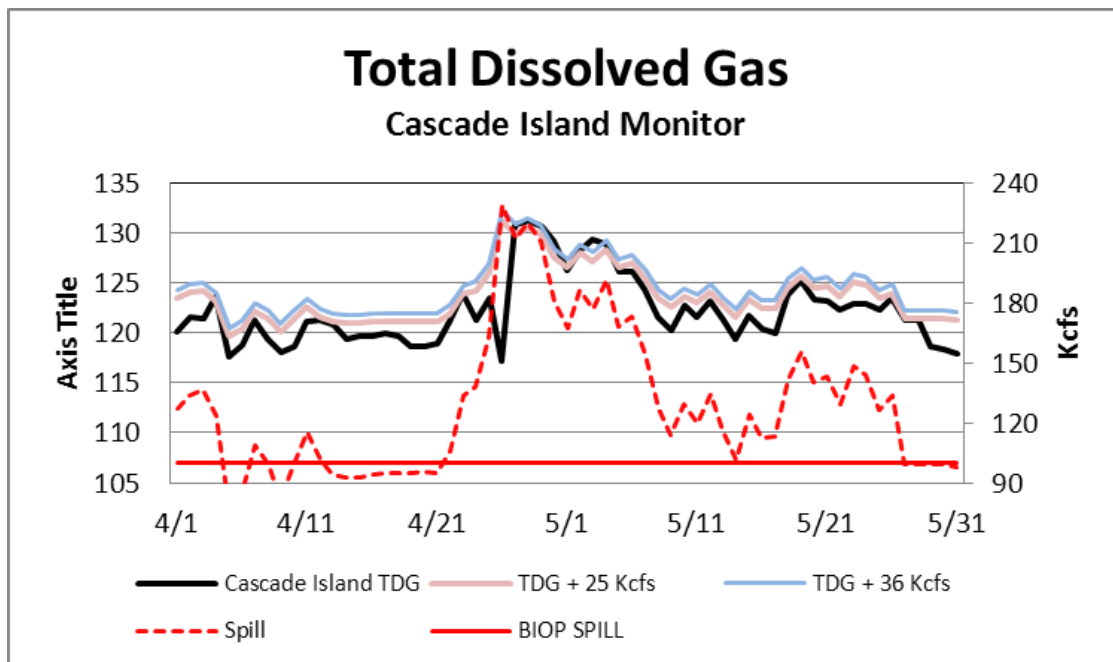
Using the data from 2012 through May 31<sup>st</sup> was developed an exponential regression model to predict the Cascade Island gage TDG from spill at Bonneville Dam. The Cascade gage has not been operational for most of the time period considered this year, but the COE is providing estimated modeled TDG. Using the COE data we developed the following equation ( $R^2 = 0.65$ ):

$$TDG = 112.71e^{(0.0005 * BonSpill)},$$

The actual and predicted TDG under the various operations are shown in Table 7. As can be observed in Table 7 and in Figure 1 the majority of time spill at Bonneville was already in excess of the BIOP spill levels for most of the time period considered. The increases in spill of 25 and 36 Kcfs did cause the tailrace TDG to exceed the 120% level on more days in the 61 day period, but rarely did the TDG levels exceed the 125%. Again, these are conservative estimates and are based on the reductions stated by the COE on the May 30<sup>th</sup> TMT conference call. On average, the TDG increase was 1.4% at 25 Kcfs additional spill to 2.2% with an additional 36 Kcfs spill.

**Table 7.** Actual versus estimated spill and TDG for conditions that might have occurred if the Bonneville PH2 was operated at the mid or lower end of the 1% efficiency range.

Operation	Spill	TDG	Number of Days Cascade Island Gage Exceeded out of 61 Days:		
			120%	125%	130%
Actual	130.4 Kcfs Range: 74.6-229.1 Kcfs	122.3% Range: 117.1-131.2%	42	10	3
+ 25 Kcfs Spill	155.4 Kcfs Range: 99.6-254.1 Kcfs	123.8% Range: 119.7-131.3%	60	12	3
+36 Kcfs Spill	166.4 Kcfs Range: 110.6-265.1 Kcfs	124.6% Range: 120.4-132.1%	61	16	4



**Figure 1.** Actual spill compared to the Biological Opinion level of 100 Kcfs, and actual total dissolved gas concentrations compared to the modeled concentrations for two increased levels of spill.

The increased spill from the operation of Bonneville PH2 to the 25% or 50% of the 1% efficiency range would likely have caused no additional mortality to the juvenile fish population passing Bonneville Dam from gas bubble trauma. The gas bubble trauma monitoring program has demonstrated that few fish are observed with signs of GBT until TDG levels approach and are sustained for a period of time at levels above 130%. The operation as described above would

only have resulted in one additional day when the TDG at Cascade Island would have been above the 130% level, and we are most likely over-estimating the change in TDG because at these already high flows the additional spill would have been considerably less than the 25 or 36 Kcfs we modeled.

In summary, the operation of Bonneville PH2 as occurred in 2012 through May 30<sup>th</sup> imposed considerable mortality on juvenile fish passing through this bypass. It is likely that fish operations requested for operating this project at the low end of the 1% operating range would have reduced both the direct mortalities that occurred and the descaling levels, while likely imposing little or no additional mortality due to the levels of total dissolved gas that were predicted to occur with increased spill levels.

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10 January 2005

To: David Clugston

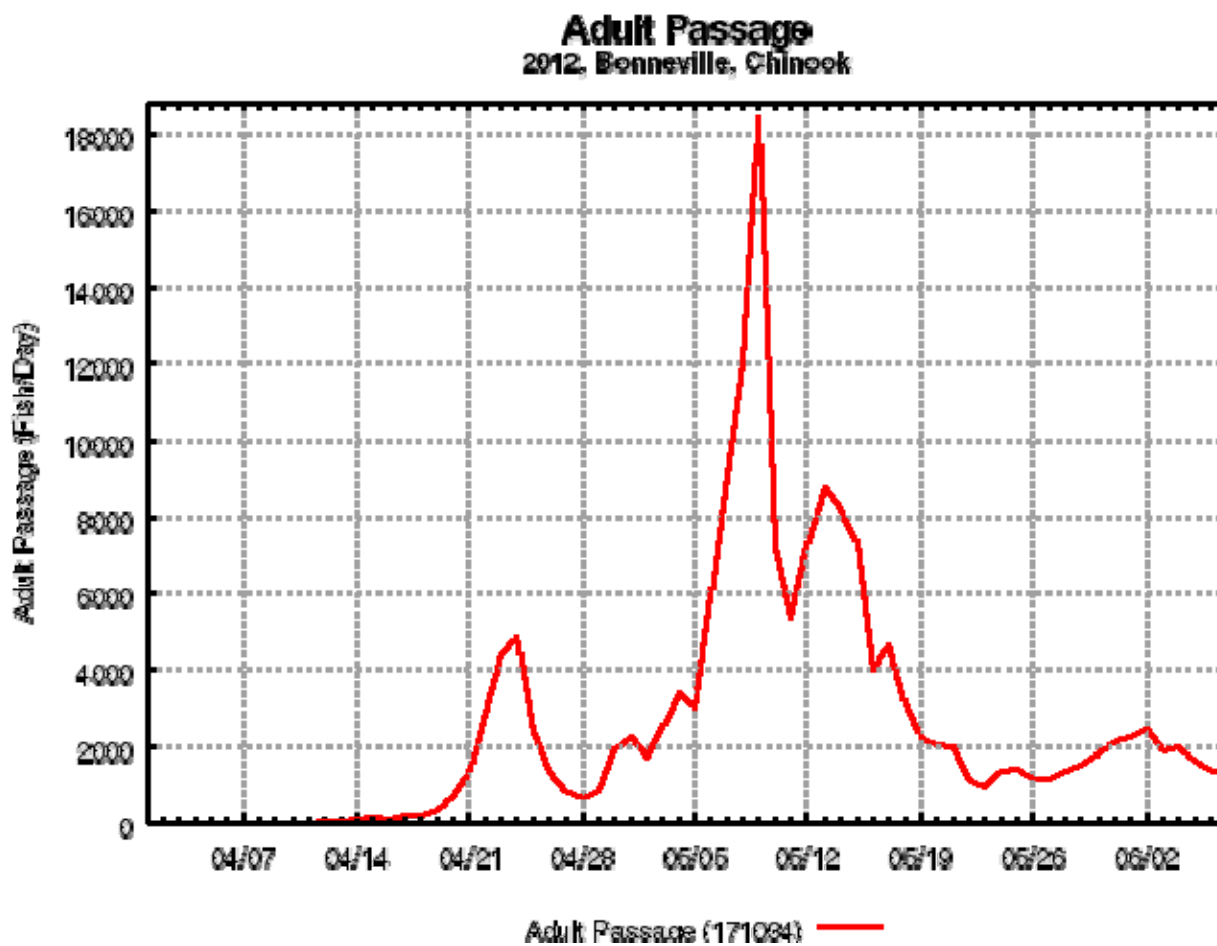
From: Chris Peery, University of Idaho

Subject: Bonneville spill and salmon behavior

Date: 27 October 2005

Effects of spill at dams on adult salmon migration and passage has been an ongoing focus of research in the Columbia hydrosystem. Radiotelemetry has been used to determine time for fish to pass Bonneville Dam, and the numbers of fish that fallback at this facility, under different spill levels. Telemetry has also been used to determine where fish will first approach fishways at Bonneville Dam with high and low spill. Results indicated that adult salmon passage can be delayed and that fish will avoid the spillway fishway entrances during periods with high spill (> 100 kcfs). We suspected that fish would be attracted to the spillway tailrace channel during spill periods, but that turbulence associated with high spill would discourage some fish from reaching the fishway entrances. In 2003 and 2004, University of Idaho and NOAA Fisheries used an underwater array of antennas to help monitor more closely the behavior of radio-tagged adult Chinook salmon and steelhead in the area of the Columbia River immediately downstream from Bonneville Dam spillway. During 2003, paired treatments of high (140 kcfs) and low (76 kcfs) spill were used to evaluate fish behavior. During 2004, a constant daytime spill level (68 kcfs) was used. Fish with radio tags were released 8 km downstream from Bonneville Dam and monitored to determine the proportion of fish that entered the spillway channel that subsequently continued on to reach the spillway fish entrances. In 2003 the spillway antenna array appeared to function as designed. In 2004, half of the array was lost, limiting the information available to assess behavior.

In 2003, 835 Chinook salmon were released downstream from the dam, of which 493 were released during the low spill treatment and 342 were released during high spill. Of those fish, 117 (23%) and 104 (30%), respectively, were detected in the spillway channel prior to making a first approach at the dam, and 85 (73%) and 56 (54%) went on to make an approach at the spillway entrances. During 2004, the comparable number was 86% of fish that first moved into the spillway channel eventually moved on to make their first approach at a spillway fishway entrance during low spill levels. We concluded that fish are attracted into the spillway channel during periods of spill, but relatively fewer fish proceed close enough to the dam to be detected near fishway entrances during periods of high spill. This behavior could partially explain the significantly longer passage times seen for fish during high spill periods.



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Fish counts and reports

**Running Sum Adult Fish Counts**  
Bonneville 4/1/2012 - 6/7/2012

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Date	All Chinook		Adult Chinook		Jack Chinook		All Steelhead		Clipped Steelhead		Unclipped Steelhead		All Coho		Adult Coho		Jack Coho		Sockeye		Chum		Pink	
	daily	sum	daily	sum	daily	sum	daily	sum	daily	sum	daily	sum	daily	sum	daily	sum	daily	sum	daily	sum	daily	sum	daily	sum
4/1/2012	2	2	2	2	0	0	78	78	58	58	20	20	0	0	0	0	0	0	0	0	0	0	0	0
4/2/2012	1	3	1	3	0	0	91	169	69	127	22	42	0	0	0	0	0	0	0	0	0	0	0	0
4/3/2012	3	6	3	6	0	0	49	218	31	158	18	60	0	0	0	0	0	0	0	0	0	0	0	0
4/4/2012	4	10	4	10	0	0	68	286	53	211	15	75	0	0	0	0	0	0	0	0	0	0	0	0
4/5/2012	17	27	17	27	0	0	64	350	41	252	23	98	0	0	0	0	0	0	0	0	0	0	0	0
4/6/2012	21	48	20	47	1	1	42	392	36	288	6	104	0	0	0	0	0	0	0	0	0	0	0	0
4/7/2012	6	54	6	53	0	1	28	420	22	310	6	110	0	0	0	0	0	0	0	0	0	0	0	0
4/8/2012	6	60	6	59	0	1	30	450	15	325	15	125	0	0	0	0	0	0	0	0	0	0	0	0
4/9/2012	15	75	15	74	0	1	60	510	43	368	17	142	0	0	0	0	0	0	0	0	0	0	0	0
4/10/2012	16	91	16	90	0	1	33	543	22	390	11	153	0	0	0	0	0	0	0	0	0	0	0	0
4/11/2012	9	100	9	99	0	1	20	563	16	406	4	157	0	0	0	0	0	0	0	0	0	0	0	0
4/12/2012	41	141	41	140	0	1	26	589	26	432	0	157	0	0	0	0	0	0	0	0	0	0	0	0
4/13/2012	79	220	78	218	1	2	35	624	24	456	11	168	0	0	0	0	0	0	0	0	0	0	0	0
4/14/2012	104	324	104	322	0	2	58	682	40	496	18	186	0	0	0	0	0	0	0	0	0	0	0	0
4/15/2012	145	469	141	463	4	6	44	726	35	531	9	195	0	0	0	0	0	0	0	0	0	0	0	0
4/16/2012	126	595	120	583	6	12	27	753	20	551	7	202	0	0	0	0	0	0	0	0	0	0	0	0
4/17/2012	235	830	235	818	0	12	31	784	15	566	16	218	0	0	0	0	0	0	0	0	0	0	0	0
4/18/2012	222	1052	222	1040	0	12	35	819	30	596	5	223	0	0	0	0	0	0	0	0	0	0	0	0
4/19/2012	371	1423	365	1405	6	18	45	864	25	621	20	243	0	0	0	0	0	0	0	0	0	0	0	0
4/20/2012	664	2087	655	2060	9	27	44	908	27	648	17	260	0	0	0	0	0	0	0	0	0	0	0	0
4/21/2012	1330	3417	1321	3381	9	36	64	972	46	694	18	278	0	0	0	0	0	0	0	0	0	0	0	0
4/22/2012	2911	6328	2887	6268	24	60	52	1024	32	726	20	298	0	0	0	0	0	0	0	0	0	0	0	0
4/23/2012	4411	10739	4376	10644	35	95	59	1083	38	764	21	319	0	0	0	0	0	0	0	0	0	0	0	0
4/24/2012	4923	15662	4873	15517	50	145	39	1122	29	793	10	329	0	0	0	0	0	0	0	0	0	0	0	0
4/25/2012	2444	18106	2427	17944	17	162	19	1141	8	801	11	340	0	0	0	0	0	0	0	0	0	0	0	0
4/26/2012	1392	19498	1382	19326	10	172	19	1160	13	814	6	346	0	0	0	0	0	0	0	0	0	0	0	0
4/27/2012	792	20290	781	20107	11	183	35	1195	30	844	5	351	0	0	0	0	0	0	0	0	0	0	0	0
4/28/2012	614	20904	603	20710	11	194	31	1226	25	869	6	357	0	0	0	0	0	0	0	0	0	0	0	0
4/29/2012	835	21739	823	21533	12	206	46	1272	38	907	8	365	0	0	0	0	0	0	0	0	0	0	0	0
4/30/2012	1963	23702	1930	23463	33	239	40	1312	26	933	14	379	0	0	0	0	0	0	0	0	0	0	0	0
5/1/2012	2264	25966	2238	25701	26	265	33	1345	18	951	15	394	0	0	0	0	0	0	0	0	0	0	0	0
5/2/2012	1775	27741	1746	27447	29	294	28	1373	25	976	3	397	0	0	0	0	0	0	0	0	0	0	0	0
5/3/2012	2557	30298	2506	29953	51	345	39	1412	23	999	16	413	0	0	0	0	0	0	0	0	0	0	0	0
5/4/2012	3452	33750	3393	33346	59	404	35	1447	29	1028	6	419	0	0	0	0	0	0	0	0	0	0	0	0
5/5/2012	3097	36847	3002	36348	95	499	31	1478	22	1050	9	428	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2012	6089	42936	5959	42307	130	629	30	1508	20	1070	10	438	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2012	9305	52241	9081	51388	224	853	41	1549	34	1104	7	445	0	0	0	0	0	0	0	0	0	0	0	0
5/8/2012	12294	64535	12000	63388	294	1147	40	1589	27	1131	13	458	0	0	0	0	0	0	0	0	0	0	0	0
5/9/2012	19035	83570	18436	81824	599	1746	23	1612	18	1149	5	463	0	0	0	0	0	0	0	0	0	0	0	0
5/10/2012	7499	91069	7200	89024	299	2045	32	1644	23	1172	9	472	0	0	0	0	0	0	0	0	0	0	0	0
5/11/2012	5675	96744	5381	94405	294	2339	38	1682	28	1200	10	482	0	0	0	0	0	0	0	0	0	0	0	0
5/12/2012	7564	104308	7284	101689	280	2619	47	1729	37	1237	10	492	0	0	0	0	0	0	0	0	0	0	0	0
5/13/2012	9304	113612	8786	110475	518	3137	60	1789	44	1281	16	508	0	0	0	0	0	0	1	1	0	0	0	0
5/14/2012	8898	122510	8224	118699	674	3811	77	1866	50	1331	27	535	0	0	0	0	0	0	1	1	0	0	0	0
5/15/2012	7976	130486	7324	126023	652	4463	75	1941	51	1382	24	559	0	0	0	0	0	0	1	1	0	0	0	0
5/16/2012	4495	134981	4036	130059	459	4922	73	2014	49	1431	24	583	0	0	0	0	0	0	1	1	0	0	0	0
5/17/2012	5063	140044	4636	134695	427	5349	66	2080	43	1474	23	606	0	0	0	0	0	0	1	1	0	0	0	0
5/18/2012	3467	143511	3118	137813	349	5698	84	2164	61	1535	23	629	0	0	0	0	0	0	1	1	0	0	0	0

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**Running Sum Adult Fish Counts**  
Bonneville 5/19/2012 - 6/7/2012

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Date	All Chinook		Adult Chinook		Jack Chinook		All Steelhead		Clipped Steelhead		Unclipped Steelhead		All Coho		Adult Coho		Jack Coho		Sockeye		Chum		Pink	
	daily	sum	daily	sum	daily	sum	daily	sum	daily	sum	daily	sum	daily	sum	daily	sum	daily	sum	daily	sum	daily	sum	daily	sum
5/19/2012	2464	2464	2199	2199	265	265	58	58	37	37	21	21	0	0	0	0	0	0	0	0	0	0	0	0
5/20/2012	2314	4778	2053	4252	261	526	53	111	33	70	20	41	0	0	0	0	0	0	0	0	0	0	0	0
5/21/2012	2167	6945	1987	6239	180	706	37	148	25	95	12	53	0	0	0	0	0	0	0	0	0	0	0	0
5/22/2012	1243	8188	1097	7336	146	852	45	193	23	118	22	75	0	0	0	0	0	0	0	0	0	0	0	0
5/23/2012	1074	9262	960	8296	114	966	45	238	39	157	6	81	0	0	0	0	0	0	0	0	0	0	0	0
5/24/2012	1500	10762	1372	9668	128	1094	56	294	44	201	12	93	0	0	0	0	0	0	0	0	0	0	0	0
5/25/2012	1569	12331	1406	11074	163	1257	66	360	48	249	18	111	0	0	0	0	0	0	2	2	0	0	0	0
5/26/2012	1266	13597	1160	12234	106	1363	76	436	60	309	16	127	0	0	0	0	0	1	3	0	0	0	0	0
5/27/2012	1228	14825	1144	13378	84	1447	58	494	43	352	15	142	0	0	0	0	0	3	6	0	0	0	0	0
5/28/2012	1490	16315	1383	14761	107	1554	90	584	63	415	27	169	0	0	0	0	0	1	7	0	0	0	0	0
5/29/2012	1582	17897	1494	16255	88	1642	103	687	77	492	26	195	0	0	0	0	0	10	17	0	0	0	0	0
5/30/2012	1941	19838	1833	18088	108	1750	79	766	62	554	17	212	0	0	0	0	0	30	47	0	0	0	0	0
5/31/2012	2292	22130	2149	20237	143	1893	85	851	68	622	17	229	0	0	0	0	0	32	79	0	0	0	0	0
6/1/2012	2395	24525	2264	22501	131	2024	81	932	58	680	23	252	0	0	0	0	0	83	162	0	0	0	0	0
6/2/2012	2645	27170	2480	24981	165	2189	95	1027	78	758	17	269	0	0	0	0	0	175	337	0	0	0	0	0
6/3/2012	1979	29149	1864	26845	115	2304	114	1141	80	838	34	303	0	0	0	0	0	267	604	0	0	0	0	0
6/4/2012	2117	31266	1998	28843	119	2423	74	1215	56	894	18	321	0	0	0	0	0	289	893	0	0	0	0	0
6/5/2012	1750	33016	1618	30461	132	2555	90	1305	61	955	29	350	0	0	0	0	0	334	1227	0	0	0	0	0
6/6/2012	1496	34512	1374	31835	122	2677	90	1395	63	1018	27	377	0	0	0	0	0	566	1795	0	0	0	0	0
6/7/2012	1501	36013	1386	33221	115	2792	135	1530	101	1119	34	411	0	0	0	0	0	576	2371	0	0	0	0	0
Date	All Chinook		Adult Chinook		Jack Chinook		All Steelhead		Clipped Steelhead		Unclipped Steelhead		All Coho		Adult Coho		Jack Coho		Sockeye		Chum		Pink	

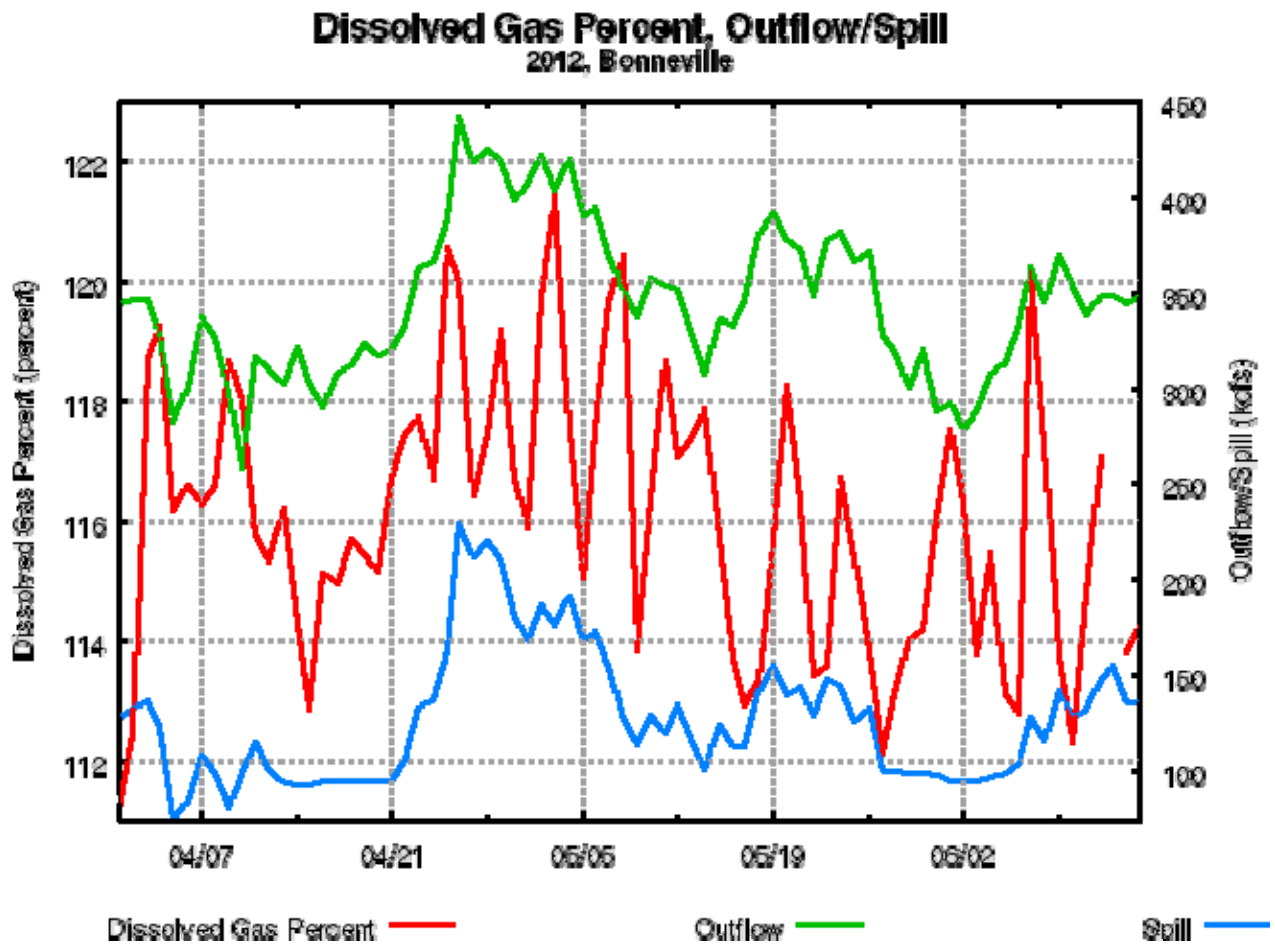
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## Oregon High 12-hour Average Percent TDG - April 2012

Date	Monitoring Stations (full list)																						
	FDRW	GCGW	CHJ	CHQW	WEL	LWG	LGNW	LGSA	LGSW	LMNA	LMNW	IHRA	IDSW	MCNA	MCPW	JDY	JHAW	TDA	TDDO	BON	CCIW	WRNO	CWMW
Gas Cap %	110	110	110	110	115	115	120	115	120	115	120	115	120	115	120	115	120	115	120	115	120	115	
04/01/2012	103.8	101.2	101.9	104.3	•	102.4	115.9	107.0	113.3	109.0	118.8	107.9	119.2	106.7	122.5	107.5	120.7	112.3	116.0	112.0	120.1	114.0	111.5
04/02/2012	102.3	99.9	100.5	116.2	•	100.6	111.4	105.6	111.8	106.9	120.7	110.3	119.1	107.1	121.0	106.9	121.8	119.0	120.9	115.4	121.5	116.9	113.2
04/03/2012	103.6	103.3	102.1	118.4	•	104.5	114.3	108.2	117.7	112.0	119.9	112.4	119.4	108.3	120.6	108.1	122.2	121.1	123.3	119.6	121.4	119.9	117.0
04/04/2012	103.7	122.7	101.9	118.3	•	105.2	109.9	109.0	113.5	109.6	119.1	113.2	119.0	108.2	120.0	109.3	122.3	118.1	120.1	120.0	123.6	120.6	118.0
04/05/2012	103.3	112.9	105.1	118.7	•	103.9	109.6	106.7	113.0	112.0	118.8	110.9	118.6	109.2	119.1	111.2	120.7	118.7	120.6	116.5	117.6	116.7	116.8
04/06/2012	103.2	109.7	114.7	118.2	116.2	103.2	109.1	106.0	113.1	110.5	118.4	111.9	118.9	109.6	120.2	111.0	120.7	115.6	118.1	116.7	118.8	117.3	115.3
04/07/2012	104.7	106.5	112.2	115.5	115.1	104.6	111.8	106.2	113.0	111.3	118.8	112.5	118.4	109.9	120.7	109.7	120.7	114.9	117.6	116.7	121.3	117.8	115.3
04/08/2012	105.0	105.3	109.9	115.8	112.6	105.9	110.2	106.9	112.4	112.5	119.2	113.7	118.4	112.0	119.3	110.6	120.9	115.0	120.3	116.8	119.3	117.5	114.7
04/09/2012	105.6	111.8	106.7	113.1	112.4	107.5	111.0	108.5	113.0	113.3	119.2	115.0	118.8	113.9	119.9	112.8	120.0	116.6	119.0	119.9	118.0	118.8	116.6
04/10/2012	107.5	105.0	108.3	113.4	109.2	108.1	110.7	111.1	114.1	113.5	119.6	116.5	118.9	114.9	117.8	115.4	120.1	114.6	119.1	119.6	118.7	119.1	118.0
04/11/2012	108.1	109.0	111.6	114.2	111.1	108.3	111.1	111.9	114.2	114.3	119.5	116.8	119.4	115.3	118.4	116.6	116.8	113.4	118.0	116.4	121.1	117.8	116.8
04/12/2012	107.4	105.2	105.1	113.7	109.7	106.9	113.0	110.6	114.4	113.2	119.7	114.8	119.6	114.0	117.6	115.5	116.9	113.7	118.0	115.8	121.2	116.6	116.1
04/13/2012	108.8	105.3	108.6	112.4	108.8	106.0	113.1	110.0	115.0	113.8	119.4	114.7	119.8	113.2	118.4	115.4	117.1	114.0	117.9	116.4	120.8	116.8	115.8
04/14/2012	107.6	105.1	105.0	107.1	108.2	105.4	115.3	110.8	116.4	114.3	119.5	114.8	119.4	113.8	117.9	114.1	118.2	112.4	117.6	115.4	119.3	115.7	115.1
04/15/2012	107.5	106.4	105.0	113.3	105.6	104.7	114.0	109.3	114.8	113.2	118.7	114.7	119.1	113.8	117.7	112.1	117.6	113.2	116.8	113.7	119.6	114.4	114.1
04/16/2012	108.2	112.4	106.4	112.5	107.6	105.1	110.7	108.8	113.7	115.6	119.7	114.8	118.9	113.6	117.4	112.7	115.8	112.7	117.2	115.3	119.6	116.1	113.9
04/17/2012	107.9	114.7	107.4	111.1	107.6	105.2	110.3	109.7	113.9	112.4	118.7	114.3	119.2	112.5	117.4	112.8	116.1	112.3	116.5	115.2	120.0	115.9	114.6
04/18/2012	108.4	105.9	114.7	114.4	107.0	105.1	110.6	106.9	113.9	113.3	119.2	114.9	119.7	112.5	117.6	113.7	117.3	112.6	117.0	115.9	119.7	116.3	115.3
04/19/2012	108.2	111.0	114.5	115.8	112.9	105.5	113.6	106.2	114.8	112.7	118.7	114.3	119.7	113.6	117.5	113.5	117.9	113.8	116.9	115.7	118.7	116.2	114.1
04/20/2012	108.7	109.3	106.4	118.1	110.2	105.5	113.2	106.2	115.9	113.1	119.2	114.2	119.7	113.3	118.1	113.5	118.1	114.5	118.0	115.5	118.7	115.8	114.6
04/21/2012	109.0	107.1	113.3	114.5	109.9	105.6	110.8	108.6	114.3	114.8	119.4	114.7	119.8	114.2	118.2	114.8	118.0	114.3	116.7	117.6	119.0	117.4	117.0
04/22/2012	112.5	108.3	108.6	115.1	112.5	106.3	113.8	109.1	115.2	115.8	119.8	117.0	119.9	117.6	119.3	116.1	118.5	115.2	117.3	117.7	121.1	118.5	118.2
04/23/2012	112.5	119.2	109.1	120.0	111.1	106.8	117.7	109.0	116.3	116.2	120.4	117.7	120.6	118.0	120.0	118.3	119.7	117.3	120.0	118.0	123.9	119.8	119.5
04/24/2012	112.3	114.5	113.1	122.0	114.0	106.2	123.4	110.5	123.1	116.5	125.4	117.0	123.6	117.7	121.2	118.6	121.8	118.2	122.7	117.1	121.3	118.7	117.6
04/25/2012	112.6	109.7	117.4	120.8	116.0	105.4	127.2	114.2	125.9	124.2	125.8	120.5	128.0	116.7	126.8	118.5	125.7	117.4	122.0	120.9	123.4	123.2	119.5
04/26/2012	112.6	116.3	114.4	115.9	117.5	105.9	126.6	117.7	123.3	127.4	124.1	122.4	125.3	117.6	123.1	118.3	123.1	120.6	122.7	120.5	117.1	125.5	123.2
04/27/2012	110.3	116.3	108.5	116.5	110.1	103.2	130.6	113.6	126.2	118.5	126.2	117.0	128.0	112.4	122.5	113.3	121.4	113.5	118.4	117.7	•	122.0	121.2
04/28/2012	110.5	108.3	115.0	113.2	110.2	105.5	128.8	118.1	123.8	124.1	123.4	120.8	126.1	115.7	122.4	114.3	122.1	116.1	119.8	118.5	•	123.4	122.5
04/29/2012	112.1	117.9	115.9	115.9	116.0	107.7	122.7	121.4	119.9	124.1	121.2	122.0	122.6	119.5	121.0	113.7	120.4	115.1	118.7	119.5	•	123.5	124.0
04/30/2012	112.7	119.5	113.4	122.1	113.8	107.9	118.5	120.5	119.4	123.2	119.9	121.6	120.3	118.8	121.4	115.9	120.3	114.8	121.3	117.3	•	121.3	121.3

Generated: Tue May 1 23:27:10 2012

## Number of hours of data used:

OR:  0  1  2  3  4  5  6  7  8  9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24

Red text denotes exceedances.

- indicates no data due to malfunctioning gauge
- indicates gauge is out of service for winter

Dates run from hour 1 to 24 (not 0 to 23).

The gas caps shown only apply when spilling to facilitate juvenile fish passage ("voluntary spill") between April 3rd and August 31st. At all other times, the gas cap is 110%.

## Oregon High 12-hour Average Percent TDG - May 2012

Date	Monitoring Stations (full list)																						
	FDRW	GCGW	CHJ	CHQW	WEL	LWG	LGNW	LGSA	LGSW	LMNA	LMNW	IHRA	IDSW	MCNA	MCPW	JDY	JHAW	TDA	TDDO	BON	CCIW	WRNO	CWMW
Gas Cap %	110	110	110	110	115	115	120	115	120	115	120	115	120	115	120	115	120	115	120	115	120	115	
05/01/2012	112.3	119.2	117.2	120.3	114.6	105.7	119.0	113.9	117.6	117.5	120.4	115.9	119.8	111.8	122.0	115.0	122.4	116.1	121.6	117.5	•	118.6	116.7
05/02/2012	112.9	120.0	117.6	116.7	116.2	104.1	117.2	109.8	117.0	116.8	119.3	114.8	119.8	112.1	122.2	112.9	122.5	116.0	122.4	121.3	•	122.4	121.0
05/03/2012	113.5	121.1	118.2	116.2	115.7	105.0	115.4	111.2	116.0	116.6	118.7	116.5	119.2	115.7	122.4	111.4	123.0	115.8	122.5	122.1	•	123.4	121.3
05/04/2012	113.2	118.1	118.9	117.2	116.2	104.5	117.8	109.2	118.4	113.9	119.2	113.8	118.9	114.5	121.9	110.2	121.7	112.7	118.9	118.3	•	121.7	119.5
05/05/2012	112.2	109.8	118.6	117.4	115.9	102.5	117.9	105.6	116.8	113.2	116.8	112.2	117.9	112.1	121.5	111.2	121.8	112.3	118.7	115.4	•	118.7	117.9
05/06/2012	112.2	109.7	110.7	116.1	114.3	102.5	111.8	107.7	113.2	115.5	112.9	113.4	117.1	114.9	119.4	111.5	120.6	115.1	119.4	118.8	•	120.7	119.7
05/07/2012	113.4	110.6	110.7	115.1	111.7	104.5	111.3	112.5	115.4	114.6	120.6	115.1	118.0	117.5	119.3	113.8	119.8	115.4	122.1	119.9	•	121.0	120.1
05/08/2012	114.6	114.8	111.9	116.4	112.6	106.3	115.9	115.1	115.7	116.3	121.8	116.5	118.6	119.2	119.5	117.7	119.2	116.1	118.9	121.0	•	120.8	119.5
05/09/2012	115.1	112.5	114.0	116.8	113.6	105.7	118.2	112.1	118.2	116.7	119.4	116.9	118.3	118.4	119.9	117.3	118.7	114.3	121.9	115.1	•	117.1	116.8
05/10/2012	114.5	111.8	115.4	117.5	115.3	103.5	114.1	109.3	114.1	115.0	119.2	115.8	116.4	114.9	119.6	114.4	118.8	114.9	120.7	117.6	•	118.0	116.9
05/11/2012	114.7	111.8	112.1	114.8	112.7	102.3	110.6	112.4	114.8	114.5	119.5	115.5	116.5	114.5	120.2	114.1	119.4	115.6	118.2	119.0	•	119.6	118.1
05/12/2012	115.0	112.0	112.7	111.0	112.5	103.4	110.6	113.9	114.6	113.4	119.3	115.9	116.8	116.6	119.7	114.6	118.9	114.9	117.5	117.9	•	119.3	117.0
05/13/2012	115.8	113.0	113.4	111.2	112.3	104.7	110.8	110.1	113.5	115.7	119.9	116.2	118.3	117.6	117.1	117.4	117.5	116.0	118.2	118.0	•	118.8	118.7
05/14/2012	116.5	113.8	114.3	112.2	113.1	105.9	111.0	109.9	113.8	115.7	119.8	117.1	117.9	118.8	118.4	119.6	119.0	117.3	119.2	118.3	•	118.0	118.5
05/15/2012	117.5	114.3	114.9	113.0	113.9	106.1	111.5	111.0	114.4	114.9	119.2	118.0	117.5	117.9	119.8	119.6	119.2	117.1	118.8	116.8	•	117.9	117.9
05/16/2012	117.9	115.3	114.9	113.8	113.0	105.9	115.4	111.5	116.9	115.1	115.3	117.5	118.4	117.0	118.8	118.3	118.3	115.3	118.1	114.3	•	116.1	116.1
05/17/2012	118.9	115.6	115.4	115.9	113.4	105.7	119.3	110.3	119.8	117.0	120.9	116.2	120.2	116.1	119.9	115.7	119.7	113.5	121.0	113.3	•	114.7	114.5
05/18/2012	118.7	115.4	114.9	114.7	113.7	104.7	118.6	111.6	116.9	117.8	117.5	115.0	120.1	114.2	121.8	113.2	120.6	113.6	118.6	114.8	•	116.8	115.3
05/19/2012	118.7	115.6	115.6	115.0	114.3	105.0	117.2	114.3	117.0	116.6	115.5	115.7	119.0	114.3	120.4	113.0	120.4	115.2	119.2	116.5	•	118.6	118.8
05/20/2012	118.8	116.0	115.9	115.2	114.5	106.0	111.8	115.5	115.9	117.9	114.2	116.3	117.6	115.6	120.1	114.1	119.7	114.2	117.4	118.7	•	119.8	119.2
05/21/2012	119.3	116.7	116.2	116.3	114.9	106.7	111.6	116.4	115.1	116.9	114.3	116.7	117.0	116.1	120.6	116.7	119.3	114.6	117.1	116.7	•	118.8	118.2
05/22/2012	119.4	116.3	116.0	114.9	114.6	105.9	116.6	110.0	113.1	116.1	113.8	115.9	118.7	115.1	120.3	116.6	120.0	114.7	118.0	113.9	•	116.4	115.6
05/23/2012	118.8	116.0	115.7	115.2	113.5	104.6	118.3	108.0	117.5	112.4	118.9	112.4	119.8	111.7	120.5	114.2	119.6	113.5	120.4	114.9	•	116.9	114.6
05/24/2012	119.2	115.9	115.6	114.9	114.6	104.8	116.7	110.7	114.4	113.7	113.8	112.7	119.2	112.8	120.5	112.0	119.9	113.5	117.1	117.5	•	118.6	117.9
05/25/2012	118.7	115.4	115.3	115.4	113.9	105.8	114.1	113.1	115.4	113.3	116.6	112.7	116.1	114.2	120.4	110.7	119.2	112.2	116.3	115.5	•	117.2	118.0
05/26/2012	117.8	115.0	115.5	115.3	114.6	105.9	111.3	112.4	114.2	113.6	119.0	111.9	115.4	113.6	118.9	111.1	118.9	112.7	116.6	113.9	•	116.3	116.8
05/27/2012	117.9	115.0	115.5	114.1	114.2	104.7	110.3	109.7	113.3	114.2	118.8	111.9	114.5	113.0	119.8	111.8	118.7	111.8	117.0	112.6	•	113.8	114.3
05/28/2012	117.4	114.6	115.1	113.8	113.4	103.8	110.6	109.1	113.1	113.5	118.8	112.9	115.2	112.9	117.3	111.4	117.7	112.0	117.4	113.7	•	114.7	113.6
05/29/2012	117.1	114.3	115.0	113.1	112.8	103.7	110.5	108.6	112.3	112.1	118.7	114.6	115.9	112.8	117.9	110.8	117.2	110.9	116.8	114.3	•	115.7	115.9
05/30/2012	116.4	113.8	114.3	113.3	112.6	103.8	110.2	109.2	113.2	112.2	118.6	115.0	116.6	112.8	116.2	110.4	118.3	112.9	117.7	114.7	•	115.7	115.9
05/31/2012	116.5	114.0	114.6	113.7	113.0	104.4	110.6	110.0	113.3	112.9	119.1	115.8	116.2	115.8	115.9	111.1	118.2	113.4	118.5	116.7	•	117.0	116.6

Generated: Fri Jun 1 23:26:43 2012

## Number of hours of data used:

OR:  0  1  2  3  4  5  6  7  8  9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24

Red text denotes exceedances.

• indicates no data due to malfunctioning gauge

- indicates gauge is out of service for winter

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## Oregon High 12-hour Average Percent TDG - June 2012

Date	Monitoring Stations (full list)																						
	FDRW	GCGW	CHJ	CHQW	WEL	LWG	LGNW	LGSA	LGSW	LMNA	LMNW	IHRA	IDSW	MCNA	MCPW	JDY	JHAW	TDA	TDDO	BON	CCIW	WRNO	CWMW
Gas Cap %	110	110	110	110	115	115	120	115	120	115	120	115	120	115	120	115	120	115	120	115	120	115	
06/01/2012	117.2	114.5	115.1	114.4	114.1	104.9	110.7	111.0	111.5	114.3	119.4	117.0	116.9	116.3	116.0	111.8	115.7	113.3	118.3	118.1	•	117.9	117.6
06/02/2012	117.1	114.5	115.2	115.4	113.8	104.7	110.4	111.2	113.4	114.2	118.7	116.9	116.7	115.8	116.0	112.5	116.2	112.0	117.3	116.9	•	117.2	116.5
06/03/2012	116.6	114.2	114.8	114.0	112.4	104.5	110.3	110.8	114.4	112.0	118.5	115.8	117.8	115.2	115.5	112.4	118.1	113.4	117.5	114.0	•	115.3	115.1
06/04/2012	116.8	113.7	115.1	114.4	112.6	104.4	110.5	111.6	114.7	114.1	119.2	115.3	119.1	114.8	118.5	113.4	118.3	114.1	118.7	116.3	•	116.7	114.5
06/05/2012	116.6	112.9	114.9	115.1	112.1	103.4	117.7	110.5	115.8	113.3	118.9	113.7	119.3	111.0	118.2	111.5	117.8	111.7	118.6	114.0	•	115.3	113.1
06/06/2012	115.9	113.0	113.2	115.2	111.9	103.0	119.0	105.4	118.8	110.5	117.6	111.0	120.1	107.4	119.3	108.5	120.0	112.6	123.9	114.1	119.6	114.7	114.0
06/07/2012	115.2	112.5	112.9	115.2	112.0	103.7	117.9	109.4	116.0	116.5	119.6	113.1	118.3	108.1	120.8	108.4	120.0	113.5	120.3	121.6	124.9	121.0	118.3
06/08/2012	116.1	113.1	112.6	116.8	112.8	105.1	120.3	113.1	121.0	116.6	117.9	113.8	119.1	111.1	123.2	106.8	119.7	112.3	118.7	117.7	122.3	118.1	117.4
06/09/2012	116.4	113.3	112.3	117.8	113.8	104.4	120.3	112.4	120.9	116.2	117.8	113.8	119.5	111.3	122.8	107.6	120.4	110.7	118.7	114.5	123.8	117.0	115.4
06/10/2012	116.3	113.3	112.6	115.5	112.9	103.3	120.0	110.8	118.2	116.2	118.9	113.7	118.2	111.8	119.6	108.6	119.2	112.0	117.7	113.0	121.7	115.1	115.1
06/11/2012	115.6	112.9	113.7	119.8	114.7	103.5	116.4	113.6	114.9	118.9	119.9	115.6	117.6	113.8	121.5	110.3	119.5	113.8	119.8	115.4	123.4	117.2	116.7
06/12/2012	116.0	113.8	114.3	118.8	117.5	104.8	115.3	116.8	116.3	118.4	119.8	117.8	116.8	116.5	120.3	111.5	119.1	114.4	120.5	117.5	124.1	118.9	117.9
06/13/2012	116.1	113.6	113.9	117.5	114.6	105.1	119.8	117.0	119.3	115.9	118.3	117.9	116.7	115.0	121.1	111.5	119.7	113.4	119.6	116.3	123.2	118.5	117.7
06/14/2012	116.1	113.2	113.4	110.8	113.1	104.6	117.0	114.5	114.6	115.4	119.5	117.0	117.1	114.9	120.6	111.9	119.0	112.8	118.0	114.3	123.4	117.1	117.0
06/15/2012	115.3	112.8	113.0	110.4	111.7	103.5	113.9	112.3	113.9	117.2	119.2	116.6	116.9	115.5	120.8	111.6	119.2	114.9	118.8	115.1	124.0	117.4	115.9
06/16/2012	115.5	113.2	113.7	111.9	112.6	104.3	117.2	116.7	113.9	115.7	114.9	117.5	117.3	116.9	119.9	113.1	118.4	114.3	119.9	117.8	123.1	118.4	119.1
06/17/2012	116.1	113.7	114.1	111.3	113.0	105.2	117.8	116.1	115.1	116.0	114.3	118.0	118.2	116.9	120.3	114.5	118.9	113.9	120.4	116.9	122.0	117.4	116.3
06/18/2012	116.0	112.6	113.7	111.2	112.3	104.7	117.6	114.5	114.9	115.0	114.1	115.7	117.5	113.2	120.8	113.2	118.7	112.5	119.1	114.2	123.1	117.2	114.5
06/19/2012	115.3	111.2	112.4	117.9	111.0	103.4	118.3	111.1	115.1	112.6	117.3	112.4	118.2	111.7	122.1	109.2	120.4	111.9	118.0	113.9	123.5	119.2	115.1
06/20/2012	115.2	112.9	112.7	119.5	115.0	102.5	110.3	112.1	113.5	113.5	119.5	112.6	117.1	114.5	122.3	108.0	119.6	113.3	119.1	117.5	124.0	121.0	119.6
06/21/2012	116.7	114.3	114.1	120.0	117.0	104.7	113.7	116.0	113.5	115.6	116.6	115.7	116.7	117.9	122.4	111.4	119.5	114.0	119.1	119.1	124.2	121.5	120.9
06/22/2012	118.4	115.6	114.6	120.9	116.7	105.8	119.9	116.3	115.9	115.5	119.3	117.4	117.2	119.1	122.6	115.7	119.7	113.5	119.4	116.3	123.6	119.6	119.0
06/23/2012	118.1	115.8	114.1	119.3	115.9	105.3	120.0	111.7	114.5	114.4	118.4	115.5	117.1	117.0	122.3	116.5	120.0	115.4	119.5	115.6	123.5	120.3	117.9
06/24/2012	118.6	117.4	114.5	118.8	114.6	103.7	119.5	111.3	114.5	113.7	118.3	113.3	116.9	114.9	123.0	115.3	121.5	115.4	121.0	116.1	123.7	119.3	117.8
06/25/2012	120.0	122.7	116.4	123.7	119.0	103.0	113.7	113.8	114.1	114.4	118.1	114.5	116.8	117.0	124.8	113.2	123.8	115.9	121.6	118.2	125.8	124.6	120.6
06/26/2012	120.1	123.2	117.8	121.5	120.4	102.8	119.0	114.1	114.8	114.6	118.2	114.3	116.9	116.3	123.0	112.9	118.8	114.2	119.1	117.9	123.2	122.2	121.4
06/27/2012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
06/28/2012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
06/29/2012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
06/30/2012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Generated: Tue Jun 26 08:25:05 2012

## Number of hours of data used:

OR:  0  1  2  3  4  5  6  7  8  9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24

Red text denotes exceedances.

- indicates no data due to malfunctioning gauge
- indicates gauge is out of service for winter

Dates run from hour 1 to 24 (not 0 to 23).

The gas caps shown only apply when spilling to facilitate juvenile fish passage ("voluntary spill") between April 3rd and August 31st. At all other times, the gas cap is 110%.

proj:Bonneville year:2012

Date,	Dissolved Gas Percent,	Outflow,	Spill,
04/01,	111.19,	344,	126.90,
04/02,	112.45,	346.90,	133.90,
04/03,	118.69,	346.10,	136.50,
04/04,	119.26,	327.50,	123.40,
04/05,	116.18,	283.40,	74.60,
04/06,	116.59,	301,	84.40,
04/07,	116.27,	337.60,	108.80,
04/08,	116.60,	326.80,	99,
04/09,	118.67,	296.70,	81.60,
04/10,	118.02,	258.90,	99.10,
04/11,	115.78,	316.10,	115.10,
04/12,	115.33,	310.10,	101.30,
04/13,	116.20,	302.90,	94.20,
04/14,	114.30,	321.30,	92.70,
04/15,	112.88,	303.10,	93,
04/16,	115.14,	290.70,	94.50,
04/17,	114.97,	309.10,	94.90,
04/18,	115.70,	312.40,	95,
04/19,	115.43,	323.30,	94.70,
04/20,	115.17,	317.70,	95.40,
04/21,	116.72,	320.70,	95,
04/22,	117.47,	332.60,	106,
04/23,	117.74,	363,	133.30,
04/24,	116.71,	366.50,	137.70,
04/25,	120.55,	388.50,	162.60,
04/26,	120.00,	442.10,	229.10,
04/27,	116.42,	418.20,	211.90,
04/28,	117.46,	425,	219.80,
04/29,	119.21,	418.50,	210.20,
04/30,	116.69,	398.60,	180.50,
05/01,	115.89,	406.90,	167.60,
05/02,	119.73,	421.40,	186.30,
05/03,	121.42,	404,	176.50,
05/04,	117.53,	419.20,	191.40,
05/05,	115,	389,	168.20,
05/06,	117.54,	394.90,	173.40,
05/07,	119.67,	369.30,	154.30,
05/08,	120.42,	350.70,	127,
05/09,	113.84,	336.70,	114,
05/10,	116.37,	357.90,	129.20,
05/11,	118.68,	353.60,	120.10,
05/12,	117.06,	351.70,	134.30,
05/13,	117.38,	330,	116.30,
05/14,	117.87,	308.20,	101.20,
05/15,	115.74,	336.50,	124,
05/16,	113.70,	333,	112.60,
05/17,	112.93,	347.10,	113,
05/18,	113.33,	380.60,	141.50,
05/19,	115.71,	391.20,	155.50,
05/20,	118.25,	378.10,	140.10,
05/21,	116.32,	373.20,	143.50,
05/22,	113.42,	348.90,	129.20,
05/23,	113.61,	378.20,	148.30,
05/24,	116.73,	382.40,	143.80,
05/25,	115.37,	366.30,	126.40,
05/26,	113.85,	371.70,	133.70,
05/27,	112.12,	327.80,	99.60,

05/28,	113.12,	319.20,	99.60,
05/29,	114.05,	300.30,	99.50,
05/30,	114.20,	320.40,	99.40,
05/31,	116.05,	287.60,	97.60,
06/01,	117.53,	292.80,	95.30,
06/02,	116.29,	279.10,	94.50,
06/03,	113.76,	288.30,	94.50,
06/04,	115.45,	307.60,	96.70,
06/05,	113.09,	313,	99,
06/06,	112.80,	334,	104,
06/07,	120.18,	363.50,	128.30,
06/08,	117.25,	346,	115.60,
06/09,	113.75,	369.90,	141.40,
06/10,	112.31,	353.60,	128.80,
06/11,	114.80,	337.80,	132.10,
06/12,	117.08,	349.10,	148.60,
06/13,	,	348.40,	155.40,
06/14,	113.79,	344.30,	136.10,
06/15,	114.26,	348.40,	135.80,