

Seasonal Updates to the 2012 Water Management Plan

Updated February 14, 2012

Introduction

The Annual Water Management Plan (WMP) is developed prior to the implementation of operational measures identified in the BiOp. The WMP is also developed prior to the receipt of any seasonal information that may determine how many of the operation measures are implemented. The Seasonal Update is intended to supplement the WMP with more detailed information operations as the water year progresses. Each section of the Seasonal Update will be updated when information is available and finalized when no further information is available. The first update for the primary elements of Fall and Winter will be posted on November 1st of each year. The first update for the primary elements of Spring and Summer will be posted by March 1st of each year.

Seasonal Update Elements

The elements included in the Season Update are generally the same as have been previously presented in the Fall/Winter and Spring/Summer Updates to the WMP. The change to present in this manner has been implemented to present better continuity for tracking operations as they change throughout and across each season. The elements included in the Seasonal Update and the approximate schedule for updates and finalization are as present in the table below.

Update Elements	Last Updated	Begins	Finalized
Current Conditions (WSF, Streamflows, etc...)	Feb 14, 2012	October	July
Seasonal Flow Objectives	Feb 14, 2012	April	August
Flood Control	Feb 14, 2012	January	June
Storage Project Operations	Nov 1, 2010	September	September
Water Quality (spill priority lists)	Feb 14, 2012	April	August 31
Specific Operations			
Chum Operations	Feb 14, 2012	November	April 10
Burbot	Nov 1, 2010	November	December 30
Upper Snake Flow Augmentation		April	August 31
Lake Pend Oreille	Feb 14, 2012	September	December 30
Transportation			
Spill Operations			
Fish Passage Research		March	April 3
Snake River Zero Generation	Feb 14, 2012	December	February
Hanford Reach Fall Chinook Protection Operations	Nov 30, 2010	November	June

1.0 Current Conditions

NOAA River Forecasts:

The Dalles January-July (Average = 107.3 maf)

Date Issued	Forecast	Volume (maf)	% Average
January 6	Final	86.0	80%
February 6	Final	91.9	86%
March 6	Final		
April 5	Final		
May 4	Final		
June 6	Final		
July 5	Final		

Final forecast is defined as the forecast posted on the NWRFC water supply forecast website at 5 pm Pacific Standard Time on the 4th business day of the month. NWRFC water supply forecasts may be found on the following website:

<http://www.nwrfc.noaa.gov/ws/>

The Dalles April-August (Average = 93.1 maf)

Date Issued	Forecast	Volume (maf)	% Average
January 6	Final	77.4	83%
February 6	Final	85.1	91%
March 6	Final		
April 5	Final		
May 4	Final		
June 6	Final		
July 5	Final		

The Grand Coulee January-July (Average = 62.9 maf)

Date Issued	Forecast	Volume (maf)	% Average
January 6	Final	51.6	82%
February 6	Final	56.2	89%
March 6	Final		
April 5	Final		
May 4	Final		
June 6	Final		
July 5	Final		

Lower Granite April-July (Average = 21.6 maf)

Date Issued	Forecast	Volume (maf)	% Average
January 6	Final	16.3	75%
February 6	Final	18.3	85%
March 6	Final		
April 5	Final		
May 4	Final		
June 6	Final		
July 5	Final		

NOAA link to their water supply forecasts:

http://www.nwrfc.noaa.gov/water_supply/ws_fcst.cgi

Corps Forecasts:

Libby April-August

Date Issued	Forecast	Volume (kaf)	% Average
November 7, 2011	November Pre-Season	6554	103%
December 7, 2011	December Final	5876	93
January 6, 2012	January Final	5429	86
February 6, 2012	February Final	5713	97

Normal April-August 1928-1999 = 6337 kaf

Dworshak April-July

Date Issued	Forecast	Volume (kaf)	% Average
December 8, 2011	December Final	2724	102%
January 10, 2012	January Final	2473	92%
February 7, 2012	February Final	2504	93

Normal April-July 1928-1999 = 2683 kaf

Corps forecasts may be found at the following website:

<http://www.nwd-wc.usace.army.mil/report/colriverflood.htm>

Reclamation Forecast:

Hungry Horse April-August

Date Issued	Forecast	Volume (kaf)	% Average
January 9	Apr-Aug January Final	1908	92%
February 7	Apr-Aug February Final	2010	97%

Hungry Horse April-August (30 year average =2070 kaf)

Hungry Horse January - July

Date Issued	Forecast	Volume (kaf)	% Average
January 9	Jan-Jul January Final	2050	92%
February 7	Jan-Jul January Final	2143	96%

Hungry Horse January-July (30 year average = 2224 kaf)

Hungry Horse May-September

Date Issued	Forecast	Volume (kaf)	% Average
January 9	May-Sep January final	1691	92%
February 7	May-Sep January final	1781	97%

Hungry Horse May-September (30 year average = 1835 kaf)

Weekly Weather / Precipitation Retrospectives:

Date	Weekly Weather / Precipitation Retrospective
October 24, 2011	The main rainfall story shifted into Canada, western Washington, and far northwester Montana last week, where the vast majority of precipitation (on the order of 150 to 200% of normal) fell. Most of the rain fell this past weekend as cold front initially stalled over British Columbia before pressing southeast into the rest of the basin on Sunday. Snow levels were above 8000ft for much of the weekend, and with soils in Canada much wetter than this time last year, streamflows above Arrow remained rather high for mid October. Elsewhere, streamflows remained near or a bit above average, with near average temperatures and below average rainfall prevailing for a second week in a row.
October 31, 2011	The first real fall chill was felt over the basin last week, with load center temperatures 2 to 6°F below average. This brought on our first significant heat loads of the season. The cool and dry weather then gave way to a warmer but wetter weekend across the region, with 1-2 inches of rain falling in western Washington, the mountains of northwest Oregon, and parts of southern BC. Modest streamflow responses were underway this morning, mostly above Arrow and tributary streams feeding into the Snake River above Lower Granite..
November 7, 2011	A few cold fronts moved through the area, but as expected, they dropped only light snow in the mountains and near to below average rain in the valleys. November is the beginning of the snow accumulation period, and while it is still very early, amounts are below normal in all but a few locations in British Columbia. Minor streamflow responses occurred at the beginning of the week, but they have since fallen off to slightly elevated fall base flows. .
November 14, 2011	It was rather mild last week as load center temperatures recovered from the previous week's chill. After a couple of mild and dry days, the weather turned to what we should normally see in November: wet. A decent storm system moved through the region this weekend which brought near average precipitation to the basin for the first time since late October, and brought the first significant mountain snows to the Cascades and mountains of Montana, and Idaho. Meanwhile in British Columbia, another dumping of snow pushed most snow-water equivalent observing sites above average.
November 21, 2011	It was a wet and cold across the basin last week. Parts of the Cascades, and mountains of Montana and British Columbia received up to 2 feet of snow last week. A somewhat drier but temporarily colder airmass spread across the region as the week ended. Modified Arctic air even clipped the BC portion of the basin and western Montana where some areas saw their first below zero (Fahrenheit) low temperatures of the season. Despite above average precipitation last week, cooler temperatures and falling snow levels reduced streamflows upstream from Lower Granite and Grand Coulee.
November 28,	As expected, we had our stormiest week so far this winter across the basin last week. Several daily precipitation records fell across the region, with up to a foot of liquid precipitation in the

2011	Coast Range and Washington Cascades. Only southern Idaho missed out on the heaviest rains. Snow levels were also unusually high with a couple of record high temperatures recorded on Wednesday. Even with the higher snow levels, the snowpack is now above average over most of the basin, particularly in Canada where some of the highest mountains picked up over 4 feet of snow last week.
December 5, 2011	A cool but very dry weather pattern developed last week over the entire basin, with well below average precipitation as storm systems were deflected well to our north and south by a blocking upper level high pressure system off the West Coast. Temperatures started off near average, but drifted as much as 7 degrees below average over the weekend. It was much colder in the mountains of BC, Idaho and Montana where mountain valleys had lows below 0°F, which in turn began to freeze upper tributary streams. Between the colder temperatures and limited liquid precipitation, natural streamflows fell slowly or were nearly steady throughout the week, but were still a little above normal as base flows were held up by the wet fall and high soil moisture.
December 12, 2011	For the third week in a row, unusually dry conditions prevailed basin-wide. This drier pattern will begin to reverse this week as a series of storm systems begin to realign the jet stream to a more typical December pattern. Precipitation will again be below normal this week, but will trend closer to average (particularly in Canada), with some signs of near average precipitation returning just before Christmas. The lack of precipitation in what is normally our wettest time of year has put a dent into what had been rather high base flows to start December, and put a large dent in our longer range water supply forecasts for the spring. While it is still early, snowpack remains a bit above average across Canada, but is now below average over most of the US portion of the basin.
December 19, 2011	For the fourth week in a row, precipitation was well below average across the basin. Some light rain and mountain snow was observed in Canada and on the west side of the Cascades, but not enough to dent what is becoming a significant precipitation deficit across the region. As blocking high pressure remained just off the west coast, temperature inversions and occasional northerly flow from British Columbia kept temperatures several degrees below average. The continued lack of precipitation and cold temperature caused base flows to slow and headwater tributaries to freeze.
December 26, 2011	A major weather pattern change is underway this morning after nearly five weeks of well below average precipitation across the basin (in some cases on the west side of the Cascades, near record low precipitation).
January 2, 2012	Temperatures: Well above average basin-wide, falling to near average this weekend. Precipitation: Well above average basin-wide. Ended December well below average, though. Streamflows: Significant spikes on Willamette, Lower Columbia, Mid-C, Clearwater from heavy rain and 6000-9000ft snow levels. Modest rises in the Spokane and Clark Fork.
January 9, 2012	Temperatures: Above average, then fell to near average over the weekend Precipitation: Below average basin wide, especially US Basins. Streamflows: Flat or gradually receding basin-wide.
January 16, 2012	Temperatures: Slightly below average, then fell well below average this past weekend. Precipitation: Below average, but turned wetter over the weekend with low snow levels. Streamflows: Flat or gradually receding.
January 23, 2012	Temperatures: Below average, rising to near average over the weekend. Snow levels at sea level early in the week rose to 4000-8000ft, then fell to 1500ft this weekend. Precipitation: Near record precipitation US Basins (2 to 4 times 7-day normal); slightly below average in Canada. Significant snowpack gain in US basins. Major ice storm in Seattle: 300,000+ customers lost power; schools and many businesses closed for 3 days resulting in significantly reduced system load; State of Emergency declared due to the heavy snow, ice storm, and lost power. Streamflows: Minor flood stages reached on the mainstem Willamette (peak flow near 220KCFS at Portland on Saturday). State of emergency declared in western Oregon due to flooding, landslides, and wind damage. Significant flow increases in the lower river incrementals. Flows generally flat upstream from John Day where most of last week's precipitation fell as snow.
January 30, 2012	Temperatures: Above average first half. Below average second half. Precipitation: Well above average basin-wide, particularly in Canada where it fell mostly as snow. Streamflows: Minor rises from some rain on snowpack on the Willamette, Mid-Cs, Clearwater, Spokane, and Snake basins. Flows are now gradually receding.
February 6, 2012	

February 13, 2012	
February 20, 2012	
February 27, 2012	
March 5, 2012	
March 12, 2012	
March 19, 2012	
March 26, 2012	
April 2, 2012	
April 9, 2012	
April 16, 2012	
April 23, 2012	
April 30, 2012	
May 7, 2012	
May 14, 2012	
May 21, 2012	
May 28, 2012	
June 4, 2012	
June 11, 2012	
June 18, 2012	
June 25, 2012	
July 2, 2012	
July 9, 2012	
July 16, 2012	
July 23, 2012	
July 30, 2012	
August 6, 2012	
August 13, 2012	
August 20, 2012	
August 27, 2012	

2.0 Seasonal Flow Objectives

Project	Average to date	BiOp Objective
Priest Rapids Spring (4/10-6/30)		135 kcfs
McNary Spring (4/10-6/30)		220-260 kcfs Pending NWRFC April fcst
McNary Summer (7/1-8/30)		200 kcfs
Lower Granite Spring (4/3-6/20)		85-100 kcfs Pending NWRFC April fcst

Lower Granite Summer (6/21/8/30)		50-55 kcfs Pending NWRFC June fcst
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3.0 Flood Control

Flood Control Elevations and April 10 Objective Elevations per each forecast period. Forecasted flood control elevations will be presented beginning in December after the Libby and Dworshak water supply forecasts are available. Subsequent forecasted flood controls will be updated after the final water supply forecasts are available January-April.

(The April 10 elevations noted below are the result of linear interpolation between the March 31 and April 15 forecasted flood control elevations.)

Libby	Dec	Jan	Feb	Mar	Apr
Jan 31	2419.0	2426.7			
Feb 28	2423.5	2436.4	2429.2		
March 31	2425.7	2441.6	2432.6		
April 10	2425.7	2441.8	2432.6		
April 15	2425.7	2442.0	2432.6		
April 30	2425.7	2442.3	2432.6		

Hungry Horse	Dec	Jan	Feb	Mar	Apr
Jan 31	3543.6	3546.0			
Feb 28	3538.5	3543.1	3540.2		
March 31	3532.5	3539.8	3535.3		
April 10	3531.1	3539.0	3533.7		
April 15	3529.6	3538.2	3532.9		
April 30	3526.7	3536.6	3530.5		

Grand Coulee	Dec	Jan	Feb	Mar	Apr
Jan 31	1290.0	1290.0			
Feb 28	1289.9	1290.0	1290.0		
March 31	1260.3	1281.5	1281.5		
April 10	1250.5	1279.7	1270.9		
April 15	1240.7	1278.5	1265.6		
April 30	1231.2	1276.2	1253.9		

Brownlee	Dec	Jan	Feb	Mar	Apr
Jan 31	2077.0	2077.0			
Feb 28	2048.4	2054.2	2049.5		
March 31	2043.1	2059.9	2045.6		
April 15	2040.7	2063.3	2046.0		
April 30	2038.4	2068.5	2046.5		

Dworshak	Dec	Jan	Feb	Mar	Apr
Jan 31	1535.9	1542.1			
Feb 28	1522.5	1534.3	1532.9		
March 31	1524.9	1541.9	1539.8		
April 10	1520.2	1548.4	1546.3		
April 15	1515.4	1551.7	1549.5		
April 30	1516.2	1528.7	1527.0		

Grand Coulee and all Canadian projects will be operated for standard flood control in 2009-10. Hungry Horse and Libby will be operated for Variable Q (VARQ) Flood Control. Beginning in January, the Corps calculates Upper Rule Curve elevations based on the monthly official final forecasts. Projects are operated using these elevations as an upper limit, with the objective of reaching their spring refill elevations. For detailed flood control operations see: <http://www.nwd-wc.usace.army.mil/report/colsum>.

4.0 Storage Project Operations

Libby Dam

Libby Dam - Bull Trout Flows

Bull trout minimum flows are specified in the 2006 Libby Sturgeon Biological Opinion (2006 BiOp) and presented in Table 7 of the WMP.

Libby Dam - Sturgeon Pulse

Per the 2006 BiOp, the sturgeon pulse volume is determined from a tiered flow structure based upon the Corps' May Final WSF for the period of April-August.

Libby Dam - April 10 and Refill Objectives

According to the Corps Libby February Runoff Forecast the most probable runoff volume for April – August was 5,713 kaf (97% of average from 1975 – 2009). This forecasted runoff volume resulted in an April 10 elevation objective of 2,435.5 ft. This section will be updated throughout the season as new forecast information becomes available.

Libby Dam – Summer draft Limit

In 2011 the Action Agencies received a System Operational Request (SOR) from the Kootenai Tribe to provide Libby target outflows of 6,000 cfs in the month of September and 4,000 cfs in the month of October. The objective of implementing the request was to provide lower Libby outflows during the months of September and October in order to facilitate habitat restoration actions being implemented by the Tribe in the Kootenai River. In coordination with the regional sovereigns in the Technical Management Team (TMT) the Action Agencies coordinated an operation to draft Libby Dam to 2,449 ft by August 31. Drafting Libby Dam to 2,449 ft. would provide the Kootenai Tribe with greater certainty of providing Libby outflows as identified in the SOR. Based on information provided in the SOR it is likely the Kootenai Tribe will request the same operation in 2012 and 2013.

Hungry Horse Dam

Water Supply Forecast and Minimum Flows

The minimum flow requirements are measured at two locations the South Fork Flathead River below Hungry Horse Dam and the Flathead River at Columbia Falls. The minimum flows will be determined monthly, beginning in January, with the Bureau of Reclamation's WSF forecast for Hungry Horse Reservoir for the period of April 1 to August 31. The final flow levels, for the remainder of the calendar year, are based on the March Final forecast. The Bureau of Reclamation's February Final WSF for April–August was 2010 kaf (97 % of average). Minimum flow requirements from Hungry Horse and Columbia Falls are currently set at 900 cfs and 3,500 cfs, respectively. The minimum flow requirements will be updated following the March Final forecast.

Hungry Horse April 10 and June 30 Refill Objectives

The Bureau of Reclamation computes Hungry Horse's final April 10 elevation objective by linear interpolation between the March 31 and April 15 forecasted flood control elevations based on the March Final WSF. Based on the February final forecast and forecasted flood control elevations, the current April 10 elevation objective is 3533.7 ft. Hungry Horse Reservoir is expected to refill by approximately June 30. A late snowmelt runoff may delay refill to sometime after June 30 in order to avoid excessive spill at the project.

Hungry Horse Summer Draft Limit

The experimental summer reservoir draft limit at Hungry Horse is 3,550 ft. (10 ft. from full) by September 30, except in the lowest 20th percentile of water years (The Dalles April-August <72.4 maf) when the draft limit is elevation 3,540 ft. (20 ft. from full) by September 30. The RFC's May Final April-August forecast is used to set the official draft limit.

Grand Coulee Dam

Grand Coulee April 10 and June 30 refill Objective

The Bureau of Reclamation computes Grand Coulee's final April 10 elevation objective by linear interpolation between the March 31 and April 15 forecasted flood control elevations based on the March Final WSF for The Dalles. Based on the February final forecast and forecasted flood control elevations, the current April 10 elevation objective is 1270.9 ft.

Grand Coulee Summer Draft Limit

The Grand Coulee summer draft limit is set by the magnitude of the RFC's July Final April–August WSF at The Dalles Dam.

Drum Gate Maintenance

Drum gate maintenance was performed in 2011 and will be performed in 2012 if conditions allow. Lake Roosevelt must be at or below elevation 1255 feet for several weeks in order to complete the maintenance.

Banks Lake

Required maintenance activities in the fall of 2011 on the Main Canal Outlet Structure and on the Feeder Canal near North Dam required Banks Lake to be drafted down by about 33 feet to around elevation 1537 feet by the end of October 2011. Maintenance activities have been completed and Banks Lake has been refilling since late November. The lake is currently above elevation 1560 feet and will be within its operating range (1565 feet – 1570 feet) by early April 2012.

Dworshak Dam

Summer Draft for Temperature Control and Flow Augmentation

Action Agencies will update in June

Upper Snake River Flow Augmentation

Action Agencies will update in April

4.0 Water Quality

The AA's coordinated the following spill priority with the TMT during the December 21, 2011 meeting.

Wintertime spill priority list

January 1, 2012 to March 31, 2012

LEVEL 1 SPILL IS AS FOLLOWS:

- 1) LWG UP TO 110% TDG SPILL CAP
- 2) LGS UP TO 110% TDG SPILL CAP
- 3) LMN UP TO 110% TDG SPILL CAP
- 4) IHR UP TO 110% TDG SPILL CAP
- 5) MCN UP TO 110% TDG SPILL CAP
- 6) JDA UP TO 110% TDG SPILL CAP
- 7) TDA UP TO 110% TDG SPILL CAP
- 8) BON UP TO 110% TDG SPILL CAP
- 9) DWR UP TO 110% TDG SPILL CAP
- 10) CHJ UP TO 110% TDG SPILL CAP

LEVEL 2 SPILL IS AS FOLLOWS:

- 11) LWG UP TO 115% TDG SPILL CAP
- 12) LGS UP TO 115% TDG SPILL CAP
- 13) LMN UP TO 115% TDG SPILL CAP
- 14) IHR UP TO 115% TDG SPILL CAP
- 15) MCN UP TO 115% TDG SPILL CAP
- 16) JDA UP TO 115% TDG SPILL CAP
- 17) TDA UP TO 115% TDG SPILL CAP
- 18) BON UP TO 115% TDG SPILL CAP

19) CHJ UP TO 115% TDG SPILL CAP

LEVEL 3 SPILL IS AS FOLLOWS:

- 20) LWG UP TO 120% TDG SPILL CAP
- 21) LGS UP TO 120% TDG SPILL CAP
- 22) LMN UP TO 120% TDG SPILL CAP
- 23) IHR UP TO 120% TDG SPILL CAP
- 24) MCN UP TO 120% TDG SPILL CAP
- 25) JDA UP TO 120% TDG SPILL CAP
- 26) TDA UP TO 120% TDG SPILL CAP
- 27) BON UP TO 120% TDG SPILL CAP
- 28) CHJ UP TO 120% TDG SPILL CAP
- 29) GCL UP TO 110% TDG SPILL CAP

LEVEL 4 SPILL IS AS FOLLOWS:

- 30) LWG UP TO 122% TDG SPILL CAP
- 31) LGS UP TO 122% TDG SPILL CAP
- 32) LMN UP TO 122% TDG SPILL CAP
- 33) IHR UP TO 122% TDG SPILL CAP
- 34) MCN UP TO 122% TDG SPILL CAP
- 35) JDA UP TO 122% TDG SPILL CAP
- 36) TDA UP TO 122% TDG SPILL CAP
- 37) BON UP TO 122% TDG SPILL CAP
- 38) CHJ UP TO 122% TDG SPILL CAP
- 39) GCL UP TO 115% TDG SPILL CAP

LEVEL 5 SPILL IS AS FOLLOWS:

- 40) LWG UP TO 125% TDG SPILL CAP
- 41) LGS UP TO 125% TDG SPILL CAP
- 42) LMN UP TO 125% TDG SPILL CAP
- 43) IHR UP TO 125% TDG SPILL CAP
- 44) MCN UP TO 125% TDG SPILL CAP
- 45) JDA UP TO 125% TDG SPILL CAP
- 46) TDA UP TO 125% TDG SPILL CAP
- 47) BON UP TO 125% TDG SPILL CAP
- 48) CHJ UP TO 125% TDG SPILL CAP
- 49) GCL UP TO 120% TDG SPILL CAP

LEVEL 6 SPILL IS AS FOLLOWS:

- 50) LWG UP TO 127% TDG SPILL CAP
- 51) LGS UP TO 127% TDG SPILL CAP
- 52) LMN UP TO 127% TDG SPILL CAP
- 53) IHR UP TO 127% TDG SPILL CAP
- 54) MCN UP TO 127% TDG SPILL CAP
- 55) JDA UP TO 127% TDG SPILL CAP
- 56) TDA UP TO 127% TDG SPILL CAP

- 57) BON UP TO 127% TDG SPILL CAP
- 58) CHJ UP TO 127% TDG SPILL CAP
- 59) GCL UP TO 122% TDG SPILL CAP

LEVEL 7 SPILL IS AS FOLLOWS:

- 60) LWG UP TO 130% TDG SPILL CAP
- 61) LGS UP TO 130% TDG SPILL CAP
- 62) LMN UP TO 130% TDG SPILL CAP
- 63) IHR UP TO 130% TDG SPILL CAP
- 64) MCN UP TO 130% TDG SPILL CAP
- 65) JDA UP TO 130% TDG SPILL CAP
- 66) TDA UP TO 130% TDG SPILL CAP
- 67) BON UP TO 130% TDG SPILL CAP
- 68) CHJ UP TO 130% TDG SPILL CAP
- 69) GCL UP TO 125% TDG SPILL CAP

LEVEL 8 SPILL IS AS FOLLOWS:

- 70) LWG UP TO 135% TDG SPILL CAP
- 71) LGS UP TO 135% TDG SPILL CAP
- 72) LMN UP TO 135% TDG SPILL CAP
- 73) IHR UP TO 135% TDG SPILL CAP
- 74) MCN UP TO 135% TDG SPILL CAP
- 75) JDA UP TO 135% TDG SPILL CAP
- 76) TDA UP TO 135% TDG SPILL CAP
- 77) BON UP TO 135% TDG SPILL CAP
- 78) CHJ UP TO 135% TDG SPILL CAP
- 79) GCL UP TO 130% TDG SPILL CAP

Date	Water Quality Discussion
January	On January 11, 2012, from 1300 – 1500 hours Corps performed a debris spill operation that resulted in spilling at a rate of 13.5 kcfs. The objective of the operation was to remove large boulders that were damaging the apron below spillbay 6. The debris spill operation did not have any significant impacts on TDG as measured at WRNO.

5.0 Specific Operations

Lake Pend Oreille Kokanee Operation

USFWS presented SOR USFWS/IDFG2011-1 during the September 28, 2011, TMT meeting that included the following specifications. IDFG and USFWS request that the Army Corps of Engineers (COE) draw Lake Pend Oreille down to a winter minimum control elevation (MCE) no lower than 2051’ in the winter of 2011-2012 and a winter MCE no lower than 2055’ during the winter of 2012-2013. Conduct drawdowns while

minimizing or eliminating the need to spill at Albeni Falls Dam. We request that the drawdown be completed by November 8 if reasonably possible. During the past five years, kokanee spawning has commenced around November 8 (earlier than years prior). If this is not possible, the MCE should be reached as soon as possible after November 8 and no later than November 15, and should not be dropped below this elevation for the duration of the winter. During the 2011-2012 drawdown, if kokanee spawning is in progress prior to November 15, and occurs in locations and depths that are deemed vulnerable to continued drawdown, the COE shall, within five days of notification (but not later than November 15), cease drawdown activities even if 2051' has not been reached. IDFG will monitor arrival time of kokanee at shoreline spawning areas and provide timely reports to the federal agencies. These proposed operations are not anticipated to cause exceedance of the state maximum total dissolved gas standards at downstream projects barring unforeseen circumstances. Lake Pend Oreille will then be held within 0.5' above the MCE to the end of kokanee spawning (monitored by IDFG) or December 31, whichever comes first.

The Action Agencies (AA) implemented the SOR as requested. The AA's operated Albeni Falls (ALF) elevation as measured at the Hope (HOPI) gauge within a 0.5 ft operational band (2051.0 to 2051.5 ft) during the kokanee spawning operation. On November 6 the HOPI reading was 2051.5 ft and this commenced the operation identified in the SOR. The AA's operated ALF within the 0.5 band until IDFG declared the 0.5 ft ALF kokanee spawning was complete on December 16. The operational range after the completion of spawning through March 31 is between elevations 2051 and 2056 feet as measured at the Hope gauge.

IDFG and USFWS will reiterate the request to TMT in 2012 regarding the desired winter lake level operation of ALF.

Burbot Spawning Flows (Non-BiOp Action)

Under the terms of an MOU prepared in 2005 by the Kootenai Valley Resource Initiative (KVRI) and signed by the Corps, the selective withdrawal gate system at Libby Dam has been set to release cool water in November and December, before temperature stratification limits the temperature control capability. The purpose of this operation is to provide cooler river temperatures downstream Libby Dam (closer to normative thermal conditions). This operation will likely result in November and December temperatures being slightly cooler than the existing selective withdrawal temperature rule curve. Corps staff at Libby Dam removed selective withdrawal gates incrementally during late October to assure that daily temperature change remains within 2° F per day; gates were removed systematically to slowly lower river temperature by early November (a span of about 8° F). Temperature will not be minimized this fall until isothermal conditions develop due to constraints and precautions that will be observed related to selective withdrawal crane rehabilitation that will occur over the winter, necessitating a more conservative gate removal pattern. Rather than removing all gates (resulting in withdrawal elevation of 2,222 ft.), the Corps removed all but 3 rows of gates (resulting in withdrawal elevation of 2,253 ft.).

Chum Operations

Date	Operation/TMT Discussion
October 26, 2011	TMT discussion – Two chum observed to date. Action Agencies will plan to begin chum ops (11.3-11.7ft.) with a target of 11.5 ft. on November 1, 2011.
November 2, 2011	TMT Discussion – 12 chum observed in Ives Island Area. Due to work at Bonneville dam the chum operation range was extended to 11.3-12.0 feet.
November 9, 2011	TMT discussion – NOAA Fisheries presented SOR 2011-5 Bonneville Chum Operation. The objective of the SOR was to allow chum to spawn in the Ives Island area at elevations higher than the 11.5 ft. elevation if fish numbers and hydrologic conditions were favorable. The SOR was a framework recommended for consideration while moving through the chum season, rather than a specific operation recommendation. It was intended to be implemented if flows support it, to allow access to additional spawning habitat areas, and to provide more natural flow conditions rather than big fluctuations between day and night time hours. The chum operation will continue to target an 11.5 feet (11.3-12.0' feet) tailwater elevation at Bonneville. Weekly field observations conducted by WDFW will inform FPAC and TMT discussions. TMT will revisit the issue on a weekly basis to discuss operations moving forward.
November 23, 2011	TMT Discussion – NOAA Fisheries provided an update that 37 chum had been observed in the Ives Island area and that officially 133 chum had been observed in the recently reconstructed off channel area. Given the chum counts and current and forecasted precipitation in to the system (with nighttime flows reaching over 200 kcfs last night), the salmon managers, per an FPAC call on 11/22, recommended taking the next step described in SOR 2011-5 to adjust the tailwater elevation range to 11.7-12.5 feet. Reclamation suggested that given the water in the system, the recommended operation fits well as a way to meet the system conditions. BPA added that a precipitation event underway had already required a change to the tailwater elevation, so was not opposed to the recommendation. As requested the AAs implemented a Bonneville tailwater elevation range of 11.7-12.5 feet.
November 30, 2011	TMT Discussion – NOAA Fisheries indicated the live chum count on 11/22 was 38 and that while there was not much activity in the Ives channel, the new channel was proving to be a 'hot spot' with 500 active spawners observed on 11/23. Given this, the salmon managers recommended no change to the current operation of 11.7-12.5 foot tailwater elevation range at Bonneville. Based on this information

	the AA's did not change the operation and continued the 11.7 to 12.5 ft. Bonneville Dam tailwater operation.
December 14, 2012	TMT Discussion – NOAA Fisheries indicated the live chum count as of 12/5 was 226 in the Ives area, with 24 'mass redds' observed. Spawning was now past its peak according to observations. NOAA Fisheries indicated the abundance and distribution of chum and redds this year was good therefore the salmon managers recommended continuing the current operation of maintaining a Bonneville tailwater elevation range of 11.7-12.5 ft. during the day time. AA's committed to continuing the current Bonneville Dam tailwater operation of 11.7 – 12.5ft.
December 21, 2012	TMT Discussion – NOAA Fisheries and WDFW indicated the spawning numbers were declining but still going at Ives and the lower sites will be checked by the field crew on Friday, 12/23. Some redds were observed exposed during low tide, which was expected. Given where the redds have been spawned, the field crew and salmon managers recommended holding the Bonneville tailwater elevation around 12.0 ft. during this protection 'maintenance' period. TMT members discussed this operation, and agreed that the commitments to protect the chum redds and meet Grand Coulee April 10 refill targets would continue. The AA's committed to continuing the current operation of 11.7 to 12.5 ft Bonneville tailwater but the AA's would put a greater emphasis on attempting to operate to a Bonneville tailwater of 12.0 ft.
December 28, 2012	TMT Discussion – WDFW indicated field surveys from 12/23 and 12/27 suggested chum spawning was near completion. TMT members discussed ending the Bonneville tailwater spawning operation (11.7 to 12.5 ft with a target of 12.0 ft.) and initiating an incubation operation (12.0 ft. minimum tailwater). Based on this discussion the AA's discontinued the spawning operation and initiated the 12.0ft. tailwater operation for incubation.
January 11, 2012	TMT Discussion – TMT members did not recommend changing the current operation therefore the AA's committed to the continuation of the current 12.0 ft. minimum Bonneville tailwater operation.
January 25, 2012	TMT Discussion – NOAA Fisheries reported that the salmon managers discussed the possibility of lowering the tailwater elevation to 11.7 feet but recent data collection revealed a potential risk to dewatering redds if the tailwater is dropped below the 12.0 ft. Salmon managers recommended AA's maintain the current 12.0 ft. tailwater elevation while there is adequate water supply. WDFW will provide GPS information to TMT on redd location that may be used to inform future decisions on changes to the Bonneville tailwater operation. The AA's committed to the continuation of the current 12.0 ft. minimum Bonneville tailwater operation.

Ives/Pierce Survey Data

Date	Lives	Dead**	Redds***	
21-Oct	2	0	0	
24-Oct	0	0	0	
28-Oct	12	0	0	1 ft. vis. 2.5 ft.
1-Nov	19	0	0	vis.
8-Nov	2	1	0	3 ft. vis.
15-Nov	37	1	12	3 ft. vis.
22-Nov	38	2	6	3 ft. vis.
29-Nov	151	24	Mass Redds	5 ft. vis.
6-Dec	226	23	Mass Redds	5 ft. vis. 12 ft.
14-Dec	29	8	Mass Redds	vis.
20-Dec	13	25	NC	5 ft. vis. 12 ft.
27-Dec	11	13	NC	vis.
3-Jan	0	2	NC	4 ft. vis. 10 ft.
10-Jan	0	5	NC	vis.
17-Jan	0	0	NC	3 ft. vis.

FPC data on these and other chum salmon surveys may be found on the following website:
http://www.fpc.org/spawning/spawning_surveys/ODFW_reports/2011spawning.htm

Vernita Bar spawning operation (Non-BiOp Action)

Date	Summary
October 23, 2011	<p>On Sunday, October 23, 2011 the second Vernita Bar ground redd count was conducted to determine the Initiation of Spawning for the zones below and above the 50 kcfs elevation. The Monitoring Team consisted of Paul Hoffarth (WDFW) and Chris Carlson (GCPUD). Observing the redd count was Shawna Meehan (WDFW). Flows from Priest Rapids Dam at Vernita Bar were about 38 kcfs. Results of this survey are provided in the table below.</p> <p>Based on the above survey count and the Hanford Reach Fall Chinook Protection Program Agreement, the Initiation of Spawning has not occurred for either zone below or above the 50 kcfs elevation.</p> <p>There were three redds counted within the 36-50 kcfs flow elevations during last year's October 24 redd count.</p> <p>The next redd count will occur on October 30, 2011 and will require USGS gauging station flows of 38 kcfs.</p>
October 30, 2011	<p>On Sunday, October 30, 2011 the third Vernita Bar ground redd count was conducted to determine the Initiation of Spawning for the zones below and above the 50 kcfs elevation. The Monitoring Team consisted of Paul Hoffarth (WDFW) and Chris Carlson (GCPUD). Observing the redd count was Demischelle Hoffarth. Flows from Priest Rapids Dam at Vernita Bar were about 39 kcfs. Results of this survey are provided in the table below.</p> <p>Based on the above survey count and the Hanford Reach Fall Chinook Protection Program Agreement, the Initiation of Spawning has been set for the 36 kcfs – 50 kcfs zone and the zone above 50 kcfs as October 26 (the Wednesday before the weekend on which the Monitoring Team identifies five or more redds with the zone).</p> <p>Last year's redd count on October 31 identified 12 redds within the 36-50 kcfs flow and none above the 50 kcfs elevation.</p> <p>The next redd count will occur on November 20, 2011 and will require USGS gauging station flows of 50 kcfs. This redd count will likely be used to set the 2011 – 2012 Critical Flow Elevation.</p>
November 5, 2011	<p>The third 2011 fall Chinook redd count aerial survey was conducted on Saturday November 5. The surveyor was Paul Wagner (EAS) and the pilot was Dave McCurry (Bergstrom Aircraft). The area surveyed was the Columbia River from just upstream of the I-182 bridge in Richland to just downstream of Priest Rapids Dam. Wind</p>

	<p>was light, and viewing conditions were excellent. Hourly discharge from Priest Rapids Dam ranged from 56.8 kcfs to 57.2 kcfs during the flight.</p> <p>A total of 8,534 redds were counted during this survey. Two thousand four hundred and forty of these redds were observed in areas of known contaminated groundwater upwelling.</p> <p>Total redd counts for this survey (8,534) approached the maximum redd counts for 2010 (8,817). Viewing conditions were excellent, and historical spawning areas appeared largely filled with redds out to maximum depths viewable. Minimal superimposition was observed.</p>
November 20, 2011	<p>The fourth and final 2011 fall Chinook redd count aerial survey was conducted on Sunday November 20. The surveyor was Paul Wagner (EAS) and the pilot was Don Clayhold (Bergstrom Aircraft).</p> <p>The area surveyed was the Columbia River from just upstream of the I-182 bridge in Richland to just downstream of Priest Rapids Dam. Wind was light, and viewing conditions were only fair due to heavy cloud cover. Hourly discharge from Priest Rapids Dam ranged from 50.8 kcfs to 60.1 kcfs during the flight.</p> <p>A total of 8,472 redds were counted during this survey, down slightly from the third survey conducted two weeks ago owing to the reduced visibility. Two thousand one hundred and sixty eight of these redds were observed in areas of known contaminated groundwater upwelling.</p>

Snake River Zero Generation (Non-BiOp Action)

According to the Lower Snake projects operating manuals, from December through February, "zero" minimum project discharge is permitted on a limited basis. Under an agreement between the Corps of Engineers and the fishery agencies, zero river flow is allowed for water storage during low power demand periods (at night and on weekends) when there are few, if any, actively migrating anadromous fish present in the Snake River. Water stored under zero river flow conditions may maximize power production from the Columbia River Basin system, but zero river flow operations are not recommended at Lower Snake projects when fish are actively migrating in the Snake River.”

In 2005, the Salmon Managers developed guidance criteria (3-day running average of less than 65 total run (hatchery and wild) adult steelhead and less than 20 wild adult steelhead passing Lower Granite per day) for dropping to zero generation. The status of the actively migrating fish in the Snake River will be evaluated in November and December to determine when the criteria have been met.

On December 9, 2011, steelhead passage at Lower Granite Dam met the criteria required in order to operate to zero generation on the Snake River projects. The AA's implemented a Snake River Zero Generation operation as needed from December 9, 2011 through February 29, 2012.

Minimum Operating Pool (MOP)

Surveys conducted in 2011 demonstrated impairment of the federal navigation channel in the Lower Granite pool. In accordance with the RPA, until maintenance activities are conducted to provide adequate channel depths for safe navigation, the Corps supports adopting the variable MOP operation used during the 2011 season and will coordinate this operation with the TMT in 2012. Snake River minimum operating pool (MOP) ranges (Table 5) as well as the variable MOP operation inflow dependent ranges are included below.

Table 5.— Snake River Minimum Operating Pool (MOP) Elevations.

Project	Operation	Lower Range Elevation (ft)	Upper Range Elevation (ft)
Ice Harbor	MOP	437.0	438.0
Lower Monumental	MOP	537.0	538.0
Little Goose ^A	MOP	633.0	634.0
Lower Granite	MOP	733.0	734.0

A – To be adjusted as necessary to provide adequate depth over entrance sill at Lower Granite navlock.

Lower Granite Dam Inflow Dependent Ranges

Inflow >= 120 kcfs	733.0-734.0 feet (MOP)
Inflow >= 80 kcfs and < 120 kcfs	734.0-735.0 feet (MOP+1)
Inflow >= 50 kcfs and < 80 kcfs	734.5-735.5 feet (MOP+1.5)
Inflow < 50 kcfs	735.0-736.0 feet (MOP+2)

At John Day, the forebay is being operated within a 1.5 ft range of the minimum level that provides irrigation pumping from April 10 to September 30. The initial range is 262.5 to 264.0 feet. The minimum level will be adjusted upward as necessary to facilitate irrigation pumping.

Date	MOP Operation Discussion
April 3, 2012	Planned start of MOP operations on the Lower Snake River

6.0 2012 Spill and Transportation Operations

AA's will update this section upon finalization of the 2012 Fish Operations Plan.

7.0 2012 Fish Passage Research

A brief summary of 2012 fish passage research is included below. More details regarding 2012 fish passage research may be found in Appendix A of the 2012 Fish Passage Plan available on the following website: <http://www.nwd-wc.usace.army.mil/tmt/documents/fpp/2012/>

Bonneville Dam

- BiOp Performance Standard Compliance Test
- Adult Kelt Passage
- Lamprey Passage Evaluations
- Sea Lion Predation

The Dalles

- Adult Lamprey Studies
- BiOp Performance Standard Testing
- Steelhead Kelt Downstream Passage Study

John Day

- Adult Lamprey Studies
- BiOp Performance Standard Compliance Test

McNary

- Adult steelhead fallback study
- BiOp Performance Standard Compliance Test
- Evaluation of Adult Pacific Lamprey Passage Success at McNary
- Underwater Video Monitoring of Adult Fish Ladder Modifications to Improve Pacific Lamprey Passage at McNary Dam
- Identify potential for adverse impact of aquatic invertebrates growing within the juvenile collection and bypass systems at McNary, 2012
- Oregon shore ladder intake screen monitoring
- Determining the feasibility of detecting JSAT Transmitters in the Tailrace Environment at McNary Dam
- Steelhead straying study
- BiOp Kelt Passage and Survival Monitoring

Ice Harbor

- Evaluation of Fish Counting Accuracy Issues at FCRPS Dams, at Ice Harbor and Lower Monumental Dams
- Evaluation of Adult Pacific Lamprey Passage Success at Ice Harbor Dam
- Underwater Video Monitoring of Adult Fish Ladder Modifications to Improve Pacific Lamprey Passage at Ice Harbor Dam

Lower Monumental

- BiOp Performance Standard Compliance Test

- Evaluation of Fish Counting Accuracy Issues at FCRPS Dams, at Ice Harbor and Lower Monumental Dams
- Evaluation of Adult Pacific Lamprey Passage Success at Lower Monumental Dam
- BiOp Kelt Passage and Survival Monitoring

Little Goose

- BiOp Performance Standard Compliance Test
- Evaluation of Adult Pacific Lamprey Passage Success at Little Goose Dam
- BiOp Kelt Passage and Survival Monitoring

Lower Granite

- Study to compare seasonal SARs of early in-river migrating versus transported Snake River yearling anadromous salmonids
- Study to compare SARs of Snake River fall Chinook salmon under alternative transportation and dam operational strategies
- Kelt Reconditioning / Transportation
- Study to Evaluate Hydropower System-related Latent Mortality Associated with Passage of Yearling Chinook Salmon Smolts through Snake River Dams
- Study to evaluate straying behavior in steelhead
- Study to identify overwintering behavior of Fall Chinook salmon
- Evaluation of Adult Pacific Lamprey Passage Success at Lower Granite Dam
- Developing Half-Duplex PIT-tag Antennas at Fishway Entrances and Exits at Lower Granite Dam
- BiOp Kelt Passage and Survival Monitoring