

April 16, 2007

Draft Spring / Summer Update to the 2007 Water Management Plan

1. Introduction

The 2007 Spring/Summer update to the Water Management Plan (WMP) updates information on how the Action Agencies plan to operate the Federal Columbia River Power System (FCRPS) reservoirs during the spring and summer seasons.

The Spring/Summer WMP Update (*S/S Update*) is needed because water supply forecasts for the spring and summer time period are not available at the time the water management plan is written. Planned operations in the *S/S Update* are based on the most current water supply forecast which is considered to be the best available forecast of the expected runoff water volume, and thus how the FCRPS will be operated in 2007. The “April Final” water supply forecast is the most current forecast available when the final version of the *S/S Update* is completed.

The *S/S Update* also reports 2007 research operations planned for the FCRPS projects. Research studies are routinely conducted to test the performance of current or new fish passage operations and the effects on a wide range of conditions, including spill survival, tailrace egress, transport benefits and the performance of new passage devices like the Bonneville second powerhouse corner collector. The Studies Review Work Group establishes the research study plan in the spring just prior to the commencement of the spring migration. The *S/S Update* summarizes the project operations that support these research activities.

The *S/S Update* does not repeat all of the information in the WMP but does provide additional detail and specifies operations based on the current water supply forecast or changes that need to be made in operations because of the availability of current water supply forecasts, flow projections, and other new information.

2. Role of Water Supply Forecasts (WSF)

There are four forecast points that are used to determine BiOp operation of the FCRPS reservoirs. The latest forecasts (March Final) are given below.

Forecast Point	Forecast Period	Forecast Date	Value (MAF)
Lower Granite	April – July	March Final	17.3 ^A
Lower Granite	April – July	April Final	15.1 ^{A,B}
The Dalles	April – August	March Final	88.3
The Dalles	April – August	April Final	85.2 ^{A,B}
Hungry Horse	April – August	March Final	2.01 ^C
Hungry Horse	April – August	April Final	X ^C
Libby	April – August	March Final	6.52 ^D
Libby	April – August	April Final	6.85 ^D
Libby	April – August	May	X ^{D,E}

All forecasts are from the National Weather Service unless otherwise indicated:

A – Northwest River Forecast Center forecast; B – Value that is used to set operations for spring flow objectives; C – USBR Forecast; D – COE Forecast; E – Value that is used to set operations for Libby sturgeon pulse

3. Seasonal Flow Objectives

Spring

The spring seasonal flow objectives for Lower Granite is established by the Northwest River Forecast Center's April final water supply forecast for the period of April-July. The spring seasonal flow objectives for McNary is established by the Northwest River Forecast Center's April final water supply forecast for the period of April-August at The Dalles. The Priest Rapids spring seasonal flow objective is fixed (not dependent on the water supply forecast). Based on the April final forecast the spring flow objectives are shown below.

Project	Spring Seasonal Flow Objective
Lower Granite	85 KCFS
McNary	237 KCFS
Priest Rapids	135 KCFS

Summer

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The summer seasonal flow objective for Lower Granite Dam is based on the [Northwest River Forecast Center's](#) June final water supply forecast [for the period of April-July](#). Based on the latest water supply forecast (April Final) the summer seasonal flow objectives are shown below. The McNary summer seasonal flow objective is always 200 kcfs and is not dependent on the water supply forecast.

Project	Summer Seasonal Flow Objective
Lower Granite	54.0 KCFS
McNary	200 KCFS

Prospects for Meeting Flow Objectives

An analysis of the likelihood of meeting the flow objectives was conducted by using the Northwest River Forecast Center Ensemble Streamflow Prediction (ESP) inflows in the Corps Hydro System Seasonal Regulation Program (HYSSR) model. This model uses the current basin conditions combined with 44 historical weather patterns (temperature and precipitation) to produce 44 ESP hydrographs for 2007. The likelihood of meeting the flow objectives and refilling the reservoirs by the targeted dates is a function of both the runoff volume and the time frame in which the snowmelt and stream flows occur. The likelihood of meeting the 2007 spring/summer flow objectives, based on XXXX, 2007 ESP inflows, are shown in Section XXX of this document.

4. Storage Project Operations

See Section XXX, XXX and XXX for latest ESP HYSSR model runs, volume charts for Libby, Dworshak and Hungry Horse and latest Dworshak ESP graphs.

Libby Dam

Sturgeon Pulse

[The sturgeon pulse is determined from a tiered flow structure based upon the Corps' May Final water supply forecast for April-August at Libby Dam.](#) A preliminary estimate of sturgeon pulse volume based on the [April](#) final WSF of 6,847 MAF for Libby (April – August) puts Libby operations in the [4th](#) tier of operations for sturgeon called for in the USFWS [2006](#) Biological Opinion. [Using the 4th](#) tier sturgeon operation, [an interpolated](#) sturgeon pulse volume [is](#) 1,116 MAF.

An SOR with specific flow and date recommendations is expected to be submitted to TMT prior to initiating a flow operation for sturgeon.

Bull trout flows

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A preliminary estimate of minimum bull trout flows based on the March final WSF is 8 kcfs. The project will also initiate bull trout flows of at least 6 kcfs on May 15 per the USFWS 2006 BiOp,

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Hungry Horse Dam

Water Supply Forecast and Minimum Flows

The March final Bureau of Reclamation WSF for April – August was 2016 kaf, 97 percent of normal. Minimum flow requirements from Hungry Horse and Columbia Falls from March through December are based on the March final forecast. This year the minimum flow requirements were set at 900 cfs and 3500 cfs, respectively.

Hungry Horse April 10 and June 30 Refill Objectives

The Bureau of Reclamation computes Hungry Horse’s April 10 elevation objective by linear interpolation between the March 31 and April 15 forecasted flood control elevations based on the March final water supply forecast (WSF). Based on the March final (WSF), the April 10 objective was elevation XXXX feet. The project was at elevation XXXX on April 10. Hungry Horse Dam is expected to refill XXXXX

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Grand Coulee Dam

Grand Coulee April 10 and June 30 refill Objective

The Bureau of Reclamation computes Grand Coulee’s April 10 elevation objective by linear interpolation between the March 31 and April 15 forecasted flood control elevations based on the March final water supply forecast (WSF). Based on the March final (WSF) and the corresponding shifted flood control elevations the April 10 objective was elevation XXXX feet. The project was at elevation 1XXXX feet on April 10. Grand Coulee is expected to refill to 1290 feet XXXX

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Grand Coulee Summer Draft Limit

The Grand Coulee summer draft limit is set by the magnitude of the July final April – August WSF at The Dalles Dam. Based on the April Final forecast at The Dalles, the summer draft limit for Grand Coulee is expected to be XXXX feet.

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Dworshak Dam

Summer Draft for Temperature Control and Flow Augmentation

A key operation at Dworshak Dam is to draft cold water from the Dworshak reservoir in July, August, and September to cool water temperatures and provide flow augmentation in the Lower Snake River for the benefit of migrating salmon and steelhead. In-season modeling will be done to provide information to aid in the making the decisions of when and how to draft Dworshak. The summer reservoir draft limit is 1,520 feet. This limit determines the maximum draft available for summer flow augmentation from Dworshak. The Action Agencies will draft Dworshak to 1520 feet in September. The extension of the draft limit from August 31 into September reflects requirements for about 200 kaf to be held for release by the Nez Perce Tribe as defined per the Snake River Basin Adjudication.

5. Upper Snake River Flow Augmentation

The Bureau of Reclamation currently estimates that the XXXX kaf of Upper Snake River flow augmentation will be provided in 2007.

6. Flood Control Operations

The 31 March, 15 April and 30 April flood control elevations based on the March final forecasts are shown in the following table. The 31 January – 28 February flood control elevations were based on previous forecasts.

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Project	31-Jan	28-Feb	15-Mar	31-Mar	15-Apr	30-Apr
ARDB	1430.5	1422.9		1414.1	1414.1	1414.1
LIB	2393.7	2396.0	2395.5	2395.5	2395.5	2395.5
DCDB	1839.3	1812.5 A		1807.7	1807.7	1807.7
HGH	3543.8	3531.7		3526.2	3525.0	3521.3
GCL	1290.0	1290.0		1273.5	1256.2	1239.8
GCL-shifted				1272.5	1252.5	
BRN	2077.0	2057.9		2060.3B.	2060.6	2061.6
BRN-shifted				2077.0	2077.0	
DWR	1532.3	1551.3		1555.4	1555.5	1555.5
DWR-shifted				1560.3	1571.6	

Dworshak/Grand Coulee flood control shift

The Grand Coulee shift is based only on the Dworshak shift with no shift from Brownlee as Idaho Power Company (Brownlee owner) did not request shift.

7. Minimum Operating Pool

The minimum operating pool (MOP) operation for the Lower Snake projects planning date is 3 April. It was agreed at the 28 March, 2007 TMT meeting that lower Snake River reservoir levels would be transitioned to a MOP operation by 3 April. The table below describes the reservoir elevation ranges under MOP operations in 2007. Elevation ranges will adjusted if needed to meet authorized project purposes including navigation. Below the table is a description of how the lower Snake River elevation levels were adjusted to reach MOP operational levels.

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Project	Lower Range		Upper Range	
	Operation	Elevation	Operation	Elevation
Ice Harbor	MOP	437	MOP + 1	438
Lower Monumental	MOP	537	MOP + 1	538
Little Goose	MOP	633	MOP + 1	634
Lower Granite	MOP	733	MOP + 1	734

IHR XX, APRIL XX – XX FEET (MOP TO MOP+1) LMN XX, APRIL XX XX-5XX FEET (MOP TO MOP+1)

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LGS XX, APRIL 6 633-634 FEET (MOP TO MOP+1)

LWG XX, APRIL XX 733-734 FEET (MOP TO MOP+1)

At John Day, the forebay is being operated within a 1.5-foot range of the minimum level that provides irrigation pumping from 10 April to 30 September. The initial range is 262.5 and 264.0 feet. The minimum level will be adjusted upward if needed to facilitate irrigation pumping. Actual John Day operations 262.5' – 264' range started 10 April 2007.

8. Hanford Reach

The Vernita Bar protection level flow was set at a level of 70 kcfs based on the 19 and 26 November 2006 redd count. This year's Vernita Bar protection operation is scheduled to end when the water over the eggs have accumulated 1000 (C degrees) thermal units after the initiation of spawning. This is expected to occur about 1 April. See Appendix C for the Hanford Reach Agreement.

9. Spill for Juvenile Fish Passage

Implementation of the Spill for Juvenile Fish Passage is described in the 2007 Fish Operations Plan. This plan was finalized and submitted to the court XXXX 2007. This plan is an attachment to the Water Management Plan.

10. Operation Considerations

11. Water Quality - Spill Priority List

River operations are conducted to meet State Clean Water Act total maximum daily load (TMDL) dissolved gas standards. Also, research operations at a particular dam can be impacted by involuntary spill. Thus spill at research projects is given lower priority in the hope that involuntary spill can be eliminated during research. The initial spill priority list for the fish spill season was issued 3 April as shown below. Involuntary spill will occur in the order shown. The priorities will be modified as needed based on status of fish migration, spill/transport strategies, and studies, and other factors.

1. 1. Lower Granite
2. 2. Little Goose
3. 3. Lower Monumental
4. 4. Bonneville
5. 5. John Day
6. 6. The Dalles
7. 7. Wanapum
8. 8. Wells
9. 9. Rocky Reach
10. 10. Rock Island
11. 11. Priest Rapids
12. 12. McNary
13. 13. Ice Harbor
14. 14. Grand Coulee
15. 15. Chief Joseph

Other Spill Operations

Until construction of the spill deflectors at Chief Joseph Dam has been completed, spill swapping between Chief Joseph Dam and Grand Coulee Dam will not be implemented if the spill deflector contractor is working downstream of Chief Joseph Dam. Construction of the deflectors is expected to take three years.

12. 2007 Fish Passage Research

Summaries of 2007 fish passage research studies that have the potential to change

project operation are described below.

Lower Granite

A spring RSW study is planned to examine its efficiency and effectiveness and fish behavior in the vicinity of the RSW and the Behavioral Guidance Structure (BGS) which has been relocated. Normal spring spill patterns as described in the FPP with Behavioral Guidance Structure (BGS) IN place and BGS OUT as two treatments. The RSW testing will take place between mid-April and late May. During the study, spill will consist of flow thru the RSW and some training spill for a total spill of approximately 20 kcfs. The evaluation involves periodic removal of the BGS, which would likely result in short-term (1-3 hours) outages of Units 6.

A summer test of the RSW and BGS may also take place sometime between mid-June and late July and will most likely run for 3 to 4 weeks. There will be two treatments for the summer test. Both treatments will use the RSW plus two different patterns of training spill. Both treatments will spill approximately 18 kcfs. The BGS will be in the OUT (stored) position during the summer test.

Little Goose

A spring study between 15 April and 30 May will examine route specific survival estimates, approach paths, passage distribution, forebay residence time, and tailrace egress. Spill during this time will be 30 percent of total outflow 24 hours/day, however, two spill patterns will be alternated. A similar study will be performed during the summer between 30 June and 31 July. The spill patterns to be used are under development with SRWG and FFDRWG.

Lower Monumental

A spring bulk spill study will occur between 25 April and 30 May. Two spill patterns will be used depending on total river flow. A bulk spill pattern will be evaluated at river flows less than 120kcfs simulating an RSW operation. For river flow in excess of 120 kcfs, a uniform spill pattern will be used.

Ice Harbor Dam

Spring and summer RSW testing are planned. Testing will occur between 1 May and 19 July. The testing will involve alternating between 30 percent spill for 24 hours/day and spilling 45 kcfs during the day and to the spill cap at night.

McNary Dam

A spring spill study will occur between 26 April and 8 June to examine passage, survival rates, and behavior under two treatments of project operations. Spill will alternate between 40 percent spill for 24 hours/day and 0 kcfs daytime spill/spill cap nighttime

spill. The specific details of the study have not yet been established. A summer spill study is tentatively scheduled to occur between 20 June and 22 July to examine passage, survival rates, and behavior under two treatments of project operations. Spill will alternate between 40 percent spill for 24 hours/day and 60 percent spill for 24 hours per day. The spill will be alternated in two day blocks which will be randomized during testing.

John Day Dam

None.

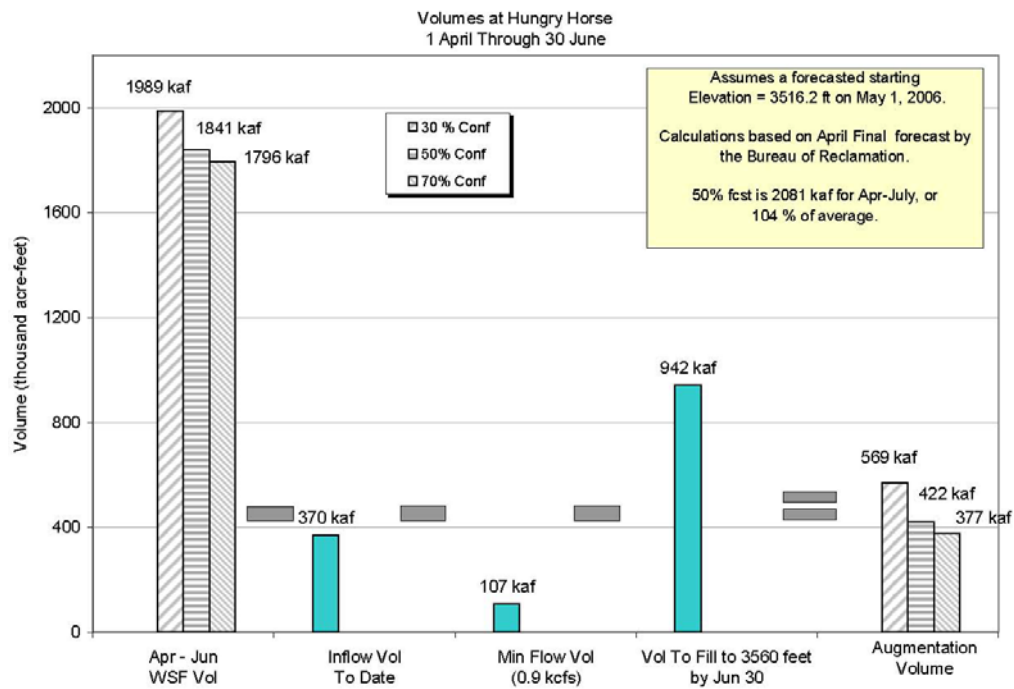
The Dalles Dam

None.

Bonneville Dam

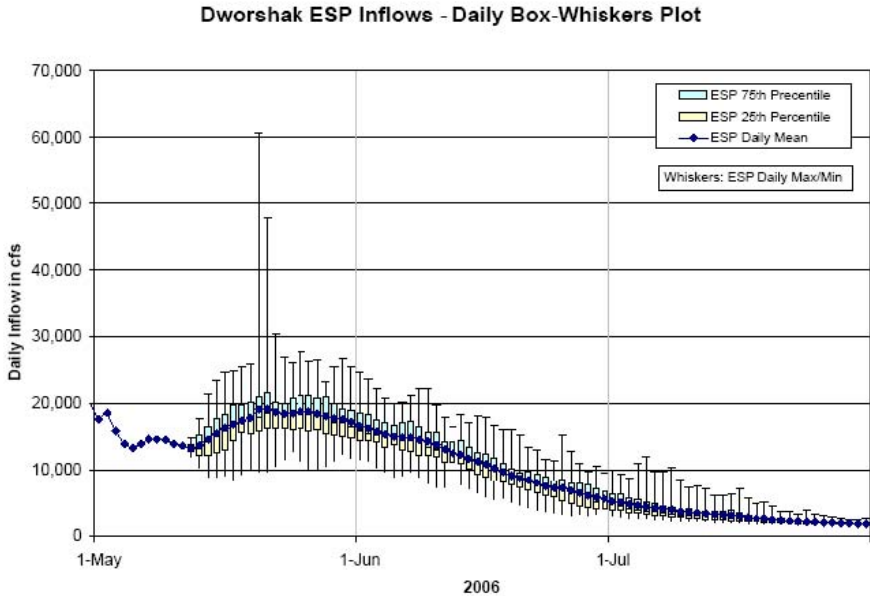
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Hungry Horse

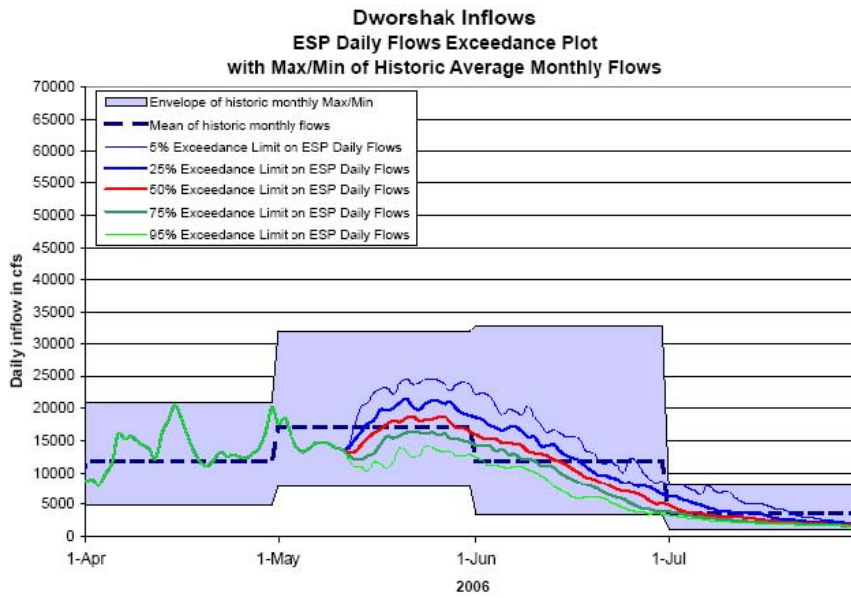


15. Latest DWR ESP Graphs (week of April 30)

ESP Inflow



ESP Inflow – Exceedance ESP Augmentation Volumes



Dworshak Augmentation Volumes ESP inflows and 1-May Water Supply Forecast

