

*Spring / Summer Update to the 2008 Water
Management Plan*

Draft - May 12, 2008

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Spring / Summer Update to the 2008 Water Management Plan

Introduction

The 2008 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 2008. The “May 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 2008 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. Water Supply Forecasts (WSF)

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

Forecast Point	Forecast Period	Forecast Date	Value (MAF)	Percent Normal ^E
Lower Granite	April – July	April Final	23.3 ^A	108
Lower Granite	April – July	May Final	21.8 ^A	101
The Dalles	April – August	April Final	94.7 ^A	102
The Dalles	April – August	May Final	90.9	98
Hungry Horse	April - August	March Final	2.12 ^B	102
Hungry Horse	May - July	May Final	2.00 ^B	117
Libby	April - August	May Final	6.4 ^C	101
Libby	April - August	April Final	6.1 ^{C D}	97
Dworshak	April – July	April Final	3.0 ^C	112
Dworshak	April – July	May Final	3.0 ^C	112

All forecasts are from the National Weather Service Northwest River Forecast Center unless otherwise indicated:

A – RFC forecast (value used to set operations for spring flow objectives)

B – USBR Forecast. The March final forecast (April –August forecast period) determines the minimum Hungry Horse and Columbia Falls flows for the remainder of the calendar year (March-December).

C – COE Forecast

D – Value that is used to set operations for Libby sturgeon pulse

E - Percent of normal for RFC and BOR forecasts is based on 1971 – 2000 average

Percent of normal for Corps forecasts is based on 1929 – 1999 average

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 objective 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	100 kcfs
McNary	260 kcfs

Priest Rapids	135 kcfs
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Summer

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 (May 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	52.4 kcfs
McNary	200 kcfs

Prospects for Meeting Flow Objectives

Not done yet

4. Storage Project Inflow, Volume Comparison and Augmentation Volume forecasts

See Sections 15 and 16 for latest inflow graphs and volume comparison charts for the storage projects. Section 17 shows augmentation volumes based on the latest ESP.

5. Storage Project Operations

Libby Dam

Bull trout flows

Bull trout minimum flows are specified in the 2006 Libby Sturgeon Biological Opinion. Per the BiOp, the project will initiate bull trout flows of at least 8 (based on the latest April – August forecast) kcfs on May 15 and maintain these minimum flow criteria until the sturgeon pulse begins. After the sturgeon pulse, through August, the bull trout minimum (based on the April forecast for the April through August forecast) will be 8 kcfs in 2008. For the month of September the bull trout minimum flow will return to 6 kcfs.

Sturgeon Pulse

Per the 2006 Libby Sturgeon Biological Opinion, the sturgeon pulse volume is determined from a tiered flow structure based upon the COE May Final WSF for the period of April-August. This year the sturgeon pulse volume is 1.04 MAF. Measurement of sturgeon volumes excludes the 4 kcfs minimum flow releases from the dam.

A request with specific flow and date recommendations will be submitted to TMT prior to initiating a flow operation for sturgeon.

[Should there be an April 10 Flood Control elevation section for Libby like the one below for Horse?]

Hungry Horse Dam

Water Supply Forecast and Minimum Flows

The March final, Bureau of Reclamation, WSF for April – August was 2117 kaf (102% 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 3528.3 feet. The project was at elevation 3504.7 feet on April 10. Low fall and winter stream flows coupled with required minimum discharges for Columbia Falls drafted the project below the April 10 elevation objective. Hungry Horse Dam 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.

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 1244.5 feet. The project achieved the elevation objective of 1244.5 feet during the day on April 10. Grand Coulee is expected to refill to 1290 feet by approximately June 30.

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 May Final forecast at The Dalles, the summer draft limit for Grand Coulee is expected to be 1278 feet.

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 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 as defined per the Snake River Basin Adjudication Agreement.

6. Upper Snake River Flow Augmentation

The Bureau of Reclamation currently estimates that a minimum of 427 kaf and up to 487 kaf of Upper Snake River flow augmentation will be provided in 2008.

7. Flood Control Operations

From May COE flood control data

Project	Date						
	31-Jan	28-Feb	15-Mar	31-Mar	10-Apr	15-Apr	30-Apr
MCDB							
ARDB	1430.5	1422.9		1414.1		1416.5	1416.5
LIB	2410.3	2398.5	2393.9	2393.9		2401.8	2401.8
DCDB	1839.3	1812.5	1807.7	1807.7		1807.7	1807.7
HGH	3543.6	3537.7		3530.5		3525	3521.3
GCL	1290	1290		1260.1		1242	1228.8
BRN	2077	2047.9		2039.8		2037.2	2033.8
DWR	1537.4	1522.5		1500.1		1451.3	1493.7

Dworshak/Grand Coulee flood control shift

Brownlee Flood Control Deviation

8. Minimum Operating Pool

All four projects reached their (MOP elevations prior to April 3. The table below describes the reservoir elevation ranges under MOP operations in 2008. Elevation ranges will be 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.

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

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 is scheduled to start 10 April 2008.

9. Hanford Reach

The Vernita Bar protection level flow was set at a level of 55 kcfs based on the 18 November 2007 redd count. This year's Vernita Bar protection operation ended on April 3 when the water over the eggs accumulated 1000 (C degrees) thermal units after the initiation of spawning. Starting at 0001 hours on April 4, Priest Rapids Dam began operating to maintain protective flow bands. See Appendix C for the Hanford Reach Agreement.

10. Spill for Juvenile Fish Passage

Implementation of the Spill for Juvenile Fish Passage is described in the 2008 Fish Operations Plan. This regionally coordinated plan was finalized on February 8, 2008. The Fish Operations Plan is an appendix to the 2008 Water Management Plan and the 2008 Fish Passage Plan.

11. Operation Considerations

Ice Harbor Dam: Minimum generation may need to vary during spring and summer fish spill season due to a transformer failure at BPA's Sacajawea transmission facility near the project. Mobile capacitor banks have been installed at BPA's Franklin substation with the intent of alleviating the need for more than one unit of generation during periods of low flow.

12. 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 latest spill priority list for the fish spill season was issued May 7 1 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. Ice Harbor
2. Lower Monumental
3. Little Goose
4. Lower Granite
5. Wanapum
6. Wells
7. Rocky Reach
8. Rock Island
9. Priest Rapids
10. McNary
11. John Day
12. The Dalles
13. Bonneville
14. Grand Coulee
15. Chief Joseph

Other Spill Operations

Until construction of the spill deflectors at Chief Joseph Dam has been completed and operating in spring of 2009, 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.

13. 2008 Spill Operations

See 2008 Fish Operations Plan

14. 2008 Fish Passage Research

2008 CRFM Activities

March 26, 2008

Bonneville Dam

1. BII Shallow Draft Behavioral Guidance Structure Evaluation
 - A ~700' long, 10' deep guidance boom has been installed in the BII forebay to guide more fish to the BII Corner Collector.
 - Acoustic telemetry will be used to assess yearling Chinook, steelhead, and subyearling Chinook behavioral response to the BGS and to estimate passage distribution at BII.
2. Spillway Survival Evaluation
 - Survival for yearling Chinook that pass the spillway and dam will be estimated for a 100 kcfs, 24-hours/day spill operation from approximately April 21 to June 20.
 - Survival for subyearling Chinook that pass the spillway and dam will be estimated for a 85 kcfs daytime/TDG cap nighttime spill operation from June 21 to approximately July 20.
3. B2 FGE Improvements Evaluation
 - JBS fish condition, mortality, and OPE of Spring Creek March releases and run of fish under various turbine loading (March-June).
4. BII Corner Collector Kelt Passage Evaluation
 - Hydroacoustic monitoring of kelt passage at the BII Corner Collector during March/April.
5. Chum Redd TDG Monitoring
 - Field and lab component Feb-May monitoring and examining the effects of TDG.
6. Sea Lion Predation Observations
 - We will continue to observe and document sea lion predation on spring Chinook, steelhead, lamprey and sturgeon in the tailrace of Bonneville Dam.
7. Adult Lamprey Passage Evaluation
 - Examine the effect of reducing nighttime ladder entrance flow on adult lamprey entrance and passage through BII fishways.

The Dalles Dam

1. No research planned for 2008.
2. We will initiate construction of a 850' long spillwall that extends downstream between bays 8 and 9. We are asking for an extension of the in-water work window – from 1 October through 31 March. Construction will take two complete

in-water work periods (winter) and be complete for a 2010 post-construction evaluation.

John Day Dam

1. Top Spillway Weirs (TSWs) Evaluation

- o Two TSWs will be installed, one in bay 15 and one in bay 16. Each TSW passes approximately 10 kcfs. Spill pattern* development will be completed on April 4 (ERDC spill pattern trip planned for week of 3/31) for operating the spillway with TSWs.
- o Direct effects of yearling Chinook passage through the TSWs vs a standard spill bay will be evaluated from March 31 - April 4 (Hi-Z balloon tag).
- o From approximately April 27 (depending on fish availability) through July 20, we will evaluate passage and survival at 30% vs. 40% spill with the TSWs operating. Yearling Chinook, steelhead, and subyearling Chinook passage will be evaluated using acoustic telemetry:
 - Forebay residence time (from ~2km upstream to passage)
 - 2-D and 3-D near-dam behavior
 - Survival through the dam and for all routes
 - Tailrace egress times
 - GPS drogue tailrace egress times and paths

DATE	START TIME	TREATMENT
MAY 2	0600 HOURS	40%
MAY 3	0600 HOURS	40%
MAY 4	0600 HOURS	40%
MAY 5	0600 HOURS	40%
MAY 6	0600 HOURS	30%
MAY 7	0600 HOURS	30%
MAY 8	0600 HOURS	30%
MAY 9	0600 HOURS	30%
MAY 10	0600 HOURS	40%
MAY 11	0600 HOURS	40%
MAY 12	0600 HOURS	40%
MAY 13	0600 HOURS	40%
MAY 14	0600 HOURS	30%
MAY 15	0600 HOURS	30%
MAY 16	0600 HOURS	30%
MAY 17	0600 HOURS	30%
MAY 18	0600 HOURS	40%
MAY 19	0600 HOURS	40%
MAY 20	0600 HOURS	30%
MAY 21	0600 HOURS	30%
MAY 22	0600 HOURS	40%
MAY 23	0600 HOURS	40%
MAY 24	0600 HOURS	40%
MAY 25	0600 HOURS	40%
MAY 26	0600 HOURS	30%
MAY 27	0600 HOURS	30%

MAY 28	0600 HOURS	40%
MAY 29	0600 HOURS	40%
MAY 30	0600 HOURS	30%
MAY 31	0600 HOURS	30%
JUN 1	0600 HOURS	30%
JUN 2	0600 HOURS	30%
JUN 3	0600 HOURS	40%
JUN 4	0600 HOURS	40%
JUN 5	0600 HOURS	40%
JUN 6	0600 HOURS	40%
JUN 7	0600 HOURS	30%
JUN 8	0600 HOURS	30%
JUN 9	0600 HOURS	30%
JUN 10	0600 HOURS	30%
JUN 11	0600 HOURS	40%
JUN 12	0600 HOURS	40%
JUN 13	0600 HOURS	30%
JUN 14	0600 HOURS	30%
JUN 15	0600 HOURS	40%
JUN 16	0600 HOURS	40%
JUN 17	0600 HOURS	40%
JUN 18	0600 HOURS	40%
JUN 19	0600 HOURS	30%
JUN 20	0600 HOURS	30%
JUN 21	0600 HOURS	40%
JUN 22	0600 HOURS	40%
JUN 23	0600 HOURS	30%
JUN 24	0600 HOURS	30%
JUN 25	0600 HOURS	30%
JUN 26	0600 HOURS	30%
JUN 27	0600 HOURS	40%
JUN 28	0600 HOURS	40%
JUN 29	0600 HOURS	40%
JUN 30	0600 HOURS	40%
JUL 1	0600 HOURS	30%
JUL 2	0600 HOURS	30%
JUL 3	0600 HOURS	40%
JUL 4	0600 HOURS	40%
JUL 5	0600 HOURS	30%
JUL 6	0600 HOURS	30%
JUL 7	0600 HOURS	30%
JUL 8	0600 HOURS	30%
JUL 9	0600 HOURS	40%
JUL 10	0600 HOURS	40%
JUL 11	0600 HOURS	30%
JUL 12	0600 HOURS	30%
JUL 13	0600 HOURS	40%
JUL 14	0600 HOURS	40%
JUL 15	0600 HOURS	40%
JUL 16	0600 HOURS	40%

JUL 17 0600 HOURS 30%
 JUL 18 0600 HOURS 30%

McNary Dam

1. Top Spillway Weirs (TSWs) Evaluation
 - o TSWs in bays 19 and 20.
 - o 2008 spill pattern* development complete.
 - o Revised unit operating priority to improve tailrace egress*.
 - o Spring acoustic telemetry passage and survival evaluation consists of a single 40% spill treatment to begin ~April 10.
 - o Summer acoustic telemetry passage and survival evaluation will examine of two spill treatments (40% vs. 60%) with a single spill pattern to begin ~mid-June.

Ice Harbor Dam

1. Project Passage and Survival Evaluation
 - o 30% vs. 45kcfs/TDG cap spill.
 - o Single release project survival estimates using LMN study fish.
2. Avian Predation of Steelhead
 - o Steelhead collected and tagged at JBS for release.
 - o

DATE	START TIME	BLOCK	TREATMENT
APR 30	0500 HOURS	1	45KCFS/GC
MAY 1	0500 HOURS	1	45KCFS/GC
MAY 2	0500 HOURS	1	30%
MAY 3	0500 HOURS	1	30%
MAY 4	0500 HOURS	2	45KCFS/GC
MAY 5	0500 HOURS	2	45KCFS/GC
MAY 6	0500 HOURS	2	30%
MAY 7	0500 HOURS	2	30%
MAY 8	0500 HOURS	3	45KCFS/GC
MAY 9	0500 HOURS	3	45KCFS/GC
MAY 10	0500 HOURS	3	30%
MAY 11	0500 HOURS	3	30%
MAY 12	0500 HOURS	4	30%
MAY 13	0500 HOURS	4	30%
MAY 14	0500 HOURS	4	45KCFS/GC
MAY 15	0500 HOURS	4	45KCFS/GC
MAY 16	0500 HOURS	5	30%
MAY 17	0500 HOURS	5	30%
MAY 18	0500 HOURS	5	45KCFS/GC
MAY 19	0500 HOURS	5	45KCFS/GC
MAY 20	0500 HOURS	6	45KCFS/GC
MAY 21	0500 HOURS	6	45KCFS/GC
MAY 22	0500 HOURS	6	30%
MAY 23	0500 HOURS	6	30%
MAY 24	0500 HOURS	7	45KCFS/GC
MAY 25	0500 HOURS	7	45KCFS/GC
MAY 26	0500 HOURS	7	30%
MAY 27	0500 HOURS	7	30%

MAY 28	0500	HOURS	8	30%
MAY 29	0500	HOURS	8	30%
MAY 30	0500	HOURS	8	45KCFS/GC
MAY 31	0500	HOURS	8	45KCFS/GC
JUN 1	0500	HOURS	9	45KCFS/GC
JUN 2	0500	HOURS	9	45KCFS/GC
JUN 3	0500	HOURS	9	30%
JUN 4	0500	HOURS	9	30%
JUN 5	0500	HOURS	10	45KCFS/GC
JUN 6	0500	HOURS	10	45KCFS/GC
JUN 7	0500	HOURS	10	30%
JUN 8	0500	HOURS	10	30%
JUN 9	0500	HOURS	11	30%
JUN 10	0500	HOURS	11	30%
JUN 11	0500	HOURS	11	45KCFS/GC
JUN 12	0500	HOURS	11	45KCFS/GC
JUN 13	0500	HOURS	12	30%
JUN 14	0500	HOURS	12	30%
JUN 15	0500	HOURS	12	45KCFS/GC
JUN 16	0500	HOURS	12	45KCFS/GC
JUN 17	0500	HOURS	13	45KCFS/GC
JUN 18	0500	HOURS	13	45KCFS/GC
JUN 19	0500	HOURS	13	30%
JUN 20	0500	HOURS	13	30%
JUN 21	0500	HOURS	14	45KCFS/GC
JUN 22	0500	HOURS	14	45KCFS/GC
JUN 23	0500	HOURS	14	30%
JUN 24	0500	HOURS	14	30%
JUN 25	0500	HOURS	15	30%
JUN 26	0500	HOURS	15	30%
JUN 27	0500	HOURS	15	45KCFS/GC
JUN 28	0500	HOURS	15	45KCFS/GC
JUN 29	0500	HOURS	16	30%
JUN 30	0500	HOURS	16	30%
JUL 1	0500	HOURS	16	45KCFS/GC
JUL 2	0500	HOURS	16	45KCFS/GC
JUL 3	0500	HOURS	17	45KCFS/GC
JUL 4	0500	HOURS	17	45KCFS/GC
JUL 5	0500	HOURS	17	30%
JUL 6	0500	HOURS	17	30%
JUL 7	0500	HOURS	18	30%
JUL 8	0500	HOURS	18	30%
JUL 9	0500	HOURS	18	45KCFS/GC
JUL 10	0500	HOURS	18	45KCFS/GC
JUL 11	0500	HOURS	19	30%
JUL 12	0500	HOURS	19	30%
JUL 13	0500	HOURS	19	45KCFS/GC
JUL 14	0500	HOURS	19	45KCFS/GC
JUL 15	0500	HOURS	20	30%
JUL 16	0500	HOURS	20	30%

JUL 17 0500 HOURS 20 45KCFS/GC
 JUL 18 0500 HOURS 20 45KCFS/GC

Lower Monumental Dam

1. Removable Spillway Weir (RSW) Evaluation

- RSW installed in Bay 8.
- Spring two-treatment test to evaluate two spill patterns* (Bulk vs. Flat) at TDG cap spill.
- Summer single treatment test to evaluate RSW performance at 17 kcfs spill.
- "Bulk" pattern (Table 1) will be used outside of study window.

SPILL TREATMENT SCHEDULE.

DATE	START TIME	BLOCK	TREATMENT
APR 30	0600 HOURS	1	FLAT
MAY 2	0600 HOURS	2	BULK
MAY 4	0600 HOURS	2	FLAT
MAY 6	0600 HOURS	3	BULK
MAY 8	0600 HOURS	3	FLAT
MAY 10	0600 HOURS	4	FLAT
MAY 12	0600 HOURS	4	BULK
MAY 14	0600 HOURS	5	FLAT
MAY 16	0600 HOURS	5	BULK
MAY 18	0600 HOURS	6	BULK
MAY 20	0600 HOURS	6	FLAT
MAY 22	0600 HOURS	7	BULK
MAY 24	0600 HOURS	7	FLAT
MAY 26	0600 HOURS	8	FLAT
MAY 28	0600 HOURS	8	BULK
MAY 30	0600 HOURS	9	BULK
JUN 1	0600 HOURS	9	FLAT

Little Goose Dam

1. Adult Passage Evaluation

- Three treatment (spill patterns*) radio telemetry evaluation to determine the effects of tailrace hydraulics on adult passage.

SPILL SCHEDULE

DATE	START TIME	BLOCK	TREATMENT
APR 3	0001 HOURS	1	BULK
APR 5	0001 HOURS	1	UNIFORM
APR 7	0001 HOURS	1	ALTERNATE
APR 9	0001 HOURS	2	BULK
APR 11	0001 HOURS	2	ALTERNATE
APR 13	0001 HOURS	2	UNIFORM
APR 15	0001 HOURS	3	UNIFORM
APR 17	0001 HOURS	3	BULK
APR 19	0001 HOURS	3	ALTERNATE
APR 21	0001 HOURS	4	UNIFORM
APR 23	0001 HOURS	4	ALTERNATE

APR 25	0001	HOURS	4	BULK
APR 27	0001	HOURS	5	UNIFORM
APR 29	0001	HOURS	5	ALTERNATE
MAY 1	0001	HOURS	5	BULK
MAY 3	0001	HOURS	6	UNIFORM
MAY 5	0001	HOURS	6	BULK
MAY 7	0001	HOURS	6	ALTERNATE
MAY 9	0001	HOURS	7	UNIFORM
MAY 11	0001	HOURS	7	BULK
MAY 13	0001	HOURS	7	ALTERNATE
MAY 14	0001	HOURS	7	ALTERNATE
MAY 15	0001	HOURS	8	BULK
MAY 17	0001	HOURS	8	ALTERNATE
MAY 19	0001	HOURS	8	UNIFORM
MAY 21	0001	HOURS	9	ALTERNATE
MAY 23	0001	HOURS	9	UNIFORM
MAY 25	0001	HOURS	9	BULK
MAY 27	0001	HOURS	10	UNIFORM
MAY 29	0001	HOURS	10	ALTERNATE
MAY 31	0001	HOURS	10	BULK
JUN 2	0001	HOURS	11	UNIFORM
JUN 4	0001	HOURS	11	BULK
JUN 6	0001	HOURS	11	ALTERNATE
JUN 8	0001	HOURS	12	BULK
JUN 10	0001	HOURS	12	ALTERNATE
JUN 12	0001	HOURS	12	UNIFORM
JUN 14	0001	HOURS	13	ALTERNATE
JUN 16	0001	HOURS	13	BULK
JUN 18	0001	HOURS	13	UNIFORM
JUN 20	0001	HOURS	14	BULK
JUN 22	0001	HOURS	14	UNIFORM
JUN 24	0001	HOURS	14	ALTERNATE
JUN 26	0001	HOURS	15	BULK
JUN 28	0001	HOURS	15	UNIFORM
JUN 30	0001	HOURS	15	ALTERNATE
JUL 2	0001	HOURS	16	BULK
JUL 4	0001	HOURS	16	UNIFORM
JUL 6	0001	HOURS	16	ALTERNATE
JUL 8	0001	HOURS	17	UNIFORM
JUL 10	0001	HOURS	17	ALTERNATE
JUL 12	0001	HOURS	17	BULK
JUL 14	0001	HOURS	18	UNIFORM
JUL 16	0001	HOURS	18	BULK
JUL 18	0001	HOURS	18	ALTERNATE
JUL 20	0001	HOURS	19	BULK
JUL 22	0001	HOURS	19	ALTERNATE
JUL 24	0001	HOURS	19	UNIFORM
JUL 26	0001	HOURS	20	UNIFORM
JUL 28	0001	HOURS	20	ALTERNATE
JUL 30	0001	HOURS	20	BULK
AUG 1	0001	HOURS	21	ALTERNATE
AUG 3	0001	HOURS	21	BULK
AUG 5	0001	HOURS	21	UNIFORM
AUG 7	0001	HOURS	22	UNIFORM
AUG 9	0001	HOURS	22	BULK
AUG 11	0001	HOURS	22	ALTERNATE
AUG 13	0001	HOURS	23	UNIFORM

AUG 15	0001	HOURS	23	ALTERNATE
AUG 17	0001	HOURS	23	BULK
AUG 19	0001	HOURS	24	UNIFORM
AUG 21	0001	HOURS	24	BULK
AUG 23	0001	HOURS	24	ALTERNATE
AUG 25	0001	HOURS	25	BULK
AUG 27	0001	HOURS	25	ALTERNATE
AUG 29	0001	HOURS	25	UNIFORM
AUG 31	0001	HOURS	26	ALTERNATE

Lower Granite Dam

1. Adult Passage Evaluation
 - Second year of transition pool modification post-construction evaluation. Also, examine passage behavior relative to temperature differentials in ladder.
2. Transportation Seasonal Effects Evaluation
 - Weekly barging begins April 10 to determine an optimal transportation strategy.
3. Alternate Barging Strategies
 - Weekly barging begins April 21 to determine effects of releasing smolts at alternative sites below Bonneville Dam.