

## **Spring / Summer Update to the 2003 Water Management Plan**

### **Introduction**

The purpose of the Spring / Summer update to the Water Management plan is to provide information on how the Action Agencies plan on operating the Federal Columbia River Power System (FCRPS) reservoirs during the spring and summer seasons. The 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. The Spring / Summer update has current water supply forecasts that give the action agencies a better idea on how the FCRPS will be operated.

The Spring / Summer update does not repeat information in the Water Management plan unless more detail or changes need to be provided because of the availability of water supply forecasts and other new information.

### **Water Supply Forecasts**

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

Forecast Point	Forecast Period	Forecast Date	Value (February Final Forecast)
Lower Granite	April – July	February Final	14.7 MAF
Lower Granite	April – July	February Final	14.7 MAF
The Dalles	April – August	February Final	65.3 MAF
The Dalles	April – August	February Final	65.3 MAF
Hungry Horse	April – August	February Final	1.53 MAF <sup>B</sup>
Libby	April - August	February	4.7 MAF <sup>C</sup>

All forecasts from Weather Service unless otherwise indicated

A – Value that is used to set operations

B – USBR Forecast      C – COE Forecast

## Flow Objectives

### ***Spring***

The April final water supply forecast sets the spring flow objectives for Lower Granite and McNary. The Priest Rapids spring flow objective is fixed (not dependent on the water supply forecast). Based on the February final forecast the spring flow objectives are shown below.

Project	Spring Flow Objective
Lower Granite	85 KCFS
McNary	220 KCFS
Priest Rapids	135 KCFS

### ***Summer***

Based on the latest water supply forecast (February Final) the summer flow objectives are shown below. The McNary summer flow objective is fixed (not dependent on the water supply forecast).

Project	Summer Flow Objective
Lower Granite	50 KCFS
McNary	200 KCFS

## ***Prospects For Meeting Flow Objectives***

An analysis of the likelihood of meeting the flow objectives was conducted by using the Corps' QADJ runs of the HYSSR model. This model uses the volume of the current water supply forecast and applies the 59 shapes observed in the runoff record to this runoff volume. 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 timeframe in which the snowmelt and stream flows occur.

14-Feb-03

### Summary of February 2003 QADJ Model Runs

#### Assumptions:

- \* Streamflows were adjusted to the February Final Water Supply Forecast and shaped 59 different ways based on observed historical runoff.
- \* Starting Elevations were actual Jan 31 observed data.
- \* Grand Coulee operates to meet 70 kcfs at Priest Rapids Feb - Apr 15. Coulee attempts to meet McNary flows May-June.
- \* Hungry Horse operates to VARQ, meets minimum flows at Columbia Falls, targets full in June, and drafts to 3540 ft by 31 Aug.
- \* Brownlee operates to flood control elevations.
- \* Dworshak targets full in June, releases a maximum of 13,000 cfs in July - August for LWG and targets 1520

ft by 31 Aug.

\*Libby operates on 4 kcfs minimum flow or VARQ flood control Feb - Apr. Operates on 4 kcfs minimum flow in May, 6 kcfs in June, targets full in July, and drafts to 2439 ft by 31 Aug.

Results:

Priest Rapids Meets Flow Objectives of 70 kcfs Jan - Apr1  
and 135 kcfs Apr2 - Jun:

Month	Occurrences out of 59 Years	Average Flow for 59 Years (kcfs)
Feb	59	71
Mar	42	75
Apr1	59	78
Apr2	3	91
May	55	152
Jun	11	99

**Grand Coulee  
meets an Apr 15  
target elevation of  
1283.3 ft in 18 out  
of 59 years with an  
average elevation  
for the 59 years of  
1270.8 ft.**

Lower Granite Meets Flow Objectives of 85 kcfs in Apr - May, 73.3 kcfs in June and 50 kcfs in Jul - Aug:

Month	Occurrences out of 59 Years	Average Flow for 59 Years (kcfs)
Apr2	2	55
May	26	82
Jun	26	73
Jul	5	40
Aug1	0	31
Aug2	0	24

McNary Meets Flow Objectives of 220 kcfs in Apr2 - Jun and 200 kcfs in Jul - Aug:

Month	Occurrences out of 59 Years	Average Flow for 59 Years (kcfs)
Apr2	1	140
May	43	218
Jun	4	171
Jul	0	131
Aug1	0	124
Aug2	0	116

Bonneville Meets Flow Objectives of 125 kcfs in Feb - Apr:

Month	Occurrences out of 59 Years	Average Flow for 59 Years (kcfs)
Feb	12	118
Mar	18	124
Apr1	45	143
Apr2	51	160

Projects Refill by 30 June:

Month	Occurrences out of 59 Years	Average Elevation on 30 Jun for 59 Years
Libby	54	2459
Hungry Horse	28	3558
Grand Coulee	59	1288
Dworshak	54	1600

## Storage Project Operation

### *Libby*

#### **Tier**

The current water supply forecast (4.66 MAF) for Libby (April – August) puts Libby operations in the 1st tier of operation for sturgeon called for in the USFWS 2000 Biological Opinion. Tier 1 call for no Sturgeon flow and minimum bull trout releases in July of 6 kcfs.

#### **Sturgeon Pulse**

Based on the current water supply forecast no Libby Sturgeon pulse will occur this year.

#### **Libby Outlook**

Graph not available yet

### *Hungry Horse*

#### **HGH Minimum Flows**

Based on the Bureau of Reclamation February forecast for April – August of 1540 kaf, the minimum outflow from Hungry Horse will be 683 cfs and the minimum flow for Columbia Falls will be 3,370 cfs.

#### **HGH Outlook**

Graph not available yet

## ***Grand Coulee***

### **GCL Summer Draft Limit**

Based on the current April – August forecast at the Dalles, the summer draft limit for Grand Coulee is expected to be 1278 feet.

## ***Dworshak***

### **DWR Outlook**

Graph not available yet

### **Summer Draft for Temperature Control**

Modeling will be done to help decide how to draft Dworshak for temperature control.

## **Upper Snake Operation**

The Bureau of Reclamation currently estimates that between 250 and 300 kaf will be available for flow augmentation in 2003.

## **Flood Control**

The flood control elevations based on the February Final Forecast are as follows. Note April 10th flood control elevations are interpolated. There is no official method of determining April 10th flood control elevations

Project	Date						
	31-Jan	28-Feb	15-Mar	31-Mar	10-Apr	15-Apr	30-Apr
ARDB	1435.5	1437.1		1435.4		1435.4	1435.4
LIB	2426.7	2436.4	2441.1	2446.9			2454.4
DCDB	1849.8	1828.6		1828.6		1828.6	1828.6
HGH	3548.1	3551.7		3553.1	3553.5	3553.7	3554.3
GCL	1290	1290		1283.3	1283.3	1283.3	1283.3
BRN	2077	2070		2073.6		2075.3	2077
DWR	1560.3	1565		1577.6	1581.7	1583.8	1583.8

### ***Dworshak/Grand Coulee flood control shift***

No information yet.

## MOP

Mop operation for the Lower Snake projects is scheduled is scheduled to start April 3rd. The table below shows currently planed MOP operations.

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

At John Day the forebay will be operated within a 1.5 foot range between 262.5 and 265.0 feet from April 10th to September 30th.

## Hanford Reach

Info not available yet

## Spill for Juvenile Fish Passage

### *Spring*

Since the forecasted average flow at Lower Granite is below 85 kcfs, there will be no spill for juvenile fish passage at Lower Granite, Little Goose, and Lower Monumental.

### **LWG**

No voluntary spill except when Removable Spillway Weir test is ongoing. See under research below.

### **LGS**

No voluntary spill.

### **LMN**

No voluntary spill.

### **IHR**

Spill to gas cap 1800 – 0500 spill limited to 45 kcfs 0500 – 1800.

### **MCN**

Spill to gas cap 1800 – 0600. Spill started April 10th.

### **JDA**

See under research below.

**TDA**

Spill 40% of the outflow up to the gas cap 24 hours a day. Spill started April 10th.

**BON**

See under research below.

***Summer***

Summer spill planning date is June 21 for the Lower Snake projects and July 1st for the Lower Columbia projects.

**LWG**

No summer spill

**LGS**

No summer spill

**LMN**

No summer spill

**IHR**

Spill to gas cap 1800 – 0500 spill limited to 45 kcfs 0500 – 1800.

**MCN**

No summer spill

**JDA**

See under research below.

**TDA**

Spill 40% of the outflow up to the gas cap 24 hours a day.

**BON**

See under research below.

**Water Quality**

***Spill Priority List***

In cases of involuntary spill the projects are to spill in the following order McNary, John Day, The Dalles, Bonneville, Little Goose, Ice Harbor, Lower Granite, Priest Rapids, Rocky Reach, Wells, Rock Island, Wanapum, Chief Joseph. Note this order is subject to change during the season. Also note that Lower Monumental is not on the spill priority list due tailrace erosion and repair work.

## Research

Note for more detail on research see the 2003 Fish Passage Plan, Appendix A, Special Operations and Studies. Only research activities the significantly impact project operations are discussed below.

### ***Removable Spillway Weir – Lower Granite***

#### **Proposed Operation of Lower Granite and the RSW**

Due to the possible low water conditions the following protocol has been developed for testing the RSW at Lower Granite this year.

#### ***Testing Triggers***

1. At the March Final forecast (March 7 –14<sup>th</sup>), if the projected runoff for the period of April to July at Lower Granite is:
  - Less than 13 MAF, then no test is proposed; or
  - Equal to or greater than 13 MAF, then prepare for test and more to next test trigger.
  
2. At the April Final Forecast (April 7 – 10<sup>th</sup>), if the projected runoff for the period of April to July at Lower Granite is:
  - Equal or greater than 16.5 million acre feet (MAF), then proceed with full season (6-week) test plan; or
  - Equal to 13 MAF<sup>2</sup> but less than 16.5 MAF, then proceed with shorter duration (3-week) test plan.

#### ***Test Plans***

**Full Season Test** – Meets all of the objectives of the 2003 for both, survival and performance. Depending on the performance of the stand-alone RSW tests in 2003 and the plans for testing of a modified BGS in 2004, a RSW operation may be developed and implemented as early as the 2004 season.

- Duration: 6 weeks
- Experimental Test Conditions: 2 or 3 conditions (plus an alternate condition in the event flows exceed 120kcfs during the testing period. This item was introduced in the FFDRWG meeting Dec. 11, 2002, but was not included in the low flow test discussed at the Jan. 22, 2003 meeting).
- Test Flows: >70kcfs

**Shorter Duration Test** – Meets all of the objectives of 2003 for both, survival and performance. The data will be sufficient to provide the information desired to confirm RSW survival to keep the Ice Harbor fast track on schedule and for the development BGS

2004 test and the BGS Ice Harbor implementation schedule. The resulting data to support 2004 operation decisions for LGR RSW may not be as strong as the data from the full season test but should be sufficient to provide direction for 2004 operation.

- Duration: 3 weeks
- Experimental Test Conditions: 2 conditions (BiOp and one RSW)
- Test Flows: expected 3 week period with average flow >70kcfs, but initiate study during lower flows, 50 to 70kcfs, to avoid overlap of peak fish run. Test may be split into 3 periods to reduce the potential of spilling spill during the migration peak.

### ***McNary TDG Spill Test***

A field study is proposed to address the TDG exchange associated with the modified spillway and associated operations under a wide range of operating conditions. A portion of this study will be conducted during the first two weeks of April.

This study will primarily focus on determining the total dissolved gas exchange characteristics associated with spillway operation for discharges up to the design spill for a 7-day, 10-year frequency flood. Both spillway and powerhouse discharge will be systematically varied during the test with spillway discharge ranging from 2 to 10 kcfs/bay. The study will be scheduled during river flow conditions that will accommodate as wide a range of tailwater elevations as possible. The spill patterns investigated will encompass the newly established standard spill pattern and special spill patterns involving only a limited number of spill bays. The designation of alternative powerhouse loading will be scheduled to investigate the interaction of powerhouse and spillway releases. Circulation patterns below the dam will also be described through a variety of sampling devices. This information will support the interpretation of study TDG data and related issues concerning fish passage through this river reach.

### ***John Day Project Survival Test***

Spill will alternate between 0% day / 60% night and 30% day / 30% night according to the schedule below

<b>Date</b>	<b>Spill Treatment</b>	<b>Date</b>	<b>Spill Treatment</b>	<b>Date</b>	<b>Spill Treatment</b>
9-Jun-03	30 day/30 night	26-Jun-03	0 day/60 night	13-Jul-03	30 day/30 night
10-Jun-03	30 day/30 night	27-Jun-03	30 day/30 night	14-Jul-03	30 day/30 night
11-Jun-03	0 day/60 night	28-Jun-03	30 day/30 night	15-Jul-03	0 day/60 night
12-Jun-03	0 day/60 night	29-Jun-03	30 day/30 night	16-Jul-03	0 day/60 night
13-Jun-03	30 day/30 night	30-Jun-03	30 day/30 night	17-Jul-03	30 day/30 night
14-Jun-03	30 day/30 night	1-Jul-03	0 day/60 night	18-Jul-03	30 day/30 night
15-Jun-03	0 day/60 night	2-Jul-03	0 day/60 night	19-Jul-03	30 day/30 night
16-Jun-03	0 day/60 night	3-Jul-03	30 day/30 night	20-Jul-03	30 day/30 night
17-Jun-03	30 day/30 night	4-Jul-03	30 day/30 night	21-Jul-03	0 day/60 night
18-Jun-03	30 day/30 night	5-Jul-03	0 day/60 night	22-Jul-03	0 day/60 night
19-Jun-03	0 day/60 night	6-Jul-03	0 day/60 night	23-Jul-03	0 day/60 night
20-Jun-03	0 day/60 night	7-Jul-03	0 day/60 night	24-Jul-03	0 day/60 night
21-Jun-03	30 day/30 night	8-Jul-03	0 day/60 night	25-Jul-03	30 day/30 night
22-Jun-03	30 day/30 night	9-Jul-03	30 day/30 night	26-Jul-03	30 day/30 night
23-Jun-03	0 day/60 night	10-Jul-03	30 day/30 night	27-Jul-03	30 day/30 night
24-Jun-03	0 day/60 night	11-Jul-03	0 day/60 night	28-Jul-03	30 day/30 night
25-Jun-03	0 day/60 night	12-Jul-03	0 day/60 night	29-Jul-03	0 day/60 night
				30-Jul-03	0 day/60 night

**BON Adult Passage study**

Day time spill levels will alternate between 75 KCFS (Fallback limit) (low) and spilling to the TDG Gas Cap as shown below.(high)

Date	Spill Treatment	Date	Spill Treatment	Date	Spill Treatment	Date	Spill Treatment
10-Apr-03	Low	16-May-03	High	21-Jun-03	Low	27-Jul-03	Low
11-Apr-03	Low	17-May-03	High	22-Jun-03	Low	28-Jul-03	Low
12-Apr-03	High	18-May-03	Low	23-Jun-03	High	29-Jul-03	High
13-Apr-03	High	19-May-03	Low	24-Jun-03	High	30-Jul-03	High
14-Apr-03	Low	20-May-03	High	25-Jun-03	High	31-Jul-03	High
15-Apr-03	Low	21-May-03	High	26-Jun-03	High	1-Aug-03	High
16-Apr-03	High	22-May-03	Low	27-Jun-03	Low	2-Aug-03	Low
17-Apr-03	High	23-May-03	Low	28-Jun-03	Low	3-Aug-03	Low
18-Apr-03	High	24-May-03	High	29-Jun-03	Low	4-Aug-03	High
19-Apr-03	High	25-May-03	High	30-Jun-03	Low	5-Aug-03	High
20-Apr-03	Low	26-May-03	Low	1-Jul-03	High	6-Aug-03	Low
21-Apr-03	Low	27-May-03	Low	2-Jul-03	High	7-Aug-03	Low
22-Apr-03	High	28-May-03	Low	3-Jul-03	Low	8-Aug-03	Low
23-Apr-03	High	29-May-03	Low	4-Jul-03	Low	9-Aug-03	Low
24-Apr-03	Low	30-May-03	High	5-Jul-03	High	10-Aug-03	High
25-Apr-03	Low	31-May-03	High	6-Jul-03	High	11-Aug-03	High
26-Apr-03	Low	1-Jun-03	Low	7-Jul-03	High	12-Aug-03	Low
27-Apr-03	Low	2-Jun-03	Low	8-Jul-03	High	13-Aug-03	Low
28-Apr-03	High	3-Jun-03	High	9-Jul-03	Low	14-Aug-03	High
29-Apr-03	High	4-Jun-03	High	10-Jul-03	Low	15-Aug-03	High
30-Apr-03	High	5-Jun-03	Low	11-Jul-03	High	16-Aug-03	High
1-May-03	High	6-Jun-03	Low	12-Jul-03	High	17-Aug-03	High
2-May-03	Low	7-Jun-03	High	13-Jul-03	Low	18-Aug-03	Low
3-May-03	Low	8-Jun-03	High	14-Jul-03	Low	19-Aug-03	Low
4-May-03	High	9-Jun-03	Low	15-Jul-03	High	20-Aug-03	High
5-May-03	High	10-Jun-03	Low	16-Jul-03	High	21-Aug-03	High
6-May-03	Low	11-Jun-03	High	17-Jul-03	Low	22-Aug-03	Low
7-May-03	Low	12-Jun-03	High	18-Jul-03	Low	23-Aug-03	Low
8-May-03	Low	13-Jun-03	Low	19-Jul-03	Low	24-Aug-03	Low
9-May-03	Low	14-Jun-03	Low	20-Jul-03	Low	25-Aug-03	Low
10-May-03	High	15-Jun-03	High	21-Jul-03	High	26-Aug-03	High
11-May-03	High	16-Jun-03	High	22-Jul-03	High	27-Aug-03	High
12-May-03	Low	17-Jun-03	Low	23-Jul-03	High	28-Aug-03	Low
13-May-03	Low	18-Jun-03	Low	24-Jul-03	High	29-Aug-03	Low
14-May-03	High	19-Jun-03	High	25-Jul-03	Low	30-Aug-03	High
15-May-03	High	20-Jun-03	High	26-Jul-03	Low	31-Aug-03	High