

TECHNICAL MANAGEMENT TEAM

BOR :	<i>John Roache / Mary Mellema</i>	BPA :	<i>Robyn MacKay / Tony Norris / Scott Bettin</i>
NOAA-F:	<i>Paul Wagner / Richard Dominigue</i>	USFWS :	<i>David Wills / Steve Haeseker</i>
OR :	<i>Rick Kruger / Ron Boyce</i>	ID :	<i>Russ Kiefer</i>
WA :	<i>Cindy LeFleur</i>	MT :	<i>Jim Litchfield / Brian Marotz</i>

COE: *Cathy Hlebechuk / Jim Adams / Cindy Henriksen*

TMT CONFERENCE CALL

Monday July 02, 2007

NOTE: Time & Phone Number to be Determined

1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97209

Conference call line:

To check into the building, take the elevator to the 5th floor and the guard will issue you an ID badge if you need one and will take you down to the 4th floor where the meeting is. If you have NOT attended a TMT meeting in the past you will need to call ahead and let Cathy Hlebechuk (503) 808-3942, Jim Adams (503) 808-3938 or Cindy Henriksen (503) 808-3945 know, so you can be added to the TMT Visitor List and issued an ID badge. This badge may be used indefinitely. If you have attended TMT in the past you may re-use your ID badge indefinitely. If you are a federal employee you will also need to have an ID badge issued to you which can be used indefinitely.

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Please MUTE your Phone

*All members are encouraged to call Robin Harkless with any issues or concerns they would like to see addressed.
Please e-mail her at robin76@cnnm.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and Introductions
2. McNary Transportation
3. Other
 - Set agenda for next meeting - **July 11, 2007** [[Calendar 2007](#)] 

Questions about the meeting may be referred to [Cathy Hlebechuk](#) at (503) 808-3942, [Jim Adams](#) at (503) 808-3938 or [Cindy Henriksen](#) at (503) 808-3945

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COE: *Cathy Hlebechuk / Jim Adams / Cindy Henriksen*

TMT CONFERENCE CALL

Thursday July 05, 2007 11:00 - 12:00

NOTE: Time & Phone Number

1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97209

Conference call line: 503-808-5191

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AGENDA

1. Welcome and Introductions
2. McNary Transportation
3. [Dworshak Operation](#) 
 - Set agenda for next meeting - **July 11, 2007** [[Calendar 2007](#)] 

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Lower Snake Temperature Management

July 4, 2007

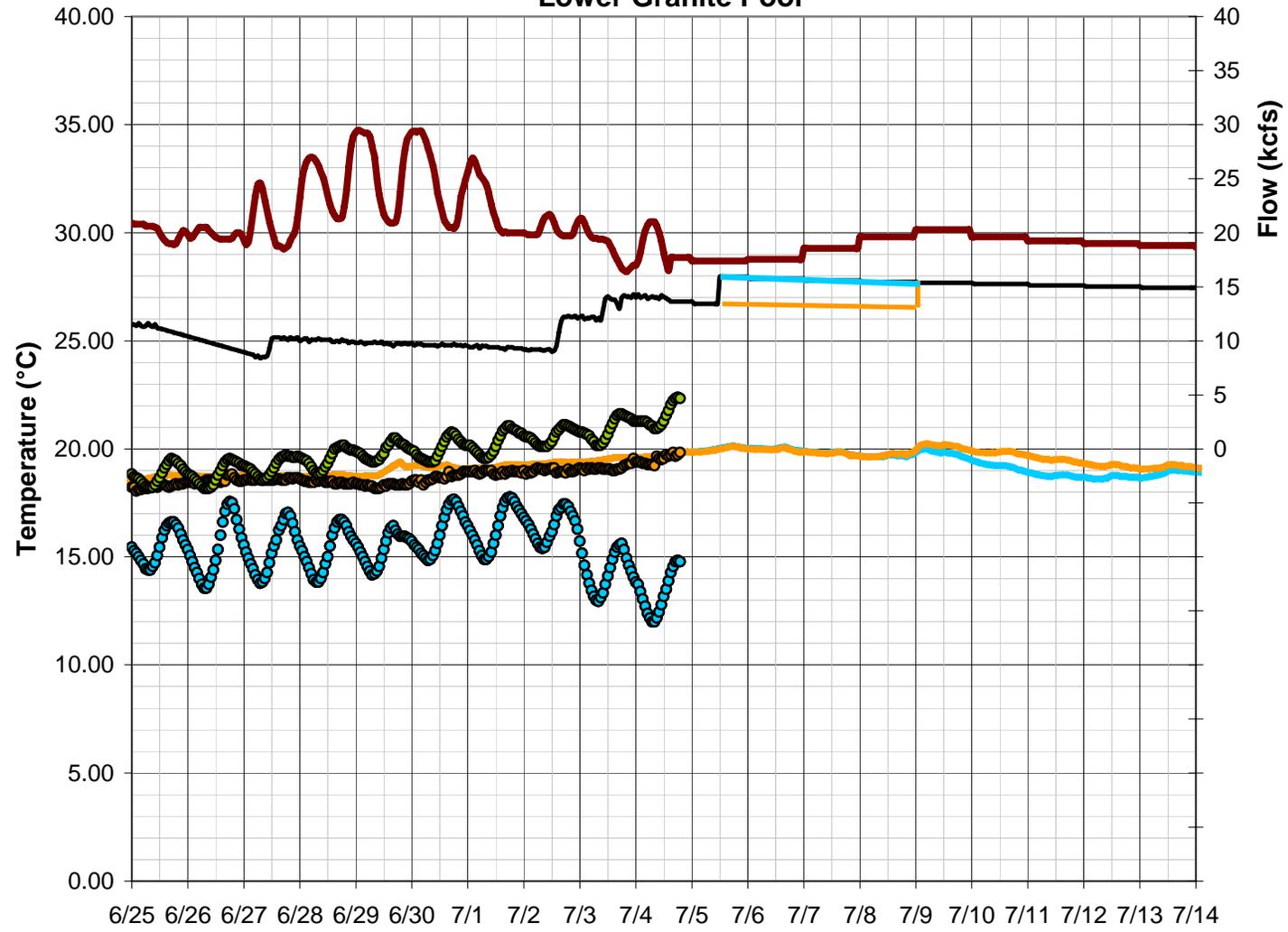
- General Observations
 - Previous temperature forecast closely tracked observed release temperature at LWG
 - Temperature in Snake River at Lower Granite 19.8 °C above normal for this time of year
 - Temperature of flow weighted inflow $T_{crit} = 18$ °C
 - T_{crit} dropped below 18.5 °C on July 3
 - Heat gain in LWG pool 0.9-1.3 C
 - Travel time in LWG pool 5.5 days

Lower Snake Temperature Management

July 4, 2007

- Results of CEQUAL-W2 simulation (June 1-July 31 simulation)
 - Base Condition (July 5-8, 9.5 kcfs; July 9-13, 12 kcfs)
 - SR Temps at LWG reach 20°C on July 5
 - Duration of 6 days near 20 °C
 - SR Temps decline after July 10
 - Alternative 1 (July 5-13, 12 kcfs)
 - Cooler temperature July 9-13 compared to base condition
 - Up to 0.5 °C cooler

Lower Granite Pool



COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

July 5 and July 9, 2007 Conference Calls

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

Notes: Erin Halton

The following notes are a summary of issues that are intended to point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the "record" of the meeting, only a reminder for TMT members.

Summer Transportation at McNary

Bernard Klatt, COE, gave TMT members a quick review of the McNary transport issue: During the June 27 TMT meeting, the Corps reported that the passage conditions at McNary Dam were no longer spring-like, and transportation operations should begin per the 2004 BiOp/UPA. On behalf of the salmon managers, NOAA proposed delaying implementation of transportation at McNary until information was reviewed from the NMFS Science Center's 2002 study results comparing transported and in-river fish at McNary. At the July 5 TMT meeting, having reviewed the science, the salmon managers stated that they did not object to beginning transportation operations at McNary. However, the Corps identified a navigation safety issue concerning the fish transport barges, given installation of TSW's and associated research and testing requiring spill at the project. The Corps proposed a navigation safety test on July 6.

The COE's plan, per guidance in the Fish Operations Plan and consistent with the 2004 BiOp, was to reduce spill to 26 kcfs on July 6 and, if the fish barge captain and project biologists determined conditions were safe enough to navigate, begin collection and start transporting on Sunday, July 8. The COE asked TMT members to weigh in on the issue:

- NOAA: Begin collection while maintaining TSW and research operations, and ensure all operations are consistent with the 2004 BiOP.
- USFWS: No objection; conclusions about the benefits of transportation at McNary may be premature at this point and further study is needed.
- OR: Do not object to NOAA's recommendation, as the operation is consistent with the 2004 BiOP, and more research is needed on the impacts of transportation on fish.
- ID: No objection to the proposed operation.
- MT: No objection to the proposed operation.
- Nez Perce: No objection to the proposed operation.
- CRITFC: The research is not conclusive enough to fully support going to collection. Defer to NOAA to make a recommendation.
- BOR: No objection to the proposed operation.
- BPA: No objection to the proposed operation.

Action/Next Steps: The email sent out by Cindy Henriksen, COE on 7/3 summarized the action the COE would take regarding transport at McNary:

"The fish barge captain has agreed to look at the required spill w/ bays 14/20/22 open (total 26 kcfs) this Friday morning to determine if tailrace conditions are safe for navigation. If they determine that it is safe then we will start collecting fish later that day and the first barge to transport from MCN will be on Sunday, 8 July. If the spill is not safe for navigation, we will leave the configuration in bypass mode and update TMT [via email]."

Update from 7/9 TMT Conference Call: Bernard Klatte reported on Friday's July 6 test: following this test, the Corps determined that it was too dangerous to operate a fish barge with the 3 spill bays open, and decided to continue bypassing fish rather than begin transport operations. TMT members indicated they would not object to this operation given the navigation safety issue under these spill conditions. Bernard noted that the signatories to the 2007 Agreement were contacted and their representative indicated there were no objections to this change in operations. It was noted that truck transportation at McNary was slated to begin on August 16.

Dworshak Operations

TMT members looked at current conditions in the Snake Basin. Air temperatures were above 100° and expected to increase over the weekend. Water temperatures into Lower Granite were around 18° C and Dworshak releases were maintaining at 43-44° C. TMT members also looked at updated CEQUAL modeling results provided by Mike Schneider, COE. A concern was raised by one TMT member that the modeling may have been too optimistic in terms of its projections, and it was also noted that travel time of the cool water from Dworshak will take approximately 5 days to reach Lower Granite given the low flows. Folks were asked to consider the option of dropping temperatures at Dworshak for a few days rather than increasing outflows, to which the USFWS reiterated that the federal hatchery would not support dropping below 43-44° at any time. Two other options were discussed: increase outflows to 14 kcfs for three days and revisit the operation with the intent to drop outflows at that time, or, increase to 12 kcfs and check in with TMT next week to determine next steps.

Action/Next Steps: Given there was not a full consensus to implement to 14 kcfs for three days, NOAA recommended operating Dworshak to 12 kcfs and checking in during an FPAC conference call on Monday to look at updated conditions and forecasts. The COE planned to shift Dworshak outflows to 12 kcfs ASAP, and the Salmon Managers held a conference call on Monday, 7/9 at 11 a.m.

Update from 7/9 TMT Conference Call: Paul Wagner, NOAA, shared the results of the FPAC call held just before the TMT call, during which the salmon managers reviewed updated modeling and conditions, and based on this information, agreed to recommend maintaining 12 kcfs through Friday, July 13 and reducing to full powerhouse (9.5 kcfs) on Saturday morning, with a check in on Wednesday during a regularly scheduled TMT meeting. This, they believed, would strike a balance between maintaining acceptable temperatures now and through the summer and reaching close to 1535' at Dworshak on

August 31. All agreed that the operation thus far had been successful and that there was a need to continue monitoring this operation closely throughout the summer. The COE planned to continue operating Dworshak at 12 kcfs outflows, and there will be further discussion at the July TMT meeting.

Next face-to-face TMT meeting: Wednesday, July 11th

Agenda items will include:

- Review/Finalize Facilitator's Notes and Meeting Minutes
- Priest Rapids Operations Report
- Updated Flow Forecasts
- Dworshak Operations
- Libby/Hungry Horse Operations
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TMT CONFERENCE CALL

Monday July 09, 2007 14:00 - 15:30

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Portland, Oregon 97209-4142
Map Quest [\[Directions\]](#)

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AGENDA

1. Welcome and Introductions
2. Dworshak Operations
 - a. [\[CE-QUAL-W2 Water Temperature Model Runs - Michael L. Schneider, COE\]](#) 
3. Other
 - Review agenda for next meeting - **July 11, 2007** [\[Calendar 2007\]](#) 

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Lower Snake Temperature Management

July 9, 2007

- General Observations
 - Lower Granite Pool
 - Temperature in Snake River at Lower Granite 19.7 °C (67.4 F)
 - Temperature of flow weighted inflow $T_{crit} = 18.4$ °C
 - T_{crit} dropped below 18.5 °C on July 3
 - Heat gain in LWG pool 0.9-1.3 C
 - Travel time in LWG pool 5.0 days
 - Density stratified flow / underflow reducing time of travel
 - Snake River at Anatone $Q_{5d} = 19.6$ kcf, $T_{5d} = 22$ °C (71.6 F)
 - Clearwater River
 - Dworshak $Q_{5d} = 10.8$ kcf, $T_{5d} = 6.5$ °C (43.7 F)
 - Orofino $Q_{5d} = 3.8$ kcf, $T_{5d} = 23.6$ °C (74.5 F)
 - Lewiston $T_{5d} = 13.3$ C (56 F)
 - Flow ratio $Q_{cr} / Q_{sr@lwg} = 42\%$

Lower Snake Temperature Management

July 9, 2007

- Forecasts

- Weather (NOAA)

- Very Hot Temperatures predicted for later this week at Lewiston ID

- July 9 10 11 12 13 14 15
 - Mon Tue Wed Thu Fri Sat Sun
 - Highs 95 96 101 107 110 99 97
 - Lows 65 65 65 67 71 68 66

- Hourly weather data from 2006 for July 16-31

- Flows

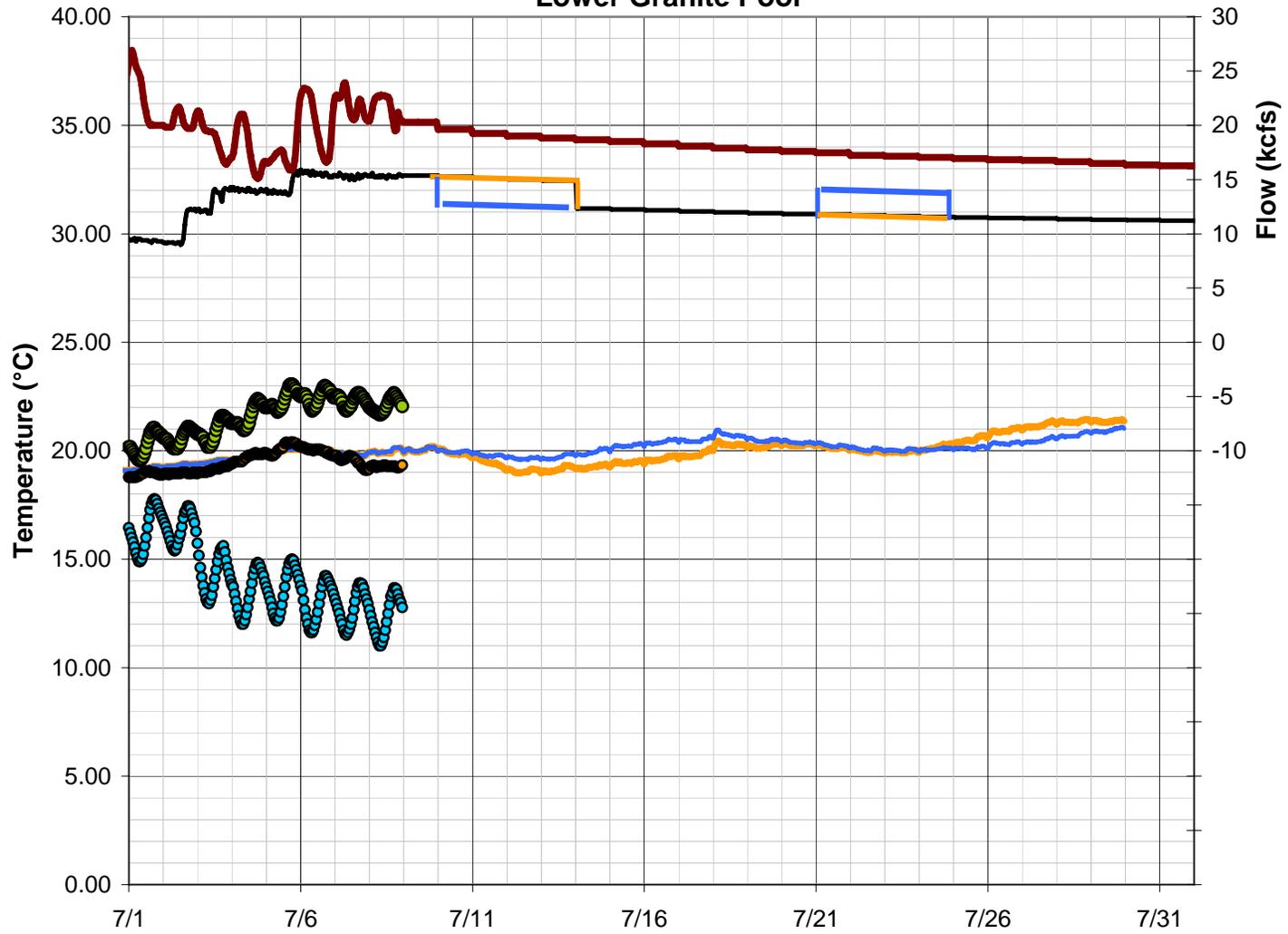
- Clearwater River at Orofino (STP) falling from 3.4 to 2.7 kcfs by July 15
 - Snake River at Anatone (STP) falling from 20.2 to 18.5 by July 15
 - Dworshak Operations (1994-avg inflow 1.4 kcfs Sept. 1)
 - 54 days before Sept 1 – 5 days@12 kcfs and 49 days @ 9.5 kcfs =1535 ft
 - Base Plan 12 kcfs through July 13, 9.5 July 14-31
 - Alternative 1 12 kcfs through July 9, 9.5 July 10-20, 12 kcfs July 21-24
 - Temperatures Boundary Conditions at Anatone and Orofino 2006

Lower Snake Temperature Management

July 9, 2007

- Results of CEQUAL-W2 simulation (June 1-July 31 simulation)
 - Base Condition
 - SR Temps near 20°C at LWG next two days
 - Cooling trend July 10-11
 - Warming trend returning to 20 C by July 17-18
 - Second Hot spike in temperatures on July 21
 - Limited to PH capacity resulting in temperature > 21 C
 - Alternative 1
 - Warmer temperatures July 13-16 compared to base condition
 - Up to 0.75 °C warmer
 - SR Temps > 20 C on July 14
 - Second Hot Spike moderated with 12 kcfs release

Lower Granite Pool



COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

July 5 and July 9, 2007 Conference Calls

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**Columbia River Regional Forum
Technical Management Team Conference Call
July 9, 2007**

1. Welcome and Introductions

Today's TMT conference call was chaired by Cathy Hlebechuk and facilitated by Robin Harkless, with representatives from the Nez Perce Tribe, BOR, COE, Washington state, NOAA, BPA, CRITFC, USFWS and Montana on the line. The following is a summary (not a verbatim transcript) of the topics discussed and decisions made during the call. Anyone with questions or comments about these notes should provide them to the TMT chair or bring them to the next meeting.

2. Dworshak Operations

The main purpose of today's conference call was to check in on Dworshak operations in light of an FPAC call earlier today to review updated conditions and CEQUAL modeling results.

Mike Schneider (COE) presented FPAC with verbal findings based on two modeled scenarios of Dworshak outflows, one a flow of full powerhouse at 9.5 kcfs, the other maintaining the current 12 kcfs discharge, Paul Wagner reported. While graphs were not yet available, Schneider's review indicated that the 12 kcfs level would provide a greater margin of safety than 9.5 kcfs outflows, which might or might not be sufficient to keep river temperatures within half a degree of the 20 degrees C criterion with a forecasted heat wave coming.

Given these findings, FPAC recommended maintaining 12 kcfs outflows until this Friday, July 13, pending future modeling results – after which FPAC might recommend a decrease in flows to powerhouse capacity late Friday night, Wagner said. FPAC also favored maintaining the current water temperature of about 43.5 degrees F, which works for the federal hatchery because the fish are getting exposure to another degree of warmth while still inside the hatchery. Wagner predicted that Friday's forecast of 110 degrees at Lewiston, Idaho, will be the peak of this summer's heat on the Snake, but advised that a decision about the weekend operation be held off until the regularly scheduled TMT meeting on July 11.

If we continue to release about 12 kcfs through Friday, that will not jeopardize the ability to release at least 10 kcfs through the end of August and still achieve the target elevation, according to the EPA RBM-10 modeling Kyle Dittmer showed TMT, Dave Statler (Nez Perce) said. If we keep outflows at 12 kcfs for much longer, we'll begin to reduce the potential for heat control later in August, Wagner said. The margin of water volume above full powerhouse is shrinking rapidly, if not gone by Friday, Wagner and Schneider agreed.

Hlebechuk reminded everyone a decision has to be made on how to shape the water releases and to keep in mind if more water is released now there will be less available later.

Wagner asked, what about the increase above 20 degrees C that happens on July 26 according to the CEQUAL modeling? That goes back to the occurrence of a second heat wave last July, which might not happen again this year, Schneider said. The consequence of having no more water above powerhouse capacity later in the month is warmer temperatures.

Historically, we have at least one or two heat spikes in the lower Snake during mid-July to mid-August, Kyle Dittmer (CRITFC) said. More hot spells can reasonably be expected, but that doesn't necessarily imply a need to run at full powerhouse capacity throughout the remainder of August. Dittmer recalled that outflows have been cut to below 7 kcfs some years, in order to conserve water for later in the season. Wagner agreed that prior years' temperature control efforts during mid-August have been effective.

This year, it will be important to remember the five-day lag time in terms of measuring effects downriver. In a day or two, we should see another decline in temperatures in conjunction with raising Dworshak to 12 kcfs outflows, Schneider said. Henriksen reminded TMT that people in the Lewiston area might need increased flows to meet their power needs during extremely hot spells.

TMT suspended decision-making about this weekend's operation until the regularly scheduled TMT meeting on Wednesday, when Mike Schneider will present the latest CEQUAL modeling results. We've only got a few more days of ability to spill above power house capacity, which means we may have less than

10 kcfs on average to work with through July and August, Statler said. He urged people to think about using these flows judiciously.

The modeling and information to date indicate that, while flows of 10 kcfs will likely keep river temperatures below the critical level, there's interest and agreement among the salmon managers to provide an extra cushion, recognizing all the things that need to be balanced, Robin Harkless said and Haller agreed. The planned operation is to continue at 12 kcfs outflows, then look at the latest modeling on Wednesday to confirm the tentative plan of reducing flows to full powerhouse beginning Saturday morning, July 14.

The COE needs to shut off spill at Dworshak spillway for about two minutes to do emergency management, Laura Hamilton (COE) said – today if possible. There were no objections to this request.

3. McNary Transportation Update

Bernard Klatte (COE) reported on the spillway navigation safety test at McNary that was discussed at the July 5 TMT meeting. TMT's recommendation at that meeting was to start transport, but it was not clear that the barge operators could navigate safely with spill in progress. Because the two RSWs in McNary spill bays 20 and 22 would require a minimum of 4 hours' spill stoppage to be closed, and are spilling 26 kcfs combined, the barge captain attempted to navigate the spillway with spill still in progress. The tow boat traversed the spilling basin and encountered turbulent flows that led the captain to decide it was unsafe to proceed with barge transportation this year, given that it's not feasible to stop spill. Klatte sent out an email on Friday to this effect, and NOAA and COE are working on proper legal documentation of this in relation to the 2004 BiOp. As noted in the BiOp, Aug. 16 is the tentative start of truck transportation at McNary, Klatte said. Paul Wagner has been working with NOAA's legal staff on how to document this situation for the court. With research underway and expectations high, this would be a terrible time to shut off spill at McNary for more than 4 hours. The ability to shut off spill briefly will definitely be included in future discussions of surface bypass options, Klatte said.

4. Next Meetings

The next regularly scheduled TMT meeting will be face to face on Wednesday, July 11. Agenda items will include a final report on Priest Rapids operations this year, updated flow forecasts, Dworshak operations, a Libby and Hungry Horse update, the summer treaty fisheries, BPA power emergency protocol, the "427 cap" (WHAT IS THIS?), and the usual operations review. This meeting summary was prepared by consultant and writer Pat Vivian.

<i>Name</i>	<i>Affiliation</i>
Greg Haller	Nez Perce

Dave Statler	Nez Perce
Pat McGrane	BOR
Cindy LeFleur	Washington
Paul Wagner	NOAA
Steve Hasaeker	USFWS
Kyle Dittmer	CRITFC
Dan Spear	BPA
Tony Norris	BPA
Jim Litchfield	Montana
Cindy Henriksen	COE
Cathy Hlebechuk	COE
Laura Hamilton	COE
Rudd Turner	COE
Mike Schneider	COE
Ray Gonzales	COE
Bernard Klatte	COE
Tina Lundell	COE
Tracy Schwartz	COE Walla Walla
Steve Juul	COE Walla Walla
John Heistuman	COE Walla Walla

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TMT MEETING

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Please MUTE your Phone

*All members are encouraged to call Robin Harkless with any issues or concerns they would like to see addressed.
Please e-mail her at robin76@cnnm.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and Introductions
2. Review [\[Meeting Minutes\]](#) 
3. Priest Rapids Update - Russell Langshaw, Grant Co. PUD
 - a. [\[Summary of 2007 PRD operations Emergence and Rearing Periods\]](#) 
 - b. [\[Priest Rapids Operations 2007\]](#) 
4. Updated Flow Forecasts - Cathy Hlebechuk, COE
 - a. Dworshak
 1. [\[Dworshak ESP Hydrographs\]](#) 
 2. [\[Dworshak ESP Inflows - Daily Box-Whiskers Plot\]](#) 
 - b. Libby
 1. [\[Libby ESP Hydrographs\]](#) 
 2. [\[Libby ESP Inflows - Daily Box-Whiskers Plot\]](#) 
 - c. Hungry Horse
 1. [\[Hungry Horse ESP Hydrographs\]](#) 
 2. [\[Hungry Horse ESP Inflows - Daily Box-Whiskers Plot\]](#) 
5. Dworshak Operations - All
 - a. [\[Dworshak Water Temperatures Data\]](#) 

- b. [\[Daily Water Temperature Reports\]](#) 
- c. [\[CEQUAL Temp Modeling - Michael L. Schneider, COE\]](#) 
- 6. Libby Operations - *Cathy Hlebechuk, COE*
 - a. [\[Libby - STP Inflow Flat Flow Operation\]](#) 
 - b. [\[Libby - STP Inflow Montana Proposal\]](#) 
 - c. [\[Kootenai River and Kooocanusa Reservoir Temperatures 2007 Sturgeon Operations\]](#) 
- 7. Montana Proposal for Libby and Hungry Horse - *All*
- 8. Review of 2007 Summer Treaty Fishing - *Kyle Dittmer, CRITFC*
 - a. [\[Summary of Pool Operations - 2007 Summer Treaty Fishery - July 11, 2007\]](#) 
 - b. [\[Photo 1\]](#) 
 - c. [\[Photo 2\]](#) 
 - d. [\[Photo 3\]](#) 
- 9. BPA Power Emergency Protocols
 - a. [\[BPA PG-5 Letter June 29, 2007\]](#) 
 - b. [\[BPA PROCEDURES FOR POWER SYSTEM EMERGENCIES\]](#) 
- 10. Flow Augmentation in Upper Snake
 - 1. [\[2007 Flow Augmentation Estimates\]](#)
- 11. Operations Review
 - a. Reservoirs
 - b. Fish
 - c. Power System
 - d. Water Quality - *Jim Adams, COE*
 - 1. [\[Spill Information 2007\]](#)
- 12. Other
 - Set agenda for next meeting - **July 18, 2007** [\[Calendar 2007\]](#) 

Questions about the meeting may be referred to [Cathy Hlebechuk](#) at (503) 808-3942 or [Jim Adams](#) at (503) 808-3938 or [Cindy Henriksen](#) at (503) 808-3945.

BPA PROCEDURES FOR POWER SYSTEM EMERGENCIES

(Current as of 7/10/07 as of 3pm)

This document updates and incorporates, and therefore replaces:

- (1) The Energy Shortage Procedures email sent 6/29 at 5:06PM from Kieran Connolly, and
- (2) The BPA Emergency Action Plan sent Mon 7/2 4:57 PM from Robyn MacKay and forwarded 7/2/2007 at 5:06PM from Terry Larson, and
- (3) It incorporates the Emergency protocols #4 sent 6/29 at 1:54PM by Bill Lamb (and forwarded 6/29 at 3:49PM by Robert Johnson and forwarded again 6/30 at 8:09PM by Angela Bolas).

Introduction:

The purpose of this procedure is to document the steps to coordinating energy shortage events. The goals of this procedure are to prevent or delay situations that would result in either the shedding of firm load or the interruption of mandated non-power operations. If those efforts fail this procedure also outlines the protocols to transition into emergency operations.

SECTION 1: DUTY SCHEDULER STEPS

SUMMARY OF DUTY SCHEDULER'S STEPS	
STEP 1:	ADVANCED PLANNING
STEP 2:	REAL TIME PLANNING:
STEP 3:	IMPLEMENT ALERT ACTIONS (When conditions develop rapidly it may become necessary to combine actions)
STEP 4:	ISSUE MARKET ALERT (If the marketing efforts do not appear to be sufficient)
STEP 5:	REQUEST POWER SYSTEM EMERGENCY
STEP 6:	IMPLEMENT EMERGENCY ACTIONS (Current as of 7/2/07 – and will be updated as needed)
STEP 7:	CURTAILMENTS (Duty Schedulers should not initiate curtailments of firm load independently)

Realtime Energy Shortage Emergency Procedures
FOR INTERNAL USE ONLY

STEP 1: ADVANCED PLANNING

If a FCRPS power shortage is well understood and anticipated in day-ahead or earlier planning, an Emergency Technical Management Team (TMT) meeting will be called. If Northwest or WECC-wide power shortages are anticipated in day-ahead or earlier planning, a NWPP Emergency Response Team (ERT) may be formed to determine a plan for the emergency.

NOTE: If either of these has been activated more specific guidance will be available – check the PGSP Operations Memo or other specific instructions from Schedule Planning.

STEP 2: REAL TIME PLANNING

Upon identifying conditions that may lead to insufficient generation to meet load obligations:

1. Determine the nature of the shortage:
 - When it will likely begin and end?
 - Is this an energy, capacity, or transmission shortage?
 - Will immediate resources free up water for the shortage period or, as in the case of a transmission limitation, will generation need to be shifted to solve the shortage?
2. Take all “Decrease Load “steps on Load Priorities.
3. Contact Technical Lead currently identified in PGSP Operations memo for actions after “use call list” on current Load Priorities. At this point, the Technical leads should assure communication is occurring with USACE and USBR regarding potential emergency conditions.
4. Whenever possible forewarn the marketing desk and the AGC dispatcher of the potential for an energy shortage.
5. If necessary have the Slice Desk help with communications.
6. Instruct marketing to implement their Emergency Protocols (SECTION 6) if you determine there is a risk that loads will exceed available capacity. (In conditions where you anticipate system capability will be stressed, purchases are a legitimate response to protect the hydraulic operation).
7. Prepare to load all available generation as hydro conditions allow.
8. Notify the AGC dispatcher of the potential for a real time energy shortage. In particular point out non-power constraints and sustainability issues that may not be readily apparent to the AGC dispatcher (e.g. MOP or draft limits).
9. Request information from the AGC dispatcher on any limitations on FCRPS generation due to transmission constraints. Information on the ability to operate Federal generation is not limited by Standards of Conduct.
10. Call out any technical support and management as needed from BPA as early as possible (all hours).
 - Contact PGSP per call list on Operations Memo and Scott Bettin.
 - Contact:
 - a. Kieran Connolly - Generation Scheduling (PGS) manager and
 - b. Steve Oliver - Vice President of Generation Asset Management (PG VP)

Realtime Energy Shortage Emergency Procedures
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STEP 3: IMPLEMENT ALERT ACTIONS: Actions utilized to avoid these interrupting fish protection measures.

NOTE: BPA Duty Schedulers shall attempt to implement all available resources on the Alert Action Checklist before initiating the process to declare an emergency, prior to implementing the BPA Emergency Actions List. When conditions develop rapidly it may become necessary to combine actions.

- Timely energy/capacity purchases at prices up to the FERC WECC price cap (currently \$400).

- Request that Corps and Reclamation return all units to service by canceling or postponing scheduled outages. (Makes all units available).
 - Corps (yes ___MW or No____potential MW)
 - Reclamation (yes ___MW or No____potential MW)
 - other actions: _____
- Stop/delay Transmission O&M actions via AGC dispatcher.

- Put into service (on line) all possible generators (e.g., Grand Coulee pump-generators)
 - Corps (yes ___MW or No____potential MW)
 - Reclamation (yes ___MW or No____potential MW)
 - other actions: _____
- Reshape flows within objectives at specific projects to meet generation needs (deal with the immediate problem – this may throw the river out of whack – if applicable spill upstream projects to position water downstream). _____
- Cut prescheduled PNCA storage return to others

- Request Exceedance of draft limits
 - Corps (yes ___MW or No____potential MW)
 - Reclamation (yes ___MW or No____potential MW)
 - other actions: _____
- Stop/Start pumping at Grand Coulee. (yes or no)
- Request tailwater rate of change exceedance at Bonneville Dam. (yes or no from RCC)
- Cancel gill netting at BON (contact RCC)
- Reschedule power system maintenance to minimize impact fish protection measures.
- Request Grant place negative bias on GCL (call GRT dispatcher). (This only helps if we are at 1.5 ft limit, no extra capacity)

Realtime Energy Shortage Emergency Procedures
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STEP 4: ISSUE MARKET ALERT (If at any time during the implementation of the Alert Actions, it is the Duty Scheduler's judgment that those actions will not be sufficient to resolve the shortage, then the Duty Scheduler may determine to issue market alert earlier during step 3.)

Request that the AGC dispatcher issue a WECCnet message requesting any parties with available generation to contact Power Services real time marketing. The message should contain the following information:

Subject: Merchant Alert:

Declaration that the BPA merchant has exhausted all available resource flexibility, has explored the market to the best of their ability and needs to acquire energy for hour(s) ___ to avoid a NERC Energy Emergency Alert.

If parties have available energy supplies please Contact {Name} at (503) 230 3650 or (503) 230 3651

Note: Quantity and price information are not included in the message, however policy in these conditions is to buy sufficient power to resolve the emergency, up to the mandated price caps.

STEP 5: REQUEST POWER SYSTEM EMERGENCY

1. Duty Scheduler has exhausted options up to this point (has talked with AGC dispatcher and hopefully Power Services management).

Note: It is critical to attempt to confirm the decision to call a power emergency with either: PGSP, PGS, or PG, prior to this point--if at all possible.

2. The appropriate BPA manager or designee will:
 - a. Notify the TMT and IT (Implementation Team) chairpersons at the earliest time practicable, within one business day minimum.
 - b. Present the details of the event to TMT or IT as appropriate at the earliest time practicable.
 - c. Notify the Regional Forum prior to the implementation of Emergency Actions when possible.
3. Duty Scheduler will request the declaration of a Power System Emergency via AGC dispatcher. The AGC dispatcher will request the NWPP Reliability Coordinator to make a declaration of emergency. (i.e. a NERC Alert)
4. **Whether or not Transmission dispatch, or the NWPP concurs and issues a NERC Alert emergency declaration, at this point in time BPA Power has declared a power emergency and may act to mitigate that emergency on that basis.**
5. Duty Scheduler implements the BPA Emergency Actions List

Realtime Energy Shortage Emergency Procedures
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STEP 6: IMPLEMENT EMERGENCY ACTIONS: Current as of 7/2/07

INTRODUCTION:

1. Emergency Actions will not be implemented unless a declaration of a Power System Emergency is requested. (Technically BPA requests that the NERC Reliability Coordinator declares a Power System Emergency.)
2. This list was developed and prioritized by BPA through discussions with TMT representatives and is intended to minimize impacts to fishery operations.
3. The list is intended to give priority guidance to BPA Duty Schedulers; actual implementation may vary depending on the emergency situation.
4. Modification to the actions taken may be requested via TMT and/or a new prioritized list may be developed as conditions change

PREPATORY STEPS:

- Ensure Corps/TMT is notified of BPA's intent to implement the list of BPA Emergency Actions.
Note: The Technical Lead or designee should use the Protocol to Notify Court and Plaintiffs of Departures from Fish Protection Measures to make appropriate internal contacts to start the notification process.
- Coordinate with the AGC dispatcher to identify whether any steps need to be skipped due to transmission limitations that will make the step unavailable.

BPA EMERGENCY ACTIONS:

(MW amounts below are estimates and will be calculated based on: Spill Reduction Amount x H/K. Since the values are only estimates of potential power, and actual operating conditions could cause this to vary significantly, the order and extent of the actual implementation of the actions in this list may be dictated by specific emergency conditions.)

April – August period

- Increase generation at MCN to operate outside 1% up to 16.5 kcfs per unit
- Increase generation at BON to operate outside 1% up to full load.
- Increase generation at JDA to operate outside 1% up to full load.
- Increase generation at TDA to operate outside 1% up to full load.
- Reduce spill at IHR to RSW (19 kcfs) 133 MW
- Reduce spill at LWG to 9 kcfs 70 MW
- Reduce spill at LWG to 0 63 MW
- Reduce spill at LGS to 0 77 MW
- Reduce spill at LMN to 0 119 MW
- Reduce spill at IHR to RSW only (9 kcfs) 180 MW
- Reduce spill at IHR to 0 133 MW
(Transmission constraints may limit the use of the Snake projects)
- Reduce spill at BON to 50 kcfs while maintain B2CC spill 105/210 MW

Realtime Energy Shortage Emergency Procedures
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- Reduce spill at MCN to 20% of flow 180 MW
- Reduce spill at BON to 0 200 MW
- Reduce spill at JDA to 0 338 MW
- Reduce spill at TDA to 30% 106 MW
- Reduce spill at TDA to 0 324MW
- Reduce spill at MCN to 0 (to save water for future hr.)
- **Increase spill to move water to downstream projects (ADDED BY PGSD MGR)**

September– March period

- Shut off adult fish attraction BON
- Shut off TDA sluiceway
- Violation of BiOp ramp rates at HGH and LIB
- Increase project drafts that might impact spring refill.(HGH/LIB/DWR/ALF)

STEP 7: CURTAILMENTS: NOTE: Duty Scheduler should not initiate curtailments of firm load independently

1. Curtailments will be directed by either:
 - a. PG VP for power emergencies or,
 - b. AGC dispatcher for transmission system stability.
 2. PG VP may direct the Duty Scheduler to request that the AGC Dispatcher (Dispatcher will in turn direct TS Scheduling to) implement the curtailment of firm loads. Direction to curtail firm loads by the PG VP will only occur if such curtailments are deemed not to impact human health and safety.
 3. Power Services scheduling (PTK/PTFR) should be prepared to identify the schedules and tags to be curtailed and convey that information to Transmission Scheduling.
- Note: This process is not currently completed and available as a mitigation action.**

Realtime Energy Shortage Emergency Procedures
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SECTION 2: RESOURCES

Related Procedures

1. DSO 332 – Realtime Energy Shortage Emergency
2. TMT Emergency Protocols
3. Load Priorities Memo
4. Current Operations Memo
5. Curtailment Procedure
6. Protocol to Notify Court and Plaintiffs of Departures from Fish Protection Measures

SECTION 3: NERC ALERTS

When previous actions appear to be insufficient to safeguard the system operation the Duty Scheduler should contact the AGC dispatcher and request the declaration of an energy shortage NERC Alert by the NWPP Reliability Coordinator. The AGC dispatcher is authorized to directly seek sources of generation from other balancing authorities or IPPs within the control area. Coordinate with the AGC dispatcher on any sources he/she finds.

Situations for initiating alert when:

- BPA is, or expects to be, unable to provide its customers' energy requirements, and has been unsuccessful in locating other systems with available resources from which to purchase, or
- BPA cannot schedule necessary resources due to, for example, Available Transfer Capability (ATC) transmission limitations.

Conditions for Duty Scheduler to request NERC Alerts 1, 2 or 3:

1. **NERC Alert One:** If it appears that all available resources, including imports, are committed to meet firm load, firm transactions, and reserve commitments; and, there is concern about sustaining required operating reserve
2. **NERC Alert Two:** If it will be necessary to curtail *non-firm energy sales and/or use operating reserves to meet firm loads, request that the AGC dispatcher contact the NWPP Reliability Coordinator to declare an. (*Note: *Since Power Services does not generally make non-firm energy sales it may be necessary to move directly to Alert Three*).
3. **NERC Alert Three:** If it appears that there will be insufficient generation to meet load even after the steps in an Alert Two.

SECTION 4: NERC DEFINITIONS

1. Alert 1 — All available resources in use.

Circumstances:

- Balancing Authority, Reserve Sharing Group, or Load Serving Entity foresees or is experiencing conditions where all available resources are committed to meet firm load, firm transactions, and reserve commitments, and is concerned about sustaining its required Operating Reserves, and
- Non-firm wholesale energy sales (other than those that are recallable to meet reserve requirements) have been curtailed.

2. Alert 2 — Load management procedures in effect.

Circumstances:

- Balancing Authority, Reserve Sharing Group, or Load Serving Entity is no longer able to provide its customers' expected energy requirements, and is designated an Energy Deficient Entity.
- Energy Deficient Entity foresees or has implemented procedures up to, but excluding, interruption of firm load commitments. When time permits, these procedures may include, but are not limited to:
- Public appeals to reduce demand.
 - Voltage reduction.
 - Interruption of non-firm end use loads in accordance with applicable contracts.
 - Demand-side management.
 - Utility load conservation measures.

3. Alert 3 — Firm load interruption imminent or in progress.

Circumstances:

- Balancing Authority or Load Serving Entity foresees or has implemented firm load obligation interruption. The available energy to the Energy Deficient Entity, as determined from Alert 2, is only accessible with actions taken to increase transmission transfer capabilities.

SECTION 5: POLICY FOR AVOIDING OR MINIMIZING IMPACT TO FISH PROTECTION MEASURES

1. Overview – please see Section 1 above for implementation.

Interruptions or adjustments of the fish protection measures per the current Biological Opinions and associated operational documents may result from operations required to maintain power system reliability.

BPA will utilize all reasonable or available actions to **avoid interrupting** (prior to impacting) fish protection measures. Any operation that **impacts** fish protection measures for this reason is considered a Power System Emergency and will be managed via Emergency Actions. Emergency Actions are viewed by the Bonneville Power Administration (BPA) as a last resort and will not be used in place of long-term investments necessary to allow full, uninterrupted implementation of the planned reservoir operations while maintaining other project purposes.

When emergencies occur, the BPA will work with TMT to adjust operations as soon as reasonably possible to provide “planned for life cycle survival” with priority given to “in-time and in-place actions”. (*This does not create legal rights or obligations on the part of any party.*)

BPA will implement operations consistent with the BPA Emergency Actions List, direction from TMT or other groups, Standard Operating Procedures for specific projects, and/or guidance from appropriate Federal agencies to resolve the event. The implementation of Emergency Actions requires a request for declaration of a Power System Emergency and notification to the Regional Forum at the earliest time practicable.

2. Regional Executive Intervention

Discussion of emergencies with effects of exceptional magnitude or duration will include involvement of the Regional Executives (e.g. 2001 drought operations and power emergency).

3. Alert Actions (used prior to Power System Emergency)

Alert Actions are implemented to avoid or minimize potential impacts to mandated fishery operations. They are possible actions that may be implemented as possible prior to implementing actions that result in Power System Emergencies.

4. Emergency Actions (used once a Power System Emergency is declared)

Emergency Actions are operations that result in interruption to fish protection measures. These actions are used as a last resort and are not implemented until a Power System Emergency is requested to be declared.

5. Notification Procedures

Realtime Energy Shortage Emergency Procedures
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The appropriate BPA manager or designee will:

- a. Notify the TMT and IT (Implementation Team) chairpersons at the earliest time practicable.
- b. Present the details of the event to TMT or IT as appropriate at the earliest time practicable, [within one business day minimum](#).
- c. Notify the Regional Forum prior to the implementation of Emergency Actions when possible.

6. Offsetting Adverse Effects of Emergency Actions

When Emergency Actions are implemented that cause adverse affects to fish protection measures, the TMT will assess the magnitude of the adverse effect and provide information on measures available to offset it. Alternative operations to offset adverse effects “in-place, in-kind” in a timely manner shall receive the highest priority. The members of the Regional Forum agree to cooperate in the development of this information for consideration through the TMT process.

SECTION 6: Emergency Protocols -- BPA Insufficient Generation
For Real-time Marketer Desk As of June 29, 2007

Situation: Upon identifying conditions that may lead to BPA having insufficient generation to meet load obligations in forthcoming hour(s):

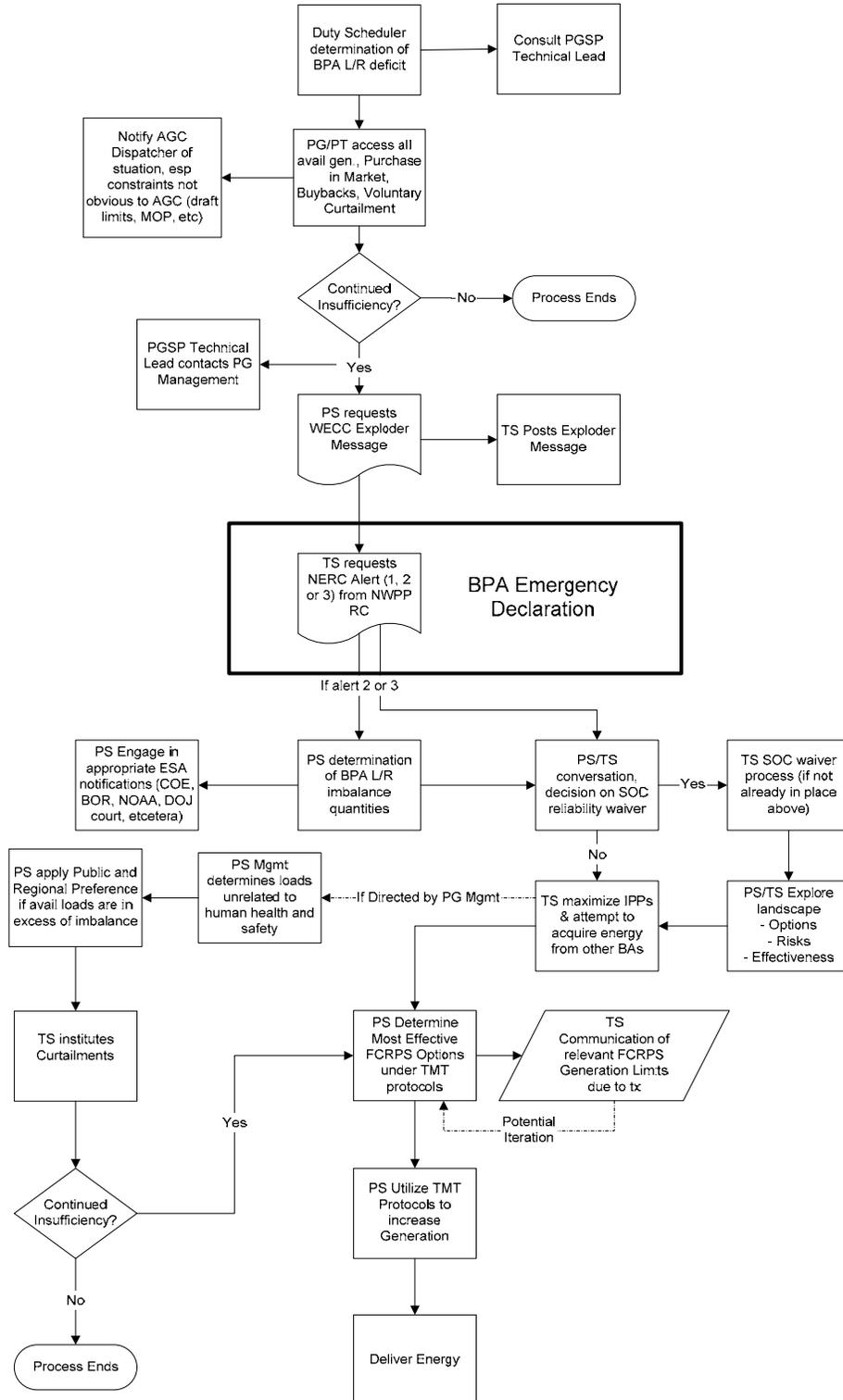
- Step 1** At the earliest possible time, the hydro desk will notify the real-time marketer of potential insufficient generation. If there is any doubt as to whether an insufficient generation condition is eminent, the real-time marketer will assume insufficiency and proceed to purchase amounts as directed by the hydro desk. **Purchase at any price** as needed to remove the concern regarding insufficient generation in forthcoming hour(s).
- Step 2** Purchases amounts needed to remove the concern of insufficiency. **If sufficient purchases are not available then:**
- Step 3** Aggressively pursue mutually agreed upon schedule curtailments (“buy-backs”).
- Step 4** **If insufficiency still in question upon exhausting all direct purchases and bilateral schedule curtailments,** direct the hydro desk to request that the AGC dispatcher (Transmission Services) issue a WECC “exploder” (WECCnet messaging system) requesting any parties with available generation to contact Power Services real time marketing.
- Step 5** **If WECCnet message does not result in eliminating the potential or expected insufficiency go to next step.**
- Step 6** **Hydro desk will contact Power Services Generation Management (Steve Oliver, et. al.) and Generation Scheduling Management (Kieran Connolly, et. al.).**

Real-time Marketer contact Bill Lamb and Alex Spain.

Realtime Energy Shortage Emergency Procedures FOR INTERNAL USE ONLY

Process Diagram for Power and Transmission Load/Resource Imbalance Emergency Determination and Resolution

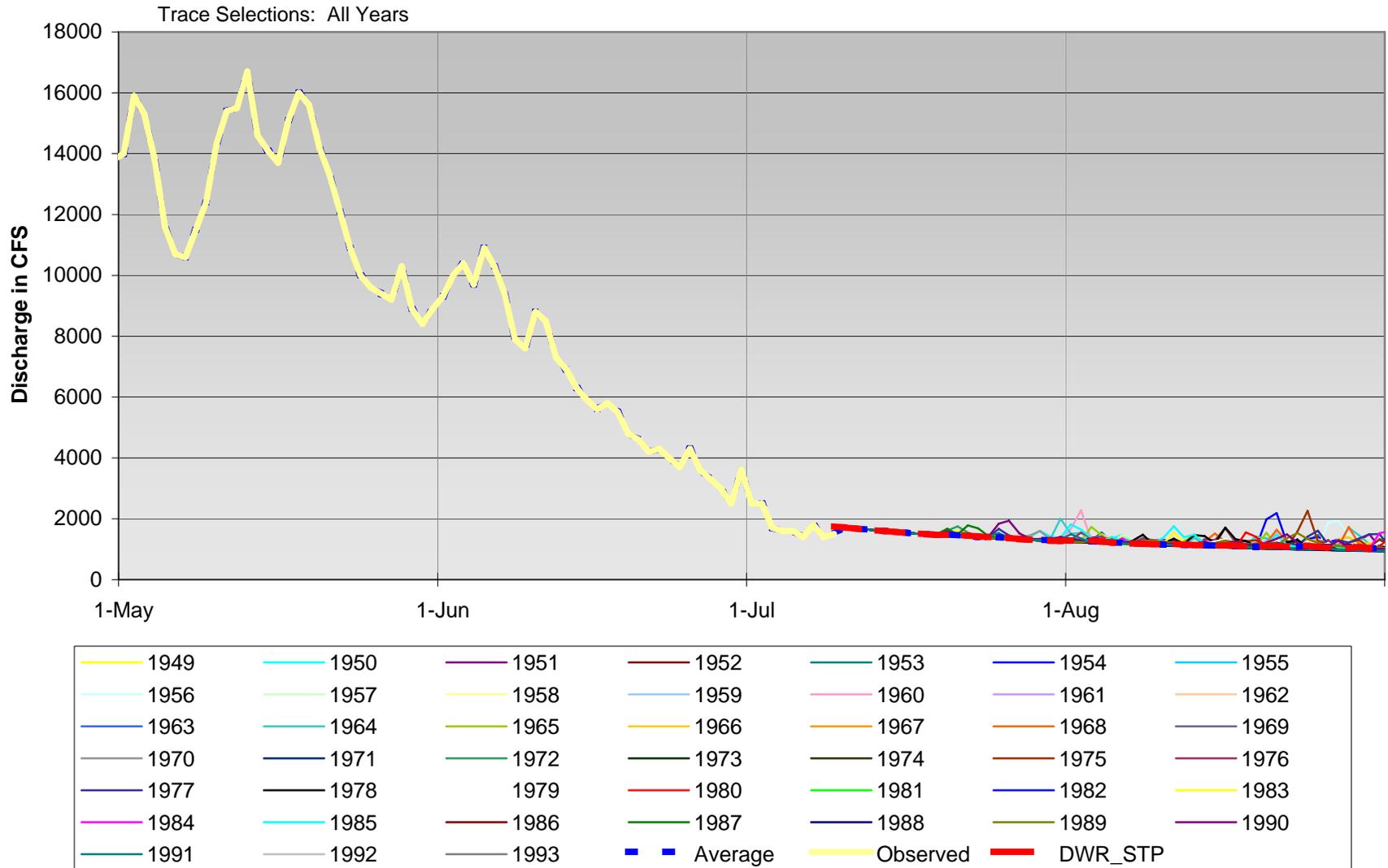
BPA load/resource imbalance



DRAFT 6/27

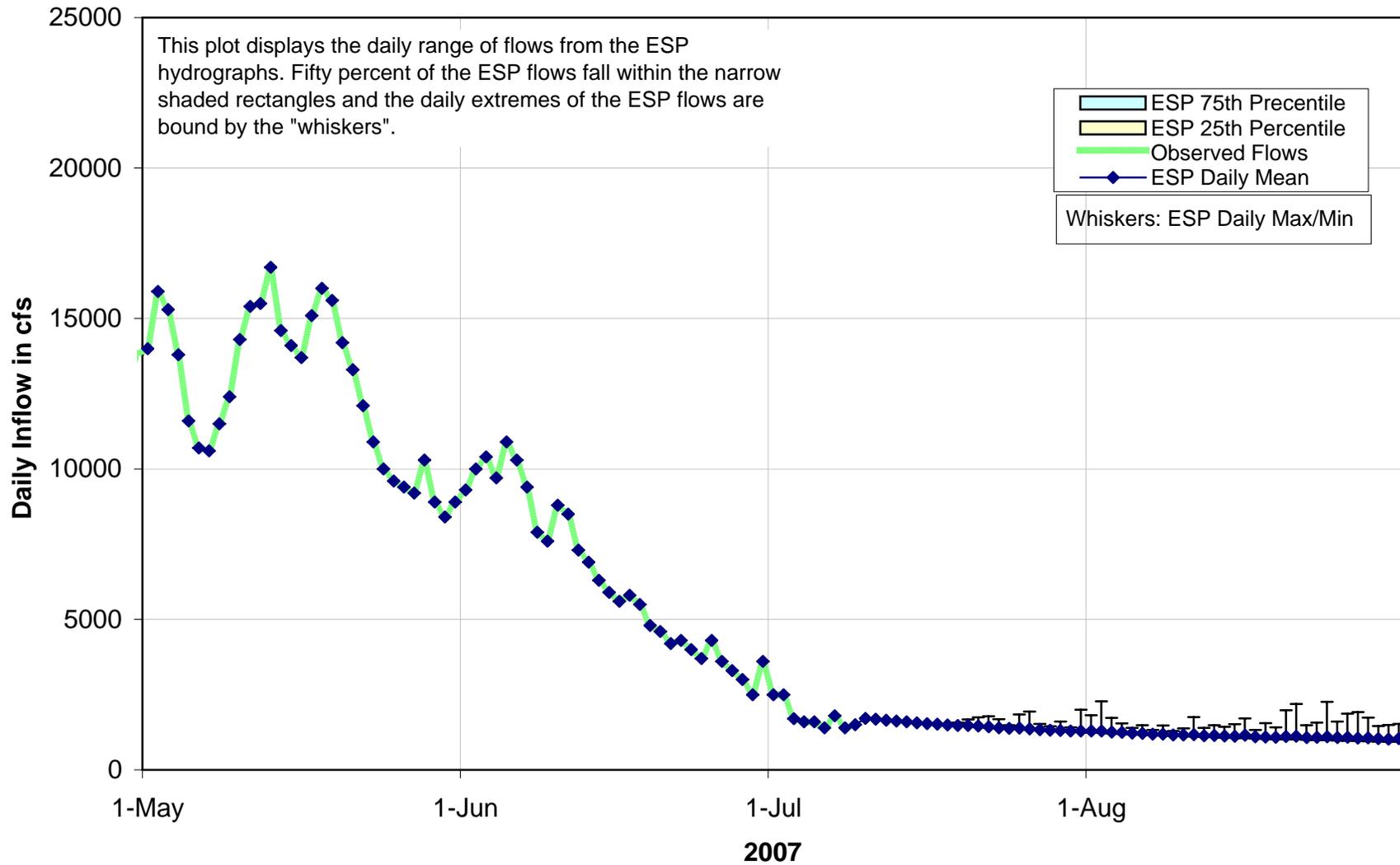
Dworshak ESP Hydrographs

7/10/2007



Dworshak ESP Inflows - Daily Box-Whiskers Plot

ESP flows updated 10-Jul-2007





Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

POWER SERVICES

June 29, 2007

In reply refer to: PG-5

Dear Colleagues:

As we prepare to enter the 2007 summer season with the associated potential for significant peaks in electricity demand, Bonneville is improving and clarifying procedures with regard to accessing Federal power in times of emergencies on neighboring systems. Clear communications and common understanding will be important in responding appropriately to events. This letter describes the process that BPA will follow if requested to support a neighboring system's load/resource imbalance emergency.¹ This process may be amended or modified at any time by BPA consistent with BPA's statutory responsibilities. It is intended to apply in most situations, but is primarily intended to address situations that develop rapidly, without time for convening the Northwest Power Pool Emergency Response Team (ERT) or an emergency meeting of the Technical Management Team (TMT).² If those forums are called, BPA may modify these procedures to fit the specific situation the region is facing.

Bonneville's ability to support neighboring utilities in an emergency is not guaranteed and there may be occasions when limited hydro supplies need to be reserved in order to meet expected firm Federal loads or forecast emergency conditions in the Pacific Northwest. BPA's management of any limited power that could be made available through extraordinary operations will be informed by the need to: 1) protect human health and safety; 2) comply with mitigation measures required under the Endangered Species Act; and, 3) honoring regional and public preference.

When a utility becomes concerned that they will not have enough resources to cover their firm load and contract obligations, it should first attempt to resolve the situation through normal marketing contacts, including the BPA Trading Floor. In times of extreme temperatures the Trading Floor will continue to be the point of contact for energy transactions and if BPA has surplus power to offer it will be available for purchase.

If a utility is unable to acquire sufficient supplies in the marketplace to meet its firm load obligations and BPA is not offering surplus energy, the requesting utility will need to confirm it has taken the following steps prior³ to BPA deciding whether to make any extraordinary

¹ Issues related to BPA Grid stability or reliability should continue to be addressed through normal transmission dispatcher-to-dispatcher contacts with the BPA Transmission Services personnel.

² This group suggests changes to Columbia River hydro system operations to accommodate environmental regulations.

³ This process addresses shortage situations or the period after contingency reserves have been exhausted. It is not intended to alter BPA's participation in the NWPP Reserve Sharing Program.

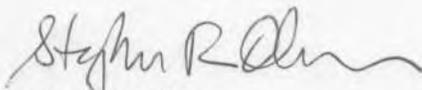
operations changes to generate additional supplies and/or to temporarily modify mitigation measures under the Endangered Species Act.

1. Contact the utility's Balancing Authority and request that a "Merchant Alert" be issued over the WECC net messaging system. A Merchant Alert is an attempt to fully exhaust efforts to resolve shortages via normal market mechanisms. See Attachment A for an example of the alert message.
2. After acquiring any resources made available through the Merchant Alert process the utility should reassess its situation and, if necessary, request that its Balancing Authority issue the appropriate NERC Alert Level. See Attachment 2 for the NERC Alert definitions.
3. After issuing the Merchant Alert and declaring at least a NERC Alert 2, the utility must also have:
 - a. Curtailed any sales that it has determined can be curtailed without adversely impacting human health and safety, and
 - b. Increased any possible generation from its own hydroelectric and other resources (including calling on any contractual rights) consistent with any emergency provisions governing the operations of those resources, including provisions curtailing fish protections.

Once BPA determines that emergencies are being declared, BPA will assess the overall demand for available emergency energy and, when necessary, allocate energy capability first based upon the level of the NERC Alert and then by regional and public preference.

If you have any questions regarding this letter please contact either Stephen Oliver, V.P. Generation Asset Management at sroliver@bpa.gov, or Kieran Connolly, Manager Generation Scheduling at kpconnolly@bpa.gov.

Sincerely,



Stephen R. Oliver
V.P. Generation Asset Management
Bonneville Power Administration
sroliver@bpa.gov
(503) 230-4090

3 Enclosures:
Attachment A – "Merchant Alert" Message
Attachment B – NERC Alert Definitions
Attachment C – Mailing List

Attachment A

This template is an example of the "Merchant Alert" message that would be posted to WECC Net by a balancing authority on behalf of a Load Serving Entity that is seeking to resolve a resource shortage.

Subject: Merchant Alert

Declaration that merchant _____ has exhausted all available resource flexibility, has explored the market to the best of its ability, and needs to acquire energy for hour(s) ____ to avoid a NERC Energy Emergency Alert.

Name and phone number of merchant point of contact

Attachment B

NERC Alert Definitions⁴

1. Alert 1 – All available resources in use.

Circumstances:

- Balancing Authority, Reserve Sharing Group, or Load Serving Entity foresees or is experiencing conditions where all available resources are committed to meet firm load, firm transactions, and reserve commitments, and is concerned about sustaining its required Operating Reserves, and
- Non- firm wholesale energy sales (other than those that are recallable to meet reserve requirements) have been curtailed.

2. Alert 2 – Load

Circumstances:

- Balancing Authority, Reserve Sharing Group, or Load Serving Entity is no longer able to provide its customers' expected energy requirements, and is designated an Energy Deficient Entity.
- Energy Deficient Entity foresees or has implemented procedures up to, but excluding, interruption of firm load commitments. When time permits, these procedures may include, but are not limited to:
 - Public appeals to reduce demand.
 - Voltage reduction.
 - Interruption of non-firm end use loads in accordance with applicable contracts.
 - Demand-side management.
 - Utility load conservation measures.

3. Alert 3 – Firm

Circumstances:

- Balancing Authority or Load Serving Entity foresees or has implemented firm load obligation interruption. The available energy to the Energy Deficient Entity, as determined from Alert 2, is only accessible with actions taken to increase transmission transfer capabilities.

⁴ From NERC Standard EOP-002-2 Capacity and Energy Emergencies, Attachment 1 - ftp://www.nerc.com/pub/sys/all_updl/standards/rs/EOP-002-2.pdf

Attachment C

Northwest Power Pool Participating Organizations**Northwest Power Pool**

Mr. Jerry D. Rust, President and Director
Northwest Power Pool
7505 NE Ambassador Place, Suite R
Portland, OR 97220

Alberta Electric System Operator

Alberta Electric System Operator
Calgary Place
330 5th Ave SW, Suite 2500
Calgary, A.B. T2P 0L4

Avista Corporation

Mr. Don F. Kopczynski, Manager, Generation & Resources
Avista Corporation
P.O. Box 3727
Spokane, WA 99220-3727

B.C. Hydro

Ms. Dawn Farrell, VP Engineering
Aboriginal Affairs and Generation
B.C. Hydro
333 Dunsmuir Street, 18th Floor
Vancouver, B.C. V6B 5R3

B.C. Transmission Corp.

Mr. Martin Huang, System Operations
B.C. Transmission Corporation
Four Bentall Centre
1055 Dunsmuir Street, Suite 1110
P.O. Box 49260
Vancouver, B.C. V7X 1V5

Chelan County PUD No. 1

Mr. Richard Riazzi, General Manager
Chelan County Public Utility District No. 1
P.O. Box 1231
327 N. Wenatchee Avenue
Wenatchee, WA 98807-1231

Mr. Steve Fisher, Scheduling
Chelan County Public Utility District No. 1
P.O. Box 1231
Wenatchee, WA 98807-1231

ColumbiaGrid

Mr. Jon Kaake, CEO
ColumbiaGrid
5933 NE Win Sivers Drive, Suite 210
Portland, OR 97220

Cowlitz County PUD No. 1

Mr. Brian Skeahan, General Manager
Cowlitz County Public Utility District No. 1
P.O. Box 3007
Longview, WA 98632-0307

Desert Generation & Transmission Coop.

Desert Power Electric Cooperative
10714 South Jordan Gateway
South Jordan, UT 84095

Douglas County PUD No. 1

Mr. William C. Dobbins, CEO/Manager
Douglas County Public Utility District No. 1
1151 Valley Mall Parkway
East Wenatchee, WA 98802-4497

Mr. Charles Wagers, Power Planning & Contracts Manager
Douglas County Public Utility District No. 1
1151 Valley Mall Parkway
East Wenatchee, WA 98802-4497

EPCOR Utilities Inc.

Mr. Lorne Whittles, Manager, PNW Marketing
EPCOR Merchant and Capital Inc.
1161 W. River St., Suite 250
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Eugene Water & Electric Board

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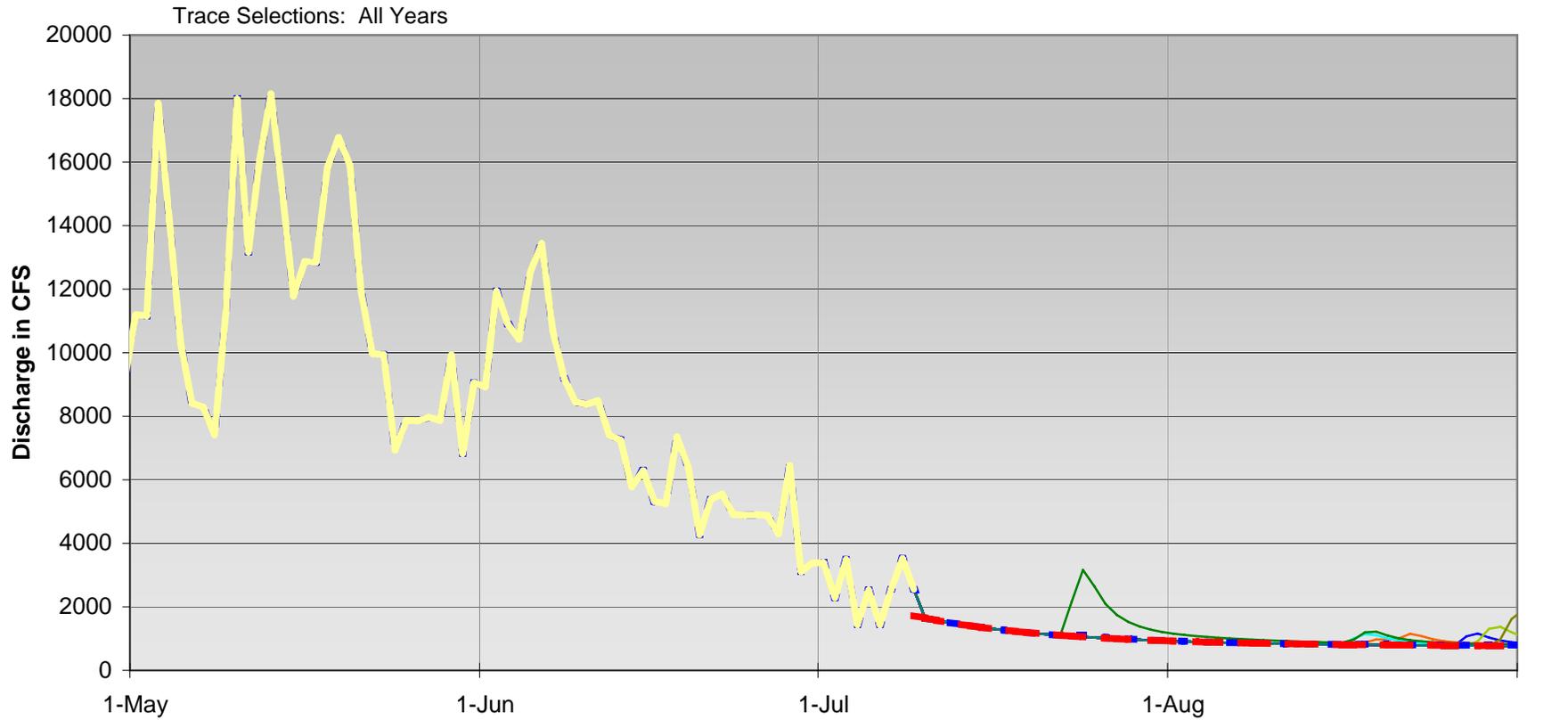
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Hungry Horse ESP Hydrographs

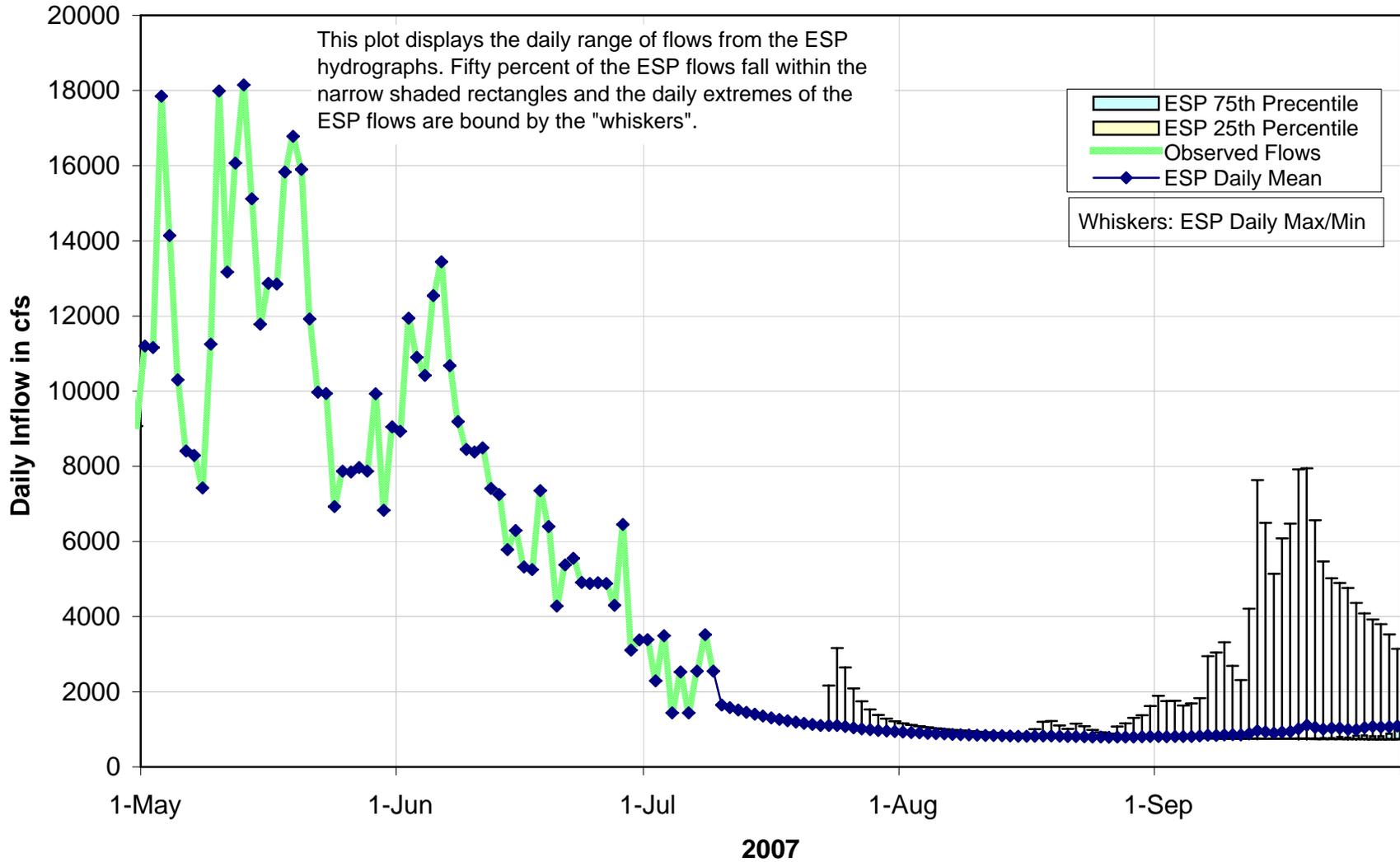
7/10/2007



1949	1950	1951	1952	1953	1954	1955	1956
1957	1958	1959	1960	1961	1962	1963	1964
1965	1966	1967	1968	1969	1970	1971	1972
1973	1974	1975	1976	1977	1978	1979	1980
1981	1982	1983	1984	1985	1986	1987	1988
1989	1990	1991	1992	1993	Average	Observed	HGH_STP

Hungry Horse ESP Inflows - Daily Box-Whiskers Plot

ESP flows updated 10-Jul-2007











COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION

729 N.E. Oregon, Suite 200, Portland, Oregon 97232

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www.critfc.org

TO: Technical Management Team (TMT)
 FROM: Kyle Dittmer, *Hydrologist - Meteorologist*, CRITFC Hydro Program
 DATE: July 11, 2007
 SUBJECT: Summary of Pool Operations – 2007 Summer Treaty Fishery

CRITFC submitted two System Operation Requests (2007-C1 and C2) via the NMFS' TMT forum to support 2007 summer treaty fishing. CRITFC requested two criteria: (1) one-foot elevation bands and (2) stable pool elevations during each week of treaty fishing. Criterion #1 asked to operate the pools as a hard constraint within a one-foot elevation range for all of the Zone 6 pools (i.e. Bonneville, The Dalles, and John Day). The Corps committed to a hard constraint of a 1.5-foot range, or 1-foot as a soft constraint, as they have done so since 1996, but only for the Bonneville pool.¹ The table summarizes the hourly compliance of CRITFC's 1-foot elevation band criteria and the Corps' 1.5-foot criteria during the 2007 and 2006 treaty fisheries.

2007	Bonneville Pool	The Dalles Pool	John Day pool
1 foot range (CRITFC):			
JUNE 18 - JUNE 20	89%	82%	100%
JUNE 27 - JUNE 29	100%	99%	99%
JULY 3 - JULY 6	80%	71%	100%
average:	90%	84%	100%
2006 average:	93%	62%	99%
1.5 foot range (COE):			
JUNE 18 - JUNE 20	100%	98%	100%
JUNE 27 - JUNE 29	100%	100%	100%
JULY 3 - JULY 6	100%	88%	100%
average:	100%	95%	100%
2006 average:	100%	82%	100%

Pool elevation data is a good objective measure as to the absolute pool fluctuations (Criterion #2) as shown in Figures 1 through 9. The Bonneville pool saw 0.5 – 1.1 foot swings (compared to 0.3 – 0.9 foot swings in summer 2006). The Dalles pool saw 0.5 – 2.0 foot swings (compared to 1.3 – 2.5 foot swings in summer 2006). John Day pool saw 0.4 – 0.8 foot swings (compared to 0.3 – 0.8 foot swings in summer 2006).

As previously mentioned to TMT, the low BON pool during the June 23-24 weekend caused problems with the platform fishers (see the accompanying photos), which was outside the scope of the SORs. At least three fishers complained that their nets filled with eel grass due to the low water and high winds. It would be desirable for the COE managers to have further discussions with CRITFC and the Tribal managers on this issue as soon as possible.

cc: CRITFC Hydro Program (Heinith, Lorz) and Fish Management Division (Ellis, Matylewich)

¹ CRITFC's member tribes are currently engaged in policy discussions with the Corps NWD commanders regarding providing appropriate pool operations for all of Zone 6 during the treaty fisheries.

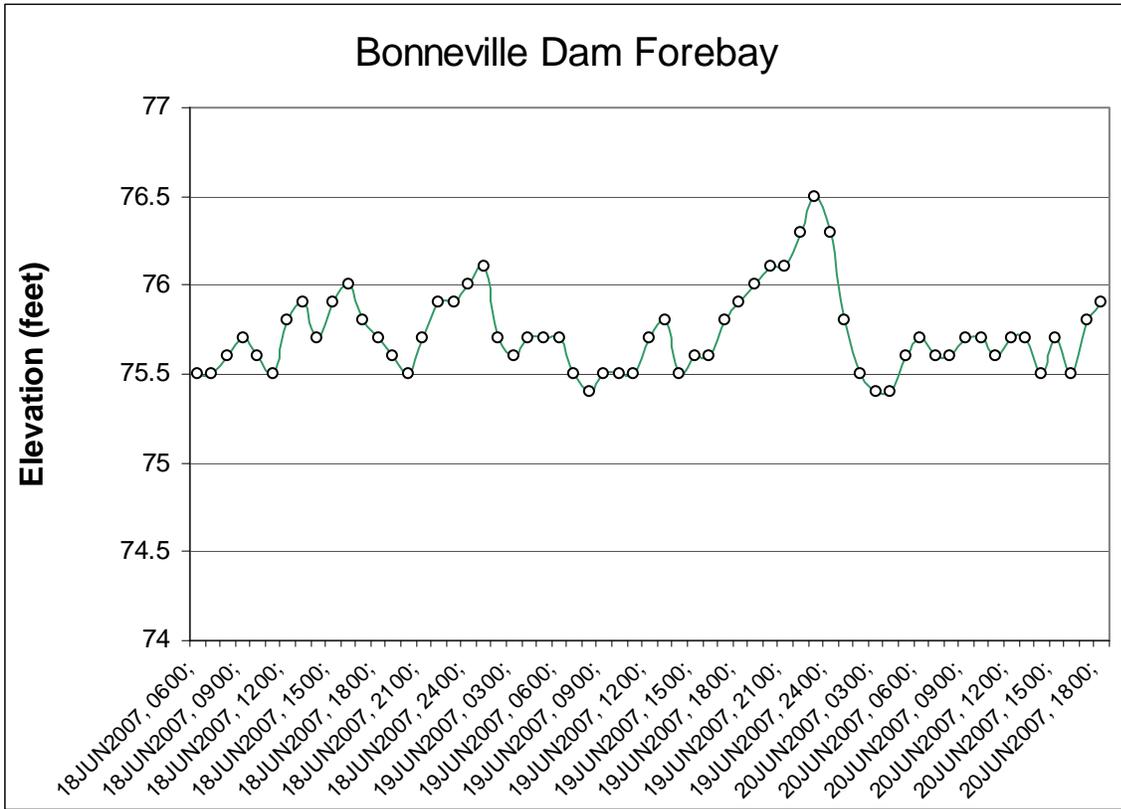


Figure 1. Observed BON pool elevations during June 18-20, 2007 summer treaty fishing.

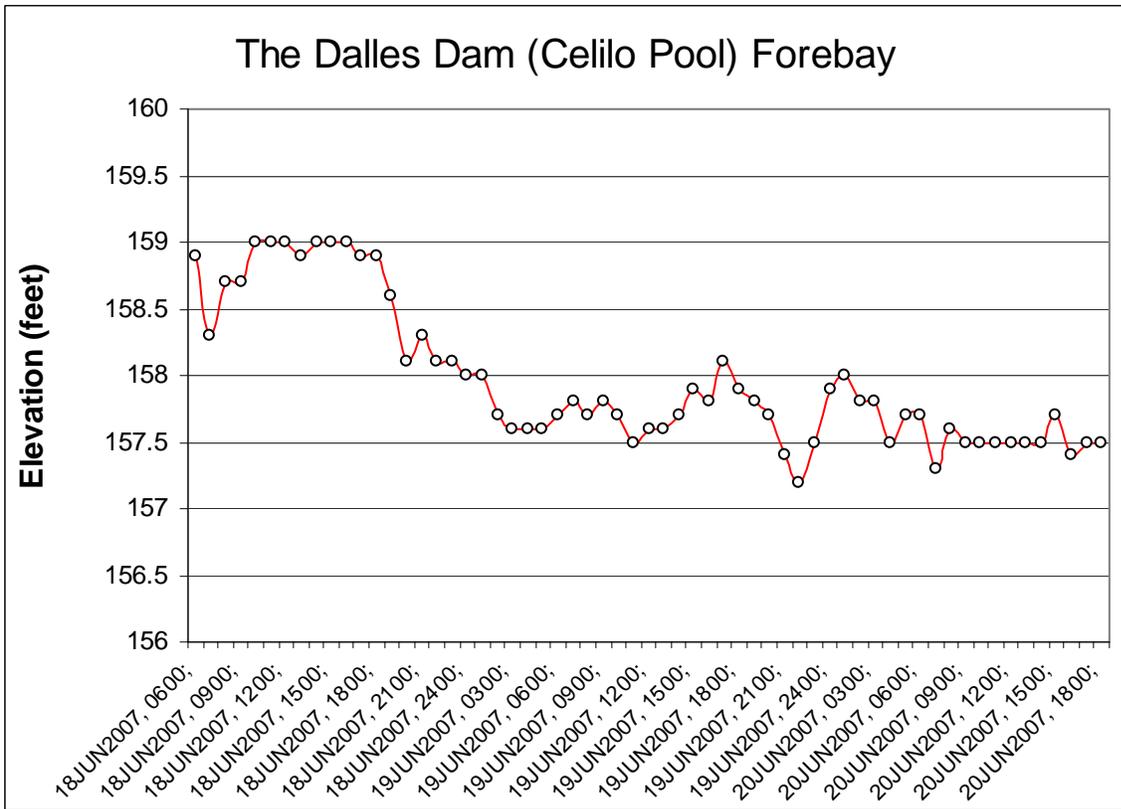


Figure 2. Observed TDA pool elevations during June 18-20, 2007 summer treaty fishing.

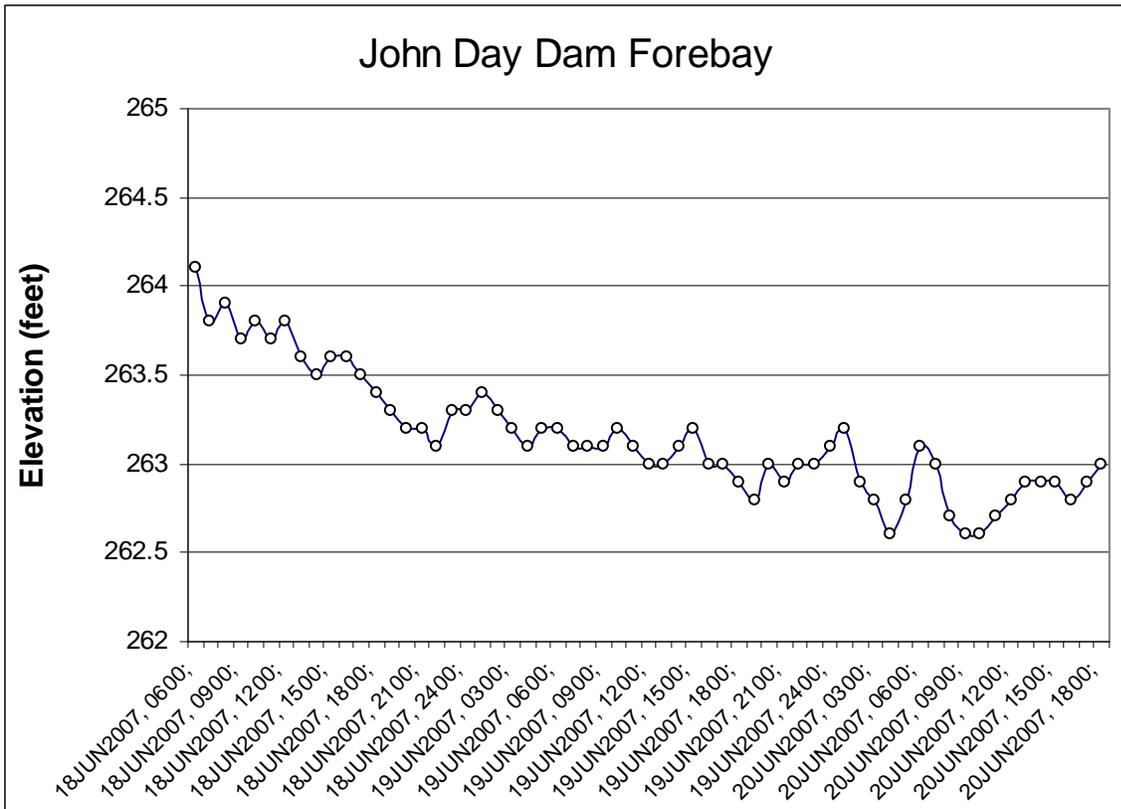


Figure 3. Observed JDA pool elevations during June 18-20, 2007 summer treaty fishing.

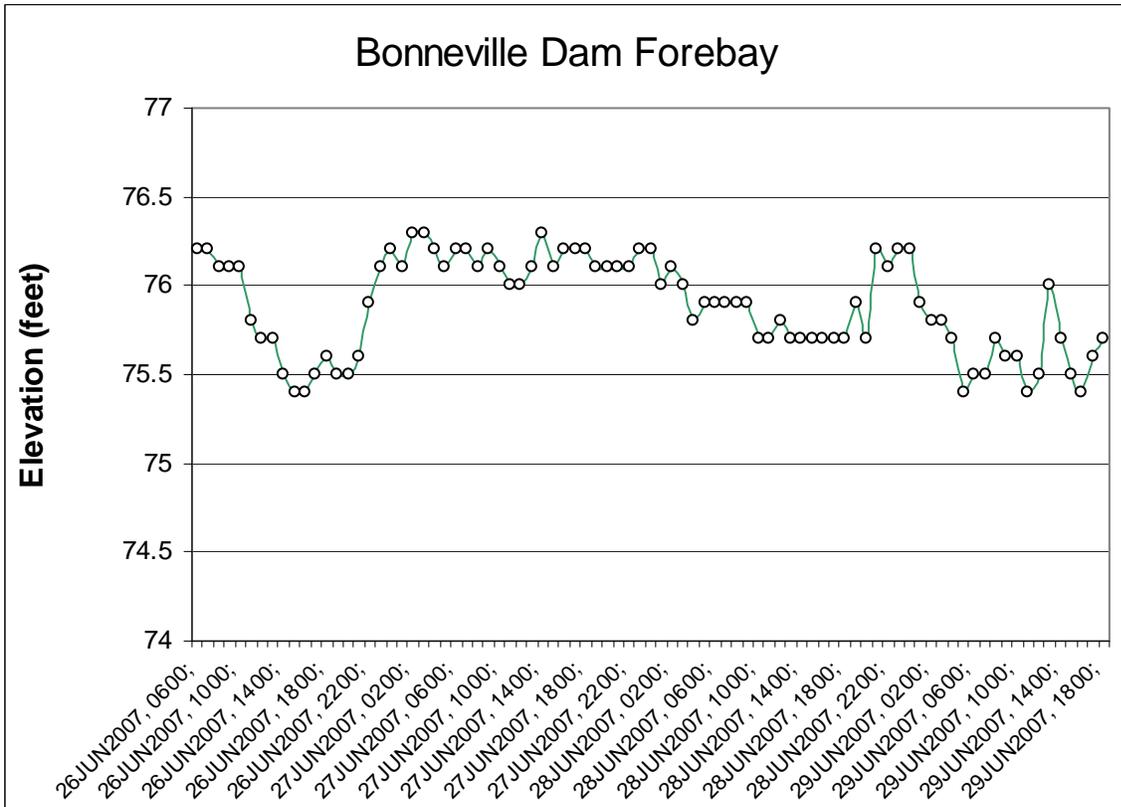


Figure 4. Observed BON pool elevations during June 26-29, 2007 summer treaty fishing.

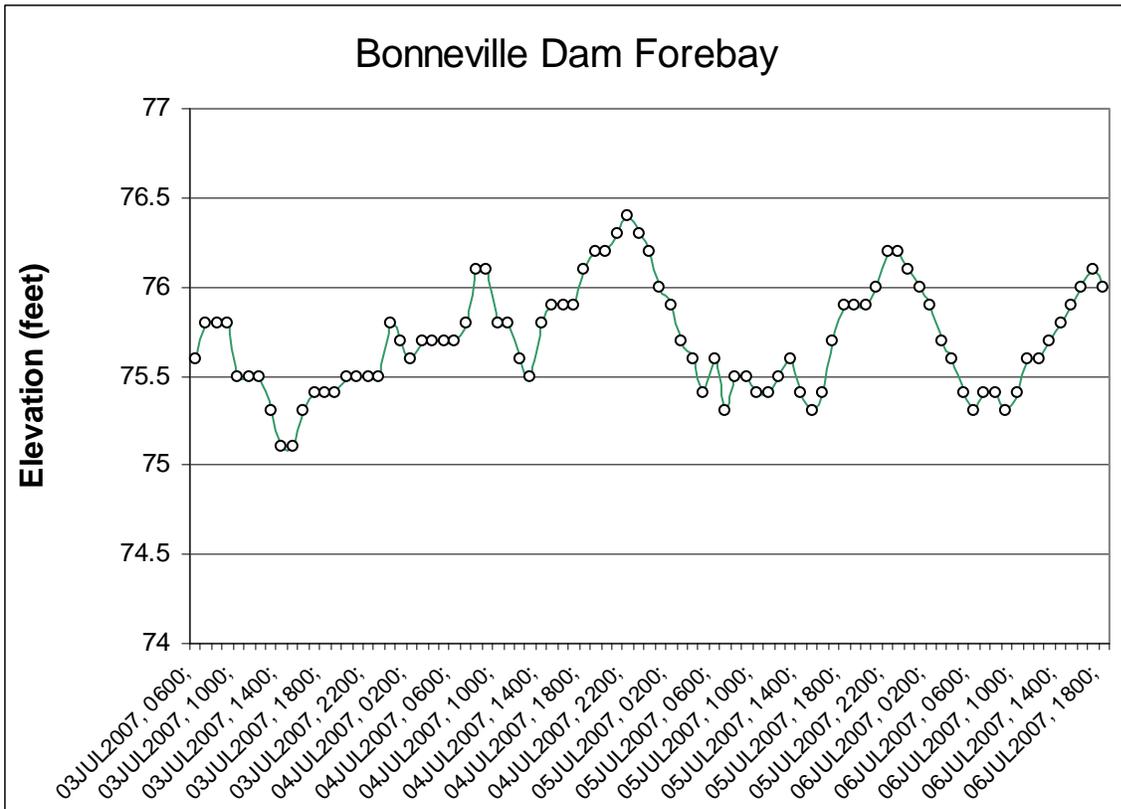


Figure 7. Observed BON pool elevations during July 3-6, 2007 summer treaty fishing.

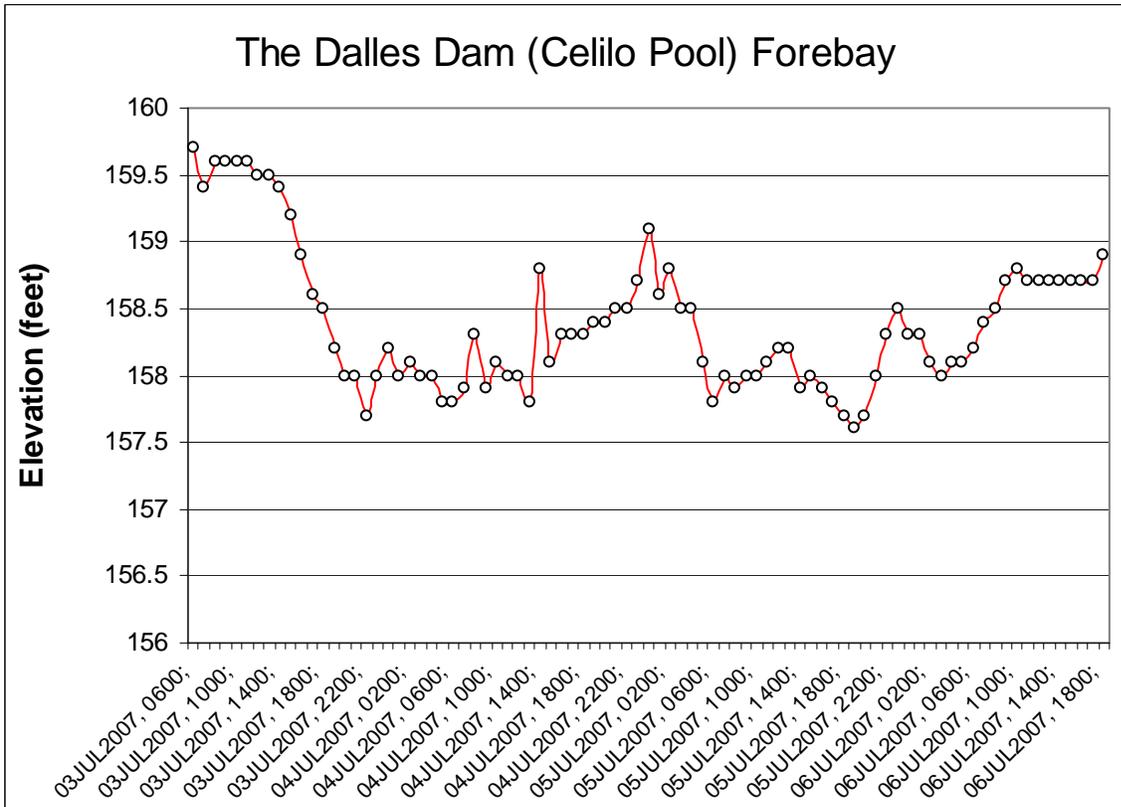


Figure 8. Observed TDA pool elevations during July 3-6, 2007 summer treaty fishing.

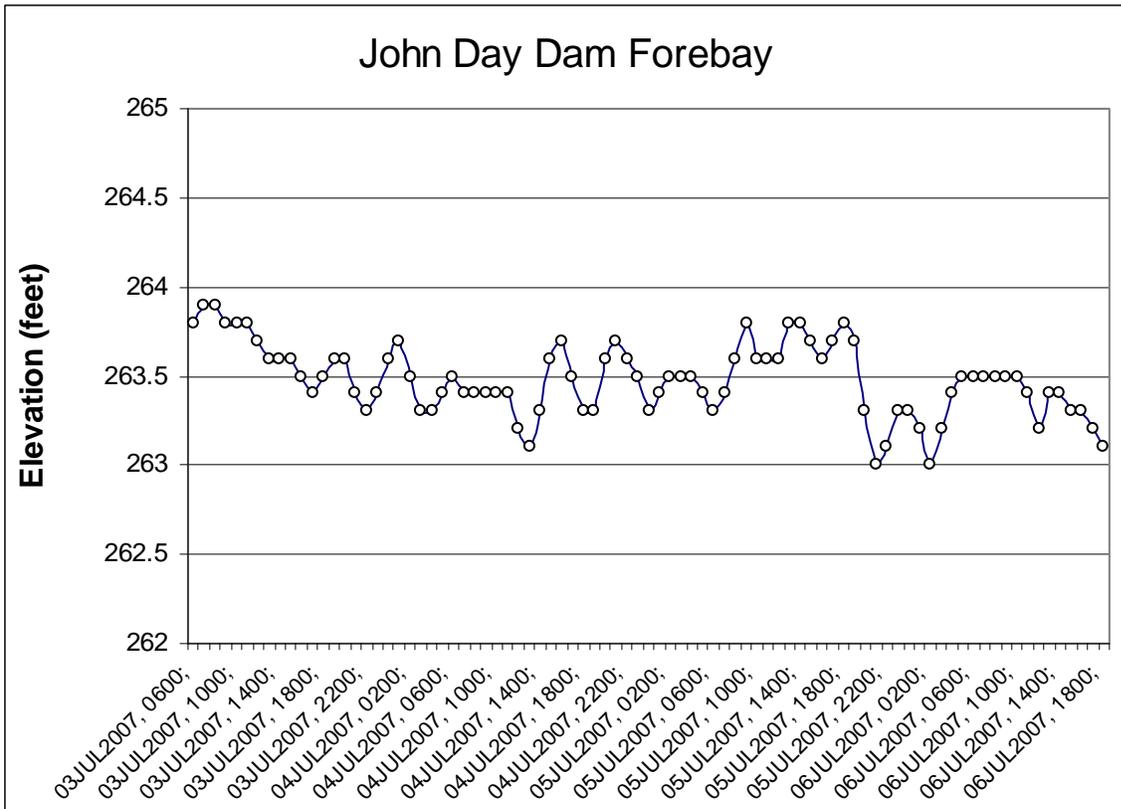
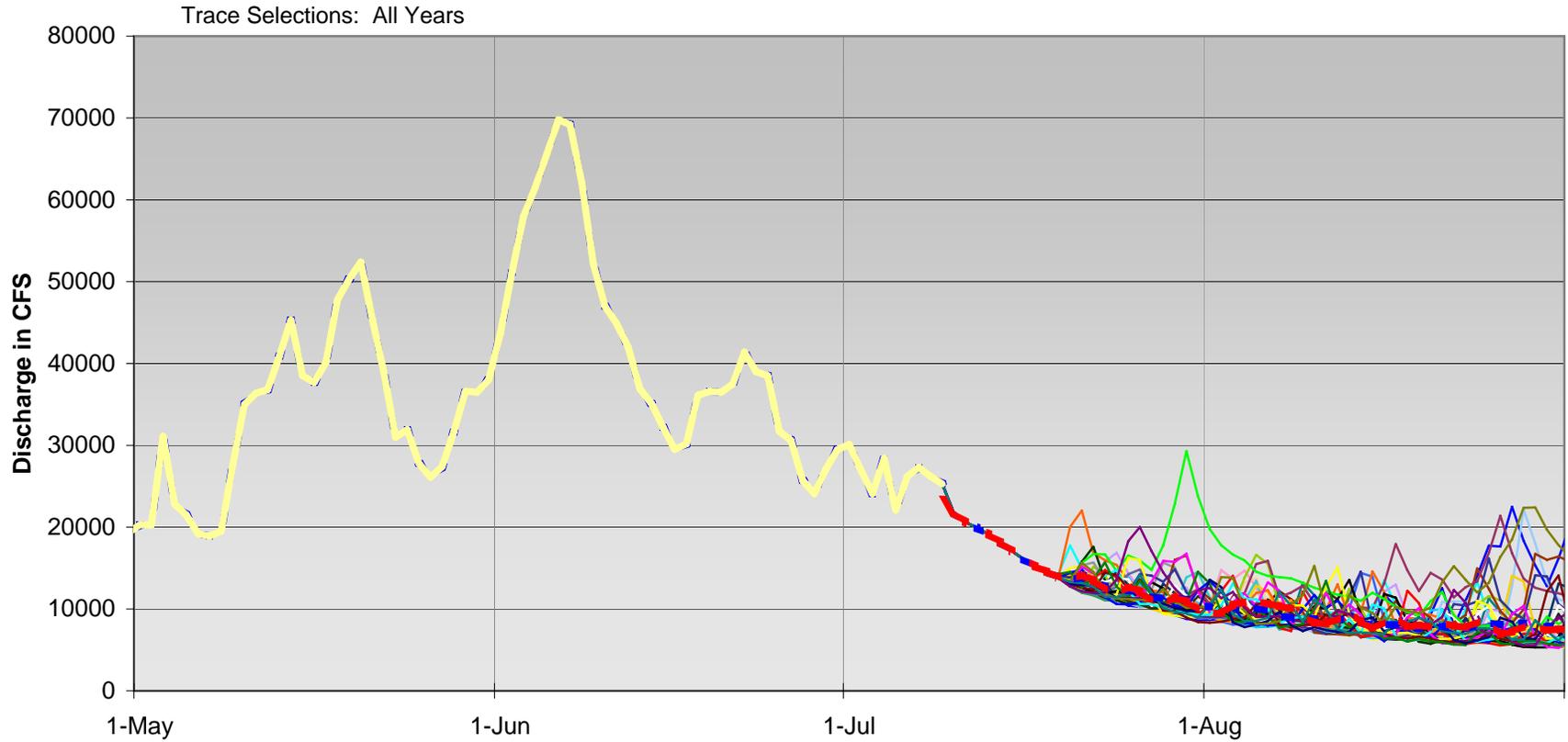


Figure 9. Observed JDA pool elevations during July 3-6, 2007 summer treaty fishing.

Libby ESP Hydrographs

7/10/2007



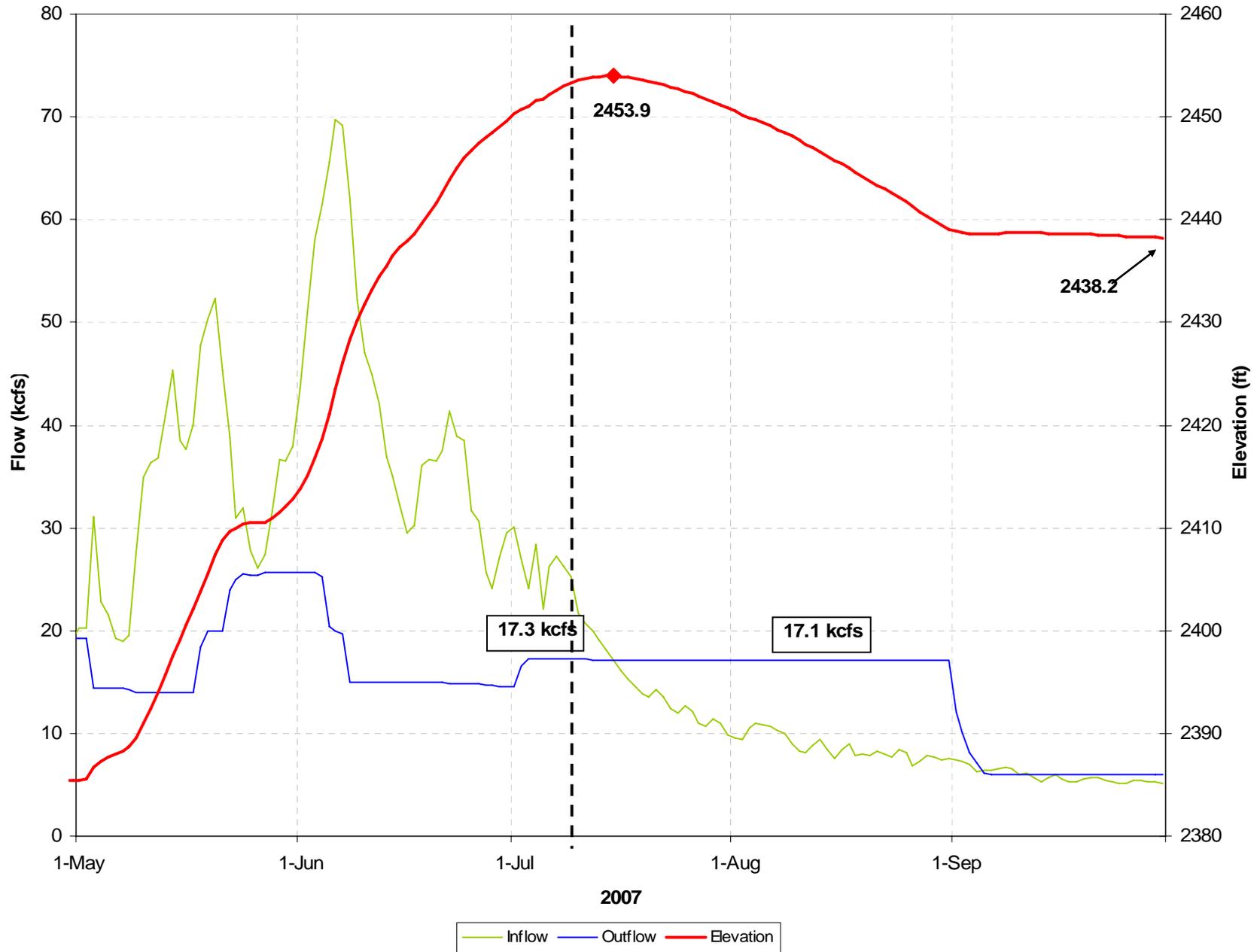
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1957	1958	1959	1960	1961	1962	1963	1964
1965	1966	1967	1968	1969	1970	1971	1972
1973	1974	1975	1976	1977	1978	1979	1980
1981	1982	1983	1984	1985	1986	1987	1988
1989	1990	1991	1992	1993	Average	Observed	LIB_STP

10 JULY STP INFLOW USED STARTING 7/10/07

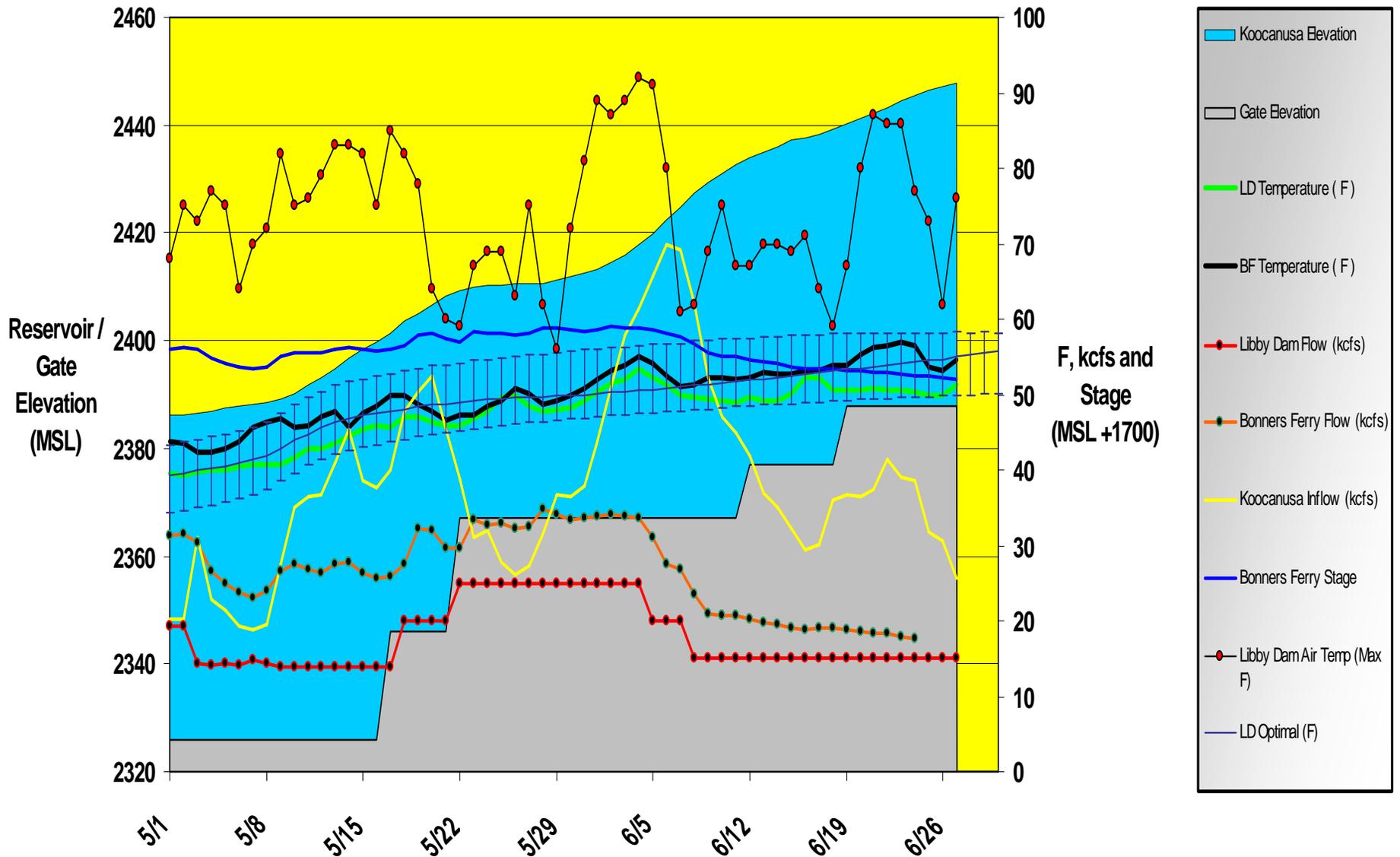
Libby - STP Inflow

APR-AUG VOLUME= 6.879 MAF

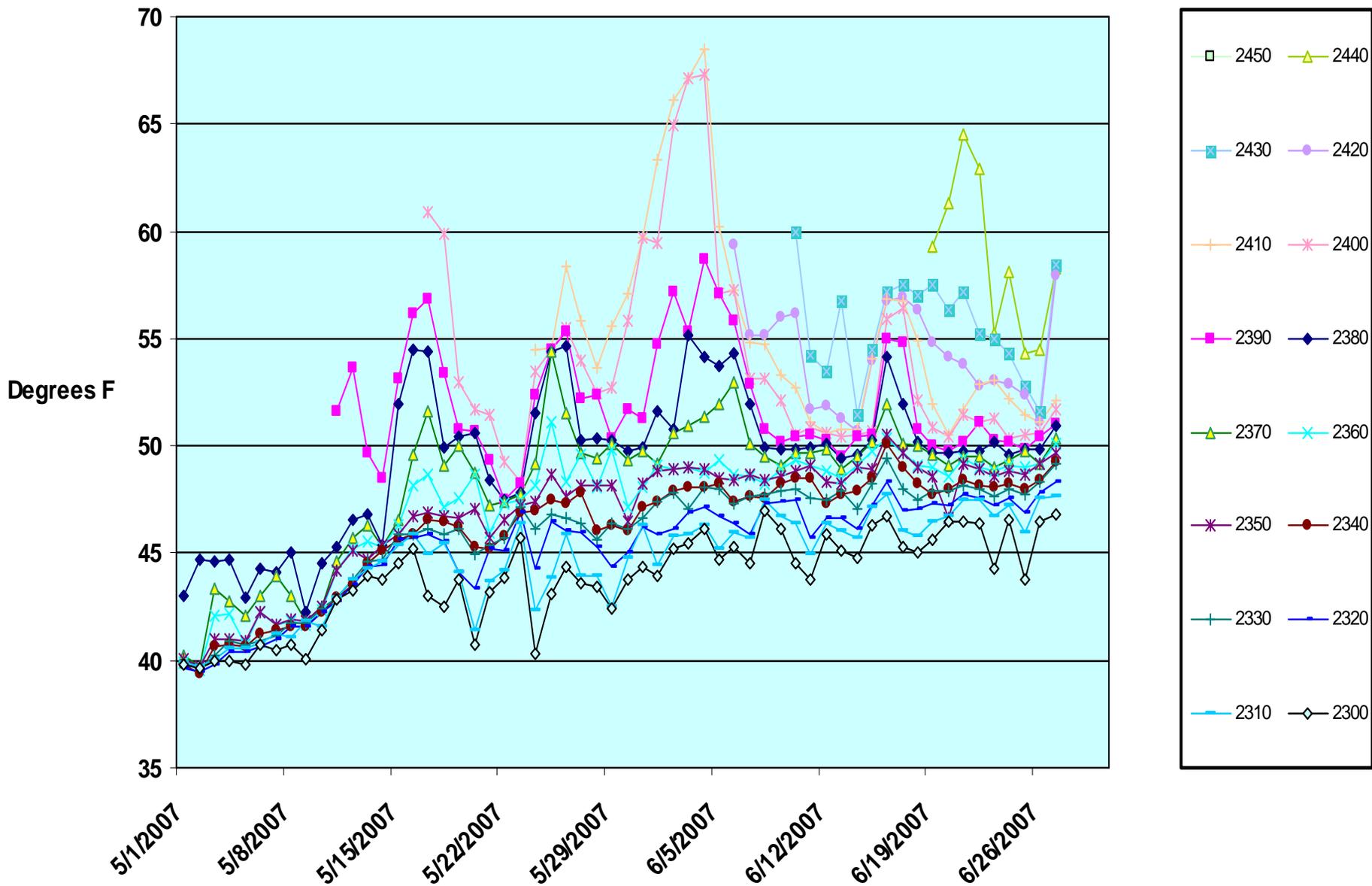
Flat Flow Operation - 2439 End of August



Kootenai River and Koocanusa Reservoir Temperatures 2007 Sturgeon Operations (1 May - 30 June)



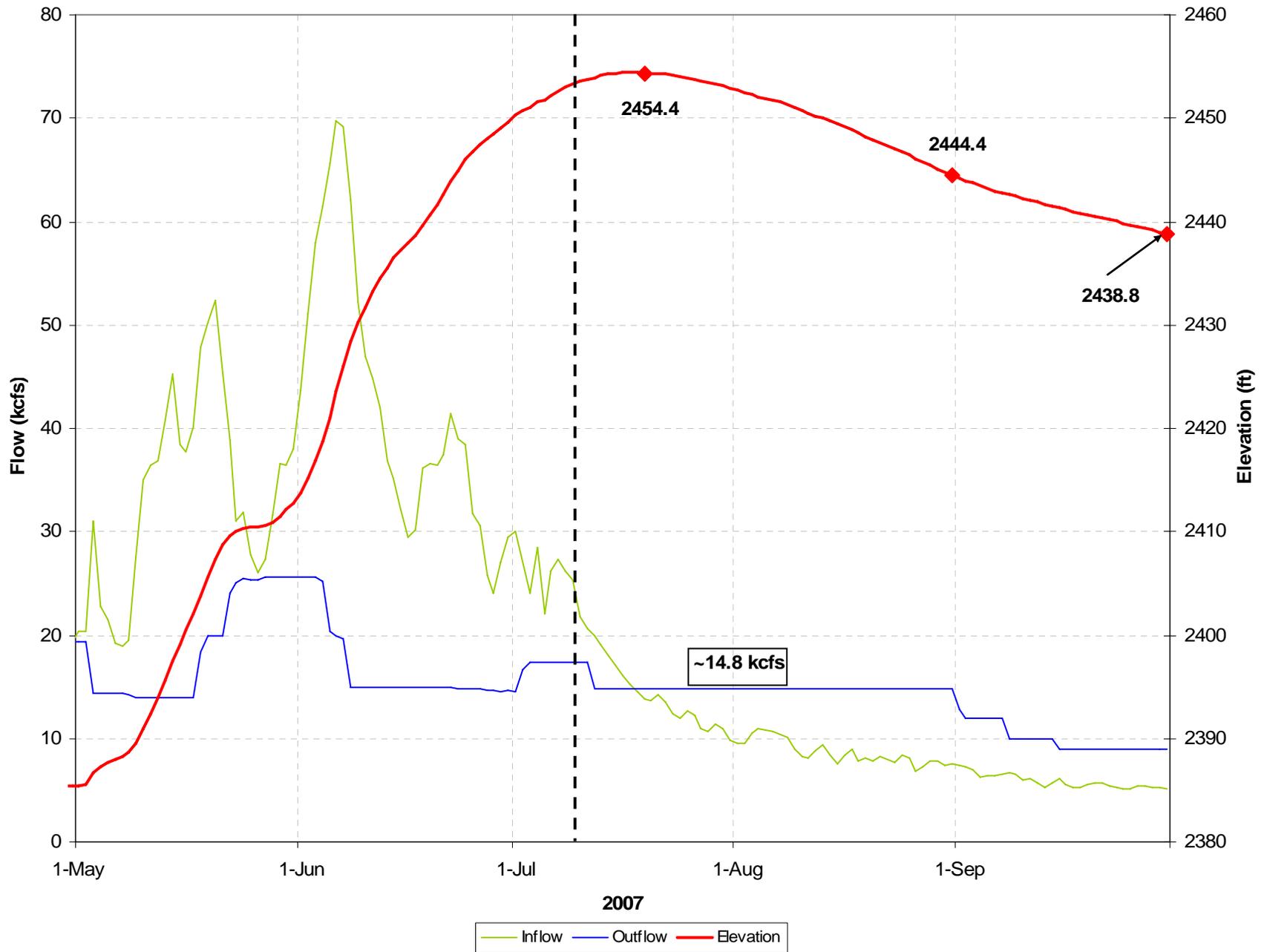
Koocanusa Reservoir Temperatures 2007 Sturgeon Operations (1 May - 31 July)



10 JULY STP INFLOW USED STARTING 7/10/07

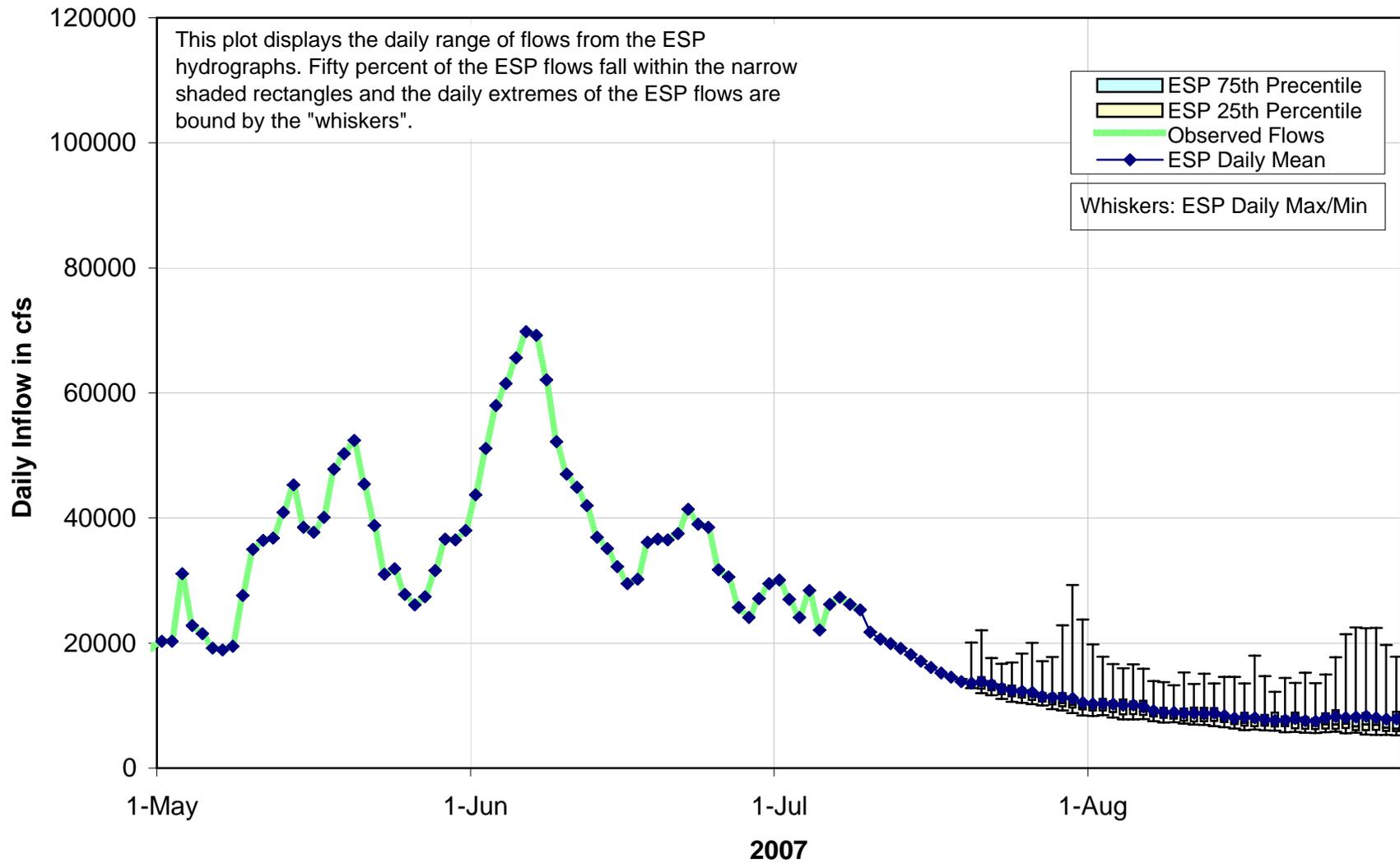
Libby - STP Inflow
Montana Proposal

APR-AUG VOLUME- 6.879 MAF



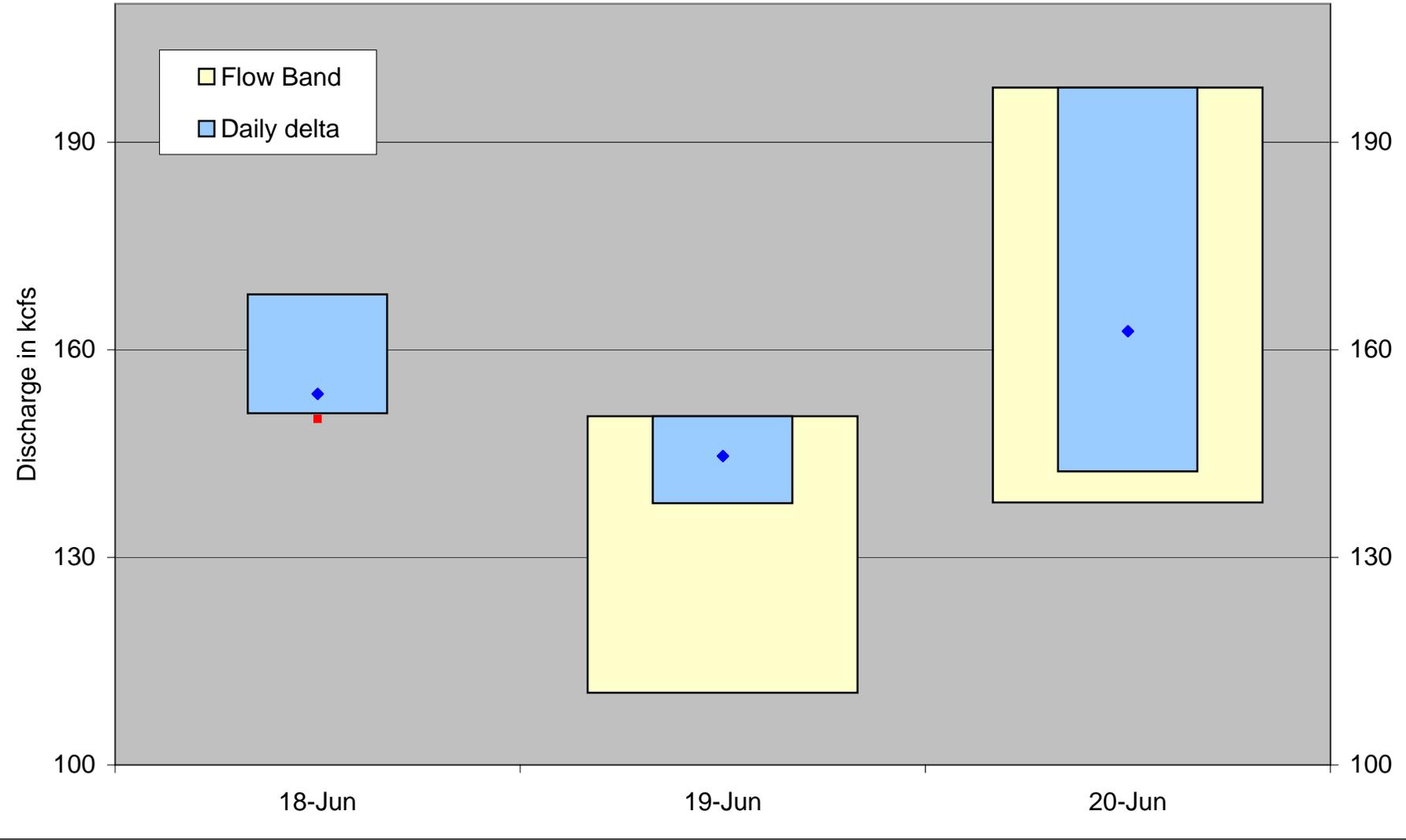
Libby ESP Inflows - Daily Box-Whiskers Plot

ESP flows updated 10-Jul-2007



Priest Rapids Operations 2007

Number of exceedances: 0



Summary of 2007 PRD operations Emergence and Rearing Periods

- Mean PRD discharge = 171.7 kcfs
- Mean Daily Delta = 38.2 kcfs
- Number of exceedances = 4
- Mean exceedance = 1.4 kcfs
- Criteria distribution
 - 40 kcfs = 5
 - 60 kcfs = 42
 - 150 kcfs min = 21

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

July 11, 2007 Meeting AND update from July 13 Conference Call

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

Notes: Erin Halton

The following notes are a summary of issues that are intended to point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the "record" of the meeting, only a reminder for TMT members.

Review of Facilitator Notes / Meeting Minutes

June 27th TMT facilitator notes had one clarifying edit to the Treaty Fishing section and were finalized. No changes were made to the facilitator notes or official meeting minutes from the July 5th and 9th conference calls.

Action: The facilitation team will send the COE a final version of the 6/27 facilitator notes for posting as soon as possible.

Priest Rapids Update

Russell Langshaw, Grant County PUD, reported on a summary of 2007 Priest Rapids operations. A graph linked to the TMT agenda showed 4 total exceedances, a mean discharge of 171.7 kcfs and a mean daily delta of 38.2 kcfs. TMT members commended the good job done on Priest Rapids Operations this year.

Action/Next Steps: Langshaw said a formal 2007 Priest Rapids operations report will be completed in September and Priest Rapids will be on the agenda for the TMT year end review in November.

Updated Flow Forecasts

Cathy Hlebechuk, COE, referred TMT to several flow forecasts posted to the TMT web page, updated as of 7/10. The Dworshak ESP hydrograph showed inflows ranging between 1-1.5 kcfs and Hlebechuk noted that actual flows were down from the 1.85 kcfs forecasted by the River Forecast Center and the COE. Dworshak whiskers plot showed minimal variation in the minimum/maximum flow range. Libby ESP hydrographs showed flows gradually declining through August. Pat McGrane, BOR, said that Hungry Horse elevation was about two feet from full, drafting slightly with outflows at 4.4 kcfs.

Dworshak Operations

Cathy Hlebechuk, COE, reported that Dworshak continued to release 12 kcfs. Tina Lundell, COE, reported that Dworshak temperatures were holding at 43.5° and that the forebay elevation was at 1590.25'. Lundell added that Lower Granite tailwater temperatures were 67° and that air temperatures in the area were expected to be in the range of 101-103° for the next couple of days and then drop to 95° by 7/15. Mike Schneider, COE, referred TMT to slides linked to the TMT agenda on CEQUAL modeling for the lower Snake River. In his presentation, Schneider noted that the travel

time through the Lower Granite pool (4.7 days) had decreased slightly due to lower temperatures. He said that the Orofino water temperatures of 76° were the warm point in the system, temperatures at Anatone were 72°, and Clearwater at Lewiston water temperatures were at 54.7°. Schneider's presentation displayed a base option of holding outflows at 12 kcfs through 7/13, then shifting to 9 kcfs for 7/14-31. An alternative option was to hold outflows at 12 kcfs through 7/16, shift to 9 kcfs for 7/17-27, then drop to 7.3 kcfs for 7/28-30. Schneider clarified that neither of these options considered Dworshak modeling for the August time frame. MT and CRITFC expressed some concern for potential temperature increases in mid-late July. TMT members discussed the alternative option, but the base option was determined to be the course of action for the time being. TMT members thanked Schneider and the COE for their modeling efforts.

Action/Next Steps from 7/11 TMT meeting:

- The COE will continue to operate Dworshak at 12 kcfs until the evening of 7/13, when the COE will shift to full power house (9-9.5 kcfs).
- Dworshak temperatures will be closely monitored, and TMT members will be notified by the COE if temperatures spike between now and the 7/18 TMT meeting.
- Dworshak operations will be on the agenda for the 7/18 TMT meeting.

UPDATE - 7/13 TMT Conference Call:

An unscheduled TMT Conference Call was held to discuss the latest Dworshak modeling results. Mike Schneider walked TMT members through base and alternative scenarios that were posted as a link to the TMT website and noted that with the base option, modeled temperatures went above 20°, while the alternative option of holding outflows at 12 kcfs for three additional days was projected to hold temperatures at or below 20°. Salmon Managers present on the call: NOAA, USFWS, ID, Nez Perce Tribe, asked clarifying questions regarding the CEQUAL modeling assumptions and acknowledged the challenge in managing the complex conditions. During the TMT call, Russ Kiefer, ID, suggested an operation of holding outflows at 12 kcfs through 7/14, shifting to 11 kcfs for 7/15, and dropping to full power house (9-9.5 kcfs) on 7/16. Greg Haller, Nez Perce Tribe, acknowledged Kiefer's suggestion as a compromise and supported it if release temperatures could be slightly reduced. Howard Burge, USFWS, said the Federal Hatchery would be supported by temperatures no lower than 43°. Cathy Hlebechuk, COE, said that the project was currently operating with one small unit in undershot mode, with release temperatures of 43.8-43.9°. The COE and the Nez Perce Tribe expressed concern for the end of August Dworshak elevation.

Action/Next Steps from 7/13 Conference Call:

- The COE will operate Dworshak with outflows of 12 kcfs until 2200 hours on 7/14, when the COE will shift to 11 kcfs. The COE will operate two units in undershot mode, while trying to maintain temperatures of no less than 43°.
- The COE will shift to full power house (9-9.5 kcfs) at 2200 hours on 7/15.
- Temperatures and flows at the project will be closely monitored and TMT will revisit Dworshak operations at the 7/18 meeting.

- Dave Statler, Nez Perce Tribe requested the COE generate a graph of projected Dworshak elevations, given the operations-to-date, to be included for discussion at the 7/18 TMT meeting.

Libby/Hungry Horse Operations

Cathy Hlebechuk, COE, reported that Regional Executives will meet on 7/17 to discuss Libby operations, per the 6/29 IT conference call. She referred TMT to updated operation scenarios, linked to the TMT agenda and noted Libby was releasing 17.3 kcfs. The COE's most current forecast and that of the RFC ESP showed total flows in the range of 6.89-7.2 MAF at Libby. Jim Litchfield, Montana, reiterated the objective of the Montana proposal: to maintain fairly flat 15 kcfs outflows through August followed by a gradual ramp down in September and thanked the COE for graphing this option. Also linked to the agenda was a 2007 sturgeon operations graph, showing Libby temperatures remaining at an optimal level. Pat McGrane, BOR, said that if Hungry Horse held flows at 4.4 kcfs, the project would be 17' from full by the end of August.

Action/Next Steps: A Regional Executive meeting to discuss Libby operations will be held on 7/17 at 3:30 p.m. TMT will receive an update at the 7/18 meeting.

2007 Summer Treaty Fishing

Kyle Dittmer, CRITFC, referred TMT to a summary of 2007 treaty fishing, linked to the TMT agenda. Dittmer characterized the 2007 season as good overall, and said that final counts would be available in the near future. Dittmer said he would encourage discussion between COE managers, CRITFC and Tribal managers on the drop in Bonneville pool elevation on 6/23-24 that impacted platform (non-treaty) fishing. Cathy Hlebechuk, COE, acknowledged the desire for further discussion of the issue and noted that Treaty Fishing discussions were occurring through the Remand process.

BPA Procedures for Power System Emergencies

Tony Norris, BPA, referred TMT to two documents linked to the TMT agenda: a letter written by Stephen Oliver, BPA, describing procedures that need to take place before an emergency is declared and how neighboring systems would be affected; and an internal, BPA 'real time' guiding document that describes procedures for emergencies. Norris said the procedures have been distributed to the Real Time schedulers who work 24 hours/day. Norris characterized the procedures as a 'living document' and clarified that the letter from Oliver had been filed with the court, but the procedures had not. Cindy Henriksen, COE, added that there were discussions happening at the policy level and through the remand process about policy and procedures regarding system emergencies, and that there would be no changes to TMT's emergency protocols during this season. Norris asked TMT members to review the protocols document with special attention to the actions listed in Step 6. Norris clarified that the BPA protocols do not supercede the protocols listed in the TMT guidelines and TMT members acknowledged the BPA need to have internal guidance in place.

Action/Next Steps: TMT members should direct edits/suggestions for changes to the BPA document to Norris.

Flow Augmentation in the Lower Snake River

Pat McGrane, BOR, said this year's use of 427 KAF was formalized in the Nez Perce Settlement and that it would continue through the middle-end of August. For details on this, see the document linked to the agenda that show 2007 flow augmentation estimates as of 7/10.

Operations Review

Don Faulkner, COE, reported that an outage at Little Goose's T1 unit had begun at 0730 on 7/13 and would conclude at 1700 hours on 7/14. The outage was not expected to have any effect on fish. Faulkner also reported on an Ice Harbor request for 1-2 hour outages to test a large unit, which would require a drop in spill levels. Salmon Managers requested the operation be done in September, after fish spill ends but made a recommendation to discuss the request at the 7/18 meeting and make a decision after more specifics are made available.

Reservoirs – Cathy Hlebechuk and Pat McGrane reported on reservoirs. Hungry Horse was at elevation 3557.5' with outflows of 4.4 kcfs. Grand Coulee was full, at elevation 1290' and targeting an elevation of 1278' by 8/31. Libby was at elevation 2453.5', with inflows of 20 kcfs and outflows of 17.3 kcfs. Dworshak was at elevation 1590.6', with inflows of 1.5 kcfs and outflows of 12 kcfs. Spring seasonal averages were 61 kcfs at Lower Granite, and 240 kcfs at McNary, with new summer average targets of 50 kcfs at Lower Granite and 200 kcfs at McNary. No changes were reported for Bonneville.

Fish – Paul Wagner, NOAA, reported on juvenile fish: yearling Chinook passage had ended, but sub-yearling daily passage numbers were in the 2-4000 range at Lower Granite. Wagner said that there was an issue with the efficiency of collection rates at Lower Granite, Little Goose and Lower Monumental, and that the actual counts may be up to four times as many as estimated. McNary passage numbers had likely peaked, and steelhead passage was nearing its end.

Cindy LeFleur, WA, reported on adult fish: passage at Bonneville was in the 5-700 per day range, with counts at 39,000 thus far and expected to still be under the predicted total of 45,000 by July 16. She said that sockeye and steelhead were running close to predicted, with sockeye counts in the range of 20,000. Spring Chinook jack counts remained high, and were expected to be in the 82-85,000 range.

Power system – Tony Norris, BPA, noted that the power system was well positioned to meet loads.

Water quality – Laura Hamilton, COE, said that there had been two TDG exceedances near Camas over the last ten days. Temperatures in the Lower Columbia and Lower Snake River were both in the 68-69° range.

Next face-to-face TMT meeting: Wednesday, July 18th

Agenda items will include:

- Review/Finalize Facilitator's Notes and Meeting Minutes
- Updated Flow Forecasts
- Dworshak Operations
- Libby/Hungry Horse Operations – Report from Executive meeting on 7/17.
- Ice Harbor Outage Request
- Operations Review

**Columbia River Regional Forum
Technical Management Team Meeting
July 11, 2007**

1. Welcome and Introductions

Today's TMT meeting was chaired by Cathy Hlebechuk and facilitated by Robin Harkless, with representatives from BPA, BOR, COE, Montana, NOAA, Oregon, Washington, CRITFC, the Nez Perce Tribe and FPC attending. The following is a summary (not a verbatim transcript) of the topics discussed and decisions made at the meeting. Anyone with questions or comments about these notes should provide them to the TMT chair or bring them to the next meeting.

2. Review Facilitator's Notes and Meeting Minutes

The facilitator's notes for conference calls on July 5 and 9 have been posted to the TMT website, as well as the June 27 official minutes, Robin Harkless said. Official minutes from the July 5 and 9 conference calls will be posted this week.

Kyle Dittmer (CRITFC) commented on the June 27 facilitator's notes under the Treaty Fishing section. The draft pool has been causing a problem for platform fishers, not gillnet fishers as the notes said. The platform fishery is ongoing, not a special operation like the treaty fishery involving SORs every summer, Hlebechuk explained.

3. Priest Rapids Update

Russell Langshaw (Grant County PUD) gave a final briefing on this year's operation, which ended June 20. A final report will be issued in September. Langshaw described the final days of operations June 18-20:

- Discharges were 144 to 162.7 kcfs.
- Daily deltas were 12.6 to 55.5 kcfs.
- Protection flows were 150 kcfs minimum, with 40 kcfs and 60 kcfs flow bands.

He summed up 2007 season operations:

- Daily mean discharges were 171.7 kcfs.
- The mean daily delta was 38.2 kcfs.
- There were a total of 4 minor exceedances, with a mean of 1.4 kcfs.
- There were 5 days of 40 kcfs bands, 42 days of 60 kcfs bands, and 21 days of 150 kcfs minimum flows.
- The mean daily delta for this operation was less than the smallest protection criteria.

Langshaw offered kudos for the Grant Co. PUD operators who helped make this a great season, and Wagner complimented them all on a successful year. Langshaw will participate in the year-end TMT review in November.

4. Updated Flow Forecasts

A. Dworshak. The ESP hydrograph is fairly flat, with current outflows of about 2.5 kcfs, Hlebechuk said. The June final COE inflow forecast (the COE does not prepare a July forecast) and the July RFC final forecast are 1.86 and 1.85 MAF, respectively.

B. Libby. The ESP hydrograph shows that there is potential for thunderstorm activity in late August in the basin, so this forecast is a bit more varied than the one for Dworshak, Hlebechuk said. The whiskers plot for Libby shows a gradual decline throughout August.

C. Hungry Horse. Drafting a couple tenths a day, Hungry Horse is in recession and 2.5 feet from full, releasing 4.4 kcfs, Pat McGrane (BOR) said.

5. Dworshak Operations

Outflows were increased to 12 kcfs on Thursday, July 5. There was a TMT call on Monday, July 9, to decide whether the 12 kcfs outflows should continue through Friday night. The plan was to reevaluate that decision today in light of new modeling information.

First, Tina Lundell (COE) reported on temperatures at Dworshak. At 5 a.m. today the water temperature of the outflow from Dworshak was 43.5 degrees F, with Lower Granite tailwater temperatures at 67 degrees F and holding. The forebay elevation of Dworshak reservoir was 1,590.6 feet.

Mike Schneider (COE) presented updated CEQUAL modeling results (which take a day to process, so he used yesterday's (July 10) forecasts). The good news is that forecasted air temperatures are dropping a bit – to 105 degrees F on July 12 and 13. Yesterday's weather forecasts were for 110 degrees July 12 at Lewiston, so the outlook now is cooler.

Water release temperatures at Lower Granite are about 67 degrees F and trending flat, with maybe a slight decline that corresponds with the arrival of 12 kcfs discharges that started July 5, Schneider said. Conditions on the Snake River at Anatone gage remained fairly flat at about 22 degrees C, or 72 degrees F for the last 5 days. The area is expected to warm up later this week. Temperatures on the Clearwater River have been about 43.5 degrees F at the 12 kcfs release point with the regulating outlets in operation and one gate of one of the small turbines in undershot mode. Orofino gage is registering 3.3 kcfs

outflows at 24.5 degrees C, or 76 degrees F, a warm point in the system. The current estimate is that Clearwater flows are making a 21% constant contribution to the Snake.

The end of excess water for Dworshak releases is here, Schneider said. According to the updated forecast, there are about 2 more days of 12 kcfs outflows available in the water supply before needing to drop back to powerhouse capacity to meet the end of August elevation target. Schneider presented two options for TMT to consider:

- The base case shows outflows of 12 kcfs continuing through Friday, July 13, ramping down to powerhouse capacity for the rest of July.
- The alternative provides 3 additional days of 12 kcfs flows through July 16 before dropping to full powerhouse on July 17 for the rest of July.

Dittmer asked, are these results from the official National Weather Service forecast for Lewiston or the raw model data for Lewiston? The difference is significant. The numbers came from NOAA's webpage showing the 7-day forecast for Lewiston, Schneider said, which is the official forecast. Last year there were opportunities in August to back off powerhouse flows and still meet the 20 degrees C target and target elevations, so the barrel is not necessarily dry. Schneider recommended extending the operations at 12 kcfs outflows, knowing it's likely the spent water can not be recovered later.

The COE will plan on continuing 12 kcfs outflows, dropping to full powerhouse on Friday evening, July 13, Hlebechuk said. Jim Litchfield (Montana) expressed concern because this is a difficult period heat-wise until mid August. The releases from Hells Canyon have been small, which makes Dworshak releases more effective, Dittmer said. Continuing 12 kcfs outflows should produce the desired effects at Lower Granite at least through next Thursday morning, Lundell said.

6. Montana Proposal for Libby and Hungry Horse

Because TMT could not reach consensus on Libby operations, the decision was elevated to IT on July 6, then further elevated to the Federal Executive level, Cathy Hlebechuk (COE) reported. The Federal Executive meeting is scheduled for July 17.

Cathy Hlebechuk provided an overview of Libby operations. Outflows are 17.3 kcfs, with an assumption that outflows from 17 to 17.5 kcfs will achieve elevation 2,439 feet by the end of August. The model shows a drop to 6 kcfs outflows in September.

Jim Litchfield asked, will outflows be held at 17.3 kcfs for now? The plan is to maintain that level, Hlebechuk said. There are two different volume forecasts for July 2 – the ESP forecast is 6.90 maf, and the regression forecast is 7.2 maf. The COE June final forecast was around 7 maf.

The second graph attached to today's TMT agenda shows the Montana proposal, or about 15 kcfs out through the end of August, stepping down in September and using STP flows to reach elevation 2,444.4 feet on Aug. 31. Hlebechuk asked, do the Salmon Managers want Libby to reach elevation 2,439 feet by Aug. 31?

The substance of the Montana proposal is a compromise on the full implementation of the Council's mainstem amendments vs. the historic operation under the BiOps, Jim Litchfield said. Rather than target a specific ending elevation, the Montana proposal was based on a reasonable flat flow according to the volume forecast. The volume forecast shown on this graph happens to draft 20 feet out by the end of September, which would be an acceptable outcome for Montana as a compromise. Litchfield emphasized that this graph depicts exactly the conditions Montana was hoping to achieve.

A third graph attached to today's agenda shows Libby dam temperatures in the optimal level, with Bonner's Ferry temperatures in that range also, Hlebechuk said.

Pat McGrane (BOR) described Hungry Horse operations. For the time being, 4.4 kcfs are being released, a slight difference from what is reported on the water data page. Continuing 4.4 kcfs outflows would put the reservoir at 17 feet from full by end August, according to BOR's calculations. This operation will also be discussed at the regional executive meeting next Tuesday.

8. Review of 2007 Summer Treaty Fishery

Kyle Dittmer (CRITFC) reported on three weeks of treaty fishing under two SORs. Things in general look good. Bonneville pool has been in compliance with the 1 foot criteria requested under the SOR for 90% of the time, a 3% improvement over summer 2006 operations. The Dalles pool achieved 84% compliance with the terms of the SOR, or a 22% improvement over last year. The John Day pool achieved 100% compliance this year; last year's rate was 99%.

The fishing effort was generally successful this year. However, the weekend of June 23-24 brought precipitous drops in the elevation of Bonneville pool as a result of a COE operation for recreation and human safety. Dittmer showed TMT photos of the gap between fishing platforms and the water level at Bonneville pool, which generated a lot of complaints. The tribe decided to end the gillnet fishery early and will finish this season via the platform fishery at the end of July. Hlebechuk noted the low elevations June 23-24 were coordinated

with CRITFC and occurred outside the Treaty Fishing periods. Future changes in the agreement for these operations should be handled at the remand meetings, Hlebechuk said.

9. BPA Power Emergency Protocols

Tony Norris (BPA) briefed TMT on BPA's internal procedure for power system emergencies, which has been evolving since the April 3 event where some units operate outside 1% peak efficiency. Some TMT members have been discussing a possible revision to the current TMT protocols. However, the process has been stalled since the Action Agencies were unable to arrive at a consensus that a modification is necessary for this season. Judge Redden emphasized that on April 3, BPA's duty schedulers did not have clear instructions on how to proceed. In light of this, BPA senior managers were uncomfortable moving into summer without giving clear direction to their power operations staff.

The two documents linked to today's TMT agenda are currently in the hands of BPA's duty schedulers and staff to make decisions if a power system emergency should occur, Norris said. The documents cover two types of emergencies: BPA energy shortages, and shortages in neighboring systems.

The letter from Steve Oliver of BPA (first attachment) describes the process a neighboring power system must follow before BPA will consider declaring a power system emergency that could result in modifications to fish operations. The intent is to impress upon neighboring systems that they must make every effort to avoid placing BPA in the position of choosing between health and human safety and fish operations. This letter has been provided to the court.

The second attachment, called BPA Procedures for Power System Emergencies, spells out the steps for coordinating energy shortage events within BPA. The goals of the procedure are to prevent or delay situations that would result in either the shedding of firm load or the interruption of fish operations. If those efforts fail, Norris said, the procedure also outlines the protocols for transitioning into emergency operations. These emergency protocols are considered BPA internal procedures and have not been filed with the court.

Norris pointed out a notable difference in this list and the current TMT protocols: Any interruption of fish operations is considered an emergency. Actions that interrupt fish operations are not to be implemented without a request from BPA power services management for a NERC (North American Energy Electric Reliability Council) Alert, a significant step in electric reliability that is never undertaken lightly. Once the declaration has been requested, the duty scheduler will follow the protocol to implement emergency actions. The emergency action list is somewhat altered from what is currently in the TMT protocols. In the effort to provide the best list possible, Norris worked with

individual salmon managers to develop the list that's attached to today's TMT agenda. He invited the Salmon Managers to comment or provide changes to the list. Not all the prioritized actions would equally resolve a given problem. Therefore, the most effective actions will be chosen, though every attempt will be made in an emergency to follow the prioritized list.

TMT discussed the potential for energy conservation to meet BPA load requirements. This is not a viable option in a near term emergency, i.e. possible power shortages that are only 3 hours away. Harvesting conservation megawatts takes months of investing in public promotion plus possibly gubernatorial involvement. Nonetheless, appeals for energy conservation are part of the NERC Alert process. If TMT wants to update list of TMT protocols so they match up with this list, that would be a welcome recommendation, Norris said. While TMT and ultimately the whole region at the executive level could be drawn into this process, essentially it's a BPA document, Hlebechuk said.

Norris invited TMT members to converse with Terry Larson and Steve Kerns from BPA, who were present at the meeting. Kerns emphasized that NERC Alerts are extremely rare in the energy industry and are taken very seriously. In terms of declaring an emergency, a NERC Alert would be issued first, then BPA would take action. Ruth Burris (PGE) asked, at what point might BPA's customers be affected? That would happen in step 5, the NERC Alert, Kerns replied. TMT members were invited to review the documents attached to today's agenda and give their comments to Tony Norris.

Cindy Henriksen of the Corps clarified the Corps view of this document. This is a BPA internal document and it is not endorsed by other Action Agencies. The Corps finds that this document contains two parts, the process part and the action part. Currently the process part is not altogether consistent with the current August 2006 TMT Emergency Protocols. The Corps will look at that to see if the BPA document can be brought up that level. The action part is the list of actions to take in an emergency. The Corps agrees the TMT should look at those actions to see if a list can be agreed upon. As for the overarching process under an emergency, the Corps is not prepared to change the process leading into an Emergency declaration from what is in the currently agreed upon TMT Emergency Protocols. If there is a desire to change the definitions of emergency and how the region leads into one, that will be discussed under the Remand process.

10. Flow Augmentation in the Upper Snake River

Pat McGrane (BOR) provided information on BOR's expectations for flow augmentation volumes this year. Despite it being one of the driest years on record in the upper Snake, BOR expects 427 kaf of water supplies, mainly due to the use of powerhead space in reservoirs. Powerhead space is water stored above turbine intakes in the reservoir. Normally considered inactive space,

unavailable for drafting, powerhead space is nevertheless water that can be used.

BOR hasn't used much powerhead space since 1994 because of water rights' issues with the State of Idaho. However, the Nez Perce settlement acknowledged that powerhead space can be included in BOR's supply of flow augmentation water, but only in years when 427 kaf would otherwise not be available.

Problems can arise in a second or third dry year, which might result in BOR having to shut down the Palisades power plant due to lack of powerhead space. Under that scenario, BOR would have to draw the space down to compensate irrigators.

BOR's current estimate of water supplies for flow augmentation from the upper Snake above Brownlee is 427 kaf, including powerhead space. Not much powerhead space (157 kaf) is available at the Palisades plant, with much of that being used this year. This means a good winter is urgently needed in terms of the water supply, McGrane said.

11. Operations Review

A. Reservoirs. Don Faulkner (COE) informed TMT about an outage at Little Goose. The project is experiencing transformer problems that took units 1 through 4 out of service for a few days. At the beginning and end of the outage, the whole powerhouse will go offline for half an hour. The operation started this morning at 7:30 am and will be completed at 5 pm on Thursday. The units will be out of service for 1 or 2 days.

Even using the small unit at Ice Harbor we have been unable to meet specified spill quantities. In spite of that Faulkner asked, would TMT allow one of the larger units (U-4) to be started and tested? The question arose because U-4 has just completed a long term overhaul and the project wanted to perform some tests. The tests would be short in duration, and take place a couple times. Rick Kruger (Oregon) and Jim Litchfield (Montana) expressed a preference for doing the test in August after the peak fish migration has passed. Faulkner said he would delay the test, which should take only a few hours to perform.

Hungry Horse is at elevation 3,557.5 feet, releasing 4.4 kcfs, McGrane said. Grand Coulee is full at elevation 1,290 feet, passing inflows and headed to elevation 1,278 by end August. Libby is at elevation 2,453.5 feet, with 20 kcfs inflows that are dropping steeply, and 17.3 kcfs outflows. Dworshak is at elevation 1,590.6 feet with 1.5 kcfs inflows and 12 kcfs outflows. Lower Granite seasonal average flows for April 3-June 20 were 61 kcfs; the flow objective was 85 kcfs. For the past 7 days, Lower Granite has averaged 35 kcfs, and McNary has averaged 156 kcfs. McNary spring flows for April 10-June 30 were 240 kcfs,

with an objective of 237 kcfs. McNary flows have been 158 kcfs for July so far. There's a new summer target at McNary of 200 kcfs.

B. Fish. The yearling Chinook migration is done, Wagner said, except for a few fish in the lower Columbia. The subyearling Chinook migration is busy, with Lower Granite passage indices showing 4,000 fish per day. Collection efficiency at Lower Granite is low, Wagner said – so four times that number should bring the passage index closer to reality. Collection efficiency at Little Goose is also low, and is only 6% at Lower Granite. The spilling of subyearlings at McNary has probably ended. Subyearling passage at Lower Granite is extremely low. Of 4,095 wild fish that were tagged, only 181 were detected.

Steelhead passage continues at Little Goose, but is nearing its end, Wagner said. The number of steelhead subyearlings is higher than usual for this time of year. Litchfield asked whether this level of collection efficiency is new. RSWs are amazingly efficient – they seem to be passing fish like crazy, Wagner said. The amount of spill provided for subyearlings the past couple years is new.

About 500 to 700 adult fish are passing Bonneville daily, Wagner said. Cindy LeFleur (WDFW) reported on summer Chinook adult runs. Predictions for June 16-July 31 were about 45,000 fish, but are coming in under 40,000 fish. This year's sockeye salmon returns are poor – somewhere in the mid 20,000 range, but close to what WDFW projected. Summer Chinook runs will be lower than predicted.

Jack Chinook returns for spring were impressive, while summer jack Chinook returns are above average. The run size is around 82,000 to 85,000 fish, with a prediction of 78,000 fish for this year.

C. Power System. There's a lot of load on BPA thanks to hot weather, Norris said. Nevertheless, BPA is well positioned to meet load, and California is in good shape.

D. Water Quality. There were two exceedances at Camas-Washougal gage over the past 10 days, Laura Hamilton (COE) said. Flows have been low. Exceedances are posted on the TMT web page twice a month.

13. Next TMT Meeting

The next regularly scheduled TMT meeting will be on Wednesday, July 18 and will include discussion of updated flow forecasts, the Ice Harbor outage, Dworshak operations, the Federal Executive meeting on Libby/Hungry Horse operations, and the usual operations review . This meeting summary was prepared by consultant and writer Pat Vivian.

Name	Affiliation
Cathy Hlebechuk	COE
Tony Norris	BPA
Pat McGrane	BOR
Laura Hamilton	COE
Jim Litchfield	Montana
Paul Wagner	NOAA
Rick Kruger	Oregon
Kyle Dittmer	CRITFC
Dan Spear	BPA
Steve XX	BPA
Terry Larsen	BPA
Bernard Klatte	COE
Jennifer Miller	Susquehanna
Cindy Henriksen	COE
Tina Lundell	COE
Ruth Burris	PGE
Terry Larson	BPA
Steve Kern	BPA

Phone:

Cindy LeFleur	Washington
Dave Benner	FPC
Russ Kiefer	Idaho
Greg Haller	Nez Perce
Richelle Beck	DRA
Russell Langshaw	Grant Co. PUD
Glen Trager	Coral Energy
Bill Crampton	CBB
Russ George	WMC
Mike Schneider	COE
John XX	Constellation
Jeff XX	COE – Seattle

TECHNICAL MANAGEMENT TEAM

BOR : John Roache/Mary Mellema/Pat McGrane

BPA : Robyn MacKay/Tony Norris/Scott Bettin

NOAA-F: Paul Wagner/Richard Dominigue

USFWS : David Wills/Steve Haeseker

OR : Rick Kruger/Ron Boyce

ID : Russ Kiefer

WDFW : Cindy LeFleur

MT : Jim Litchfield/Brian Marotz

COE: Cathy Hlebechuk/Jim Adams/Cindy Henriksen

TMT CONFERENCE CALL

Friday July 13, 2007 11:00 - 12:00

NOTE: Time & Phone Number

1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97209-4142
Map Quest [\[Directions\]](#)

Conference call line: 503-808-5190

To check into the building, take the elevator to the 5th floor and the guard will issue you an ID badge if you need one and will take you down to the 4th floor where the meeting is. If you have NOT attended a TMT meeting in the past you will need to call ahead and let Cathy Hlebechuk (503) 808-3942, Jim Adams (503) 808-3938 or Cindy Henriksen (503) 808-3945 know, so you can be added to the TMT Visitor List and issued an ID badge. This badge may be used indefinitely. If you have attended TMT in the past you may re-use your ID badge indefinitely. If you are a federal employee you will also need to have an ID badge issued to you which can be used indefinitely.

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Please MUTE your Phone

*All members are encouraged to call Robin Harkless with any issues or concerns they would like to see addressed.
Please e-mail her at robin76@cnnm.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and Introductions
2. Dworshak Operation
 - a. [\[CE-QUAL-W2 Water Temperature Model Runs - Michael L. Schneider, COE\]](#) 
- Set agenda for next meeting - **July 18, 2007** [\[Calendar 2007\]](#) 

Questions about the meeting may be referred to [Cathy Hlebechuk](#) at (503) 808-3942 or [Jim Adams](#) at (503) 808-3938 or [Cindy Henriksen](#) at (503) 808-3945.

**Columbia River Regional Forum
Technical Management Team Conference Call
July 13, 2007**

1. Welcome and Introductions

The purpose of today's unscheduled TMT conference call was to revisit Dworshak operations in light of new information that shows temperatures at Anatone gage have turned out to be higher than expected under the current operation of 12 kcfs outflows. The call was chaired by Cathy Hlebechuk and facilitated by Robin Harkless, with representatives from COE, the Nez Perce Tribe, NOAA, Idaho and BPA on the line. The following is a summary (not a verbatim transcript) of the discussion and decisions made on the call. Anyone with questions or comments about these notes should provide them to the TMT chair or bring them to the next meeting.

2. Dworshak Operations

Mike Schneider (COE) presented the latest CEQUAL modeling results of forecasted Dworshak flows and temperatures. He walked TMT through a base case scenario, including four different assumptions regarding flows from Hells Canyon Dam, and an alternative scenario:

Base Case Scenario – Continue releasing 12 kcfs outflows through today, then step down to powerhouse capacity for the rest of the month.

Case 1 – Assume that the volume discharged from Hells Canyon in the past week (about 14.6 kcfs) will continue for the coming week.

Case 2 – Assume next week brings a 15% increase in the volume discharged from Hells Canyon last week.

Case 3 – Assume next week brings a 15% decrease in the volume discharged from Hells Canyon last week.

Case 4 – Assume next week's contribution from from Hells Canyon conforms to the STP forecast.

Alternative Scenario – Continue releasing 12 kcfs outflows for 3 more days, then step back on July 16 to powerhouse capacity through July 26. Make up those 3 additional days of flows above powerhouse capacity late in July in order to meet the elevation target of 1535 feet by Sept. 1.

Schneider then described the modeling results for each scenario:

Base Case Scenario - Temperatures at Lower Granite could be expected to stay flat for 3 days, with a mild warming trend running around 20-21 degrees C, depending on flows from Hells Canyon Dam.

Case 1 – Provides 3 days of cooler water which moderates temperatures from July 18-21 and keeps temperatures at or below 20 degrees C as measured at Lower Granite.

Case 2 – Provides the highest temperatures of all conditions modeled, up to 21 degrees C at Lower Granite.

Case 4 – Provides the coolest temperatures of all conditions modeled.

Alternative Scenario – Departs from all other scenarios on July 17 with 3 additional days of 12 kcfs outflows. This alternative shows a more consistent trend, maybe exceeding 20 degrees C slightly, Schneider said, but not until the end of the month. If last year's heat wave in late July were to reoccur this year, temperatures could exceed 23 degrees C.

If the Dworshak water supply is extended as modeled in the alternative scenario, there will probably be opportunities to make up for the water volume spent now by going below powerhouse capacity later this month, Schneider said. Last year, the reservoir elevation went below 1,535 feet, which meant there was less water available in September. Nevertheless, temperatures on the lower Snake did not approach 20 degrees C during that time.

Dave Statler (Nez Perce) asked Schneider whether he was leaning toward any of the modeled interpretations as being the one that most closely reflects reality. The STP simulation for Hells Canyon, with estimated average flows of 11.4 kcfs, might be a bit low, Schneider said. He expressed concern that the degree of cooling anticipated from maintaining 12 kcfs outflows has failed to materialize, given that the full effects of the cooler outflows from Dworshak should have registered at Lower Granite by now. Temperatures on the lower Snake remain close to 20 degrees C.

Paul Wagner (NOAA) asked whether the same 5-day travel time could be expected in terms of rising temperatures that result from a change in operations, or would a temperature increase show up immediately? The same 5 days of travel time from Dworshak to Lower Granite would apply to temperature increases and decreases, Schneider said. So the effects of any operational changes made today at Dworshak can be expected to show up at Lower Granite 5 days from now.

Hlebechuk raised the option of moving gates around to keep outflows from Dworshak in the range of 43 degrees F. Currently, one small unit is operating in undershot mode. Wagner and Haller agreed this change would be a step in the

right direction. The COE will transition the other small unit to undershot mode, with the big unit on overshot mode, and monitor how that affects outflow temperature, Hlebechuk said.

At an FPAC conference call just prior to this TMT call, there was no clear consensus among the Salmon Managers on how to manage Dworshak outflows, Wagner said. He asked whether Mike Schneider's presentation had made any difference in the Salmon Managers' positions.

Russ Kiefer (Idaho) recommended a compromise: continue 12 kcfs outflows and current temperature discharges from Dworshak until Saturday, then drop back to 11 kcfs. Then on Sunday, reduce to full powerhouse (approximately 9.5 kcfs). He thanked the COE for setting up today's consultation on the new modeling results and said that fits his vision of how TMT should function.

Another option FPAC discussed is running at 11 kcfs outflows through the weekend, then dropping to full powerhouse on Monday, Haller said. He expressed concern that late-season water is being tapped this early in the season, a concern Hlebechuk shared because inflow volumes are unknown.

After more conversation, TMT agreed to Russ Kiefer's compromise proposal. The COE will maintain Dworshak outflows at 12 kcfs until Saturday night at 2200 hours, cut back to 11 kcfs outflows at that time, and again to full powerhouse on Sunday night. The, COE will try to maintain Dworshak outflow temperatures in the high 42 to low 43 degree F range.

3. Next TMT Meeting

The next regularly scheduled TMT meeting will be on Wednesday, July 18. This meeting summary was prepared by consultant and writer Pat Vivian.

Name	Affiliation
Cathy Hlebechuk	COE
Mike Schneider	COE
Paul Wagner	NOAA
Scott Bettin	BPA
Russ Kiefer	Idaho
Greg Haller	Nez Perce

TECHNICAL MANAGEMENT TEAM

BOR : John Roache/Mary Mellema/Pat McGrane **BPA :** Robyn MacKay/Tony Norris/Scott Bettin
NOAA-F: Paul Wagner/Richard Dominigue **USFWS :** David Wills/Steve Haesecker
OR : Rick Kruger/Ron Boyce **ID :** Russ Kiefer
WDFW : Cindy LeFleur **MT :** Jim Litchfield/Brian Marotz
COE: Cathy Hlebechuk/Jim Adams/Cindy Henriksen

TMT MEETING

Wednesday July 18, 2007 09:00 - 12:00

1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97209-4142
Map Quest [\[Directions\]](#)

Conference call line: 503-808-5190

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AGENDA

1. Welcome and Introductions
2. Review [\[Meeting Minutes\]](#) 
3. Dworshak Operations - All
 - a. [\[Dworshak Outflows and Lower Snake River Tailwater Temperatures in 2007\]](#) 
 - b. [\[Daily Water Temperature Reports\]](#) 
 - c. [\[Dworshak STP outflows - draft to 1535' end August\]](#) 
 - d. [\[CEQUAL Temp Modeling - Michael L. Schneider, COE\]](#) 
 - e. [\[Hells Canyon Outflows - Actual data and Forecasted by IPC \(in kcfs\)\]](#) 
4. Libby Operations - Cathy Hlebechuk, COE
 - a. [\[Libby - STP Flat Outflow Operation\]](#) 
 - b. [\[Libby - STP Montana Proposal\]](#) 
 - c. [\[Kootenai River and Koocanusa Reservoir Temperatures 2007 Sturgeon Operations\]](#) 
5. Montana Proposal for Libby and Hungry Horse - All
6. Ice Harbor potential outage/ Lower Snake Projects double testing
7. BPA Procedures for Power System Emergencies
 - a. [\[BPA Procedures for Power System Emergencies\]](#) 
8. Operations Review

- a. Reservoirs
- b. Fish
 - [\[ISAB Latent Mortality Report - 2007\]](#) 
 - [\[Schaller & Petrosky NAJFM 27 2007\]](#) 
- c. Power System
- d. Water Quality - *Jim Adams, COE*
 - 1. [\[Spill Information 2007\]](#)
- 9. Other
 - Set agenda for next meeting - **July 25, 2007** [\[Calendar 2007\]](#) 

Questions about the meeting may be referred to [Cathy Hlebechuk](#) at (503) 808-3942 or [Jim Adams](#) at (503) 808-3938 or [Cindy Henriksen](#) at (503) 808-3945.

BPA PROCEDURES FOR POWER SYSTEM EMERGENCIES

(Current as of 7/11/07 as of 3pm)

This document updates and incorporates, and therefore replaces:

- (1) The Energy Shortage Procedures email sent 6/29 at 5:06PM from Kieran Connolly, and
- (2) The BPA Emergency Action Plan sent Mon 7/2 4:57 PM from Robyn MacKay and forwarded 7/2/2007 at 5:06PM from Terry Larson, and
- (3) It incorporates the Emergency protocols #4 sent 6/29 at 1:54PM by Bill Lamb (and forwarded 6/29 at 3:49PM by Robert Johnson and forwarded again 6/30 at 8:09PM by Angela Bolas).

Introduction:

The purpose of this procedure is to document the steps to coordinating energy shortage events. The goals of this procedure are to prevent or delay situations that would result in either the shedding of firm load or the interruption of mandated non-power operations. If those efforts fail this procedure also outlines the protocols to transition into emergency operations.

SECTION 1: DUTY SCHEDULER STEPS

SUMMARY OF DUTY SCHEDULER'S STEPS	
STEP 1:	ADVANCED PLANNING
STEP 2:	REAL TIME PLANNING:
STEP 3:	IMPLEMENT ALERT ACTIONS (When conditions develop rapidly it may become necessary to combine actions)
STEP 4:	ISSUE MARKET ALERT (If the marketing efforts do not appear to be sufficient)
STEP 5:	REQUEST POWER SYSTEM EMERGENCY
STEP 6:	IMPLEMENT EMERGENCY ACTIONS (Current as of 7/2/07 – and will be updated as needed)
STEP 7:	CURTAILMENTS (Duty Schedulers should not initiate curtailments of firm load independently)

Realtime Energy Shortage Emergency Procedures
FOR INTERNAL USE ONLY

STEP 1: ADVANCED PLANNING

If a FCRPS power shortage is well understood and anticipated in day-ahead or earlier planning, an Emergency Technical Management Team (TMT) meeting **will** be called. If Northwest or WECC-wide power shortages are anticipated in day-ahead or earlier planning, a NWPP Emergency Response Team (ERT) may be formed to determine a plan for the emergency.

NOTE: If either of these has been activated more specific guidance will be available – check the PGSP Operations Memo or other specific instructions from Schedule Planning.

STEP 2: REAL TIME PLANNING

Upon identifying conditions that may lead to insufficient generation to meet load obligations:

1. Determine the nature of the shortage:
 - When it will likely begin and end?
 - Is this an energy, capacity, or transmission shortage?
 - Will immediate resources free up water for the shortage period or, as in the case of a transmission limitation, will generation need to be shifted to solve the shortage?
2. Take all “Decrease Load “steps on Load Priorities.
3. Contact Technical Lead currently identified in PGSP Operations memo for actions after “use call list” on current Load Priorities. At this point, the Technical leads should assure communication is occurring with **Corps of Engineers (USACE) and Bureau of Reclamation (USBR)** regarding potential emergency conditions.
4. Whenever possible forewarn the marketing desk and the AGC dispatcher of the potential for an energy shortage.
5. If necessary have the Slice Desk help with communications.
6. Instruct marketing to implement their Emergency Protocols (SECTION 6) if you determine there is a risk that loads will exceed available capacity. (In conditions where you anticipate system capability will be stressed, purchases are a legitimate response to protect the hydraulic operation).
7. Prepare to load all available generation as hydro conditions allow.
8. Notify the AGC dispatcher of the potential for a real time energy shortage. In particular point out non-power constraints and sustainability issues that may not be readily apparent to the AGC dispatcher (e.g. MOP or draft limits).
9. Request information from the AGC dispatcher on any limitations on FCRPS generation due to transmission constraints. Information on the ability to operate Federal generation is not limited by Standards of Conduct.
10. Call out any technical support and management as needed from BPA as early as possible (all hours).
 - Contact PGSP per call list on Operations Memo and Scott Bettin.
 - Contact:
 - a. Kieran Connolly - Generation Scheduling (PGS) manager and
 - b. Steve Oliver - Vice President of Generation Asset Management (PG VP)

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STEP 3: IMPLEMENT ALERT ACTIONS: Actions utilized to avoid these interrupting fish protection measures.

NOTE: BPA Duty Schedulers shall attempt to implement all available resources on the Alert Action Checklist before initiating the process to declare an emergency, prior to implementing the BPA Emergency Actions List (Step 6). When conditions develop rapidly it may become necessary to combine actions.

- Timely energy/capacity purchases at prices up to the FERC WECC price cap (currently \$400).

- Request that Corps and Reclamation return all units to service by canceling or postponing scheduled outages. (Makes all units available).
-Corps (yes ___MW or No____potential MW)
-Reclamation (yes ___MW or No____potential MW)
other actions: _____
- Stop/delay Transmission O&M actions via AGC dispatcher.

- Put into service (on line) all possible generators (e.g., Grand Coulee pump-generators)
-Corps (yes ___MW or No____potential MW)
-Reclamation (yes ___MW or No____potential MW)
other actions: _____
- Reshape flows within objectives at specific projects to meet generation needs (deal with the immediate problem – this may throw the river out of whack – if applicable spill upstream projects to position water downstream). _____
- Cut prescheduled PNCA storage return to others

- Request Exceedance of draft limits
-Corps (yes ___MW or No____potential MW)
-Reclamation (yes ___MW or No____potential MW)
other actions: _____
- Stop/Start pumping at Grand Coulee. (yes or no)
- Request tailwater rate of change exceedance at Bonneville Dam. (yes or no from RCC)
- Cancel gill netting at BON (contact RCC)
- Reschedule power system maintenance to minimize impact fish protection measures.
- Request Grant place negative bias on GCL (call GRT dispatcher). (This only helps if we are at 1.5 ft limit, no extra capacity)
- Monitor reserves and request a declaration of a NERC ALERT 1 (via AGC dispatcher) when there is concern about sustaining required operating reserves. Dispatcher will call NWPP Reliability Coordinator.**

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STEP 4: ISSUE MARKET ALERT (If at any time during the implementation of the Alert Actions, it is the Duty Scheduler's judgment that those actions will not be sufficient to resolve the shortage, then the Duty Scheduler may determine to issue market alert earlier during step 3.)

Request that the AGC dispatcher issue a **Market Alert through the WECC "exploder"** (WECCnet messaging system) requesting any parties with available generation to contact Power Services real time marketing. The message should contain the following information:

Subject: Merchant Alert:

Declaration that the BPA merchant has exhausted all available resource flexibility, has explored the market to the best of their ability and needs to acquire energy for hour(s) ___ to avoid a NERC Energy Emergency Alert.

If parties have available energy supplies please Contact {Name} at (503) 230 3650 or (503) 230 3651

Note: Quantity and price information are not included in the message, however policy in these conditions is to buy sufficient power to resolve the emergency, up to the mandated price caps.

STEP 5: REQUEST POWER SYSTEM EMERGENCY (NERC ALERT 2 or 3)

1. Duty Scheduler has exhausted options up to this point (has talked with AGC dispatcher and hopefully Power Services management).

Note: It is critical to attempt to confirm the decision to call a power emergency with either: PGSP, PGS, or PG, prior to this point--if at all possible.

2. The appropriate BPA manager or designee will:
 - a. Notify the TMT and IT (Implementation Team) chairpersons at the earliest time practicable, **within one business day minimum**.
 - b. Present the details of the event to TMT or IT as appropriate at the earliest time practicable.
 - c. Notify the Regional Forum prior to the implementation of Emergency Actions when possible.
3. Duty Scheduler will request the declaration of a Power System Emergency (**NERC Alert**) via AGC dispatcher. The AGC dispatcher will request the NWPP Reliability Coordinator to make a declaration of emergency. (i.e. a NERC Alert)
4. **Whether or not Transmission dispatch, or the NWPP concurs and issues a NERC Alert emergency declaration, at this point in time BPA Power has declared a power emergency and may act to mitigate that emergency on that basis.**
5. Duty Scheduler implements the BPA Emergency Actions List (**Step 6**).

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STEP 6: IMPLEMENT EMERGENCY ACTIONS

INTRODUCTION:

1. Emergency Actions will not be implemented unless a declaration of a **NERC Alert 2 or 3 due to** Power System Emergency is requested. (Technically BPA requests that the NERC Reliability Coordinator declare a **NERC Alert**.)
2. This list was developed and prioritized by BPA through discussions with TMT representatives and is intended to minimize impacts to fishery operations.
3. The list is intended to give priority guidance to BPA Duty Schedulers; actual implementation may vary depending on the emergency situation.
4. Modification to the actions taken may be requested via TMT and/or a new prioritized list may be developed as conditions change

PREPATORY STEPS:

- Ensure Corps/TMT is notified of BPA's intent to implement the list of BPA Emergency Actions.
Note: The Technical Lead or designee should use the Protocol to Notify Court and Plaintiffs of Departures from Fish Protection Measures to make appropriate internal contacts to start the notification process.
- Coordinate with the AGC dispatcher to identify whether any steps need to be skipped due to transmission limitations that will make the step unavailable.

BPA EMERGENCY ACTIONS:

(MW amounts below are estimates and will be calculated based on: Spill Reduction Amount x H/K. Since the values are only estimates of potential power, and actual operating conditions could cause this to vary significantly, the order and extent of the actual implementation of the actions in this list may be dictated by specific emergency conditions.)

April – August period

- Increase generation at MCN to operate outside 1% up to 16.5 kcfs per unit
- Increase generation at BON to operate outside 1% up to full load.
- Increase generation at JDA to operate outside 1% up to full load.
- Increase generation at TDA to operate outside 1% up to full load.
- Reduce spill at IHR to RSW (19 kcfs) 133 MW
- Reduce spill at LWG to 9 kcfs 70 MW
- Reduce spill at LWG to 0 63 MW
- Reduce spill at LGS to 0 77 MW
- Reduce spill at LMN to 0 119 MW
- Reduce spill at IHR to RSW only (9 kcfs) 180 MW
- Reduce spill at IHR to 0 133 MW
(Transmission constraints may limit the use of the Snake projects)
- Reduce spill at BON to 50 kcfs while maintain B2CC spill 105/210 MW

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- Reduce spill at MCN to 20% of flow 180 MW
- Reduce spill at BON to 0 200 MW
- Reduce spill at JDA to 0 338 MW
- Reduce spill at TDA to 30% 106 MW
- Reduce spill at TDA to 0 324MW
- Reduce spill at MCN to 0 (to save water for future hr.)
- **Increase spill to move water to downstream projects (ADDED BY PGSD MGR)**

September– March period

- Shut off adult fish attraction BON
- Shut off TDA sluiceway
- Violation of BiOp ramp rates at HGH and LIB
- Increase project drafts that might impact spring refill.(HGH/LIB/DWR/ALF)

STEP 7: CURTAILMENTS: NOTE: Duty Scheduler should not initiate curtailments of firm load independently

1. Curtailments will be directed by either:
 - a. PG VP for power emergencies or,
 - b. AGC dispatcher for transmission system stability.
 2. PG VP may direct the Duty Scheduler to request that the AGC Dispatcher (Dispatcher will in turn direct TS Scheduling to) implement the curtailment of firm loads. Direction to curtail firm loads by the PG VP will only occur if such curtailments are deemed not to impact human health and safety.
 3. Power Services scheduling (PTK/PTFR) should be prepared to identify the schedules and tags to be curtailed and convey that information to Transmission Scheduling.
- Note: This process is not currently completed and available as a mitigation action.**

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SECTION 2: RESOURCES

Related Procedures

1. DSO 332 – Realtime Energy Shortage Emergency
2. TMT Emergency Protocols
3. Load Priorities Memo
4. Current Operations Memo
5. Curtailment Procedure
6. Protocol to Notify Court and Plaintiffs of Departures from Fish Protection Measures

SECTION 3: NERC ALERTS

(Requested when we have a Power or Transmission System Emergency)

When previous actions appear to be insufficient to safeguard the system operation the Duty Scheduler should contact the AGC dispatcher and request the declaration of an energy shortage NERC Alert by the NWPP Reliability Coordinator. The AGC dispatcher is authorized to directly seek sources of generation from other balancing authorities or IPPs within the control area. Coordinate with the AGC dispatcher on any sources he/she finds.

Situations for initiating alert when:

- BPA is, or expects to be, unable to provide its customers' energy requirements, and has been unsuccessful in locating other systems with available resources from which to purchase, or
- BPA cannot schedule necessary resources due to, for example, Available Transfer Capability (ATC) transmission limitations.

Conditions for Duty Scheduler to request NERC Alerts 1, 2 or 3:

1. **NERC Alert One:** If it appears that all available resources, including imports, are committed to meet firm load, firm transactions, and reserve commitments; and, there is concern about sustaining required operating reserve
2. **NERC Alert Two:** If it will be necessary to curtail *non-firm energy sales and/or use operating reserves to meet firm loads. (*Note: *Since Power Services does not generally make non-firm energy sales it may be necessary to move directly to Alert Three*).
3. **NERC Alert Three:** If it appears that there will be insufficient generation to meet load even after the steps in an Alert Two.

SECTION 4: NERC DEFINITIONS

1. Alert 1 — All available resources in use.

Circumstances:

- Balancing Authority, Reserve Sharing Group, or Load Serving Entity foresees or is experiencing conditions where all available resources are committed to meet firm load, firm transactions, and reserve commitments, and is concerned about sustaining its required Operating Reserves, and
- Non-firm wholesale energy sales (other than those that are recallable to meet reserve requirements) have been curtailed.

2. Alert 2 — Load management procedures in effect.

Circumstances:

- Balancing Authority, Reserve Sharing Group, or Load Serving Entity is no longer able to provide its customers' expected energy requirements, and is designated an Energy Deficient Entity.
- Energy Deficient Entity foresees or has implemented procedures up to, but excluding, interruption of firm load commitments. When time permits, these procedures may include, but are not limited to:
- Public appeals to reduce demand.
 - Voltage reduction.
 - Interruption of non-firm end use loads in accordance with applicable contracts.
 - Demand-side management.
 - Utility load conservation measures.

3. Alert 3 — Firm load interruption imminent or in progress.

Circumstances:

- Balancing Authority or Load Serving Entity foresees or has implemented firm load obligation interruption. The available energy to the Energy Deficient Entity, as determined from Alert 2, is only accessible with actions taken to increase transmission transfer capabilities.

SECTION 5: POLICY FOR AVOIDING OR MINIMIZING IMPACT TO FISH PROTECTION MEASURES

1. Overview – please see Section 1 above for implementation.

Interruptions or adjustments of the fish protection measures per the current Biological Opinions and associated operational documents may result from operations required to maintain power system reliability.

BPA will utilize all reasonable or available actions to **avoid interrupting** (prior to impacting) fish protection measures. Any operation that **impacts** fish protection measures for this reason is considered a Power System Emergency and will be managed via Emergency Actions. Emergency Actions are viewed by the Bonneville Power Administration (BPA) as a last resort and will not be used in place of long-term investments necessary to allow full, uninterrupted implementation of the planned reservoir operations while maintaining other project purposes.

When emergencies occur, the BPA will work with TMT to adjust operations as soon as reasonably possible to provide “planned for life cycle survival” with priority given to “in-time and in-place actions”. *(This does not create legal rights or obligations on the part of any party.)*

BPA will implement operations consistent with the BPA Emergency Actions List, direction from TMT or other groups, Standard Operating Procedures for specific projects, and/or guidance from appropriate Federal agencies to resolve the event. The implementation of Emergency Actions requires a request for declaration of a Power System Emergency and notification to the Regional Forum at the earliest time practicable.

2. Regional Executive Intervention

Discussion of emergencies with effects of exceptional magnitude or duration will include involvement of the Regional Executives (e.g. 2001 drought operations and power emergency).

3. Alert Actions (used prior to Power System Emergency)

Alert Actions are implemented to avoid or minimize potential impacts to mandated fishery operations. They are possible actions that may be implemented as possible prior to implementing actions that result in Power System Emergencies.

4. Emergency Actions (used once a Power System Emergency is declared)

Emergency Actions are operations that result in interruption to fish protection measures. These actions are used as a last resort and are not implemented until a Power System Emergency is requested to be declared.

5. Notification Procedures

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The appropriate BPA manager or designee will:

- a. Notify the TMT and IT (Implementation Team) chairpersons at the earliest time practicable.
- b. Present the details of the event to TMT or IT as appropriate at the earliest time practicable, **within one business day minimum**.
- c. Notify the Regional Forum prior to the implementation of Emergency Actions when possible.

6. Offsetting Adverse Effects of Emergency Actions

When Emergency Actions are implemented that cause adverse affects to fish protection measures, the TMT will assess the magnitude of the adverse effect and provide information on measures available to offset it. Alternative operations to offset adverse effects “in-place, in-kind” in a timely manner shall receive the highest priority. The members of the Regional Forum agree to cooperate in the development of this information for consideration through the TMT process.

SECTION 6: Emergency Protocols -- BPA Insufficient Generation
For Real-time Marketer Desk As of June 29, 2007

Situation: Upon identifying conditions that may lead to BPA having insufficient generation to meet load obligations in forthcoming hour(s):

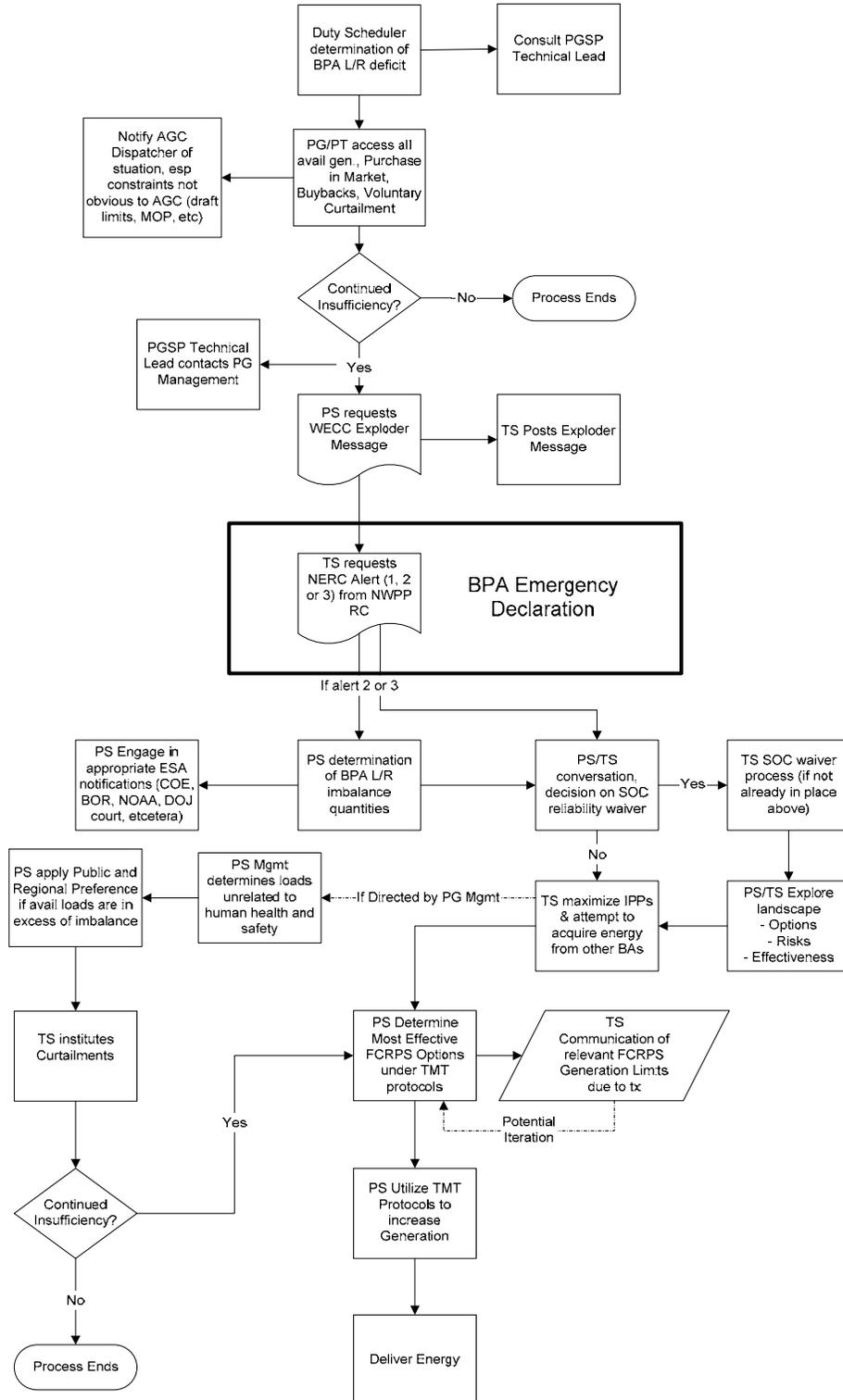
- Step 1** At the earliest possible time, the hydro desk will notify the real-time marketer of potential insufficient generation. If there is any doubt as to whether an insufficient generation condition is eminent, the real-time marketer will assume insufficiency and proceed to purchase amounts as directed by the hydro desk. **Purchase at any price** as needed to remove the concern regarding insufficient generation in forthcoming hour(s).
- Step 2** Purchases amounts needed to remove the concern of insufficiency. **If sufficient purchases are not available then:**
- Step 3** Aggressively pursue mutually agreed upon schedule curtailments (“buy-backs”).
- Step 4** **If insufficiency still in question upon exhausting all direct purchases and bilateral schedule curtailments,** direct the hydro desk to request that the AGC dispatcher (Transmission Services) issue a WECC “exploder” (WECCnet messaging system) requesting any parties with available generation to contact Power Services real time marketing.
- Step 5** **If WECCnet message does not result in eliminating the potential or expected insufficiency go to next step.**
- Step 6** **Hydro desk will contact Power Services Generation Management (Steve Oliver, et. al.) and Generation Scheduling Management (Kieran Connolly, et. al.).**

Real-time Marketer contact Bill Lamb and Alex Spain.

Realtime Energy Shortage Emergency Procedures FOR INTERNAL USE ONLY

Process Diagram for Power and Transmission Load/Resource Imbalance Emergency Determination and Resolution

BPA load/resource imbalance

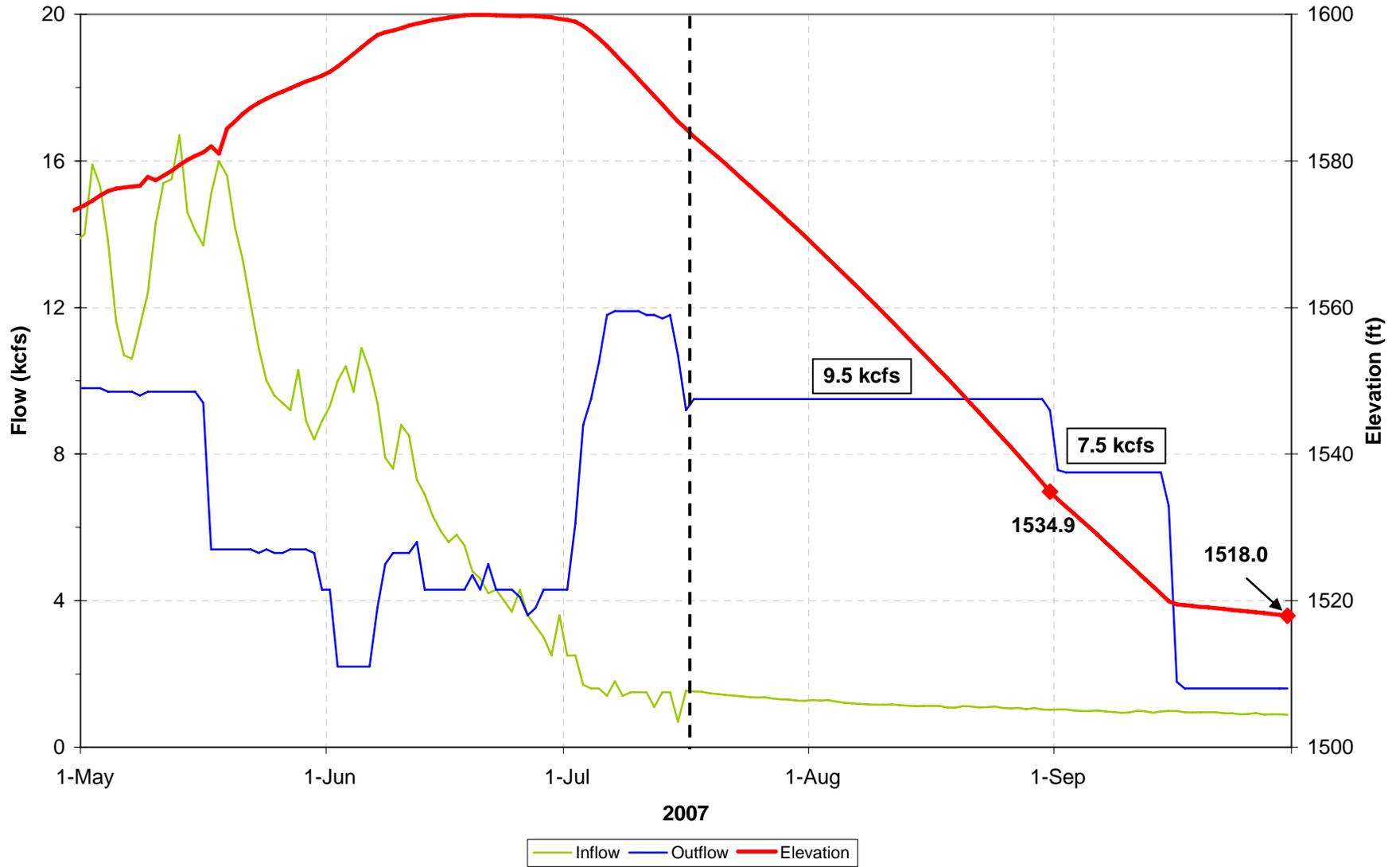


DRAFT 6/27

17 JULY STP INFLOW USED STARTING 7/17/07

Dworshak - STP Inflow

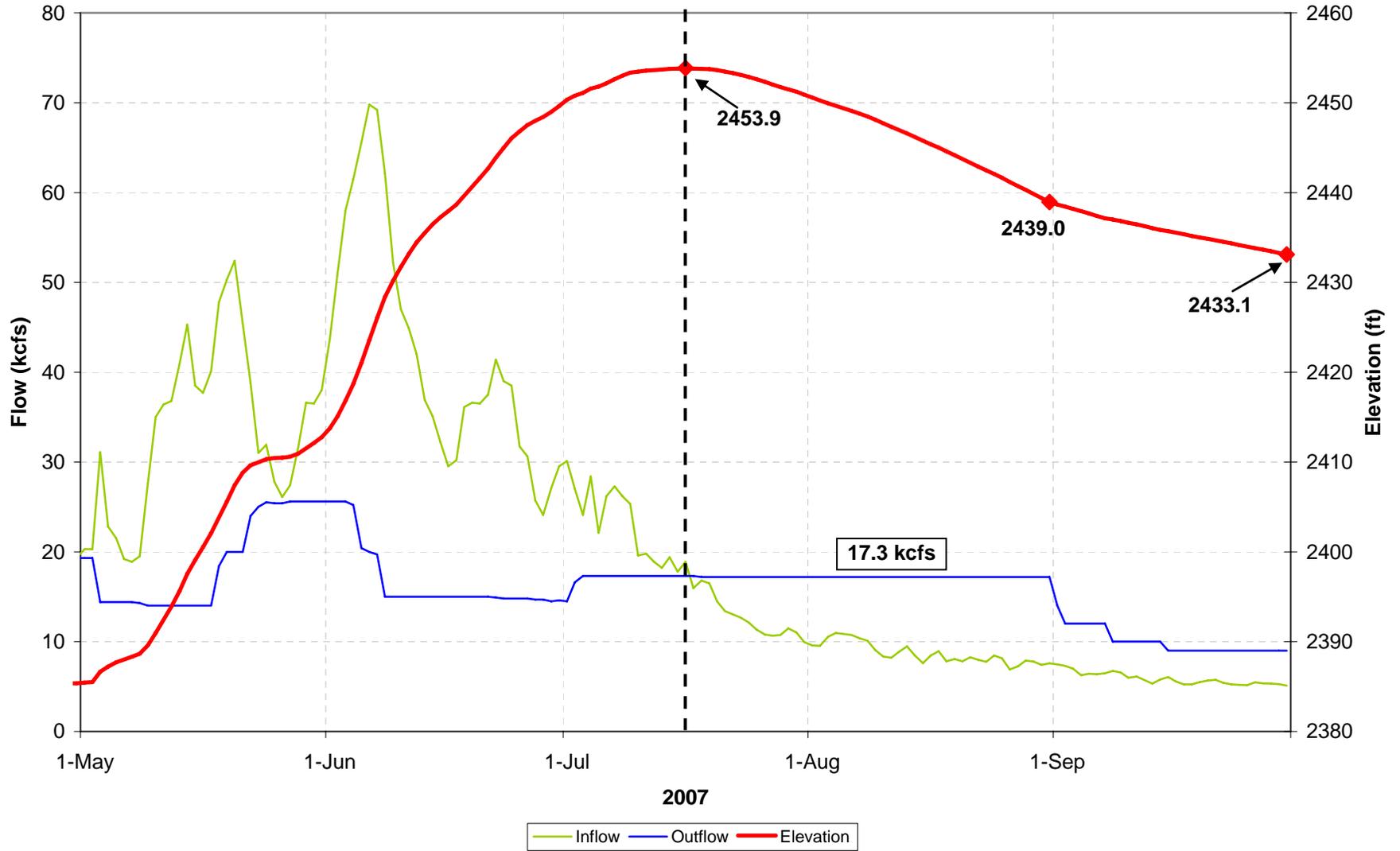
APR-JUL VOLUME=1.889 MAF



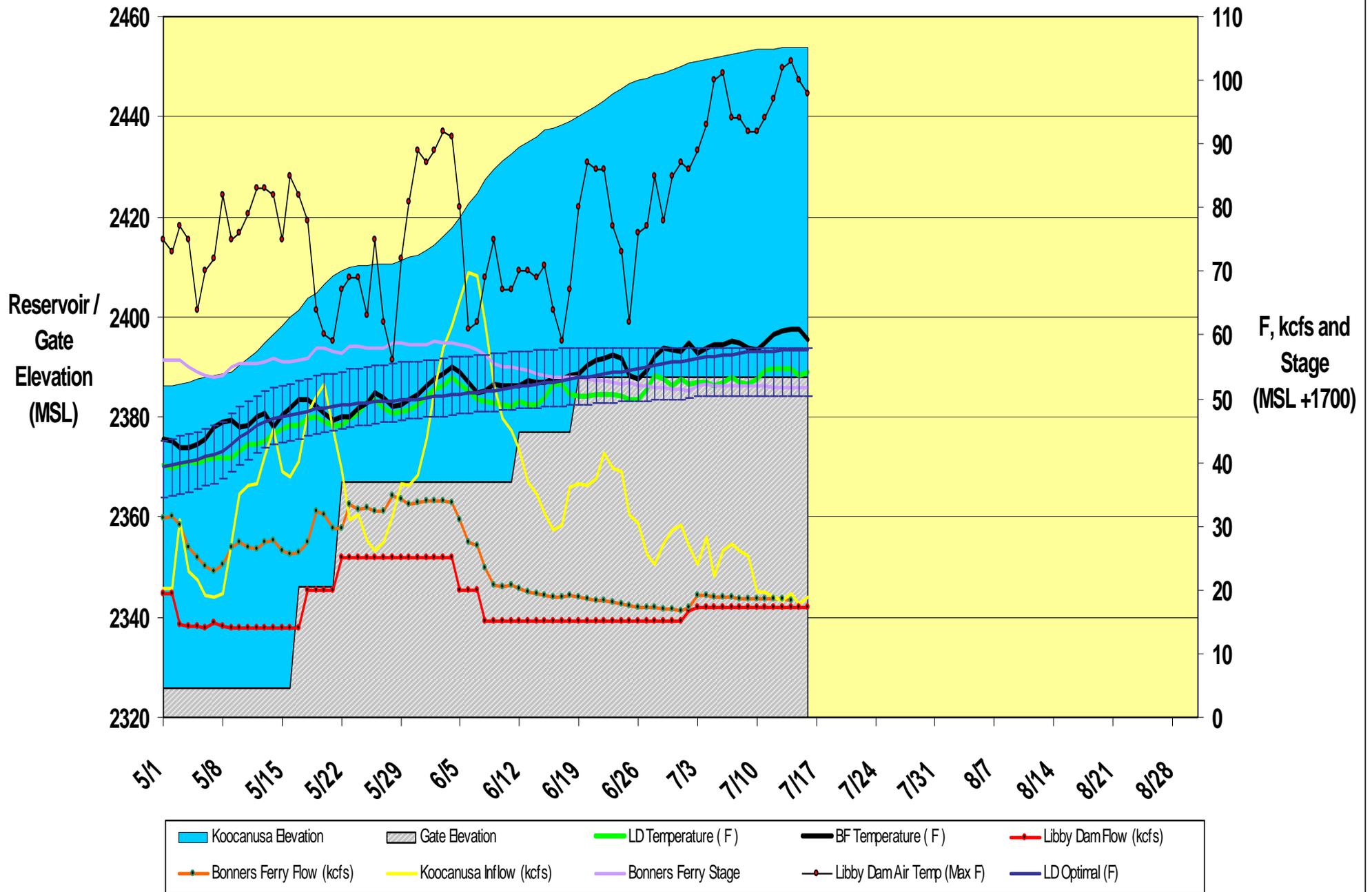
17 JULY STP INFLOW USED STARTING 7/17/07

APR-AUG VOLUME= 6.886MAF

Libby - STP Inflow Flat Flow Operation - 2439 End of August



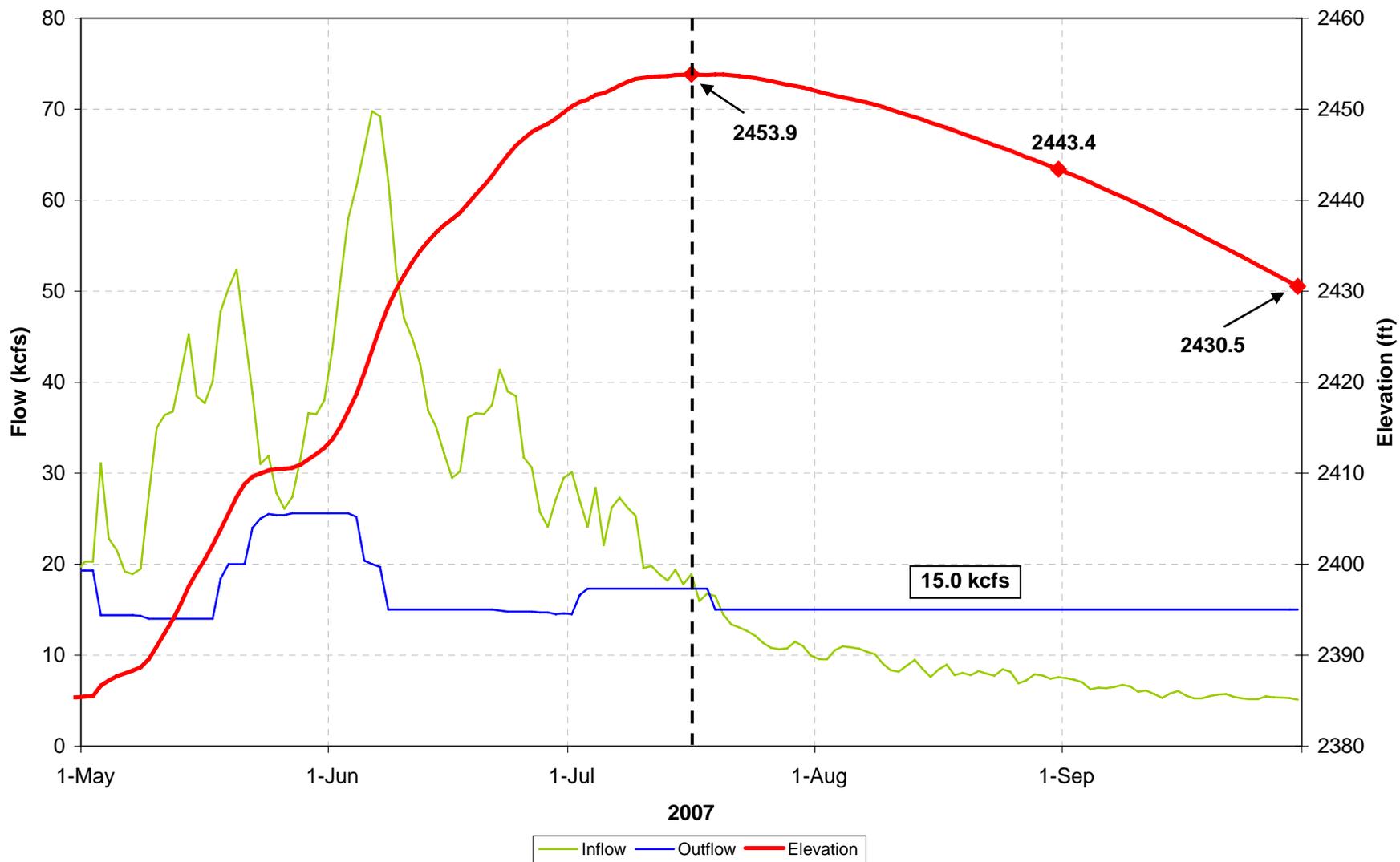
Kootenai River and Kootanusa Reservoir Temperatures 2007 BiOp Fish Operations (1 May - 31 August)



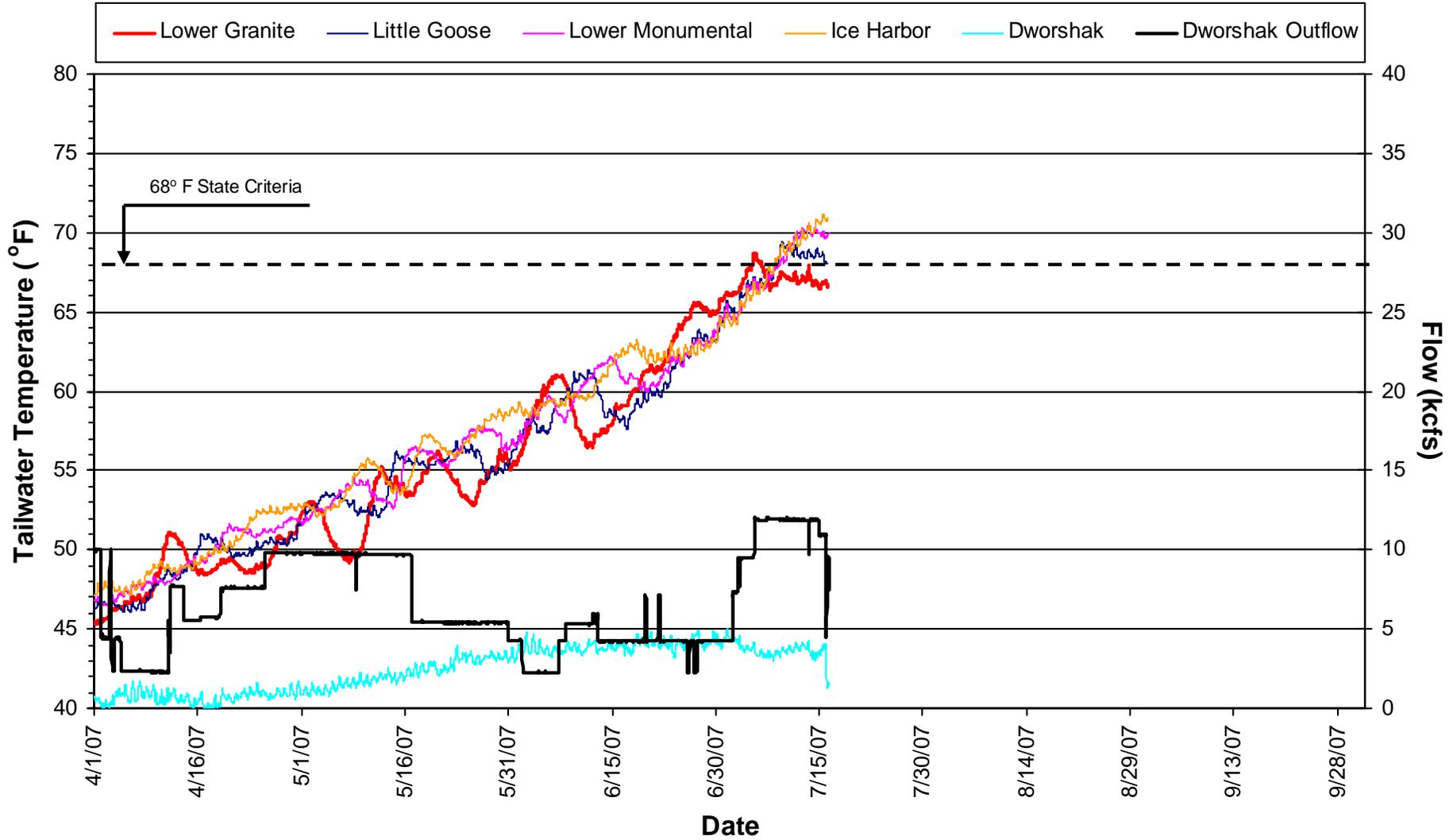
17 JULY STP INFLOW USED STARTING 7/17/07

APR-AUG VOLUME=6.886 MAF

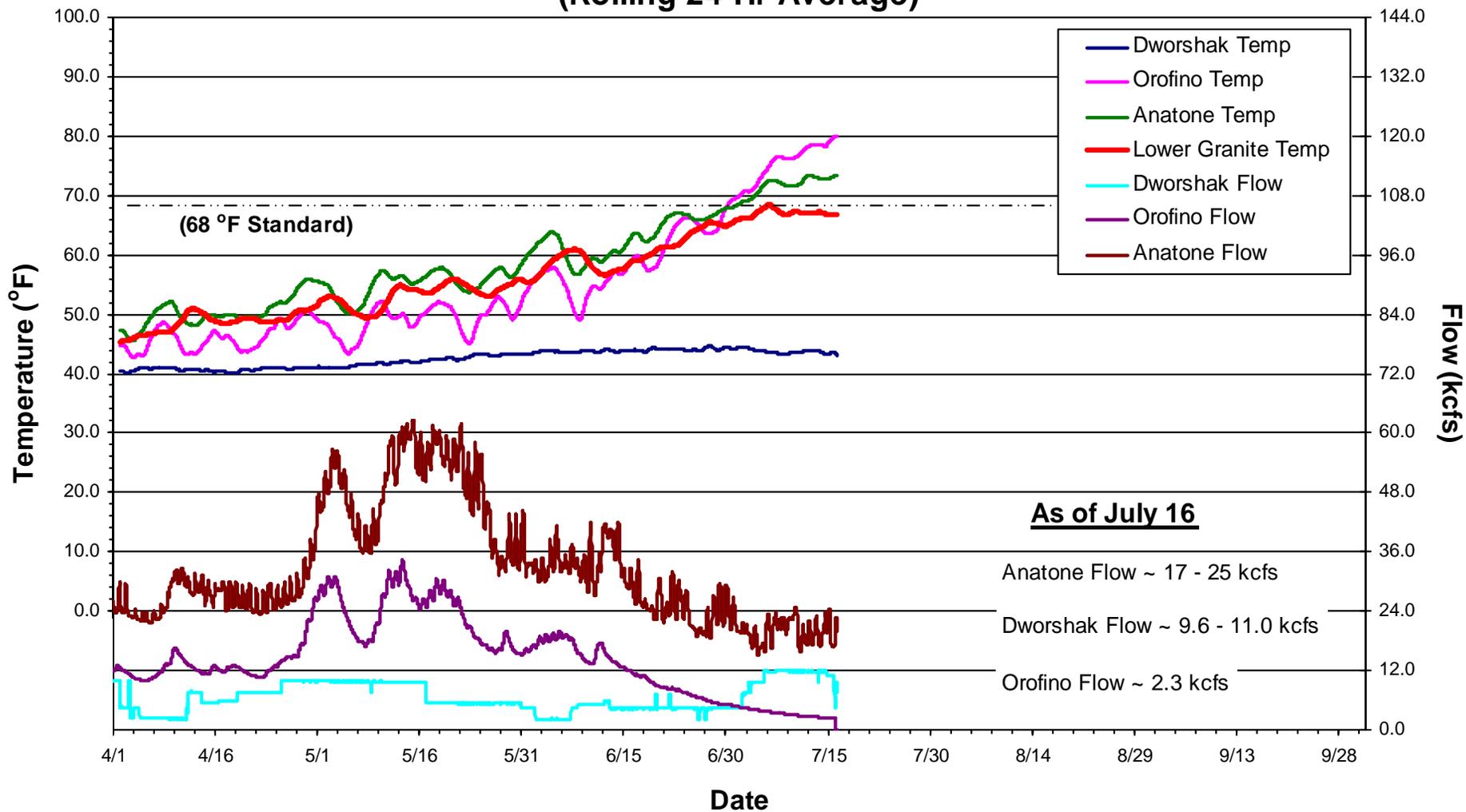
Libby - STP Inflow Montana Proposal - Assume 15 kcfs Starting 19 July



Dworshak Outflows and Lower Snake River Tailwater Temperatures in 2007 (April 1 - September 30)



Lower Granite Inflows and Temperatures in 2007 (Rolling 24-Hr Average)



COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

July 18, 2007 Meeting

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

Notes: Erin Halton

The following notes are a summary of issues that are intended to point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the "record" of the meeting, only a reminder for TMT members.

Review of Facilitator Notes / Meeting Minutes

No changes were made to the facilitator notes or official meeting minutes from the July 11th business meeting and July 13th conference call. Jim Adams, COE, requested that future facilitator notes from a TMT conference call stand as their own document, for better clarity between meeting dates/discussions.

Action: DS Consulting will send the COE the facilitator notes from TMT conference calls as a separate document for posting on the web.

Dworshak Operations

Jim Adams, COE, reported on Lower Snake River temperatures and referred TMT to several updated graphs linked to the agenda. Lower Granite tailwater temperatures were shown to be holding fairly steadily below the 68°F temperature criteria, with one 'touch above' exceedance during the July 1-2 timeframe. Orofino water temperatures were near 80°F, with flows of 2-2.5 kcfs. Inflow temperatures at Anatone were 72-73°F, with flows ranging between 17-25 kcfs. Adams reported that Dworshak went to full powerhouse (9.6 kcfs) at 2200 hrs on 7/15 with all units in undershot mode, outflow temperatures dropped to about 41.5°F. The project achieved its 43°F temperature target by switching one of the small unit's gates to overshot. Cathy Hlebechuk, COE, referred TMT to Dworshak models that showed continued flows of 9.5 kcfs would bring the project to elevation 1535' by the end of August. A shift to 7.5 kcfs for early-mid September would bring the project to 1520' by the end of September.

Mike Schneider, COE, referred TMT to slides linked to the TMT agenda on the latest CEQUAL modeling for the lower Snake River. Travel time through the Lower Granite pool was 5 days and heat gain in the LWG pool ranged from 0.9°F to 1.5°F. Temperature of flow weighted inflow was 18.4°C. Schneider noted that the modeling used 'as of 7/16' air temperature forecasts and that updated forecasts for 7/19-21 were 2-5° lower than previously anticipated. Hlebechuk added that actual flows out of Hells Canyon were running higher than predicted. Paul Wagner, NOAA, said that given the modeling, flows of 9.5 kcfs from Dworshak would likely maintain tailwater temperatures at or below 20°C for the next five days. Russ Kiefer, ID, and Dave Statler, Nez Perce Tribe, said they agreed that flows of 9.5 kcfs should keep temperatures at or below 20°C for the next

several days and Kiefer clarified that Idaho's main concern is the potential higher temperatures for the 7/22-24 timeframe.

Action/Next Steps from 7/11 TMT meeting:

- The COE will continue to operate Dworshak at 9.5 kcfs, targeting temperatures of 43°F to support the hatchery.
- The COE will update their CEQUAL modeling and run scenarios based on continued flows of 9.5 kcfs and, per request and for comparative reference, flows of 12 kcfs.
- The COE will forward modeling results to TMT on 7/20 and there is a placeholder for an 'if-needed' conference call if conditions change drastically prior to the scheduled 7/25 conference call.
- Dworshak operations will be on the agenda for the scheduled 7/25 TMT conference call.

Libby/Hungry Horse Operations

Cathy Hlebechuk, COE, referred TMT to updated operation scenarios, linked to the TMT agenda and noted Libby was releasing 17.3 kcfs. This week's STP model showed total inflow volume in the range of 6.9 MAF at Libby. Paul Wagner, NOAA, gave a brief summary of the 7/17 Regional Executive Call: the decision was made to implement the CRITFC/Nez Perce/OR/USFWS SOR for 2007, as a default BiOP supported operation. Federal executives present at that meeting expressed support for implementing the Montana proposal per the Mainstem Amendment recommendations in the future, and for including discussions of this issue through the Remand process, as it is supported by ISAB review and supports listed fish.

Ice Harbor / Lower Snake Projects Doble Testing

Don Faulkner, COE, reported that the request for 1-2 hour outage to test a large unit at Ice Harbor will be postponed until September, after spill ends. He added that before unit #2's long-term rehab begins, it will have to be run for about 5 minutes, as is standard procedure for flushing fish out of the draft tube before installing stop logs and unwatering. Lower Snake projects will have annual doble testing that will not affect spill, but may generate increased TDG levels. Other needed work may be performed at the same time to make use of the outage. Faulkner said that several line outages at Libby will need to be scheduled for September.

BPA Procedures for Power System Emergencies

Robyn MacKay, BPA, followed up on the 7/11 TMT meeting and reminded TMT that BPA welcomes TMT input on their internal emergency procedures document.

Action/Next Steps: TMT members should direct edits/suggestions for changes to the BPA document to Norris.

Operations Review

Reservoirs – John Roache, BOR, and Cathy Hlebechuk, COE, reported on reservoirs. Grand Coulee was at elevation 1287.6' and targeting an elevation of 1278' by 8/31. Hungry Horse was at elevation 3556.2' with outflows holding at 4.4 kcfs. Libby was at elevation 2453.9', with outflows of 17.3 kcfs. Dworshak was at elevation 1583'.

Average flows for the last week were 33.3 kcfs at Lower Granite and 200 kcfs at McNary.

Fish – Paul Wagner, NOAA, reported on juvenile fish: sub-yearling daily passage numbers were consistent and in the 1-3,000 range at all Lower Snake projects. McNary passage had a peak of 515,000 on 7/12, and Steelhead passage was still nearing its end. Smolt predictions for Snake River stocks estimated 90% passage by 7/19.

Cindy LeFleur, WA, reported that adult sockeye passage numbers were poor but that steelhead were still running close to predicted. Dave Statler, Nez Perce Tribe, added that there may be an upcoming effort on deep net sampling of PIT-tagged fish in the Snake and Clearwater Rivers.

Power system – nothing to report.

Water quality – Jim Adams, COE, said that there were no TDG exceedances to report.

Next TMT meeting: Conference Call on Wednesday, July 25th

Agenda items will include:

- Dworshak Operations

**Columbia River Regional Forum
Technical Management Team Meeting
July 18, 2007**

1. Welcome and Introductions

Today's TMT meeting was chaired by Cathy Hlebechuk and facilitated by Robin Harkless, with representatives from COE, BOR, BPA, Montana, Idaho, Washington, Oregon, CRITFC, the Nez Perce Tribe, FPC and USFWS attending. The following is a summary (not a verbatim transcript) of the topics discussed and decisions made at the meeting. Anyone with questions or comments about these notes should provide them to the TMT chair or bring them to the next meeting.

2. Review Facilitator's Notes and Meeting Minutes

All facilitator's notes and meeting minutes to date are posted on the TMT website, Jim Adams (COE) said. He suggested that the facilitator's notes for July 11 and 13 be split into two separate documents. Hlebechuk suggested cross-referencing the two sets of notes where appropriate.

3. Dworshak Operations

Outflows and Temperatures: Temperatures at Lower Granite tailwater dropped on about June 30, holding steadily below the 68 degrees F criteria ever since, Adams said. A corresponding drop in tailwater temperatures has occurred at Little Goose, which is still below the 68 degrees F criteria. A drop in tailwater temperatures at Lower Monumental is probably due to the cool water from Dworshak working its way downstream. However, tailwater temperatures at Ice Harbor have been around 72 degrees F, an indication that the cooling effect is not working all the way down through the Snake. It still could show up, Dave Statler (Nez Perce) and Adams agreed.

Temperatures at Orofino gage have been pushing 80 degrees F, with relatively low flows of around 2 to 2.5 kcfs, Adams said. Temperatures at Anatone gage have been around 72 to 73 degrees F.

Operations: Outflows of 11 kcfs from Dworshak were reduced to full powerhouse, 9.6 kcfs, at 2200 hours on July 15, Hlebechuk said. For several hours on Monday, all gates were in undershot mode, so outflows were around 41 degrees F. At 8 a.m. July 16, the project switched one unit to overshot mode and the effects appeared several hours later. The 43 degree F target for Dworshak outflows is being met.

According to a Dwoshak STP inflow projection of 1.9 kcfs, full powerhouse or 9.5 kcfs outflows can be maintained through the end of August, with an end of

August elevation of 1535 feet, Hlebechuk said. This scenario assumes that Dworshak outflows would drop to 7.5 kcfs throughout the first half of September.

Modeling: Mike Schneider (COE) presented a CEQUAL modeling run that extends existing operations through July 31. His team has been tracking flow weighted inflow temperatures, which are around 18.5 degrees C, and updating the model several times a week. During warm performance periods, they're seeing release temperatures from Dworshak pool vary by as much as a degree and a half C. There is also vertical temperature structuring in the pool, ranging from 24 degrees C on the surface to as low as 17.5 degrees C near the bottom. Flows have been fairly constant, with about 42% of flows in the Snake coming from the Clearwater.

Flows at Anatone fluctuate with the variability of operations at Hells Canyon Dam, Schneider said – the wild card in terms of thermal budgets entering Lower Granite pool. There was extended conversation regarding the contribution of Hells Canyon flows to temperatures in the Snake. Noting an increase in air temperatures at Lewiston since the latest CEQUAL model was run, Kyle Dittmer (CRITFC) suggested updating the modeling results when the latest weather forecast for Lewiston becomes available.

The forecast of Dworshak storage according to CEQUAL modeling differs slightly from the STP forecast, Schneider said. The CEQUAL model shows Dworshak releasing 9.5 kcfs outflows through the end of July. However, there may be as many as four days of 7.3 kcfs outflows required to meet the target elevation of 1,535 feet by the end of August, a finding that differs from the STP model. Both models assumed an average inflow of 1.2 kcfs for the remainder of July and August. Hlebechuk and Schneider will work on resolving the discrepancy.

This week's CEQUAL model assumed a single condition of 9.5 kcfs flat outflows through the rest of July, Schneider said. Hlebechuk noted that 9.5 kcfs isn't a COE recommendation, only a basis for modeling. It provides a relative gage of what could be done differently if needed, Wagner said.

Projections of water temperatures at Lower Granite show release temperatures as remaining fairly flat for the next week to 10 days, Schneider said. That indicates continuing the current level of operations will cause river temperatures to hover around 20 degrees C, Adams said. Schneider noted that STP projections for Anatone were used in the model, assuming that Hells Canyon Dam releases are 11 kcfs.

Hlebechuk pointed out that Idaho Power's forecasted releases have been lower than actuals by around 1-2 kcfs for the past several days. A scenario assuming 11.5 kcfs average discharge from Hells Canyon Dam would be appropriate, Wagner said.

Litchfield suggested running another CEQUAL model showing the temperature impacts of slightly higher Dworshak outflows through July. The Salmon Managers didn't reach consensus on a recommendation for further modeling as of yesterday's FPAC meeting, Wagner and Statler said.

The Salmon Managers agreed on a modeling request for Dworshak outflows of 12 kcfs starting July 23, with an outflow temperature of around 43 degrees C as a test of temperature sensitivities to dam operations. In addition, there was interest in clarifying the Hells Canyon contribution to water temperatures in the Snake, specifically modeling higher Hells Canyon flows.

The Salmon Managers did not see a need to caucus on this issue. Idaho, the Nez Perce, Washington and Oregon representatives agreed on an operation of 9.5 kcfs outflows from Dworshak for the near future, targeting outflow temperatures of around 43 degrees C for the sake of the Federal hatchery. David Wills (USFWS) agreed to that. TMT agreed to a conference call in a week, with a call sooner if the results of updated modeling show a need for meeting sooner.

4. Libby Operations

Assuming an inflow volume of 6.9 maf based on STP projections, maintaining 17.3 kcfs outflows through the end of August will reach elevation 2,439 feet, Hlebechuk said. Litchfield asked if the runoff volume had been updated. It's been 114% of normal for July and probably won't change much, Hlebechuk said. She showed a graph of 15 kcfs out through August. Litchfield noted that's not the Montana proposal and last week's graph depicted it accurately. The change will show up in the end of August and September elevations, Hlebechuk said.

5. Montana Proposal for Libby and Hungry Horse

Paul Wagner provided a summary of yesterday's Federal Executive meeting regarding the Montana proposal. The Federal executives chose the CRITFC/Nez Perce/OR/USFWS SOR for 2007, as a default BiOp supported operation. The Federal executives also strongly supported Montana's operation in the future and through the remand process. The Montana operation has been supported by ISAB peer review of the issue, including the benefits to listed white sturgeon and bull trout upriver.

There was incomplete discussion of the status of Snake River fall Chinook, Statler said. A process issue (lack of a formal resolution authorizing CRITFC to speak on behalf of the lower Columbia tribal councils) blocked their input at the meeting.

Roache noted that the CRITFC SOR differs slightly from the 2004 BiOp in that it recommends flat flows, which the BiOp operation did not. The BOR won't draft Hungry Horse below elevation 3,340 feet. Montana supports that operation, Litchfield said.

6. Ice Harbor Potential Outage/Lower Snake Projects Doble Testing

The annual doble test requires a powerhouse outage for half an hour to an hour, then taking several units off line for several days, ending with another short powerhouse outage, Don Faulkner (COE) said. It doesn't result in loss of spill, but in spill increases in all cases, which has TDG implications. This test was postponed until September per the request of the Salmon Managers at last week's TMT meeting. Faulkner asked the Salmon Managers whether they agree with taking action to flush fish out of unit 2 before putting stop logs in when the test is performed. Idaho and Oregon agreed to the operation and there were no objections.

There will also be several line outages near Libby in September and October for routine maintenance, Faulkner and Henriksen noted.

7. BPA Procedures for Power System Emergencies

Robyn MacKay (BPA) invited TMT members to provide comments on these procedures to Tony Norris. Wagner requested that a discussion of BPA's emergency action priority list be added to an upcoming TMT agenda.

8. Operations Review

A. Reservoirs. Grand Coulee is at elevation 1,287.6 feet, headed toward a target of 1,278 feet elevation on Aug. 31 which is based on the July final forecast for the April-August period at The Dalles, Roache said. Hungry Horse is at elevation 3,556.2 feet, discharging 4.4 kcfs. Libby is at elevation 2,453.9 feet, maintaining 17.3 kcfs outflows. Dworshak is at elevation 1,583 feet. Lower Granite seasonal average flows for the past 7 days were 33.3 kcfs. McNary seasonal average flows for the past 7 days were 200 kcfs.

B. Fish. The subyearling Chinook passage indices show passage in fairly equal numbers passing all the Snake projects, Wagner said. Lower Granite is passing 1,000 to 2,000 fish per day, Little Goose 1,000 to 3,000 fish per day, and Lower Monumental 500 to 1,000 fish per day. Wagner and Litchfield agreed that overall passage on the Snake is ramping down from a peak of around 6,000 fish per day. Steelhead passage is winding down at Little Goose and finished on the lower river. Fall Chinook hatchery releases that were PIT tagged are still passing in small numbers. The overall similarity in upriver and downriver detections is a good sign, indicating that fish are making it all the way to the estuary, Wagner said.

Cindy LeFleur (WDFW) discussed adult fish passage. Summer Chinook are passing at the rate of about 400 to 500 a day. Sockeye are experiencing a poor run this year. The summer steelhead run is slightly better than average.

Litchfield asked, when is the cutoff between spring and summer runs? June 15 in terms of fish management, LeFleur said. Dittmer asked, on what are the passage indices at Lower Granite based? Tagging that reflects the Snake River but doesn't include the Clearwater, Wagner said. The detections involve PIT tags but not coded wire tags.

The Nez Perce Tribe will be conducting deep net sampling on the Clearwater near Lewiston sometime in the near future, Statler said. He recommended a recent article on delayed mortality in the *American Journal of Fisheries Management*. Kruger provided the article on a zip drive, and Hlebechuk will link it to the TMT agenda.

C. Power System. Everything is fine, Robyn MacKay said.

D. Water Quality. There have been no TDG exceedances for awhile, Adams said. Typically, exceedances occur at Camas Washougal gage when there's a combination of heat in the Bonneville forebay with gas from spill. There are times when the COE can't control over this phenomenon, which can happen regardless of spill levels.

13. Next TMT Meeting

Conference calls were scheduled for the next two Wednesdays, July 25 and Aug. 1, mainly to check in on Dworshak operations. The next regularly scheduled TMT meeting in person will be held Wednesday, Aug. 15. This meeting summary was prepared by consultant and writer Pat Vivian.

Name	Affiliation
Cathy Hlebechuk	COE
John Roache	BOR
Jim Litchfield	Montana
Paul Wagner	NOAA
Jim Adams	COE
Robyn MacKay	BPA
Russ Kiefer	Idaho
Rick Kruger	Oregon
Tim Heizenrader	Cascade Energy
Joe Pollen	PPM Energy
Bernard Klatte	COE
Don Faulkner	COE
Cindy Henriksen	COE

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Dan Spear
Cindy LeFleur

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Greg Haller
Kyle Dittmer
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Dave Benner
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John Heizenman
Mike Schneider
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Nez Perce
CRITFC
Nez Perce
FPC
USFWS
DRA
COE – Libby Dam
COE – Walla Walla
COE
COE
Consultant

TECHNICAL MANAGEMENT TEAM

BOR : John Roache/Mary Mellema/Pat McGrane **BPA :** Robyn MacKay/Tony Norris/Scott Bettin
NOAA-F: Paul Wagner/Richard Dominigue **USFWS :** David Wills/Steve Haesecker
OR : Rick Kruger/Ron Boyce **ID :** Russ Kiefer
WDFW : Cindy LeFleur **MT :** Jim Litchfield/Brian Marotz
COE: Cathy Hlebechuk/Jim Adams/Cindy Henriksen

TMT CONFERENCE CALL

Wednesday July 25 , 2007 09:00 - 12:00

1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97209-4142
Map Quest [\[Directions\]](#)

Conference call line: 503-808-5190

To check into the building, take the elevator to the 5th floor and the guard will issue you an ID badge if you need one and will take you down to the 4th floor where the meeting is. If you have NOT attended a TMT meeting in the past you will need to call ahead and let Cathy Hlebechuk (503) 808-3942, Jim Adams (503) 808-3938 or Cindy Henriksen (503) 808-3945 know, so you can be added to the TMT Visitor List and issued an ID badge. This badge may be used indefinitely. If you have attended TMT in the past you may re-use your ID badge indefinitely. If you are a federal employee you will also need to have an ID badge issued to you which can be used indefinitely.

We have had disruptions on the phone because people are not hitting 'mute' after dial in.
Please MUTE your Phone

*All members are encouraged to call Robin Harkless with any issues or concerns they would like to see addressed.
Please e-mail her at robin76@cnnm.net or call her at (503) 248-4703.*

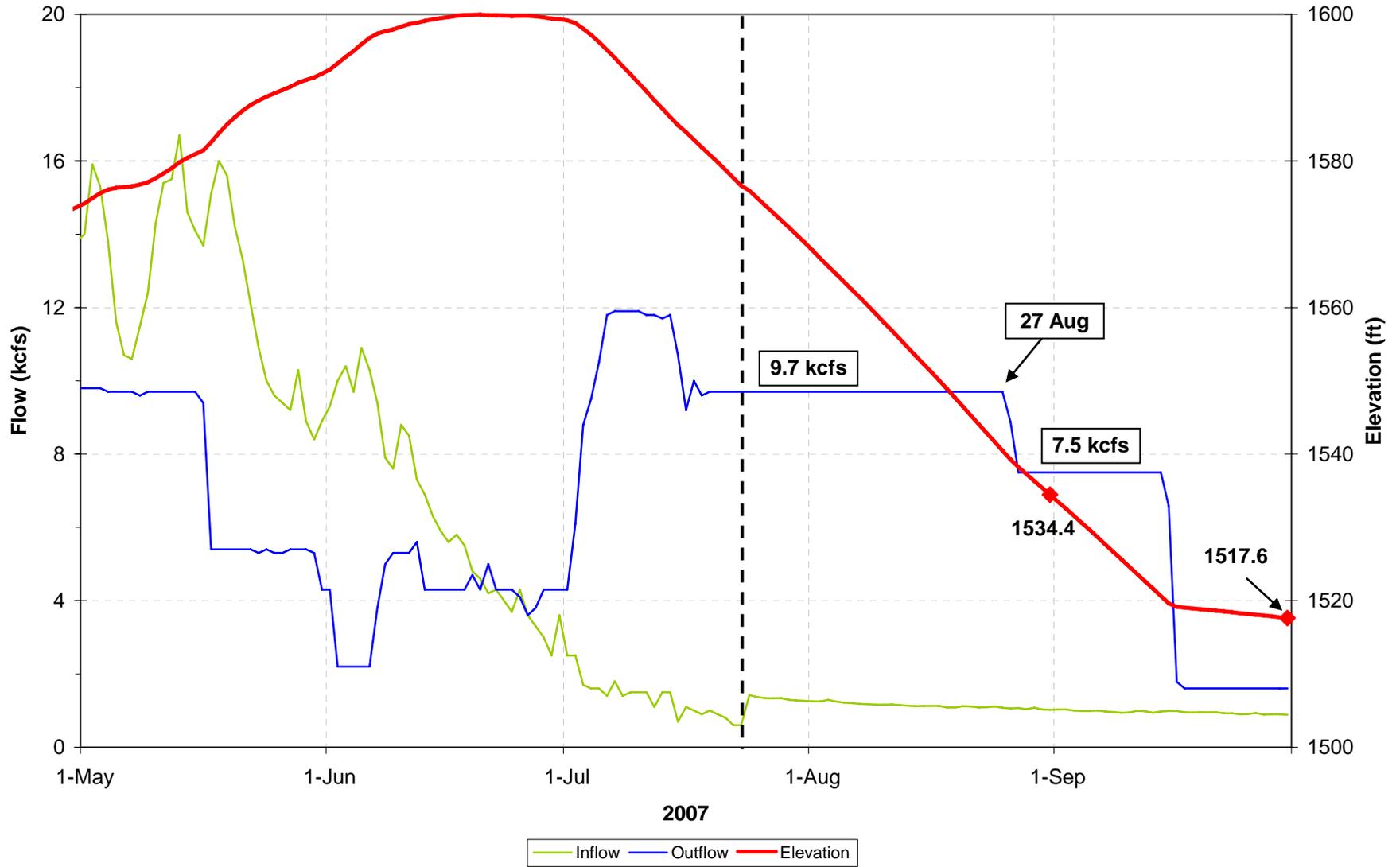
AGENDA

1. Welcome and Introductions
2. Review [\[Meeting Minutes\]](#)
3. Dworshak Operations - All
 - a. [\[Daily Water Temperature Reports\]](#) 
 - b. [\[Dworshak - STP Inflow\]](#) 
 - c. [\[CEQUAL Temp Modeling - Michael L. Schneider, COE\]](#) 
4. McNary Transport Update - Paul Wagner, NOAA Fisheries
5. Lower Monumental Research Equipment Installation – Ann Setter, NWW
6. Operations Review
 - a. Reservoirs
 - [\[Libby - STP Flat Outflow Operation\]](#) 
 - b. Fish
 - c. Power System
 - d. Water Quality - Jim Adams, COE
 1. [\[Spill Information 2007\]](#)
7. Other
 - Scheduling 2007 Year-End Review Meeting.
 - Set agenda for next meeting - **August 1, 2007** [\[Calendar 2007\]](#) 

23 JULY STP INFLOW USED STARTING 7/24/07

APR-JUL VOLUME=1.880 MAF

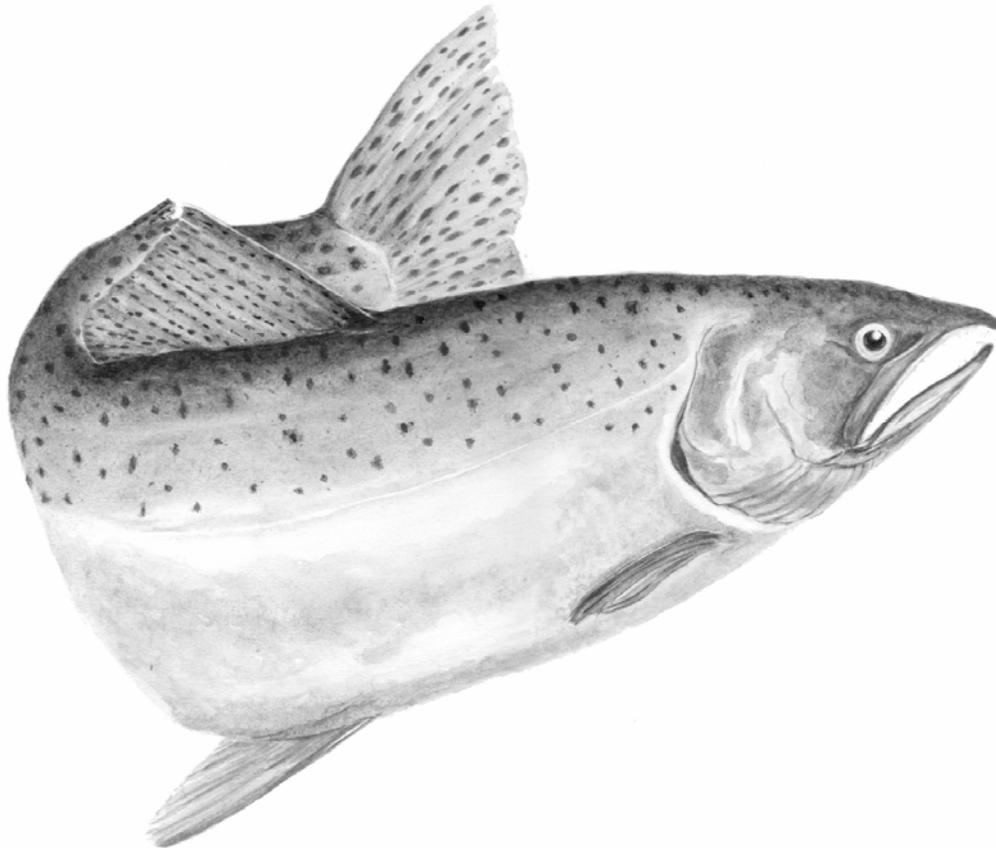
Dworshak - STP Inflow





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Columbia River Basin Indian Tribes,
and National Marine Fisheries Service
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Latent Mortality Report



Review of Hypotheses and Causative Factors Contributing to
Latent Mortality and their Likely Relevance to the “Below Bonneville”
Component of the COMPASS Model

April 6, 2007 (revised June 11, 2007)

ISAB 2007-1

ISAB Members

Robert Bilby, Ph.D., Ecologist at Weyerhaeuser Company.

Susan Hanna, Ph.D., Professor of Agriculture and Resource Economics at Oregon State University (also an IEAB member).

Nancy Huntly, Ph.D., Professor of Wildlife Biology at Idaho State University.

Stuart Hurlbert, Ph.D., Professor of Biology and Director, Center for Inland Waters at San Diego State University.

Roland Lamberson, Ph.D., Professor of Mathematics and Director of Environmental Systems Graduate Program at Humboldt State University.

Colin Levings, Ph.D., Research Scientist and Past Section Head Marine Environment and Habitat Science Division, Department of Fisheries and Oceans, Canada (also an ISRP member).

William Percy, Ph.D., Professor Emeritus of Oceanography at Oregon State University.

Thomas P. Poe, M.S., Consulting Fisheries Scientist, an expert in behavioral ecology of fishes, formerly with the U.S. Geological Survey (also an ISRP member).

Peter Smouse, Ph.D., Professor of Ecology, Evolution, and Natural Resources at Rutgers University.

Ad Hoc Members

Richard Alldredge, Ph.D., Professor of Statistics at Washington State University (also an ISRP member).

Brian Riddell, Ph.D., Manager of the Salmon and Freshwater Ecosystems Division, Pacific Biological Station, Department of Fisheries and Oceans Canada, Nanaimo, British Columbia (former ISAB and ISRP member).

ISAB Latent Mortality Report

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ISAB Latent Mortality Report

Executive Summary

On November 27, 2006, NOAA Fisheries requested that the ISAB review a number of hypotheses about the causative factors that contribute to latent mortality. Additionally, the Columbia River Inter-Tribal Fish Commission urged the ISAB to agree on a method for assigning weights to the submitted hypotheses. These hypotheses are intended for incorporation in the Comprehensive Passage (COMPASS) model, specifically to affect the “below Bonneville” component of the model. In an effort to provide the modeling team with some initial input, the ISAB offers the following recommendations and conclusions:

- The ISAB recommends that the various components of latent mortality be merged into a single model. A merged data set should be used to evaluate this model with a statistical analysis that aids in selecting among hypotheses. The ISAB recommends this investigation as the most scientifically rigorous approach to reducing the number of alternative hypotheses based on all available data.
- The ISAB concludes that the hydrosystem causes some fish to experience latent mortality, but strongly advises against continuing to try to measure absolute latent mortality. Latent mortality relative to a damless reference is not measurable. Instead, the focus should be on the total mortality of in-river migrants and transported fish, which is the critical issue for recovery of listed salmonids. Efforts would be better expended on estimation of processes, such as in-river versus transport mortality that can be measured directly.
- Estimates based on limited time series have a high degree of uncertainty, and ocean conditions that affect survival will vary on several time/space scales. Thus there will be considerable uncertainty in estimates of post-Bonneville survival, and the ISAB recommends that this uncertainty be accounted for as efforts to reduce it continue. Estimates of the uncertainty should be bounded and incorporated in simulation models and annual management planning processes.
- Future monitoring and research is needed to further quantify biological factors that contribute to variability in estimated post-Bonneville mortality. In particular, the ISAB recommends that acoustic tags continue to be developed and used to assess and partition mortality in the lower river, the estuary, and the Pacific Ocean shelf. In addition, the ISAB recommends the continuation of PIT tagging with a monitoring and evaluation program designed to reduce the current levels of uncertainty.
- The ISAB also recommends that a logit modeling approach be investigated as a potential alternative framework for future modeling of post-Bonneville mortality.

Assignment

The downstream passage (LGR → Bon) part of the COMPASS model is nearing completion, and it is time to turn attention to the estuarine, ocean, and return phases (Bon → Ocean → Bon → LGR). The ISAB received a request from NOAA Fisheries (27 November 2006) to review a pantheon of competing hypotheses about the causative factors that contribute to latent mortality. In a separate memo, the Columbia River Inter-Tribal Fish Commission (4 December 2006) urged the ISAB to agree on a method for assigning weights to the submitted hypotheses. These hypotheses are likely to affect the “below Bonneville” component of the COMPASS model, once provision for it is included. These disparate hypotheses are neither mutually consistent nor exhaustive, so how should latent mortality be incorporated into the COMPASS model? In an effort to provide the modeling team with some initial input, NOAA Fisheries posed questions that should influence the latent mortality modeling effort.

1. How plausible is each of the latent mortality hypotheses, based on the lines of evidence presented by the authors (e.g., data, analyses based on those data, and other considerations)? Are the data appropriate for deriving the estimates of interest?
2. How applicable is each of the hypotheses to estimating the overall (absolute) latent mortality associated with the existence of dams and current/recent operations? How does each rank in this regard? Is sufficient information available for the ISAB to suggest how the hypotheses should be weighted in this type of application?
3. How applicable is each of the hypotheses for estimating changes in latent mortality associated with alternative operations? Among all hypotheses how does each rank with respect to providing plausible estimates? Is sufficient information available for the ISAB to suggest how the hypotheses should be weighted in this type of application?
4. To what extent are the hypotheses and methods described applicable to ESUs other than Snake River spring/summer Chinook salmon? Is information presented or referenced that permits such inferences? (Please consider all 13 listed ESUs in the Columbia River basin).
5. Can the ISAB suggest modifications to any of the hypotheses and analyses to make them more useful? Would these changes affect the rankings or weightings?
6. What lines of future research and monitoring would be most valuable for reducing the uncertainty associated with the magnitude of, and mechanisms responsible for, latent mortality?

Introductory Comments

From examining the general life-cycle information for wild Snake River spring/summer Chinook, we have some data regarding survival estimates and mechanisms of mortality for the early part of the life cycle down to just below Bonneville Dam. Briefly, direct mortality is that which occurs directly from some event along the downriver passage through (or around) the

hydropower system, i.e., mortality directly associated with the hydrosystem (Figure 1). We denote that mortality as $L_{I,ds} = (1 - S_{I,ds})$ for the fish that run the entire eight project in-river gauntlet, with $S_{I,ds}$ being the survival rate from LGR →BON. Similarly, $L_{T,ds} = (1 - S_{T,ds})$ is the direct mortality of transported fish. Both $S_{I,ds}$ and $S_{T,ds}$ are estimable with Cormack-Jolly-Seber (CJS) methods, and both can be, and have been, included in the downstream module of COMPASS.

In considering the subsequent fate of fish that have arrived below Bonneville, the authors of the questions posed above define “latent mortality associated with the FCRPS (for Snake River fish) as any mortality that occurs after fish pass Bonneville Dam as juveniles that would not occur if the FCRPS dams did not exist.” We assume that latent mortality pertains only to fish that originate above Bonneville and not to effects of changes in the hydrograph below Bonneville. Unfortunately, there is no direct information on *latent mortality* for the *damless* reference condition, and we cannot make this definition operational.

Survival estimates are lacking for segments below Bonneville to the estuary, within the estuary to the ocean, within the ocean, and on the return to Bonneville Dam, but we do know that post-Bonneville mortality of Columbia River fish is high, as reported from SARs (smolt to adult ratio, the ratio of returning adults to outmigrating smolts) in the literature. The big question is how much of this mortality is due to pre-Bonneville factors (L_i) that may show up as mortality in locations below Bonneville, and how much is due solely or primarily to factors inherent in those habitats and the life cycle of these salmonids.

Numerous factors have been postulated or documented regarding this post-Bonneville mortality, only some of which are related to the FCRPS:

- Predation by birds, especially Caspian Terns and cormorants
- Predation by pikeminnow and marine fishes (hake)
- Increased vulnerability to predators because of size, stress, or disease
- Timing of ocean entry
- Ocean conditions, including density dependent factors, upwelling, spring transition, ENSO and PDO
- Ocean interceptions and harvest of returning adults
- In-river adult pre-spawn mortalities (harvest, dam passage, marine mammals, disease, high temperatures)

Several alternative approaches have been proposed to investigate relative latent mortality for different populations of fish.

1. Estimate the latent mortality that is incurred by fish that have run the entire in-river gauntlet of eight dams and compare that with the latent mortality that is incurred by fish that have been transported.
2. Compare latent mortality for upriver populations versus downriver populations, such as comparing Snake River versus John Day populations.

3. Compare latent mortality for pre-dam populations versus post-dam populations.
4. Use environmental conditions as covariates to account for changes in latent mortality.

None of these approaches can provide **direct** estimates of absolute latent mortality for the damless reference condition although attempts to do so have been made by invoking additional strong, unverifiable assumptions.

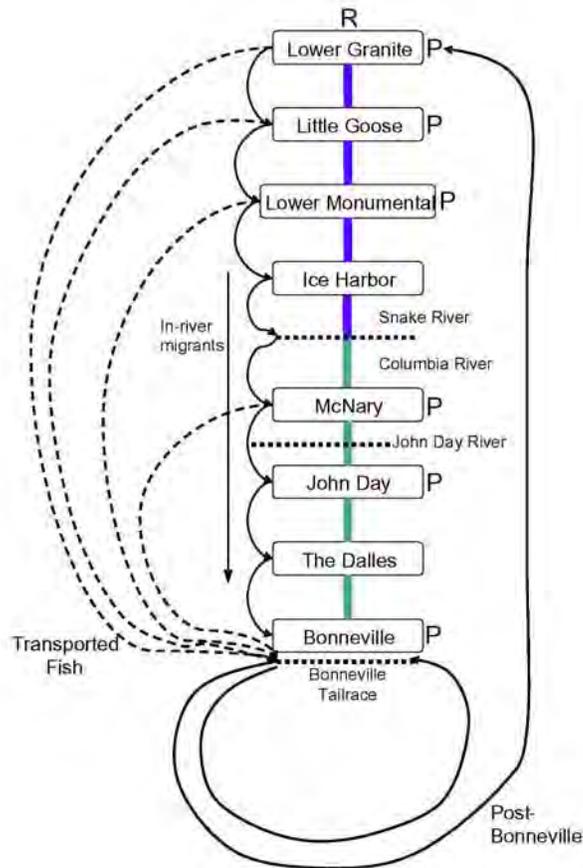


Figure 1. Features of the Snake and Columbia River Hydrosystem that are modeled in COMPASS for Snake River fish. “R” represents the release site or the site where the fish enter the hydrosystem (head of Lower Granite reservoir). Fish move downstream via in-river migration or by transportation. “P” represents PIT-Tag detection sites. The post-Bonneville component of the model takes fish from the Bonneville tailrace and returns them to either Bonneville Dam or Lower Granite Dam, depending on the hypothesis.

The COMPASS document suggests no separation of transported fish into those coming from each of the four projects (Lower Granite, Little Goose, Lower Monument and McNary; Figure 1), ranging from the furthest upriver dam to the fifth dam in the system. A juvenile transported from McNary has already run the gauntlet through four upriver projects, and demographic

attrition has already taken a toll on the cohort released above Lower Granite. Fish transported from Lower Granite, on the other hand, avoid all of the subsequent in-river mortality losses on the way to Bonneville. Fish transported from Little Goose or Lower Monument would also have their own histories (Budy et al., 2002).

Data indicate that Snake River wild stream-type Chinook salmon have lower smolt to adult return rates than John Day River wild stream-type Chinook salmon (Schaller and Petrosky, *in review*). One interpretation is that fish from John Day, having navigated fewer dams, survive better. Similarly, the subbasin from which the smolts were transported might also matter for subsequent (*latent*) survival, because smolts transported from different subbasins have different ages, nutritional conditions, predation histories, and arrival times below Bonneville.

Latent mortality is here defined as *the delayed effect of the downstream passage experience*, so we seek in-river passage predictor variables that we can measure. But if variation in latent mortality only exists below Bonneville, any connection between downstream passage variables and a survival signal that we can detect on the return run has been filtered and attenuated. Predictors (or surrogates) are observable in-river, but those in the ocean are not directly observable. Any signal we can detect will be subtle at best and confusing at worst, contributing to the confusion over latent mortality.

Alternative Hypotheses/Models

The competing hypotheses represent a range of ideas about latent mortality, as well as the contrast between L_I and L_T ; those hypotheses translate into different modeling strategies. Most of the discussion has been couched in terms of L_I , but the COMPASS team also has to model L_T . These two constructs are connected through D_{IT} , the ratio of SAR for transported fish to that of in-river fish.

The notation for these components follows. The Smolt to Adult Survival Rate (SAR) is the fraction of smolts that have arrived below Bonneville that eventually return as adults to the reservoir above Lower Granite, denoted as $SAR_{I, Bon \rightarrow LGR}$ for smolts that have run the eight-dam gauntlet and as $SAR_{T, Bon \rightarrow LGR}$ for smolts that have been transported from one of four upriver dams to a release point below Bonneville. We describe latent mortality as a component of these two SAR variables,

$$SAR_{I, Bon \rightarrow LGR} = S_{e/o} \cdot (1 - L_I) \cdot S_{I,us} \text{ for the in-river fish ,}$$

$$SAR_{T, Bon \rightarrow LGR} = S_{e/o} \cdot (1 - L_T) \cdot S_{T,us} \text{ for the transported fish ,}$$

and can define a SAR ratio D_{IT} as,

$$D_{IT} = \frac{SAR_{T, Bon \rightarrow LGR}}{SAR_{I, Bon \rightarrow LGR}} = \frac{(1 - L_T) \cdot S_{T, us}}{(1 - L_I) \cdot S_{I, us}}$$

Ocean survival ($S_{e/o}$) is modeled to be the same for both in-river and transported smolt, ascribing any difference to differences in latent mortality ($L_I \neq L_T$). Assuming $S_{e/o}$ -values for in-river and transported fish are equal seems dubious, particularly when we know that in-river and transported fish have different survival rates from LGR \rightarrow BON. However, given the assumption that $S_{e/o}$ cancels in the definition of D_{IT} above, we are still left to consider the possibility that returning adults that have matured from in-river and transported smolts might have different survival rates ($S_{I,us}$ and $S_{T,us}$) on the upstream part of their journey. We can measure $(1 - L_T) \cdot S_{T,us}$ and $(1 - L_I) \cdot S_{I,us}$ as products, but a clean estimate of the ratio $(1 - L_T) \div (1 - L_I)$ requires either strong belief in estimated upstream survival rates ($S_{T,us}$ and $S_{I,us}$) or a plausible assertion (assumption) that they are equal. An up-stream passage comparison by Berggren et al. (2006) found differences in estimated $S_{I,us}$ and $S_{T,us}$ values. Given the data available, it seems unlikely that $S_{e/o}$ is equal for in-river and transported fish.

The following comments represent the ISAB's sense of each of the hypotheses, garnered from the 8 December 2006 briefing and from the voluminous documentation submitted in support of the alternatives.

Hypothesis A – Annual L_i is a function of water travel time (WTT) for wild Snake River spring/summer Chinook

The authors of this hypothesis (Petrosky et al., 2006) used linear multiple regression to relate third year survival (S3) of Snake River spring/summer wild Chinook salmon to WTT and two ocean variables the September Pacific Decadal Oscillation (PDO) index and the April upwelling index. Water travel time (WTT) is a measure of the average number of days for water particles to travel from the confluence of the Clearwater and Snake rivers to Bonneville Dam (from April 15-May 31) and WTT was about 2 days for this period in the damless river and now with 8 dams has increased to an average of about 19 days with a range of 10 to 40 days (Petrosky et al., 2006). Estimates of S3 were derived using methods similar to Zabel et al. (2006), assuming that survival during the second and third ocean years is fixed at 0.8. The simplest best-fit model used WTT, September Pacific Decadal Oscillation (PDO) index, and the April upwelling index as predictor variables:

$$-\ln(S3) = \beta_0 + \beta_1 \cdot WTT + \beta_2 \cdot \text{Sept(PDO)} - \beta_3 \cdot \text{Apr(Upwelling Index)} + \varepsilon$$

Estimates of L_I are embedded within estimates of S3 but this is not the same as latent mortality with reference to the damless river.

Hypothesis B – Seasonal L_i is a function of arrival timing at Bonneville Dam for wild spring/summer Chinook

The authors of this hypothesis (Scheuerell and Zabel, 2006) used logistic regression to estimate post-Bonneville SAR of in-river migrants as a function of day of arrival below Bonneville and a year-effect. By shifting the observed distribution of arrival times forward and doing some

comparative analyses they were then able to determine the percent increase in SAR versus the overall shift in arrival timing. This approach used PIT tagged fish data and the response variable was binary based on whether a fish was (1) or was not (0) detected as an adult. The relationship to latent mortality with reference to the damless river is lacking.

Muir et al. (2006) also provide some data, which give insight into the arrival timing and sources of mortality for stream-type Chinook in the lower Columbia River and estuary (i.e. below Bonneville to the mouth of the river). They investigated the arrival timing and lengths of transported (barged) and run-of-the-river fish to examine if there were differences in SARs. Muir et al. (2006) concluded that the most parsimonious explanation for differential post-hydropower system mortality of transported Chinook salmon smolts related not to effects of stress but to differential size and timing of ocean entry. They found that transported smolts were more vulnerable to predation by northern pikeminnow, *Ptychocheilus oregonensis*, in freshwater habitats and by Pacific hake, *Merluccius productus*, in marine habitats than were migrants; this was particularly true for the smaller wild smolts transported early in the season.

Hypothesis C – The existence and operation of the four Snake River dams results in annual L_I averaging 59-64% for wild Snake River spring/summer Chinook

This hypothesis/analysis estimates (Petrosky et al., 2006) annual latent mortality for wild spring/summer Chinook at an average of 59-64% based on differences in SARs from up-river (Snake River) vs. down-river (John Day) comparisons. These values represent an estimate from Deriso et al. (2001) and an updated value in Schaller and Petrosky (2006). Petrosky et al. (2006) reviewed estimates of L_I in different time periods (pre-1970 vs. post-1975) and in different locations (Snake River populations versus downstream populations), as reported by Peters and Marmorek (2001), with a mean of 0.59. A comparison of Snake River versus downstream John Day spring Chinook, forced to navigate fewer projects, yielded an average of 0.67. The year-to-year variation was quite substantial for both series. The authors indicate that cumulative stress from passage associated with the four lower Snake River dams is the primary basis for this L_I .

The stress response in juvenile salmonids has been well documented physiologically (measured by elevated levels of serum cortisol, plasma glucose, and lactate) and behaviorally. Laboratory studies simulating stress upon dam passage (multiple acute handling stressors) determined that juvenile salmonids stressed by simulated dam passage were more vulnerable to predators than non-stressed controls (Mesa 1994). The stress response for fish has also been shown to be a natural response and recovery of predator avoidance abilities/behavior has been observed to return in ~ 15 to 90 minutes (Mesa, 1994; Olla and Davis, 1989). While it is likely that multiple passage stresses occur, there is no direct measure of its leading to latent mortality because evidence to date is primarily from laboratory studies.

In a recent radio telemetry study conducted in the lower Columbia River by Schreck et al. (2006), the authors hypothesized that stress, disease, and bird predation interacted. They also suggested that juvenile Chinook stressed by their passage through the hydrosystem were more vulnerable to disease and were relatively less ready for seawater life, as estimated by relatively low gill Na^+, K^+ -ATPase activity that also made them more susceptible to predation. The hatchery Chinook salmon used by Schreck et al. (2006) were on average ≥ 28 mm larger than

wild fish. However, comparisons of smoltification (n=6 fish) and disease (n=8 fish) were based on very small numbers of fish sampled on the bird colony and compared different cohorts of fish including Snake River fish from the barge, fish from the bypass at Bonneville Dam where few Snake River fish were likely present, and fish of unknown origin on the bird colony.

Hypothesis D – Annual L_I is low, confounded with other variables, and unquantifiable for wild Snake River spring/summer Chinook.

This hypothesis states that L_I is not measurable. Furthermore, after a review of available research, the authors conclude if hydro-related latent mortality exists it is very low. Geiselman et al. (2006) describe the hypothesis in detail, while Paulsen and Fisher (2006), Hinrichsen (2006), Scheuerell and Williams (2005) provided information illustrating the considerable difficulties of measuring L_I . The central idea here is that hydro-related latent mortality (L_I) cannot be derived from existing spawner-recruit data. As noted above, in the absence of survival data from the *damless* river condition, there is no **direct** way to measure L_I . Geiselman et al. (2006) conclude that observed differences in SARs and spawner-recruitment estimates: (1) are explainable by processes other than latent mortality, (2) are net effects – confounded with direct mortality estimates and other non-hydro life stage stresses, and (3) are traceable to overly parameterized models.

Hypothesis E – Annual D_{IT} Based on Historical D Estimates

This hypothesis asserts that the ratio of annual transported SAR to in-river SAR (D_{IT}) can be expected to remain consistent with historical D_{IT} -values observed since the mid-1990s. The modeling suggestion would be to use an annual D_{IT} that is sampled from the historical distribution of annual D_{IT} -values from medium/high flow years for any year projected to have medium/high flow. For years projected to have low annual flow, one would use the annual D_{IT} from 2001, a low-flow year.

Alternative methods of calculating historical D_{IT} -values include: (a) the method used for the Comparative Survival Study (CSS, 2006), (b) the method used by NMFS in various reports (Williams et al., 2005), and (c) the method used by the University of Washington in their ROSTER model (Buchanon et al., 2006). These methods differ in the nature of the control and transported groups, analytical methods, and temporal scale of estimates. In all of these variations, D_{IT} differs from latent mortality with reference to the damless river.

Hypothesis F – Annual Project-Specific D_{IT} Are Estimated

This hypothesis specifies that SARs should be seasonally predictable for each project. Wilson (2006) describes a method for predicting the seasonal SAR ratios (TIRs) prospectively, based on log-normal distributions derived from PIT-tag data from recent years for transported and in-river SARs. Annual, project-specific estimates of D_{IT} are obtained by removing sampling error from TIR data for both wild spring/summer Chinook and wild steelhead. Then, D_{IT} can be calculated from project-specific TIRs, measured to the release point below Bonneville.

For COMPASS modeling, TIR-values for each species, project, and year could be drawn randomly from an appropriate log-normal distribution, using project-specific parameters based on past data. We note again that $D_{IT} = (1 - L_T) \div (1 - L_I)$ differs from latent mortality, L_I , with reference to the damless river.

Hypothesis G – Seasonal D Based on Arrival Time Below Bonneville.

For this hypothesis, Scheuerell and Zabel (2006) employed logistic regression to estimate the post-Bonneville SARs for both in-river and transported smolts. The best model included the Julian day of arrival below Bonneville Dam, a year-effect, and transportation site-effect (for transported fish only). In this model, both in-river migrants and transported smolts were considered, allowing the computation of $D_{IT} = (1 - L_T) \div (1 - L_I)$, and transported fish were separated by site of collection.

The evaluation of transported smolts was based on migration years 1995 and 1998-2002, whereas the in-river data were based on migration years 1998-2002. Based on the SAR_I and SAR_T estimates, Scheuerell and Zabel (2006) then obtained seasonally adjusted estimates of D_{IT} for the five years in common (1998-2002).

Hypothesis H – Seasonal SAR Ratios

This hypothesis incorporates seasonal changes in spring/summer Chinook values of TIR at Lower Granite Dam. Past work by CSS and NOAA suggests that transport SAR to in-river SAR ratios (TIRs) may vary in a roughly predictable way within the course of the (spring) migration season. This leads to the question of when within a season to transport wild yearling-migrant Chinook that are collected at Lower Granite Dam (LGR). Paulsen (2005) divided the migration season into quartiles and developed confidence intervals around quartile TIRs by bootstrapping PIT-tag data for migration years 1995-2003.

One Additional Hypothesis

At the Council's request, the ISAB examined a hypothesis that *the hydrosystem indirectly affects smolt-to-adult survival (SARs) by shifting the timing of mortality of transported fish to post Bonneville Dam, based on the hypothesis that fish experience a fixed rate of mortality.* This hypothesis essentially states that continual "culling" is the primary cause for the in-river mortality experienced through the hydrosystem. This hypothesis was examined and discussed at the CSS workshop in 2004 and is reported in the CSS Report (Marmorek et al. 2004).

After reviewing the CSS Final Report and materials for this review, the ISAB has two fundamental reasons for not supporting this hypothesis (the CSS Final Report 2004 does not provide supportive evidence for the hypothesis either):

- 1) The spring/summer Chinook and steelhead under consideration are already 1+ years old and have passed the stage of initial early mortalities in freshwater. The migrants of these Chinook and steelhead are larger fish, and we see no reason to speculate on a fixed

mortality rate in larger migrant fish. It is possible that early migrants of hatchery Chinook and steelhead could have a higher initial mortality after release, but much of this mortality would occur before these fish reached Lower Granite Dam.

- 2) There is no physiological process known that would result in a fixed mortality rate. Potentially a pathogen, expressed when these fish are under stress (transportation or downstream migration in the hydrosystem), could result in similar mortality rates, but these would not be fixed, nor would they be expected to be fixed each year.

The Data

Estimation of latent mortality of Chinook and steelhead salmon that migrate in-river through the Columbia River hydrosystem involves a maze of statistical models and assumptions, but the data are well defined. The analyses reviewed involve three types of data, but subsets of data may be selected for any specific analysis. The basic data sets include:

- 1) Stock and recruitment data for index populations of spring/summer Chinook within the Columbia River Basin (seven populations within the Snake River and three within the John Day River). These data date from the 1950s to present but vary between populations. The data relate the number of adult salmon returning ($R_{i,t+n}$ = recruits produced from population i , in spawning year t) to the Columbia River to the number of parental spawners ($S_{i,t}$) that produced them.
- 2) Passive Integrated Transponder (PIT) tags applied to juvenile spring/summer Chinook and steelhead (hatchery and wild, in-river migrants or barged fish) uniquely identify individual fish. Various portions of the PIT Tag Information System (PTAGIS) database are used in different analyses, but two sets of PIT data are most commonly referred to. These data include the NMFS PIT data for 1995-2002 (Williams et al. 2005, Scheuerell and Zabel *draft ms* (text files: <https://secure.bpa.gov/salmonrecovery/>), Muir et al 2006); and Comparative Survival Study (CSS) tags for 1994-2004 out-migration from the Snake and John Day rivers (Berggren et al. 2006).
- 3) Environmental covariates to account for changes in the hydrosystem flow regimes over time, estuary and near-shore marine conditions, and larger scale climate variation. Numerous environmental parameters have been applied by different authors (Berggren et al. 2006, Petrosky et al. 2006, Paulsen and Fisher *in review*) to account for environmental trends and cycles within the time series of stock/recruit data and smolt-adult survival rates.

The various hypotheses presented (described above) can be related based on types of data involved and models applied (Figure 2).

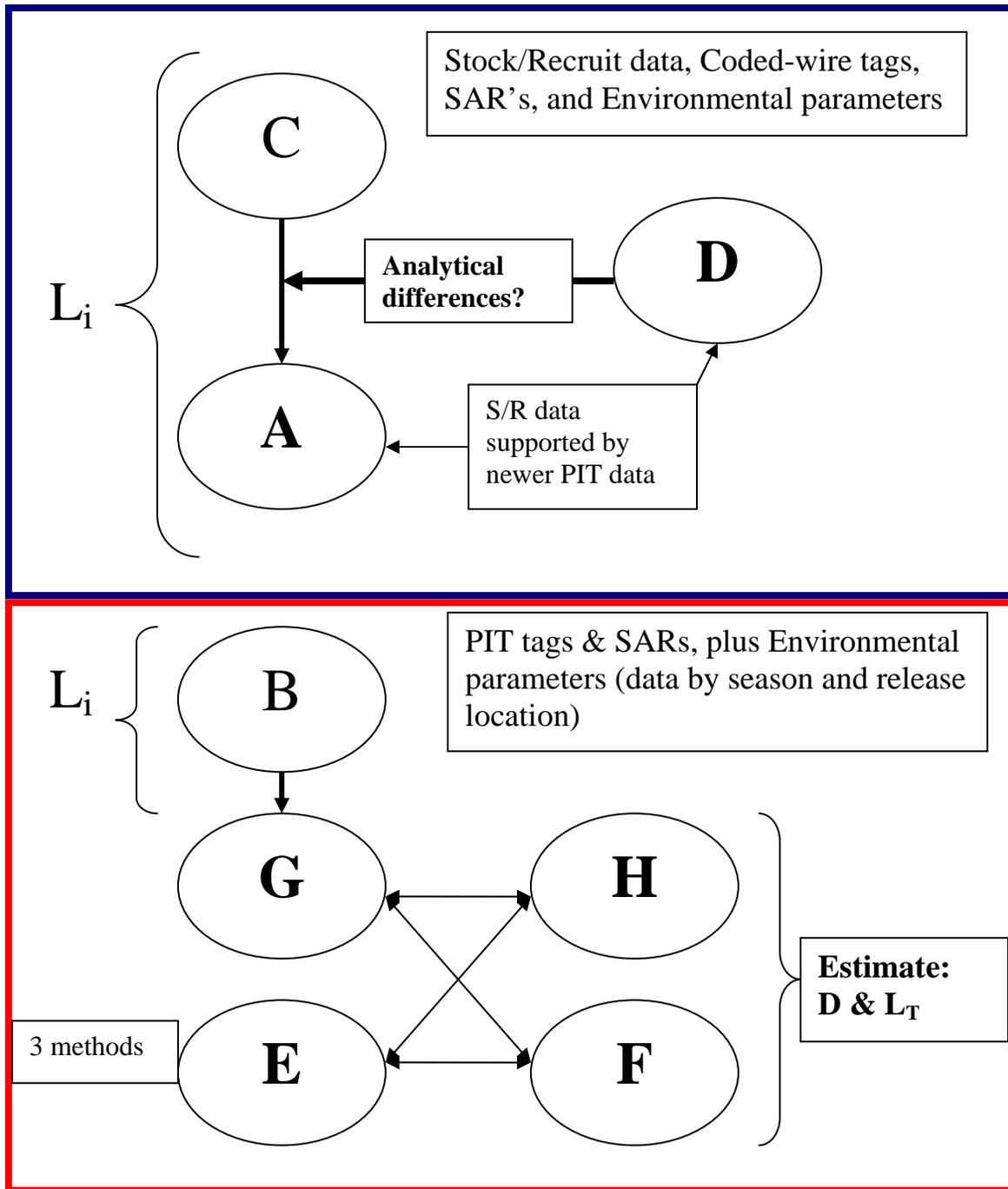


Figure 2. Relationships among hypotheses and supporting data.

Before commenting on the individual data sets, it is worth recognizing the challenge involved in estimating the magnitude of latent or delayed mortality. Since it is defined as the mortality of in-river migrants downstream of Bonneville but attributed to effects of the hydrosystem, delayed mortality cannot be observed and must be estimated **indirectly**. Extensive and creative effort

has been focused on how to assess delayed mortality and the relative survival of transported fish versus in-river migrant fish from Bonneville to their return as adults (notably, see Marmorek et al. 2004) (www.fpc.org/documents/CSS/CSSworkshop_reportfinal.pdf).

While some level of delayed mortality likely does occur each year, its value may be highly variable and its magnitude and variability could differ among populations of salmon and years of downstream migration. Until the development of the PIT tags, stock/recruitment analyses were the bases for estimation of latent mortality, but these analyses inherently require a long time-series of information (on production from a known number of spawning adults) and assume random background environmental condition. This condition is seldom true, particularly within the Columbia Basin, due to changes in physical environmental conditions in the Columbia that are the background to any assessment of stock/recruitment for Columbia Basin salmonids. In addition, climate variation must also be super-imposed and, although several authors have appropriately begun to evaluate variation in climate factors to account for annual deviations in stock/recruitment rates, smolt-to-adult survival rates, and estimation of delayed mortality, the pattern of climate effects introduces two issues that also merit consideration:

- a) Is the cumulative impact of climate-related factors symmetric with respect to the impact of delayed mortality or do poor conditions have greater impacts?
- b) How does the period of climate cycles or trends compare to generation time of the salmon? For example, following a series of poor survivals, would we anticipate the salmon to have sufficient time to recover?

The combination of these issues could have serious consequences for the recovery of a salmon population and for what may be perceived as an “acceptable” level of hydro-related mortality (both direct and in-direct) on a population. For example, in periods of good ocean climate and high productivity, does it matter if delayed mortality was minimal or is the critical issue how extensive mortality becomes during poor environmental conditions? The answer to the latter question will be tied to the expected duration of the environmental regimes, how depressed in abundance the populations became, and our capability to manage mortality factors.

The challenge in assessing delayed mortality involves estimating a value that is likely conditioned by annual climate variation (at various spatial scales) set against physical environmental conditions that also change but at different scales of time and space. Given this situation, any future value of latent mortality will have a high degree of uncertainty.

Stock and Recruitment Data: (see Deriso et al. 2001; Petrosky et al. 2006; Paulsen and Fisher, *in review*; Schaller and Petrosky, *in review*)

Each of the analyses using stock and recruitment data (in this current review) use spawning escapement data for seven “index” populations within the Snake River and three “index” populations in the John Day River. Total returns to the Columbia River are estimated by run reconstruction, accounting for the number of spawners, in-river harvest, and inter-dam losses by age for each population (run reconstruction method described in Beamesderfer et al. 1997). The time series of data varied among populations but was typically broken into two time periods, pre and post the 1970-1974 period of dam completion in the Snake River. Various models account for density-dependence (the number of spawners), time period, and common year effects

between populations or environmental covariates (references above). However, the most significant difference between the models presented was the assumption that **all** populations had a common productivity parameter (Snake and John Day populations, Hinrichsen, *pers comm*) as opposed to using separate estimates of productivities for each population or region for the Snake River and the John Day basins. The assumption of a common productivity value had a major impact on the productivity estimated (much lower) and greatly decreased the estimated delayed mortality to near zero. The use of a common productivity parameter between two geographically discrete population groups was strongly refuted in an August 14, 2006, memo from Ron Boyce, Charlie Petrosky, Howard Schaller, Earl Weber, Rod Woodin, and Peter McHugh to Ed Bowles and Chris Toole, Chairmen of the Framework Group.

It may be argued that differences in results due to assuming common versus differing productivities can be explained by trends in environmental variation. Schaller and Petrosky (in press) show that patterns of residuals of $\ln(R/S)$ over time are strongly correlated between the Snake and John Day populations and are not randomly distributed with time. Consequently, patterns in residuals could be explained by examining environmental covariates (Paulsen and Fisher *in review*). If the climate covariates account for the trends, then the stock/recruitment analyses would be expected to better estimate the density-dependent recruitment functional relationships within populations.

Although the discussion concerning interpretation of stock and recruitment analyses, environmental covariates, and the value of upstream (Snake River) versus downstream (John Day River and Carson hatchery) continues (Hinrichsen *pers comm*, Paulsen and Fisher *in review*, Schaller and Petrosky *in review*), the ISAB questions whether this continuing discussion is productive. Compared to the value of PIT-tag information, stock/recruit (S/R) analyses are a blunt instrument for assessment of annual delayed mortality. Numerous authors are now using PIT tag data to support the S/R findings and estimating smolt-to-adult survival rates and/or recruitment at age-3 (survival to Age-3, one year after entry to the marine environment). Regional commitments to increased PIT tag application and detection capabilities in several dams for juveniles and adults, now provide substantial new information on the mortality of individual fish related to seasonality, location, and size at tagging, downstream and upstream passage history, predation risks, and such.

PIT Tag data: (see: Berggren et al. 2006, Marmorek et al. 2004, Muir et al. *draft ms*, Petrosky et al. 2006, Scheuerell and Zabel *draft ms*, Williams et al. 2005, Zabel et al. 2005)

“The use of passive integrated transponder (PIT)-tag technology in the Snake and Columbia Rivers, with each fish having a unique tag code, has provided an unprecedented opportunity to evaluate survival over the entire life cycle of salmon. PIT-tag detection systems are now installed in the juvenile bypass systems at most mainstem dams and in adult fish ladders of half the dams that Snake River anadromous salmonids pass, allowing evaluation of survival on a much finer scale than allowed by older technologies.” (Muir et al. 2006)

The application of PIT tags began in 1987 and in excess of 15 million tags have now been applied to salmonids in the Columbia River Basin. Much of the data and historical information is maintained by staff at the Pacific States Marine Fisheries Commission (PSMFC) in the PIT Tag Information System (PTAGIS database; www.ptagis.org) including data access tools and a

very useful library menu linked to documents and peer-reviewed journal publications. The early development of the tagging and detection systems has been described by Prentice et al. (1990a,b) and initial analyses of downstream survival of tagged salmonids reported by Muir et al. (2001) and Williams et al. (2001).

The PIT-tag program is essentially a multiple mark-recapture program with automated detection of tags that eliminates the need to recover and handle tagged animals. The statistical models used in analyses of PIT-tag data have been described by Newman (1997a,b), Skalski (1998), Skalski et al. (1998), Sandford and Smith (2002), and Townsend et al. (2006). As with any mark-recapture program, the information value is limited by the number of tag detections (the “observed” recoveries) and the adequacy of the recovery sampling effort. As electronic detection became more fully developed within the Columbia hydrosystem, detections of downstream migrating smolts (or smolts transported) provided significant information on downstream survival rates, migration timing, and specific-reach mortality, all of which could be related to specific information on individual tagged salmonids. Nevertheless, estimation of smolt-to-adult survival rates could still be limited by the number of adult detections. Ocean survival rates for spring/summer Chinook and steelhead remain only a few percent of the smolts entering the ocean and limit the number of detections possible unless tagging rates and adult upstream sampling rates can be increased to compensate. This limitation can be compounded by allotting released tags to a variety of release strata defined by seasonal period, stock of origin (tributary, hatchery, etc.), location of release (specific dams), and such.

PIT-tag data greatly increase the number of release strata that can be assessed and opportunities for explanatory studies (e.g., rate of downstream passage, time of entry to the ocean, bird predation rates, size of bypassed smolts, etc.), but the technology can not compensate for the indirect estimation of latent mortality. The relatively short time series of PIT tag data also limits ability to relate variation in results to the environmental data applied to the stock/recruitment studies. The same environmental parameters may be considered, but the number of annual comparisons will simply limit comparisons until more annual data are accumulated. The potential value of PIT-tag data though is clearly exemplified by the differences in passage rates, reach survivals, and smolt-to-adult survival measured for downstream migrants in the 2001 drought year (Berggren et al. 2006). The PIT-tag data do continue, however, to support the existence of latent mortality (D values < 1) for Snake River spring/summer Chinook and steelhead, but the value depends on the comparison made (in-river vs. transported, hatchery vs. wild, early vs. later season, etc.) and on environmental conditions during the juvenile emigration year (see Tables B-1 and B-7, Berggren et al. 2006). Two particular points of confusion in the presentation of PIT tag analyses should be noted:

- Given the number of release strata possible with PIT-tag data, it is important for reports to clearly identify the comparisons being made. The interpretation of reports reviewed by the ISAB was complicated by this issue. For example, without full notation of release points, what sources of mortality would be included within a smolt-to-adult survival rate?
- Latent mortality levels can vary with annual environmental conditions, but estimates of “ D ” (a ratio) may not if the numerator versus denominator responded proportionately to the environmental variation. For example, transported and in-river

Chinook may both have increased survival rates under favorable marine conditions, but a ratio comparison would be insensitive to such conditions if the two groups responded proportionately. However, a “D” value comparison that includes the in-river survival factor could show greater sensitivity to change in the in-river group due to improved in-river survival that does not affect the transported fish.

Environmental Data: (see: Paulsen and Fisher, *in review*; Petrosky et al. 2006, Schaller and Petrosky, *in review*)

These citations identify the environmental indices applied in recent assessments and will not be reiterated here. The impact (and explanatory value) of environmental conditions will, however, be dependent on the correlations between freshwater, estuary, and marine environmental conditions and parameters. Hinrichsen (2006) provides an example of this point, and some papers reviewed took account of these correlations. In a number of other papers reviewed, though, discussions of outcomes or expected changes in D values show little consideration of this point (beyond recognition now that environmental conditions can have a strong effect on mortality rates).

NOAA’s Questions

Finally, we take up the questions posed, attempting to treat alternative models/hypotheses collectively and comparatively for each question. As prelude, we open with a few overarching comments. As has been the case for the downstream passage modules of COMPASS, there are two sets of issues: (1) estimation/testing of competing models of latent mortality, and (2) how to deploy what we learn to seed COMPASS modeling.

Leaving aside estimation/testing for the moment, it remains unclear whether we are after L_I and L_T , SAR_I and SAR_T , $TIRs$ and/or D_{IT} . One thing that is clear is that we are not able to estimate *latent mortality* for the *damless* reference condition. Thus, we cannot estimate the overall, absolute latent mortality associated with the existence of dams. Also, because the background environmental conditions appear to have a major effect on the SARs, we may expect it to take substantial time and effort to measure the relative latent mortality of some operational changes against the background noise of the environment.

There are hypotheses within the set presented to the ISAB that would allow us to address modeling strategies, and most of the hypotheses are (with modification) connectible. They are not mutually exclusive, nor are they exhaustive. Except for hypothesis D, the other hypotheses relate in combination to time or size upon arrival at Bonneville and incorporate seasonal and climatic factors (flows, upwelling, PDO). Evidence shows that an arrival time that is too early or too late can lead to poor survival. Rather than choosing among alternatives, each of which has its own value, our sense is that it would be most profitable to *connect hypotheses* in ways that will allow the COMPASS team to evaluate the interconnectedness of hypotheses and determine relative significance of variables. This would produce a versatile modeling platform for the “below Bonneville” component.

Comments on Questions of Interest

All of these models can be expressed in a common modeling and statistical framework. We note that subsets of the hypotheses group easily into clusters, as portrayed in Figure 2. We will comment on the plausibility and evidentiary support for each of the models below, as requested, but our comments should be viewed less in the vein of promoting a choice of models for the COMPASS modeling team than as an attempt to help them tie things together.

1. Model Plausibility and Data Availability - How plausible is each of the latent mortality hypotheses, based on the evidence presented by the authors (e.g., data, analyses based on those data, and other considerations)? Are the data appropriate for deriving the estimates of interest?

The central point is that the comparative phase of the work lies ahead, guided by a coherent analytical and modeling framework, either that articulated in Figure 2 or by an equally explicit alternative. It is obvious that the simplest (most parsimonious) model is preferable, unless and until compelling evidence indicates the need for a more elaborate specification of the problem.

Hypotheses F and H are minor variants of the same idea, that project-specific variation in TIRs translates into project-specific D_{IT} variation, which later can then be used to model operational alternatives. Hypothesis H adds the wrinkle that the TIRs are also seasonal.

Several models are based on continuously varying river or climatic conditions or on alternative operational strategies, both of which must be modeled in continuous terms. There are three alternative modeling directions, Hypothesis A (water travel time), Hypotheses B and G (seasonality), and Hypotheses F and H (project specificity). These are all somewhat related.

2. Evaluation of Current Hydropower Operation – How applicable is each of the hypotheses for estimating the overall (absolute) latent mortality associated with the existence of dams and current/recent operations? How do the hypotheses rank in this regard? Is sufficient information available for the ISAB to suggest how the hypotheses should be weighted in this type of application?

The question translates as “How well can we determine L_I and/or L_T under operational conditions embedded within recent or projected environmental conditions?” A direct comparison of current *in-river* and *damless* survival rates for the “below Bonneville” component of the life cycle would provide us with an assessment of L_I . As we pointed out, however, we cannot directly observe the *damless* river condition, and that leaves us trying to argue backwards from what we can see to what we cannot. As pointed out by the proponents of Hypothesis D, that is extraordinarily difficult to do: too many other factors are involved, and they are all confounded. Although historical pre/post dam survival comparisons provide us with some information, we note that S/R estimates are not as credible as the PIT tag estimates. Therefore credible estimation of L_I remains elusive.

It seems that both SAR_I and SAR_T are credibly measurable for any given year (on average) and, with less precision and accuracy, for particular seasons, single projects, or under changing circumstances. We can compute the SAR-ratio,

$$D_{IT} = \frac{SAR_{T, Bon \rightarrow LGR}}{SAR_{I, Bon \rightarrow LGR}} = \frac{(1-L_T) \cdot S_{T, us}}{(1-L_I) \cdot S_{I, us}}$$

And, assuming that we can separately measure $S_{T,us}$ and $S_{I,us}$ (or can reasonably assume them to be equal), we can establish the ratio $(1 - L_T) \div (1 - L_I)$ thus establish L_T relative to non-measurable L_I .

SAR_I and SAR_T are associated with various predictor variables, some environmental, some operational (not being assessed for this question), and some representing interactions. The array of potential predictors is large and they vary in a mutually dependent complicated fashion. Simple hypotheses are easy to evaluate, while more elaborate hypotheses require ever more information and tighter specification of the connections between the variables. For simple hypotheses, crude data are adequate, but for more elaborate hypotheses, sampling errors or uncertainties can create *faux* signals. The simpler the model the greater our inferential power, while more complex models increase the challenge of the modeling task.

3. Evaluation of Operational Alternatives - How applicable is each hypothesis for estimating *changes* in latent mortality associated with alternative operations? How does each hypothesis rank with respect to providing plausible estimates? Is sufficient information available for the ISAB to suggest how the hypotheses should be weighted in this type of application?

The ISAB does not intend to rank the hypotheses. Rather our review is intended to identify hypotheses that might best inform operational alternatives in the short-term, given the data that are available. We cannot use any hypothesis that sets SAR_I and SAR_T constant for a whole year, for a particular season, or for a particular project, except as null hypothesis (reference) models against which to compare more elaborate models with changes in the operational regime for any one/combination of the separate projects. Models/Hypotheses D and E will be of little help in evaluating operational alternatives. Model C is also not helpful unless we specify separate parameters for each particular set of operational variables, not an attractive modeling option.

For Model A, we should be able to convert altered sets of project operations into changes of WTT for any given week or for a whole season, so it should be possible to assess the impact of changing WTT on the SARs. How well we could assess the impact of changing operations would depend on (a) how well we can translate those operational changes into WTT, (b) the extent to which changing operations impact WTT, and (c) the extent to which WTT predicts the SAR outcome. Similarly, to the extent that we can convert project-specific operational changes into distributions of arrival times at the estuary, it should be possible to use Model B to assess the impact of those operational changes, in a general way. As with Model A, the assessment would have to be indirect, with the same sorts of caveats as for Model A.

Model G shows promise for evaluation of operational changes, since it is couched in terms of specific projects, and because both L_I and L_T are examined. Model F yields project-specific estimates and should be assessable under changing project-specific operations, but it leads to tabular output. While a table may be a convenient source of parameter values to plug into

COMPASS, it is less than ideal for evaluation of a continuum of operational alternatives. On the other hand, if operational changes alter the lognormal parameters, μ and σ , in a simple and continuously predictable way, Model F might be quite interesting in this vein. Model H adds a seasonal element to the project-specific focus and is something of a blend of F and G. It should be possible to keep track of the separate groups taking any particular route from above Lower Granite to below Bonneville and to follow their subsequent survival experience. That will require a multi-state demographic treatment, but a proper accounting through careful design to gather appropriate PIT-tag data is a requisite.

The more indirect the inferential pathway, the greater will be the uncertainty in the inferential outcome. Models G, F, and H are the most empirical, making best use of available data. The ISAB is also aware that NOAA Fisheries (Matthews and Muir 2006) has an ongoing transport/in-river study to evaluate hydropower system-related latent mortality associated with passage of yearling Chinook through the Snake River dams. Within the next several years, if sufficient numbers of adults from the tagged groups return, the results may apply as a test related to latent mortality hypothesis C. Models A and B are not likely to be informative without further elaboration. Models D and E do not appear useful for the analysis of alternative operations.

4. Evaluating Listed Columbia Basin ESUs – To what extent are the hypotheses and methods described applicable to ESUs other than Snake River spring/summer Chinook salmon? Is information presented or referenced that permits such inferences? Comment on the 13 listed ESUs for the Columbia River Basin, separately for each listed ESU.

The Framework team points out that the hypotheses described above were developed for Snake River spring/summer Chinook, and in some cases for Snake River steelhead. They request information on Snake River fall Chinook and Snake River sockeye, in particular, and the question has been generalized to include all of the listed ESUs.

Our first comment is that any ESU that is not routinely transported can yield no estimates of SAR_T and therefore no estimates of D_{IT} or L_T . On the other hand, we might profitably be able to compute a SAR-ratio for any pair of competing operational alternatives, as long as we can divide the smolts into separately trackable cohorts. For alternatives A and B, we have

$$D_{AB} = \frac{SAR_{B, Bon \rightarrow LGR}}{SAR_{A, Bon \rightarrow LGR}} = \frac{(1 - L_B) \cdot S_{B, us}}{(1 - L_A) \cdot S_{A, us}}$$

We can obtain the ratio $(1 - L_B) \div (1 - L_A)$ and, while we can obtain neither L_A nor L_B in absolute terms, we can certainly obtain the ratio between them, which provides a comparative metric that can be used for evaluation of the impacts of changing operations, variable river, variable climate, or variable ocean situations.

5. Can We Improve the Hypotheses? – Can we suggest modifications to any of the hypotheses and analyses to make them more useful? Would these changes affect the rankings or weightings?

Hypothesis A. Before this relationship can be implemented in COMPASS, the authors have indicated that they will need to confer with COMPASS modelers to ensure that estimates of WTT are equivalent in the regression and the COMPASS model (consider adjustments to WTT based on changes to the Lower Granite to Bonneville fish travel time from probable reductions in forebay delays due to hydro actions) and to determine if any conversion steps are necessary. There will also need to be some discussion regarding how to implement the ocean/climate environmental variables.

Hypothesis D. It seems that since we cannot measure latent mortality in absolute terms, we should not make any assertion as to its magnitude for modeling purposes. The information presented in support of Hypothesis D establishes confounding in estimates of latent mortality but does not establish anything about the size of latent mortality. And it does not support the conclusion that latent mortality is 0 or very near 0.

Hypothesis G. This relationship is already implemented in COMPASS as an average relationship across years. We suggest that the COMPASS group pay particular attention to assumptions underlying estimation of seasonal in-river survival, since only the timing of bypassed in-river migrants is known.

Hypothesis H. To implement in modeling, it would be assumed that future action is either high spill/no transport at LGR or no (voluntary) spill/max transport at LGR during any given week in the season. We suggest that the COMPASS group pay particular attention to assumptions underlying estimation of seasonal in-river survival, since only the timing of bypassed in-river migrants is known.

If we cast hypotheses in a single coherent framework, reflecting the network in Figure 2, we facilitate statistical estimation/testing and subsequent COMPASS modeling. The COMPASS team has shown a penchant for log-linear models of the form shown in the various survival equations used to describe the hypotheses above. Our penchant is for logit-linear models, which are a little more versatile for comparative modeling. We will pose our suggestions in that latter vein. Pending a clearer statement of the problem, it is not clear what the overall purpose of the investigation is. Recall the four alternatives mentioned in our introductory comments. Our sense is that one favored alternative is to measure the SARs and the SAR-ratios, pursuing differential latent mortality for in-river vs. transported smolts. If so, we need a framework that can handle both, and such considerations lead us to the suggestions detailed in the appendix.

Another promising alternative is to combine all hypotheses except Hypotheses C and D (which directly assert the result that latent mortality is large or small). The remaining hypotheses include various components of latent mortality and could be merged into a single, integrated model. A merged data set could then be used to evaluate this model, and the statistical analysis should be able to determine that some of the components are not particularly important and that others are significant when it comes to estimating post-Bonneville mortality (see Catchpole et al., 1998; Fournier et al., 1998; Maunder, 2001; and Goodman, 2004, for examples of merged data sets). This global modeling method of analysis could be used to integrate the investigation of the four alternative approaches discussed in our introductory comments.

6. *Future Monitoring and Research* – What lines of future research and monitoring would be most valuable for reducing the uncertainty associated with the magnitude of and mechanisms responsible for latent mortality?

The ISAB perspective on the scope and feasibility of research needed to address the latent mortality uncertainties may be framed with a series of questions. What is really knowable, given the limits of our ability to measure behavior and survival in the estuary and ocean and to compare various stocks (genetics, life histories) that pass different dams, at different sizes, at different times? Can we clearly identify causative models or are we necessarily dealing with retrospective phenomenological descriptions? Can we really get useful answers from research on these issues? Under what circumstance do we meet the point of diminishing returns (cost effectiveness) on conducting research?

A looser, weight of the evidence management approach might be needed because of the great variability and the difficulty of measuring the various sources of mortality, as well as the time it will take to fill the remaining information gaps. In the long term, we can better define the noise, but it is still likely that analyses will need to address how to handle the large, unidentified noise in estimates of fish performance. There is a high degree of uncertainty in any estimates based on limited time series. Ocean conditions that affect survival vary greatly on several time/space scales. The ISAB strongly believes that such uncertainty needs to be acknowledged; management must take into account the uncertainty, not just the mean. This implies that the region must manage for the highest risk, i.e., must select management strategies that are robust to the uncertainty.

Identifiable factors that contribute to variability in post-Bonneville mortality may inform future monitoring and research needs. These needs may include biological factors already mentioned:

- Predation by birds, especially Caspian Terns and cormorants
- Predation by pikeminnow and marine fishes (hake)
- Increased vulnerability to predators because of size, stress, or disease
- Timing of ocean entry
- Ocean conditions, including density dependent factors, upwelling, spring transition, ENSO and PDO
- Ocean interceptions and harvest of returning adults
- In-river adult pre-spawn mortalities (harvest, dam passage, marine mammals, disease, high temperatures)

While future research and monitoring may take many years to estimate these various sources of mortality, some new and developing technologies offer the potential to do so. Although PIT tags provide estimates of direct mortality within the hydrosystem down to Bonneville Dam, there are not observations of the PIT tags beyond Bonneville Dam that would allow for estimation of mortality in the lower river and estuary. Currently, lower river and estuary mortality are combined within the total mortality in the marine environments, including coastal and open ocean life phases (noted as $S_{e/o}$). The relatively recent developments of acoustic tag systems have given rise to several studies designed to estimate survival of spring/summer Chinook and steelhead for the lower Columbia River below Bonneville, to and through the estuary, and the

Pacific Ocean shelf (Welch and Rechisky 2007, a joint Kintama Research and UBC study; McComas et al. 2006, a joint NOAA Fisheries and PNL study). The application of acoustic tags in these large smolts would allow for separation of effects by time/area in the lower river, estuary, and plume and near-shore coastal zones (and new information on habitat use, migration rates, etc.). However, a new tag-type introduces new uncertainties about the impact of these larger tags on the survival and migration of emigrating smolts. A continuation of the PIT-tag programs, coupled with an acoustic tagging program would provide for direct comparisons between tags and direct assessment of mortality rates associated with the acoustic tags. Further, the acoustic tags would only provide new information during the lower river (below Bonneville) and early marine phases. At present, given the size of these smolts, available acoustic tags would only have sufficient battery life for a few months (other programmable tags are available but initial investigations should determine duration of use in the estuary and coastal zone).

Continued comparisons of in-river migrants versus transported fish would require acoustic tags being applied in upper river locations, and the ISAB is aware that both the Welch and McComas studies have tagged fish at up-river locations. Tagged fish would then be allocated to in-river migrant and transported groups. We must caution, though, that these studies are either in the early stages or in the demonstration stage. The estimates currently produced are based on very small numbers of tagged fish and are preliminary. It will likely be a number of years before statistically sound estimates are available and are widely accepted.

Conclusions and Recommendations

The ISAB recommends that an investigation of merging the various components of latent mortality into one grand model be conducted. A merged data set could then be used to evaluate this model with the result that the statistical analysis should aid in selecting among hypotheses by determining which latent mortality components are important when it comes to estimating post-Bonneville mortality (see Catchpole et al., 1998; Fournier et al., 1998; Maunder, 2001; and Goodman, 2004, for examples). Hypotheses C and D that directly assert that latent mortality is large or small would not be included in this investigation.

The ISAB also recommends a logit-linear approach (presented in Appendix A) be investigated as a potential alternative approach/framework for future modeling.

There is a high degree of uncertainty in any estimates based on limited time series. Ocean conditions that affect survival vary greatly on several time/space scales. The ISAB strongly believes that the uncertainty needs to be acknowledged and efforts continue to reduce this uncertainty. Future monitoring and research is needed to further quantify biological factors that contribute to variability in estimated post Bonneville mortality. In particular, the ISAB recommends that acoustic tags continue to be developed and used to assess mortality in the lower river (below Bonneville), the estuary, and the Pacific Ocean shelf and to determine how mortality varies in these regions with environmental conditions. As well as acoustic tagging, this will require the continuation of PIT tagging (a monitoring and evaluation program) and many more years of data before this question can be assessed further. Analyses of PIT tag data with

incorporation of biological and environmental variables has provided useful new insights and this research should clearly continue to provide a necessary time-series.

The ISAB concludes that some latent mortality occurs to fish that experience the hydrosystem. However, researchers/modelers have made estimates of latent mortality ranging from 0.01 to 64%, and the ISAB recommends against continuing trying to measure latent mortality. Its value relative to a damless reference is not useful; instead, the total mortality of in-river migrants and transported fish is the critical issue in this line of inquiry for recovery of listed salmonids and has the considerable advantage of being directly measurable.

Finally, we note that management must take into account uncertainty in fish performance, not just the mean. This implies that the region must manage for the uncertainty in estimates of performance and its relationships with management actions.

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Appendix A

(a) Rather than using log-linear models of the form

$$\ln(\text{SAR}_{I,j}) = \ln(S_{I,j}) = \beta_{0I} + \beta_{1I} \cdot x_{1j} + \beta_{2I} \cdot x_j + \varepsilon_{I,j} ,$$

$$\ln(\text{SAR}_{T,j}) = \ln(S_{T,j}) = \beta_{0T} + \beta_{1T} \cdot x_j + \beta_{2T} \cdot x_j^2 + \varepsilon_{T,j} ,$$

we would suggest general usage of log-linear forms such as

$$\ln \left\{ \frac{S_{I,j}}{L_{I,j}} \right\} = \beta_{0I} + \beta_{1I} \cdot x_{1j} + \beta_{2I} \cdot x_{2j} + \varepsilon_{I,j} \quad \text{and} \quad \ln \left\{ \frac{S_{T,j}}{L_{T,j}} \right\} = \beta_{0T} + \beta_{1T} \cdot x_{1j} + \beta_{2T} \cdot x_{2j} + \varepsilon_{T,j} ,$$

etc., ensuring that all of the survival and mortality estimates are properly bounded, for both models used to predict particular SARs and for those used to predict ratios.

(b) When comparing SAR_T with SAR_I , use the log odds ratio Δ_{IT} , rather than D_{IT} ,

$$\begin{aligned} \Delta_{IT,j} &= \ln \left[\frac{S_{T,j}}{L_{T,j}} \div \frac{S_{I,j}}{L_{I,j}} \right] = \ln \left[\frac{S_{T,j}}{L_{T,j}} \right] - \ln \left[\frac{S_{I,j}}{L_{I,j}} \right] \\ &= (\beta_{0T} - \beta_{0I}) + (\beta_{1T} - \beta_{1I}) \cdot x_{1j} + (\beta_{2T} - \beta_{2I}) \cdot x_{2j} + (\beta_{3T} - \beta_{3I}) \cdot x_{3j} + \varepsilon_j \\ &= \delta_0 + \delta_1 \cdot x_{1j} + \delta_2 \cdot x_{2j} + \delta_3 \cdot x_{3j} + \varepsilon_j \end{aligned}$$

If we define similar models for in-river and transported smolts, but with different values for the regression coefficients, we can estimate δ_{0T} , δ_{1T} , δ_{2T} , etc. That is to say, we define the latent mortality parameters in relative terms, the difference between the *transported* and *in-river* values, avoiding the difficulty associated with the absence of a *damless* river reference set. The alternative hypotheses/models can all be cast in this same general framework, which means we can compare them with log-likelihood and AIC criteria.

(c) A modeling strategy would be to add terms to the model until the log-likelihood or AIC criteria tell us we are not accomplishing anything by adding more terms. This modeling strategy will have analogues for Hypothesis E (and variants) as well as models D and C. The idea is to move from the simple to the complex, judiciously. For example, specification of Hypothesis A should take the form (with x_1 as WTT),

$$\Delta_{IT,j} = \delta_0 + \delta_1 \cdot x_{1j} + (\text{oceanic factors}) + \varepsilon_j ,$$

and similarly for Hypothesis B (with arrival time as x_1). We elaborate Hypothesis B as Hypothesis G, for which the following comment might be helpful to the Modeling team. The model for in-river smolts is of the form

$$\text{Logit}(\text{SAR}_{I,ij}) = \alpha_{I,i} + \beta_{0I} + \beta_{1I} \cdot x_{ij} + \beta_{2I} \cdot (x_{ij})^2 + \varepsilon_{ij} \quad ,$$

as in Hypothesis B, and

$$\text{Logit}(\text{SAR}_{T,ikj}) = \alpha_{T,i} + \lambda_{T,k} + \beta_{0T} + \beta_{1T} \cdot x_{ij} + \beta_{2T} \cdot (x_{ij})^2 + (\text{day} \cdot \text{site}) \text{ interaction} + \varepsilon_{ikj} \quad ,$$

The interaction term for arrival day and site is probably telling us that β_1 and β_2 vary among sites. A more natural way to model Δ_{IT} would be the following specification

$$\Delta_{IT,ikj} = \alpha_{ik} + [\delta_{0,k} + \delta_{1,k} \cdot x_{ikj} + \delta_{2,k} \cdot (x_{ikj})^2] + \varepsilon_{ikj} \quad ,$$

where α_{ik} is the difference between in-river and transported β_0 -values for the j^{th} and k^{th} project. All parameters are now indexed for the particular site of transportation ($k = 1$ for LGR, $k = 2$ for LGS, $k = 3$ for LMN, and $k = 4$ for MCN). We have a separate equation for each transport source, an explicit comparison with the in-river cohort for that year. We thus have a quartet of (arrival-day) logit-quadratic models, correlated across projects, with enough parameters to provide a data-model match that is at least as good as the higher order equation reported by Scheuerell and Zabel (2006), and more straightforward to interpret.

Assessing Hydrosystem Influence on Delayed Mortality of Snake River Stream-Type Chinook Salmon

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Abstract.—Snake River stream-type Chinook salmon *Oncorhynchus tshawytscha* exhibited substantial delayed mortality despite recent improvements in oceanic and climatic conditions. These salmon declined sharply with the completion of the Columbia River hydrosystem in addition to other anthropogenic impacts and changes in oceanic conditions. Previous analytical approaches have compared management options for halting the population decline. The predicted benefits of these options on salmon recovery hinged on whether the source of the mortality that takes place in the estuary and during early ocean residence is related to earlier hydrosystem experience during downstream migration (i.e., delayed hydrosystem mortality). We analyzed the spatial and temporal patterns of mortality for Chinook salmon populations to determine whether delayed mortality for the Snake River populations decreased during the recent period of favorable oceanic and climatic conditions. We found that Snake River stream-type Chinook salmon populations continued to exhibit survival patterns similar to those of their downriver counterparts but survived only one-fourth to one-third as well. The hypothesis that delayed mortality decreased and became negligible with more favorable oceanic conditions appears inconsistent with the patterns we observed for the common year effect and our estimates of delayed mortality of in-river migrants. A plausible explanation for this persistent pattern of delayed mortality for Snake River populations is that it is related to the construction and operation of the hydrosystem.

The success of recovery actions for Snake River stream-type Chinook salmon *Oncorhynchus tshawytscha* hinges on whether delayed mortality is substantial and linked to their hydrosystem experience during seaward migration. Delayed mortality is the component of mortality that takes place in the estuary and during early ocean residence that is related to earlier life stage anthropogenic impacts. All populations of Snake River salmon *Oncorhynchus* spp. substantially declined since completion of the hydroelectric projects of the Federal Columbia River Power System (FCRPS) and were subsequently listed under the U.S. Endangered Species Act (ESA). The declines in survival rates of Snake River stream-type Chinook salmon, coincident with completion of the hydrosystem projects, were considerably sharper than those of downriver populations (Schaller et al. 1999; Deriso et al. 2001). Most survival rate declines were in the smolt-to-adult life stage rather than in the spawner-to-smolt life stage (Petrosky et al. 2001). Previous large-scale analytical assessments (Karieva et al. 2000; Peters and Marmorek 2001; Wilson 2003) evaluated management options for

halting the decline of these populations. These results depended on whether the source of mortality that takes place in the estuary and during early ocean residence is related to earlier hydrosystem experience during downstream migration.

Delayed mortality is expressed after fish pass through the hydrosystem and therefore is presently impractical to measure directly. There are a number of reasons why delayed mortality would be associated with FCRPS development and operation. Specific impacts from the FCRPS have been identified as possible causes of delayed mortality in the literature, such as injuries or stress from migration through juvenile bypass systems, turbines, or spill at dams; stress or transmission of disease resulting from concentration of fish in bypass systems or transportation barges; changes to migration rates and timing; depletion of energy reserves from prolonged migration; and altered conditions in the estuary and plume as a result of FCRPS construction or operation (Bottom et al. 2001; Williams 2001; Budy et al. 2002; Congleton et al. 2002; Williams et al. 2005; Schreck et al. 2006). At the same time that there were impacts from the hydrosystem, there were also changes in oceanic and climatic conditions (Francis and Mantua 2003) as well as possible hatchery and other freshwater habitat effects. These potential impacts make it difficult to

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reach consensus on the relative influence of different factors in elevating mortality levels. However, a number of reviews have found evidence in various forms that links delayed mortality to the construction and operation of the FCRPS (Budy et al. 2002; Marmorek et al. 2004; Muir et al. 2006).

The agencies that operate the FCRPS and a National Marine Fisheries Service study (Williams et al. 2005) have hypothesized that delayed mortality has been low or nonexistent in recent years, when oceanic conditions were favorable to high ocean survival rates. Williams et al. (2005) asserted that hydrosystem-related delayed mortality under the oceanic conditions that juveniles experienced in 1999 and 2000 would not prevent populations from returning to abundance levels observed before completion of the hydrosystem.

In response to the salmon declines and ESA listings in the Snake and Columbia rivers, the region has embarked on one of the most costly and administratively complex fishery restoration programs in the world (NRC 1996). The large-scale analytical processes described above address the policy and management question of whether adequate life cycle or smolt-to-adult survival can be achieved without breaching Snake River dams (Peters and Marmorek 2001). More recent salmon recovery policy and decisions for the Snake and Columbia rivers emphasize tributary habitat restoration actions to improve survival in the smolt-to-adult life stage to offset mortality caused by migration through the hydrosystem and variable oceanic conditions (NMFS 2000, 2004; NPCC 2003). The effectiveness of these complex and costly restoration strategies will be determined, ultimately, by the extent to which direct and delayed hydrosystem mortality limit smolt-to-adult return rates (SARs).

In this study, we assessed whether the delayed mortality of Snake River stream-type Chinook salmon decreased substantially during the recent period of favorable oceanic and climatic conditions. Because of the difficulties that presently exist for directly measuring delayed mortality, our assessment followed three steps.

First, we estimated the difference in mortality rates between Snake River populations and downriver stream-type Chinook salmon populations that migrate through fewer dams (Schaller et al. 1999; Deriso et al. 2001). These differential mortality rates were estimated, taking into consideration a common mortality pattern (common year effect) exhibited among Snake River and downriver populations. Following Deriso et al. (2001), we attributed to the FCRPS those relative shifts in productivity and survival rates that were associated in time and space with FCRPS impacts. We also evaluated other methods and data types to corroborate the estimates of differential mortality rates

between Snake River and downriver populations. We then subtracted estimates of measurable juvenile passage mortality (Berggren et al. 2005b; Williams et al. 2005) from total FCRPS mortality to estimate delayed mortality of Snake River populations (Peters and Marmorek 2001).

Second, we evaluated whether downriver population performance was a reasonable control for Snake River populations. The common year effect is a measure of the covariation of survival rates between upriver and downriver stream-type Chinook salmon in the Columbia River. Snake River and downriver stream-type Chinook salmon have similar smolt migration timing when leaving the tributaries and share common estuary and early-ocean conditions (Schaller et al. 1999; Berggren et al. 2005a). We evaluated whether the variation captured by the common year effect for Snake River and downriver populations was similar to the variation in survival rates for salmon species across a wide geographic range outside the Columbia River. We then evaluated how well the common year effect correlated with oceanic and climatic environmental variables. These assessments were also used to evaluate the validity of previous criticisms for using downriver populations as controls for Snake River population performance (Zabel and Williams 2000; Williams et al. 2005).

Last, an evaluation was performed to determine whether delayed mortality decreased and became negligible for the Snake River populations during the recent period of favorable oceanic and climatic conditions.

Methods

Spawner–recruit (SR) information was analyzed for seven Snake River spring–summer Chinook salmon populations and three lower Columbia River spring Chinook salmon populations (Figure 1) to evaluate patterns of survival rate indices and between-region similarities and differences in mortality rates from the 1950s through brood year 1998. Snake River SR data began with 1949 data for the Imnaha River, 1954 data for the Minam River, and 1957 data for the Bear Valley Creek, Marsh Creek, Sulphur Creek, Poverty Flat, and Johnson Creek populations (Schaller et al. 1999). Downriver SR data began with 1959 data for the upper main stem and North Fork John Day River and 1960 data for the Middle Fork John Day River.

All populations in the analysis are stream-type Chinook salmon (Healy 1991), producing yearling smolts that migrate seaward in the spring (primarily April and May). The Snake River populations migrate as smolts through eight dams and reservoirs, and a large portion of the smolts are collected and transported

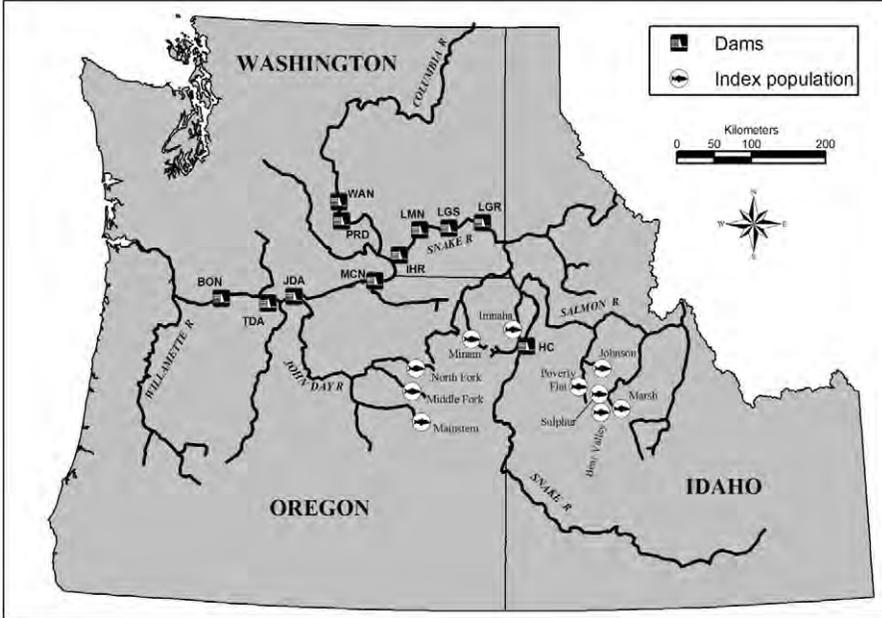


FIGURE 1.—Distribution of index populations of spring and summer Chinook salmon in the Snake and lower Columbia rivers. Main-stem dams include Bonneville (BON), the Dalles (TDA), John Day (JDA), and McNary (MCN) on the lower Columbia River and Ice Harbor (IHR), Lower Monumental (LMN), Little Goose (LGS), and Lower Granite (LGR) on the Snake River. For reference we included Priest Rapids (PRD) and Wanapum (WAN) of the upper Columbia River.

past most of the dams on barges or trucks (Figure 1). The last of these eight dams, Lower Granite Dam, was completed in 1975. The upriver and downriver populations are all interior Columbia River basin Chinook salmon and have similar life history characteristics as juveniles and adults (Schaller et al. 1999, 2000).

The seven Snake River and three downriver populations were previously the subject of intensive SR analyses through brood year 1990 (e.g., Schaller et al. 1999; Deriso et al. 2001; Peters and Marmorek 2001; Paulsen and Hinrichsen 2002). The spawners and recruits were defined and estimated according to methods in Beamesderfer et al. (1997) and Schaller et al. (1999). Spawners represented adults age 4 and older on the spawning ground; recruits were age-3 jacks and adults returning to the Columbia River.

Productivity and survival rate indices.—Productivity and survival rate indices were analyzed for different periods and populations in the Snake and lower Columbia River basin, updating the analysis of Schaller et al. (1999). We then evaluated whether productivity and survival rate indices declined more for Snake River populations than for downriver populations after hydrosystem development with the use of the updated SR data.

For each index population, SR data were classified

into two primary time periods (and a transition period) defined by FCRPS development and operations affecting the threatened Snake River populations (Schaller et al. 1999). The first period, pre-1970 brood years, was before completion of the final two Snake River dams. The second primary period, post-1974 brood years (1975–1998), was marked by initiation of mass transportation of smolts around the Snake River dams in barges and trucks and gradual passage improvement at the dams. The transition period, 1970–1974, was a period of construction and of changing operations in the Snake River that caused extremely high levels of atmospheric gas supersaturation in high-flow years (Raymond 1979) before mass transportation of smolts had begun.

Productivity and survival rate indices were estimated for pre-1970 and post-1975 periods for each index population in the Snake and lower Columbia rivers. Productivity is defined as the natural logarithm of the ratio of recruits to spawners in the absence of density-dependent mortality. The SR data can be fit to the Ricker recruitment function (Ricker 1975) with the equation

$$R = e^a S e^{-\beta S} \tag{1}$$

The a and β parameters are estimated by the \log_e transformation of equation (1). Productivity is mea-

sured as the intercept, or Ricker a . Schaller et al. (1999) found that the Ricker recruitment function provided a better fit to the first-period data than a Beverton–Holt function. Survival rate indices provide a time series of density-independent mortality estimates through deviations of observed $\log_e(R/S)$ from those predicted by the fitted stock–recruitment function for a specified time period. We would expect a temporal change in density-independent mortality, such as that imposed by hydroelectric development and operation or an oceanic regime shift, to be reflected primarily in the intercept (Ricker a) rather than in the slope (β) of the regressions. To account for nonstationarity in the recruitment functions (Hilborn and Walters 1992), we followed the Schaller et al. (1999) analysis of covariance (ANCOVA) using the SAS; SAS version 8.02 (SAS 2002) general linear model (GLM) to examine differences in the intercepts (Ricker a) of the relationship of $\log_e(R/S)$ versus S in the equation

$$\ln(R_{ij}/S_{ij}) = \tau_i + a - \beta(S_{ij} - \bar{S}_{..}) + \varepsilon_{ij}, \quad (2)$$

where τ_i is the class effect (period), a is the overall intercept, β is the overall slope, \bar{S} is the average spawners for all observations during both time periods, ε_{ij} is the normally distributed residual, i is the class (period), and j is the observation (brood year).

First, the homogeneity of slopes was tested for significant interaction between the treatment (period) and the covariate (spawners). An ANCOVA was then run to estimate the period effect on $\log_e(R/S)$, taking into account spawning level. The measure of productivity by period was estimated with $\tau_i + a$ from the ANCOVA results (equation 2). This is equivalent to the Ricker a parameter by period (assuming a common slope [β] for all periods).

We tested whether survival rate indices declined more for Snake River populations than for downriver populations in the post-1974 period. Survival rate indices are defined as the life cycle survival rate after accounting for density-dependent mortality. Using the ANCOVA fit (equation 2) to survival rate indices (SRI-1s) for pre-1970 data (Schaller et al. 1999), SRI-1s are estimated from $\log_e[(\text{observed } R/S)/(\text{predicted } R/S)]$. These SRI-1s are the residuals about the predictions of recruits per spawner based on Ricker coefficients for the pre-1970 time period. Period differences in survival rate indices were tested between population groups from the two regions with one-way classification analysis of variance (ANOVA) under the GLM procedure of SAS (SAS 2002).

Common year effect and differential mortality.—Deriso et al. (2001) evaluated alternative SR models using the same SR data set used in Schaller et al. (1999) and three additional downriver populations

(Klickitat, Warm Springs, and Wind rivers); the SR data for these populations began in 1966, 1969, and 1970, respectively. The best empirical models evaluated by Deriso et al. (2001) included an estimate of a common year effect (δ) for Snake River and downriver stream-type Chinook salmon populations. Their primary model (delta model) was

$$\ln(R_{it}/S_{it}) = (a_i + \delta_t - m_{it}) - \beta_i S_{it} + \varepsilon_{it}, \quad (3)$$

where R_{it} is the Columbia River recruitment originating from spawning in year t and population i , S_{it} is the spawners in year t and population i , a_i is the Ricker a value for population i , δ_t is the common year effect in year t , m_{it} is the total passage mortality (direct plus delayed mortality) for population i in year t , β_i is the regression slope for population i , and ε_{it} is the normally distributed process error and sampling error.

The differential mortality (μ_t for a given year t) experienced by Snake River populations relative to the downriver populations can be indirectly estimated from the delta model output for a given year t . Differential mortality is the difference between model-estimated total mortality for the Snake River populations (m_{it}) and juvenile passage mortality (M_{it}) experienced by the downriver populations (equations 4–6 in Deriso et al. 2001). Note that equation (3) estimates the same mortality rates (m_{it}) for populations (i) within a region for a given year (t) because these populations pass the same number of dams (equations 5 and 6 in Deriso et al. 2001).

We used Paulsen and Hinrichsen’s (2002) ordinary least squares (OLS) method to fit the delta model to all years of SR data updated through brood year 1998. We used the same Snake River populations as Deriso et al. (2001), but for the downriver populations we only used the three John Day River populations in these analyses because updated estimates for the other downriver populations were not available. We performed sensitivity analyses to the Deriso et al. (2001) approach by excluding the other downriver populations. We compared the μ (for convenience, the t subscript is dropped when generally referring to a differential mortality) between the OLS fit through brood years 1990 and 1998 with those reported by Deriso et al. (2001) through brood year 1990.

An analogous measure of differential mortality was calculated between Snake River and downriver populations based on the SARs of Snake River and John Day River wild stream-type Chinook salmon. The SAR data provided independent information to help identify the life stage that primarily influences the SR model estimates of μ . This analog to μ was estimated as

$$\mu_{\text{SAR},t} = -\log_e(\text{SAR}_{\text{Snake},t}/\text{SAR}_{\text{John Day},t}), \quad (4)$$

where $SAR_{Snake} = (\text{smolts arriving at the first dam encountered or Lower Granite Dam})/(\text{adult returns to Bonneville Dam})$, $SAR_{John\ Day} = (\text{smolts arriving at the first dam encountered or John Day Dam})/(\text{adult returns to Bonneville Dam})$, and t is brood year. The estimates of SAR_{Snake} and $SAR_{John\ Day}$ were available from passive integrated transponder (PIT)-tag studies for smolt migration years 2000–2004 (Berggren et al. 2006), where the John Day River PIT-tagging studies started in migration year 2000. We estimated the mean and 95% confidence interval (Ott 1977; paired-difference experiment approach) for $\mu_{SAR,t}$.

Comparison of estimates for differential mortality.—Estimates of differential mortality between Snake River and downriver populations were compared for alternative methods and time periods. We compared our updated μ estimate with the μ estimated by Deriso et al. (2001) in their primary model (equation 3). We also compared our μ estimate (mean and the 95% confidence interval) with alternative differential mortality estimates, such as (1) changes in productivity between time periods (using $\tau_1 - \tau_2$ from equation 2) and (2) regional differences in survival rate indices (average period difference of SRI-1 values for Snake River and downriver populations). The final comparison was between the differential mortality estimated from SAR ratios (equation 4) with estimates from the above SR-based methods.

Variation in survival rates.—There is considerable evidence that populations going through a steep decline (such as that caused by large bottlenecks) exhibit increased variation in survival rates (or population growth rates; Schaller et al. 1999; Morris and Doak 2002). A population's health is directly related to the performance of individuals through birth, death, and growth rates. Explicitly considering the variability in these demographic rates is critical in determining population growth and persistence (Morris and Doak 2002). Therefore, we contrasted the temporal patterns of variation in survival rates for Snake River populations with the downriver populations. We then assessed whether these patterns of variation in survival for Snake River populations were similar to those exhibited by salmon populations across a wide geographic range along the U.S. West Coast.

Using an F -test, we evaluated the change in SRI-1 variance between period 1 and period 2 for each population. We then evaluated whether survival rates for Snake River populations recently became more variable than for downriver populations.

The variances of δ and the SRI-1 for Snake River and downriver stream-type Chinook salmon populations were compared with the variances of the residuals from other salmon population groups. We obtained

residuals of Beverton–Holt SR fits for population groups of pink salmon *O. gorbuscha*, chum salmon *O. keta*, and sockeye salmon *O. nerka* for brood years 1950–1996 (Pyper et al. 2001, 2002, 2005) from R. M. Peterman and B. J. Pyper (Simon Fraser University, personal communication). We calculated the variance of the Oregon production index (OPI) for hatchery populations of coho salmon *O. kisutch* for brood years 1969–2003 from \log_e transformed SARs (Appendix B in PFMC 2005). Spawner–recruit residuals for three lower and mid-Columbia River populations of ocean-type Chinook salmon (brood years 1964–1991) were obtained from Peters et al. (1999). We standardized our SRI-1s for stream-type Chinook salmon to a mean of zero by subtracting the average residual and designated the standardized parameter as SRI-1* to graphically contrast with other populations. We used F -tests to determine differences between the variance of δ and the SRI-1s for Snake River and downriver Chinook salmon as well as population groups for the other salmon species at a significance level of 0.05.

Correlation of survival indices with environmental variables.—To evaluate whether variation in oceanic conditions influenced the survival patterns of Snake River and downriver populations similarly, we correlated the measure of salmon mortality rates in common with Snake River and downriver populations to several oceanic environmental variables that have been linked to (or hypothesized to influence) salmon survival. We also correlated SRI-1 values for Snake River and downriver populations with these oceanic and climatic environmental variables to determine whether there was independent support for a common influence on survival from oceanic conditions on these populations. These included Pacific decadal oscillation (PDO), regional sea surface temperature (SST) conditions, and upwelling indices. All correlations corresponded to the year of ocean entry (brood year + 2) for stream-type Chinook salmon.

The PDO is a large-scale measure of SST variability. We correlated δ s and SRI-1s with the winter PDO (December–February average before smolt out-migration) and summer PDO (June–August average after out-migration), consistent with Hare and Mantua (2000), as well as the PDO during smolt out-migration (April–May). The PDO data were from updated standardized values of the PDO index derived as the leading principal component of monthly SST anomalies in the North Pacific Ocean (Mantua et al. 1997). The PDO indices were obtained from the Joint Institute for the Study of the Atmosphere and Ocean Web site: jisao.washington.edu/pdo/PDO.latest.

Mueter et al. (2005) found that regional averages of SSTs were better predictors of survival rates across a

wide geographic range than large-scale measures of SST variability such as the PDO. We correlated δs and SRI-1s with the monthly SST anomalies at three latitudes: 41, 45, and 47°N. The SST values were obtained from the National Oceanic and Atmospheric Administration (NOAA; nomad2.ncep.noaa.gov/upwelling_data/).

Upwelling indices have also been linked to ocean survival for Columbia River stream-type Chinook salmon (Scheuerell and Williams 2005) and Oregon coastal coho salmon (Nickelson 1986). We correlated δs and SRI-1s with the monthly upwelling anomalies at three latitudes: 42, 45, and 48°N. Upwelling indices were obtained from the NOAA Pacific Fisheries Environmental Laboratory (www.pfeg.noaa.gov/products/PFEL/modeled/indices/upwelling/upwelling.html).

Direct and delayed mortality.—Past decision analysis showed that hypotheses related to the cause of mortality in the estuary and ocean life stages (either delayed hydrosystem mortality or “extra” mortality unrelated to the dams) had the most influence on projected outcomes of actions to recover Snake River stream-type Chinook salmon populations (Peters and Marmorek 2001). In light of recently increased recruitments, improved oceanic conditions, and empirical estimates of juvenile passage mortality, we tested the hypothesis that delayed hydrosystem mortality substantially decreased with improved oceanic conditions.

Retrospective juvenile passage modeling (Peters and Marmorek 2001) generated historical estimates (for brood years 1952–1990) of four parameters related to the passage of smolts through the migration corridor: (1) the direct passage survival rate (e^{-M} , where M is the direct mortality rate through the migration corridor) measured from the top of the reservoir of the first dam encountered (Lower Granite since 1975) to below the last dam (Bonneville), including transportation; (2) the survival rate of in-river smolts from the head of Lower Granite reservoir to below Bonneville Dam (V_c); (3) the proportion of smolts arriving below Bonneville Dam that were transported (P_{bt}); and (4) the estuary and ocean survival rate of transported fish relative to that of in-river fish (this ratio is called D). The ratio D is estimated as

$$D = (\text{SAR}_t/\text{SAR}_i)/(V_c/V_t), \quad (5)$$

where SAR_t is the smolt-to-adult survival rate for groups transported from the point of collection and placement in a barge (or truck) back to that point as adults, SAR_i is the smolt-to-adult survival rate of in-river migrants back to that point as adults, V_t is the survival rate of transported fish in the barge (assumed

to be 0.98) times in-river survival to the point of collection and transport, and V_c is the survival rate of in-river fish from the top of the hydrosystem to below Bonneville Dam.

The juvenile passage parameters are used to estimate system survival (ω), defined as the number of in-river-equivalent smolts below Bonneville Dam (i.e., adjusting for the relative estuary and ocean survival of transported fish) divided by the population at the head of the first reservoir. System survival (ω) is calculated as

$$\omega = e^{-M}(\text{DP}_{bt} + 1 - P_{bt}). \quad (6)$$

From the four passage parameters and m_{ti} from equation (3), we can derive an estimate of the post-Bonneville survival factor for nontransported smolts, λ_n , which is an estuary and ocean survival rate of the in-river fish after accounting for a common year effect that is estimated as

$$\lambda_n = e^{-m - \log_e(\omega)}, \quad (7)$$

where m is defined in equation (3; see the appendix in Peters and Marmorek 2001 for details). Delayed mortality is defined as $1 - \lambda_n$.

Wild Chinook salmon PIT-tag studies provided empirical estimates for V_c , P_{bt} , and D in brood years 1991–1998 (Berggren et al. 2005b). Estimates of total direct mortality, M , also included survival through the Lower Granite Dam pool (Williams et al. 2005). Before brood year 1991, partitioning estimates of m_{ti} into direct and delayed mortality components required the use of passage models for V_c and P_{bt} (Peters and Marmorek 2001), coupled with use of the brood year 1992–1998 average D -value (0.53; Berggren et al. 2005b) for all years before brood year 1992. Input values for M , P_{bt} , and D are shown in the appendix.

We evaluated whether the level of delayed mortality was significant in years with better-than-average oceanic or climatic conditions (positive common year effect) with a two-tailed t -test to determine whether 95% of the values were greater than a 10% mortality rate. In other words, we evaluated whether the delayed mortality of in-river migrants became negligibly small when oceanic or climatic conditions improved.

Results

Productivity and Survival Rate Indices

Using all of the brood years (including updated brood years 1991–1998), productivity declined significantly from period one to period two for all but two populations (Poverty Flat and Middle Fork John Day River). However, declines were substantially greater for Snake River populations relative to downriver populations from the first to the second period (average

TABLE 1.—Analysis of covariance results for Ricker recruitment functions that used period (treatment) and spawners (covariate) for stream-type Chinook salmon index populations from the Snake River and downriver (lower Columbia River) regions, brood years 1949–1998. See equations (1) and (2) for variable definitions.

Regions and subbasin	Index stock	Intercept		$\tau_1 - \tau_2$	$H_0: \tau_1 = \tau_2$			$H_0: \beta \leq 0$		P (homogeneity of slope)
		$\tau_1 + a$ (pre-1970)	$\tau_2 + a$ (post-1974)		P	SE(β)	Slope (β)	P	R^2	
Snake River										
Middle Fork Salmon	Bear Valley	3.8606	1.2113	2.6493	0.0017	0.7789	0.001608	0.0029	0.25	0.1065
	Marsh	3.7044	0.8559	2.8486	0.0001	0.6260	0.002876	0.0016	0.39	0.1030
	Sulphur	3.5181	0.9034	2.6147	0.0001	0.5573	0.003760	0.0005	0.42	0.4271
South Fork Salmon	Poverty	1.4073	0.6043	0.8030	0.0661	0.4224	0.000378	0.0630	0.10	0.0494
	Johnson	2.0160	0.7533	1.2628	0.0050	0.4211	0.001847	0.0139	0.21	0.7732
Imnaha	Main stem	2.0356	0.5396	1.4980	0.0001	0.2383	0.000657	0.0002	0.51	0.5587
Grande Ronde	Minam	2.8082	0.9332	1.8751	0.0001	0.4158	0.002484	0.0003	0.38	0.0058
Downriver										
John Day	Main stem	2.0414	1.3558	0.6856	0.0217	0.2842	0.002085	0.0017	0.43	0.0652
	Middle Fork	1.9637	1.5207	0.4430	0.2361	0.3667	0.002216	0.0005	0.43	0.0389
	North Fork	2.7330	1.4518	1.2812	0.0001	0.2409	0.000764	0	0.56	0.7410

difference between τ_1 and τ_2 between regions = 1.13; Table 1).

The pattern of survival rates as measured by SRI-1s for Snake River populations exhibited a marked decline in the post-1974 brood years. Snake River survival rates for the 1991–1998 brood years continued to remain below those observed in the pre-1970 period (Figure 2A). Survival rates of downriver populations showed a smaller decline and returned to the level observed in the pre-1970 period for the most recent brood years (Figure 2B). Survival rates declined significantly more for Snake River populations than for downriver populations ($F = 45.39$; $P < 0.0001$).

Common Year Effect and Differential Mortality

Estimates of the common year effect (δ) ranged from -1.89 to 1.49 for brood years 1952–1998 (Figure 3). The range of δ equated to changes from 15% to 444% of the long-term average density-independent survival rate (e^δ). Estimates of δ for the updated time period indicated a shift from poor oceanic or climatic conditions in 1991–1994 to good conditions in brood years 1995–1998 (Figure 3). Except for the 1991 brood year, which exhibited the strongest negative value in the full time series, updated δ estimates fell within the range observed in previous years.

The differential mortality (μ) of Snake River stream-type Chinook salmon remained high through brood year 1998 (Figure 4). Estimates of μ averaged 1.47 for brood years 1975–1998. Snake River populations survived only 23% ($e^{-\mu}$) as well as downriver populations for brood years 1975–1998. Estimates of μ for the updated brood years (1991–1998) fell well within the range of previous years (Figure 4).

Comparison of Estimates for Differential Mortality

Estimates of differential mortality ranged from 1.1 to 1.5 when different methods and time periods were used (Table 2). Our updated delta model estimate of μ of 1.47 was similar to the previous estimate made by Deriso et al. (2001). Sensitivity analysis indicated that use of only John Day River populations as downriver indicators produced a similar estimate of μ (1.42)

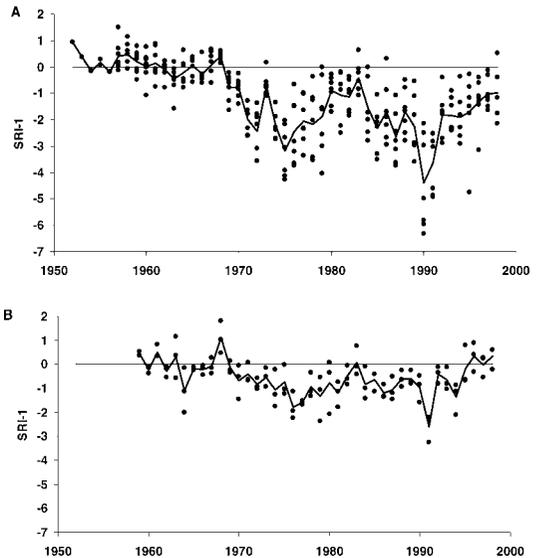


FIGURE 2.—Deviations of $\log_e\{[\text{observed recruits } \{R\}/\text{spawners } \{S\}]/[\text{predicted } R/S]\}$ of stream-type Chinook salmon from analysis of covariance fit to survival rate indices from the pre-1970 period (SRI-1s) for (A) the Snake River and (B) the downriver (lower Columbia River) regions, brood years 1952–1998. The average SRI-1 values are represented by the solid lines.

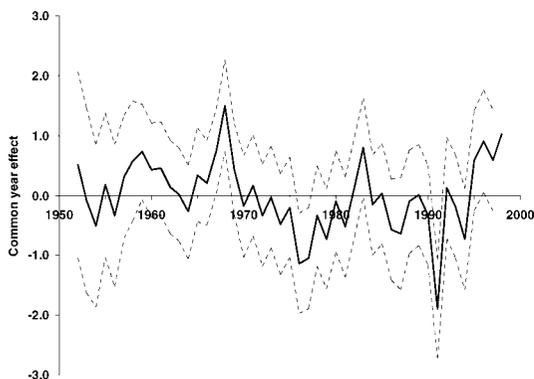


FIGURE 3.—Estimates (solid line) and 95% confidence intervals (dashed lines) of the common year effect for Snake River and downriver stream-type Chinook salmon, brood years 1952–1998.

compared with the Deriso et al. (2001) estimate (1.44) when using the same brood years (1970–1990). This result is not surprising because of the limited time series for the three additional downriver populations. Our updated estimate of μ was somewhat higher than estimates of μ from the alternative SR methods (changes in productivity between time periods and regional differences in survival rate indices). John Day River population SARs ranged from 0.025 to 0.119 for brood years 1998–2002. In contrast, Snake River population SARs ranged from 0.004 to 0.027 for brood years 1998–2002. Our estimate of μ based on the ratio of SARs was 1.48, which was similar to our SR estimates of μ from the delta model. The 95% confidence intervals for all μ estimates excluded zero, except for those based on $\tau_1 - \tau_2$ (Table 2).

Variation in Survival Rates

Survival rates became more variable (post-1974) for a majority of Snake River populations, which was in contrast to the patterns for downriver populations. This pattern was similar to the results of Schaller et al. (1999). Variance increased significantly in the second period for all Snake River populations, except Poverty Flat (Table 3). For downriver populations, only the North Fork John Day River showed a significant increase in variance in the second period.

The distribution of the common year effect appeared generally similar to the distributions of residuals for pink, chum, sockeye, coho, and ocean-type Chinook salmon population groups (Table 4; Figure 5A). The *F*-tests indicated that, compared with the variance of 40 population groups of other salmon, the variance of δ was significantly less than 19, not different from 18, and significantly greater than 3 (Table 4). The variance of δ was most similar to the variance of chum and

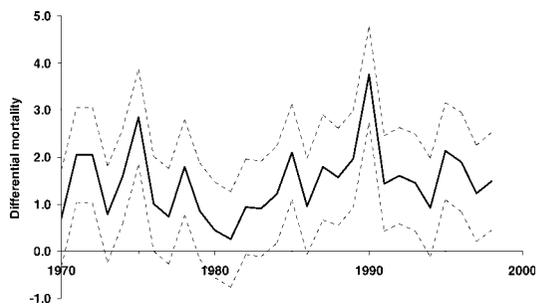


FIGURE 4.—Estimates (solid line) and 95% confidence intervals (dashed lines) of differential mortality between Snake River and downriver stream-type Chinook salmon populations, brood years 1970–1998.

sockeye salmon and less than that for most of the pink salmon population groups.

The distribution of downriver SR residuals also appeared generally similar to those of other salmon population groups (Table 4; Figure 5B). The *F*-tests indicated that, compared with the variance of 40 population groups of other salmon, the variance of John Day River SRI-1s was significantly less than 6, not different from 18, and significantly greater than 16 population groups (Table 4).

In contrast to the common year effect and downriver SR residual patterns, the Snake River SR residuals were more variable than the residuals for other salmon population groups (Table 4; Figure 5C). The Snake River SRI-1s were significantly more variable than 12 of 14 pink salmon population groups, 14 of 15 chum salmon population groups, 8 of 9 sockeye salmon population groups, the OPI for coho salmon, and Columbia River ocean-type Chinook salmon. In no cases were Snake River SR residuals significantly less variable than any population group for any other salmon species.

Correlation of Survival Rate Indices with Environmental Variables

We found modest correlations between SRI-1s and oceanic and climatic variables. The common year effect and the SRI-1s for Snake River and downriver populations correlated similarly with environmental variables. The summer PDO correlated negatively with δ (−0.37), SRI-1s for Snake River (−0.48), and SRI-1s for John Day River (−0.52), whereas the winter and spring PDO showed less correlation with SRI-1s (Figure 6C). At the latitude closest to the point of ocean entry for Columbia River populations (45°N), there were positive correlations with April upwelling (Figure 6A) and negative correlations with both October upwelling (Figure 6A) and SSTs during the

TABLE 2.—Comparison of differential mortality estimates (μ ; 95% confidence intervals in parentheses) and differential survival ($e^{-\mu}$) for stream-type Snake River Chinook salmon using alternative methods and time periods; SRI-1 = survival rate index; SAR = smolt-to-adult return rate.

Method	Brood years	Differential mortality	Differential survival	Source
Updated μ	1975–1998	1.47 (1.15–1.80)	0.23	Equation (3)
Previous μ	1970–1990	1.44 (1.09–1.79)	0.24	Deriso et al. (2001)
Updated $\tau_1 - \tau_2$	1975–1998	1.13 (–0.01–2.27)	0.32	Equation (2)
Previous $\tau_1 - \tau_2$	1975–1990	1.16 (–0.04–2.35)	0.32	Schaller et al. (1999)
Updated SRI-1	1975–1998	1.13 (0.80–1.46)	0.32	This paper
Previous SRI-1	1975–1990	1.15 (0.75–1.56)	0.32	Schaller et al. (1999)
μ_{SAR}	1998–2002	1.48 (1.10–1.85)	0.23	Equation (4)

spring of ocean entry (Figure 6B). The correlations were generally consistent across the different SRI-1s (δ and SRI-1s for Snake River and John Day River populations) and latitudes investigated.

Direct and Delayed Mortality

For brood years 1991–1998, direct mortality (M) averaged 0.20 and ranged from 0.12 to 0.32 (Table A.1). For brood years 1991–1998, differential delayed mortality of transported fish (D) averaged 0.53 and ranged from 0.34 to 1.01. The proportion of Chinook salmon transported averaged 0.91 for this time period.

Estimates of delayed mortality of in-river migrants have remained high (Figure 7). For the updated brood years 1991–1998, delayed mortality ($1 - \lambda_n$) averaged 0.81 and ranged from 0.75 to 0.90. In contrast, delayed mortality estimates for brood years 1975–1990 averaged 0.64 and ranged from 0.06 to 0.98.

There was a weak positive correlation (0.28) between the common year effect and delayed mortality of in-river migrants. Delayed mortality of in-river migrants did not appear to decrease with the climatic improvements in the late 1990s (Figure 7). For the years with a positive common year effect, 95% of the distribution of delayed mortality estimates (two-tailed t -test) was greater than 65%. In addition, for the recent years with a positive common year effect (years with

PIT tags), 95% of the distribution of delayed mortality estimates (two-tailed t -test) was greater than 70%. In other words, for the years influenced by good oceanic and climatic conditions, the majority of the distribution (95%) of estimates for delayed mortality far exceeded a negligible mortality level of 10%.

Discussion

The hypothesis that delayed mortality levels decreased and became negligible during years with more favorable oceanic and climatic conditions appears inconsistent with the patterns we observed for the common year effect and our estimates of delayed mortality for in-river migrants. The hypothesis that this source of mortality that takes place in the estuary and during early ocean residence is related to earlier hydrosystem experience during downstream migration of juvenile Snake River stream-type Chinook salmon remains a plausible explanation.

Our spatial and temporal population performance comparisons provide additional support for delayed hydrosystem mortality. In addition, more recent tagging studies have demonstrated substantial delayed mortality of transported fish relative to in-river migrants (appendix; Berggren et al. 2005b; Williams et al. 2005). Substantial evidence from the literature demonstrates numerous mechanisms that would ex-

TABLE 3.—Results of F -tests for the change in variance of Snake River and downriver (lower Columbia River) region stream-type Chinook salmon survival rate indices (SRI-1s) between periods.

Region and subbasin	Index stock	Variance of pre-1970 SRI-1 deviations	Variance of post-1974 SRI-1 deviations	F	df	P	Direction of change
Snake River							
Middle Fork Salmon	Bear Valley	0.4581	1.2547	2.74	12, 23	0.0367	+
	Marsh	0.3099	1.5513	5.01	12, 22	0.0030	+
	Sulphur	0.2258	2.1958	9.73	12, 21	0.0001	+
South Fork Salmon	Poverty	0.3712	0.7767	2.09	12, 22	0.0934	0
	Johnson	0.2775	0.8608	3.10	12, 23	0.0228	+
Imnaha	Main stem	0.1770	0.4849	2.74	17, 22	0.0191	+
Grande Ronde	Minam	0.4612	1.5945	3.46	15, 23	0.0081	+
Downriver							
John Day	Main stem	0.4846	0.5301	1.09	10, 23	0.4631	0
	Middle Fork	0.9495	0.6433	1.48	9, 23	0.2152	0
	North Fork	0.0953	0.5216	5.48	10, 23	0.0041	+

TABLE 4.—Comparison of variance of the common year effect (δ) and spawner–recruit survival residuals for Columbia River stream-type Chinook salmon and other salmon species. The columns represent the number of population groups for which the variation of Columbia River stream-type Chinook salmon was less than (<), not different from (0), or greater than (>) the variation in other salmon species.

Variable	Comparison	<	0	>
δ	Pink salmon	10	4	0
	Chum salmon	5	9	1
	Sockeye salmon	3	4	2
	Coho salmon	1	0	0
	Ocean-type Chinook salmon	0	1	0
	Total	19	18	3
SRI-1 (John Day River)	Pink salmon	5	6	3
	Chum salmon	0	7	8
	Sockeye salmon	1	4	4
	Coho salmon	0	1	0
	Ocean-type Chinook salmon	0	0	1
	Total	6	18	16
SRI-1 (Snake River)	Pink salmon	0	2	12
	Chum salmon	0	1	14
	Sockeye salmon	0	1	8
	Coho salmon	0	0	1
	Ocean-type Chinook salmon	0	0	1
	Total	0	4	36

plain delayed mortality in relation to a fish’s experience passing through the hydrosystem (Budy et al. 2002; Marmorek et al. 2004). Petrosky et al. (2001) concluded that most of the Snake River populations’ survival rate declines were in the smolt-to-adult life stage (consistent with high levels of delayed hydro-system mortality) rather than in the earlier life stage from spawner to smolt. These conclusions should provide pause for implementing costly recovery strategies for Snake River stream-type Chinook salmon populations that rely on tributary restoration actions to improve life cycle survival rates with current or slightly modified hydrosystem actions (NMFS 2004).

Our estimates for differential mortality between Snake River and downriver stream-type Chinook salmon ranged from 1.1 to 1.5; these results are consistent with the values estimated by previous studies (Schaller et al. 1999; Deriso et al. 2001). Thus, the relative survival of Snake River populations since FCRPS development continues to average one-fourth to one-third that of downriver populations, despite operational and structural changes to the hydrosystem. The estimate of differential mortality from μ_{SAR} agreed with those from the SR estimates, providing additional evidence that the relative survival difference occurred during the smolt-to-adult life stage. Wilson (2003) explored a number of lines of evidence in his analysis and also concluded that the elevated mortality (over historical levels) in the smolt-to-adult life stage (rather than in the egg-to-smolt life stage) was responsible for

the depressed status of Snake River stream-type Chinook salmon.

The delayed mortality of Snake River stream-type Chinook salmon remained high, even as oceanic and climatic conditions improved in the late 1990s. The weak correlation we observed between delayed mortality and the common year effect was positive, opposite of the hypothesis evaluated. The common year effect was evident and influential in both the updated and previous SR data. Williams et al. (2005) stated that hydrosystem-related latent mortality under the oceanic conditions that juveniles experienced in 1999 and 2000 would not prevent populations from returning to abundance levels observed before completion of the hydrosystem. Our corresponding estimates of δ for these years (brood years 1997 and 1998) were 0.59 and 1.03 (Figure 3); in other words, the density-independent survival (e^δ) was 1.8–2.8 times the long-term average. It is unlikely that highly favorable oceanic conditions experienced by smolts in 1999 and 2000 would continue indefinitely.

The relevance of upriver and downriver population comparisons in inferring common climatic influences and estimating hydrosystem impacts, including delayed mortality, was questioned by Zabel and Williams (2000), Levin and Tolimieri (2001), and Williams et al. (2005). A primary criticism was that the two population groupings may have considerable genetic differences, are from different evolutionarily significant units (ESUs), and would not respond identically to estuary and oceanic conditions. Our analyses and previous published papers (Marmorek et al. 1998; Schaller et al. 1999, 2000; Deriso et al. 2001; Budy et al. 2002) stressed that the population differences would need to explain the systematic change in relative population performance coincident with, but unrelated to, the development and operation of the hydrosystem. The relevant issue is not whether there are any genetic differences between population groupings, but whether genetic differences manifest themselves in a systematic change in population performance coincident with, but unrelated to, hydrosystem development and operation. Another criticism against using the downriver populations as a control is that the Snake River populations have different arrival timing to the estuary. Snake River and John Day River stream-type Chinook salmon have similar smolt migration timing leaving the tributaries during the spring freshet (Schaller et al. 1999; Berggren et al. 2005b). The hydrosystem delays estuary arrival timing of in-river migrants and accelerates that of transported smolts, both likely mechanisms for delayed mortality (Budy et al. 2002). Shifts in arrival-timing patterns are largely a consequence of the hydrosystem; nonetheless, the upriver and downriver populations

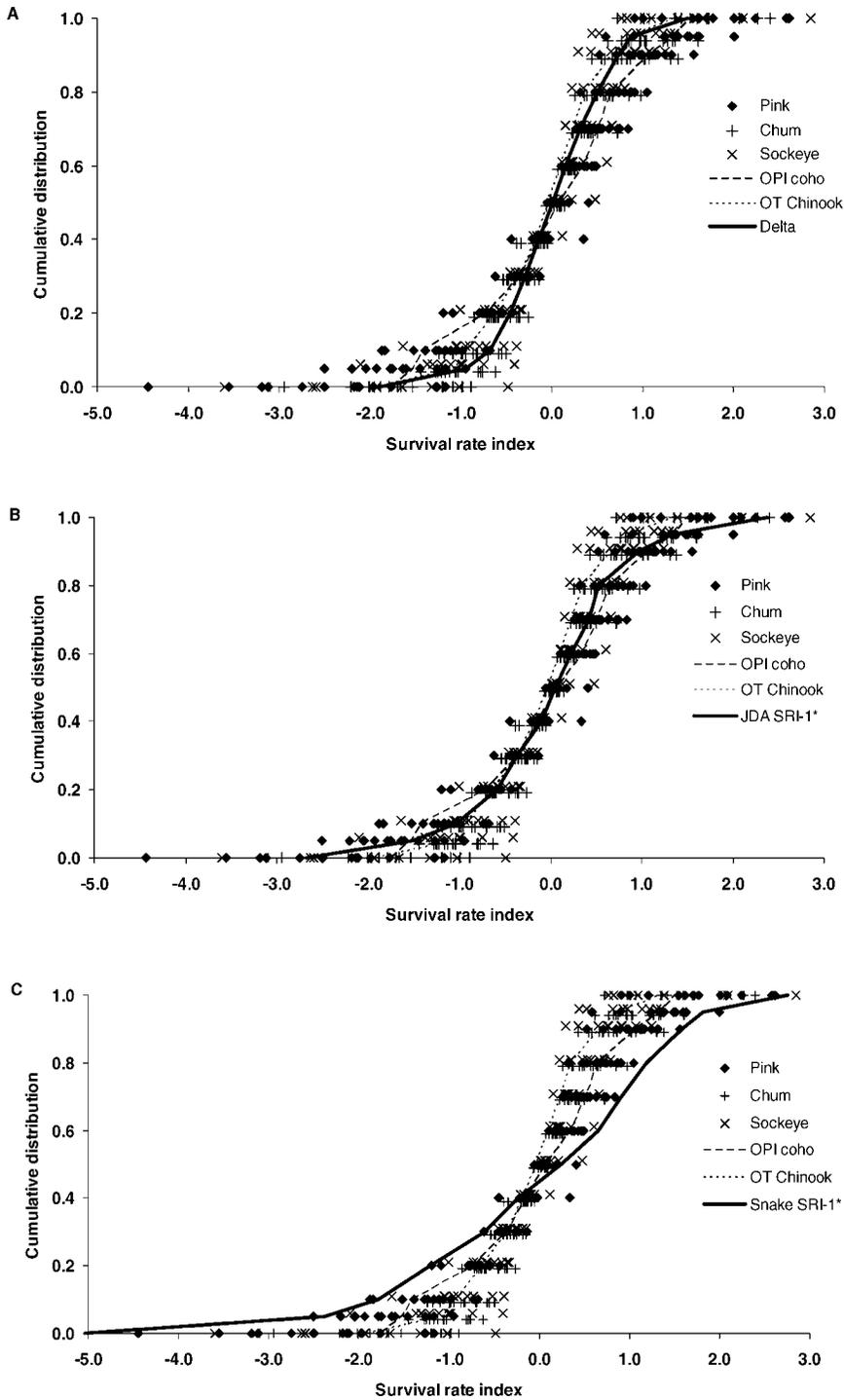


FIGURE 5.—Distributions of (A) the common year effect (delta), (B) the survival rate index (SRI-1*) for John Day River (JDA) populations, and (C) the SRI-1* for Snake River populations of stream-type Chinook salmon, compared with spawner–recruit residuals for other salmon population groups; OPI = Oregon production index for coho salmon (see text) and OT = ocean-type Chinook salmon).

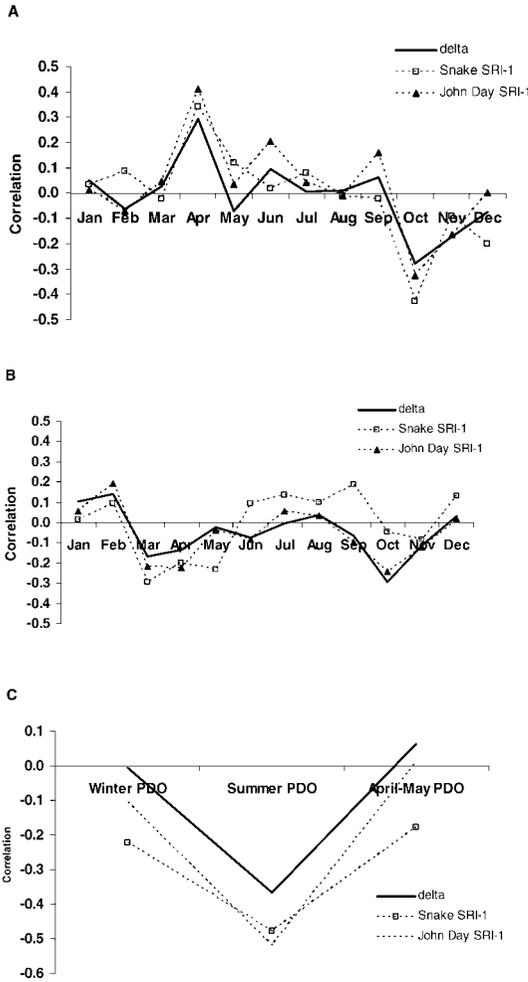


FIGURE 6.—Correlations of the common year effect (δ) and survival rate indices (SRI-1s) for John Day and Snake River stream-type Chinook salmon populations with three oceanic and climatic variables: (A) monthly upwelling anomalies at 45°N, (B) monthly sea surface temperature anomalies at 45°N, and (C) winter, summer, and April–May Pacific Decadal Oscillation (PDO) indices.

have overlapping estuary arrival timing and share common early ocean environmental conditions. These SR analyses did not assume that different ESUs (or population groupings) respond identically to environmental change. These analyses only assume that a portion of the overall survival rates for the population groups covary with common influences (e.g., estuary and early-ocean residence conditions).

The common year effect appears to be a reasonable description of the covariation of survival rates between upriver and downriver stream-type Chinook salmon in the Columbia River. Elsewhere, the covariation in survival rates within and between species has been

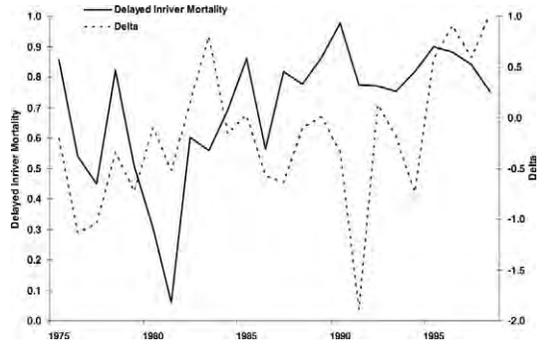


FIGURE 7.—Estimated delayed mortality of in-river migrant stream-type Chinook salmon compared with the common year effect, brood years 1975–1998, Snake and lower Columbia rivers.

described at regional scales up to 500 km from the point of ocean entry (e.g., Pyper et al. 2005). The variation in δ and in SR residuals for the downriver stream-type Chinook salmon populations fell within a similar range as that observed in pink, chum, sockeye, and coho salmon from other regions and in Columbia River ocean-type Chinook salmon (Table 4; Figure 5). In contrast, the variance in Snake River SR residuals significantly exceeded that observed in 36 out of 40 other salmon population groups. This larger variation in Snake River SR residuals relative to other salmon population groups is consistent with the large and variable mortality impacts caused by hydrosystem development and operation (Schaller et al. 1999). This larger variation in survival rates for Snake River populations has a critical impact on determining population growth rate and persistence (Morris and Doak 2002).

The common year effect and survival rate indices for Snake River and John Day River populations responded in a similar manner to oceanic and climatic variables. Our findings support previous conclusions that survival rates of salmon populations are influenced by broad-scale and local oceanic environmental conditions. These findings that the common year effect is positively correlated with the April upwelling index and negatively correlated with the October upwelling index are consistent with Scheuerell and Williams' (2005) correlations with SARs. This provides additional support that the common year effect is a reasonable index of oceanic conditions. However, survival rate indices for Snake River stream-type Chinook salmon populations were more variable than for other populations and considerably lower than for downriver populations. These patterns of survival are also consistent with the hypotheses of large mortality impacts caused by hydrosystem development and

operation, which are in addition to environmental variation.

Several Columbia River stream-type Chinook salmon populations and salmon population groups from other regions have exhibited increases in abundance since the late 1990s (BRT 2003; NMFS 2004; Good et al. 2005). While recognizing the positive trends, the West Coast Biological Review Team (BRT 2003) questioned how well the populations may fare in the future during periods of poor ocean survival combined with impacts in earlier life stages. Indeed, the 2005 and 2006 returns of Columbia River stream-type Chinook salmon were well below the recent average (see the Fish Passage Center Web site, <http://www.fpc.org/>), indicating poor ocean survival in 2003–2004. It is unknown how long poor climatic conditions may persist. Previous assessments (Peters and Marmorek 2001) indicated high risk for Snake River stream-type Chinook salmon during unfavorable climatic periods; global climate change will probably exacerbate these risks (Francis and Mantua 2003).

If both transported and in-river migrants experience substantial delayed mortality and the common year effect reasonably portrays the Snake River population's response to oceanic and climatic variation, as our results indicate, the risk to the persistence of Snake River stream-type Chinook salmon populations remains high. Recovery strategies must reduce both the direct and delayed components of hydrosystem mortality, regardless of the actions taken at other life stages.

Acknowledgments

We thank Randall Peterman and Brian Pyper for pink, chum, and sockeye salmon SR residual information, Eric Tinus for Oregon stream-type Chinook salmon updated SR data, and Joe Skalicky for creating the map. We would also like to recognize all of the efforts from the biologists of the Idaho Department of Fish and Game and the Oregon Department of Fish and Wildlife for collecting the spawning ground data. We greatly appreciate the reviews and comments of Don Anglin, Phaedra Budy, Margaret Filardo, Paul Wilson, and three anonymous reviewers. The findings and conclusions in this manuscript are those of the authors and do not necessarily represent the views of the U.S. Fish and Wildlife Service.

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Appendix: Input Data

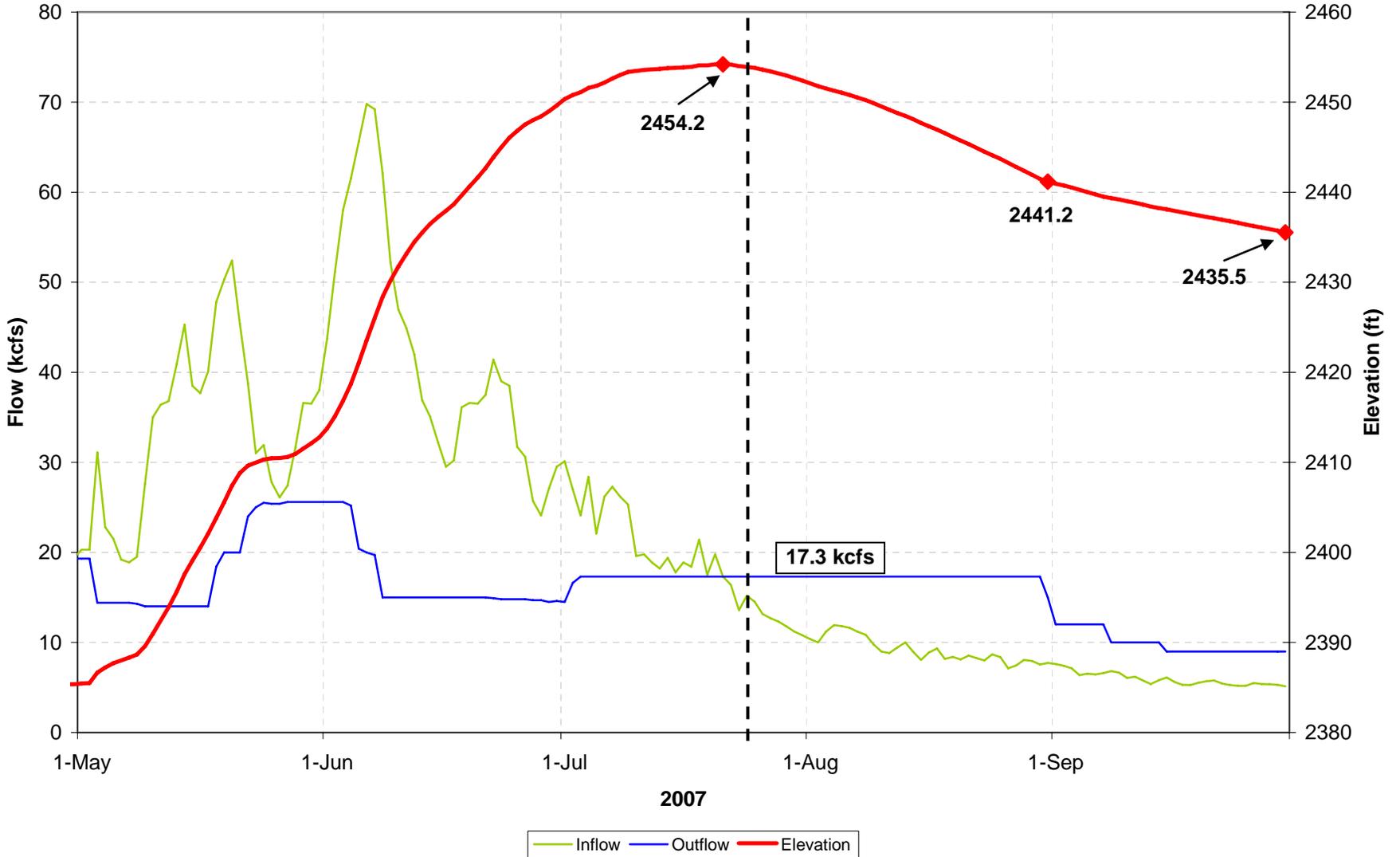
TABLE A.1.—Input data for estimating delayed mortality ($1-\lambda_n$) for Snake River stream-type Chinook salmon, brood years 1975–1998, where P_{br} is the proportion of all smolts arriving below Bonneville Dam that were transported, D is the ratio of the estuary and ocean survival rate of transported fish to that of in-river fish, and M is estimated total direct mortality.

Brood year	M	P_{br}	D
1975	1.252	0.984	0.530
1976	0.632	0.900	0.530
1977	0.514	0.936	0.530
1978	0.427	0.939	0.530
1979	0.511	0.938	0.530
1980	0.616	0.732	0.530
1981	0.738	0.703	0.530
1982	0.542	0.746	0.530
1983	0.466	0.922	0.530
1984	0.444	0.880	0.530
1985	0.492	0.958	0.530
1986	0.470	0.969	0.530
1987	0.497	0.892	0.530
1988	0.430	0.957	0.530
1989	0.339	0.942	0.530
1990	0.322	0.979	0.530
1991	0.320	0.943	0.530
1992	0.210	0.973	0.400
1993	0.159	0.939	0.390
1994	0.180	0.874	1.010
1995	0.198	0.862	0.480
1996	0.178	0.882	0.540
1997	0.121	0.912	0.780
1998	0.218	0.859	0.340

23 JULY STP INFLOW USED STARTING 7/24/07

APR-AUG VOLUME= 6.985 MAF

Libby - STP Inflow
Maintain 17.3 kcfs



Lower Snake Temperature Management

July 23, 2007

- General Observations
 - Lower Granite Pool
 - Temperature in Snake River at Lower Granite 19.2 °C (66.6 F)
 - Temperature of flow weighted inflow $T_{crit} = 18.3$ °C
 - Heat gain in LWG pool 0.9-1.5 C
 - Travel time in LWG pool 5.5 days
 - Density stratified flow / underflow reducing time of travel
 - Snake River at Anatone $Q_{5d} = 16.0$ kcf, $T_{5d} = 22.9$ °C (73.0 F)
 - Clearwater River
 - Dworshak $Q_{5d} = 9.7$ kcf, $T_{5d} = 6.2$ °C (43.2 F)
 - Orofino $Q_{5d} = 2.0$ kcf, $T_{5d} = 25.3$ °C (77.5 F)
 - Lewiston $T_{5d} = 12.0$ C (53.6 F)
 - Flow ratio $Q_{cr} / Q_{sr@lwg} = 42.2\%$

Lower Snake Temperature Management

July 23, 2007

- Forecasts

- Weather (NOAA)

- Hot Temperatures predicted for later this week at Lewiston ID

- July 24 25 26 27 28 29 30
 - Tue Wed Thu Fri Sat Sun Mon
 - Highs 89 99 103 99 100 96 95
 - Lows 58 61 66 70 66 63 64

- Hourly weather data from 2006 for July 31-August 15

- Flows

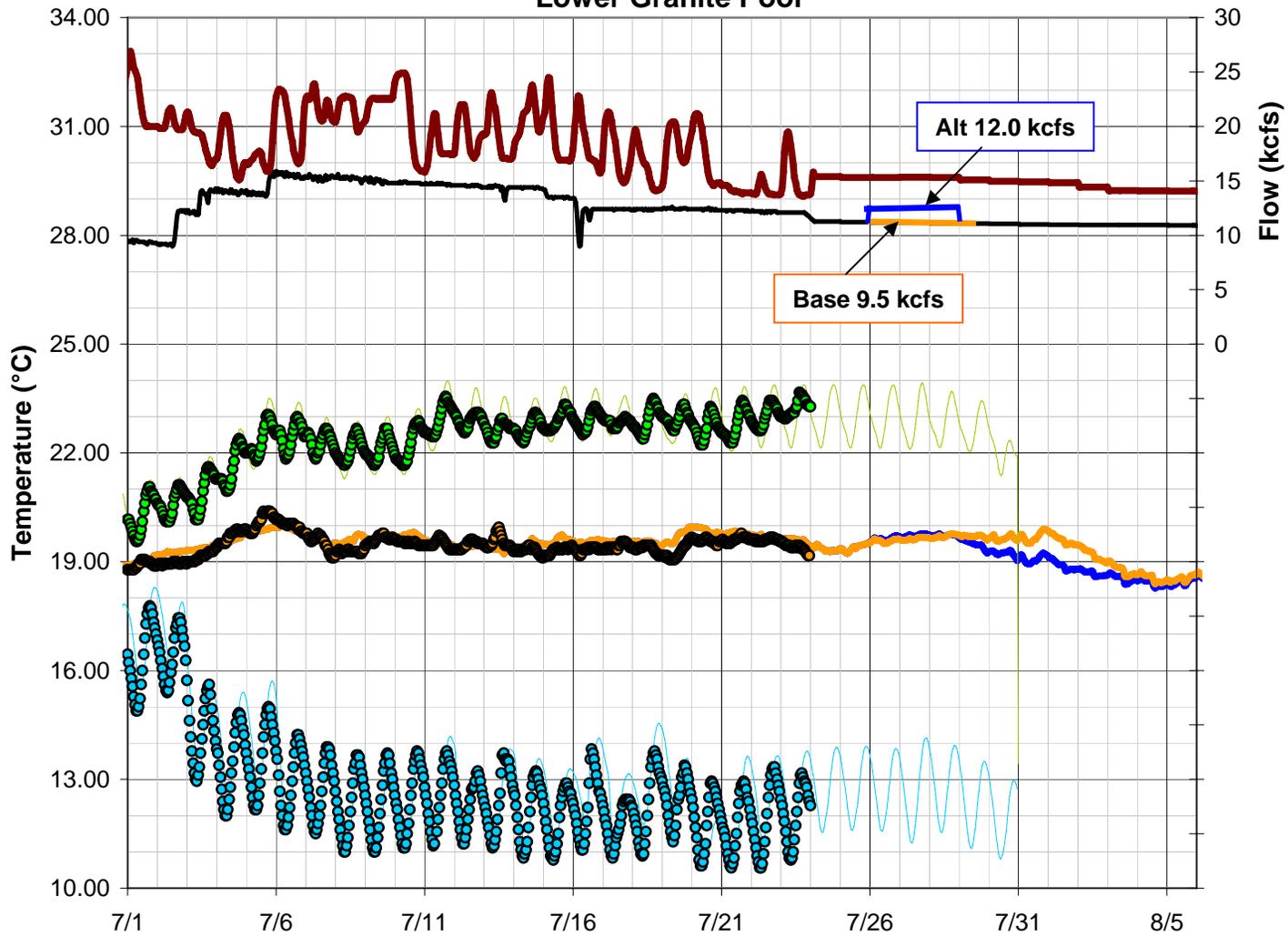
- Clearwater River at Orofino (STP) falling from 1.8 to 1.5 kcfs by July 30
 - Snake River at Anatone (STP) constant 15 kcfs through July 30
 - Dworshak Operations (STP inflow 1.1 kcfs average through Sept 1)
 - Base Plan 9.5 kcfs through July 31
 - » 39 days through August 31 – 7 days@7.3 kcfs and 32 days @ 9.5 kcfs =>1535 ft
 - Alternative Plan 9.5 kcfs through July 25, 12 kcfs July 26-28, 9.5 kcfs July 29-31
 - » 39 days through August 31 – 10 days@7.3 kcfs and 29 days @ 9.5 kcfs =>1535 ft

Lower Snake Temperature Management

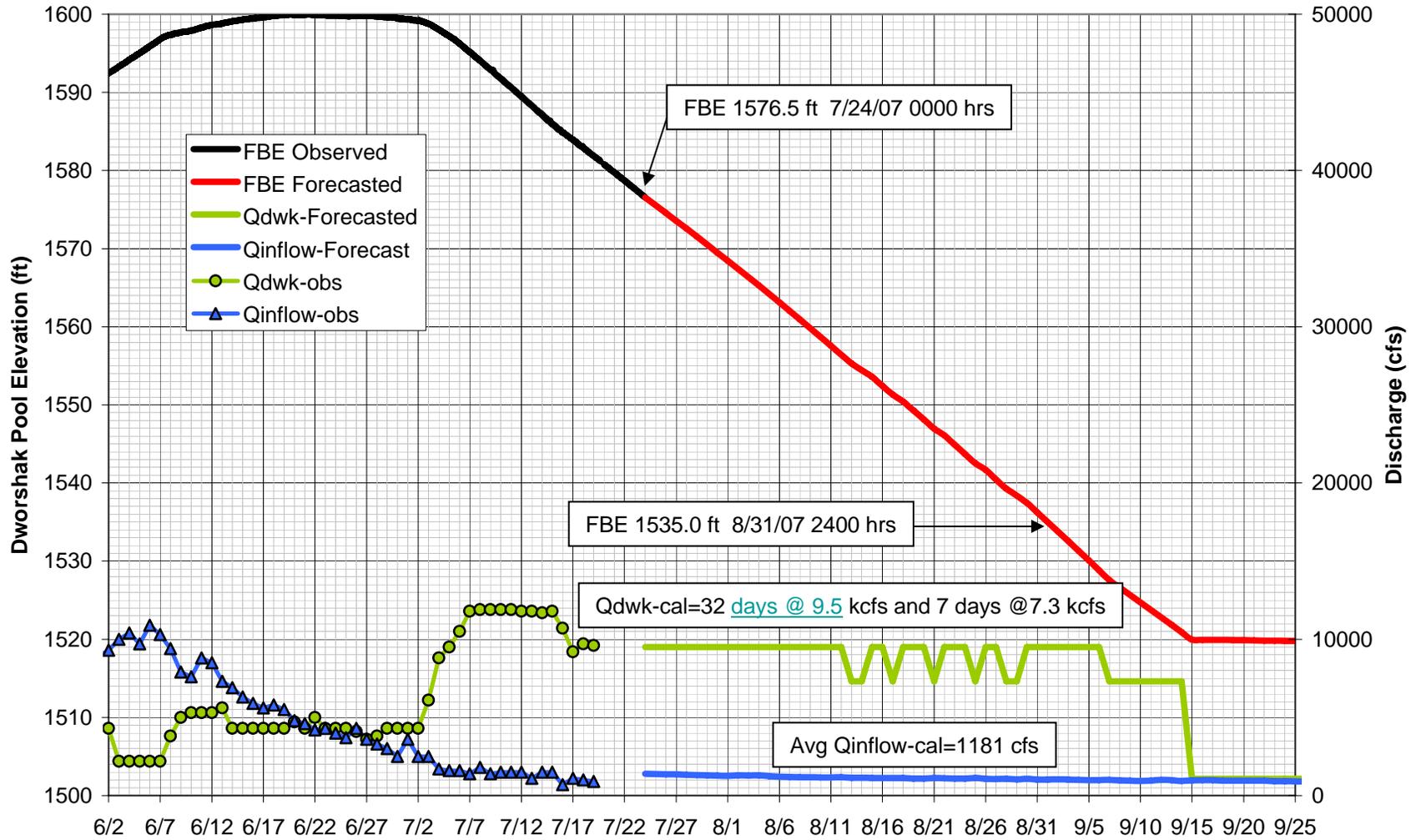
15 July 23, 2007

- Results of CEQUAL-W2 simulation (June 1-August 31 simulation)
 - Base Plan (Flat 9.5 kcfs)
 - SR Temps at LWG slight cooling to 19.3 on July 24
 - SR Temps at LWG gradually increasing to about 20 C August 1
 - SR Temps at LWG cooling trend in August
 - Alternative Plan (3 days at 12 kcfs)
 - Same as Base plan until July 29
 - Up to (.8 C) cooler temperatures during July 30-August 2
 - Warmer temperatures later in summer/fall due to elevated DWR flows now

Lower Granite Pool



2007



COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

July 25, 2007 Conference Call

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Donna Silverberg

Notes: Erin Halton

The following notes are a summary of issues that are intended to point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the "record" of the meeting, only a reminder for TMT members.

Review of Facilitator Notes / Meeting Minutes

Cathy Hlebechuk, COE, mentioned one edit to the official meeting minutes from the 7/18 TMT meeting: on page 8 it should be changed to: "The Dalles was operating within a 3' range."

Action: The Corps of Engineers will make the change and post a revised version onto the web.

Dworshak Operations

Jim Adams, COE, reported on Lower Snake River temperatures and referred TMT to several updated graphs linked to the agenda. Daily averages for Lower Granite tailwater temperatures were 66.5°; Orofino's average was 78.8°, and inflow temperatures at Anatone were averaging 73.8°. Dworshak was operating at full powerhouse (9.6-9.7 kcfs) and was discharging an average temperature of 43.1°. Cathy Hlebechuk, COE, referred TMT to Dworshak models that showed continued flows of 9.6 kcfs through 8/26-27, then dropping to 7.5 kcfs for the last few days in August would bring the project to elevation 1534.4' by 8/31.

Mike Schneider, COE, referred TMT to slides linked to the TMT agenda on the latest CEQUAL modeling for the Lower Snake River. He noted that the 7/24 temperatures at Anatone were the warmest yet this year, at 24°C, and said that Hells Canyon Dam was discharging slightly lower flow rates into the Lower Granite pool. Travel time through the Lower Granite pool had increased slightly, to 5.5 days and average flow weighted inflow temperatures to Lower Granite pool were in the range of 18.3-18.4°. Schneider noted Monday's forecast for air temperatures at Lewiston were at or above 100° for 7/26-27, but said that updated forecasts were trending downward. Kyle Dittmer, CRITFC, said that there would likely be cloud cover coming into the area during the upcoming weekend, which would likely provide some cooling. The CEQUAL modeling showed Snake River temperatures at Lower Granite Dam for the base operation of 9.5 kcfs released from Dworshak Dam will remain at or slightly below the target temperature of 68 F for the next 5-7 days.

Paul Wagner, NOAA, speaking on behalf of the Salmon Managers, thanked the COE for the modeling and said that consensus was reached at the 7/24 FPAC meeting: stay with

the full powerhouse operation range of 9.5-9.7 kcfs. TMT members present on the call: ID, OR, USFWS, Nez Perce Tribe, the COE, BOR, and BPA supported that option as well.

Action/Next Steps:

- The COE will continue to operate Dworshak at full power house, targeting temperatures of 43° to support the hatchery.
- The COE will update their CEQUAL modeling and run alternative scenarios per request and, for comparative reference, on stepping back flows in August.
- FPAC members will discuss Dworshak modeling results at their 7/31 meeting.
- Dworshak operations will be on the agenda for the scheduled 8/1 TMT conference call.

McNary Transport Update

Paul Wagner, NOAA, on behalf of the Salmon Managers, reported that there were no objections raised at the 7/24 FPAC meeting in regards to the proposed truck transport at McNary beginning on 8/16. Additionally, Bernard Klatte, COE, reported on a proposed barge transport following the passage of test fish, likely on 8/2. The docking of the barge would require the closure of the spillway, followed by spill patterns described in the Fish Operations Plan. TMT members did not raise any objections to this operation during the call.

Lower Monumental Research Equipment Installation

Ann Setter, NWW, reported on a request for an outage on 8/14 to install equipment in the Lower Monumental forebay. She added that CRITFC suggested timing the outage between 11 a.m. - 4 p.m., when fish passage is the least active. Setter also reported on a goal of tagging 2800 fish at Little Goose, to follow up on the 2006 pilot hydrology tests and see how to best facilitate fish movement through the project. This would require tagging all fish that pass at Little Goose. TMT members did not raise any objections to the outage request or the tagging request.

Bonneville Testing Outside 1%

Bernard Klatte, COE, reported on a request to operate each unit outside 1% peak efficiency at Bonneville power house 2 for a performance modeling exercise. Beginning 8/10, the testing will last 1 hr each day for 7 consecutive days, in order to test each unit one at a time. Klatte clarified that the request for the operation had been vetted through FPOM, and will be coordinated with the signatories of the 2007 Fish Operations Agreement and then reported to the court. Klatte added that the timing of the operation was due to a contract already in place. CRITFC suggested timing the outages between 11 a.m. - 4 p.m., when fish passage is the least active.

Action/Next Steps: If TMT members have any concerns, they should pass them on to their FPOM representative.

Operations Review

Reservoirs – Jim Adams, COE; John Roache, BOR; and Robyn MacKay, BPA, reported on reservoirs. Dworshak was at elevation 1575', with inflows of .7 kcfs and outflows of 9.7 out. Libby was at elevation 2454.2', with outflows of 17.3 kcfs. It was noted that with higher inflows, maintaining outflows of 17.3 kcfs will not achieve a 20' draft by the end of August; instead, the project would continue to draft into September. All TMT members supported steady outflows of 17.3 into September at the project. Hungry Horse was at elevation 3554.45' with outflows holding at 4.4 kcfs. Grand Coulee was at elevation 1287.2', with flows adjusted as needed for power and targeting an elevation of 1278' by 8/31. Because of high inflow into Canadian projects, the U.S. reach an agreement with Canada/BC Hydro to reshape flows in order to avoid a 'big spike' in discharge out of Arrow. As such, BC Hydro will maintain flows of 70 kcfs, then return to normal flow levels in late August.

Fish – Paul Wagner, NOAA, reported on juvenile fish: sub-yearling daily passage numbers were consistent at most projects, with passage numbers dropping most notably at Lower Monumental. McNary passage was in the 50,000 per day range. Cindy LeFleur, WA, reported on adult fish: Chinook passage was in the 400 per day range and summer steelhead were in the 1-3000 per day range.

Power system – Nothing other than the BC Hydro operation to report.

Water quality – Jim Adams, COE, reported one TDG exceedances over the 7/21-22 weekend at the Camas/Washougal fixed monitoring station. He noted that TDG levels had lowered and that the spill cap at Bonneville was 150.

Next TMT meeting: Conference Call on Wednesday, August 1st

Agenda items will include:

- Dworshak Operations
- Bonneville Operations Outside of 1%

SAVE the DATE: The TMT Year End Review Meeting will be held from 9-5 on November 28th, at the Robert Duncan Plaza. More details and an agenda will be shared as we approach the meeting date.

**Columbia River Regional Forum
Technical Management Team Conference Call
July 25, 2007**

1. Welcome and Introductions

Today's conference call was chaired by Cathy Hlebechuk and facilitated by Donna Silverberg, with representatives from NOAA, USFWS, BOR, BPA, COE, the Nez Perce, CRITFC, Oregon, Idaho, Montana, Washington, and FPC on the line. The following is a summary (not a verbatim transcript) of the discussion and decisions made on the call. Anyone with questions or comments about these notes should provide them to the TMT chair or bring them to the next meeting.

2. Review Meeting Minutes

The facilitator's notes for last week's meeting on July 18 were posted this morning for review, Jim Adams (COE) said.

Cathy Hlebechuk (COE) made a correction to the official minutes for June 27 under item 8, Operation of the Lower Columbia Pools for the Summer 2007 Treaty Fishery. The Dalles operates within a 3-foot range, not a 43-foot range as the minutes said.

3. Dworshak Operations

Water Temperatures: The daily average temperature of outflows at Lower Granite is around 66.5 degrees F, Adams said. Kyle Dittmer (CRITFC) noted that there are one or two instances where temperature data for Orofino gage are incorrect in the July water temperature report for the Clearwater River.

Temperatures at Orofino gage are averaging 78.8 degrees F, Adams said. Inflows coming from Anatone gage are currently about 73.8 degrees F. Outflows at Dworshak are currently 9.6 or 9.7 kcfs at full powerhouse, with two units in undershot mode and one unit in overshot mode. Dworshak outflow temperatures are currently 43.1 degrees F.

According to this week's STP inflow projections, continuing 9.5 kcfs outflows from Dworshak until Aug. 26 or 27 would put the reservoir at elevation 1,534.4 on Sept. 1 at midnight, Hlebechuk said. That sounds like a good operation, Dave Haller (Nez Perce) said.

CEQUAL Modeling: We're seeing the warmest temperatures of the year on the Snake at Anatone gage, Mike Schneider (COE) said – yesterday above 24 degrees C. Hells Canyon outflows backed off this past weekend, with higher discharges briefly over the past two days.

Temperatures of outflows at Lower Granite have been in modest decline for the past two days, Schneider said. Flow weighted inflow temperatures to Lower Granite pool have been fairly flat at 18.3 or 18.4 degrees C. Travel time is up to 5.5 days, which is longer than in the past. Consistently over the past 3 weeks, 42% of the flow into Lower Granite has been originating from the Clearwater River.

NOAA weather forecasts for Lewiston show temperatures of over 100 degrees F on July 26 and 27, with a decline over the weekend, according to this mornings' forecast. Temperatures of the unregulated flows contributing to Lower Granite inflow have been slow to climb. Schneider reminded TMT that Hells Canyon releases are a wild card.

Schneider modeled two scenarios:

1. Maintain powerhouse capacity at Dworshak through the end of this month.
2. Step up to 12 kcfs for 3 days starting tomorrow, July 26.

Starting tomorrow, a general warming trend is predicted, with temperatures projected to exceed 20 degrees C around Aug. 1, Schneider said. The 3 days of additional flows under alternative 2 indicate that outflow temperatures would drop by as much as 0.83 degrees C in response to the increased outflows from Dworshak. Schneider reminded TMT of the tradeoff involved in using up that water now.

The Salmon Managers reached consensus at yesterday's FPAC meeting to maintain full powerhouse, 9.5 to 9.7 kcfs, Paul Wagner (NOAA) said. Representatives for CRITFC, the Nez Perce, Oregon, Idaho, COE, and BOR agreed to that operation.

Adams asked, is there a desire for more modeling in preparation for a future decision? Updated modeling based on next Monday's forecasting information would be helpful at the FPAC call Tuesday morning, Wagner said.

Schneider wondered what would result from taking advantage of an opportunity to reduce load and reach elevation 1,535 feet by end August. NOAA and Idaho representatives thought considering that scenario would be fine. Schneider will include it in next week's model.

4. Libby Operations

Due to increased STP inflow projections, maintaining 17.3 kcfs outflows through August would result in less than a 20-foot draft from the pool, Adams said. The agreement was for essentially a fixed operation, meaning that any increased volume would accrue to the reservoir, Wagner said. The end result of

a higher elevation than 2,439 feet at the end of August is continuing to draft into September. Jim Litchfield (Montana) said that's a good operation.

5. McNary Transport Update

FPAC discussed this and voiced no objections to switching to truck transport on Aug. 16 at McNary, Wagner said. However, the Salmon Managers have not yet discussed switching to barge transportation when testing is complete. He asked the COE what the plan is.

There is a potential for starting fish barging after the last tagged fish are released, Bernard Klatte (COE) said. It appears that all tagged fish will have passed McNary by Aug. 1, so barging could start once the TSWs have been closed, probably around Aug. 1 or 2. Wagner said he had not heard any objections during previous discussions of this operation.

The Salmon Managers did not object to having barging start at McNary after the last tagged fish pass, then switching to truck transportation on Aug. 16.

6. Lower Monumental Research Equipment Installation

COE is requesting a 4-hour outage on Aug. 14 to install monitoring equipment in the boating restricted zone (BRZ) of Lower Monumental forebay, Ann Setter (COE) said. Prior to this call, Tom Lorz (CRITFC) agreed to the request, preferring that it be done between 11 a.m. and 4 p.m., the lowest passage time of day.

A second item: COE is requesting permission to take all collected fish in order to meet a project goal of tagging 2,800 fish. Doing so would effectively eliminate transport in September, which is the timeframe for tagging subyearling Chinook.

The purpose of the BRZ study is to look at correlations between hydraulic and weather conditions during summer in the forebay that might correlate with fish movement stopping. The study found that fish seem to be stopping in the lower half of the reservoir. The 4-hour outage is being requested to look at velocity, magnitude and direction of flows relative to RSW placement in spill bay 8, a follow-up on a pilot study last year. Idaho, NOAA, Oregon, USFWS, Washington, and CRITFC representatives did not object to the outage.

7. Bonneville Testing Outside 1 Percent

The COE Portland District is requesting to test units at powerhouse 2 outside the 1% peak efficiency limit, Klatte said, as part of a model validation exercise. The schedule for this operation – one hour per unit between 11 a.m. and 2 p.m. on Aug. 10-17 – has already been coordinated through FPOM. It is

being scheduled during fish passage season due to contractor availability. The COE will contact the signatories to the 2007 operations agreement and report it to the court, Klatte said. He advised the Salmon Managers to communicate any issues they have with this operation through their FPOM representatives.

7. Operations Review

Reservoirs: Dworshak is at elevation 1,575 feet, with inflows of 0.7 kcfs and outflows of 9.7 kcfs. Hungry Horse is at elevation 3,554.5 feet, discharging 4.4 kcfs through end August, probably to elevation 3,542 feet if the current forecast holds. Grand Coulee is at elevation 1,287.2 feet, with an Aug. 31 target elevation of 1,270 feet. Libby was discussed under agenda item 4.

Fish: Subyearlings are still showing up at all the projects, Wagner said. Passage numbers are decreasing substantially at Lower Monumental; Wagner wondered whether that was a trend or temporary. The peak of 500,000 subyearlings passed McNary on July 12, with current numbers around 50,000 per day. Most of these are Hanford hatchery fish.

Adult passage is winding down, Cindy LeFleur (Washington) said. Approximately 400 Chinook are passing each project per day, and approximately 1-3,000 summer steelhead pass each project per day.

Power: On Friday, July 20, Canada requested a reshaping of flows out of Arrow so they wouldn't have to go to 90 KCFS for a few weeks week and drop back to 50 KCFS in August, Robyn MacKay (BPA) said. So BC Hydro has upped flows to a little over 70 KCFS and will be holding that flat until sometime in late August. All water will come out of the reservoir, but there won't be a spike and drop in discharges out of Arrow Dam.

Water Quality: There were a couple of exceedances last weekend, Adams reported – 116 % at the Camas Washougal gage, but wind stripped the gas from the lower Columbia. The spill cap is 150 kcfs at Bonneville.

8. Schedule Year End Review and Next TMT Meetings

The 2007 year-end review will be all day on Nov. 28, located at the COE Portland District 3rd floor conference room. More information will follow.

The next regularly scheduled TMT meeting will be a conference call on Wednesday, Aug. 1, to discuss Dworshak operations and the COE's request to operate outside the 1% spill limit at Bonneville, as well as the standard operations review. This summary prepared by consultant and writer Pat Vivian.

Name	Affiliation
Paul Wagner	NOAA

David Wills	USFWS
John Roache	BOR
Rick Kruger	Oregon
Robyn MacKay	BPA
Tony Norris	BPA
Dan Spear	BPA
Bernard Klatte	COE
Cindy Henriksen	COE
Cathy Hlebechuk	COE
Laura Hamilton	COE
Mike Schneider	COE
Russ Kiefer	Idaho
Greg Haller	Nez Perce
Tim Heizenrader	Cascade
Barry Espenson	CBB
Greg Hoffman	COE Libby Dam
Terry Weeks	PNGC
Jeff Laufle	COE Seattle
Margaret Filardo	FPC
Mike Schneider	COE
Jim Litchfield	Montana
Ann Setter	COE
Greg Haller	Nez Perce
Kyle Dittmer	CRITFC
Cindy LeFleur	Washington
Brian Marotz	Montana

TECHNICAL MANAGEMENT TEAM

BOR : John Roache/Mary Mellema/Pat McGrane **BPA :** Robyn MacKay/Tony Norris/Scott Bettin
NOAA-F: Paul Wagner/Richard Dominigue **USFWS :** David Wills/Steve Haesecker
OR : Rick Kruger/Ron Boyce **ID :** Russ Kiefer
WDFW : Cindy LeFleur **MT :** Jim Litchfield/Brian Marotz
COE: Cathy Hlebechuk/Jim Adams/Cindy Henriksen

TMT CONFERENCE CALL

Wednesday August 1, 2007 09:00 - 12:00

1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97209-4142
Map Quest [\[Directions\]](#)

Conference call line: 503-808-5190

To check into the building, take the elevator to the 5th floor and the guard will issue you an ID badge if you need one and will take you down to the 4th floor where the meeting is. If you have NOT attended a TMT meeting in the past you will need to call ahead and let Cathy Hlebechuk (503) 808-3942, Jim Adams (503) 808-3938 or Cindy Henriksen (503) 808-3945 know, so you can be added to the TMT Visitor List and issued an ID badge. This badge may be used indefinitely. If you have attended TMT in the past you may re-use your ID badge indefinitely. If you are a federal employee you will also need to have an ID badge issued to you which can be used indefinitely.

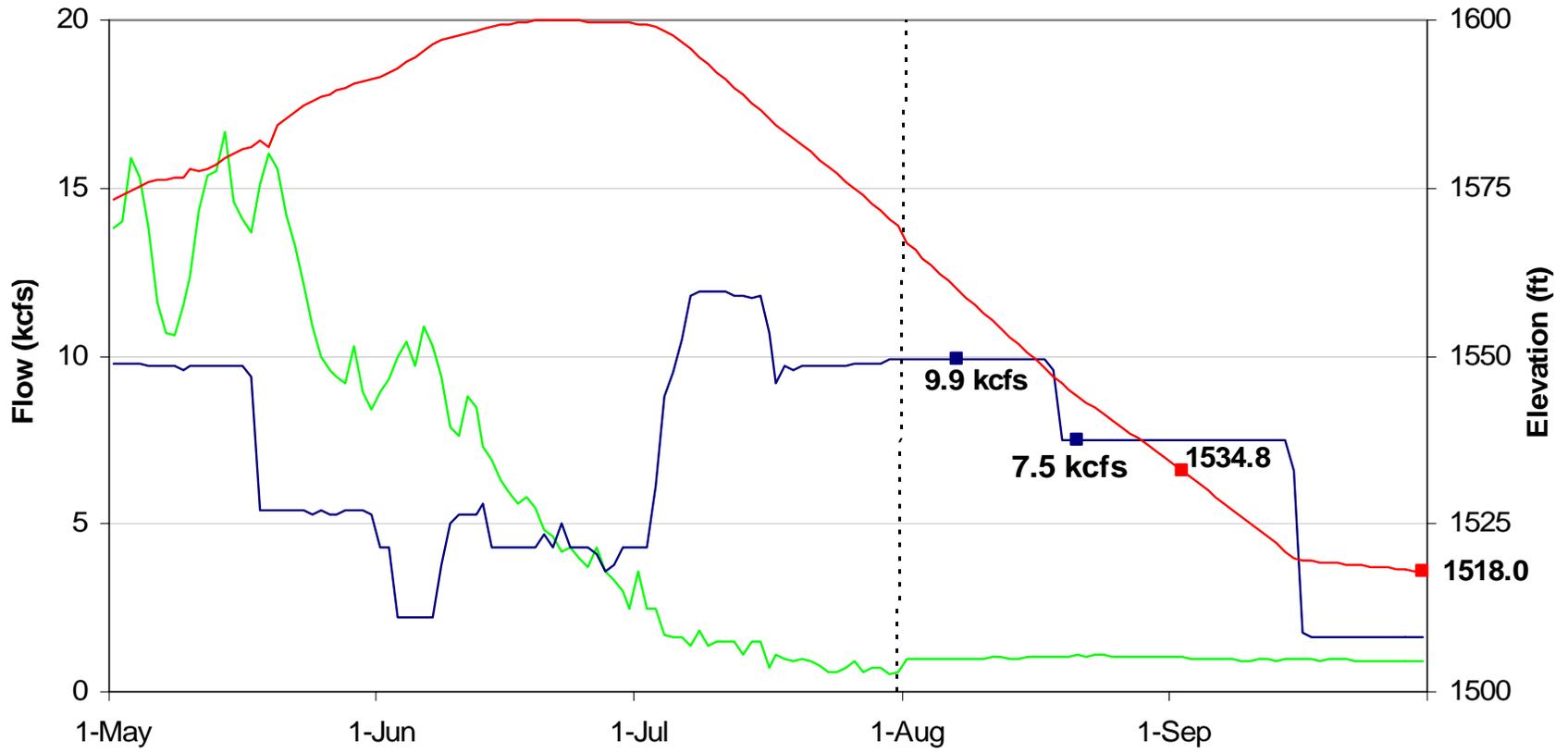
We have had disruptions on the phone because people are not hitting 'mute' after dial in.
Please MUTE your Phone

All members are encouraged to call Robin Harkless with any issues or concerns they would like to see addressed.
Please e-mail her at robin76@cnnm.net or call her at (503) 248-4703.

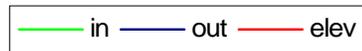
AGENDA

1. Welcome and Introductions
2. Review [\[Meeting Minutes\]](#) 
3. Lower Snake River Low Flows - Jim Adams, COE
4. Commercial Navigation Issues - Ken Ritter, Shaver Transportation
5. Dworshak Operations - All
 - a. [\[Dworshak Outflows and Lower Snake River Tailwater Temperatures in 2007\]](#) 
 - b. [\[Dworshak Water Temperatures Data\]](#) 
 - c. [\[Daily Water Temperature Reports\]](#) 
 - d. [\[Dworshak STP outflows - draft to 1535' end August\]](#) 
 - e. [\[CEQUAL Temp Modeling - Michael L. Schneider, COE\]](#) 
6. McNary Transport Update - Paul Wagner, NOAA Fisheries
7. Operations Review
 - a. Reservoirs
 - b. Fish
 - c. Power System
 - d. Water Quality - Jim Adams, COE
 1. [\[Spill Information 2007\]](#)
8. Other

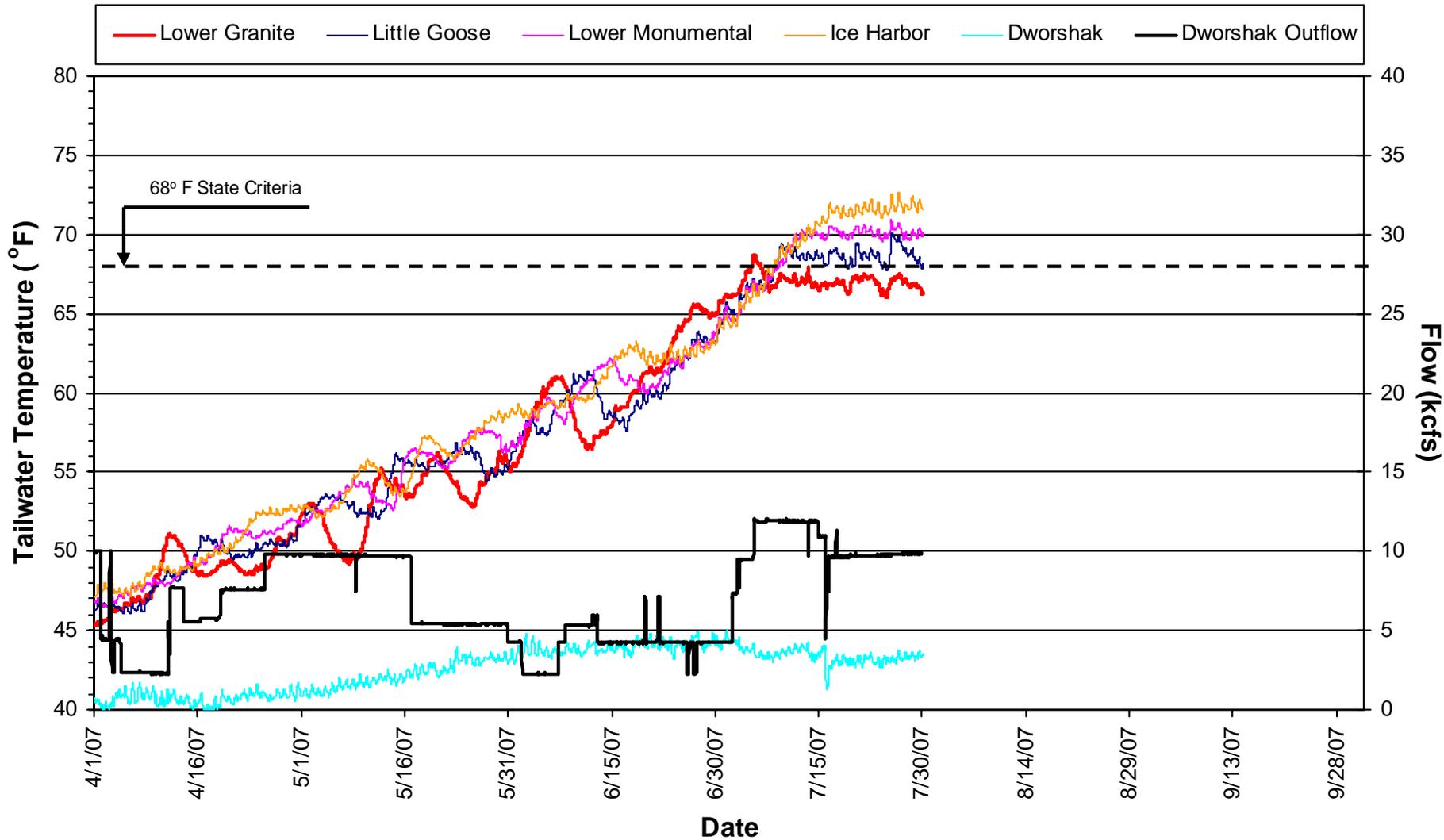
Dworshak - 30 July STP Inflow



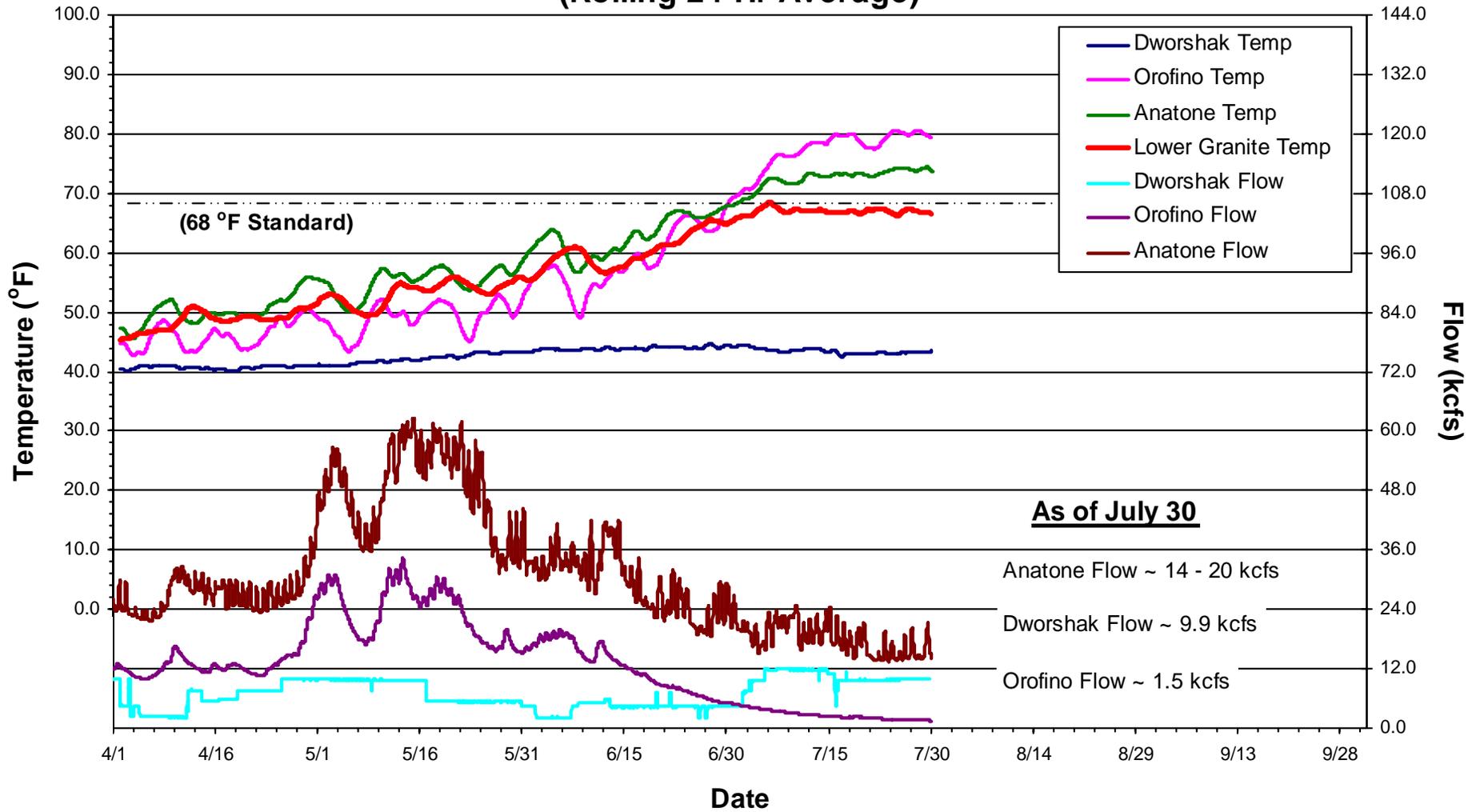
2007



Dworshak Outflows and Lower Snake River Tailwater Temperatures in 2007 (April 1 - September 30)



Lower Granite Inflows and Temperatures in 2007 (Rolling 24-Hr Average)



- Favorites
- Add...
 - Organize...
 - Fed Gov'n't
 - Financial
 - Fishing
 - Graphics
 - Journals
 - Maps
 - Media
 - Mobile Favorites
 - News-Bulletins
 - Personal
 - Personal Files
 - PUDs
 - Regional Agencies
 - Resource Agencies
 - Salmon
 - schneider
 - Search Engines
 - Spill Info
 - State Offices
 - TMT
 - Tribes
 - Water Quality Data
 - Weather
 - 10-Day Temperature ...
 - National Weather Ser...
 - NOAA - National Wea...
 - Northwest Weather R...
 - Weather Undergroun...
 - Yahoo Weather
 - Advanced Hydrologic ...
 - Camas Weather Fore...
 - Clarkston Weather Fo...
 - Eastside Wind
 - National Weather Ser...
 - Western Regional Cli...
 - Westside Wind
 - Adams
 - Club Pocket PC
 - CEFMS
 - Organizations
 - WQ Corrections Plots
 - CBT Web Messenger

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National Weather Service Forecast Office

Spokane, WA

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NEWS
ORGANIZATION

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NWS
ALL NOAA
Go

Local Forecast By
"City, St"

City, St

Go





Point Forecast: 4 Miles NW Culdesac ID
46.42N-116.73W (Elev. 1797 ft)

[En Español](#)

Last Update: 4:15 am PDT Jul 31, 2007

Forecast Valid: 8am PDT Jul 31, 2007-8pm PDT Aug 6, 2007

Forecast at a Glance

Today	Tonight	Wednesday	Wednesday Night	Thursday	Thursday Night	Friday	Friday Night	Saturday
								
Sunny	Clear	Sunny	Partly Cloudy	Hot	Slight Chc Tstms	Partly Cloudy	Partly Cloudy	Partly Cloudy
Hi 89°F	Lo 54°F	Hi 95°F	Lo 54°F	Hi 99°F	Lo 59°F	Hi 93°F	Lo 56°F	Hi 91°F

Detailed 7-day Forecast

Today: Sunny, with a high near 89. Northwest wind around 8 mph.

Tonight: Clear, with a low around 54. North wind between 3 and 7 mph.

Wednesday: Sunny, with a high near 95. North wind around 6 mph.

Wednesday Night: Partly cloudy, with a low around 54. North wind around 6 mph becoming calm.

Thursday: Partly cloudy and hot, with a high near 99. Calm wind becoming north around 6 mph.

Thursday Night: A 20 percent chance of showers and thunderstorms before 11pm. Mostly cloudy, with a low around 59.

Friday: Partly cloudy, with a high near 93.

Friday Night: Partly cloudy, with a low around 56.

Saturday: Partly cloudy, with a high near 91.

Saturday Night: Partly cloudy, with a low around 55.

Sunday: Partly cloudy, with a high near 86.

Sunday Night: Partly cloudy, with a low around 55.

Detailed Point Forecast [\[Move Down\]](#)

Click Map for Forecast



Lat/Lon: 46.42 -116.73 Elevation: 1797 ft

Current Conditions [\[Move Up\]](#)

Lewiston, Lewiston-Nez Perce County Airport
Last Update on 31 Jul 8:56 PDT

Humidity:	34 %
Wind Speed:	calm
Barometer:	30.01 in (1015.30 mb)
Dewpoint:	33°F (1°C)

62°F

USA.gov

Lower Snake Temperature Management

July 30, 2007

- General Observations

- Lower Granite Pool

- Temperature in Snake River at Lower Granite 19.3 °C (66.7 F)
 - Temperature of flow weighted inflow $T_{crit} = 17.9$ °C (64.2)
 - Heat gain in LWG pool 0.7-1.5 C
 - Travel time in LWG pool 6.2 days

- Density stratified flow / underflow reducing time of travel

- Snake River at Anatone $Q_{5d} = 15.6$ kcf, $T_{5d} = 23.3$ °C (73.9 F)

- Clearwater River

- Dworshak $Q_{5d} = 9.8$ kcf, $T_{5d} = 6.3$ °C (43.3 F)
 - Orofino $Q_{5d} = 1.6$ kcf, $T_{5d} = 26.4$ °C (79.5 F)
 - Lewiston $T_{5d} = 11.7$ C (53. F)
 - Flow ratio $Q_{cr} / Q_{sr@lwg} = 42.2\%$

Lower Snake Temperature Management

July 30, 2007

- Forecasts

- Weather (NOAA)

- Hot Temperatures predicted for later this week at Lewiston ID

- July /Aug 31 1 2 3 4 5 6
 - Tue Wed Thu Fri Sat Sun Mon
 - Highs 91 98 101 96 87 83 86
 - Lows 60 58 62 68 63 59 60

- Hourly weather data from 2006 for Aug 6-31

- Flows

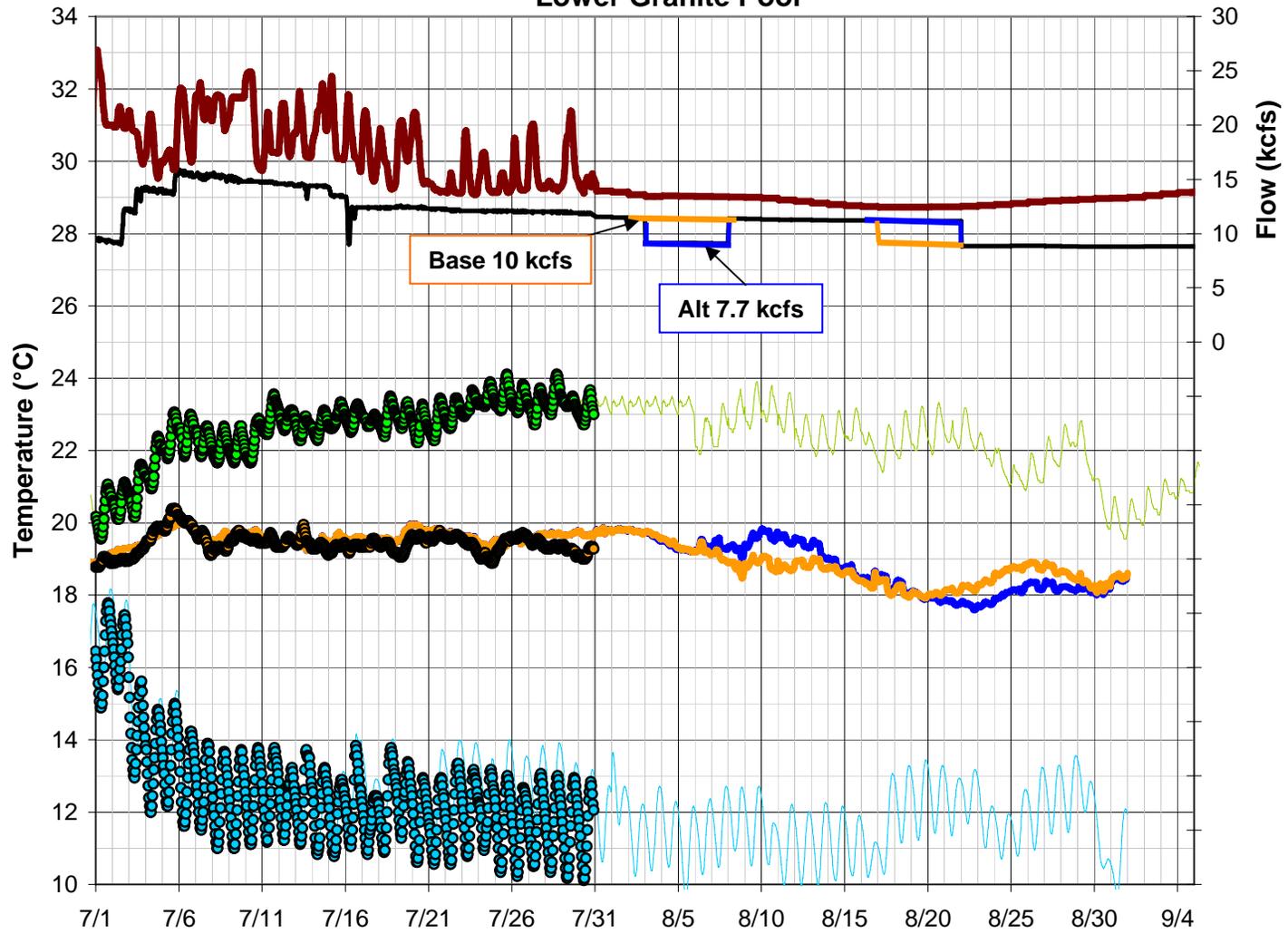
- Clearwater River at Orofino (STP) falling from 1.5 to 1.1 kcfs by Aug 31
 - Snake River at Anatone (STP) constant 13 +/- 1 kcfs through Aug
 - Dworshak Operations (average inflow 0.75 kcfs through Aug 31)
 - Base Plan Release
 - » 10.0 kcfs through Aug 15
 - » 7.7 kcfs Aug 16-31
 - Alternative Plan Release
 - » 10.0 kcfs through Aug 2,
 - » 7.7 kcfs Aug 3-7
 - » 10.0 kcfs Aug 8-20
 - » 7.7 kcfs Aug 21-31

Lower Snake Temperature Management

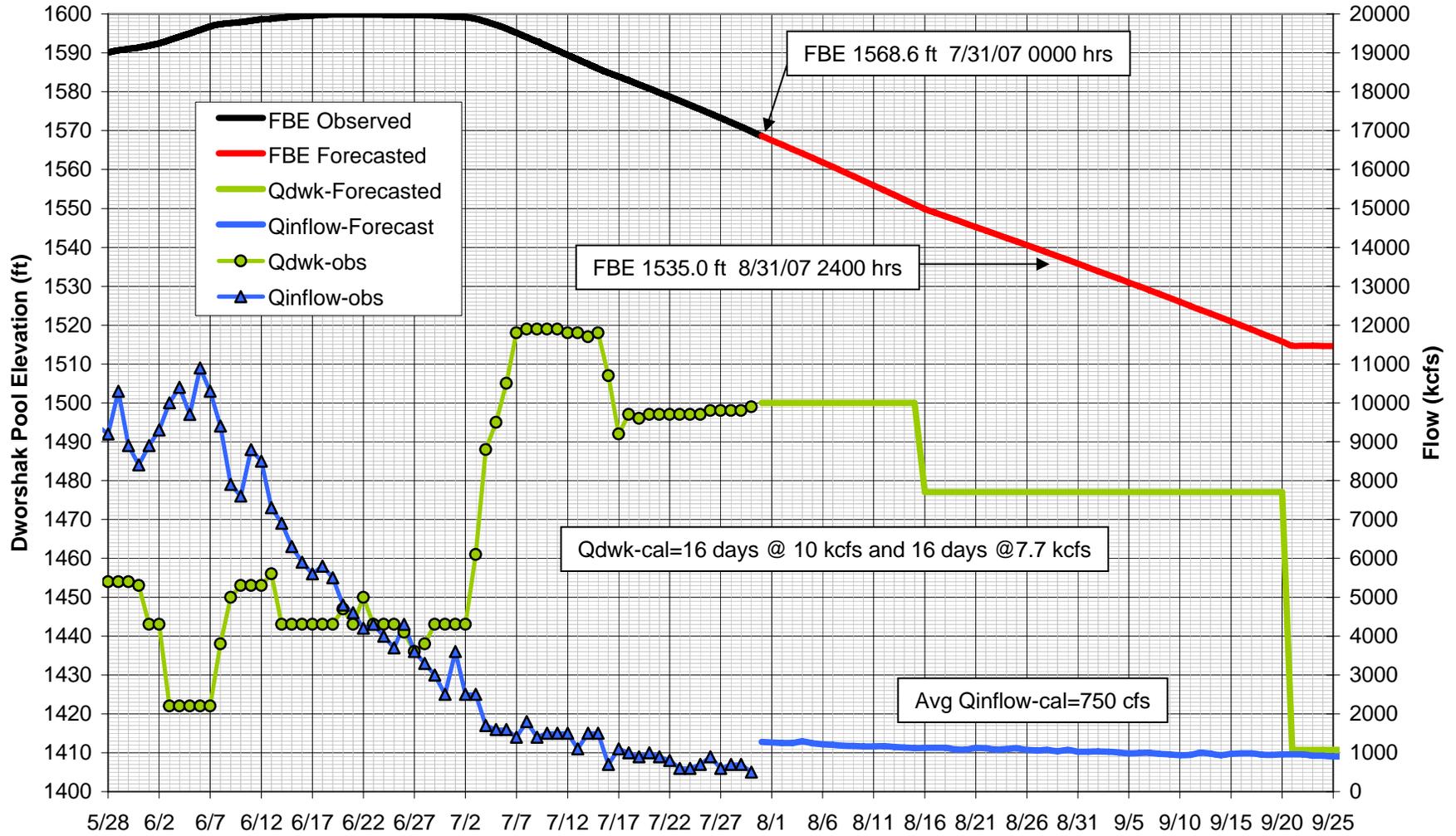
July 30, 2007

- Results of CEQUAL-W2 simulation (June 1-August 31 simulation)
 - Base Plan (10 kcfs until dropping back to 7.7 kcfs on Aug 16)
 - SR Temps at LWG remain flat for several days 19.5-20.0 C
 - SR Temps at LWG gradually decreasing beginning Aug 3
 - SR Temps at LWG cooling trend in August
 - SR Temps remain below 19 C with two unit operation
 - Alternative Plan (Stepped reduction)
 - Same as Base plan until Aug 6
 - Up to (.8 C) warmer temperatures during Aug 8-13
 - Conserved water for release later in Aug.
 - 7 day period when temperature are cooled by .3-.7 C

Lower Granite Pool



2007



COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

August 1, 2007 Conference Call

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Donna Silverberg

Notes: Erin Halton

The following notes are a summary of issues that are intended to point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the "record" of the meeting, only a reminder for TMT members.

Review of Facilitator Notes / Meeting Minutes

As of the TMT call, the facilitator summary and official meeting minutes from the 7/25 conference call had not yet been posted.

Action/Next Steps: Notes from the 7/25 TMT call will be reviewed and finalized at an upcoming TMT meeting.

Lower Snake River Low Flows

Jim Adams, COE, reported that flows in the Lower Snake River had hourly averages in the range of 24-30 kcfs. Lower Granite spill had been fluctuating between 14.2 and 18 kcfs; spill at Little Goose was consistently at 30%; spill at Lower Monumental was fluctuating between 11.8 and 17kcfs, and spill at Ice Harbor was below Fish Operations Plan (FOP) levels with the powerhouse operating at minimum generation. Adams noted that the 2007 FOP did not have spill patterns for Lower Granite below 15.2 kcfs and said that since Snake River flows were low and are expected to continue to decrease, there was a possibility that spill at Lower Granite would drop below 15.2 kcfs. He also indicated that spill patterns for Lower Granite below 15.2 kcfs were developed for use in 2006 and said the COE recommended use of these same patterns in 2007 if spill needed to be decreased to below 15.2 kcfs. Adams also noted that the 2007 FOP specified a minimum spill level at Ice Harbor of 15.2 kcfs. Due to the need to meet minimum generation requirements at Ice Harbor and the low flows in the Snake River, spill levels might need to be reduced to below 15.2 kcfs. Alternatives for this scenario are to either stop spill or to continue to spill at levels below 15.2 kcfs and follow the spill pattern table specified in the FOP. The Corps recommended the latter alternative. The following representatives present on the call provided input on the COE recommendation to follow the FOP specified spill patterns, if necessary, at Lower Granite and Ice Harbor:

- NOAA: no objection
- USFWS: no objection
- BOR: no objection
- BPA: no objection
- ID: no objection
- MT: no objection
- Nez Perce: no comment

- CRITFC: no comment

Action/Next Steps: Spill patterns described in the Fish Passage Plan and utilized in 2006 will be used again for 2007. A suggestion was made to include patterns for low flows in the 2008 Water Management Plan.

Commercial Navigation Issues

Ken Ritter, Shaver Transportation, reported on barge navigation problems in locks at McNary and Lower Granite. He acknowledged operational constraints at McNary Dam and said that there have been near-grounding incidents when spill was at the 40% of total outflow level. Ken Ritter did not have specific information for navigational difficulties at Lower Granite. The COE clarified that there needed to be more discussion time with operators at these projects, to explore a full range of options before a decision could be made. TMT members generated some preliminary options: staying near the 40% level, with reshaping patterns during barge passage; shifting to levels of 50% total outflows; and/or individual configurations for each project while balancing the need to support fish, navigation, and human health/safety.

Action/Next Steps:

- Spill flows at McNary were expected to stay near 40% until the morning of 8/3, when they will rise to 60%.
- Operational options will be explored through discussions at FPOM.
- Towboaters will contact operators as they approach McNary and Lower Granite to inform them of any navigational difficulties.
- The COE will release an issue paper and send TMT members an email describing spill patterns, as soon as they are developed.

Dworshak Operations Update

Jim Adams, COE, reported on Lower Snake River temperatures and referred TMT to several updated graphs linked to the agenda. The Lower Granite pool had stayed below the 68° criteria; flow rates at Anatone were between 14-20 kcfs, Dworshak was at 9.9 kcfs, and Orofino flows were on a downward trend and had dropped to 1.5 kcfs. Dworshak was discharging an average temperature of 43.5-44°. Adams acknowledged that temperature data used in COE modeling was from the 'as of 7/30' forecast; CRITFC suggested using more recent temperature data during TMT discussion of Dworshak operations. Russ Kiefer, ID, noted that part of the difference between the two forecasts discussed was caused by the COE inadvertently referring to the forecast for Culdesac Idaho, instead of Lewiston.

Mike Schneider, COE, referred TMT to slides linked to the TMT agenda on the latest CEQUAL modeling for the Lower Snake River. He noted that flow weighted inflows at Lower Granite had been fluctuating between 19-20° on 7/30-31, but was currently at 18°. Travel time through the Lower Granite pool had increased slightly, to 6 days. Modeling showed shaping results for the base operation: flows at full power house until mid-month, then shifting flows to 7.7 kcfs on 8/16 and reaching an elevation of 1534.8' at midnight on 8/31.

Paul Wagner, NOAA, thanked the COE for preparing modeling results each week and in time for inclusion in FPAC discussions. Salmon Managers supported staying with the base operation for the next week, and suggested revisiting Dworshak operations with a TMT conference call on 8/8.

Action/Next Steps:

- The COE will continue to operate Dworshak at full power house, with a close eye on temperatures. If Dworshak release temperatures go above 45°, other operations may be considered and discussed by TMT during or before the scheduled conference call on 8/8.
- The COE will update their CEQUAL modeling for discussion at FPAC and TMT.
- Dworshak operations will be on the agenda for the scheduled 8/1 TMT conference call.

McNary Transport Update

Paul Wagner, NOAA, on behalf of the Salmon Managers, clarified that transport at McNary would be via truck and would begin on 8/16.

Operations Review

Reservoirs – Jim Adams, COE and John Roache, BOR, reported on reservoirs. Libby was at elevation 2452.1', with inflows of 10.5 kcfs and outflows of 17.3 kcfs. Albeni Falls was at 2062.2', with current inflows of 16.2 kcfs and outflows of 11.5 kcfs. Dworshak was at elevation 1567.5', with inflows of .7 kcfs and outflows of 9.9 kcfs. Hungry Horse was at elevation 3552.47' with outflows at 4.4 kcfs and Grand Coulee was at elevation 1285', and targeting an elevation of 1278' by 8/31.

Fish – Paul Wagner, NOAA, reported on juvenile fish: sub-yearling daily passage numbers continued to decline, with Lower Monumental passage at 23 and Little Goose at 50 on 7/31. McNary passage was at 39,000 on 7/31 and steelhead in the couple hundred per day range. Wagner said adult fish passage was 'hanging in', with summer Chinook in the 300 per day range and steelhead passing Bonneville in the 1,000 per day range. Russ Kiefer, ID, gave TMT members a heads up: a significant number of steelhead smolts seemed to have stalled in the Little Goose pool this year, and he suggested that better means of detection and operations for 2008 be an issue for discussion at an upcoming TMT meeting. He added that the first two summer sockeye adults had arrived in the Stanley Basin!

Action/Next Steps: Steelhead passage at Little Goose will be on the agenda for a fall TMT meeting.

Power system – Nothing to report.

Water quality – Jim Adams, COE, had no TDG exceedances to report. He said that the spill cap at Bonneville was moved up to 160.

Bonneville Testing Outside 1%

Cindy Henriksen, COE, clarified that there would be periods of 15-minutes or less of operations outside 1% at Bonneville while the units were being started. The tests will be in the range below the 1% peak efficiency range, not above. The testing will occur once in the morning and once in the afternoon on 8/12-17, to allow for testing on each unit, including the fish units.

Next TMT meeting: Conference Call on Wednesday, August 8th

Agenda items will include:

- Dworshak Operations
- Navigational Issues Follow-up

**Columbia River Regional Forum
Technical Management Team Conference Call
Aug. 1, 2007**

1. Welcome and Introductions

Today's conference call was chaired by Jim Adams and facilitated by Donna Silverberg, with representatives from COE, USFWS, NOAA, BPA, Montana, CRITFC, BOR, the Nez Perce Tribe and FPC on the line. The following is a summary (not a verbatim transcript) of the discussion and decisions made on the call. Anyone with questions or comments about these notes should provide them to the TMT chair or bring them to the next meeting.

2. Review Meeting Minutes

The facilitator's notes for the July 25 meeting were posted this morning for review, Jim Adams (COE) said. The official minutes for that meeting have not yet been posted. The notes for the July 25 meeting will be reviewed at the next TMT meeting.

3. Lower Snake River Low Flows

Flows in the Snake River have dropped considerably, with hourly flows fluctuating from 24-30 kcfs, Adams said. At frequent intervals the projects are having to go to minimum generation status. At Lower Granite, that means spill is periodically dropping to about 14.2 kcfs. The 30% spill provision at Little Goose is being maintained. Lower Monumental flows are dropping below 17 kcfs on a regular basis.

Adams asked TMT what the COE should do if the river gets down to minimum spill range. Last year, the COE developed patterns for spill at 7.5, 6.5 and 5.5 kcfs stops at Lower Granite. He proposed submitting the same spill pattern to the project this year in case it is necessary to go below the 15.2 kcfs spill level. NOAA, USFWS, BOR, BPA, Idaho and Montana representatives voiced no objection to that plan; the Nez Perce Tribe and CRITFC representatives had no comment. Jim Litchfield (Montana) asked, if these are the low flow patterns, why not just use them as a default instead of asking TMT? The fish operations plan says that when flows get this low, the operation of the project will be discussed at TMT, Adams said. The COE thought it was better to allow TMT to discuss the issue rather than hard-wire something into the plan now that might not work later.

According to the fish operations plan, the minimum spill at Ice Harbor is 15.2 kcfs, which includes spill to the RSW and training spill. The question here, Adams said, is whether 15.2 kcfs is a minimum spill level below which spill

should be turned off? Or should the COE use spill patterns provided in the fish passage plan that go below 15.2 kcfs?

The response is the same as for Lower Granite – go to the lower numbered stops on the spill table, Wagner said. FPAC didn't go over this issue project by project, but said essentially that when flows fall to a given point, the project should continue spilling at lower volumes consistent with the spill table instead of turning spill off to allow refill. The fish passage plan contains spill patterns for stops down from 15.4 to 8.5 kcfs, David Wills (USFWS) said.

There are no outstanding issues at Lower Monumental or Little Goose in terms of minimum spill patterns, Adams said. There were no objections to following last year's plan.

4. Commercial Navigation Issues

There have been navigation problems with barges moving into and out of the navigation lock, particularly at McNary and Lower Granite dams, Adams said. Ken Ritter (Shaver Transportation) described the problem. When spill levels dip below 60%, flows cross from the south to the north side of the channel, making navigation difficult. Around 40% spill at McNary, the barges start having problems moving upstream into the navigation lock. Ritter suggested that additional spill or a flatter spill pattern might alleviate the side currents.

In prior years, tow boaters would notify the project when approaching and spill would be shut down, Paul Wagner (NOAA) recalled. He suggested going to 40% spill on a 60% spill day during the barge passage time, with the barge operators notifying operators when they're approaching the dam. That would be sufficient from the tow boaters' perspective, Ritter said. Lower Granite and Ice Harbor are the problem sites. Dave Wills suggested going to 50% flat spill, rather than alternating 40% and 60% spill for navigation purposes. Adams noted that spill at McNary doesn't actually flow through all the open bays across the channel until flows hit 81 kcfs. An alternate spill pattern might achieve a flatter spill or lower rate of discharge.

The COE and the Salmon Managers need more time to consider the options on this issue, Henriksen said. TMT agreed to discuss it in more detail on a conference call next Wednesday, Aug. 8. In the meantime, the COE will try to get an issue paper out on the subject. The RSWs might interfere with stopping spill, Henriksen said, which means a good alternative would be needed for navigation approaches and departures. In the meantime, tow boaters can call the dam operators prior to their approach.

5. Dworshak Operations

Lower Granite has stayed below the 68 degree criteria, except for early July, Adams said. The cooling effect of Dworshak operations has slowly made its way down the river to Ice Harbor, where the tailwater temperatures are 71-72 degrees F. In terms of temperature input into the Snake, Orofino gage is registering just below 80 degrees F, with flows of 14-20 kcfs out of the middle Snake, and Anatone gage, 73-74 degrees F. Flows at Orofino dropped because discharges from the Clearwater River dropped to 1.5 kcfs and continue to drop.

The weather forecast for the Spokane area shows heat increases later in the week, Adams said. Kyle Dittmer (CRITFC) noted that today's forecast for the Spokane area is 1-2 degrees hotter and suggested the COE update its weather forecast. Russ Kiefer (Idaho) noted that the COE has been using weather data for an area south of Lewiston with an elevation 1,000 feet higher than Lewiston.

The COE is losing some ability to control outflow temperatures at Dworshak, Adams said. Currently there are two units operating in undershot mode and one in overshot mode. Temperatures have slowly started rising and are now around 43.5 to 44 degrees C. Maintaining the current project configuration will cause temperatures to rise slowly. Another option is to switch the one gate that is currently in an overshot mode into undershot. which would probably yield temperatures below the 43 degree F target chosen in previous discussions.

According to the STP inflow forecast, maintaining full powerhouse as long as possible, then shutting down one small unit on Aug. 15 or 16 and going to approximately 7.5 kcfs for the remainder of the season, would take the reservoir to elevation 1,534.8 feet by the end of August. Adams said there are approximately 15 days of full powerhouse remaining and about 15 days of running two units at 7.5 kcfs.

If Dworshak inflows go up to 45 degrees C, it might be time to change gates, Wagner said, but didn't favor using 41-degree water now. Kiefer agreed that the Salmon Managers should be alerted if temperatures reach 45 degrees.

Mike Schneider (COE) presented the latest CEQUAL modeling results. During the last few days, Lower Granite tailwater temperatures have risen to almost 68 degrees F, then began to decline. The surface-oriented releases from the RSW also affect the changes seen in release temperatures. Temperatures rose within the last 24 hours, as CRITFC and Idaho representatives mentioned earlier, outpacing the data used for this model run. Schneider cautioned TMT to be aware of that when reviewing today's results. A decrease in releases from Hells Canyon Dam this past weekend bodes well for the cooling trend in the lower Snake. Schneider presented CEQUAL modeling of two conditions:

1. Maintain powerhouse capacity through Aug. 15 as per the current operation, then step back to two-unit operations on Aug.16 to meet the target elevation of 1,535 feet by end August.
2. As an alternative, step back to two-unit operations this Friday, Aug. 3, and save water for use later this month when conditions may be more severe. This alternative shows slightly warmer water temperatures by as much as 8 degrees C around Aug. 10. Using the water saved could provide up to 0.70 degrees of cooling for 2-4 days later in the month.

This information was provided to FPAC yesterday, and the decision was to maintain the current operation of 9.5 kcfs outflows through Aug. 8, then check in at that time, Wagner said. There were no objections to this operation.

6. McNary Transport Update

Last week's TMT discussion of shutting off the TSWs and initiating transport today was based on incomplete information, Paul Wagner (NOAA) said. The fish operations plan said to adopt a spill pattern that includes the bays where the TSWs are presently spilling. If the spill bays with the TSWs were turned off, no spill pattern has been developed to match that condition. It is not likely the TSWs will be turned off, and their operation creates safety issues for the transport barge operators. Instead of initiating transport, which has been on hold while the TSWs are operating, the preference is to continue spilling through the TSWs and defer transportation until Aug. 16, when truck transportation is scheduled to begin. There were no objections to this operation.

7. Operations Review

Reservoirs: Libby is at elevation 2,452.1 feet, with inflows of 10.5 kcfs and outflows of 17.3 kcfs. Albeni Falls is at elevation 2,062.2 feet, with current inflows of 16.2 kcfs and outflows of 11.5 kcfs. Dworshak is at elevation 1,567.5 feet, with inflows of 0.70 kcfs and outflows of 9.9 kcfs. Lower Granite inflows (7-day average) are around 29 kcfs. McNary flows are fluctuating greatly with a daily average ranging from 146 to 201 kcfs, and a 7-day average of 175 kcfs. Hungry Horse is at elevation 3,552.47 feet, continuing to discharge 4.4 kcfs. Grand Coulee is at elevation 1,285 feet, with an Aug. 31 target elevation of 1,278 feet.

Fish: Subyearling chinook passage indices at Lower Granite continue to decrease, from 800 fish 10 days ago to less than 200 fish now, Wagner said. Little Goose passed 600 fish 10 days ago, compared to 850 on July 31. Lower

Monumental passed 200 fish 10 days ago and 23 on July 31. McNary is still passing a steady stream of subyearlings at around 45,000 per day.

Steelhead are passing at the rate of a few thousand per day at Bonneville, moving up the river to The Dalles and beyond, Wagner said. Low probability of adult steelhead returns to Little Goose is an issue of significant concern, Kiefer said. Apparently a significant portion of the Snake River steelhead run stalled in the Little Goose pool this year. Kiefer and Wagner agreed this needs to be addressed. Kiefer requested that the issue be revived for discussion during the winter months. Meanwhile, two sockeye salmon were trapped in the Stanley basin traps, a male and a female.

Power: There is nothing to report, Scott Bettin said.

Water Quality: There have been no exceedances and flows are so low that none of the projects are near the spill cap except Bonneville, Adams said. The spill cap at Bonneville is 150 kcfs. Camas Washougal gage read TDG levels of 114.1% yesterday.

8. Bonneville Testing Outside 1 Percent

Dave Smith (COE – Bonneville Dam) gave an update on what to expect from this annual test. The 1% excursion would occur as units are started and loading up towards the 1% band. Each unit will stop as they are being loaded and would be on the low end for 15 minutes maximum, and there would be no excursions at the higher end. This means there will be no instances when an individual unit operates at maximum capacity and remains outside the 1% turbine efficiency, Henriksen said. The units will be ramped up into the operating range for just under 15 minutes per unit. They will be tested at the rate of one in the morning and one in the afternoon on beginning on Aug. 11 and will continue from August 13-17 (no testing on Aug 12.).

8. Next TMT Meetings

There will be a conference call on Aug. 8 to review commercial navigation issues and Dworshak operations/temperature control. The next regularly scheduled TMT meeting will be on Aug. 15. This summary prepared by consultant and writer Pat Vivian.

Name	Affiliation
Jim Adams	COE
Cindy Henriksen	COE
Jim Litchfield	Montana
Dave Wills	USFWS
Paul Wagner	NOAA
Ken Ritter	Shaver Transportation

Toby Jacobson
Glen Traeger
Ann Larson
Shane Scott
Kyle Dittmer
John Roache
Margaret Filardo
Bob XX
Mike Schneider
Dave Smith
Tammy Mackey
Paul Wagner
Greg Haller
Russ Kiefer
Scott Bettin

Shaver Transportation
Coral Energy
COE – Walla Walla
NWRP
CRITFC
BOR
FPC
South Atlantic division
COE
COE
COE – Bonneville Dam
NOAA
Nez Perce
Idaho
BPA

TECHNICAL MANAGEMENT TEAM

BOR : John Roache/Mary Mellema/Pat McGrane

BPA : Robyn MacKay/Tony Norris/Scott Bettin

NOAA-F: Paul Wagner/Richard Dominigue

USFWS : David Wills/Steve Haeseker

OR : Rick Kruger/Ron Boyce

ID : Russ Kiefer

WDFW : Cindy LeFleur

MT : Jim Litchfield/Brian Marotz

COE: Cathy Hlebechuk/Jim Adams/Cindy Henriksen

TMT CONFERENCE CALL

Wednesday August 8, 2007 09:00 - 12:00

1125 N.W. Couch Street, Suite 4A34

Portland, Oregon 97209-4142

Map Quest [\[Directions\]](#)

Conference call line: 503-808-5190

To check into the building, take the elevator to the 5th floor and the guard will issue you an ID badge if you need one and will take you down to the 4th floor where the meeting is. If you have NOT attended a TMT meeting in the past you will need to call ahead and let Cathy Hlebechuk (503) 808-3942, Jim Adams (503) 808-3938 or Cindy Henriksen (503) 808-3945 know, so you can be added to the TMT Visitor List and issued an ID badge. This badge may be used indefinitely. If you have attended TMT in the past you may re-use your ID badge indefinitely. If you are a federal employee you will also need to have an ID badge issued to you which can be used indefinitely.

We have had disruptions on the phone because people are not hitting 'mute' after dial in.

Please MUTE your Phone

All members are encouraged to call Robin Harkless with any issues or concerns they would like to see addressed.

Please e-mail her at robin76@cnnm.net or call her at (503) 248-4703.

AGENDA

1. Welcome and Introductions
2. Review [\[Meeting Minutes\]](#) 
3. Navigation Issues
 - a. [\[Alternative Lower Granite Spill Pattern for Navigation\]](#) 
 - b. [\[Alternative McNary Spill Pattern for Navigation\]](#) 
4. Dworshak Operations - All
 - a. Weather Forecast [\[Lewiston Weather Forecast\]](#)" 
 - b. [\[Dworshak Water Temperatures Data\]](#) 
 - c. [\[Daily Water Temperature Reports\]](#) 
 - d. Dworshak outflows - draft to 1535' end August
 - a. [\[with 500 cfs inflows\]](#)
 - b. [\[with 750 cfs inflows\]](#)
 - c. [\[with 1 kcfs inflows\]](#)
 - e. [\[CEQUAL Temp Modeling - Michael L. Schneider, COE\]](#) 
 - f. [\[Hells Canyon Flows - Actual vs Average Forecasted\]](#) 
5. Lower Monumental Equipment Installation Update
6. Operations Review
 - a. Reservoirs

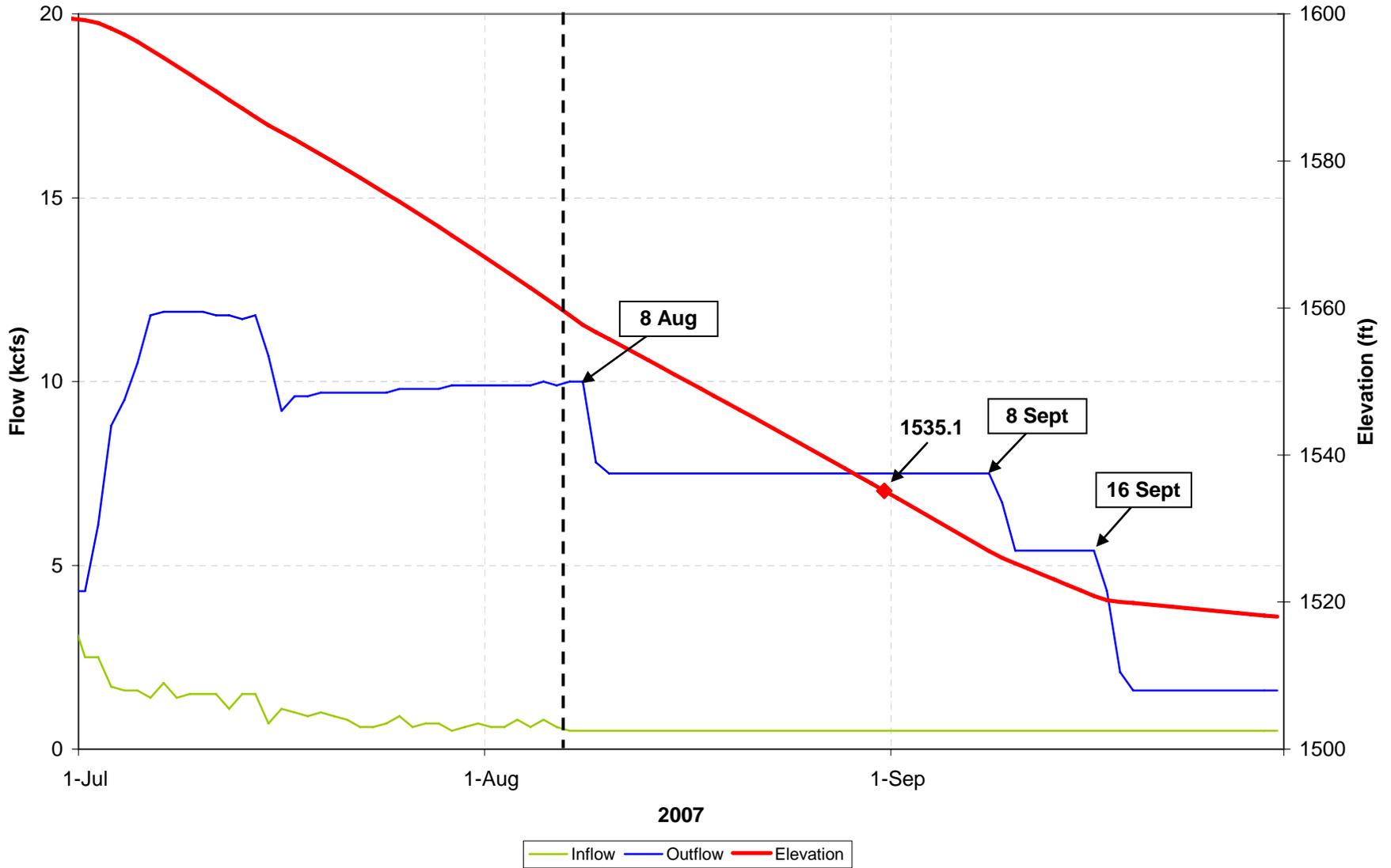
- b. Fish
 - c. Power System
 - d. Water Quality - *Jim Adams, COE*
 - 1. [\[Spill Information 2007\]](#)
7. Other
- Set agenda for next meeting - **August 15, 2007** [\[Calendar 2007\]](#) 

Questions about the meeting may be referred to [Cathy Hlebechuk](#) at (503) 808-3942 or [Jim Adams](#) at (503) 808-3938 or [Cindy Henriksen](#) at (503) 808-3945.

500 CFS INFLOW USED STARTING 8/7/07

APR-JUL VOLUME=1.800 MAF

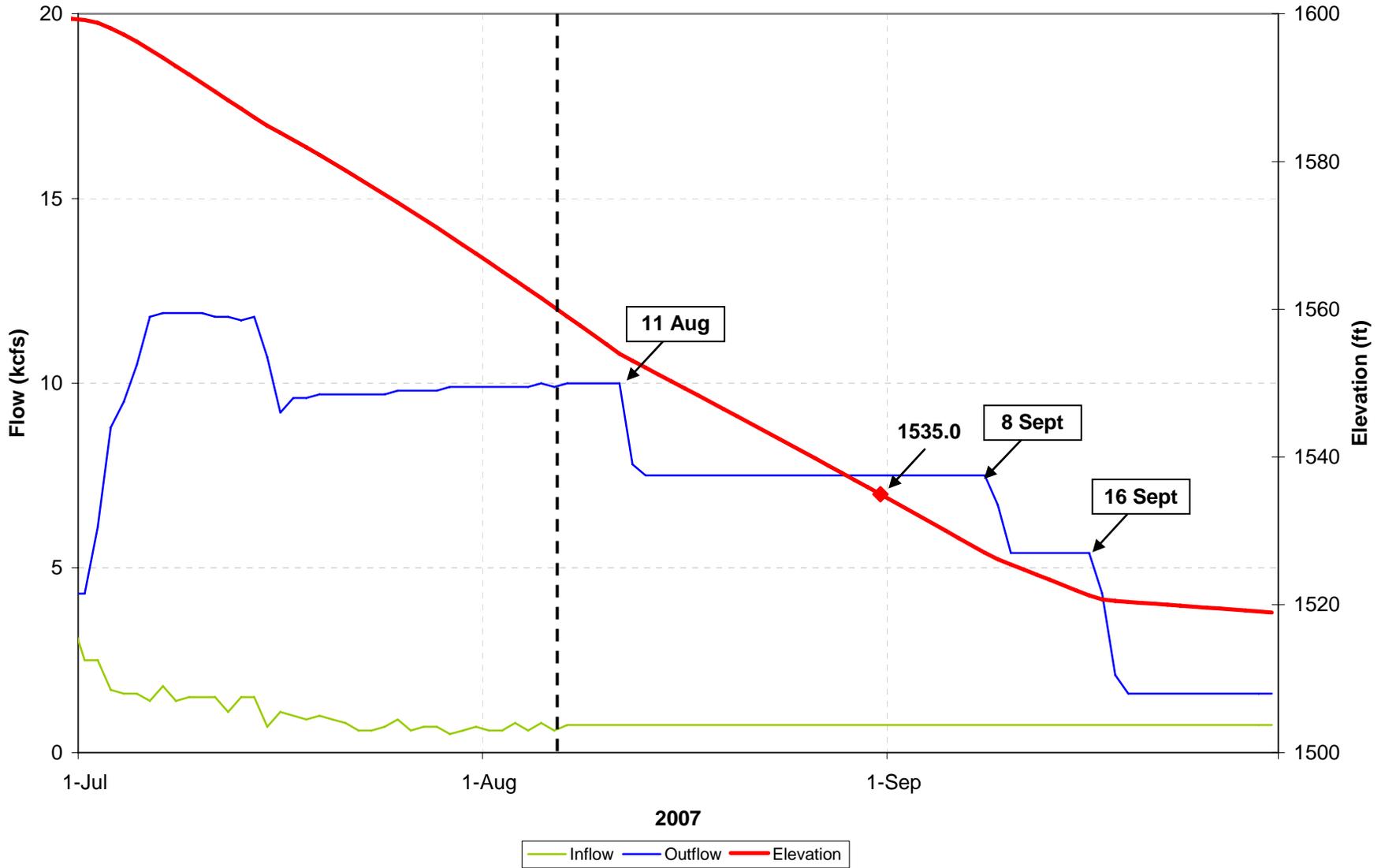
Dworshak
500 cfs Average Inflow



750 CFS INFLOW USED STARTING 8/7/07

Dworshak 750 cfs Average Inflow

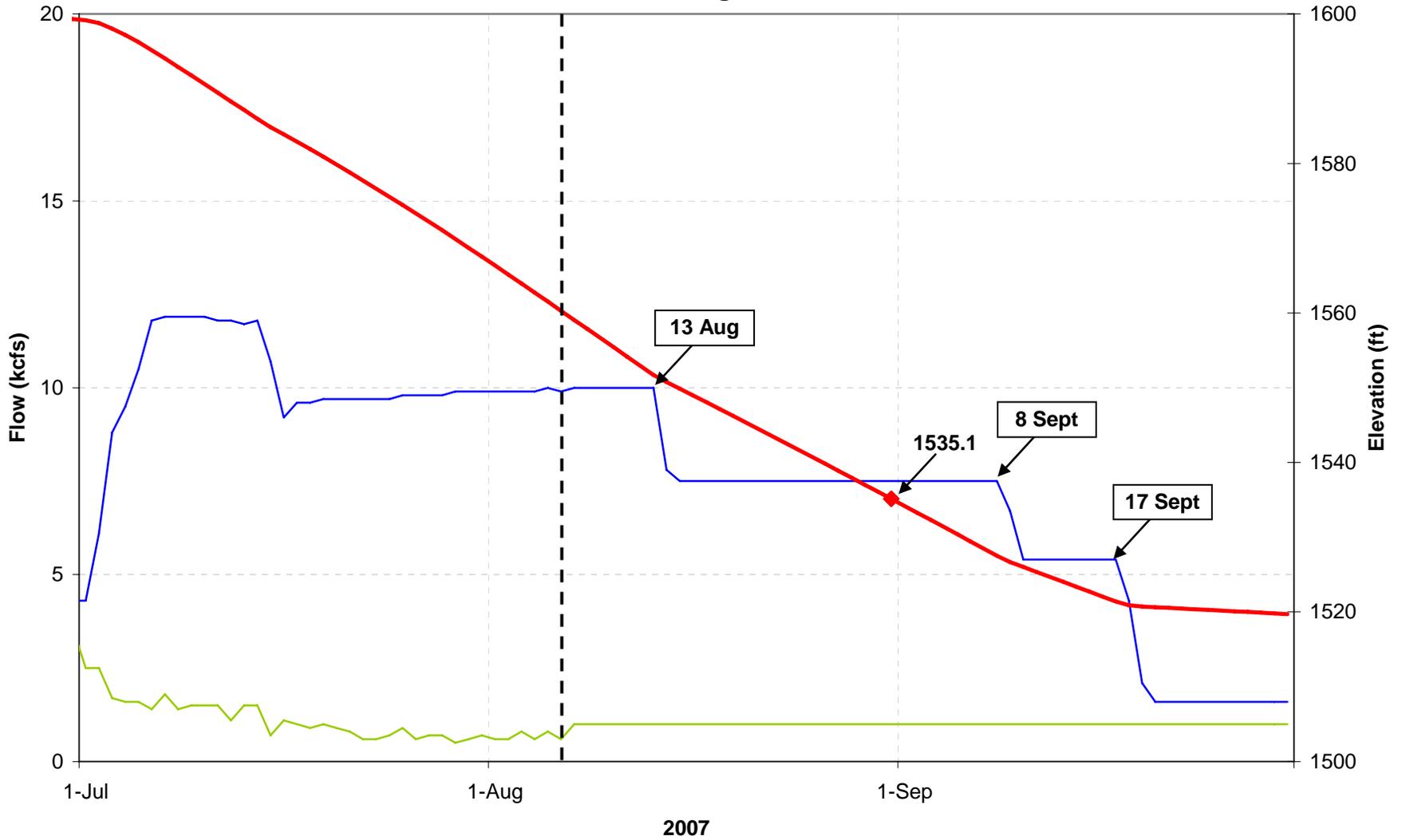
APR-JUL VOLUME=1.800 MAF



1 KCFS INFLOW USED STARTING 8/7/07

Dworshak 1 Kcfs Average Inflow

APR-JUL VOLUME= 1.800MAF

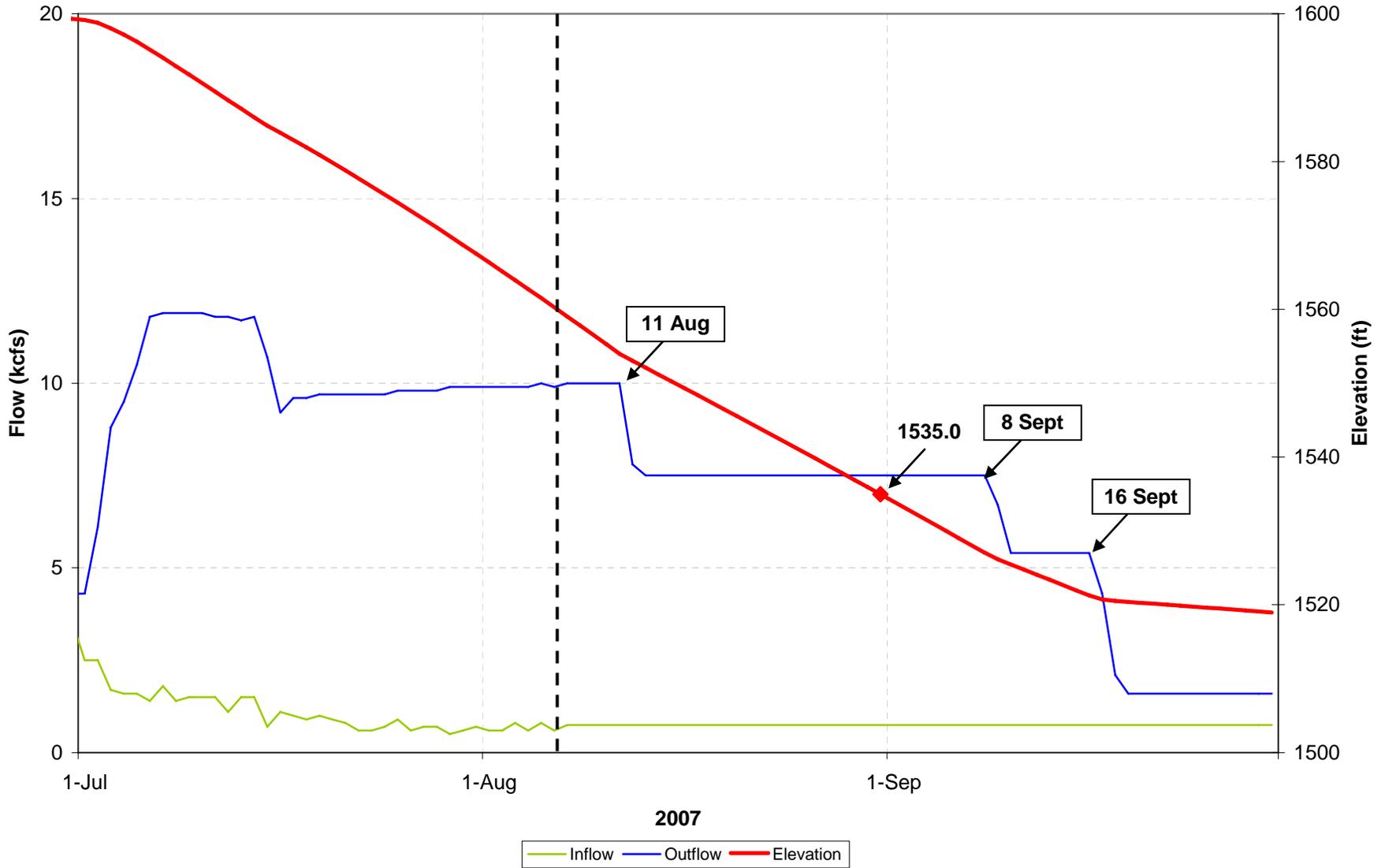


Inflow Outflow Elevation

750 CFS INFLOW USED STARTING 8/7/07

Dworshak 750 cfs Average Inflow

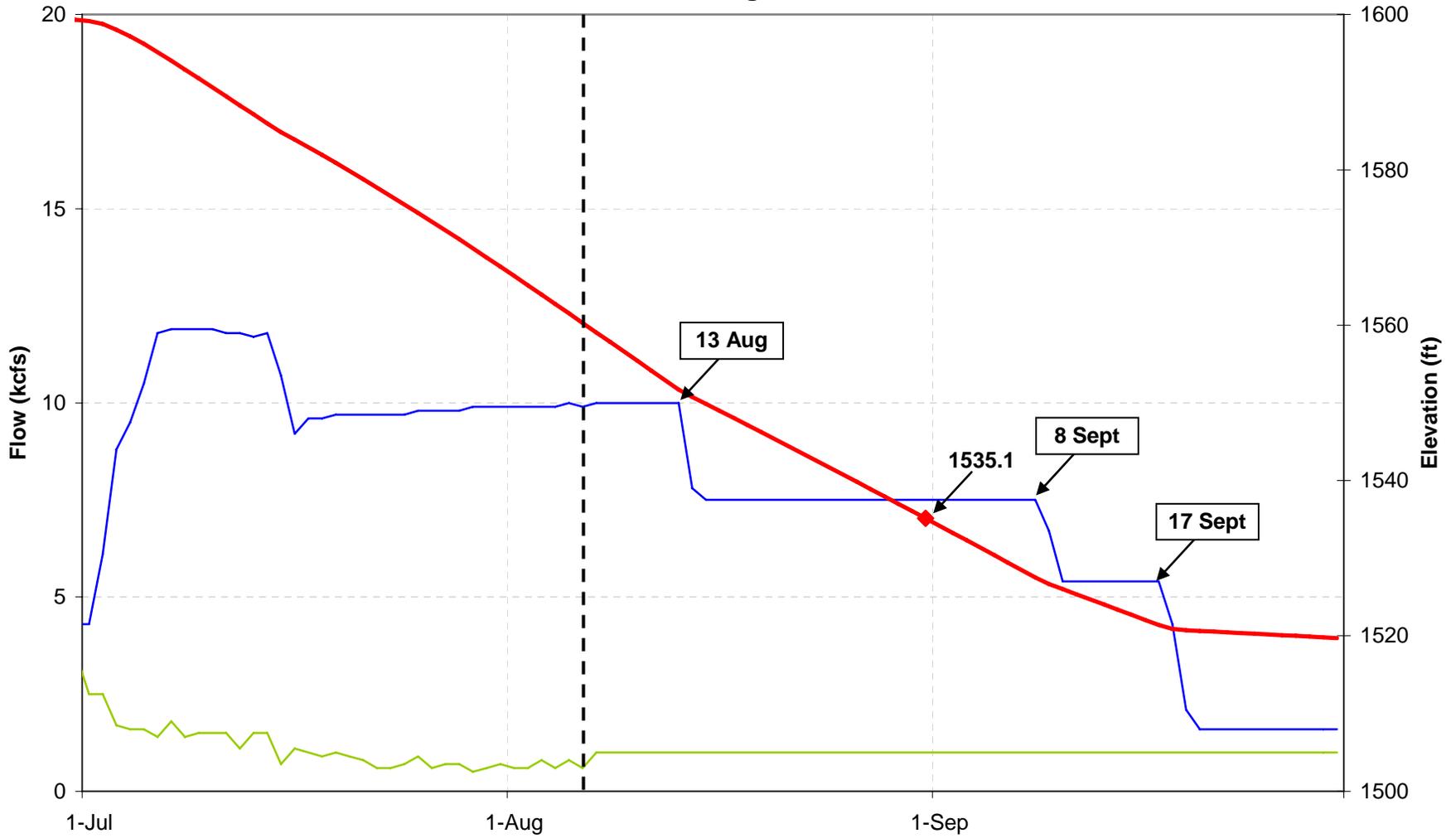
APR-JUL VOLUME=1.800 MAF



1 KCFS INFLOW USED STARTING 8/7/07

Dworshak 1 Kcfs Average Inflow

APR-JUL VOLUME= 1.800MAF



2007

Inflow Outflow Elevation

HELLS CANYON OUTFLOWS - Actual Data and Averaged* Forecasted values by IPC (in kcfs)

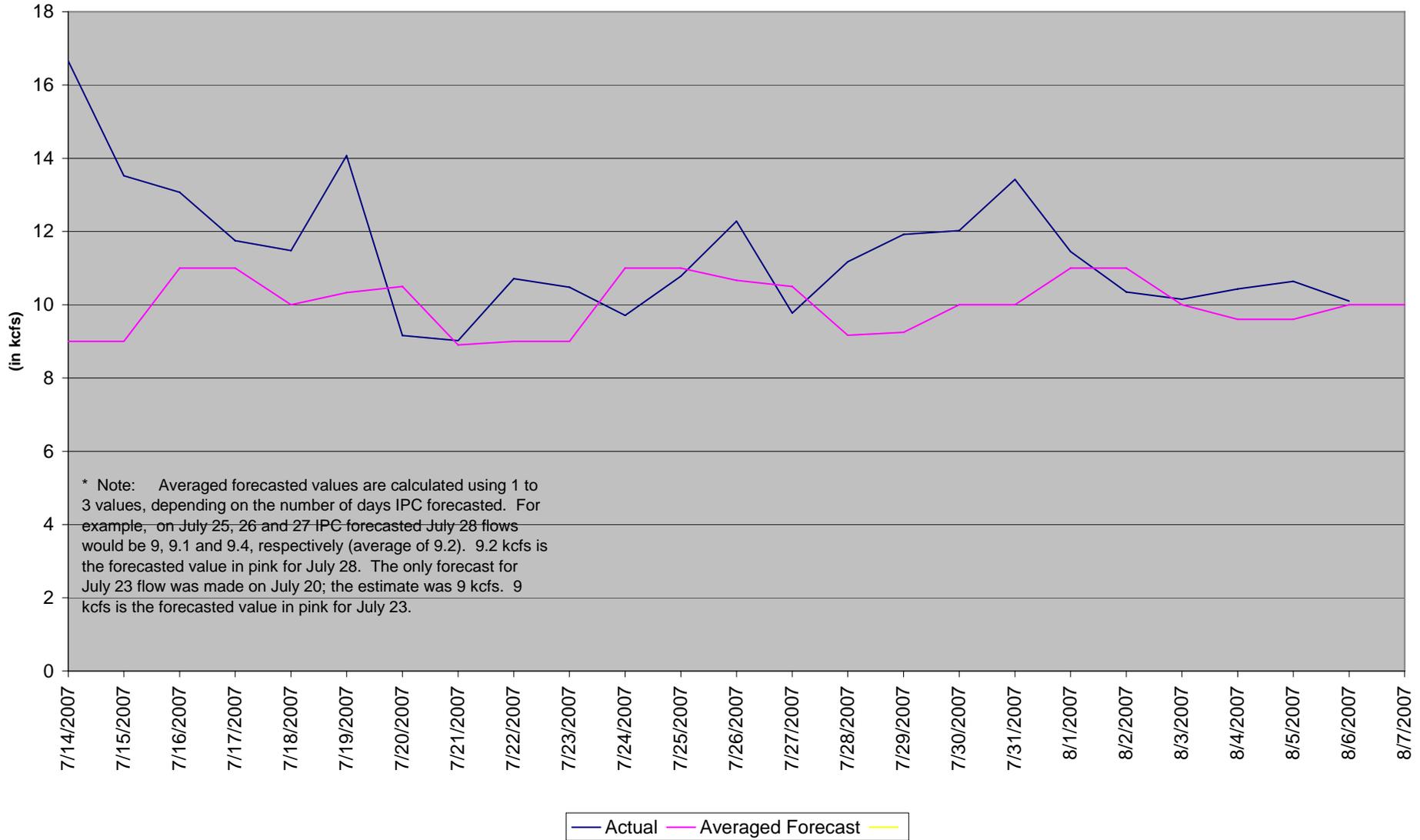


Table LWG-9. Lower Granite spillway pattern for fish passage (with RSW operating at pool elevation 734).

Spill Bay								Total Stops	Total Spill
1	2	3	4	5	6	7	8		
3.5	0	0	0	0	0	1	2	6.5	11.9
3.5	0	0	0	1	0	1	2	7.5	13.6
3.5	0	1	0	1	0	1	2	8.5	15.3
3.5	0	1	0	1	1	1	2	9.5	17.0
3.5	0	1	1	1	1	1	2	10.5	18.7
3.5	1	1	1	1	1	1	2	11.5	20.4
3.5	1	1	2	1	1	1	2	12.5	22.2
3.5	1	1	2	2	1	1	2	13.5	24.0
3.5	1	1	2	2	2	1	2	14.5	25.8
3.5	1	2	2	2	2	1	2	15.5	27.7
3.5	2	2	2	2	2	1	2	16.5	29.5
3.5	2	2	2	2	2	2	2	17.5	31.3
3.5	2	2	3	2	2	2	2	18.5	36.6
3.5	2	2	3	3	2	2	2	19.5	35.0
3.5	2	2	3	3	3	2	2	20.5	36.9
3.5	2	3	3	3	3	2	2	21.5	38.7
3.5	3	3	3	3	3	2	2	22.5	40.6
3.5	3	3	4	3	3	2	2	23.5	42.4
3.5	3	3	4	4	3	2	2	24.5	44.3
3.5	3	3	4	4	4	2	2	25.5	46.2
3.5	3	4	4	4	4	2	2	26.5	48.0
3.5	4	4	4	4	4	2	2	27.5	49.9
3.5	4	4	4	4	4	2	3	28.5	51.7
3.5	4	4	4	4	4	3	3	29.5	53.6
3.5	4	4	5	4	4	3	3	30.5	55.5
3.5	4	4	5	5	4	3	3	31.5	57.3
3.5	4	4	5	5	5	3	3	32.5	59.2
3.5	4	5	5	5	5	3	3	33.5	61.0
3.5	5	5	5	5	5	3	3	34.5	62.9
3.5	5	5	5	5	5	3	4	35.5	64.8
3.5	5	5	5	5	5	4	4	36.5	66.6
3.5	5	5	6	5	5	4	4	37.5	68.5
3.5	5	5	6	6	5	4	4	38.5	70.3

Note: Minimum involuntary spill with RSW operating is 11.5 kcfs.

Note: At approximately 3.5 stops, the tainter gate no longer regulates flow through the RSW. The tainter gate should be raised at least 9 stops so the gate does not interfere with the spillbay flow.

NOTES ARE CONTINUED ON NEXT PAGE

Note: Spillbay discharge at pool elevation 734:

<u>Stops</u>	<u>Discharge (kcfs)</u>
<u>(without RSW in place)</u>	
1	1.7
2	3.5
3	5.4
4	7.2
5	9.1
6	11.0
7	12.8
8	14.7
<u>(with RSW in place)</u>	
RSW 3.5 stops or more	6.7

Table LWG-10. Lower Granite spillway pattern for fish passage (RSW NOT operating, pool elevation 734).

Spillbay Stops								Total Stops	Total Spill (kcfs)
1 (RSW)	2	3	4	5	6	7	8		
<i>Closed</i>	1	1			1	1	2	6.0	10.3
<i>Closed</i>	1	1			1	2	2	7.0	12.1
<i>Closed</i>	2	1			1	2	2	8.0	13.9
<i>Closed</i>	2	2			1	2	2	9.0	15.7
<i>Closed</i>	2	2	1		1	2	2	10.0	17.4
<i>Closed</i>	2	2	1	1	1	2	2	11.0	19.1
<i>Closed</i>	2	2	2	1	1	2	2	12.0	20.9
<i>Closed</i>	2	2	2	1	2	2	2	13.0	22.7
<i>Closed</i>	2	2	2	2	2	2	2	14.0	24.5
<i>Closed</i>	2	2	2	2	2	2	3	15.0	26.4
<i>Closed</i>	2	2	2	2	2	3	3	16.0	28.3
<i>Closed</i>	3	2	2	2	2	3	3	17.0	30.2
<i>Closed</i>	3	3	2	2	2	3	3	18.0	32.1
<i>Closed</i>	3	3	3	2	2	3	3	19.0	34.0
<i>Closed</i>	3	3	3	2	3	3	3	20.0	35.9
<i>Closed</i>	3	3	3	3	3	3	3	21.0	37.8
<i>Closed</i>	3	3	3	3	3	3	4	22.0	39.6
Closed	3	3	3	3	3	4	4	23.0	41.4
<i>Closed</i>	4	3	3	3	3	4	4	24.0	43.2
<i>Closed</i>	4	4	3	3	3	4	4	25.0	45.0
Closed	4	4	4	3	3	4	4	26.0	46.8
<i>Closed</i>	4	4	4	3	4	4	4	27.0	48.6
Closed	4	28.0	50.4						
<i>Closed</i>	4	4	4	4	4	4	5	29.0	52.3
Closed	5	4	4	4	4	4	5	30.0	54.2
<i>Closed</i>	5	4	4	4	4	5	5	31.0	56.1
<i>Closed</i>	5	5	4	4	4	5	5	32.0	58.0
Closed	5	5	5	4	4	5	5	33.0	59.9
<i>Closed</i>	5	5	5	4	5	5	5	34.0	61.8
<i>Closed</i>	5	5	5	5	5	5	5	35.0	63.7
<i>Closed</i>	5	5	5	5	5	5	6	36.0	65.6
<i>Closed</i>	5	5	5	5	5	6	6	37.0	67.5

Notes: Patterns in **bold** were evaluated with the Corps' Lower Granite 1:80 physical general model. These values match preliminary spill patterns for this test condition that were previously sent to RCC via e-mail message on 4/12/02. Values shown in *italics* were added to this expanded table on 6/7/02.

Lower Snake Temperature Management

August 6, 2007

- General Observations
 - Lower Granite Pool
 - Temperature in Snake River at Lower Granite 19.3 °C (66.7 F)
 - Temperature of flow weighted inflow $T_{crit} = 17.0$ °C (62.6 F)
 - Coolest average inflow temperature since June 21
 - Heat gain in LWG pool 0.7-1.5 C
 - Travel time in LWG pool 6.5-7.0 days
 - Density stratified flow / underflow reducing time of travel
 - Snake River at Anatone $Q_{5d} = 14.9$ kcf, $T_{5d} = 22.9$ °C (73.2 F)
 - HCD maintained low weekend flows (10.5 kcfs)
 - HCD releases are expected to remain low
 - Clearwater River
 - Dworshak $Q_{5d} = 9.9$ kcf, $T_{5d} = 6.6$ °C (43.8 F)
 - Orofino $Q_{5d} = 1.3$ kcf, $T_{5d} = 24.8$ °C (76.6 F)
 - Lewiston $T_{5d} = 11.0$ C (51.8. F)
 - Flow ratio $Q_{cr}/Q_{sr@lwg} = 42.9\%$

Lower Snake Temperature Management

August 6, 2007

- Forecasts

- Weather (NOAA)

- Moderate Temperatures predicted for later this week at Lewiston ID

- Aug 7 8 9 10 11 12 13
 - Tue Wed Thu Fri Sat Sun Mon
 - Highs 90 89 90 90 93 92 92
 - Lows 62 62 60 59 59 62 62

- Hourly weather data from 2006 for Aug 14-31

- Flows

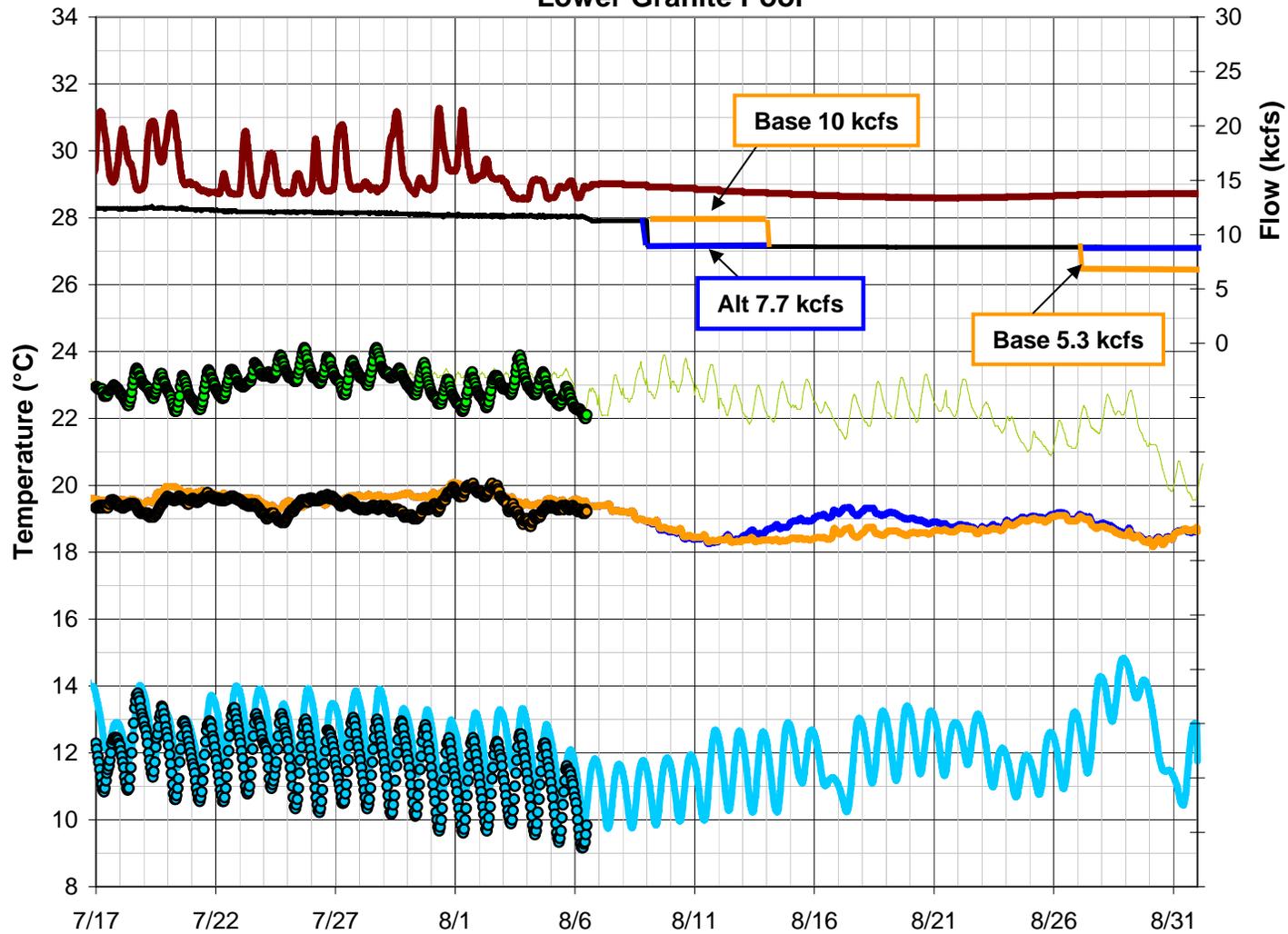
- Clearwater River at Orofino (STP) falling from 1.5 to 1.1 kcfs by Aug 31
 - Snake River at Anatone (STP) constant 13 +/- 1 kcfs through Aug
 - Dworshak Operations (average inflow 0.68 kcfs through Aug 31)
 - Base Plan (8 days @ 10, 13 days @ 7.7, 5 days @ 5.3)
 - » 10.0 kcfs through Aug 13
 - » 7.7 kcfs Aug 14-26
 - » 5.3 kcfs Aug 27-31
 - Alternative Plan (3 days@10+23 days@7.7)
 - » 10.0 kcfs through Aug 8
 - » 7.7 kcfs Aug 9-31
 - Both plans will maintain objective of 1535 ft. on Sept. 1

Lower Snake Temperature Management

August 6, 2007

- Results of CEQUAL-W2 simulation (June 1-August 31 simulation)
 - Base Plan (continued capacity release Aug 13)
 - SR Temps at LWG gradually decreasing Aug 6-11
 - Temps fall below 18 C
 - SR Temps at LWG gradually increasing Aug 16-26
 - SR Temps remain below 19 C with two unit operation
 - Single unit operation will cause warmer temp in Sept
 - Alternative Plan (conservation policy)
 - Same as Base plan until Aug 13
 - Up to (0.6 C) warmer temperatures during Aug 13-20
 - Conserved water for release later in Aug
 - Cooler temperatures during 1st week in September

Lower Granite Pool



2007

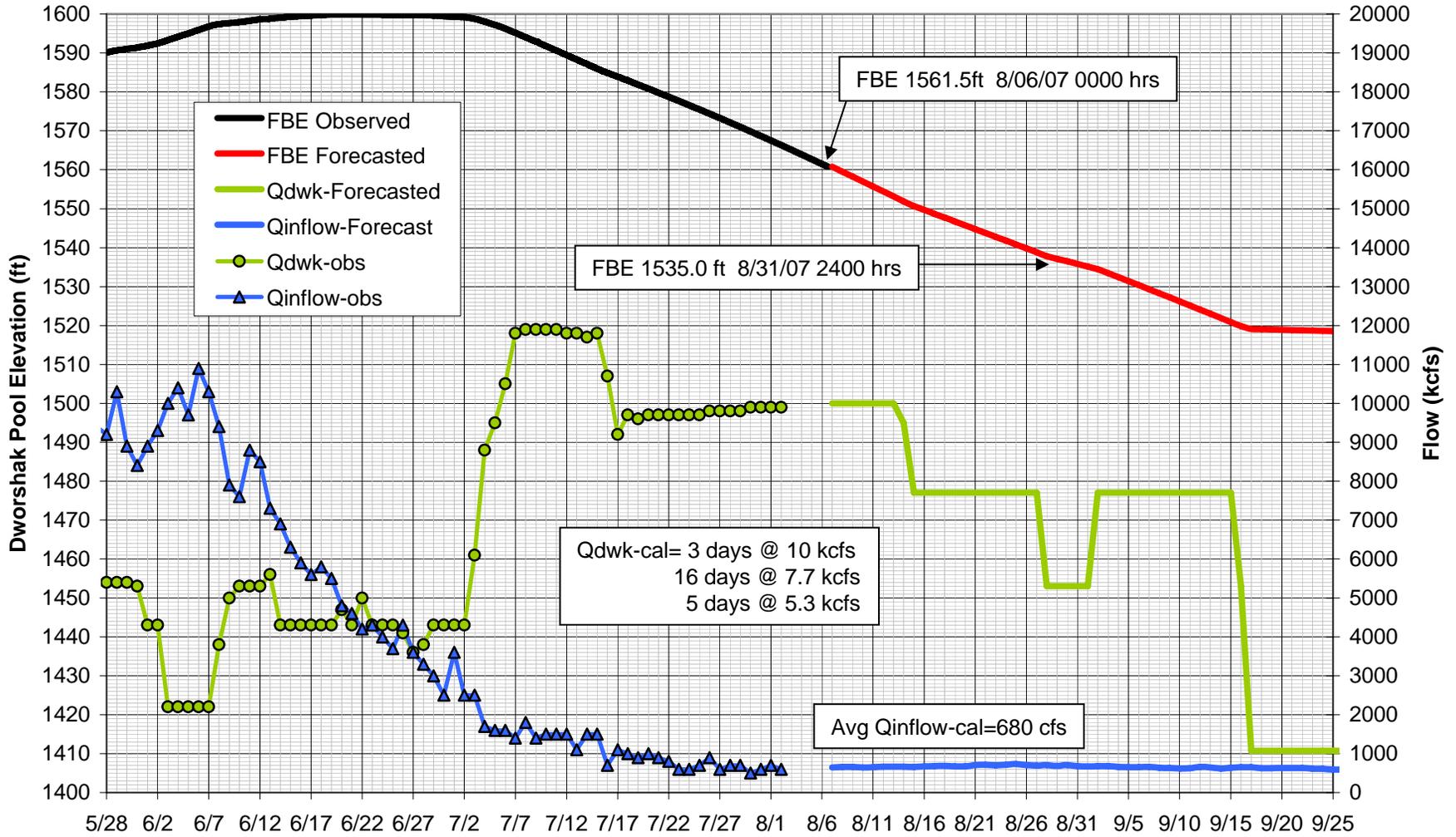


Table MCN-7. McNary "Summer Navigation Spill Pattern". (Discharge at forebay elevation 339)

(6 August 2007)

SPILLWAY BAY (Gate Opening in feet)																						Total Stops	Total Spill (kcfs)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		
2																		2	5.2	1	5.5	15.7	28.5
2		1																2	5.2	1	5.5	16.7	30.5
2		2																2	5.2	1	5.5	17.7	32.4
2	1	2																2	5.2	1	5.5	18.7	34.4
2	1	2															1	2	5.2	1	5.5	19.7	36.4
2	1	2															2	2	5.2	1	5.5	20.7	38.3
2	1	2														1	2	2	5.2	1	5.5	21.7	40.3
2	2	2														1	2	2	5.2	1	5.5	22.7	42.2
2.5	2	2.5														1	2	2	5.2	1	5.5	23.7	43.9
2.5	2	3.5														1	2	2	5.2	1	5.5	24.7	51.2
2.5	2	3.5														2	2	2	5.2	1	5.5	25.7	53.1
2.5	2	3.5												1		2	2	2	5.2	1	5.5	26.7	55.1
2.5	2	3.5												2		2	2	2	5.2	1	5.5	27.7	57.0
2.5	2	3.5												2	1	2	2	2	5.2	1	5.5	28.7	58.8
2.5	2	3.5												2	1	3	2	2	5.2	1	5.5	29.7	60.7
2.5	2	3.5											1	2	1	3	2	2	5.2	1	5.5	30.7	62.4
2.5	2	3.5											1	3	1	3	2	2	5.2	1	5.5	31.7	64.4
2.5	2	3.5										1	1	3	1	3	2	2	5.2	1	5.5	32.7	66.3
2.5	2	3.5										2	1	3	1	3	2	2	5.2	1	5.5	33.7	68.2
2.5	2	3.5										2	1	3	2	3	2	2	5.2	1	5.5	34.7	69.9
2.5	2	3.5										2	1	3	3	3	2	2	5.2	1	5.5	35.7	71.9
2.5	2	3.5								1		2	1	3	3	3	2	2	5.2	1	5.5	36.7	73.8
2.5	2	3.5								2		2	1	3	3	3	2	2	5.2	1	5.5	37.7	75.5
2.5	2	3.5								2		2	2	3	3	3	2	2	5.2	1	5.5	38.7	77.5
2.5	2	3.5								2		3	2	3	3	3	2	2	5.2	1	5.5	39.7	79.4

- 1) TSWs in bays 20 and 22 have flow equivalent to 5.2 and 5.5 stops at forebay elevation of 339, respectively.
- 2) Raise gates for TSWs approximately 3 to 5 feet above water surface to ensure free surface and debris passage.

Table MCN-7. McNary "Summer Navigation Spill Pattern". (Discharge at forebay elevation 339)

(6 August 2007)

SPILLWAY BAY (Gate Opening in feet)																						Total Stops	Total Spill (kcfs)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		
2.5	2	3.5								2	1	3	2	3	3	3	2	2	5.2	1	5.5	40.7	82.6
2.5	2	3.5								2	1	3	2	3	3	3	2	2	5.2	2	5.5	41.7	84.6
2.5	2	3.5							1	2	1	3	2	3	3	3	2	2	5.2	2	5.5	42.7	86.6
2.5	2	3.5	1	2		2	1	2	1	2	1	2	3	2	1	2	1	2	5.2		5.5	43.7	88.5
2.5	2	3.5	1	2	1	2	1	2	1	2	1	2	3	2	1	2	1	2	5.2		5.5	44.7	90.4
2.5	2	3.5	1	2	1	2	1	2	1	2	1	2	3	2	1	2	1	2	5.2	1	5.5	45.7	92.1
2.5	2	3.5	1	2	1	2	1	2	1	2	1	2	3	2	1	2	1	2	5.2	2	5.5	46.7	94.0
2.5	2	3.5	1	2	1	2	1	2	1	2	1	2	3	2	1	2	2	2	5.2	2	5.5	47.7	95.9
2.5	2	3.5	1	2	1	2	1	2	1	2	1	2	3	2	1	2	2	3	5.2	2	5.5	48.7	97.8
2.5	2	3.5	1	2	1	2	1	2	1	2	1	2	3	2	2	2	2	3	5.2	2	5.5	49.7	99.7
2.5	2	3.5	1	2	2	2	1	2	1	2	1	2	3	2	2	2	2	3	5.2	2	5.5	50.7	101.6
2.5	2	3.5	1	2	2	2	1	2	2	2	1	2	3	2	2	2	2	3	5.2	2	5.5	51.7	103.5
2.5	2	3.5	1	2	2	2	1	2	2	2	2	2	3	2	2	2	2	3	5.2	2	5.5	52.7	105.1
2.5	2	3.5	1	2	2	2	2	2	2	2	2	2	3	2	2	2	2	3	5.2	2	5.5	53.7	106.8
2.5	2	3.5	2	2	2	2	2	2	2	2	2	2	3	2	2	2	2	3	5.2	2	5.5	54.7	108.5
2.5	2.5	4	2	2	2	2	2	2	2	2	2	2	3	2	2	2	2	3	5.2	2	5.5	55.7	110.2
2.5	2.5	4	2	2	2	2	2	2	2	2	2	2	3	2	2	2	2	3	5.2	3	5.5	56.7	111.9
2.5	2.5	4	2	2	2	2	2	2	2	2	2	2	3	2	2	2	3	3	5.2	3	5.5	57.7	113.6
2.5	2.5	4	2	2	2	2	2	2	2	2	2	2	3	2	2.5	2.5	3	3	5.2	3	5.5	58.7	115.3
2.5	2.5	4	2	2	2	2.5	2	2	2	2.5	2	2	3	2	2.5	2.5	3	3	5.2	3	5.5	59.7	117.0
2.5	2.5	4	2	2.5	2	2.5	2	2	2	2.5	2	2	3	2.5	2.5	2.5	3	3	5.2	3	5.5	60.7	118.7
2.5	2.5	4	2	2.5	2	2.5	2	2.5	2	2.5	2	2.5	3	2.5	2.5	2.5	3	3	5.2	3	5.5	61.7	120.4
2.5	2.5	4	2	2.5	2.5	2.5	2	2.5	2.5	2.5	2	2.5	3	2.5	2.5	2.5	3	3	5.2	3	5.5	62.7	122.1
2.5	2.5	4	2	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3	2.5	2.5	2.5	3	3	5.2	3	5.5	63.7	123.8
2.5	2.5	4	3	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3	2.5	2.5	2.5	3	3	5.2	3	5.5	64.7	125.5

1) TSWs in bays 20 and 22 have flow equivalent to 5.2 and 5.5 stops at forebay elevation of 339, respectively.

2) Raise gates for TSWs approximately 3 to 5 feet above water surface to ensure free surface and debris passage.

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

August 8, 2007 Conference Call

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator/Notes: Erin Halton

The following notes are a summary of issues that are intended to point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the "record" of the meeting, only a reminder for TMT members.

Review of Facilitator Notes / Meeting Minutes

The facilitator summary and official meeting minutes from the 7/25 and 8/1 conference calls were posted to the TMT website. No changes or edits to those documents were made during the call.

Action/Next Steps: Meeting summaries and minutes from the 8/1 and 8/8 conference calls will be reviewed and finalized at the 8/15 TMT meeting.

Commercial Navigation Issues

Jim Adams, COE, referred TMT to alternate spill patterns for McNary and Lower Granite dams, posted as links to the TMT agenda. The patterns were developed through the Walla Walla District office, with input from project operators. Adams clarified that the patterns were experimental and would be carefully observed; the patterns aim to minimize lateral flow by shifting spill to alternate bays. Adams noted that the alternate spill pattern for Lower Granite was the one he e-mailed to TMT on 8/6. John Piggott, Columbia River Towboat Association, clarified that the alternate patterns would be used only for barges with loads. He estimated an average of 4-5 lockages per day, for periods of 20-30 minutes each.

Tom Lorz, CRITFC, speaking on behalf of the Salmon Managers, said that there had been discussion of the navigational issue at the FPAC meeting on 8/7; no objections to the proposed patterns were made. Salmon Managers provided input: Russ Kiefer, ID, acknowledged the need for use of the alternate spill patterns, but added that they are less effective for fish passage. Lorz stated that a long term solution that minimizes effects on fish should be part of planning for 2008. Jim Adams, COE, acknowledged the concerns of the Salmon Managers and clarified that the patterns would be used only for barges with deep drafts, and for as little a duration as possible. TMT members weighed in on the proposed spill patterns:

- NOAA: no objection
- USFWS: no objection
- BOR: no objection, defer to COE
- BPA: no objection
- WA: no objection
- ID: no objection
- MT: no objection

- CRITFC: no objections, but look to improve operations for 2008 through FDDRWG discussions

Action/Next Steps:

- The COE will implement alternate spill patterns for barge navigation at McNary and Lower Granite on an as-needed basis.
- Operational options for 2008 will be explored through discussions at upcoming FDDRWG meetings.
- Towboaters will contact operators as they approach McNary and Lower Granite.

Dworshak Operations Update

Jim Adams, COE, reported on Lower Snake River temperatures and referred TMT to several updated graphs linked to the agenda. The Lower Granite tailwater was averaging 66.3°; Orofino temperatures had a daily average of 71.4° and Dworshak was discharging an average temperature of 44.5°, with two units in undershot and one in overshot. Adams said that air temperature data for the Lewiston area showed moderate temperatures for the upcoming week. Predicted vs. actual flows out of Hells Canyon were posted as a link to the agenda and were expected to be near 11.5 kcfs for the upcoming week.

COE modeling showed shaping results for Dworshak operations with inflows of 500, 750 and 1,000 cfs and alternative August dates for shifting outflows from full power house to 7.7 kcfs. Tom Lorz said that the Salmon Managers discussed the modeling at their 8/7 FPAC meeting and that they supported a shift to 7.7 kcfs, deferring to the COE to determine when to make the shift. Russ Kiefer, ID, added that a two-unit operation at Dworshak would likely achieve the end of August elevation goal of 1535' and asked the COE whether running both units in undershot would help maintain temperatures of no lower than 43° and thereby support the hatchery. Adams stated that if both units were set in the undershot operation, outflow temperatures would likely be in the range of 41° F to 42° F. If the large unit was set in undershot and a small unit set in overshot, temperatures could be in the 47° F to 48° F.

Action/Next Steps:

- The COE will continue to operate Dworshak at full power house, with a tentative plan to shift outflows to 7.7 kcfs at midnight on 8/11.
- John Heitstuman, COE, offered to 're-run' the modeling with updated data and flow scenarios for temperatures in the 47-48° range.
- Russ Kiefer, ID, offered to plug data into a spreadsheet he developed to model Dworshak operations.
- Dave Wills, USFWS, offered to contact the Dworshak Hatchery to confirm a preferred temperature range. He will also contact the Nez Perce Tribe, to apprise them of the latest on Dworshak operations.
- USFWS and the COE will discuss Dworshak operations offline on/by 8/10.
- Dworshak operations will be on the agenda for the scheduled 8/15 TMT meeting.

UPDATE: *Cathy Hlebechuk, COE, sent TMT members the following e-mail on 8/9:*

"Walla Walla District has completed CEQUAL modeling assuming:

-Releases from Dworshak held 10,000 cfs thru August 11 [and shifting to] 7,600 cfs thereafter
-Release Temperature from Dworshak (48 F) (releases are more likely to be 45 to 46 degrees)
-7 day weather forecast from NOAA. Hourly weather data from 2006 thereafter.
Using above assumptions, model shows peak temperature LWG tailwater 19.43 C / 67 F from now through the end of August. We plan to operate the units in the default mode - large unit in undershot and the small unit in overshot starting Saturday night unless TMT desires a different configuration. We will be watching the water temperature on Sunday. If you have any concerns e-mail or call Jim Adams or myself."

Lower Monumental Equipment Installation Update

Bernard Klatte, COE, reported on a request to install equipment at Lower Monumental on 8/14; he clarified that the entire powerhouses would need to be shut down while boats install the gear in front of Main Units 2 and 3. Once this work is completed, then the entire spillway would be closed to install gear in front of spillbay 6. He noted that the outage would take place during the Salmon Manager recommended timeframe of 11 a.m. - 3 p.m.

Action/Next Steps: Klatte will coordinate the request with the signatories to the 2007 Fish Operations Agreement and will issue a teletype.

Operations Review

Reservoirs – Jim Adams, COE and Mary Mellema, BOR, reported on reservoirs. Libby was at elevation 2449.5', with inflows of 8.3 kcfs and outflows of 17.3 kcfs. Albeni Falls was at 2062.2', with inflows of 10.4 kcfs and outflows of 8.3 kcfs. Dworshak was at elevation 1559', with inflows of .8 kcfs and outflows of 10 kcfs. Hungry Horse was at elevation 3550.3' with outflows at 4.4 kcfs and holding through August until September, when outflows will ramp down to 2.2-2.3 kcfs to meet Columbia Falls minimums. Grand Coulee was at elevation 1284.8', and targeting an elevation of 1278' by 8/31. The seven day average at McNary was 157.3.

Fish – Tom Lorz, CRITFC, reported on juvenile fish: sub-yearling daily passage numbers continued to decline, with Lower Monumental passage very low and Little Goose and Lower Granite passage numbers trailing off. Passage at John Day was in the range of 20-50,000 per day and Lorz noted that steelhead passage numbers from Bonneville reflected a relatively late run. Cindy LeFleur, WA, reported on adults: summer steelhead counts were in the 74-7800 range at Bonneville and upriver brights were in the 40-50,000 range.

Power system – Nothing to report.

Water quality – Jim Adams, COE, referred TMT to TDG data linked to the TMT website. Lower Columbia River temperatures were right around 70° F.

Next face-to-face TMT meeting: Wednesday, August 15th

Agenda items will include:

- Dworshak Operations

- Navigational Issues Update
- Autumn Treaty Fishing
- Looking ahead: End of Spill
- Operations Update

**Columbia River Regional Forum
Technical Management Team Conference Call
Aug. 8, 2007**

1. Introduction

Today's conference call was chaired by Jim Adams (COE) and facilitated by Erin Halton (DS Consulting), with representatives from COE, NOAA, CRITFC, BPA, BOR, Montana, Idaho and Washington attending. The following is a summary (not a verbatim transcript) of the topics discussed and decisions made at the meeting. Anyone with questions or comments about these notes should provide them to the TMT chair or bring them to the next meeting.

2. Review Meeting Minutes

Meeting minutes for July 25 and Aug. 1 have been posted. There were no comments today.

3. Navigation Issues

Jim Adams gave an update on issues associated with the navigation locks for McNary and Lower Granite. Towboat operators and Walla Walla District staff have met and identified alternative spill patterns for use at the towboat captain's request when entering or exiting the navigation lock. The COE will monitor carefully how these patterns perform.

Kyle Dittmer (CRITFC) asked whether the patterns would reduce spill. It's readjustment, not reduction – the same amount of spill gets shifted to alternate spill bays, Adams said. Russ Kiefer (Idaho) expressed concern about the impacts on fish of changing the spill patterns. Use of the altered spill pattern will be quite minimal because only loaded barges with deep drafts will need it, and only for the approximately 20-30 minutes it takes to pass the lock and out of the spillway.

Tom Lorz (CRITFC) asked, is there some remedy we could look at, particularly at Lower Granite, so special operations aren't needed after this year? Lorz suggested the issue be addressed by Walla Walla FFDRWG. Adams agreed a long term technical solution is needed.

The altered spill pattern shifts spill toward the navigation lock guide wall, Adams said. Of 4-5 lockages per day, only those involving loaded barges would need the spill shift. Idaho, NOAA, USFWS, BPA, BOR, CRITFC, Washington and Montana representatives did not object to this operation.

4. Dworshak Operations

Adams described existing conditions. Temperatures at Lower Granite are trending downward, with a tailwater daily average water temperature of 66.3 degrees F on Aug. 7 and ranging from 65.4 to 67 degrees F over the past two days. Dworshak outflows are 44.5 degrees F, and have been slowly rising since Aug. 1. Currently two units are in undershot mode and one is in overshot mode. Temperatures can be expected to continue to rise gradually.

Adams presented three inflow scenarios for the Salmon Managers to use in decision making: 500 cfs, 750 cfs, and 1 kcfs. At 500 cfs inflows, dropping from 3 to 2 units on Aug. 8 and continuing with 7.5 kcfs outflows would bring the reservoir to elevation 1,535 feet by August 31. At 750 kcfs inflows, the change from full powerhouse to 2 units and lesser outflows would need to happen around Aug. 11. The COE is not proposing any specific operation, Adams said.

John Heitstuman (COE) presented a CEQUAL modeling run showing the base condition (current operations) and one alternative. The base plan doesn't drop flows to 7.7 until Aug. 13, while the alternative drops flows on Aug. 9 and temperatures would rise to 0.6 degrees F warmer than the base condition. Hells Canyon flows have been close to the forecasted levels, but are higher at times and unpredictable as usual.

At FPAC, the Salmon Managers and the COE agreed that reducing flows around Aug. 11 is the most prudent thing to do, Lorz said. The Salmon Managers didn't specify a date for the change, leaving that to the COE's discretion, Kiefer and Dittmer said. With advance notice, BPA can accommodate the change on either Aug. 10 or Aug. 11, Dan Spear said. The ultimate goal is to maintain full powerhouse for a few more days and drop to two units in time for the reservoir to reach elevation 1,535 feet by the end of August.

The group discussed the option of controlling temperatures by operating units in undershot or overshot mode. Putting the big unit in undershot mode and the small unit in overshot mode would probably yield temperatures of 47-48 degrees F, Adams said. If both the big unit and one small unit are in undershot mode, temperatures would probably be around 41-43 degrees F. Idaho preferred that the big unit and one of the two smaller units be operated in undershot mode to maintain temperatures around 43 degrees F. Running both of the smaller units in undershot mode would likely yield water temperatures too cold for steelhead hatchery operations, Russ Kiefer said.

David Wills (USFWS) said he would contact hatchery personnel regarding temperature needs before the COE drops from full powerhouse to two units in undershot mode the evening of Aug. 11. Meanwhile, the COE will contact the Nez Perce Tribe regarding this operation, as there was no Nez Perce

representative on today's call. John Heitstuman will do a model run of the base case operation and a worst case scenario.

5. Lower Monumental Equipment Installation Update

The Walla Walla District has modified an earlier request to schedule Lower Monumental forebay operations for installation of acoustic telemetry rays, Bernard Klatte (COE) said. The initial four-hour spillway outage request has been changed to a request to shut off the powerhouse starting at 11 am, continue spilling while work is done by boat, and bring the powerhouse back on line while the entire spillway is shut down for the installation. USFWS, Idaho, NOAA and CRITFC representatives did not object to this operation.

6. Operations Review

a. Reservoirs. Libby is at elevation 2,449.5 feet, with average inflows of 8.3 kcfs and outflows of 17.3 kcfs. The 7-day average inflow rate is 8.8 kcfs.

Albeni Falls is at elevation 2,062.2 at the Hope gage, with inflows of 10.4 kcfs and outflows of 8.03 kcfs. The 7-day average for inflows is below 10 kcfs.

Dworshak is at elevation 1,559.0 feet, with daily inflows of 0.8 kcfs and outflows around 10 kcfs. The 7-day average inflows for inflows is 0.7 kcfs. The 7-day average for inflows to Lower Granite is 27.1 kcfs. And the 7-day inflow average at McNary is 157.3 kcfs.

Hungry Horse is at elevation 3,550.3 feet, with 4.4 kcfs outflows through the end of August. Operations will ramp down the first week of September to the Columbia Falls minimum of 3,500 cfs. Grand Coulee is at elevation 1,284.8 feet, continuing toward a target of 1,278 feet on Aug. 31.

b. Fish. Lower Granite numbers for juvenile passage are tapering off to a few hundred fish per day, Rich Domingue (NOAA) said. Numbers at Little Goose are also dropping, after having peaked a week or two ago. Passage at Lower Monumental is low, as usual. McNary, John Day and Bonneville dams on the lower Columbia are all passing around 20,000 to 60,000 fish per day. The steelhead migration is nearly over.

The adult fall Chinook run started Aug. 1, with about 300 adults passing Bonneville per day, and large numbers of summer steelhead, Cindy LeFleur said.

c. Power System. There is nothing to report, Scott Bettin (BPA) said.

d. Water Quality. The only TDG issue has been Camas Washougal gage, Adams said. Peak spill rates at Bonneville at night are 138-139 kcfs, and the spill cap during the day is 155 kcfs. Flows in the river are currently too low to hit the

spill cap; as a result, Camas Washougal readings are well below criteria. Temperatures in the lower Columbia have been around 70 degrees F, a daily average.

7. Next Meeting

The next meeting will be on Aug. 15, with Dworshak operations, August treaty fishing, navigation issues, the end of spill, and the usual operations review on the agenda. This summary was prepared by consultant and writer Pat Vivian.

Name	Affiliation
Jim Adams	COE
Rich Domingue	NOAA
Kyle Dittmer	CRITFC
John Piggott	XXXX
Tom Lorz	CRITFC
Bernard Klatte	COE
Jim Litchfield	Montana
Russ Kiefer	Idaho
Cindy LeFleur	Washington
Dave Wills	USFWS
Scott Bettin	BPA
Dan Spear	BPA
Fred Mason	BOR
John Heitstuman	COE
Glen Trager	Coral Energy
Shane Scott	NWRP

TECHNICAL MANAGEMENT TEAM

BOR : John Roache/Mary Mellema/Pat McGrane

BPA : Robyn MacKay/Tony Norris/Scott Bettin

NOAA-F: Paul Wagner/Richard Dominigue

USFWS : David Wills/Steve Haesecker

OR : Rick Kruger/Ron Boyce

ID : Russ Kiefer

WDFW : Cindy LeFleur

MT : Jim Litchfield/Brian Marotz

COE: Cathy Hlebechuk/Jim Adams/Cindy Henriksen

TMT MEETING

Wednesday August 15, 2007 09:00 - 12:00

1125 N.W. Couch Street, Suite 4A34

Portland, Oregon 97209-4142

Map Quest [\[Directions\]](#)

NOTE: NEW CONFERENCE PHONE LINE

Conference call line:**203-310-2162**; PASS CODE = **4703150**

To check into the building, take the elevator to the 5th floor and the guard will issue you an ID badge if you need one and will take you down to the 4th floor where the meeting is. If you have NOT attended a TMT meeting in the past you will need to call ahead and let Jim Adams (503) 808-3938, Cathy Hlebechuk (503) 808-3942, or Cindy Henriksen (503) 808-3945 know, so you can be added to the TMT Visitor List and issued an ID badge. This badge may be used indefinitely. If you have attended TMT in the past you may re-use your ID badge indefinitely. If you are a federal employee you will also need to have an ID badge issued to you which can be used indefinitely.

We have had disruptions on the phone because people are not hitting 'mute' after dial in.

Please MUTE your Phone

All members are encouraged to call Robin Harkless with any issues or concerns they would like to see addressed.

Please e-mail her at robin76@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome and Introductions
2. Review [\[Meeting Minutes\]](#)
3. Navigation Issues Update - John Piggott, Columbia River Towboat Association
 - a. [\[LWG Nav Lock & Turbine Tailwater vs. LGS Forebay\]](#) 
4. Dworshak Operations - All
 - a. Weather Forecast [\[Lewiston Weather Forecast\]](#)
 - b. [\[Dworshak Water Temperatures Data\]](#)
 - c. [\[Daily Water Temperature Reports\]](#)
 - d. Dworshak outflows - draft to 1535' end August
 1. [\[with 500 cfs inflows\]](#) 
 2. [\[with 750 cfs inflows\]](#) 
 3. [\[with 1 kcfs inflows\]](#) 
5. Autumn Treaty Fishing - Kyle Dittmer, CRITFC
 - a. [\[SOR #2007 C3\]](#) 

6. Operations Review

- a. Reservoirs
- b. Fish
- c. Power System
- d. Water Quality - *Jim Adams, COE*
 1. [\[Spill Information 2007\]](#)

7. Other

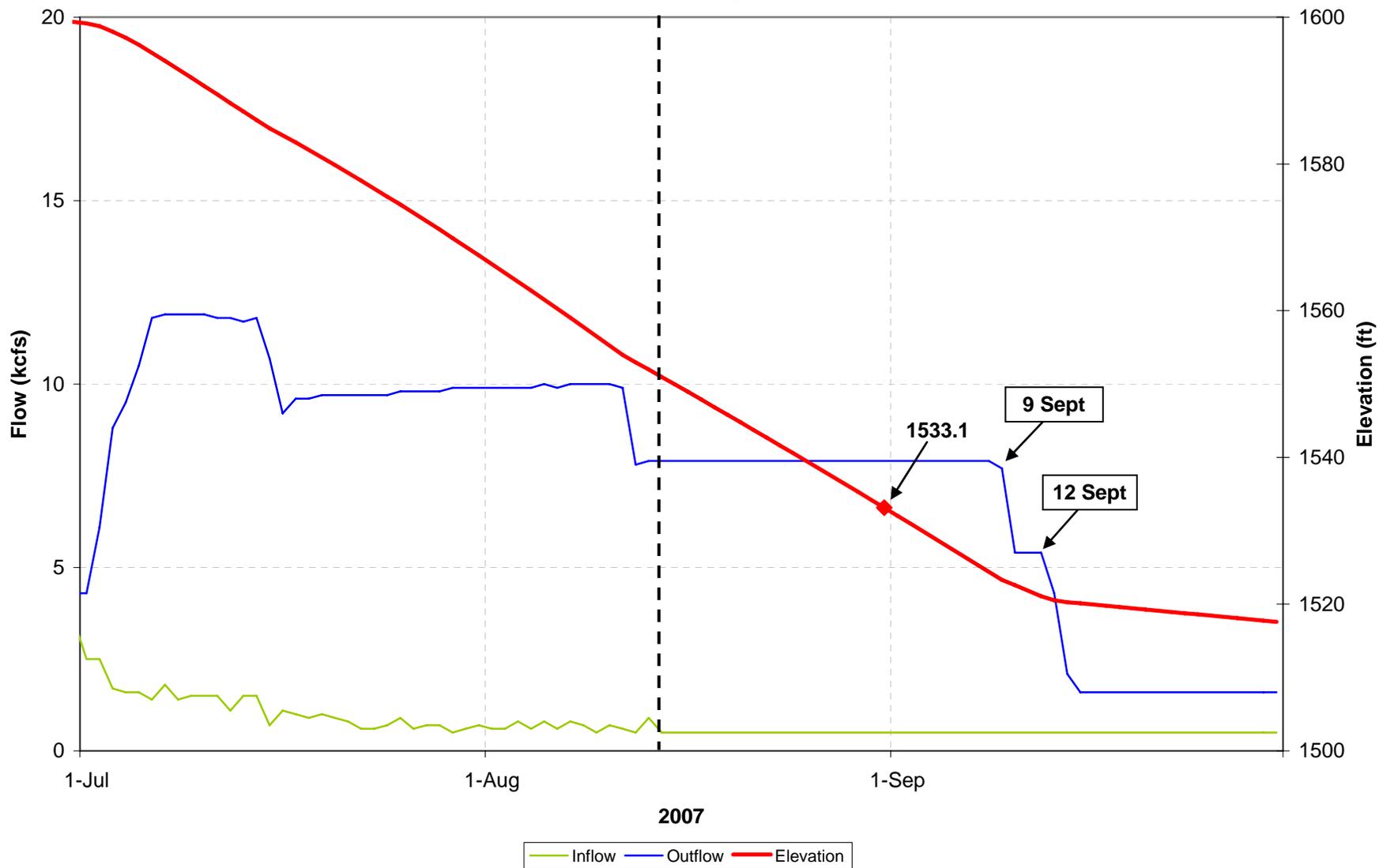
- Set agenda for next meeting - **August 22, 2007** [\[Calendar 2007\]](#) 

Questions about the meeting may be referred to [Cathy Hlebechuk](#) at (503) 808-3942 or [Jim Adams](#) at (503) 808-3938 or [Cindy Henriksen](#) at (503) 808-3945.

500 CFS INFLOW USED STARTING 8/14/07

APR-JUL VOLUME=1.800 MAF

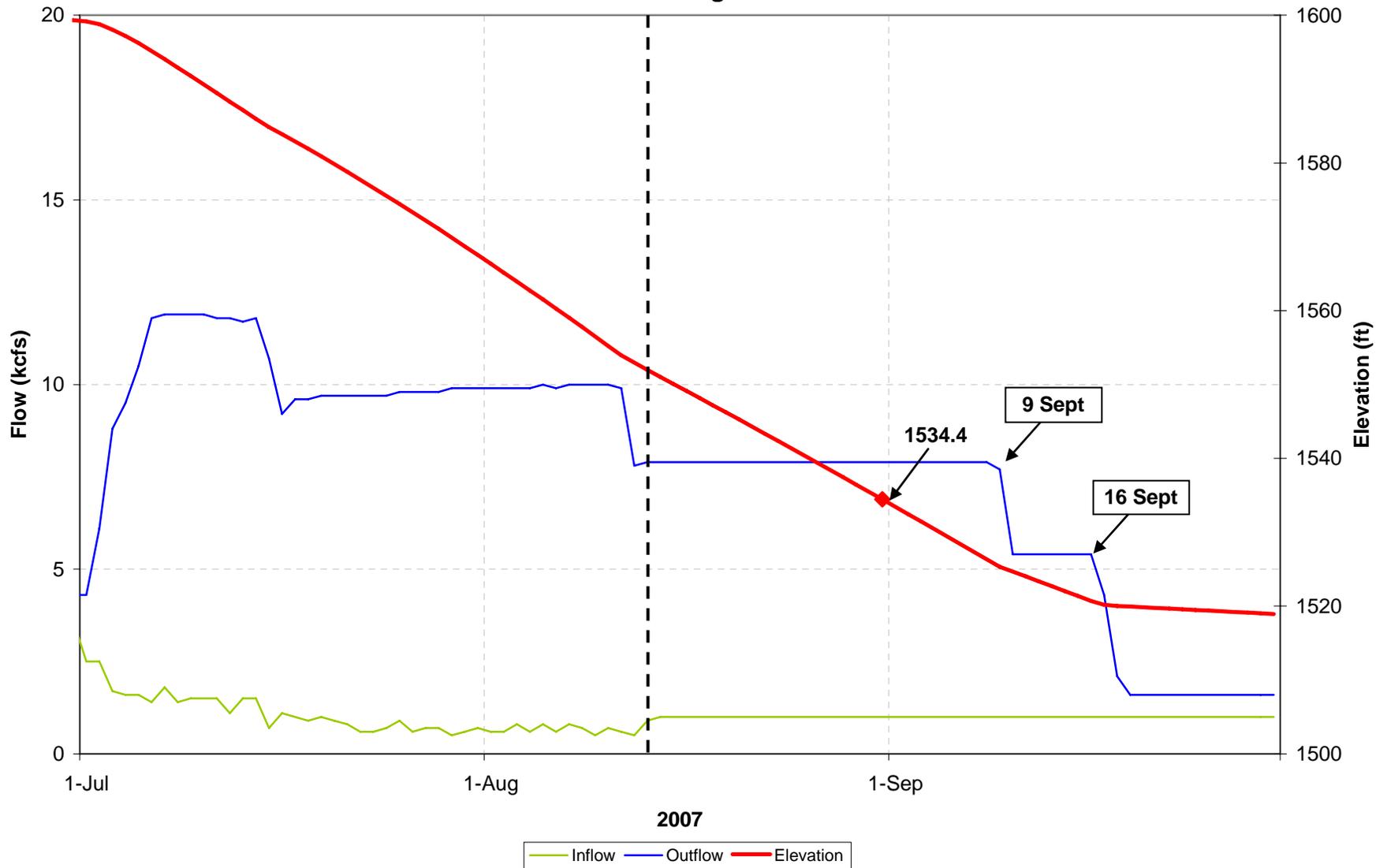
Dworshak 500 cfs Average Inflow



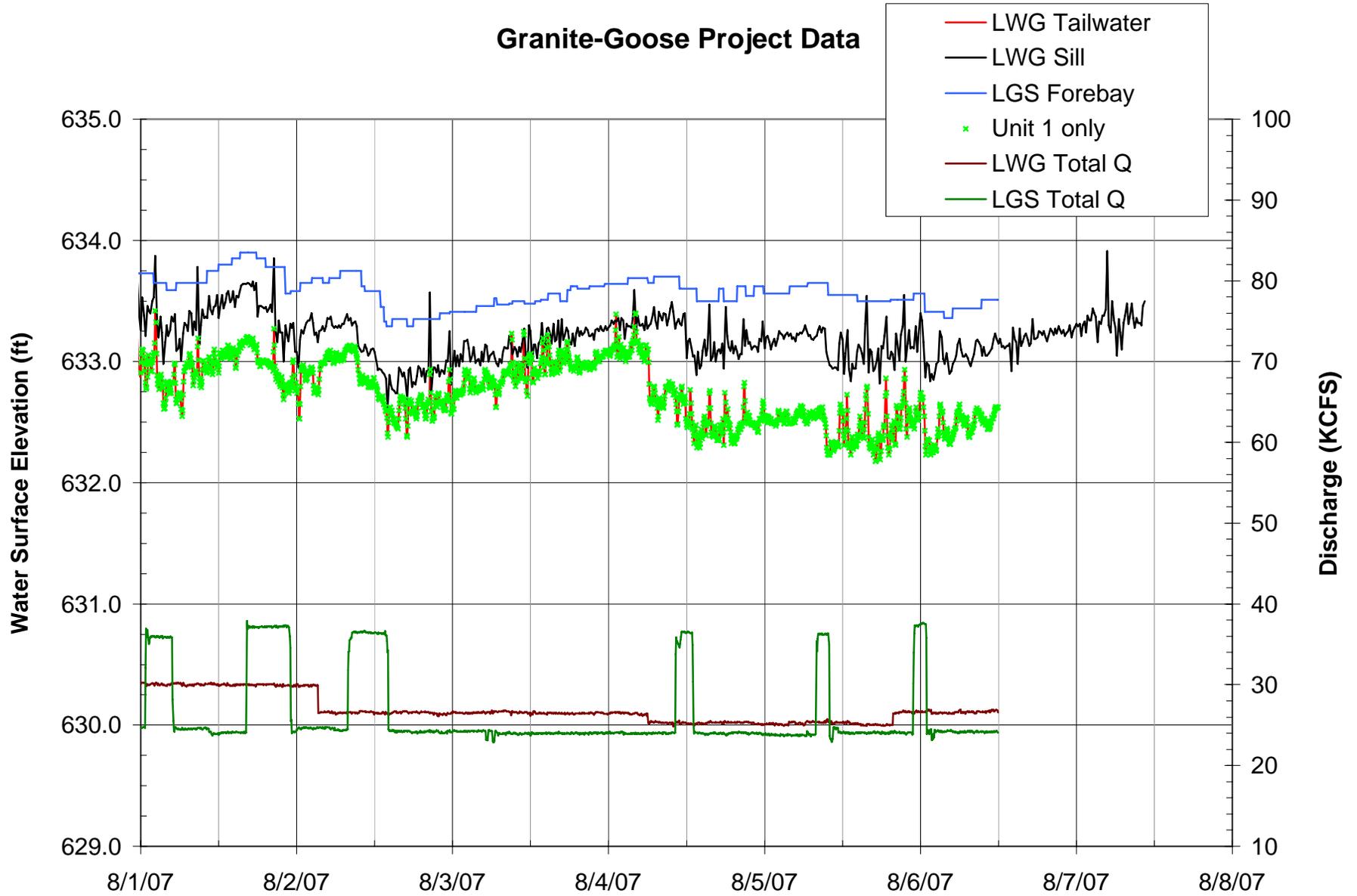
1 KCFS INFLOW USED STARTING 8/14/07

APR-JUL VOLUME=1.800 MAF

Dworshak 1 Kcfs Average Inflow



Granite-Goose Project Data



COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

August 15, 2007

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

Notes: Erin Halton

The following notes are a summary of issues that are intended to point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the "record" of the meeting, only a reminder for TMT members.

Review of Facilitator Notes / Meeting Minutes

The facilitator summary and official meeting minutes from the 7/25 and 8/1 conference calls were finalized. The facilitator notes from the 8/8 conference call were posted to the TMT website and were finalized. The official meeting minutes from the 8/8 conference call were expected to be posted later this or next week.

Action/Next Steps: The COE will post the 8/8 meeting minutes as soon as they are submitted. TMT will look to review/finalize the 8/8 minutes and 8/15 notes and minutes at the face-to-face meeting on 8/22.

Commercial Navigation Issues:

Jim Adams, COE, reported on the implementation of alternate spill patterns at Lower Granite and McNary for safe navigation. A total of six barges passed through McNary over the 8/11-12 weekend and the alternate patterns were reported to have worked well for navigation. Alternate patterns were implemented at Lower Granite twice over the weekend with mixed results varying from slight improvement to no change with respect to navigation. John Piggott, Columbia River Towboat Association, said that the Lower Granite pool appeared to dip just below MOP at times, providing thin barge clearance. Adams clarified that there are different gauge placements at Lower Granite and Little Goose and that the gauges may have caused the data to appear as though the pools dropped below the minimum operating levels. TMT members were referred to a graph linked to the agenda, showing project data for Little Goose and Lower Granite. The Walla Walla District COE planned to investigate this issue further and continue working with the Towboaters to meet their primary interest of keeping the pool levels at or above the minimum operating range for safe navigation. It was noted that at this point, the concern was at a level to warrant further investigation but not a change in operations.

Action/Next Steps: RCC COE will coordinate with its Walla Walla District office to resolve gauge reading issues and will continue to provide ample barge navigation depths. If further action is warranted, discussions will resume through the TMT process and there may be follow up on this item at the 8/22 TMT meeting.

Dworshak Operations Update

Jim Adams, COE, reported on Lower Snake River temperatures: the Lower Granite tailwater was averaging 65.3° F; Dworshak was discharging an average temperature of 45.5-46° F, with one unit in undershot and one in overshot. Adams said that air temperature data for the Lewiston area showed temperatures cooling through the upcoming weekend and into next week. Shaping for potential inflows of 500 cfs, 750 cfs and 1 kcfs were posted as links to the agenda, with each alternative's end of August elevation indicated. Salmon Managers present at the

meeting (USFWS, Idaho and Nez Perce) supported continuing the current operation, and acknowledged the potential to make a slight change later in order to achieve the 1535' elevation target on 8/31. TMT also reviewed thermocline graphs for Dworshak, which showed temperature data tracking slightly warmer than in 2005 and cooler than in 2006.

Action/Next Steps: The COE will continue to operate Dworshak with one unit in overshot and one in undershot. Outflows will be near 7.5 kcfs, and temperatures will be maintained at 45-46^o F degrees as best as possible. This item will be on the agenda for the 8/22 TMT meeting.

Autumn Treaty Fishing – SOR#2007 C3

Kyle Dittmer, CRITFC, shared the request for autumn treaty fishing operations, posted as a link to the TMT agenda: for Bonneville, John Day and Ice Harbor, hold the pools within 1' elevation for August 22-24th, August 28th - 31st, and September 4-8th, with appropriate elevations to be determined by the COE for the first two fisheries. Dittmer noted that specific elevation ranges for the September 4-8th timeframe will be requested through an SOR which will be shared at the September 5 TMT meeting. Jim Adams, COE, said the COE plans to operate the pools according to the 1998 Ted Strong (CRITFC) agreement with Colonel Mogren (NWP). He noted that discussions are ongoing amongst the COE and CRITFC about including specific language in the new BiOp that addresses Treaty fishing in the hopes of providing clear guidance for fisheries operations.

Action/Next Steps: Kyle Dittmer made a request to be copied on the COE's teletype list for the treaty operation. CRITFC will likely submit another SOR on 9/5 for the final September fishery.

Operations Review

Reservoirs – Jim Adams, COE and John Roache, BOR, reported on reservoir operations. Grand Coulee was at elevation 1281.2', and targeting an elevation of 1278' by 8/31. Hungry Horse was at elevation 3548.1' with outflows at 4.4 kcfs and holding through August, with outflows ramping down in September to meet Columbia Falls minimums. Libby was at elevation 2446.4', with inflows of 7.3 kcfs and outflows likely holding at 17.3 kcfs through the end of August. Adams noted that ESP runs show that if Libby shifted to outflows of 15 kcfs on 8/24, it would reach an elevation of 2438.99' by 8/31. Albeni Falls was at 2062.3', with inflows of 9.3 kcfs and outflows of 6.9 kcfs. Dworshak was at elevation 1551', with inflows of .7 kcfs and outflows of 7.9 kcfs. 7-day average flows at Lower Granite were 25.2 kcfs and 161 kcfs at McNary.

Fish – Dave Wills, USFWS, reported that fall Chinook numbers were just starting up and tracking per usual, and that subyearling passage was winding down.

Power system – Nothing to report.

Water quality – Jim Adams, COE, reported one exceedance that occurred 8/14 at Camas/Washougal. He added that the nighttime spill cap at Bonneville would drop by 5 kcfs on 8/15 given the higher temperatures but likely be increased right away with expected cooler temperatures on the way. He also reported that double testing at Little Goose was underway, with TDG levels staying in the range of 115-117%.

Next face-to-face TMT meeting: Wednesday, August 22nd

Agenda items will include:

- Dworshak Operations
- End of Spill Operations
- Operations Update

**Columbia River Regional Forum
Technical Management Team Conference Call
Aug. 15, 2007**

1. Introduction

Today's conference call was chaired by Jim Adams (COE) and facilitated by Robin Harkless (DS Consulting), with representatives from COE, BPA, BOR, CRITFC, Idaho, USFWS, and the barging industry attending. The following is a summary (not a verbatim transcript) of the topics discussed and decisions made at the meeting. Anyone with questions or comments about these notes should provide them to the TMT chair or bring them to the next meeting.

2. Review Meeting Minutes

The facilitator's notes for Aug. 8 have been posted, and the official minutes for Aug. 8 will be posted soon. There were no comments on any of the notes today. The Aug. 1 and 8 facilitator's notes can be considered finalized.

3. Navigation Issues Update

Eddies have been forming at Lower Granite and McNary dams, making lock passage on the Snake River difficult for boats that are fully loaded, Jim Adams said. At last week's TMT meeting, the COE proposed new spill patterns, which were discussed and implemented on Aug. 9. Barge operators at McNary have since expressed satisfaction with the new patterns. However, results were mixed at Lower Granite. Some operators are still reporting problems even with the alternate spill pattern employed.

John Piggott (chair of the Columbia River Towboaters Association) expressed concern that water depths in the Snake River may have gone below minimum pool in selected locations. Tow boaters have been working with the COE Walla Walla District on this. The question is whether elevation discrepancies measured at the tailwater gauge and at the downstream forebay gauge imply that, at times, some parts of the river may have elevations below MOP.

At Lower Granite Dam, the COE has installed a gage at the navigation lock which is visible to the lock operator during lockages, John Heitstuman (COE Walla Walla) said. There appears to be about 0.3 or 0.4 feet of difference in the datums of the two projects. The COE is conducting surveys to determine whether there is a datum difference between the two projects. Due to this uncertainty, the COE has placed a soft constraint to keep the Little Goose forebay in the upper half foot of MOP (633.5 – 634 feet). Adams presented a graph linked to today's agenda that depicts the discrepancy. For the most part, the river elevation as measured at the Lower Granite navigation lock gage has stayed above 633 feet at the downstream sill of the Lower Granite navigation lock.

As tow boats enter the lock, their captains communicate with dam operators, Adams said. In response to concerns about water depth, the COE has been operating the pool at Little Goose within the upper half foot, keeping elevations above 633.4 over the past 10 days. There was discussion of integrating elevation data into the GDACS system so it can be downloaded automatically. As it works now, the data is downloaded weekly and is available to the navigation lock operators in real time and the same elevation data are recorded electronically.

Because there's a hard sill where boats exit the navigation lock, that's where tow boaters really need to have adequate water to clear the sill, Piggott said. He asked what is needed to provide accurate readings. When the navigation lock reads 633 feet elevation, the water is actually 15 feet deep over the sill in spite of possible datum differences, the Walla Walla District said. This finding has been verified. The discrepancies occur between the tailwater gage at Lower Granite and the forebay gage at Little Goose – and they become more noticeable during periods of low flow. At such times the tailrace gage readings at Lower Granite are not truly representative of the depths barges experience at the navigation lock.

The industry representatives agreed to work with the Walla Walla District staff to investigate this issue further. If passage is found to be unsafe, and operational changes are recommended, they will bring the issue back to TMT for further consideration.

4. Dworshak Operations

Temperatures at Lower Granite tailwater were 65.3 degrees F yesterday, Adams said, and have been hovering around 65-66 degrees F for at least the past 7 days. Water temperatures are well under the 68 degree criteria.

On the evening of Aug. 11, Dworshak operations went from full powerhouse down to two units, with one in undershot and one in overshot mode. This resulted in a full degree increase in Dworshak outflow temperatures, which have been around 45.5 to 46 degrees F. Temperatures can be expected to rise slowly as the pool drops. A heat wave is predicted in Lewiston for the next few days, followed by cooler temperatures and possibly rain.

Adams presented modeling of three scenarios, 500 cfs, 750 kcfs, and 1 kcfs. If the current operation is maintained and inflows are 500 cfs through the end of August, the reservoir will be at elevation 1,533 feet, roughly 2 feet below the end of August elevation target of 1,535 feet. If inflows average 750 kcfs, the end August elevation will be 1,533.8 feet, or 1.2 feet lower than the target. If inflows average 1 kcfs, the elevation will be 1,534.4 feet on Aug. 31. Inflows at Dworshak have averaged 0.66 kcfs over the past 7 days. Kyle Dittmer (CRITFC) said these comparative graphs are helpful.

At FPAC, the Salmon Managers favored maintaining the current operations and tracking water temperatures weekly, Dave Wills (USFWS) said. The Nez Perce Tribe planned for use of its 200 kaf on the basis of Dworshak reaching elevation 1,535 feet on Aug. 31, but made the target somewhat flexible, Greg Haller said.

The current operation is to run two units, one in undershot and the other in overshot mode with approximately 7.5 kcfs outflows, Adams said. This operation is estimated to

bring the reservoir to 1,535 feet elevation at around 8 pm on Aug. 30. The Nez Perce Tribe was amenable to that operation.

5. Autumn Treaty Fishing

The Tribes are planning to fish from 6 a.m. Aug. 22 to 6 p.m., Aug. 24, and again from 6 a.m. Aug. 28 to 6 p.m. Aug. 31, Dittmer said. The SOR for this fishing season is posted on CRITFC's webpage. The Tribes anticipate a run of around 250,000 Chinook salmon at Bonneville Dam and almost 298,000 steelhead. CRITFC might present an additional SOR for more fishing at the Sept. 5 TMT meeting.

The current SOR requests a 1-foot flow band within specific elevation constraints, Dittmer said. During the fishery, Bonneville will operate between elevation 75 feet and 76.5 feet as a hard system constraint, Adams said. The Dalles pool typically operates within a 3-foot range, and the John Day pool within a 1.5-foot range at elevation 262.5 to 264 feet. This is according to the 1998 Colonel Mogren/Ted Strong agreement. Dittmer asked the COE to send him a copy of its teletyped instructions regarding treaty fishing operations.

6. Operations Review

a. Reservoirs. Libby forebay is at elevation 2,446.4 feet, with average inflows of 7.3 kcfs. Outflows of 17.3 kcfs are being maintained until around Aug. 24, when they will ramp down to 15.7 kcfs. According to STP projections, the reservoir will hit elevation 2,438.99 feet on Aug. 31 under this operation.

Albeni Falls is at elevation 2,062.3 feet, as measured at the Hope gage, with inflows of 9.3 kcfs and outflows of 6.9 kcfs.

Dworshak forebay is at elevation 1,551 feet, with daily inflows of 0.7 kcfs and outflows of 7.9 kcfs. The 7-day average for inflows to Dworshak is about 0.66 kcfs. The 7-day average for inflows to Lower Granite is 25.2 kcfs. The 7-day inflow average at McNary is 161 kcfs.

Hungry Horse is at elevation 3,548.10 feet, discharging 4.4 kcfs through the end of August. Starting Sept. 1, BOR will ramp down the discharges to meet the Columbia Falls minimum flow of 3.5 kcfs Ramp down rates will probably be about 600 kcfs per day to get down to minimum flows.

Grand Coulee is at elevation 1,281.2 feet, heading toward 1,278 feet by Aug. 31. The plan for Banks Lake is the same as every year: draft 5 feet out toward elevation 1,565 at end August. The current elevation of Banks Lake is 1,567 feet, with 1,565 feet expected by end August.

b. Fish. There is not much going on at present, Dave Wills said. The adult fall Chinook run is just starting. Subyearling passage numbers are winding down on the Snake River, but there are still a number of fish passing at John Day and Bonneville dams.

c. Power System. There is nothing to report, Robyn MacKay (BPA) said.

d. Water Quality. There was an exceedance yesterday at Camas Washougal gage, and there will probably be another one today, Adams said. The COE will drop the spill cap by 5 kcfs but will raise it again if the weather cools.

Doble testing is in progress at Little Goose now, moving to Lower Monumental next week and to Lower Granite the following week. TDG levels at the Lower Monumental gage are around 115-117% and there have been no exceedances.

7. Next TMT Meeting

The next meeting will be in person on Aug. 22, with Dworshak operations, end of spill season, and the usual operations review on the agenda. There will be a TMT conference call on Aug. 29 and an in-person meeting on Sept. 5. This summary prepared by consultant and writer Pat Vivian.

Name Affiliation

Jim Adams COE
Tina Lundell COE
Robyn MacKay BPA
John Roache BOR
Kyle Dittmer CRITFC
Tony Norris BPA
Shane Scott NWRP
Bob Diaz PPM Energy
Laura Hamilton COE
Jennifer Miller Susquehanna
Mike Walker XXX
John Piggott Barge Lines of the Columbia River
Steve Shaver River Transportation
Terry Weeks PNGC
Bernard Klatte COE
Glen Vansco Pacific NW Waterways
David Wills USFWS

Phone:

Tracy Schwarz COE Walla Walla
Ann Glassley COE Walla Walla
Rob Wall COE Walla Walla
Steve Juul COE Walla Walla
John Heitstuman COE Walla Walla
Russ Kiefer Idaho
Greg Haller Nez Perce

TECHNICAL MANAGEMENT TEAM

BOR : John Roache/Mary Mellema/Pat McGrane

BPA : Robyn MacKay/Tony Norris/Scott Bettin

NOAA-F: Paul Wagner/Richard Dominigue

USFWS : David Wills/Steve Haesecker

OR : Rick Kruger/Ron Boyce

ID : Russ Kiefer

WDFW : Cindy LeFleur

MT : Jim Litchfield/Brian Marotz

COE: Cathy Hlebechuk/Jim Adams/Cindy Henriksen

TMT MEETING

Wednesday August 22, 2007 09:00 - 12:00

1125 N.W. Couch Street, Suite 4A34

Portland, Oregon 97209-4142

Map Quest [\[Directions\]](#)

NOTE: NEW CONFERENCE PHONE LINE

Conference call line:**203-310-2162**; PASS CODE = **4703150**

To check into the building, take the elevator to the 5th floor and the guard will issue you an ID badge if you need one and will take you down to the 4th floor where the meeting is. If you have NOT attended a TMT meeting in the past you will need to call ahead and let Jim Adams (503) 808-3938, Cathy Hlebechuk (503) 808-3942, or Cindy Henriksen (503) 808-3945 know, so you can be added to the TMT Visitor List and issued an ID badge. This badge may be used indefinitely. If you have attended TMT in the past you may re-use your ID badge indefinitely. If you are a federal employee you will also need to have an ID badge issued to you which can be used indefinitely.

We have had disruptions on the phone because people are not hitting 'mute' after dial in.

Please MUTE your Phone

All members are encouraged to call Robin Harkless with any issues or concerns they would like to see addressed.

Please e-mail her at robin76@cnmw.net or call her at (503) 248-4703.

AGENDA

1. Welcome and Introductions
2. Review [\[Meeting Minutes\]](#)

3. Dworshak Operations - All
 - a. Weather Forecast [\[Lewiston Weather Forecast\]](#)
 - b. [\[Dworshak Water Temperatures Data\]](#)
 - c. [\[Daily Water Temperature Reports\]](#)
 - d. Dworshak outflows - draft to 1535' end August
 1. [\[with 750 cfs inflows\]](#)

4. End of Spill
 - a. Lower Snake River end of MOP
 - b. [\[MCN TSW Closure/Spill Pattern\]](#) 
 - c. MCN Spill Schedule
 - d. BON B2CC Closure

5. [\[2008 Draft Water Management Plan\]](#)  - *Scott Boyd, USACE*

6. Operations Review

- a. Reservoirs
- b. Fish
- c. Power System
- d. Water Quality - *Jim Adams, COE*
 1. [\[Spill Information 2007\]](#)

7. Other

- Set agenda for next meeting - **August 29, 2007** [\[Calendar 2007\]](#) 

Questions about the meeting may be referred to [Jim Adams](#) at (503) 808-3938 or [Cathy Hlebechuk](#) at (503) 808-3942 or [Cindy Henriksen](#) at (503) 808-3945.

750 CFS INFLOW USED STARTING 8/22/07

APR-JUL VOLUME=1.800 MAF

Dworshak 750 cfs Average Inflow

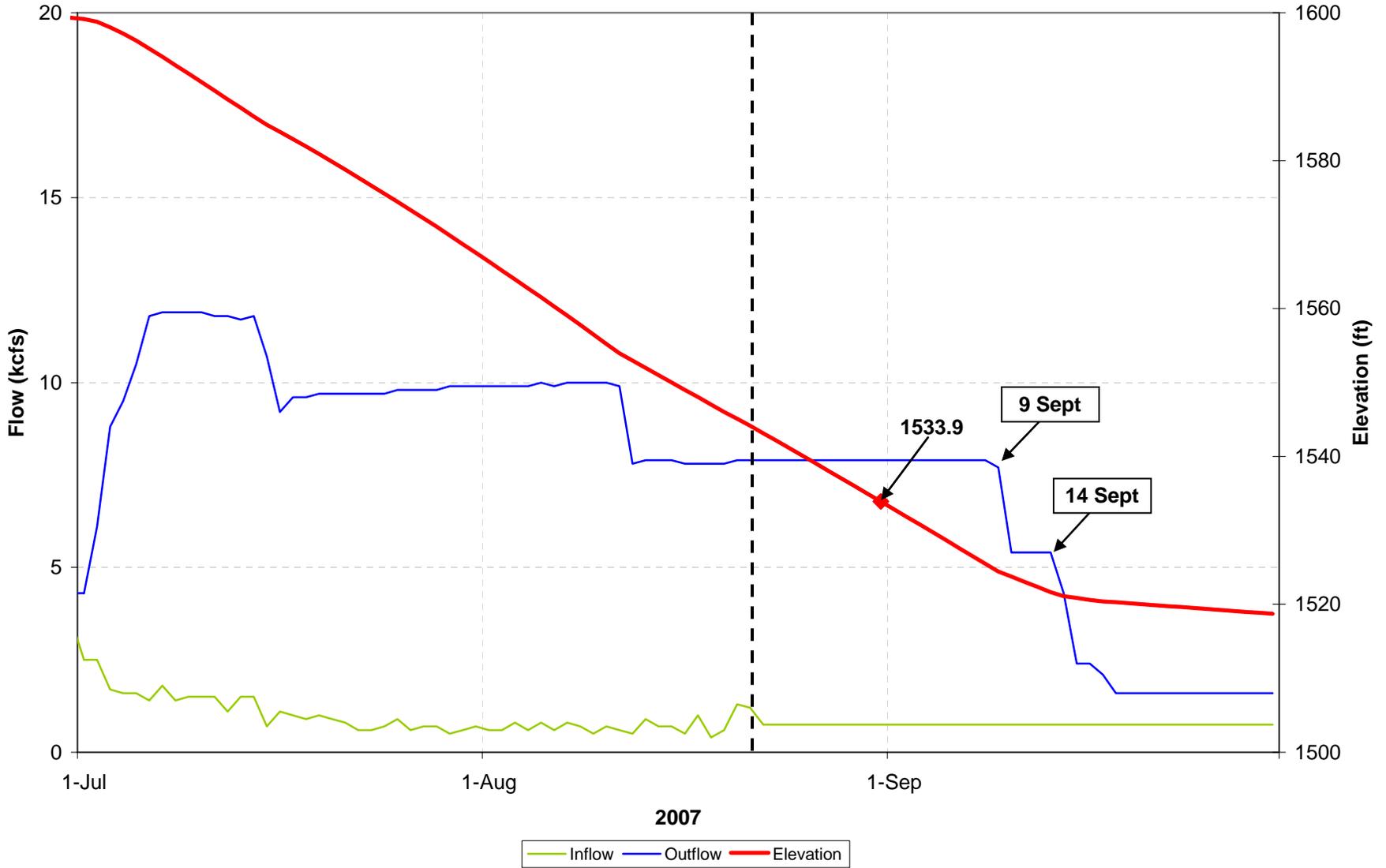


Table MCN-7. McNary "August 30 and 31 2007 Spill Pattern". (Discharge at forebay elevation 339)

(24 August 2007)

SPILLWAY BAY (Gate Opening in feet)																						Total Stops	Total Spill (kcfs)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		
2	3.5	3.5	2	2	2		2	2	2	1												22	42.1
2	3.5	3.5	2	2	2		2	2	2	2												23	44.0
2	3.5	3.5	2	2	2		2	2	2	2	1											24	46.0
2	3.5	3.5	2	2	2		2	2	2	2	2											25	47.9
2	3.5	3.5	2	2	2		2	2	2	2	2	1										26	49.9
2	3.5	3.5	2	2	2		2	2	2	2	2	2										27	51.8
2	3.5	3.5	2	2	2		2	2	2	2	2	2	1									28	53.8
2	3.5	3.5	2	2	2		2	2	2	2	2	2	2									29	55.7
2	3.5	3.5	2	2	2		2	2	2	2	2	2	2	1								30	57.7
2	3.5	3.5	2	2	2		2	2	2	2	2	2	2	2								31	59.6
2	3.5	3.5	2	2	2		2	2	2	2	2	2	2	2	1							32	61.6
2	3.5	3.5	2	2	2		2	2	2	2	2	2	2	2	2							33	63.5
2	3.5	3.5	2	2	2		2	2	2	2	2	2	2	2	2	1						34	65.5
2	3.5	3.5	2	2	2		2	2	2	2	2	2	2	2	2	2						35	67.4
2	3.5	3.5	2.5	2.5	2		2	2	2	2	2	2	2	2	2	2						36	69.1
2.5	3.5	3.5	2.5	2.5	2.5		2	2	2	2	2	2	2	2	2	2						37	70.8
2.5	4	4	2.5	2.5	2.5		2	2	2	2	2	2	2	2	2	2						38	72.4
2.5	4	4	3	2.5	2.5		2.5	2	2	2	2	2	2	2	2	2						39	74.1
2.5	4.5	4.5	3	2.5	2.5		2.5	2	2	2	2	2	2	2	2	2						40	75.7
2.5	4.5	4.5	3	2.5	2.5		2.5	2.5	2.5	2	2	2	2	2	2	2						41	77.4
2.5	5	5	3	2.5	2.5		2.5	2.5	2.5	2	2	2	2	2	2	2						42	79.0
2.5	5	5	3	2.5	2.5		2.5	2	2	2	2	2	2	2	2	2	2					43	81.2
2.5	5	5	3	2.5	2.5		2.5	2.5	2.5	2	2	2	2	2	2	2	2					44	82.9
2.5	5	5	3	2.5	2.5		2.5	2.5	2.5	2.5	2.5	2	2	2	2	2	2					45	84.6
2.5	5	5	3	2.5	2.5		2.5	2.5	2.5	2.5	2.5	2.5	2	2.5	2	2	2					46	86.3

Table MCN-7. McNary "August 30 and 31 2007 Spill Pattern". (Discharge at forebay elevation 339)

(24 August 2007)

SPILLWAY BAY (Gate Opening in feet)																						Total Stops	Total Spill (kcfs)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		
2.5	5	5	3	2.5	2.5		2.5	2.5	2.5	2.5	2.5	2	2	2	2	2	2	2				47	88.5
2.5	5	5	3	2.5	2.5		2.5	2.5	2.5	2.5	2.5	2.5	2	2.5	2	2	2	2				48	90.2
2.5	5	5	3	2.5	2.5		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2	2.5	2	2				49	91.9
2.5	5	5	3	2.5	2.5		2.5	2.5	2.5	2.5	2.5	2.5	2	2.5	2	2.5	2	2.5			1	50	93.9
2.5	5	5	3	2.5	2.5		2.5	2.5	2.5	2.5	2.5	2.5	2	2.5	2	2.5	2	2.5			2	51	95.8
3	5	5	3	2.5	2.5		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2	2.5	2	2.5			2	52	97.5
3	5	5	3	2.5	2.5		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5			2	53	99.2
3	5	5	3	3	3		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5			2	54	100.9
3	5	5	4	3	3		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5			2	55	102.5
3	5	5	4	3	3		3	3	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5			2	56	104.2
3.5	5	5	4	3	3		3	3	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5			2.5	57	105.9
3.5	5	5	4	3	3		3	3	3	3	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5			2.5	58	107.6
3.5	5	5	4	3	3		3	3	3	3	2.5	3	2.5	3	2.5	2.5	2.5	2.5			2.5	59	109.3
3.5	5	5	4	3	3		3	3	3	3	2.5	3	2.5	3	2.5	3	2.5	3			2.5	60	111.0
3.5	5	5	4	3	3		3	3	3	3	3	3	3	3	2.5	3	2.5	3			2.5	61	112.7
3.5	5	5	4	3	3		3	3	3	3	3	3	3	3	3	3	3	3			2.5	62	114.4
3.5	6	5	4	3	3		3	3	3	3	3	3	3	3	3	3	3	3			2.5	63	116.0
3.5	6	6	4	3	3		3	3	3	3	3	3	3	3	3	3	3	3			2.5	64	117.6
3.5	6	6	4	4	3		3	3	3	3	3	3	3	3	3	3	3	3			2.5	65	119.2
3.5	6	6	4	4	4		3	3	3	3	3	3	3	3	3	3	3	3			2.5	66	120.8
3.5	6	6	4	4	4		3	3	3	3	3	3	3	3	3	3	3	3			3.5	67	122.4
3.5	6	6	4	4	4		4	3	3	3	3	3	3	3	3	3	3	3			3.5	68	124.0
3.5	6	6	4	4	4		4	4	3	3	3	3	3	3	3	3	3	3			3.5	69	125.6
3.5	6	6	4	4	4		4	4	4	3	3	3	3	3	3	3	3	3			3.5	70	127.2
3.5	6	6	4	4	4		4	4	4	4	3	3	3	3	3	3	3	3			3.5	71	128.8

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

August 22, 2007

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Harkless

Notes: Erin Halton

The following notes are a summary of issues that are intended to point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the "record" of the meeting, only a reminder for TMT members.

Review of Facilitator Notes / Meeting Minutes

The facilitator summary and official meeting minutes from the 8/8 TMT conference call and 8/15 meeting had been posted to the web. No changes or edits were made to the documents and they were finalized.

Dworshak Operations Update

Jim Adams, COE, reported on Lower Snake River temperatures: the Lower Granite tailwater was averaging 66.7° F; Dworshak was discharging an average temperature of 46.6° F, with outflows of 7.9 kcfs and one big unit in undershot/one small unit in overshot. The Dworshak pool was at elevation 1544', with a seven day average inflow of 0.81 kcfs; Adams noted that inflows had been 1.2-1.3 kcfs the two days prior to the meeting. An STP graph linked to the agenda showed shaping results for Dworshak inflows of 750 cfs, predicting an 8/31 elevation of 1533.9'. Adams noted that there would likely be a shift to a one big unit operation near 9/10. Dave Wills, USFWS, thanked the COE for the head's up and said that the Salmon Managers would consider specific Dworshak configurations as we get closer to September.

Action/Next Steps: The COE will continue to operate Dworshak with one unit in overshot and one in undershot. This item will be on the agenda for the 8/29 TMT conference call.

End of Spill

Bernard Klatt, COE, reported on end of spill specifications at the following projects:

- MOP operations at Little Goose, Lower Monumental and Ice Harbor are set to end on 8/31 at midnight. Paul Wagner, NOAA, speaking on behalf of the Salmon Managers, said that their preferred filling sequence is: Little Goose, then Lower Monumental, then Ice Harbor, to take best advantage of the cooler water upriver. Robyn MacKay, BPA, said that given the low flows, BPA did not anticipate any major issues associated with filling the pools.
- Lower Granite will stay in MOP until natural cooling occurs; Wagner reported that FPOM had discussed the possibility of a MOP+1 to MOP+2 operation through mid-September to support operation of the Lower Granite fish trap.

Action/Next Steps: This item will be on TMT agendas for the next few weeks.

- Spill at McNary is scheduled to end on 8/31; project operators will close the TSW's late on Thursday, 8/30. With spill bays 20 and 22 with the TSW's closed entirely, the Corps requested that this spill be shifted to middle bays (likely bays 10 and 12). The request had been coordinated with Gary Fredericks, NOAA, and Tom Lorz, CRITFC. Paul Wagner, NOAA, speaking on behalf of the Salmon Managers, said that no objection was raised to the request at the FPAC meeting on 8/22.
Action/Next Steps: Spill patterns will be developed through the COE Walla Walla District office; the COE will issue a teletype and link the spill pattern to today's TMT agenda.
- McNary's research-driven spill schedule has alternated between 40 and 60% spill. Due to lack of sufficient water supply to hold spill at 60%, especially on weekends, the COE made a request to shift the 40% and 60% spill blocks so that McNary spill would end with 2 days of 60% spill. Paul Wagner, NOAA, speaking on behalf of the Salmon Managers, said that no objection was raised to the request at the FPAC meeting on 8/22.
Action/Next Steps: The COE suggested addressing the McNary spill pattern in next year's Water Management Plan.
- Bonneville's B2 corner collector will close within 12 hours of the end of spill, in accordance with the Fish Passage Plan.

Special Announcement: Bernard Klatte, COE, announced that he had accepted a position as Lower River Coordinator at the COE Portland District office. Congratulations, Bern!

2008 Water Management Plan

Scott Boyd, COE, reported that a draft 2008 Water Management Plan (WMP) based on the February 2007 version of the Water Management Plan was posted as a link to the TMT homepage. Boyd noted that the new draft had been formatted to be more 'project' specific.

Action/Next Steps: The COE will email TMT members a copy of the 2008 WMP for their review. Comments/edits should be submitted in a redline version, with specific regard to how the new document relates to the existing (2004) BiOP. This item will be on the agenda for the next few TMT meetings.

Operations Review

Reservoirs – Jim Adams, COE and Mary Mellema, BOR, reported on reservoir operations. Libby was at elevation 2443', with inflows of 7.4 kcfs and outflows at 17.3 kcfs. Albeni Falls was at 2062.26', with inflows of 9.86 kcfs and outflows of 8.44 kcfs. Dworshak was at elevation 1544'. Seven-day average flows at Lower Granite were 22.3 kcfs and 137.2 kcfs at McNary. Grand Coulee was at elevation 1281', and targeting an elevation of 1278' by 8/31 and a possibility of a .5' drop below 1278' during the day on 8/31. Hungry Horse was at elevation 3545.86' with outflows at 4.4 kcfs and holding through August, with outflows ramping down to 2.2-2.3 kcfs for 3-4 days in September to meet Columbia Falls minimums.

Fish – Paul Wagner, NOAA, reported on juvenile fish: smolt data showed subyearling Chinook were in the 100 per day range at Lower Granite, in the teens-100 per day range

at Little Goose. He noted that passage at McNary had dropped dramatically, down from 58,000 on 8/11 to 2,500 for the past week. Cindy LeFleur, WA, reported on adult fish: steelhead counts over Bonneville were in the 11,000 per day range and were expected to be above average for the season. Fall Chinook were expected to increase dramatically and peak the week of 8/27.

Action/Next Steps: Cindy LeFleur, WA, will provide an adult passage summary for an early September TMT meeting.

Power system – Nothing to report.

Outages – Don Faulkner, COE, reported that there will be an outage at Little Goose on 9/11-13, to finish double testing. Outages at Ice Harbor will take place on 8/28 to remove USGS equipment and 9/23-27 to allow for equipment calibration.

Action/Next Steps: The Little Goose outage will be on the agenda for the next TMT meeting, to allow further discussion and option generation.

Water quality – Jim Adams, COE, reported one exceedance that occurred 8/17. He added that TDG levels were low overall and that Lower Columbia temperatures were in the 69-70° range.

Next TMT meeting: a conference call on Wednesday, August 29th

Agenda items will include:

- Dworshak Operations
- Outages
- Operations Update

**Columbia River Regional Forum
Technical Management Team Conference Call
Aug. 22, 2007**

1. Introduction

Today's face-to-face meeting was chaired by Jim Adams (COE) and facilitated by Robin Gumpert (formerly Harkless), with representatives from COE, Idaho, BPA, BOR, NOAA, USFWS, Montana and Washington attending. The following is a summary (not a verbatim transcript) of the topics discussed and decisions made at the meeting. Anyone with questions or comments about these notes should provide them to the TMT chair or bring them to the next meeting.

2. Review Meeting Minutes

Facilitator notes and official minutes for all meetings to date have been posted. There were no comments on them today.

3. Dworshak Operations

Lower Granite tailwater temperatures yesterday averaged 66.7 degrees F, and Little Goose tailwater was 67.1 degrees F, meaning both are under the criteria of 68 degrees, Jim Adams (COE) said. Lower Monumental tailwater was 68.1 degrees or just over criteria, and Ice Harbor tailwater was 71.0. In general the river is cooling.

Dworshak outflows averaged 46.6 degrees F as of yesterday, with outflows still at 7.9 kcfs. The pool elevation is 1,544 feet. Seven-day average inflows are 0.81 kcfs, with inflows of 1.2 or 1.3 over the past few days.

Currently, the big unit is in undershot and the small unit in overshot mode. If it is assumed that the temperature resulting from undershot mode is about 41 degrees F, overshot flows should be around 61.5 degrees F, Adams said. According to the STP run, operations drop down to a single unit sometime around Sept. 10th and operational decisions may need to be made.

Paul Wagner (NOAA) asked, what about dropping to two small units instead? Yes, that's a possibility, Adams said, but the STP run modeled a change to one big unit on Sept. 10, with flows dropping to about 5 kcfs. Using two small units instead, with one unit in undershot and one in overshot mode, would yield temperatures around 50 degrees F. Adams asked TMT whether they would prefer that result, or temperatures in the 40s with the big unit in overshot mode. David Wills (USFWS) suggested TMT decide the week before the change is scheduled to happen.

{Supplemental Notation: The Corps will implement the operational strategy outlined in the 2007 Operational Plan for the use of the Nez Perce Tribe's 200 kaf of Stored Water in Dworshak Reservoir. Any amendments to this strategy will only occur upon unanimous written consent of the parties of the Nez Perce Board}

4. End of Spill

a. Lower Snake River End of MOP. The end of spill is Aug. 31 at midnight, Adams said. A number of issues need to be addressed, beginning with MOP operations in the lower Snake River. FPAC discussed that yesterday and agreed on a strategy of filling the upper reservoirs in sequence from Little Goose to Ice Harbor with cooler water first, beginning Aug. 31. The preference is to keep flows above 10 kcfs minimums in order to fill the pools, Wagner said.

{Supplemental Notation: Minimum flows at Little Goose and Lower Monumental are 11.5 kcfs (March – November). Minimum flows at Ice Harbor is normally 7.5 kcfs (August – November), but due to the Sacajawea transformer outage issue, minimum generation flow at Ice Harbor is 9.5 kcfs in order to provide voltage support to the system.}

Lower Granite will stay in MOP operations until sometime in October, Adams said. Wagner gave TMT a heads-up that a decision point regarding operation of the adult trap at Lower Granite will probably occur in September. The issue is providing enough water for additional fish tanks, Scott Bettin (BPA) said. Cindy LeFleur (Washington) asked, does anybody see a problem with operating at MOP +1 foot in September? We're operating at MOP to MOP+1 on Snake River pools now for the sake of navigation, so you're probably talking MOP+2, Jim Litchfield (Montana) replied. This issue will be on TMT agendas in the coming weeks.

b. McNary TSW Closure and Spill Pattern. Spill ends at midnight on the Friday before a holiday weekend, Bernard Klatte (COE) said. At McNary, operators are required to close the TSWs in bays 20-22 on Friday and shift that spill into the middle of the spill pattern. Because they're not scheduled to work on Friday, the COE is requesting that the TSWs be closed as late as possible Thursday afternoon, Aug. 30. In offline discussions, NOAA and CRITFC representatives didn't see a problem as long as the spill is shifted to the middle of the spill pattern, Klatte said. FPAC has discussed this issue and doesn't see a problem, Wagner said. Klatte will send out a teletype on this operation and post the spill pattern to be used to today's agenda.

c. McNary Spill Schedule. Last year, the COE didn't get definitive information on whether 60% or 40% spill is better for fish, so the COE scheduled spill to alternate between the two levels randomly until the end of spill, Klatte said. Based on early 2000 data, spill below 40% creates bad egress and survival

conditions. On Aug. 20, a 60% spill day, there wasn't enough water to provide 60% all day so Klatte discussed alternative spill operations with several of the Salmon Managers on whether to spill 60% until water is depleted, or spread spill out. The agreed operation was to go to 40% and spread the spill out over the remainder of the 60% block. The same thing is anticipated to occur next Monday, which is also a 60% spill day. The end result of this situation was a COE request to switch the last block of 40% with the last block of 60% spill days around so that there will always be at least 40% spill available. No one objected to this request. FPAC has discussed it and decided it wouldn't be a problem, Wagner said. The only question is, what is the total number of days at 40% or 60% spill? It would be exactly the same number of spill days as planned, just on different days, Klatte said. Bettin suggested this be addressed in the 2008 Water Management Plan.

d. Bonneville B2 Corner Collector Closure. Similar to the request to close the TSWs at McNary early on Labor Day weekend, the COE initially requested to close the B2 corner collector early. The Fish Passage Plan says the corner collector must close within 12 hours of the end of spill. In response to Klatte's coordination efforts to make that happen, Bonneville project staff volunteered to come to work on Friday, Aug. 31 (their day off), and close it.

5. 2008 Draft Water Management Plan

Scott Boyd (COE) introduced a draft of the 2008 Water Management Plan, organized by project this year instead of by strategy. The new format was in response to previous comments regarding the WMP. Boyd explained that he did not use Tony Norris's extensive revision because it was based on a version of the WMP that has since become obsolete.

Boyd, who is managing 2008 WMP development, will email his draft to TMT members and look for comments within the next few weeks. The major effect of the reorganization is that readers will no longer be able to cross-reference a given action, as they could when the WMP was organized according to strategies, Klatte said. Readers will need to look under each project for information on a given action. This could be a challenge because the Bi Ops will continue to be organized by strategy, not by project. WMP development will be on TMT agendas in the coming weeks.

6. Operations Review

a. Reservoirs. Libby is at elevation 2,443 feet, with inflows of 7.4 kcfs and outflows of 17.3 kcfs, Adams said. Albeni Falls is at elevation 2,062.26 at the Hope gage, with inflows of 9.86 kcfs and outflows of 8.44 kcfs.

Dworshak is at elevation 1,544 feet, with details provided in today's discussion. The 7-day average for inflows to Lower Granite is 22.3 kcfs. The 7-day inflow average at McNary is 137.2 kcfs.

Hungry Horse is at elevation 3,545.86 feet, with 4.4 kcfs outflows through the end of August, Mary Mellema (BOR) said. Operations will ramp Hungry Horse discharges down the first week of September to meet the Columbia Falls minimum of 3500 cfs, (the minimum ramp down rate is 600 cfs per day). It will take three or four days to get down to an approximate discharge of 2200 to 2400 cfs. BOR estimates an end of August elevation of around 3542.4 feet and will begin reducing Hungry Horse outflows on Sept. 1.

Grand Coulee is at elevation 1,281 feet. The current plan is to draft the reservoir to 1,278 feet on Aug. 31. The pool elevation may go slightly below 1,278 feet, by up to half a foot for operating flexibility. The elevation will be up to 1,278 feet or higher by early morning on Sept. 1, Mellema said.

b. Fish. Paul Wagner (NOAA) and Cindy LeFleur (Washington) gave updates. Juvenile passage numbers are dwindling, Wagner said. The only sizable migration is subyearling Chinook at Lower Granite, where around 100 per day passed last week. Little Goose is passing less than 100 fish per day, and Lower Monumental is passing around 50 fish per day. McNary is experiencing a dramatic decrease, with an index count of 58,000 fish on Aug. 11, down to 2500 in the past week. A few steelhead are still showing up at Little Goose, but their numbers are dwindling as well.

In terms of adult passage, the best news is adult steelhead – 11,000 or so passing Bonneville per day recently, LeFleur said. Previous index counts indicate this is not the result of delayed migration. It is a dramatic increase over the 5,000 or so fish passing two weeks ago. Peak passage time for fall Chinook begins around Sept. 8. LeFleur will give TMT an update on the run size in two or three weeks. The majority of steelhead are in the Snake River, but they're also going into all the tributaries of the Columbia.

Robyn MacKay asked about sea lions. They're an early spring nuisance, Wagner said, and have gone south by now.

c. Power System. There is nothing to report, Robyn MacKay (BPA) said.

d. Water Quality. The last exceedance was on Aug. 17 due to warm weather, Adams reported. Flows and spill have been too low to meet the spill caps, and TDG levels are low in the river. Temperatures in the Columbia are ranging from 69 degrees F at McNary tailwater to 70 degrees F at Camas Washougal gage.

e. Planned Outages. Doble testing at Little Goose didn't get finished last week as planned, Don Faulkner (COE) said. Project staff therefore requested a planned outage 11-13 Sept for 24 hours a day to finish the process. There is a possibility of spreading the outage out over several days, but Wagner said there's not much fish passage at night, so there's little point in doing that. He will bring this issue to FPAC for further consideration and report back to TMT. Doble testing at Goose will be on the Aug. 29 TMT agenda.

There's a planned outage at Ice Harbor on Aug. 28 to remove USGS hydrophones, Faulkner said. Also, Ice Harbor staff has requested an outage on 23-27 Sept. to calibrate the spill gage. Because that's the beginning of peak fall Chinook and steelhead migration, Wagner (NOAA) objected to the 23-27 Sept. Ice Harbor outage. Faulkner will advise project staff to use stop logs to perform the calibration or postpone it until next spring.

7. Next Meetings

There will be a TMT conference call on Aug. 29, with review of meeting minutes, the Little Goose doble testing schedule, Dworshak operations, August treaty fishing, and September operations on the agenda.

There will be another TMT conference call on Sept. 5 to discuss Lower Granite and Dworshak operations, followed by another call on Sept. 19. Gumpert said she would begin gathering information for the TMT year-end review Nov. 28. This summary was prepared by consultant and writer Pat Vivian.

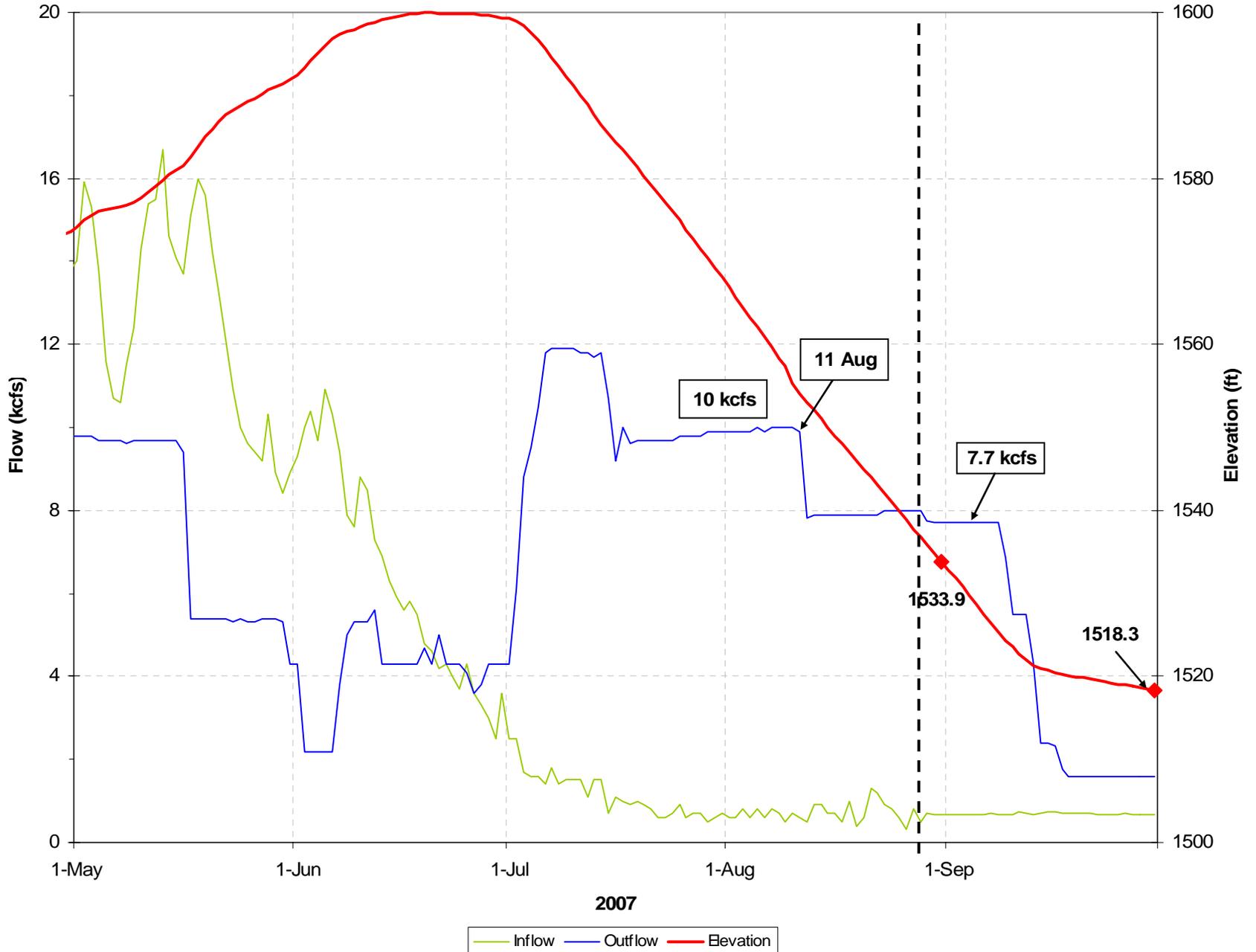
Name	Affiliation
Jim Adams	COE
Russ Kiefer	Idaho
Robyn MacKay	BPA
Mary Mellema	BOR
Scott Boyd	COE
Paul Wagner	NOAA
Dave Wills	USFWS
Jim Litchfield	Montana
Terry Weeks	PNGC
Don Faulkner	COE
Rudd Turner	COE
Bernard Klatte	COE
Tim Heizenrader	Cascade Energy
Bob Deitz	PPM Energy
Dan Spear	BPA
Cindy LeFleur	Washington
Cathy Hlebechuk	COE

Phone:

Barry Espenson	CBB
Scott Bettin	BPA
Laura Hamilton	COE
Tina Lundell	COE
Russ George	WMC
Shane Scott	NWRP
Margaret Filardo	FPC
Ruth Burris	PGE
Mike Schneider	COE
Jennifer Miller	Susquehanna
Tom Lorz	CRITFC

APR-JUL VOLUME=1.800 MAF

Dworshak - STP Inflow



TECHNICAL MANAGEMENT TEAM

BOR : John Roache/Mary Mellema/Pat McGrane

BPA : Robyn MacKay/Tony Norris/Scott Bettin

NOAA-F: Paul Wagner/Richard Dominigue

USFWS : David Wills/Steve Haesecker

OR : Rick Kruger/Ron Boyce

ID : Russ Kiefer

WDFW : Cindy LeFleur

MT : Jim Litchfield/Brian Marotz

COE: Cathy Hlebechuk/Jim Adams/Cindy Henriksen

TMT CONFERENCE CALL

Wednesday August 29, 2007 09:00 - 12:00

1125 N.W. Couch Street, Suite 4A34

Portland, Oregon 97209-4142

Map Quest [\[Directions\]](#)

NOTE: NEW CONFERENCE PHONE LINE

Conference call line: **203-310-2162**; PASS CODE = **4703150**

To check into the building, take the elevator to the 5th floor and the guard will issue you an ID badge if you need one and will take you down to the 4th floor where the meeting is. If you have NOT attended a TMT meeting in the past you will need to call ahead and let Jim Adams (503) 808-3938, Cathy Hlebechuk (503) 808-3942, or Cindy Henriksen (503) 808-3945 know, so you can be added to the TMT Visitor List and issued an ID badge. This badge may be used indefinitely. If you have attended TMT in the past you may re-use your ID badge indefinitely. If you are a federal employee you will also need to have an ID badge issued to you which can be used indefinitely.

We have had disruptions on the phone because people are not hitting 'mute' after dial in.

Please MUTE your Phone

All members are encouraged to call Robin Harkless with any issues or concerns they would like to see addressed.

Please e-mail her at robin76@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome and Introductions
2. Review [\[Meeting Minutes\]](#)
3. Dworshak Operations - All
 - a. [\[Daily Water Temperature Reports\]](#) 
 - b. [\[Dworshak Water Temperatures Data\]](#) 
 - c. Dworshak outflows - draft to 1520'
 1. [\[with DWR STP run\]](#) 
 - d. Weather Forecast [\[Lewiston Weather Forecast\]](#)
4. [\[MCN TSW Closure/Spill Pattern\]](#)  - Bern Klatte, USACE
5. Little Goose Doble Testing - Don Faulkner, USACE
6. [\[2008 Draft Water Management Plan\]](#)  - Scott Boyd, USACE
7. Emergency Action Plan - Robyn MacKay - BPA
8. Operations Review
 - a. Reservoirs

- b. Fish
 - c. Power System
 - d. Water Quality - *Jim Adams, COE*
 - 1. [\[Spill Information 2007\]](#)
9. Other
- Set agenda for next meeting - **September 5, 2007** [\[Calendar 2007\]](#) 

Questions about the meeting may be referred to [Jim Adams](#) at (503) 808-3938 or [Cathy Hlebechuk](#) at (503) 808-3942 or [Cindy Henriksen](#) at (503) 808-3945.

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

August 29, 2007 Conference Call

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Gumpert

Notes: Erin Halton

The following notes are a summary of issues that are intended to point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the “record” of the meeting, only a reminder for TMT members.

Review of Facilitator Notes / Meeting Minutes

The facilitator summary and official meeting minutes from the 8/22 TMT meeting had been posted to the web. John Roache, BOR, Jim Adams, COE, and Paul Wagner, NOAA, made the following edits to the official Meeting Minutes from August:

- **8/8** Minutes: In operations review reservoir section, John clarified that Columbia Falls minimum flow is 3500 cfs.
- **8/15** minutes: the operations review for Grand Coulee/Banks Lake should read, “draft toward 1565', 5' from full.”
- **8/22** minutes: the COE clarified that under Dworshak Operations, the projected temperatures for a single unit operation were provided for TMT consideration only, and not meant to be a recommended strategy. The COE added clarifying language referencing the 2007 Spill Agreement.
- **8/22** minutes: Under the ‘End of Spill’ section, NOAA and the COE clarified minimum flows for Little Goose and Ice Harbor. Due to the outage at Sacagawea, minimum flows at Ice Harbor are 9.5 kcfs.

Dworshak Operations Update

Existing Conditions: Jim Adams, COE, reported on Lower Snake River temperatures: the Lower Granite tailwater was averaging 65° F; Little Goose tailwater was at 67.1°; Lower Monumental reached 68° on 8.28. The Lower Monumental pool was expected to cool to below 68° due to overall river cooling.

Dworshak Pool Temperatures: Dworshak was discharging an average temperature of 47.8° F; outflows had previously risen to a 7.9-8.0 kcfs range due to decreased head in the pool, but were down to 7.7 kcfs to better meet the recommendation from the Dworshak Board. TMT was referred to a thermocline graph posted to the TMT agenda, showing 2007 Dworshak pool temperatures tracking cooler than in 2006 and warmer than in 2005. TMT members suggested that the graph might be easier to read if the current year's conditions were more ‘stand out.’ The COE welcomed suggestions for making improvements to the graphs to be more user-friendly.

STP Graph: An STP graph, based on the April-July volume of 1.8 MAF, showed that elevation 1520' could be reached by the end of September by shaping outflows of 7.7 kcfs through 9/10, then making step-down flow reductions the rest of the month. The

change in outflow was also based on a recommendation from the Dworshak Board to meet elevation 1535' on or near August 30.

Dworshak Board Agreement: Greg Haller, Nez Perce tribe, speaking on behalf of the Dworshak Board (chaired by the Nez Perce Tribe and comprised of BPA, ID, and NOAA representatives), reported on the tentative plan to use the granted 200 kaf for September: Reduce outflows from 7.7 kcfs to 5.4 kcfs late 9/9 or early 9/10 ; reduce outflows to 2.4 kcfs on 9/13 or 9/14 , then ramp down to 1.4 kcfs around on 9/18 and maintain the minimum outflow until the end of September. Maintain desired temperatures as best as possible by making unit (undershot/overshot) adjustments at the project.

Action/Next Steps: The COE will continue to provide TMT and the Dworshak Board with updates on Dworshak conditions. The Dworshak Board will meet as needed and this item will be on the agenda for scheduled 9/5 TMT conference call.

McNary TSW/Plan for End of Spill

Bernard Klatte, COE, reported on end of spill specifications for McNary. Spill at the project will end on 8/30. Klatte said a modified spill pattern to be used during TSW work was posted to the TMT agenda and noted that spillbay 7 would need to close in order to install stop logs in preparation for maintenance work on that bay. Klatte said the pattern had been coordinated with NOAA and that this would be implemented for about 36 hours. Jim Adams, COE, added that he had notified John Piggott of the Towboaters Association, and no concerns had been raised.

Action/Next Steps: The COE will implement the McNary plan for end of spill on 8/30.

Little Goose Doble Testing

Don Faulkner, COE, reported on an outage request to complete doble testing at Little Goose. He clarified that there is a regulatory requirement to test the equipment every three years and said the COE could do the work on 9/17-19 or 10/9-11, and that the ability to complete the work would require favorable weather conditions. ID and NOAA raised concerns regarding the effect on fish migration in mid-September, as peak steelhead and fall Chinook passage occurs at the project at that time. Cindy Henriksen, COE, acknowledged the concern of the Salmon Managers and suggested there was a possibility that the work might be able to be done later in the evening, depending on whether contractors were available. BPA expressed support for the COE's need to finish the doble testing at the project. Salmon Managers expressed a preference for the 10/9-11 dates, as impacts to passage would be less detrimental than earlier in September.

Action/Next Steps: The COE planned to completed doble testing on 10/9-11 and to explore the option of testing later in the evening. Follow-up on this item will be added to the agenda for the 9/5 TMT call. As doble testing normally is completed in mid-August at Little Goose, all supported completing the work in one stage and on time (to the extent possible) in the future, to avoid conflicts with fish passage. .

Don Faulkner, COE, gave TMT a heads up that structural work will also need to be done at Lower Granite but that it should have no impact on fish operations.

2008 Water Management Plan

Scott Boyd, COE, reminded TMT members to send comments on the draft 2008 Water Management Plan. The plan was posted as a link to the TMT homepage and Boyd said he emailed TMT members a word version of the document.

Action/Next Steps: TMT members should submit their comments on the draft plan in track changes format. This item will be on the September 5 TMT agenda.

Emergency Action Plan

Robyn MacKay, BPA, said that the COE and BPA were in the process of developing mutually agreeable language in an Emergency Action Plan document and that the goal was to include the document as part of the TMT Emergency Protocols in the WMP.

Action/Next Steps: This will be on the agenda at an upcoming TMT meeting.

Operations Review

Reservoirs – Jim Adams, COE and John Roache, BOR, reported on reservoir operations. Grand Coulee was at elevation 1280.15', and targeting an elevation of 1278' by 8/31. Hungry Horse was at elevation 3543.52' with outflows at 4.4 kcfs and holding through August. Starting on September 1, outflows will be ramped down to around 2.2-2.3 kcfs in order to meet Columbia Falls minimums. It will take 3-4 days to ramp down discharges at Hungry Horse. Libby was at elevation 2440.01'; inflows were at 5.1 kcfs and outflows were at 15 kcfs, to meet the 8/31 elevation target of 2439'. The STP for Libby showed reducing outflows to 9.0 kcfs beginning 9/1, then reducing to 6.0 kcfs in mid-September for the rest of the month. Albeni Falls was at 2062.15', with inflows of 7.29 kcfs and outflows of 8.24 kcfs, and the project will likely drop its elevation by 1.5' in the first couple weeks of September. Dworshak was at elevation 1536.65', with inflows of .5 kcfs and outflows of 7.7 kcfs. Seven-day average flows at Lower Granite were 22.3 kcfs and 133 kcfs at McNary.

Fish – Paul Wagner, NOAA, reported on juvenile and adult fish: sub yearlings were passing in the less than 100 per day range at Lower Granite and Little Goose; passage was in the single-digit per day range at Lower Monumental, and in the couple hundred per day range at McNary. He noted that Fall chinook adult passage over Bonneville was in the 3,000 per day range and that steelhead were ranging 3,000-5,000 and were above average for the season.

Power system – Nothing to report.

Water quality – Jim Adams, COE, reported one exceedance at Camas/Washougal. He added that Bonneville flows were low and that spill season ends on 8/31.

Next TMT meeting: a conference call on Wednesday, September 5th

Agenda items will include:

- Dworshak Operations

- Little Goose Doble Testing Update
- Comments on the Draft 2008 Water Management Plan
- Operations Update

**Columbia River Regional Forum
Technical Management Team Conference Call
Aug. 29, 2007**

1. Introduction

Today's conference call was chaired by Jim Adams (COE) and facilitated by Robin Gumpert (formerly Harkless), with representatives from COE, the Nez Perce Tribe, BPA, NOAA, BOR, FPC Montana, and Idaho attending. The following is a summary (not a verbatim transcript) of the topics discussed and decisions made at the meeting. Anyone with questions or comments about these notes should provide them to the TMT chair or bring them to the next meeting.

2. Review Meeting Minutes

John Roache (BOR) commented on the 8-08-07 official minutes, section 6 Operations Review, which reads: "Hungry Horse operations will ramp down to the Columbia Falls minimum (WHAT IS THIS?)." He said "3,500 cfs" could replace the parenthetical query.

Roache commented on the 8-15-07 official minutes, section 6, Operations Review, which reads: "The plan for Banks Lake is the same as every year: draft 5 feet out toward elevation 1,570 feet." The elevation should be 1,565, not 1,570.

Jim Adams (COE) added a notation to the 8-22-07 minutes, section 3, Dworshak Operations, to explain that the COE wasn't recommending an operational strategy: "The COE is going to implement the operational strategy outlined in the 2007 operational plan for use of the Nez Perce Tribe's 200 kaf of stored water in Dworshak reservoir. Any amendments to this strategy will occur upon the unanimous written consent of the parties of the Nez Perce board."

Adams also added a supplemental notation to the 8-22-07 official minutes, section 4, End of Spill, to clarify that minimum September flows are 11.5 kcfs for Little Goose and Lower Monumental. Normally, minimum flows at Ice Harbor are 7.5 kcfs for August to November, but the Sacajawea Transformer outage means minimum flows will be 9.5 kcfs.

3. Dworshak Operations

The daily average temperature at Lower Granite tailwater was 65.0 degrees F on Aug. 28, well below the 68 degree F criteria according to today's temperature report, Adams said. The daily average temperature at Little Goose tailwater is 67.1 degrees F, and tailwater temperatures at Lower Monumental have been below criteria until Aug. 28 when temperatures bumped up slightly to 68.3 degrees F. They're coming down again because the river is cooling. In a few

days to a week, Ice Harbor tailwater temperatures should be below criteria, Adams said.

The latest Dworshak STP run shows operations at 7.7 kcfs outflows until around Sept. 10, and then dropping as per the operational strategy from the Nez Perce board, Adams said (see below). Flows at Dworshak had slowly increased to about 7.9 – 8.0 kcfs recently due to decreased head from the falling reservoir elevation. However, flow was reduced to 7.7 to be in alignment with the recommendation of the Dworshak Board to have the Dworshak reservoir reach elevation 1,535 feet on or around Aug. 30.

Greg Haller (Nez Perce) gave background on the Nez Perce 200 kaf plan. As per the Snake River water rights act of 2004, the tribe controls the use of 200 kaf in Dworshak reservoir for flow augmentation and temperature control. The operation of that is ordained through a Memorandum of Agreement with several parties and the Nez Perce Tribe as chair. The Dworshak board includes representation by the COE, BPA, NOAA, and Idaho. The task of developing the tribal plan for the 200 kaf is completed for this year, based on six considerations:

1. Projected summer water temperature and flow conditions for the Snake River at Lower Granite Dam
2. Growth rates of juvenile fall Chinook in the Clearwater River
3. Migration status of juvenile fall Chinook in the Clearwater and Snake rivers
4. Migration status of adult steelhead and fall Chinook
5. Cultural resources in and around Dworshak reservoir
6. Summer recreational uses of Dworshak reservoir

Haller gave the timing of stored water releases under the plan. The board decided to continue the current operation of approximately 7.7 kcfs outflows until around Sept. 9, with expected water temperatures around 47-48 degrees F from that operation. On or around Sept. 9, outflows will drop to 5.4 kcfs. Normally, the 5.4 kcfs outflow is achieved by using Unit 3 (the big unit) alone, which draw water either in overshoot or undershot. Haller estimated that overshoot mode would yield temperatures around 55 degrees F. Adams estimated that operation in overshoot mode may result in outflow temperatures closer to 60 degrees F. Operation in undershot mode would yield temperatures around 42-45 degrees F, Adams said. The board will decide about overshoot/undershot operations closer to the ramp down on Sept. 9.

Brian Marotz (Montana) asked, isn't there a concern about stranding or impacting the morphology of the river downstream at these ramp down rates? There are no stranding issues in the Clearwater River at present, Haller replied. Haller will let TMT know if the board makes any significant changes to the plan. This topic will be on the Sept. 5 and Sept. 26 TMT agendas.

4. McNary TSW Closure/Spill Pattern

At the last meeting, TMT agreed to an operational request to close the TSWs at McNary on Aug. 30th rather than on Aug. 31st, due to the holiday schedule, Bern Klatter (COE) said. Subsequently, hydraulic engineer Ken Hanson (COE – Walla Walla) worked with Gary Fredricks (NOAA) to develop a spill pattern to use during the time when spill bays #20 and #22 are closed (these are the spill bays where the TSW's are located) and the end of voluntary spill at midnight on Aug. 31st. In addition, project staff requested permission to close spill bay 7 on Aug. 30 so the contractor can begin work on the gates. While the refurbishing work wouldn't begin until Sept. 4th, the project would like to tag out the gate on the 30th so they could prepare for the contractor work.

None of the salmon managers present objected to this request. The closure will take place Aug. 30-31, pending any navigational concerns regarding the altered spill pattern. If there is a navigation problem, the spill patterns in the fish passage plan can be used as previously discussed.

5. Little Goose Doble Testing

The Doble testing at Little Goose couldn't be completed in August due to equipment failure, Don Faulkner (COE) said, so Walla Walla project staff requested a three day outage on Sept. 11-13 to complete the work. TMT discussed the need for Doble testing, a regulatory requirement every three years. The COE can't afford to delay this testing, given that a failed transformer can be out of service for two years, Faulkner and Henriksen explained. The Snake projects each have two banks with three transformers per bank, all needing doble testing on a regular basis. Testing on the Snake River in particular draws attention because there is only one powerhouse line, meaning the powerhouse is shut down during the tests.

Russ Kiefer (Idaho) asked how the risk of equipment failure compares to the risk of delaying returning adult fall Chinook during their peak migration in mid-September. Oct. 9 is also a possibility for the powerhouse outage, Faulkner said. That would be after the peak steelhead passage, with adult Chinook passage in decline, Wagner said. The cooler temperatures of October would lessen the impacts of delayed migration. Also, steelhead appear to experience fewer problems finding the entrance to the fish ladder than fall Chinook when testing is in progress. The testing needs to occur sometime during fish passage season because it requires good weather. Given these factors, Wagner suggested the COE start planning now for an outage Oct. 9-11, from 6 a.m. to 6 p.m. each day. Given the Salmon Managers' desire to delay the testing as long as possible, the COE will proceed with Oct. 9-11 for the planned outage at Little Goose.

Dave Benner (FPC) asked if the doble testing could be done at night, avoiding dawn when most fish pass. Faulkner will check into that possibility.

When double testing is going on, the COE operates one unit at speed no load for station service and spills the remainder, Adams said. With flows around 20 kcfs, that would mean around 15 kcfs spill. It's possible that adults would not have difficulty finding the ladder at these lower flow rates. The COE will report back to TMT when there is new information on this issue.

The USGS has requested an outage on Sept. 13 at Lower Granite to remove hydrophones from the spillway, Faulkner said. Two units at a time would be out of service, and the plant would not stop generating.

6. 2008 Draft Water Management Plan

Scott Boyd (COE) recently sent out the WMP as a Word document to all TMT members. Comments should be made in "track changes" and sent to him.

7. Emergency Action Plan

BPA and the COE are still working on language for the generation action plan which is to be included in the emergency protocols, Robyn MacKay said. This issue will be revisited at a later date.

8. Operations Review

a. Reservoirs. Libby is at elevation 2,440.01 feet, with inflows of 5.1 kcfs and outflows of 15 kcfs. Outflows dropped from 17.3 to 15 kcfs on Aug. 23 to avoid overshooting the elevation target of 2,439 foot for the end of the month. The current STP run shows Libby outflows at 9 kcfs from Sept. 1 until mid-September, when they drop to 6 kcfs for the remainder of September.

Albeni Falls is at elevation 2,062.15 at the Hope gage, with inflows of 7.29 kcfs and outflows of 8.24 kcfs.

Dworshak forebay is at elevation 1,536.65 feet, with inflows of 0.5 kcfs, and outflows of 7.7 kcfs beginning last night. The 7-day inflow average at Lower Granite is 22.3 kcfs. The 7-day inflow average at McNary is 133 kcfs.

Hungry Horse is at elevation 3,543.52 feet, with 4.4 kcfs outflows through the end of August. Operations will ramp down beginning Sept. 1 to meet the Columbia Falls minimum flow. Grand Coulee is at elevation 1,280 feet with a target elevation of 1,278 feet by the end of August.

b. Fish. Passage numbers of subyearlings are dropping to less than 100 fish per day at Lower Granite over the past week, Paul Wagner (NOAA) said. Little Goose has passed nearly 100 fish per day over the past week, while numbers at Lower Monumental are in the single digits. McNary is passing about 2,500 fish per day, markedly less than two weeks ago.

Adult fall Chinook passage is increasing at Bonneville to about 3,000 fish per day. Steelhead migration has peaked and is now about 3-5,000 fish per day. The steelhead run is stronger than average, but not stellar.

c. Power System. There is nothing to report, Robyn MacKay (BPA) said.

d. Water Quality. There was an exceedance at Camas Washougal gage a few days ago, Adams reported. Flows are so low – less than 80 kcfs spill – that there are no additional water quality issues. Spill ends midnight Aug. 31.

7. Next Meetings

There will be a TMT conference call on Sept. 5, with Dworshak operations, follow-up on the Little Goose double testing, the 2008 WMP, and the usual operations review on the agenda.

TMT won't meet again after the Sept. 5 meeting (unless there's an emergency) until the face-to-face meeting on Sept. 26. This summary prepared by consultant and writer Pat Vivian.

Name	Affiliation
Jim Adams	COE
Brian Marotz	Montana
Jim Litchfield	Montana
Robyn MacKay	BPA
Tony Norris	BPA
Paul Wagner	NOAA
John Roache	BOR
Scott Boyd	COE
Don Faulkner	COE
Bernard Klatte	COE

Phone:

Tim Heizenrader	Centaurus Energy
Ruth Burris	PGE
Tina Lundell	COE
Dan Spear	BPA
Russ Kiefer	Idaho
Richelle Beck	DRA
Cindy Henriksen	COE
Greg Haller	NPT
Dave Benner	FPC

TECHNICAL MANAGEMENT TEAM

BOR : John Roache/Mary Mellema/Pat McGrane

BPA : Robyn MacKay/Tony Norris/Scott Bettin

NOAA-F: Paul Wagner/Richard Dominigue

USFWS : David Wills/Steve Haeseker

OR : Rick Kruger/Ron Boyce

ID : Russ Kiefer

WDFW : Cindy LeFleur

MT : Jim Litchfield/Brian Marotz

COE: Cathy Hlebechuk/Jim Adams/Cindy Henriksen

EMERGENCY TMT CONFERENCE CALL

Thursday August 30, 2007 3:00 - 4:00 Columbia Room

1125 N.W. Couch Street, Suite 4A34

Portland, Oregon 97209-4142

Map Quest [\[Directions\]](#)

NOTE: NEW CONFERENCE PHONE LINE

Conference call line:**203-310-2162**; PASS CODE = **4703150**

To check into the building, take the elevator to the 5th floor and the guard will issue you an ID badge if you need one and will take you down to the 4th floor where the meeting is. If you have NOT attended a TMT meeting in the past you will need to call ahead and let Jim Adams (503) 808-3938, Cathy Hlebechuk (503) 808-3942, or Cindy Henriksen (503) 808-3945 know, so you can be added to the TMT Visitor List and issued an ID badge. This badge may be used indefinitely. If you have attended TMT in the past you may re-use your ID badge indefinitely. If you are a federal employee you will also need to have an ID badge issued to you which can be used indefinitely.

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Please MUTE your Phone

All members are encouraged to call Robin Harkless with any issues or concerns they would like to see addressed.

Please e-mail her at robin76@cnnm.net or call her at (503) 248-4703.

AGENDA

1. Potential Power Emergency

Questions about the meeting may be referred to [Jim Adams](#) at (503) 808-3938 or [Cathy Hlebechuk](#) at (503) 808-3942 or [Cindy Henriksen](#) at (503) 808-3945.

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

August 30, 2007 Emergency TMT Call

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Gumpert

The following notes are a summary of issues that are intended to point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the “record” of the meeting, only a reminder for TMT members.

Potential Power Emergency

BPA convened an emergency TMT call to inform the TMT that Los Angeles Department of Water and Power (LADWP) may need to declare a stage 2 emergency this afternoon if they cannot meet load. Robyn Mackay, BPA, reported that if a NERC stage 2 alert were to be declared, BPA Administrator Steve Wright would be notified and would discuss the situation with the LADWP General Manager, before taking action. The expectation was that the risks to an emergency would diminish after 6:00 pm today, August 30, but that the situation would need to be closely monitored through tomorrow. The Action Agencies had been discussing options for providing relief. Grand Coulee was running at full capacity. Questions were raised about what steps the action agencies would take if an emergency were to be declared. It was clarified that the Action Agencies would utilize available flexibility as a next step prior to reducing spill. If spill reductions are needed, they would begin at Ice Harbor. BPA added that they would do their best to follow the emergency actions list as needed and feasible, and would report back to TMT the results of the situation, whether or not action was taken.

ACTION: BPA will send an email to the COE on Friday, August 31, for posting to the TMT web that outlines the results of the situation and any action that was taken to address this issue.

**Columbia River Regional Forum
Technical Management Team Unscheduled Conference Call**

BPA requested an Unscheduled TMT call at 3:00 p.m. Aug 30 to alert the region of a potential power emergency developing in California, per the TMT Emergency Protocols.

1. Introduction

Following its procedures for notification of public power emergencies, BPA convened today's conference call to inform federal agency, state and tribal representatives that a power emergency could possibly necessitate an interruption of fish protection measures. The call was chaired by Jim Adams (COE) and facilitated by Robin Gumpert (D.S. Consulting), with representation from BPA, COE, NOAA, Oregon, Idaho, and Montana. The following is a summary (not a verbatim transcript) of the topics discussed and decisions made at the meeting. Anyone with questions or comments about these notes should provide them to the TMT chair or bring them to the next meeting.

2. Discussion

BPA informed the TMT that today at 1:00 pm PDT, the Los Angeles Department of Water and Power ("Department"), declared a "Merchant Alert" through the WECCNET stating that they "may be short on energy and capacity" over the peak due to higher than expected load. BPA confirmed that LA has scoured the region of power and have asked for conservation.

BPA said that it doesn't know whether or not the LADWP will call for a Stage II alert. If a Stage II is declared, the BPA Administrator will speak directly with the LADWP General Manager before deciding whether or not to declare an official power emergency. If declared, the Action Agencies would then implement the TMT's new Generation Action Plan

BPA is not currently declaring any sort of emergency, MacKay assured TMT. The purpose of today's call is to inform the region of a potential situation and to review action list.

The first actions on the list would have BPA operate the turbines at John Day and The Dalles dams outside of their 1% peak efficiency range. However, under the present circumstances, that would be ineffective because there is not enough water coming into those projects to sustain that operation.. GCL is currently operating at full capacity. Spilling water at Chief Joseph Dam to move more water downstream is not an option, due to ongoing work in the tailrace at Chief Joseph Dam.

Rick Kruger (Oregon) raised the possibility of creating more energy by drafting additional water at the headwater projects – Hungry Horse, Libby and Dworshak dams. Jim Litchfield (Montana) objected stating that it would be disruptive to the reservoir and river around Libby Dam. He questioned the number of fish left migrating in the Snake River and pointed out that the proposed PA for the new Bi-Op says that when daily average index counts have been less than 1,000 fish for three days, spill will be shut off. Many Snake River fall Chinook are overwintering anyway, so there should be little or no effect on them if the Action Agencies were to reduce spill at Snake River projects to generate more energy, Litchfield said. The migration season is nearly over, and many of the fish passing Snake River projects now are probably of the type that overwinters in the reservoirs rather than migrating. That PA has not yet been adopted, and Oregon disagrees with it, Rick Kruger replied. He continued by stating that Oregon places a high priority on maintaining spill. Oregon suggested drafting water from the headwater projects if necessary, instead of altering Snake River spill. If Libby outflow is reduced, it would take awhile to get back to the 9 kcfs outflow we've been trying to maintain, Henriksen advised. MacKay explained that generation from headwater projects are more appropriate for an extended energy emergency when sustained generation is needed as in a cold snap or prolonged heat event. This is expected to be a short term capacity event where power is only needed for a few hours. The COE agreed with this assessment.

Kruger asked whether BPA would follow the list as stated; MacKay emphasized that only effective actions would be taken. Unless transmission issues arise, the expectation is that BPA would start an emergency response by reducing spill on the Snake River projects.

In closing, Idaho and Montana representatives asked for clarification on the actions BPA would take if called upon to produce more energy. BPA would first reduce spill at Ice Harbor Dam to the RSW, MacKay said.

3. Next Steps

MacKay stressed again that this is just a heads up to notify TMT members of a potential situation and thanked participants for joining the call; and NOAA thanked BPA for initiating it and appreciated them being forthright about the situation. BPA will let TMT know what actions were taken if LADWP does declare a Stage II alert. BPA will also let TMT know if a follow-up call is needed.

{Editors Note: On the morning of August 31, Scott Bettin (BPA) sent the following E-mail to TMT, “To follow up with the Emergency TMT call yesterday afternoon, there were no actions taken on the FCRPS that impacted BiOp fish measures. All BiOp fish measures were implemented as planned last night. LADWP (Los Angeles Department of Water and Power) and other California utilities did not declare a stage II alert. There continues to be a tight energy market today, but temperatures are slightly lower in the

west and the market appears to have sufficient energy available to meet the load without impacting BiOp fish measures.

The LADWP situation arose fairly quickly yesterday, necessitating the need to convene the TMT meeting to review potential actions in light of the developing issues at the time. We want to take this opportunity to thank all of you for getting together quickly and with such short notice. With fish passage measures wrapping up at midnight tonight, we hope you can all enjoy the long holiday weekend as we await the arrival of the fall Chinook and chum.”}

7. Next Meetings

The next scheduled TMT conference call is on Sept. 5, with Dworshak operations, Little Goose double testing, the 2008 WMP, and the usual operations review on the agenda. Following the Sept. 5 meeting, TMT won't meet again, absent another emergency, until the face-to-face meeting on Sept. 26. This summary prepared by consultant and writer Pat Vivian.

Name	Affiliation
Robyn MacKay	BPA
Jim Adams	COE
Jim Litchfield	Montana
Rick Kruger	Oregon
Paul Wagner	NOAA
Cindy Henriksen	COE
Russ Kiefer	Idaho
Brian Marotz	Montana
Dan Spear	BPA
Scott Bettin	BPA
Greg Haller	Nez Perce
John Roache	BOR

TECHNICAL MANAGEMENT TEAM

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ID : Russ Kiefer

WDFW : Cindy LeFleur

MT : Jim Litchfield/Brian Marotz

COE: Cathy Hlebechuk/Jim Adams/Cindy Henriksen

TMT CONFERENCE CALL

Wednesday September 5, 2007 09:00 - 12:00

1125 N.W. Couch Street, Suite 4A34

Portland, Oregon 97209-4142

Map Quest [\[Directions\]](#)

NOTE: NEW CONFERENCE PHONE LINE

Conference call line:**203-310-2162**; PASS CODE = **4703150**

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AGENDA

1. Welcome and Introductions
2. Review [\[Meeting Minutes\]](#)
3. Dworshak Operations - All
 - a. [\[Daily Water Temperature Reports\]](#) 
 - b. [\[Dworshak Water Temperatures Data\]](#) 
4. Lower Granite Pool MOP+1 to MOP+2 Operation
5. [\[2008 Draft Water Management Plan\]](#)  - Scott Boyd, USACE
6. Autumn Treaty Fishing - Kyle Dittmer, CRITFC
7. Operations Review
 - a. Reservoirs
 - b. Fish
 - c. Power System
 - d. Water Quality - Jim Adams, COE
 1. [\[Spill Information 2007\]](#)
8. Other

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

September 5, 2007 Emergency TMT Call

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Gumpert

The following notes are a summary of issues that are intended to point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the "record" of the meeting, only a reminder for TMT members.

Official Minutes/Facilitator Notes

Notes from the 8/29 and emergency 8/30 TMT conference calls were not yet posted and would be by early next week. Comments on those, and this set of notes can be raised at the 9/26 face to face TMT meeting.

Dworshak Operations

Jim Adams, COE, shared current conditions information: Lower Granite tailwater temperatures were around 65 degrees and had remained consistently below criteria. The Ice Harbor tailwater average was 69.3 degrees, and Anatone water temperatures were trending downward. Dworshak outflow temperatures ranged from 48.5-49 degrees and the project was releasing about 7.7 kcfs outflows, utilizing the big unit in undershot mode and a small unit in overshot. The project was just below 1530'.

Given projected forecasts and recommendations from the Dworshak Board, the COE planned to reduce outflows to 5.5 kcfs on 9/9 or 9/10 and operate the project to continue to meet desired temperature releases. The Dworshak Board was scheduled to meet on Friday, 9/7 to discuss guidance for the COE on how to operate the project to best manage for temperature.

Lower Granite Pool MOP +1 to MOP +2 Operation

Dave Hurson, COE, shared that Lower Granite is currently operating two holding tanks for Fall Chinook and maintaining pool elevations below MOP +1. An analysis of the project design showed that in order to operate additional tanks (there are six available), the pool elevation would need to be raised to between MOP +1 and MOP +2. Greg Haller, Nez Perce Tribe, responded that as they are not expecting a big return of Fall Chinook at this point, the Tribe recommended the COE continue to operate two tanks until after the Dworshak augmentation operation and then revisit the issue. Higher numbers of fall chinook were expected to arrive around September 17-20, which coincides with the planned end of the Dworshak augmentation operation. Oregon supported the Nez Perce recommendation. Idaho suggested that tracking fall chinook counts at Ice Harbor, given their 4-5 day travel time, would provide the region the opportunity to make changes at Lower Granite when high numbers of fish are observed. NOAA said they would consider elevating the Lower Granite pool if more than 500 fish were observed per day, to provide more holding space. Additional options for providing

space could also be explored, e.g. using trucks. A final suggestion was made to make a change in the Fish Passage Plan to list “post-Dworshak augmentation operation” as a criteria for potentially changing MOP levels at Lower Granite – the current criteria lists a temperature trigger of 68 degrees.

2008 Water Management Plan

Scott Boyd, COE, reported that no comments had yet been received on the draft WMP. Comments are due by the end of September. It was noted that few changes were made from the 2007 version, and that any changes resulting from a new BiOp would likely be added to the Spring/Summer Update.

Autumn Treaty Fishing

Kyle Dittmer, CRITFC, gave TMT a heads up that an SOR for fall fishing would be submitted later this week, and likely weekly for the month of September. CRITFC has also been sponsoring net flights over the past few weeks, with a total count of 469 nets and the majority located at Bonneville.

Operations Review

Reservoirs – Libby was at elevation 2438.4’, operating 5.6 kcfs in and 9 kcfs out. The August 31 elevation was 2438.94’. The COE’s current plan was to reduce outflows to 6 kcfs around September 15 and hold through the remainder of the month. (It was noted that this operation plan has not been finalized.) Albeni Falls was at elevation 2062.34’ and would likely begin to draft around September 15. Dworshak was at elevation 1529.26’, with .6 kcfs inflows and 7.8 kcfs outflows. The August 31 elevation at the project was 1533.46’. The seven-day average flows were 21.9 kcfs at Lower Granite and 122.1 kcfs at McNary. Pool elevations at Snake River projects were up slightly and supportive of safe navigation. Grand Coulee was at elevation 1278.5’ and reached its target elevation on August 31, as did Banks Lake. Hungry Horse was at elevation 3541.54’ and operating 2.5 kcfs out.

Fish – Subyearling counts at Lower Snake projects were less than 100 indicating the end of the migration season. Fall chinook counts at Bonneville were averaging 5,000-6,000 per day, with a total of 67,000. Steelhead numbers were around 2,000-3,000 and totaled 267,000 to date.

Power system – Robyn Mackay, BPA, shared that with cooler temperatures, the system is running well. She thanked TMT members for being available for the emergency TMT call last week. She said that no stage 2 emergency was declared by the Los Angeles Department of Water and Power and no action was taken by BPA. A question was asked about the rolling blackouts that occurred in California, and Robyn responded that this was due to local equipment failure and that no relief could be (or was) provided by BPA.

Water quality – Nothing to report.

Little Goose Doble Testing

Don Faulkner, COE, per the previous TMT discussion on this issue, reported that operators would not be able to perform doble testing at night due to safety issues, but did offer to do testing during staggered hours to be the least disruptive to fish passage. This would require four days of testing instead of three. The current plan is to begin doble testing on October 9.

ACTION: The salmon managers said they would discuss this option during their next FPAC call and respond to the COE ASAP.

Next Meeting, September 26

An agenda will be developed for the meeting in the next few weeks. TMT also has a placeholder for a conference call on September 19 as needed.

**Columbia River Regional Forum
Technical Management Team Conference Call
September 5, 2007**

1. Introduction

Today's conference call was chaired by Jim Adams (COE) and facilitated by Robin Gumpert (D.S. Consulting), with representatives from COE, CRITFC, BPA, the Nez Perce Tribe, BOR, NOAA, Oregon and Idaho attending. The following is a summary (not a verbatim transcript) of the topics discussed and decisions made at the meeting. Anyone with questions or comments about these notes should provide them to the TMT chair or bring them to the next meeting.

2. Review Meeting Minutes

The official minutes from the August 29 TMT call have been posted for TMT review. The facilitator's notes for the August 29 and 30 calls and the official minutes for August 30 will be posted shortly. This topic will be on the agenda at the next TMT meeting September 26, or on September 19 if a call is needed.

3. Dworshak Operations

The daily average tailwater temperature at Lower Granite is 64.5 degrees F and has been consistently less than 65 degrees F since the beginning of September, Jim Adams (COE) said. The daily average tailwater temperature at Ice Harbor is 69.3 degrees F, making it the only lower Snake River project above criteria. Temperatures at Anatone gage are still above 70 degrees but trending downward. Dworshak outflow temperatures have been 48.5-49 degrees F and steadily increasing. Outflows are still at 7.7-8 kcfs, with the big unit in undershot mode and the small unit in overshot mode. The pool elevation was just below 1,530 feet yesterday.

The COE has attempted to predict outflow temperatures when the operation shifts to 5.5 kcfs outflows on around September 9 as previously discussed at TMT. If it is assumed that the temperature of water coming through the big turbine in undershot mode to be approximately 44-45 degrees F, then the temperature of water coming through the smaller unit in overshot mode should be approximately 60 degrees F. The large unit will be in undershot mode when the shift occurs. The COE might be able to operate two units (the big unit and one small unit) at a low flow rate and achieve 5.5-5.6 kcfs outflows combining a blend of waters to yield an overall water temperature of around 50 degrees F. Adams said he will investigate this possibility.

Greg Haller (Nez Perce) said he'll seek feedback from the Dworshak board on that approach. Dave Wills (USFWS) asked, what unit operation would be needed to achieve this temperature? Adams estimated that operation of a

single unit in undershot mode would release temperatures of 44-45 degrees F, based on existing flows. This estimate was based on a comparison of thermocline data from this year to what occurred last year, and that underflow operations last year yielded temperatures of approximately 47.5 degrees F. Current thermocline data indicates that water temperatures in the Dworshak forebay at the elevation of withdrawal are about 2-3 degrees F less than they were in 2006. Wills and Adams agreed that temperatures around 48-50 degrees F would be preferable for the hatchery's needs, that anything close to 60 degrees would be unacceptable, and 44-45 degrees F would be acceptable but not first choice. Haller will email the COE regarding this decision after the Dworshak board meets on September 6. Meanwhile, Adams will look into the possibility of blending waters to achieve temperatures around 50 degrees F.

The operations plan, based on STP modeling, parallels what the Dworshak board said. The COE will start ramping outflows down to 5.5 kcfs beginning around September 9 until the forebay elevation reaches 1521 feet, for five days, then switch to a single-unit operation with outflows of 2.3 kcfs for one to three days until the pool elevation reaches 1,520 feet. At that point outflows will drop to minimum flows (about 1.6 kcfs). There will be TMT updates as this operation progresses.

4. Lower Granite Pool MOP+1 to MOP+2 Operation

Dave Hurson (COE) gave an update on the fish holding tank situation at Lower Granite. Initially there were two tanks, and this year four more were added, each a third bigger than the initial tanks. All the water for the trap comes out of a pipeline at the end of the fish ladder, which opens and closes with the forebay elevation to maintain flows of about 75 cfs down the ladder. That equals between 1 and 1.3 feet of water going over the weir and ladder itself, or a minimum elevation of 734.5 feet, which translates to MOP+1 or MOP+1.5 over minimum operating pool. Last year when this situation arose, the COE wanted to add a criterion to the fish passage plan saying how to operate the tanks, which was reviewed and approved by agencies. It says that two small tanks can be operated even if they impact the amount of water coming down the ladder. The current elevation is below MOP+1, or about 0.95 feet of water over the weir. With four tanks running, the elevation will continue to drop. The COE can operate the two tanks at the current elevation and stay within criteria, but if WDFW wants to trap more fish, the pool elevation will need to be raised in order to operate the tanks.

Operating just the two smaller tanks should be sufficient for the Nez Perce Tribe's needs, as the run size probably won't be large this year, Greg Haller (NPT) said. The tribe would prefer to wait a few weeks for flow augmentation from Dworshak than raise the pool elevation now. Haller and Hurson agreed that there are alternatives to operating more than two tanks if the numbers of fish increase, including collection and transport to the hatcheries when passage rates

get high. This need could be predicted in advance using passage numbers at Ice Harbor to predict run sizes 4-5 days ahead of their arrival at Lower Granite. The peak fall Chinook run is typically September 17-20, Paul Wagner (NOAA) said. The peak number of fish per day in September 2006 was 385 fish.

There was no objection to operating only two fish tanks until Dworshak augmentation flows end. Then TMT will revisit the issue and decide whether more tanks are needed to provide adequate holding space. Passage numbers of more than 500 fish per day will serve as a trigger for TMT to consider alternatives (e.g. increasing the holding capacity for these fish by raising forebay operations to MOP+1 to MOP+2, MOP operations, providing trucking, or devising other alternatives). With the September flow augmentation program in place, Haller suggested adding a new criterion to the fish passage plan saying the pool elevation will be raised after flow augmentation has taken place. TMT will continue to monitor this and revise plans as needed.

5. 2008 Draft Water Management Plan

Scott Boyd (COE) asked TMT members to review the draft WMP and send him their comments by the end of September. He also wants to hear from commenter's who think the plan is fine as is. The WMP will, for the time being, continue to be based on the Plan of Action included in the 2004 Bi-Op. When a new Bi-Op is issued this fall, the WMP (probably the spring/summer update) will be revised accordingly.

6. Autumn Treaty Fishing

The tribes will meet tomorrow afternoon, September 6, in their third week of treaty fishing operations, Kyle Dittmer (CRITFC) reported. There will be an initial three-week fishery in August, followed by one-week fisheries based on run sizes. The summer fishing season ends July 31 and fall season begins August 1. Dittmer will send the SOR regarding treaty fishing operations to TMT members on September 6. He asked TMT members to call him if they have questions after reviewing the SOR.

7. Operations Review

a. Reservoirs. Libby is at elevation 2,438.4 feet, with inflows of 5.6 kcfs and outflows of 9 kcfs. The plan is to continue releasing outflows of 9 kcfs until September 14-15, then ramp down to 6 kcfs outflows for the rest of the month. Montana and BPA are still discussing this operation.

Albeni Falls is at elevation 2,062.34 at the Hope gage, with inflows of 7.8 kcfs and outflows of 9.49 kcfs. This elevation has been at that level for quite a while and will remain so until around September 15, when the COE will begin to draw the reservoir down based on inflow forecasts.

Dworshak forebay is at elevation 1529.26 feet, with inflows of 0.6 kcfs and outflows of 7.8 kcfs. The 7-day inflow average at Lower Granite is 21.9 kcfs. The 7-day inflow average at McNary is 122.1 kcfs. Little Goose is at elevation 634.95 feet, which is about a foot above the minimum elevation. Lower Monumental is at elevation 538.2 feet, which is about 1.2 feet above the minimum elevation. Ice Harbor is at elevation 439.71 feet, about 2 feet above the minimum elevation.

Hungry Horse is at elevation 3541.54 feet with current discharges at approximately 2.5 kcfs to meet the Columbia Falls minimum flow of 3.5 kcfs. Grand Coulee is at elevation 1278.5 feet and reached the target elevation of 1,278 feet on August 31. The target elevation of 1,565 feet at Banks Lake was achieved on August 31.

b. Fish. Passage numbers of subyearling Chinook at lower Snake River projects is quite low, Wagner said. Fewer than 100 fish per day are passing Lower Granite, and passage indices at Little Goose are in the upper teens, at Lower Monumental, less than 10 fish per day. McNary is passing a few thousand fish per day.

Fall Chinook passage at Bonneville Dam remains around 5-6,000 fish per day. Steelhead passage at Bonneville has risen from a few thousand per day to nearly 267,000 fish per day.

c. Power System. BPA thanked the TMT for gathering for the unscheduled TMT call so quickly. Temperatures have cooled considerably since the August 30 unscheduled call regarding a possible power shortage in California, Robyn MacKay (BPA) said. A Stage II NERC alert never materialized, as reported to TMT in a follow-up email August 31. Los Angeles has since experienced rolling brownouts, but these were due mostly to local equipment failure, not a shortage of power.

d. Water Quality. Spill ended August 31, Adams reported, and TDG levels in the river are low. Elevations at midnight on August 31 were 2,438.94 feet at Libby reservoir and 1,533.46 feet at Dworshak reservoir.

8. Little Goose Doble Testing

The doble testing scheduled for mid-October at Little Goose can't be completed at night because of safety issues, Don Faulkner (COE) reported. At its last regular meeting, TMT members considered the possibility of having the work done at night to avoid peak steelhead migration times. An alternative to that schedule would be holding off for the first 3-4 hours of the day to allow for better migration conditions, then starting the testing around 9 or 10 am, Faulkner said. This option would extend the testing schedule for another day, for a total of four days instead of the three days initially proposed.

Russ Kiefer (Idaho) suggested this testing schedule be referred to FPAC for further consideration at its next meeting September 11. After that meeting, FPAC will share its recommendation with Jim Adams, who will keep TMT informed of the testing process via email.

9. Next Meetings

The next TMT meeting will be in person on September 26. There will be a possible TMT call September 19 to discuss Lower Granite MOP operations. This summary prepared by consultant and writer Pat Vivian.

<i>Name</i>	<i>Affiliation</i>
Jim Adams	COE
Russ George	WMC
Tim Heizenrader	Centaurus Energy
Scott Boyd	COE
Kyle Dittmer	CRITFC
Robyn MacKay	BPA
Russ Kiefer	Idaho
Dave Wills	USFWS
John Roache	BOR
Mike Butchko	Powerex
Tina Lundell	COE
Greg Haller	Nez Perce
Paul Wagner	NOAA
Rick Kruger	Oregon
Cathy Hlebechuk	COE
Dave Hurson	COE – Walla Walla

TECHNICAL MANAGEMENT TEAM

BOR : John Roache/Mary Mellema/Pat McGrane **BPA :** Robyn MacKay/Tony Norris/Scott Bettin
NOAA-F: Paul Wagner/Richard Dominigue **USFWS :** David Wills/Steve Haeseker
OR : Rick Kruger/Ron Boyce **ID :** Russ Kiefer
WDFW : Cindy LeFleur **MT :** Jim Litchfield/Brian Marotz
COE: Jim Adams/Cathy Hlebechuk/Cindy Henriksen

TMT MEETING

Wednesday September 26, 2007 09:00 - 12:00

1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97209-4142
Map Quest [\[Directions\]](#)

CONFERENCE PHONE LINE

Conference call line:203-310-2162; PASS CODE = 4703150

To check into the building, take the elevator to the 5th floor and the guard will issue you an ID badge if you need one and will take you down to the meeting room on the 4th floor. If you have NOT attended a TMT meeting in the past you will need to call ahead and let Jim Adams (503) 808-3938, Cathy Hlebechuk (503) 808-3942, or Cindy Henriksen (503) 808-3945 know, so you can be added to the TMT Visitor List and issued an ID badge. This badge may be used indefinitely. If you have attended TMT in the past you may re-use your ID badge indefinitely. If you are a federal employee you will also need to have an ID badge issued to you which can be used indefinitely.

We have had disruptions on the phone because people are not hitting 'mute' after dial in.
Please MUTE your Phone

All members are encouraged to call Robin Harkless with any issues or concerns they would like to see addressed.
Please e-mail her at robin76@cnmw.net or call her at (503) 248-4703.

AGENDA

1. Welcome and Introductions
2. Review [\[Meeting Minutes\]](#)
3. Albeni Falls Fall/Winter Operations - Russ Keifer - Idaho
 - a. [\[SOR 2007-USFWS-IDFG\]](#) 
4. Lower Granite MOP Operations - Jim Adams - USACE
5. Little Goose Outage Follow-up - Jim Adams, USACE
6. Emergency Action Plan - Robyn MacKay - BPA
 - a. [\[Emergency Action Plan - 26 Sep 07\]](#) 
7. Treaty Fishery - Kyle Dittmer, CRITFC
 - a. [\[SOR 2007-C5\]](#) 
8. 2008 Draft Water Management Plan - Scott Boyd, USACE
 - a. [\[2008 Draft Water Management Plan\]](#) 
9. Operations Review
 - a. Reservoirs
 - b. Fish

- c. Power System
 - d. Water Quality - *Jim Adams, COE*
 - 1. [\[Spill Information 2007\]](#)
10. Other
- Set agenda for next meeting - **October 10, 2007** [\[Calendar 2007\]](#) 

Questions about the meeting may be referred to [Jim Adams](#) at (503) 808-3938 or [Cathy Hlebechuk](#) at (503) 808-3942 or [Cindy Henriksen](#) at (503) 808-3945.

Draft March 20, 2006

2006 Water Management Plan – Appendix 1 Emergency Protocols

FEDERAL COLUMBIA RIVER POWER SYSTEM
PROTOCOLS FOR
EMERGENCY OPERATIONS
IN RESPONSE TO GENERATION, TRANSMISSION OR OTHER
EMERGENCIES—

FOR ATTACHMENT TO THE
WATER MANAGEMENT PLAN
AND OTHER APPROPRIATE ACTION PLANS

Draft March 22, 2006

A. Introduction

This paper attempts to define a protocol for reacting to short term (approximately 1-7 days of duration) emergency conditions and situations that arise affecting the generation and delivery of energy produced by the Federal Columbia River Power System (FCRPS) (herein after called emergency), including the immediate response taken in the face of the emergency and any necessary follow-on activities deemed appropriate as a consequence of the emergency and the immediate response. The specific purpose for this effort is to establish a formal, written procedure for actions affecting the system when an emergency occurs. For emergencies of a longer duration, the notification process outlined in this document will be followed and the overall procedures identified in Section 9 of the NMFS 2000 BiOp will be followed.

The purposes of these protocols are to: 1) identify types of emergencies; 2) identify procedures for responding to emergencies including follow-up activities; and 3) establish procedures for the consideration of alternative actions to provide benefits to fish and wildlife that were affected by the emergency as described in Section F.

It is the intent that these protocols would be incorporated into the annual Water Management Plan of the Technical Management Team (TMT) to guide actions taken by the Federal operating agencies and other parties in the Region as they seek to meet the performance standards developed in the 2000 BiOps.

B. Definition of an Emergency:

“**e•mer•gen•cy** (i mur’jen se), n., pl. **-cies**. a sudden, urgent, usually unforeseen occurrence or occasion requiring immediate action.”

It is appropriate to define emergencies as they apply to the operation of the FCRPS. As evident from previous actual events, emergencies are a unique situation having the potential for many types of impacts, generally requiring some type of action or response to minimize or eliminate impacts. An emergency may require an operating agency to operate the FCRPS in a manner other than the planned operation contained in the 2000 Biological Opinions or the associated Decision Documents (Corps' Record of Consultation Statement of Decision (Corps' ROCASOD); Reclamations' Findings (Reclamations' FINCOM); BPA's Record of Decision (BPA ROD)) issued by the operating agencies (probably footnote the individual names and collectively call them Decision Documents). These events may increase fish mortality above levels anticipated in the 2000 Biological Opinions and Decision Documents (RODs).

However, it is important to distinguish emergencies from "planned risks." In operating a complex system such as the FCRPS, certain risks are assumed every day. Future conditions are uncertain. Operational decisions rely on predictions, forecasts and probabilities. If an extreme circumstance occurs, it is not necessarily an emergency even though it was sudden and urgent, and caused an immediate action to be taken.

C. Goals:

1. An overall goal of this protocol is to prevent or minimize, and offset actions associated with emergency-related FCRPS impacts to the fish protection measures in the Biological Opinions and Decision Documents. ***
2. To achieve this goal, the Federal operating agencies will maintain and use system flexibility including power purchases in-season so that responses to emergencies, when required, will consider alternatives that prevent or minimize fish impacts. The Federal operators commit to improving system reliability by identifying and completing actions to achieve improved reliability.
3. Another goal of this protocol is to complete timely coordination and consultation in accordance with Section E.

*** This does not create legal rights or obligations on the part of any party.

D. Types of Emergencies:

For this protocol, emergencies are divided into three types. Each type is described below and illustrated with several examples.

1. Generation Emergency - the potential for or actual insufficiency of electrical generation to satisfy electrical demand or load in a particular geographical area

considered in the 2000 Biops. The insufficiency can be of short duration (a capacity shortfall) or have the potential to persist for a period of time (an energy shortfall) and is usually spread over a defined geographical area as determined by the interconnectivity of the transmission and distribution system.

For example, a generation emergency may be caused by a cold snap which is a forecasted period of three (3) or more days when the composite Pacific Northwest load center (Seattle, Portland and Spokane, weighted by relative Federal system loads) average temperature is at least 8.33 degrees Celsius (15 degrees Fahrenheit) below daily averages. A generation emergency may also be caused by an unanticipated loss of a generating resource - a project/unit forced outage; or by a restriction in the amount of water available for project discharge - reducing on-site generation; or by a loss of electrical transmission capability used to import electricity into a particular geographic area - a transmission line restriction or shutdown.

2. Transmission Emergency - the potential or actual loss or limitation in the ability to move electricity from the site of generation to the actual consumer or end-user.

For example, a transmission line may fail, shutdown or otherwise be unavailable to transmit any electrical energy - a line outage; or a physical condition may exist that prevents or limits effective and reliable transmission - insufficient reactive power (VARs) to overcome the inherent losses in long-distance transmission; or a temporary limitation on transmission line capability that restricts the export of electricity - which causes a generation surplus in one area, thus reducing overall generation levels but causes a shortage in another area as noted above in the description for a generation emergency.

3. Other Emergency - the existence or result of extenuating circumstances which fall outside the range of normal operations, is unanticipated, and may result in catastrophic impact, physical damage or failure to part of the physical power system.

For example, all natural disasters fall under this category of emergency - earthquakes, floods, and fires; or human caused failures - ship or barge strandings, facility failures (e.g., locks, gates, outlets, etc.), chemical spills into the river, train derailments impacting the river and terrorist acts; or overriding circumstances or needs that require operations to exceed normal limits such as a police investigation, a rescue operation, and a project operation specifically designed to prevent damage to or protect other parts of the FCRPS. There may also be Western Electricity Coordinating Council (WECC) required actions for system reliability.

NMFS' 2000 Biological Opinion on the FCRPS recognized the need to involve regional executives in the event of power system emergencies which are of exceptional magnitude or duration.

There are number of “givens” surrounding emergencies:

- As the dictionary definition implies, emergencies are unforeseen and can occur at any moment in time.
- While many types of emergencies can be identified or described (as was done just above), not all emergencies can be so identified prior to the occurrence.
- Emergencies are first recognized by those individuals who operate or are responsible for the system or facility.
- Generally, the individual who recognizes the emergency is the first person to take steps in responding to the situation.

- It is possible to plan for and to develop procedures for responding to many, but not all, emergencies.
- The level or critical nature of emergencies spans over a range from those emergencies that require immediate action to those that allow for coordination among affected parties prior to action.

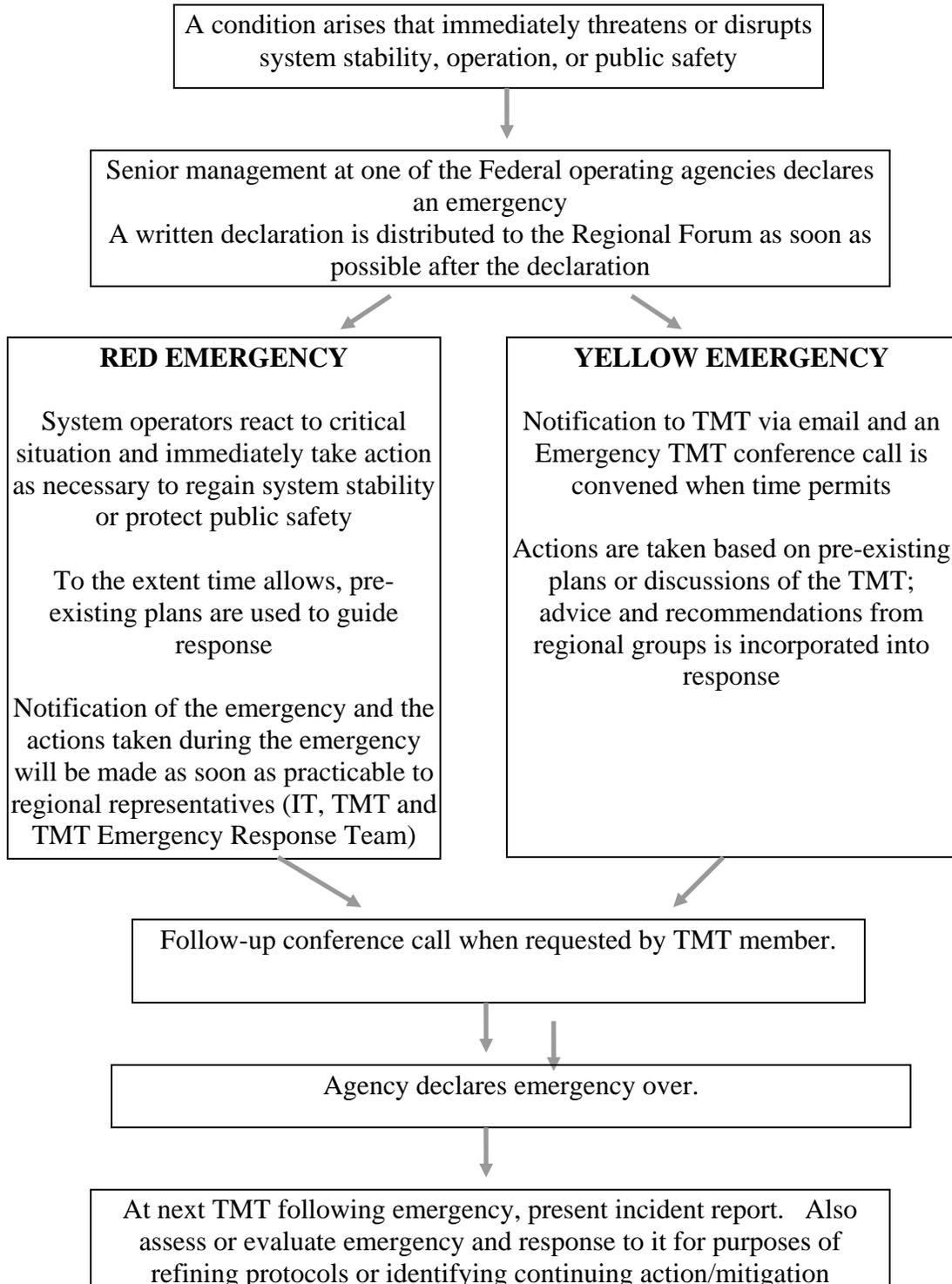
E. Emergency Protocol:

1. Emergencies can be further categorized by level of degree or immediacy – a Red Level emergency is an emergency in which time is essential and quick action is required because of an immediate public safety concern. For the power system, this type of emergency is characterized by system instability or the potential for electrical service to be interrupted. A Yellow Level emergency is an emergency in which operation can continue without immediate or significant public safety concerns. For the power system, this type of emergency is characterized by a stable system with no immediate loss of load-serving capability.

2. In a Red Level emergency situation, the Corps, Reclamation, and BPA will act as necessary and do what is necessary to maintain power system stability and public safety. One of the Federal agencies will provide notification as soon as practicable that a Red Level emergency has occurred to the IT and TMT chairs (who will disseminate information regarding the emergency to members of these teams) and to a designated list of “first contacts” from the TMT. The notification will include a brief description of the event, and will detail action that is being taken in response to the emergency. A more detailed (one page) written incident report will be provided to the IT and TMT chairs and the first contacts of TMT by the following day or as soon as practicable. It will include the following information: 1) description of the emergency, how it occurred, and how long it is anticipated to last, 2) description of how the emergency jeopardized system stability or public safety, 3) identification of agencies that declared and responded to the emergency, 4) identification of who were notified of the emergency, 5) description of what actions were taken by each agency, and 6) identification of alternatives considered to reduce and offset impacts of the emergency. In a Red Level emergency, FCRPS operators will consider Standard Operating Procedures for specific projects, the action lists that have been developed in the TMT, and/or

- guidance from appropriate Federal agencies to try to restore the system to conditions prior to the emergency. Priority action lists and other procedures developed through TMT will be contained in the annual Water Management Plan. They include, but are not limited to, a spill priority list for managing total dissolved gas, a generation emergency response action plan and others. See Appendices at the end of this document for Action Lists and Procedures.
3. In the event of a Yellow Level emergency, the Corps will notify TMT members via email and if time permits, convene an emergency TMT call to discuss the potential emergency situation. Preparatory actions may begin at this time in an attempt to lessen the severity, adverse biological impacts, or length of the emergency. All efforts should be made to take actions during the emergency which have been contemplated in advance. Extraordinary actions beyond those contemplated will be revisited with the TMT as soon as possible after the action.. In a Yellow Level emergency, the Action Agencies will consider the priority action lists, direction from TMT or other groups, Standard Operating Procedures for specific projects, and/or guidance from appropriate Federal agencies to try to restore the system to conditions prior to the emergency. Action lists and other procedures developed through TMT will be contained in the annual Water Management Plan. They include, but are not limited to, a spill priority list for managing total dissolved gas, a generation emergency response action plan and others. See Appendices at the end of this document for Action Lists and Procedures.
 4. When requested by a TMT member, the Corps will arrange for a follow-up emergency TMT conference call with at least the persons from TMT initially contacted and if appropriate, all other TMT representatives of the Federal agencies, state, and Tribal sovereigns. The purpose of the call is: 1) to review status of the emergency, 2) to insure that all requirements for declaration of the emergency by the Corps, Reclamation, and BPA have been met and that all alternatives for offsetting adverse impacts of the emergency have been considered, and 3) to review the use of priority action lists.
 5. It is incumbent upon the agency that calls the emergency or initiates action to remedy an emergency to issue notification to the regional representatives when the emergency situation is passed. In general, system operation will revert to normal conditions or as agreed upon at the most recent TMT forum when the emergency is declared over. The agency that calls the emergency will submit a written report detailing the incident and response at the next TMT meeting following the event.
 6. The Federal agencies will provide an opportunity for representatives of the region's affected parties to review the course of events for the emergency and to suggest refinements to these protocols or to the specific action steps employed. These issues will be discussed at the next TMT meeting following the event.

7. The following flowchart illustrates the emergency response protocol described above:



F. Offsetting Adverse Effects of Emergency and Response Actions:

1. In the event that emergency conditions or the immediate response to an emergency situation results in an operation that causes adverse effects to fish and wildlife, the TMT will assess the magnitude of the adverse effect and provide information on measures available to offset it. Alternative operations to offset adverse effects in-place, in-kind in a timely manner shall receive the highest priority. The members of the Regional Forum agree to cooperate in the development of this information for consideration through the TMT process.
2. If the operation that was affected is a requirement of a Biological Opinion, then the appropriate agency (National Marine Fisheries Service (NMFS) or Fish and Wildlife Service (USFWS)) will use the information on the magnitude of the adverse effects to determine whether the modified operation is inconsistent with the relevant Biological Opinion(s). If the modified operation differs significantly from the conditions in the Biological Opinion(s) then NMFS or USFWS may recommend offsetting measures to conclude that the action satisfies Endangered Species Act requirements.
3. An agency deciding not to provide offsets, or offsetting actions are different from those recommended through the TMT process, will provide a written explanation for the record stating the decision and the basis for the decision.
4. NMFS and/or USFWS may make a determination that re-initiation of consultation is necessary.
5. Nothing in this section prevents a sovereign from independently pursuing remedies under applicable Federal, state or Tribal law.

Appendices

1. Spill Priority List

[Not included here - it is developed for each operating year.]

2. Generation Emergency Action Plan (Updated September 26, 2007).

The following is a list of power system actions that will be pursued when attempting to avoid or delay a situation that would result in either the shedding of firm load or the interruption of mandated fishery operations. Should the implementation of available resources on the pre-emptive actions list below fail to resolve a situation, or if the situation arises suddenly without warning, the process to declare a power system emergency (Red Emergency) will be initiated. A declaration of a power system emergency will initiate implementation of the actions from the Emergency Actions List on the next page.

Draft March 20, 2006

Notification to the region will be made as soon as practicable, and will follow the protocols for notification, reporting, and documentation as specified in the *Protocols for Emergency Operations In Response to Generation, Transmission or Other Emergencies, Section E of Appendix 1 – Emergency Protocols of the TMT Water Management Plan.*

Pre-emptive Actions (not in priority order)

- Timely energy purchases at prices up to the FERC WECC price cap (currently \$400/mwh).
- Request that Corps and Reclamation return all units to service by canceling or postponing scheduled outages. (Makes all units available).
- Stop/delay Transmission O&M actions via AGC dispatcher.
- Put into service (on line) all possible generators (e.g., Grand Coulee pump-generators)
- Reshape flows within objectives at specific projects to meet immediate generation needs (deal with the immediate problem – this may throw the river out of whack – if applicable spill upstream projects to position water downstream).
- Cut prescheduled PNCA storage return to others
- Request Exceedance of draft limits
- Stop/Start pumping at Grand Coulee.
- Request tailwater rate of change exceedance at Bonneville Dam.
- Contact RCC and Tribes to alter Treaty fishing elevations is applicable.
- Reschedule power system maintenance to minimize impact fish protection measures.
- Monitor reserves and request a declaration of a NERC ALERT 1 (via AGC dispatcher) when there is concern about sustaining required operating reserves. Dispatcher will call NWPP Reliability Coordinator.
- Issue “Merchant Alert” through WECC.

Emergency Actions List

The following is a prioritized list of emergency actions. This list may be updated as necessary through coordination with the TMT. The order of the list will be followed as best as possible. The order and extent of the actual implementation of the actions in this list will be dictated by each specific emergency.

Implementation of actions from the Emergency Actions List will not occur unless a declaration of a NERC Alert 2 or 3 (Red Emergency) due to a Power System Emergency is requested.

Emergency Actions List (Updated via TMT as of September 26, 2007)

April – August period (MW amounts are approximate)

- Increase generation at JDA to operate outside 1% up to full load
- Increase generation at TDA to operate outside 1% up to full load
- Reduce spill at IHR to RSW (19 kcfs) 133MW
- Reduce spill at LWG to 9 kcfs 70MW
- Reduce spill at LWG to 0 63 MW
- Reduce spill at LGS to 0 77MW
- Reduce spill at LMN to 0 119MW
- Reduce spill at IHR to RSW only (9 kcfs) 180MW
- Reduce spill at IHR to 0 133MW
- Increase generation at MCN to operate outside 1% up to 16.5 kcfs per unit
- Increase generation at BON to operate outside 1% up to full load
- Reduce spill at MCN to 20% of flow 180MW
- Reduce spill at BON to 50 kcfs while maintain B2CC spill 105/210MW
- Reduce spill at BON to 0 200MW
- Reduce spill at JDA to 0 338MW
- Reduce spill at TDA to 30% 106MW
- Reduce spill at MCN to 0 (to save water for future hours)
- Reduce spill at TDA to 0 324MW
- Increase spill to move water to downstream projects

September– March period

- Increase generation at JDA to operate outside 1% up to full load (Sep-Oct)
- Increase generation at TDA to operate outside 1% up to full load (Sep-Oct)
- Increase generation at MCN to operate outside 1% up to 16.5 kcfs per unit (Sep-Oct)
- Increase generation at BON to operate outside 1% up to full load (Sep-Oct)
- Shut off adult fish attraction BON
- Shut off TDA sluiceway
- Violation of BiOp ramp rates at HGH and LIB
- Increase project drafts that might impact spring refill.(HGH/LIB/DWR/ALF)

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

September 26, 2007 TMT Meeting

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Gumpert

Notes: Erin Halton

The following notes are a summary of issues that are intended to point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the "record" of the meeting, only a reminder for TMT members.

Official Minutes/Facilitator Notes

Notes from the 9/5 TMT conference calls were posted, and with no further comments or edits, were finalized during today's meeting.

Albeni Falls Fall/Winter Ops: Lake Pend Oreille SOR 2007-USFWS-IDFG

Russ Kiefer, Idaho, presented an SOR on behalf of IDFG and USFWS, which requested drawing Lake Pend Oreille down to an elevation no lower than 2055', preferably around November 20, to support kokanee spawning (a food source for endangered bull trout) in the lake. Russ noted that the rationale behind this recommendation was based on a decision tree and included consideration of the following factors: last year's operation during which the lake was drawn down to about 2051'; NOAA's 3-month forecast of above normal precipitation; and kokanee abundance numbers are low. Idaho believes the decision tree is a good step toward balancing the needs of resident fish in Idaho and listed fish in the lower Columbia. Scott Bettin, BPA, added that an additional balancing consideration is cost, which he estimated at \$4.4 million a year for BPA and \$12 million to the region to hold the lake up as is being requested this year. Kyle Dittmer, CRITFC, suggested Idaho look at improved forecasting methods and noted a trend in the region toward 'consensus forecasting' that the Climate Impacts Group and others are starting to utilize. Russ acknowledged these additional considerations.

ACTION: TMT members did not object to the SOR, and the COE planned to implement the operation as specified. Idaho acknowledged the need to revisit the proposed operation if unforeseen circumstances were to occur such as a major shift in the forecasts.

Lower Granite MOP Operations

Jim Adams, COE, shared that temperature profiles in the Clearwater were showing around 65 degrees at Orofino and a downward trend. Lower Snake temperatures were in the lower 60's and also trending downward. Given these conditions and the desire to have additional flow through the fish collection facility at Lower Granite Dam, the COE proposed lifting MOP restrictions at the project starting today. The salmon managers discussed this issue at FPAC and raised no objections to the proposal.

ACTION: The COE planned to lift the MOP restriction at Lower Granite today, 9/26. BPA and the COE will work out the details of the operation at Lower Granite and inform TMT via email or at the next meeting.

Little Goose Outage Follow-Up

Jim Adams, COE, reported that double testing planned for October 9-10 at Little Goose was no longer necessary. Due to a ground fault that occurred earlier in September, the project had an entire powerhouse outage in order to diagnose what caused the ground fault and to repair what was broken. While this work was being conducted, the project took advantage of the outage to go ahead and perform the Double testing on the T-1 transformer. The project was brought back on line after a couple of days.

Emergency Action Plan

Robyn Mackay, BPA, reported on the updated Appendix 2 Emergency Action Plan, noting that language in the preamble had been discussed and coordinated among the Action Agencies, and the pre-emptive actions were a list of actions BPA will take prior to declaration of an emergency. The emergency actions list had been reviewed by the salmon managers, and a few revisions were made since that review under the September-March timeframe. NOAA, BPA, BOR, Montana, and the COE approved the new plan during today's meeting.

ACTION: Other TMT members will review Appendix 2 and submit comments and/or agreement with the document to the DS Consulting Team by Friday, September 28. Email comments to robin76@cmnw.net. Comments will be shared with the COE and, upon finalization, the Appendix will be attached to the 2007 WMP and the DRAFT 2008 WMP.

Treaty Fishery SOR 2007-C5

Kyle Dittmer, CRITFC, presented an SOR for last week's treaty fishery, requesting Bonneville pool be maintained at 73.5-74.5', The Dalles pool at 158-159.5', and John Day at 263.5-264'. He noted that the Bonneville pool elevation request was lower than usual due to dredging that was occurring in the Bonneville area. While CRITFC expressed concern for the 2 foot drawdown, their primary interest was in stable pools. He added that discussions and coordination had occurred between the COE, CRITFC and the Federal hatchery on this. Most nets were focused in the John Day area and Kyle offered a suggestion to the COE to consider the net flight surveys in making decisions about how to operate the pools during the treaty fishing season. The Tribes planned to meet on Thursday, September 27, to determine whether to request an additional week of treaty fishing. It was noted that the Seattle District COE holds a permit for dredging until Sunday, September 30, but expected the work to be completed sooner than that. Currently, the requested range was being met at Bonneville.

2008 Draft Water Management Plan

Scott Boyd, COE, said comments on the draft 2008 WMP had been received by Montana and USFWS and posted to the TMT web page. As the plan was written based on the 2004 BiOp, and a 2007 proposed Biological Assessment and BiOp were expected out soon,

several TMT members and CRITFC said they would wait and comment on the new information – which will likely be added to the 2008 Fall/Winter Update (and revised 2008 WMP).

Special Note: The next IT meeting is scheduled for Thursday, November 8 from 9am-3:00 pm at NOAA Fisheries, at which the draft BiOp will be presented and discussed. TMT members were encouraged to attend that meeting.

ACTION: Scott Boyd will add the list of Appendices currently under the 2007 WMP to the 2008 Draft WMP (with the new Appendix 2 Emergency Actions List, per discussions above). The BOR planned to send comments on the 2008 draft soon for posting to the web.

Operations Review

Reservoirs – Grand Coulee was at elevation 1284.9’ and slowly filling; the project will stay above elevation 1283’ for kokanee spawning until mid-November. Hungry Horse was at elevation 3537.46’, currently releasing 2.8 kcfs and ramping back down to around 2.4 kcfs to meet Columbia Falls minimums. Libby was at elevation 2435.5’ with 4.5 kcfs in and 6 kcfs out. Per the latest STP, the COE planned to maintain 6 kcfs outflows until October 1, then ramp down to 4.8 kcfs into early November. Albeni Falls was at elevation 2061.3’ with 10.1 kcfs in and 12.5 kcfs out. Dworshak was at elevation 1518.9’ with 1.1 kcfs in and 1.7 kcfs out. Lower Granite averaged 17.2 kcfs inflows, and the 7-day average flows at McNary were 78 kcfs. MOP operations at John Day will end on October 1.

Fish – The juvenile Snake River passage season has ended, with very low subyearling numbers in the system. Adult upriver brights are tracking behind the expected migration this year, totaling 113,000 vs. the predicted 192,000. Fisheries managers downgraded their forecast to 118,500 for the year. Spring Creek hatchery adults are also lower than expected; the actual was 16,000 vs. 19,000 predicted. McNary dam counts are down – for the first time in 20 years, fisheries managers are closely watching the escapement goal (45,000 fish) at the project, though it is likely the number will be met this year. The escapement number and ESA-driven harvest rates both impact fishery management throughout the season. Jack counts were very high this year, for both tules and brights.

ACTION: Information about passage numbers, harvest, and other fisheries management can be found at: <http://www.wdfw.wa.gov/fish/crc/crcindex.htm>. This link will be added to the TMT web page for quick reference.

Power system – No report.

Water quality – No report.

Other

NRCS is sponsoring a US Drought Forum in the coming month. See the NRCS website for more details.

Next TMT Meeting, October 24, 9-noon

An agenda will be developed for the next meeting. Items include:

- Chum Operations
- 2008 WMP and Fall/Winter Update

**Columbia River Regional Forum
Technical Management Team Meeting
September 26, 2007**

1. Introduction

Today's meeting was chaired by Jim Adams (COE) and facilitated by Robin Gumpert (D.S. Consulting), with representatives from COE, NOAA, USFWS, BPA, BOR, CRITFC, Montana, Idaho and Washington attending. The following is a summary (not a verbatim transcript) of the topics discussed and decisions made at the meeting. Anyone with questions or comments about these notes should provide them to the TMT chair or bring them to the next meeting.

2. Review Meeting Minutes

There were no comments on previous notes today. Notes for all TMT meetings through September 5 can be considered final.

3. Albeni Falls Fall and Winter Operations/SOR 2007 – USFWS/IDFG - 1

Russ Kiefer (Idaho) presented this SOR on behalf of its signatories, the Idaho Dept. of Fish and Game, USFWS, and Pend Oreille/Priest Lakes Commission. The decision tree at the back of the SOR is a proposal to guide operational decisions while balancing the needs of resident fish in Idaho with those of anadromous fish below Bonneville Dam.

The SOR asks that Lake Pend Oreille be held at no lower than elevation 2,055 feet throughout the winter to enhance kokanee spawning. The gravel below that was cleaned by the wave action last year when the lake was held down. Keeping the water level high will provide access to spawning gravel for the kokanee in the lake, as well as an opportunity to observe how well they spawn under such conditions.

Providing flow for chum during a period of high precipitation can cause fish to spawn at elevations that can't be maintained over the winter, and it may result in the redds being dewatered, Kiefer explained. The SOR is based on NOAA's three month forecast for November through January, which shows the Columbia basin receiving above average precipitation. Kyle Dittmer (CRITFC) raised the possibility that this could turn out to be a near-normal water year. BPA pointed out that this operation on average costs BPA customers \$4.4 million and the region as a whole \$12 million when compared to an operation drafting to 2051.

There were no objections to the SOR as presented. The COE will implement it as specified. Kiefer expressed appreciation and added the signatories might request a change if unusual conditions occur.

4. Lower Granite MOP Operations

Temperatures at the Orofino gage have been steadily dropping since September 6, with significant cooling on the Clearwater River, Adams said. Yesterday's temperature was 56 degrees F at Orofino, while temperatures at the Anatone gage and throughout the lower Snake River are in the low 60's. More water is needed for the fish holding tanks, so the COE proposed to remove all MOP restrictions on the Lower Granite pool as of today, instead of waiting for October 1 when they would normally expire.

Scott Bettin (BPA) asked, is a minimum elevation of 1 foot needed as a soft constraint? Not at this time since they are only using 2 of the 6 fish holding tanks, Adams said. Meanwhile, the Salmon Managers have discussed this at FPAC and agreed that lifting MOP restrictions at Lower Granite is appropriate, given the natural cooling taking place. Adams will fill TMT in on the details of actual operations at the next TMT meeting.

5. Little Goose Outage Follow-up

Doble testing scheduled for October 9 at Little Goose won't be needed after all, Adams said. A recent groundfault occurrence at Little Goose led to a discovery that bad connectors in the transformer need to be replaced, requiring a line outage. The double testing was completed at the same time the T-1 line was out of service for connector replacement. Double testing, initially planned for September, had been delayed until October at TMT's request to avoid impacting adult passage during peak migration.

6. Emergency Action Plan

There has been resistance to changing the actual emergency protocols because of the Biological Assessment process this year, Robyn MacKay said. So only the first four bullets of the generation action plan in Appendix 2 have been revised. A preamble explains the pre-emptive actions that would happen before moving to red emergency actions if the pre-emptive actions fail to resolve the situation. MacKay pointed out that new "red action items" have been added to the September-October period, which might involve going outside the 1% spill limitation on the Columbia River instead of drafting from upstream reservoirs.

MacKay asked TMT to consider adopting this revised appendix so the protocols for TMT will be consistent with BPA's protocols for emergencies. The protocols can be revisited at the same time the 2008 Water Management Plan is being reviewed. Adams agreed this is an ideal time process-wise for the COE to work with BPA and the region on protocols for emergencies. Montana, Washington, USFWS, NOAA and BOR representatives were comfortable adopting the appendix without further review; Idaho asked for a little more time to digest the latest version.

7. Autumn Treaty Fishing/SOR 2007-C5

This will probably be the last SOR for the 2007 treaty fishing season, Kyle Dittmer (CRITFC) reported. The SOR covers the period from 6:00 a.m. September 25 to 6:00 p.m. September 28. It requests the following as a soft constraint:

- Maintain Bonneville pool at elevation 73.5 to 74.5 feet (2 feet lower than normally requested).
- Maintain The Dalles pool at elevation 159.5 to 158.5 feet.
- Maintain John Day pool at elevation 264.5 to 263.5 feet.

Contract work authorized by the COE has resulted in lower pool elevations than are normally requested by the tribes, Dittmer said. The permit for that work was issued by the Seattle District to Skamania County on an emergency basis, Adams said. The contract work will probably be completed by tomorrow and no later than September 30. The lowest elevation as a result was 72.6 feet on September 24. The Bonneville pool is now operating within the range specified in the SOR.

Net flight survey information shows that the biggest fishing effort this year focused on the John Day pool, rather than Bonneville pool, Dittmer said. He will continue to provide net flight information to the COE as a measure of tribal priorities. The decision as to whether the treaty fishery will be extended for another week should be made within the next 24 hours. Dittmer was asked if there were any reports from tribal fishermen of problems associated with the way the pools have been operated. He said that none have been reported and that he will check with tribal law enforcement to see.

8. Draft 2008 Water Management Plan

Scott Boyd (COE) asked whether anyone has comments on the draft WMP. Several TMT members expressed reluctance to invest much time in detailed review of the WMP until the draft Bi-Op is released October 31. Montana and Idaho representatives offered a few editorial comments in the meantime. John Roache said BOR would soon provide detailed comments on aspects of the WMP that probably won't change as a result of the new Bi-Op. Russ Kiefer requested that the next WMP draft issued for comments include appendices. Last year's appendices can be used for comments, Boyd said, with the exception of emergency protocols discussed earlier today. Dave Wills (USFWS) suggested making the new protocols available online. Boyd said he would post them, as well as any new comments on the WMP that come in.

Donna Silverberg (DS Consulting) invited TMT members to attend the next IT meeting on November 8, an all-day presentation which will focus mainly on details of the newly released Bi-Op.

9. Operations Review

a. Reservoirs. Grand Coulee is at elevation 1,284.9 feet and slowly filling, Roache said. BOR expects to maintain the minimum elevation of 1,283 feet at Grand Coulee from the end of September through approximately mid-November for kokanee spawning.

Hungry Horse is at elevation 3,537.46 feet with approximately 2.8 kcfs outflows. The project is ramping back down to around 2.4 kcfs to meet Columbia Falls minimums. Discharges were temporarily increased to 3.9 kcfs (125 MW minimum generation requirement) on September 24 to allow for repairs on the Libby-Conkelly 230Kv transmission line (gun-shot insulators and conductors)

Libby is at elevation 2,435.5 feet, with inflows of 4.5 kcfs and outflows of 6.0 kcfs. The modeled STP run calls for maintaining outflows of 6.0 kcfs until October 1, then reducing outflows to 4.8 kcfs until early November.

Albeni Falls is at elevation 2,061.3 feet at the Hope gage, with daily average inflows of 10.1 kcfs and outflows of 12.5 kcfs.

Dworshak is at elevation 1,518.9 feet, with inflows of 1.1 kcfs and outflows of 1.7 kcfs. The Lower Granite pool elevation is within MOP range at 733.1 kcfs (daily average). The 7-day inflow average at McNary is 78 kcfs.

b. Fish. Passage numbers of subyearling Chinook are in the 20s along the Snake River and in the single digits at Little Goose and Lower Monumental dams. Numbers at McNary were in the low 100s when sampling ceased a few weeks ago, Paul Wagner (NOAA) reported.

Adult counts at Bonneville have been tracking lower than expected this year, Cindy LeFleur (Washington) said. There are about 113,000 bright fish at Bonneville, as compared to a predicted run of 192,000 fish. Hanford and Snake River runs were predicted to be 185,000; the current count is 118,500 fish. Spring Creek Hatchery tule run was predicted to be poor this year, which is turning out to be accurate.

The escapement goal for McNary is 43-45,000 fish, a target that hasn't been hard to meet over the past 20 years. This year, the goal will probably be met, but not by a lot, LeFleur said. In general, Snake River fish have been tracking better than Hanford fish in terms of counts at Lower Granite.

Steelhead runs on average have been tracking closer to predictions, with A-runs (fish that go through tributaries above Bonneville) higher than predicted and B-runs (fish coming in now) lower than predicted. Tule jacks and Spring Creek jacks have been showing up in large numbers everywhere. Preliminary indications show a jack return of about 60%, which is enormous.

For fact sheets containing the latest run and fisheries information, go to <http://www.wdfw.wa.gov/fish/crc/crcindex.htm>.

c. Power System. There is nothing to report, Robyn MacKay said.

d. Water Quality. TDG levels are low and temperatures are dropping, Adams said.

10. Next Meetings

The next regular TMT meeting will be in person on October 24. The beginning of chum season and the water management plan fall/winter update will be among the topics on that agenda. This summary prepared by consultant and writer Pat Vivian.

Name	Affiliation
Jim Adams	COE
Paul Wagner	NOAA
Dave Wills	USFWS
Scott Boyd	COE
Jim Litchfield	Montana
Robyn MacKay	BPA
John Roache	BOR
Kyle Dittmer	CRITFC
Scott Bettin	BPA
Tim Heizenrader	Centaurus Energy
Laura Hamilton	COE
Cathy Hlebechuk	COE
Scott Boyd	COE
Shane Scott	NWRP

Phone:

Russ Kiefer	Idaho
Greg Hoffman	COE
Bruce McKay	Consultant
Barry Espensen	CBB
Ruth Burris	PGE
Cindy LeFleur	Washington

TECHNICAL MANAGEMENT TEAM

BOR : John Roache/Mary Mellema/Pat McGrane

BPA : Robyn MacKay/Tony Norris/Scott Bettin

NOAA-F: Paul Wagner/Richard Dominigue

USFWS : David Wills/Steve Haesecker

OR : Rick Kruger/Ron Boyce

ID : Russ Kiefer

WDFW : Cindy LeFleur

MT : Jim Litchfield/Brian Marotz

COE: Jim Adams/Cathy Hlebechuk/Bob Buchholz

TMT MEETING

Wednesday October 24, 2007 09:00 - 12:00

1125 N.W. Couch Street, Suite 4A34

Portland, Oregon 97209-4142

Map Quest [\[Directions\]](#)

CONFERENCE PHONE LINE

Conference call line:203-310-2162; PASS CODE = 4703150

To check into the building, take the elevator to the 5th floor and the guard will issue you an ID badge if you need one and will take you down to the meeting room on the 4th floor. If you have NOT attended a TMT meeting in the past you will need to call ahead and let Jim Adams (503) 808-3938, Cathy Hlebechuk (503) 808-3942, or Bob Buchholz (503) 808-3945 know, so you can be added to the TMT Visitor List and issued an ID badge. This badge may be used indefinitely. If you have attended TMT in the past you may re-use your ID badge indefinitely. If you are a federal employee you will also need to have an ID badge issued to you which can be used indefinitely.

We have had disruptions on the phone because people are not hitting 'mute' after dial in.

Please MUTE your Phone

All members are encouraged to call Robin Gumpert with any issues or concerns they would like to see addressed.

Please e-mail her at robin76@cnnw.net or call her at (503) 248-4703.

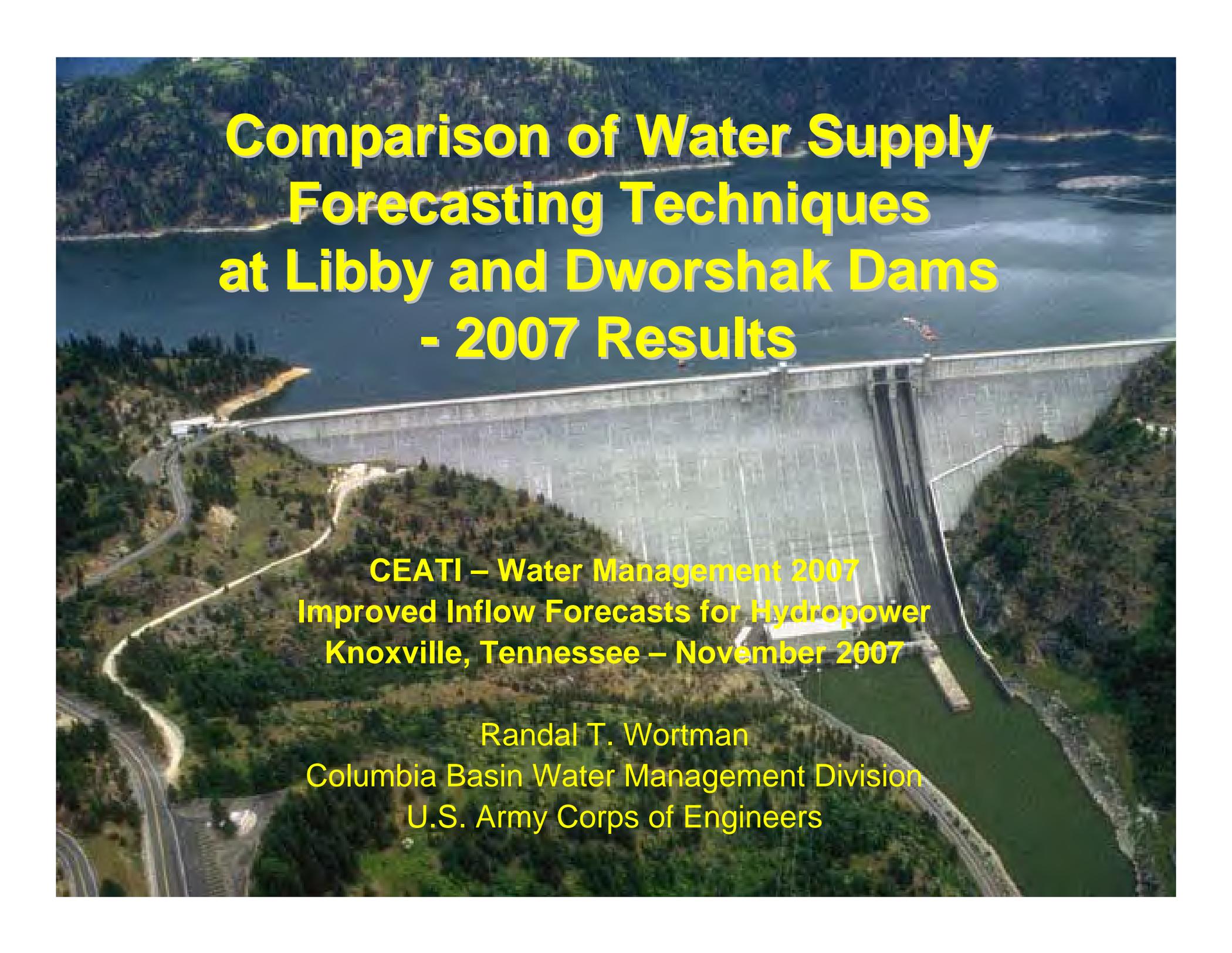
AGENDA

1. Welcome and Introductions
2. Review [\[Meeting Minutes\]](#)
3. Vernita Bar - Russell Langshaw, Grant County PUD
 - a. [28-Oct Priest Rapids Flow Request](#) 
 - b. [Results of 21-Oct-2007 Redd Count](#) 
4. Comparison of Water Supply Forecasting Techniques - Randy Wortman, USACE
 - a. [\[CEATL Presentation\]](#) 
5. Chum Operations
 - a. Measuring Behavioral Responses of Spawning Chum Salmon to Elevated River Flows - Ken Tiffan, USGS
[\[PPT\]](#) [\[PDF\]](#) [\[AVI\]](#)
 - b. Chum Operations
6. Burbot Operations
7. 2008 Draft Water Management Plan - Scott Boyd, USACE
 - a. [\[2008 Draft Water Management Plan\]](#) 
8. TMT Year End Review Agenda - Jim Adams, USACE

- a. [\[2007 Year End Review Agenda\]](#) 
- 9. Operations Review
 - a. Reservoirs
 - b. Fish
 - c. Power System
 - d. Water Quality- *Jim Adams, COE*
 - 1. [\[Spill Information 2007\]](#)
- 10. Other
 - Set agenda for next meeting - **November 7, 2007**
Note: NOAA Fisheries meeting location for this meeting only [\[Calendar 2007\]](#) 

Questions about the meeting may be referred to:

*[Jim Adams](#) at (503) 808-3938, or
[Cathy Hlebechuk](#) at (503) 808-3942, or
[Bob Buchholz](#) at (503) 808-3945.*

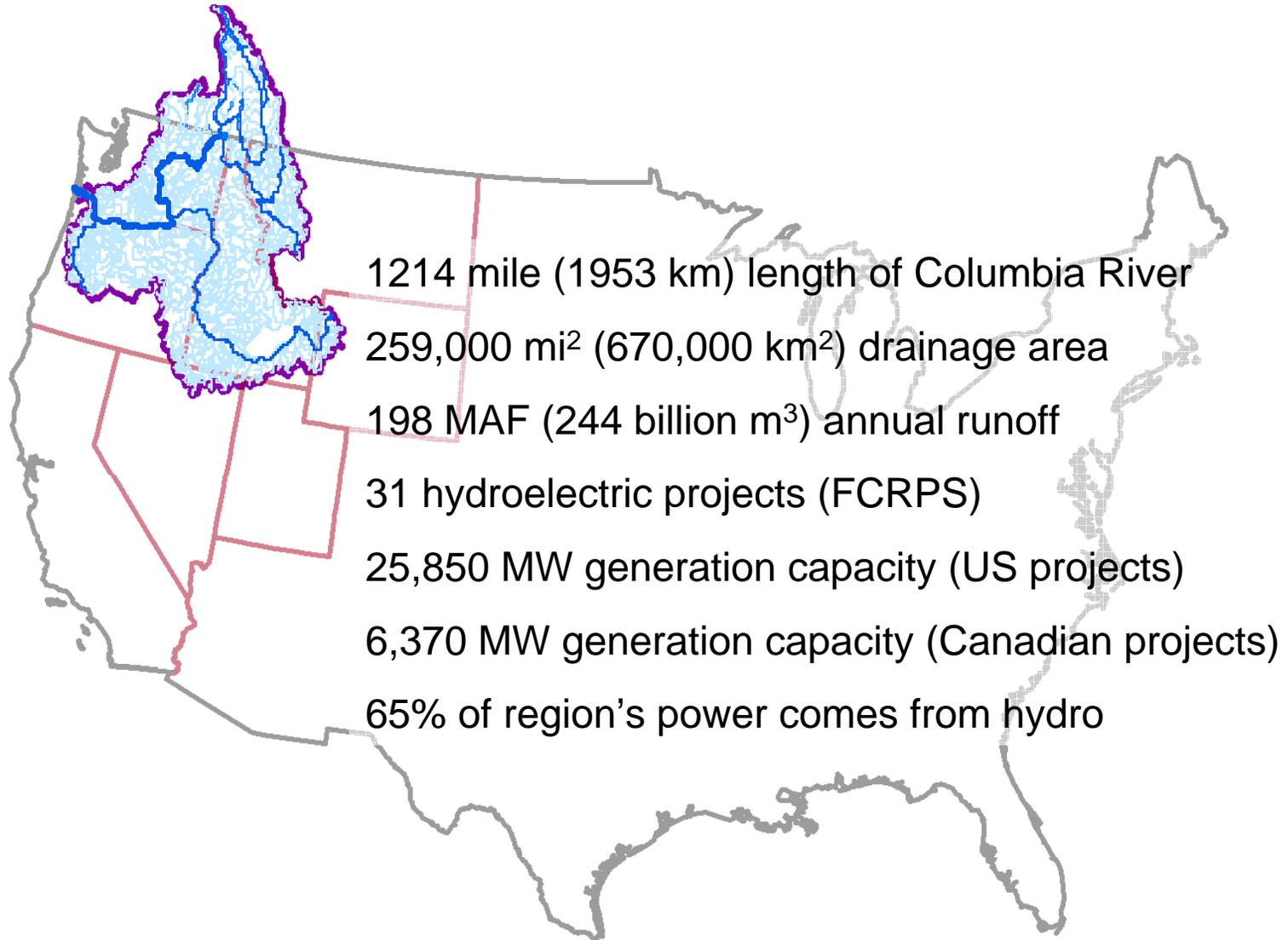


Comparison of Water Supply Forecasting Techniques at Libby and Dworshak Dams - 2007 Results

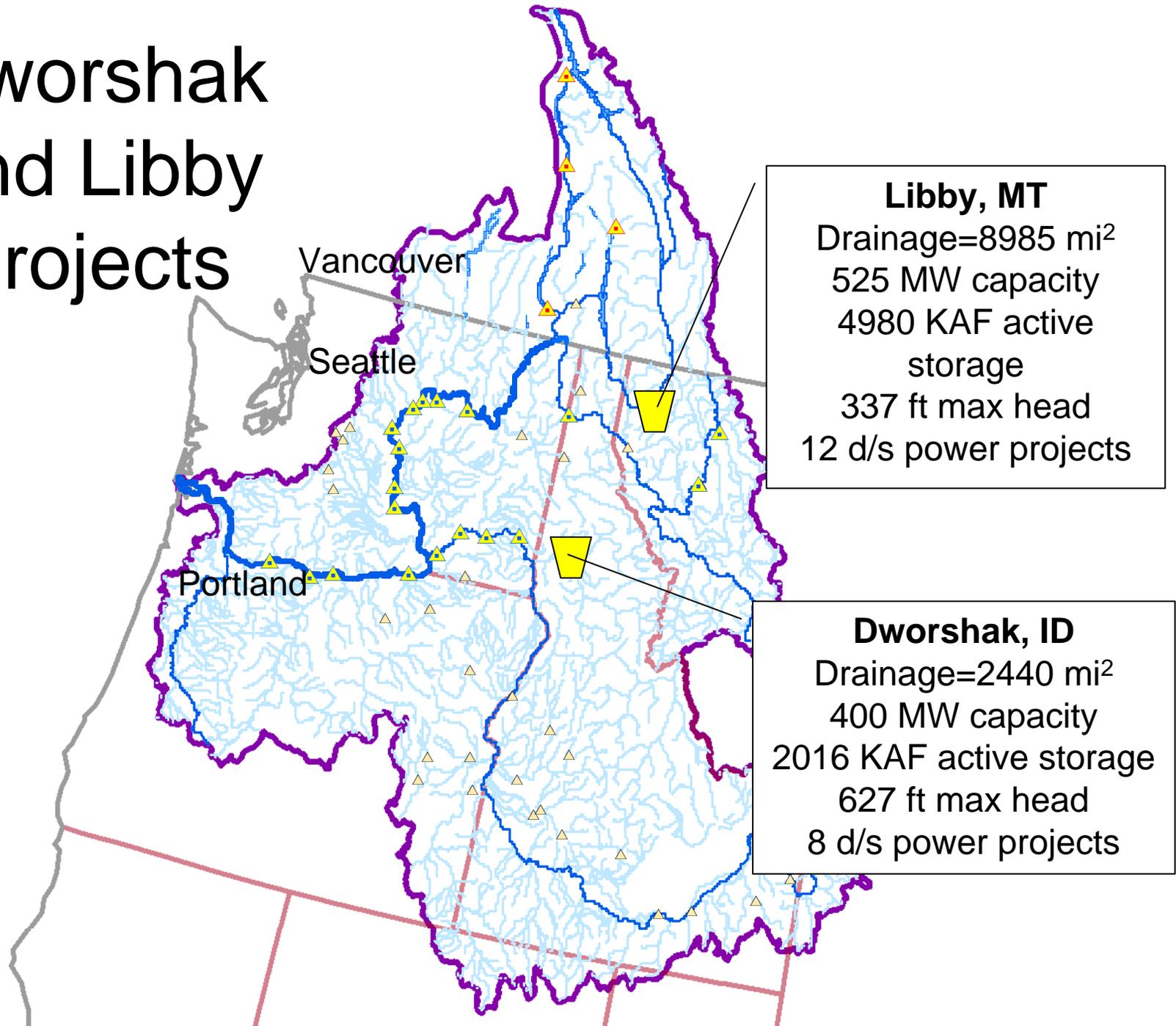
**CEATI – Water Management 2007
Improved Inflow Forecasts for Hydropower
Knoxville, Tennessee – November 2007**

**Randal T. Wortman
Columbia Basin Water Management Division
U.S. Army Corps of Engineers**

Columbia River Basin



Dworshak and Libby projects

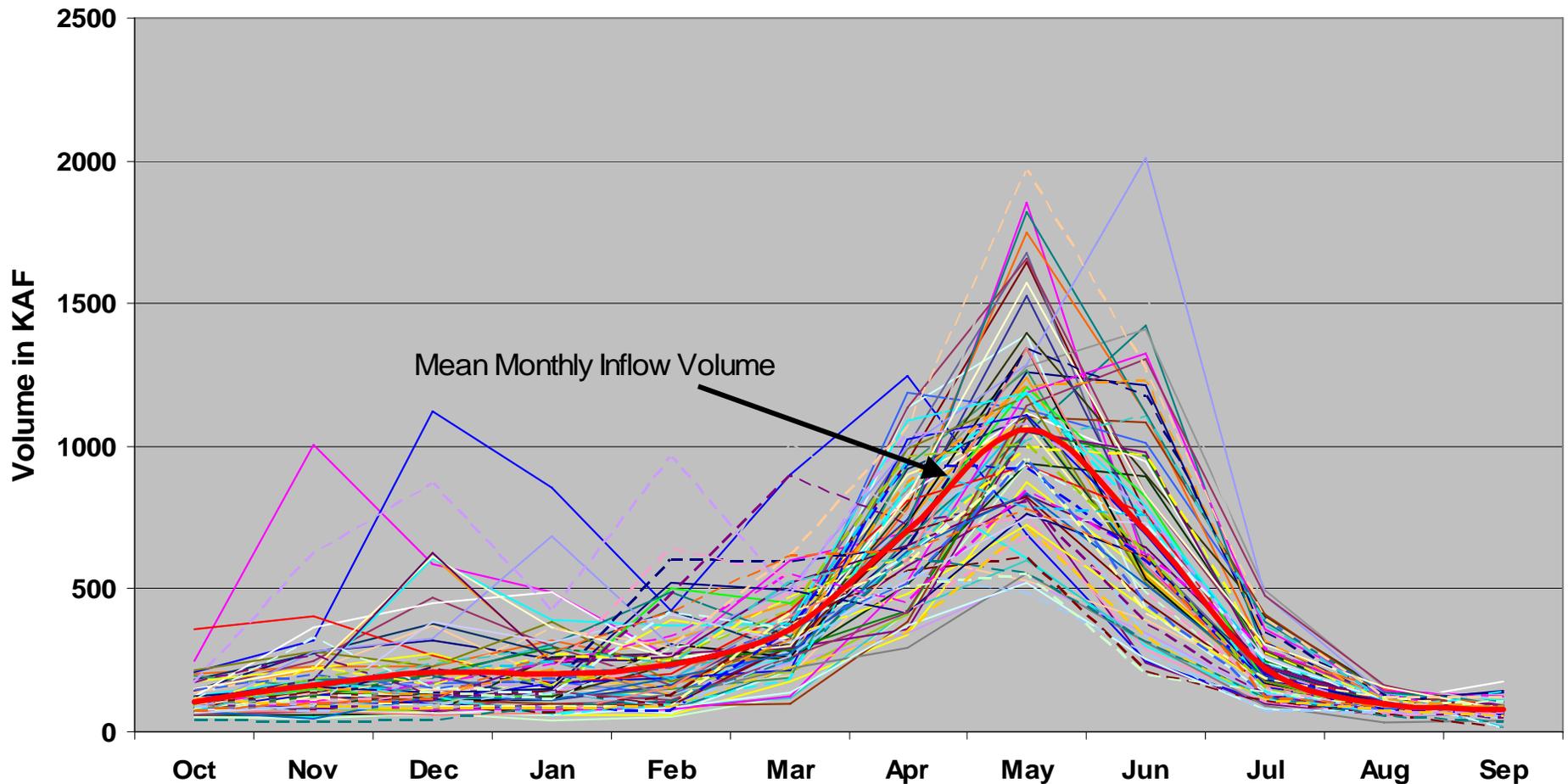


Dworshak, Idaho

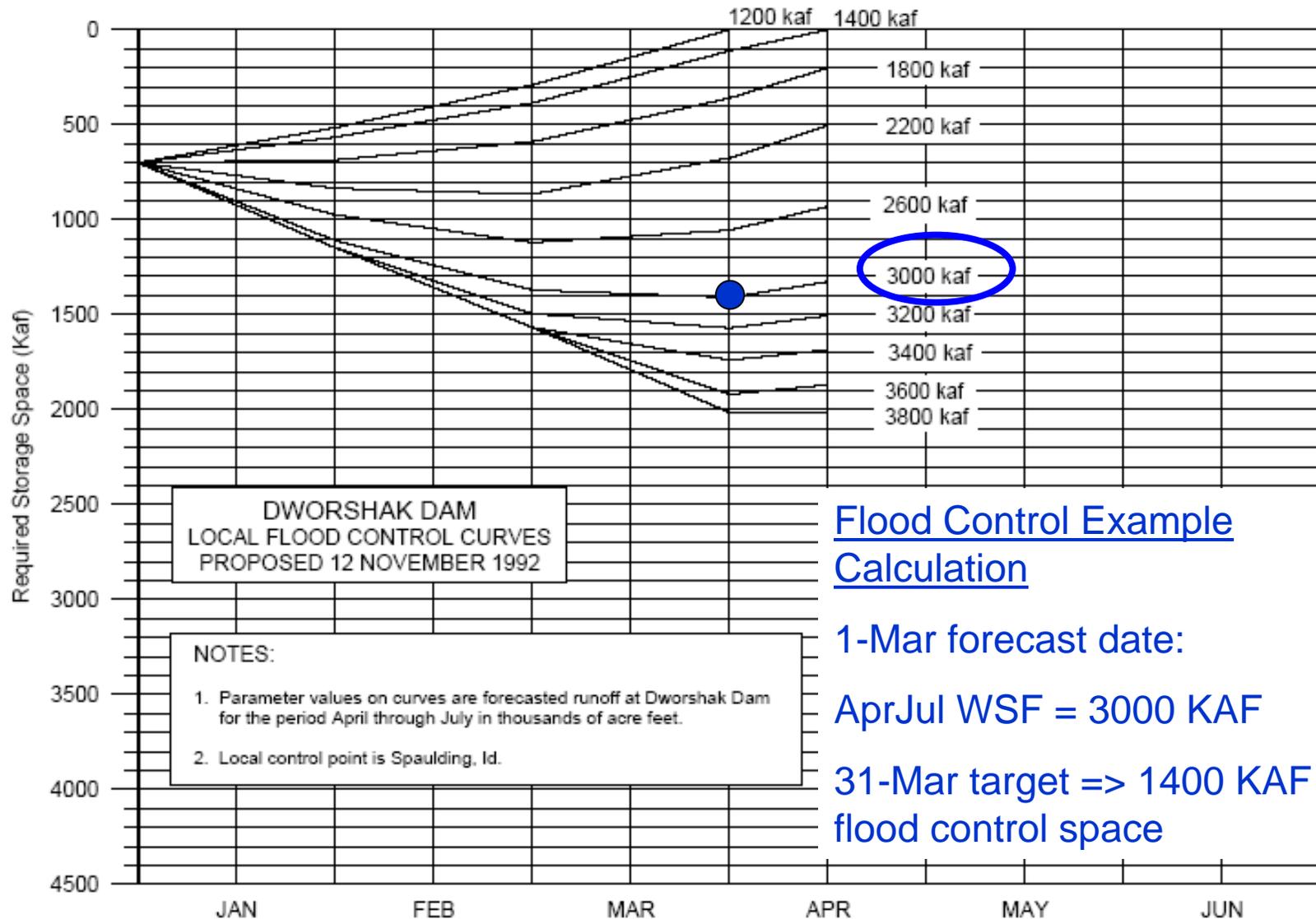


Seasonal Flow Characteristics

Dworshak Inflow 1927-2003



Water Supply Forecasts -> Monthly Flood Control Draft Targets



Flood Control Example Calculation

1-Mar forecast date:

AprJul WSF = 3000 KAF

31-Mar target => 1400 KAF
flood control space

Dworshak Water Supply Forecasts

Corps of
Engineers
Monthly
Forecasts
Dec 2006 –
May 2007

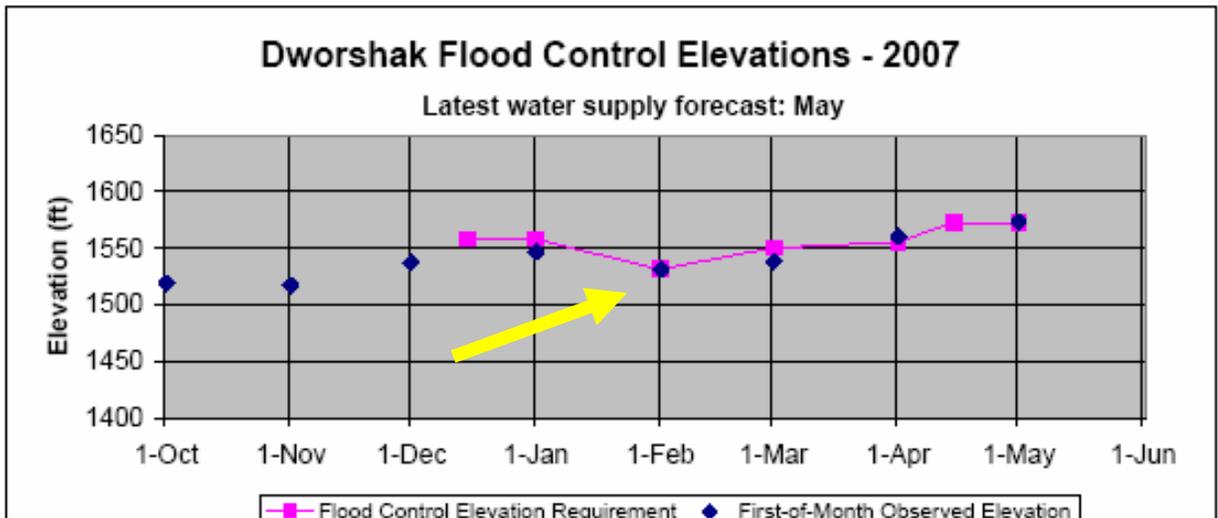
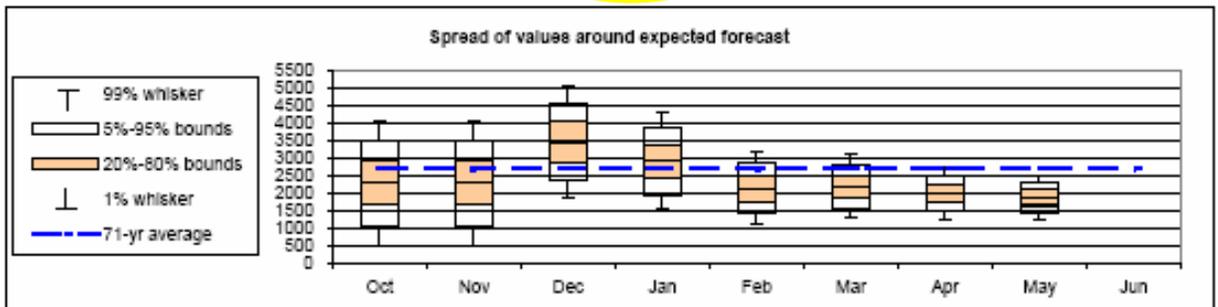
Dworshak : May Runoff Forecast & Flood Control Calculation

WY 2007

Runoff Forecast and Flood Control				1929-1999 Average	Percent of Average
Most Probable Runoff Volume	Apr-Jul	1868	KAF	2683	70%
	May-Jul	1200	KAF	1980	66%

Seasonal Flood Control (assumes no shift of flood control space to Grand Coulee)										
Forecast Date >>	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	
Apr-Jul Runoff Forecast	2283	2283	3485	2905	2126	2192	1982	1868		
First-of-Month Elev	1519.51	1517.31	1537.71	1548.94	1531.2	1538.2	1580.67	1573.42		

Date >>		15-Dec	31-Dec	31-Jan	28-Feb	31-Mar	15-Apr	30-Apr	
Flood Control Space	--	700	700	1078	814	742	479	479	
Flood Control Elevation	--	1558.2	1558.2	1531.4	1550.4	1555.4	1572.6	1572.6	

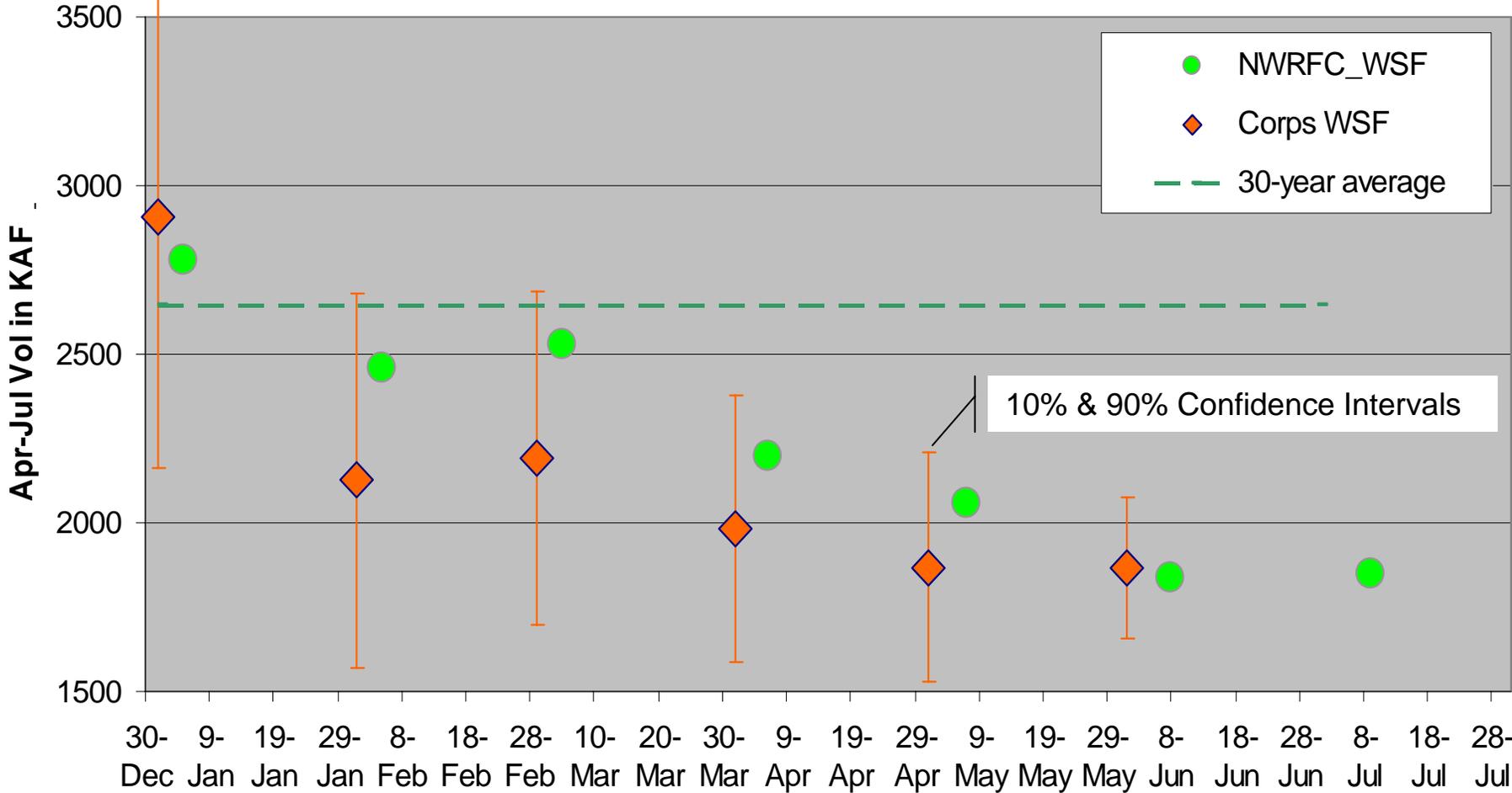


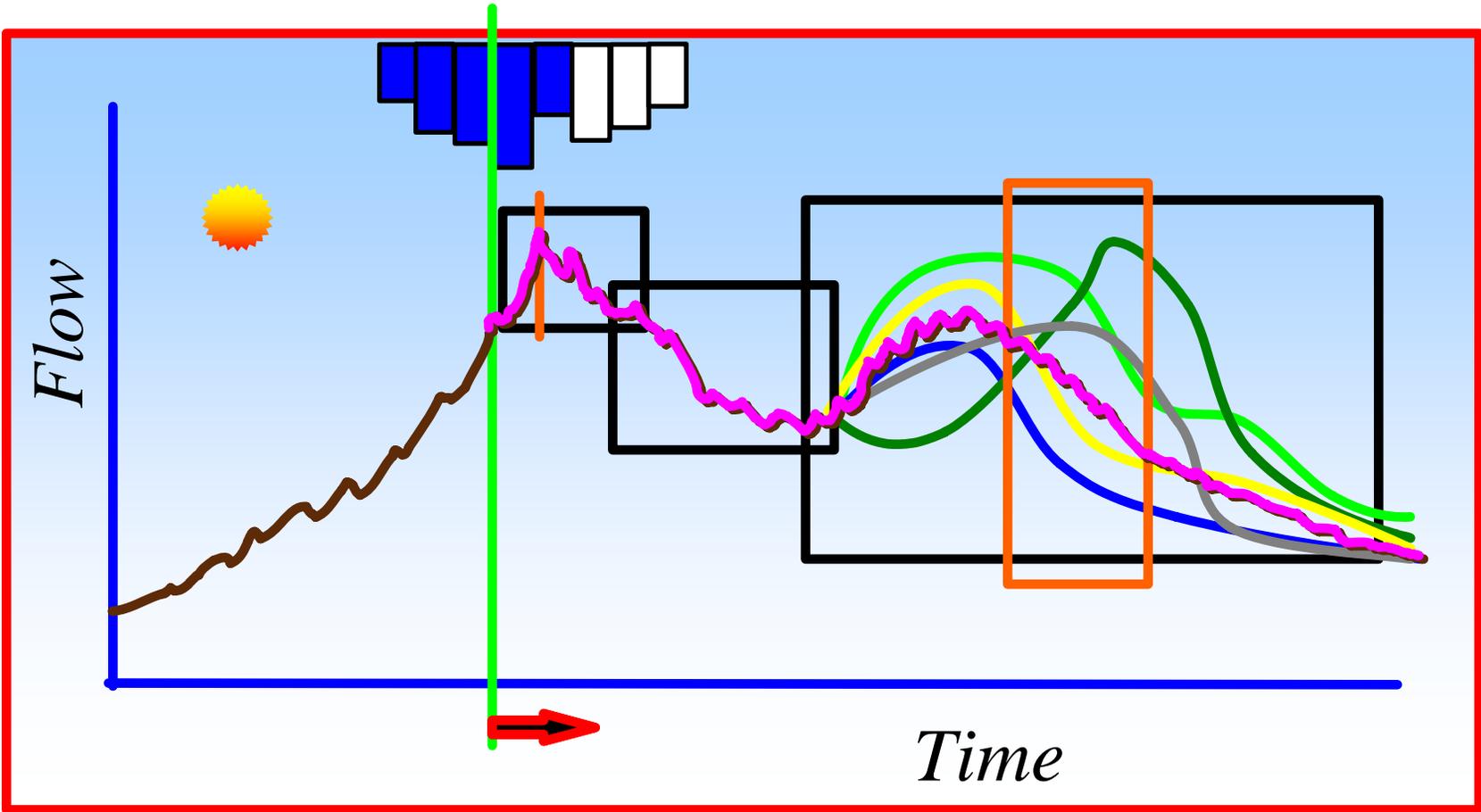
Available Water Supply Forecasts

- Monthly
 - Regression on Precipitation & Snow Index Variables (Northwest River Forecast Center-NWRFC)
 - Principal Component Regression on SOI, Precipitation, Snow (Corps of Engineers)
- Weekly/Bi-weekly Forecasts
 - 45 ESP forecasts using current conditions (soil moisture, snow), current 10-day temp & precipitation forecast, and 45 years of subsequent historic temp & precipitation (NWRFC)
 - Average of 45 values in current ESP forecast (Corps)
- Daily Forecasts
 - PC Regression using SNOTEL (Natural Resources Conservation Service, National Water & Climate Center – NRCS NWCC)

Monthly Regression Forecasts

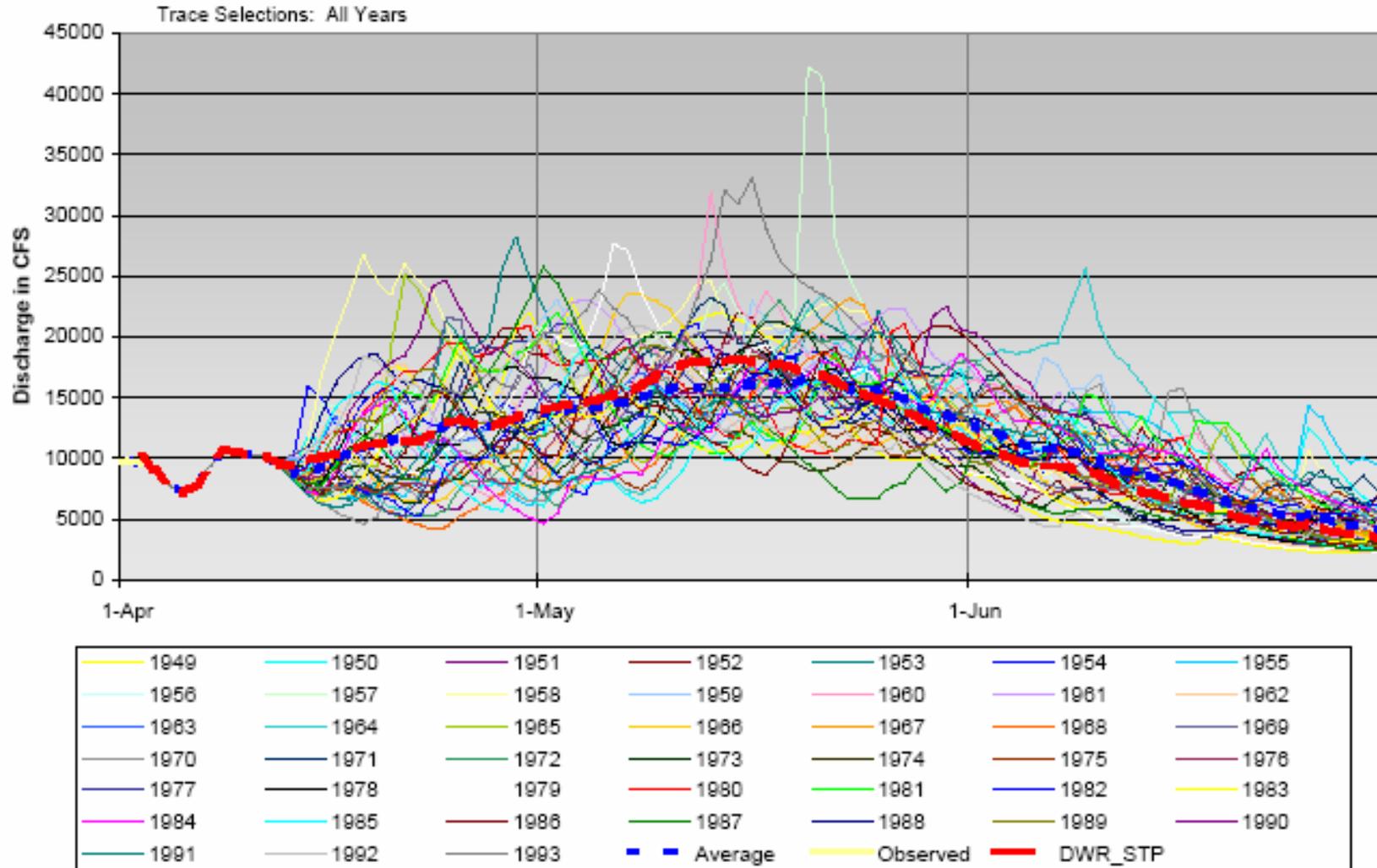
Dworshak, ID Water Supply Forecast April-July Forecast Comparison for WY2007





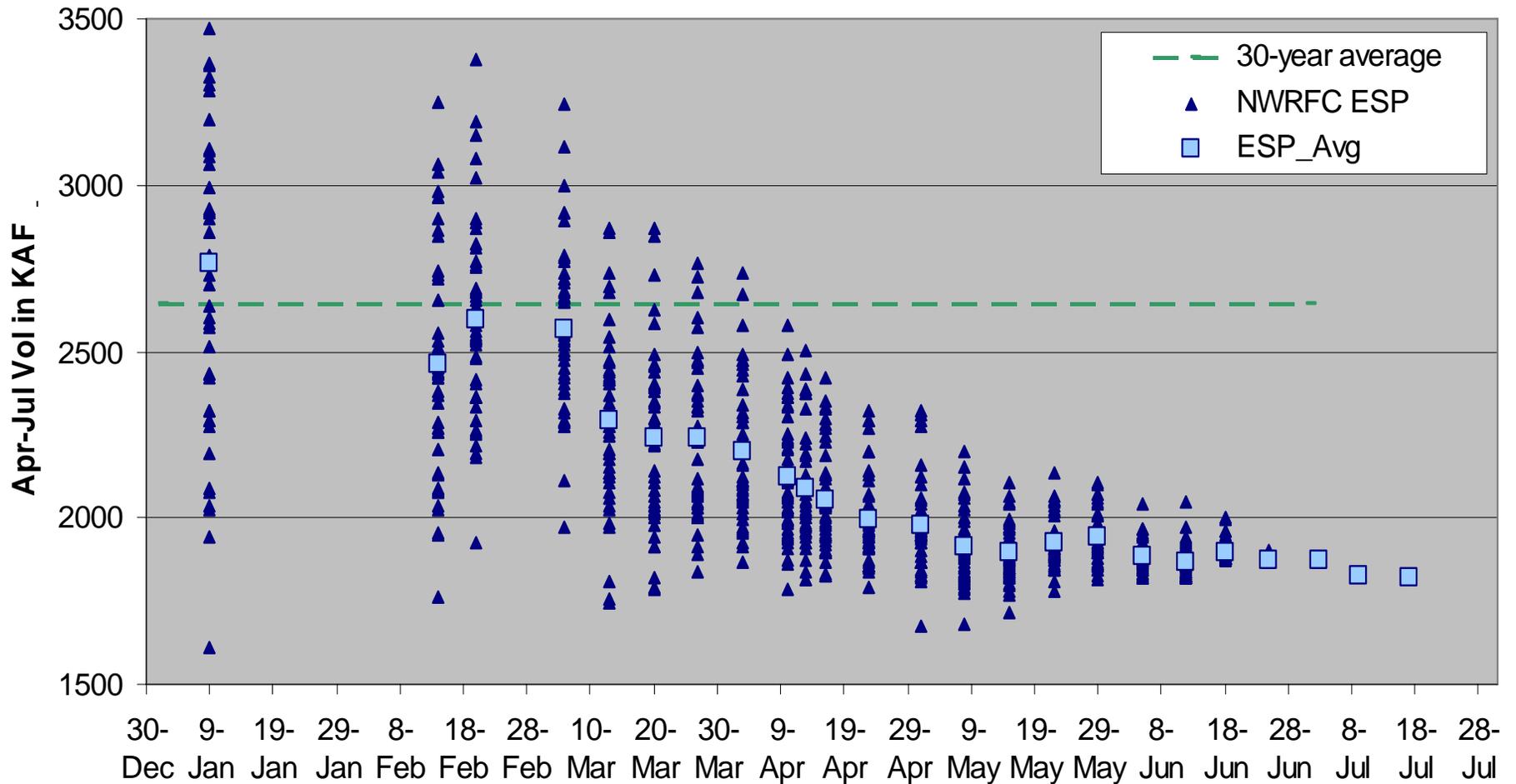
Weekly ESP Forecast

Dworshak ESP traces for 3 Apr 2007



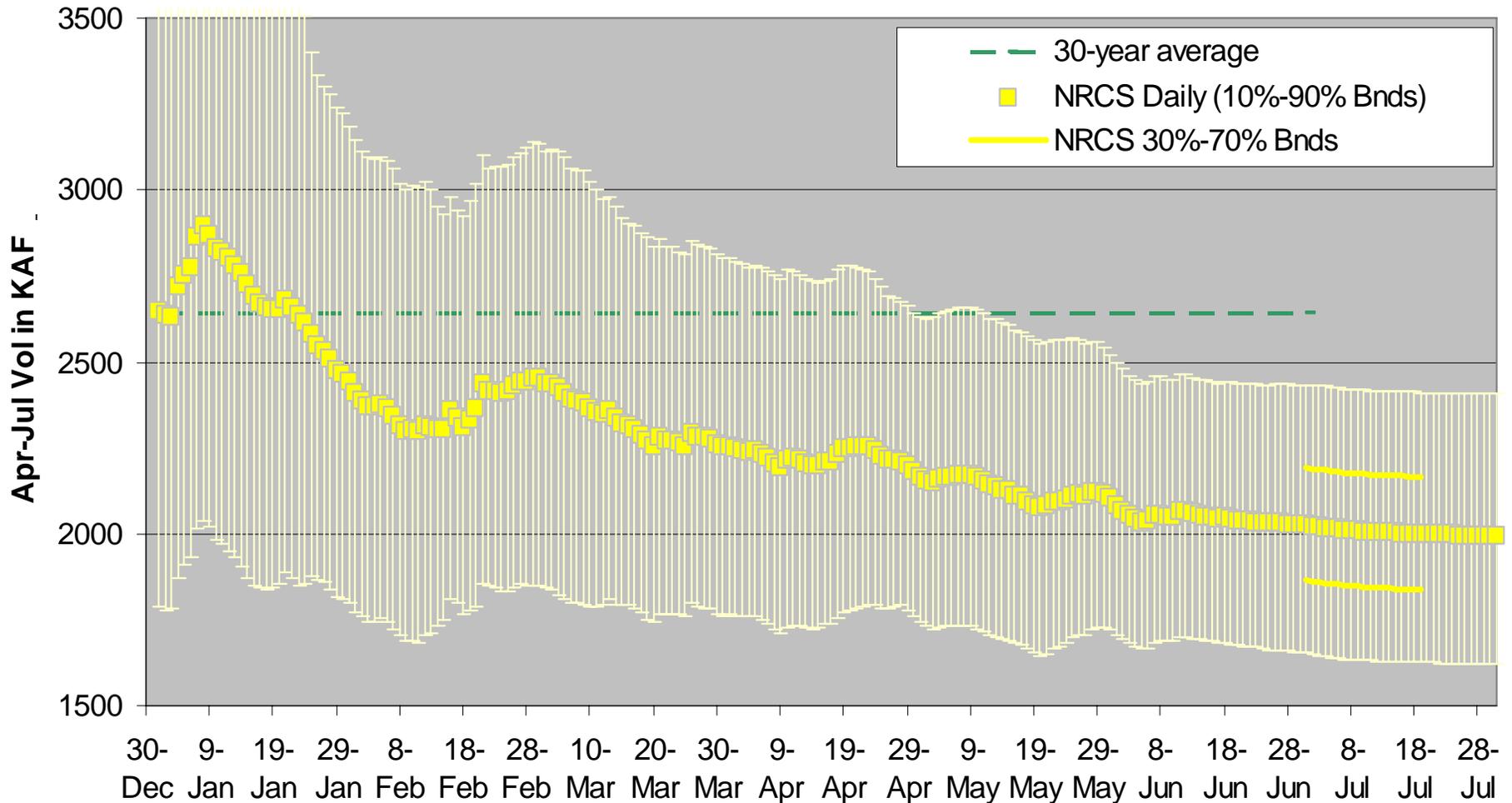
Weekly ESP Forecasts

Dworshak, ID Water Supply Forecast April-July Forecast Comparison for WY2007



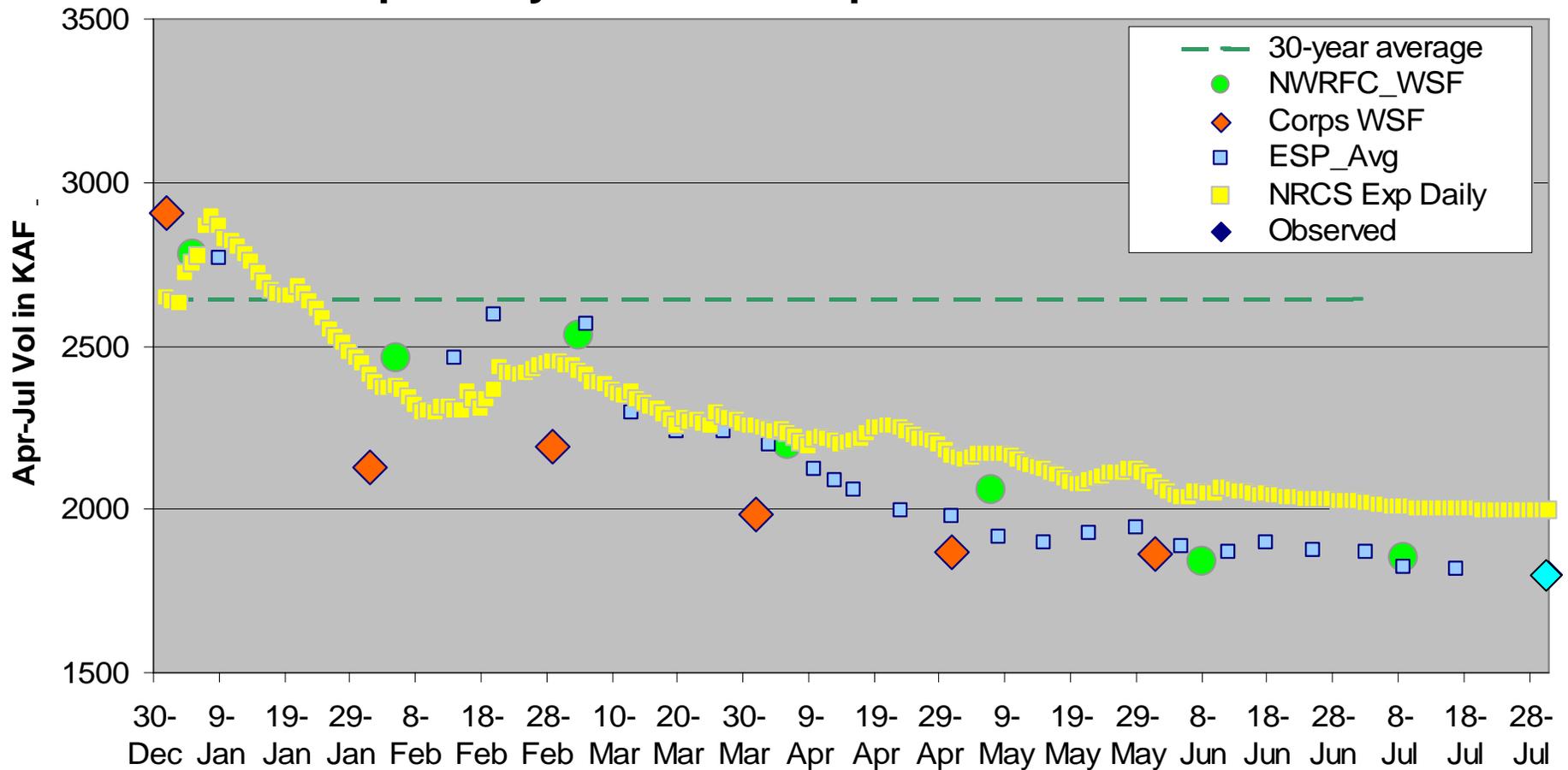
Daily Regression Forecasts

Dworshak, ID Daily Water Supply Forecast April-July Forecast Comparison for WY2007



All 2007 Forecasts

Dworshak, ID Water Supply Forecast April-July Forecast Comparison for WY2007

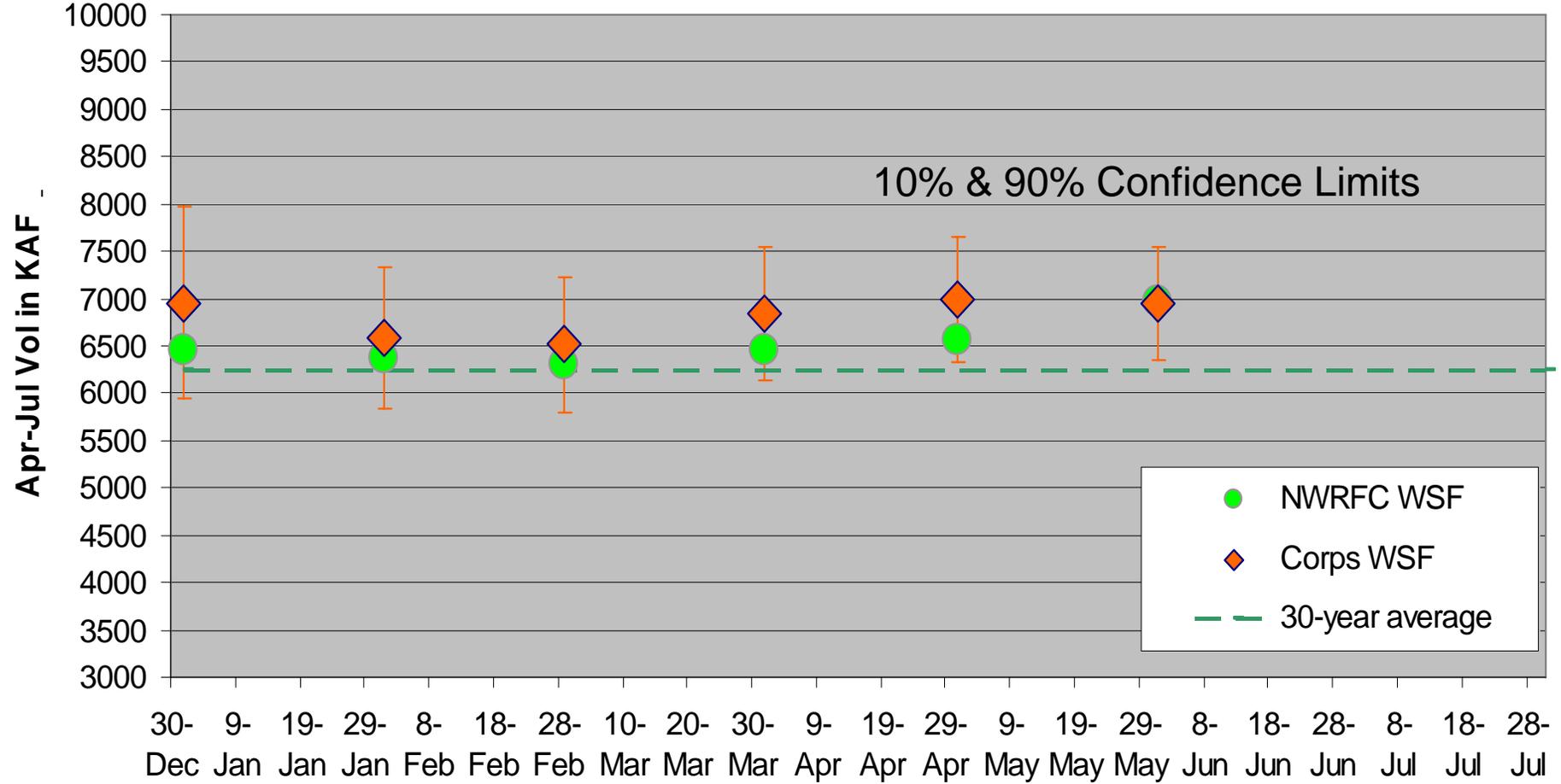


Libby, Montana



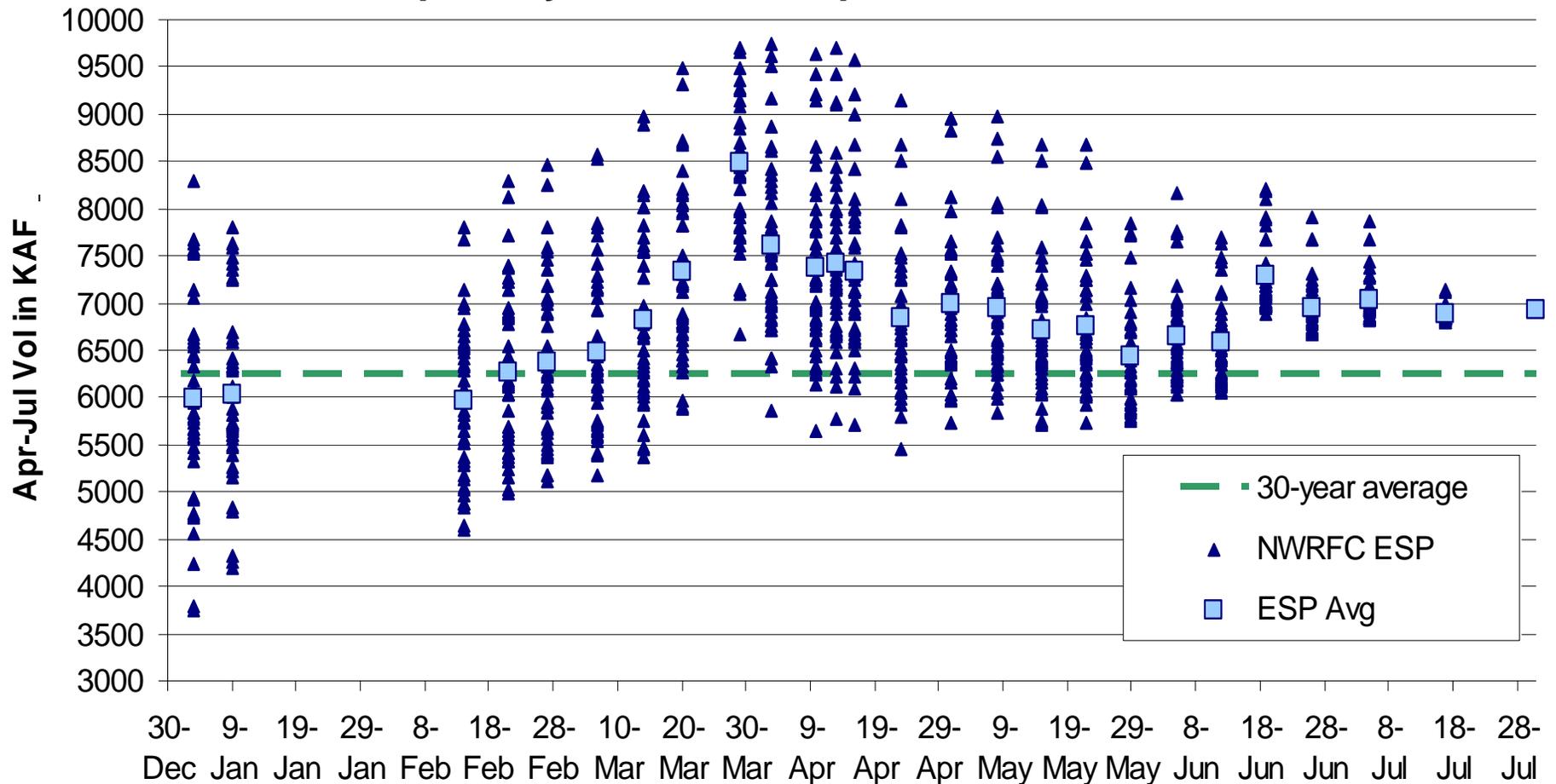
Monthly Regression Forecasts

**Libby, MT Water Supply Forecast
April-August Forecast Comparison for WY2007**



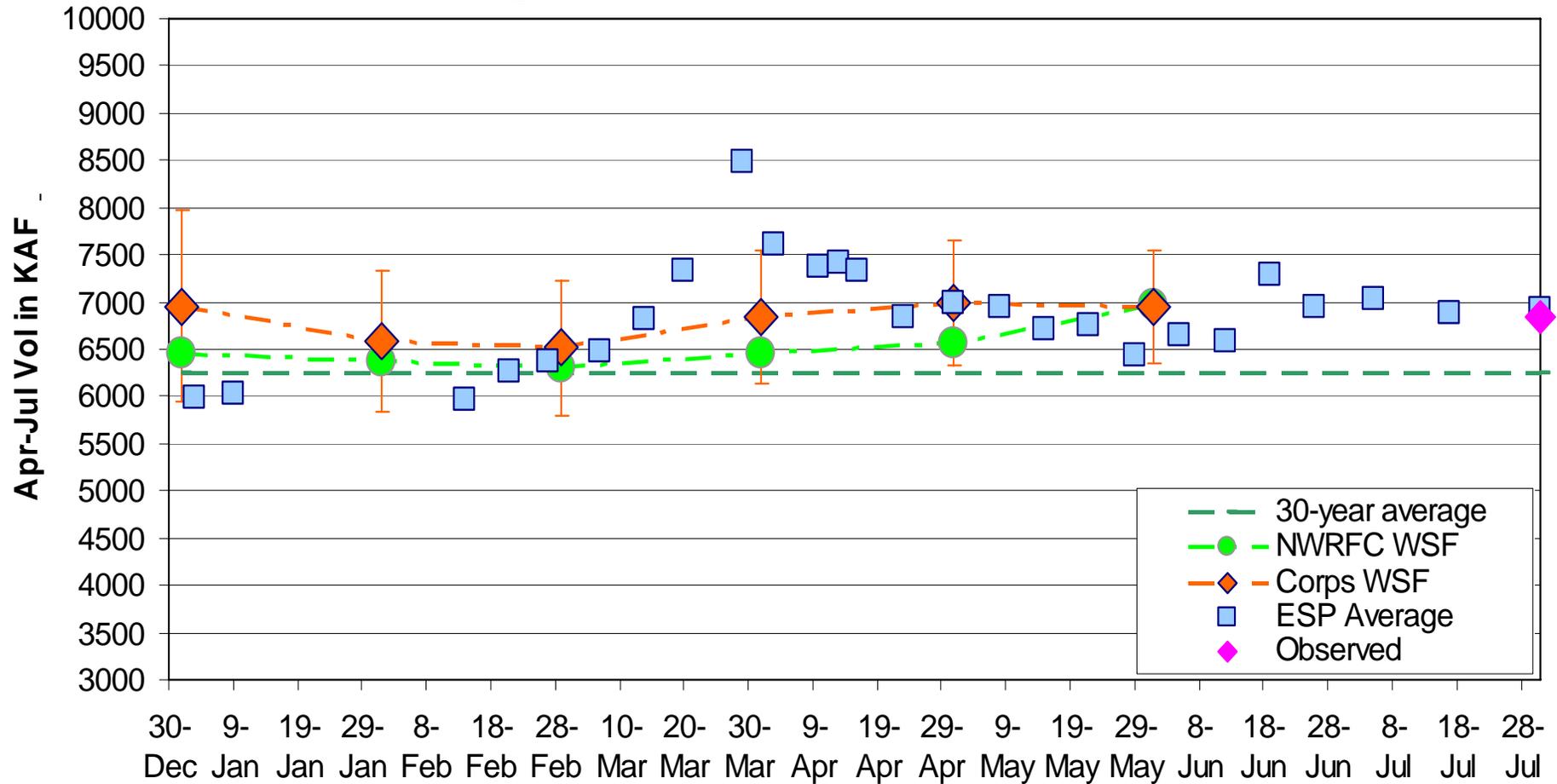
Weekly ESP Forecasts

Libby, MT Water Supply Forecast April-July Forecast Comparison for WY2007



All 2007 Forecasts

Libby, MT Water Supply Forecast April-August Forecast Comparison for WY2007



Conclusions

(based on very limited samples!)

- Through 1-April, monthly regression models meet or exceed other techniques
- Through 1-May, Principal Components regression outperforms standard regression on index variables (NWS technique)
- ESP forecasts are useful for providing insight into forecast variability and sensitivity.
- ESP forecasts are not yet robust enough to provide the operational forecast. ESP forecasts appear good after 1-May.
- NRCS daily forecasts using SNOTEL data appear promising, but currently display an unacceptable bias.

Data Sources

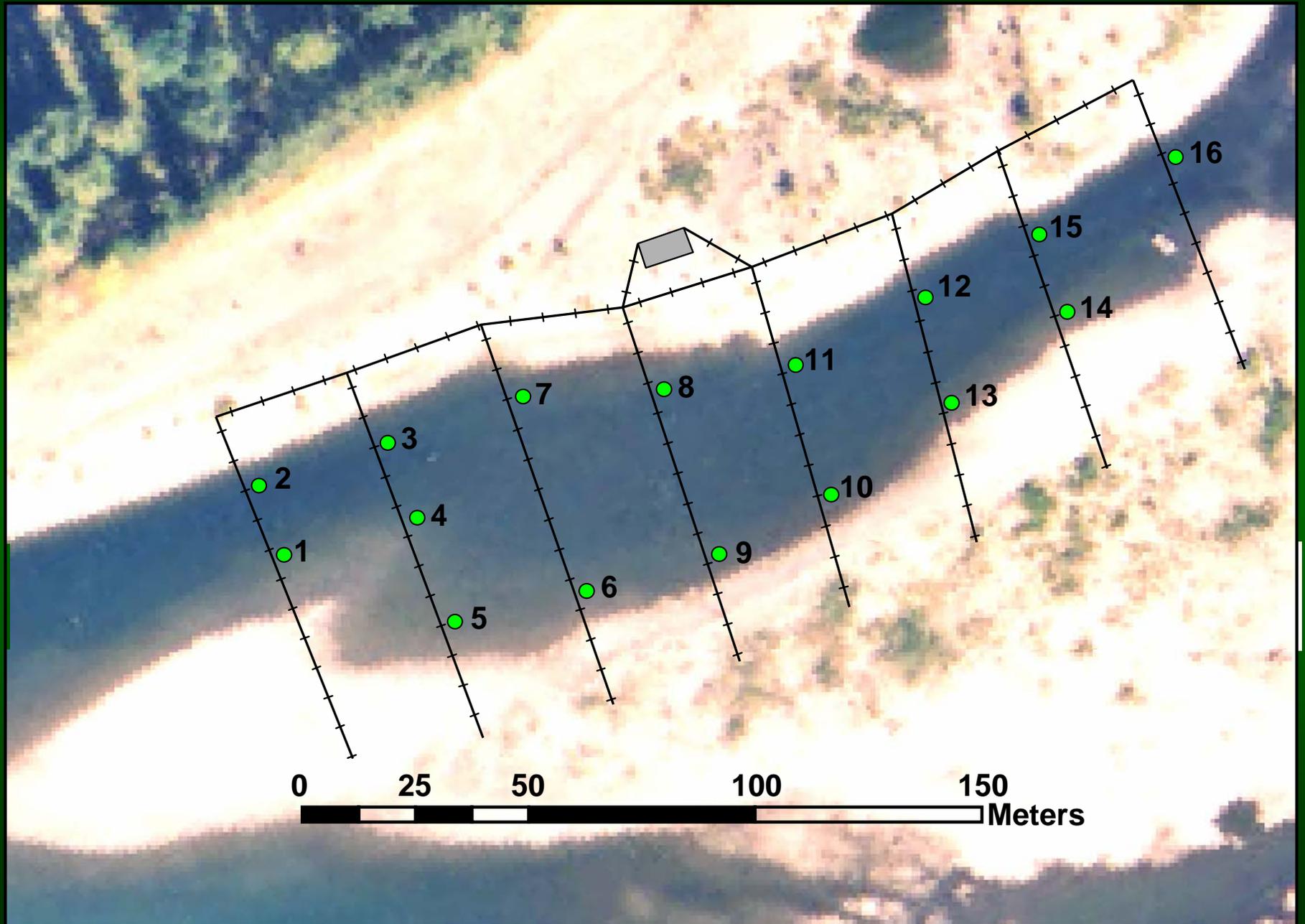
- Monthly Regression Forecasts
 - Northwest River Forecast Center
 - <http://www.nwrfc.noaa.gov/wsfkst/station/wsfplot/wsfplot.cgi?DWRI1>
 - <http://www.nwrfc.noaa.gov/espws/station/wsfplot/wsfplot.cgi?LYDM8>
 - Corps of Engineers
 - <http://www.nwd-wc.usace.army.mil/report/dwrf.htm>
 - <http://www.nwd-wc.usace.army.mil/report/libf.htm>
- Weekly/Bi-weekly ESP Forecasts
 - NWRFC (statistical summaries only)
 - <http://www.nwrfc.noaa.gov/wsfkst/station/wsfplot/wsfplot.cgi?DWRI1>
 - Corps (average computed from 45 ESP traces)
- NRCS daily experimental water supply forecasts based on SNOTEL data
 - http://www.wcc.nrcs.usda.gov/wsf/daily_forecasts.html

Measuring Behavioral Responses of Spawning Chum Salmon to Elevated River Flows



**Kenneth Tiffan and Craig Haskell
U.S. Geological Survey
Western Fisheries Research Center
Cook, Washington**

Hydrophone Setup at Ives Island - 2005



Acoustic Array



Fish Collection and Tagging





Base flow



High flow

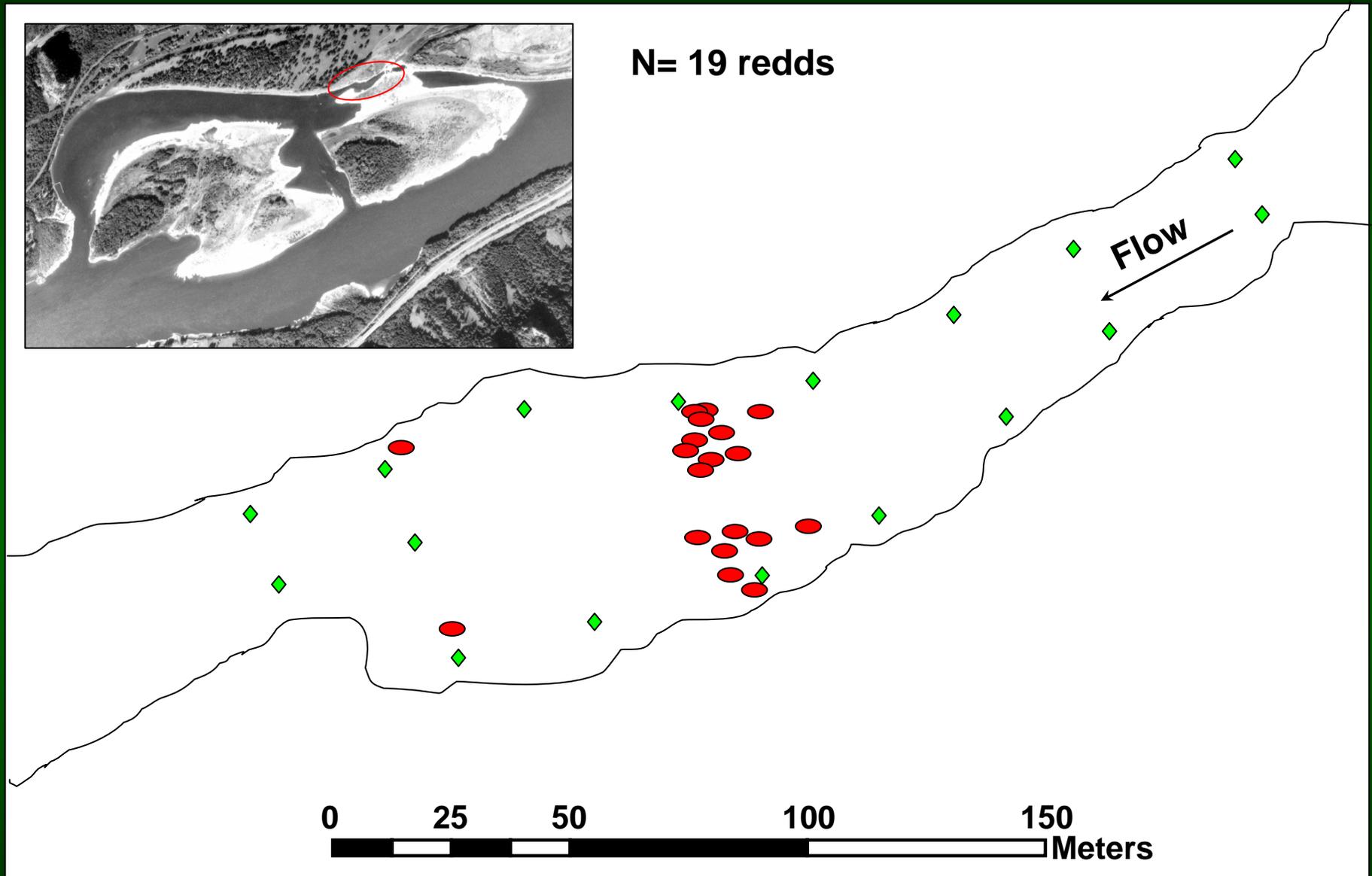
Summary of Test Flows in 2005

Test	Date	Type	Requested elevation	Maximum elevation
1	11/16	Day	13.5	13.5
2	11/17	Night	15.5	14.7
3	11/19	Day	13.5	13.1
4	11/21	Night	13.5	13.5
5	11/22	Cancelled		
6	11/26	Day	15.5	15.5
7	11/30	Night	15.5	15.5
8	12/2	Night	15.5	15.5
9	12/6	Night	15.5	15.5
10	12/8	Night	13.5	13.5

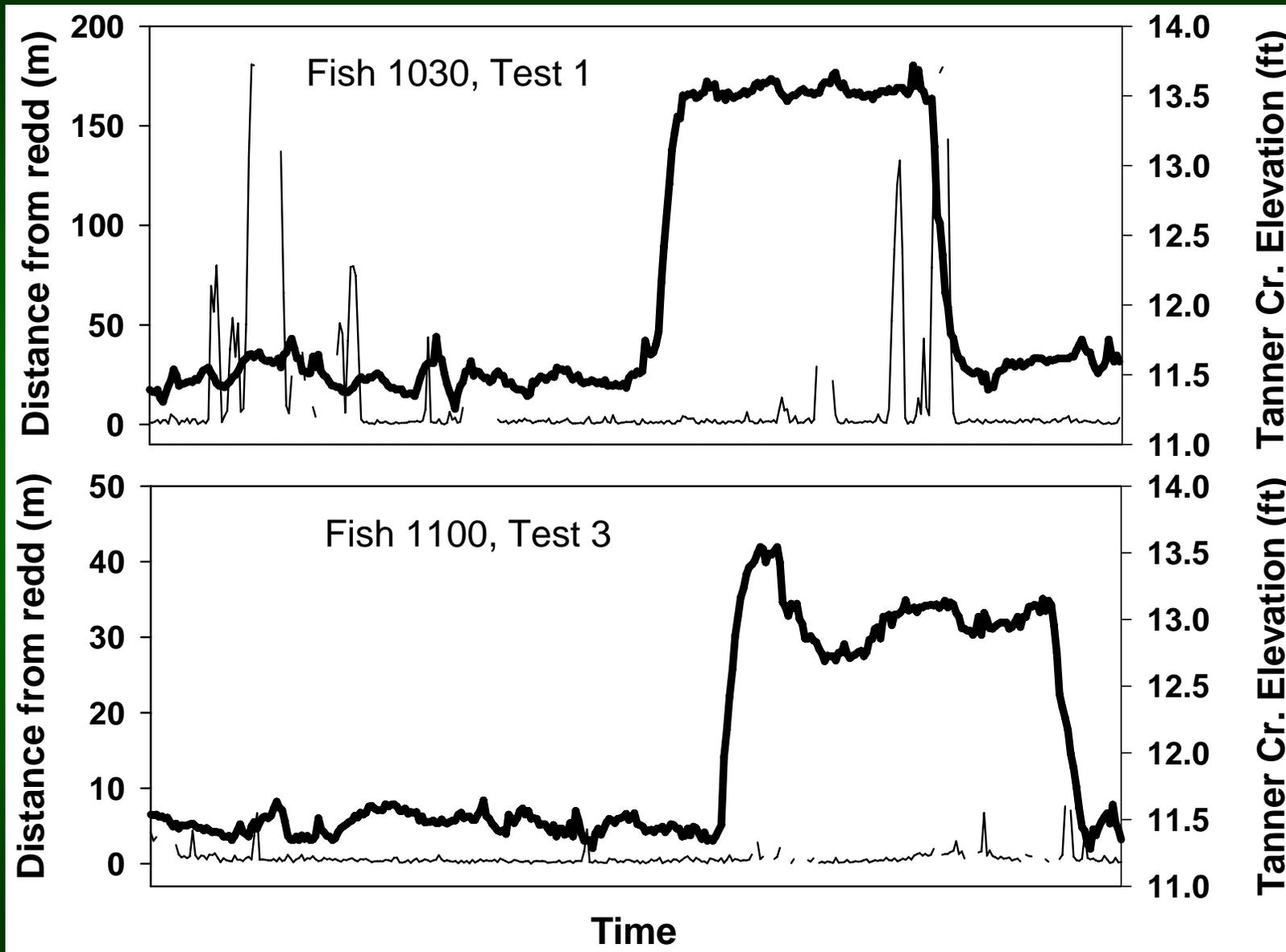
Tests were 8 h

1-h ramp rate from 11.5' to 13.5', 2-h ramp rate from 11.5' to 15.5'

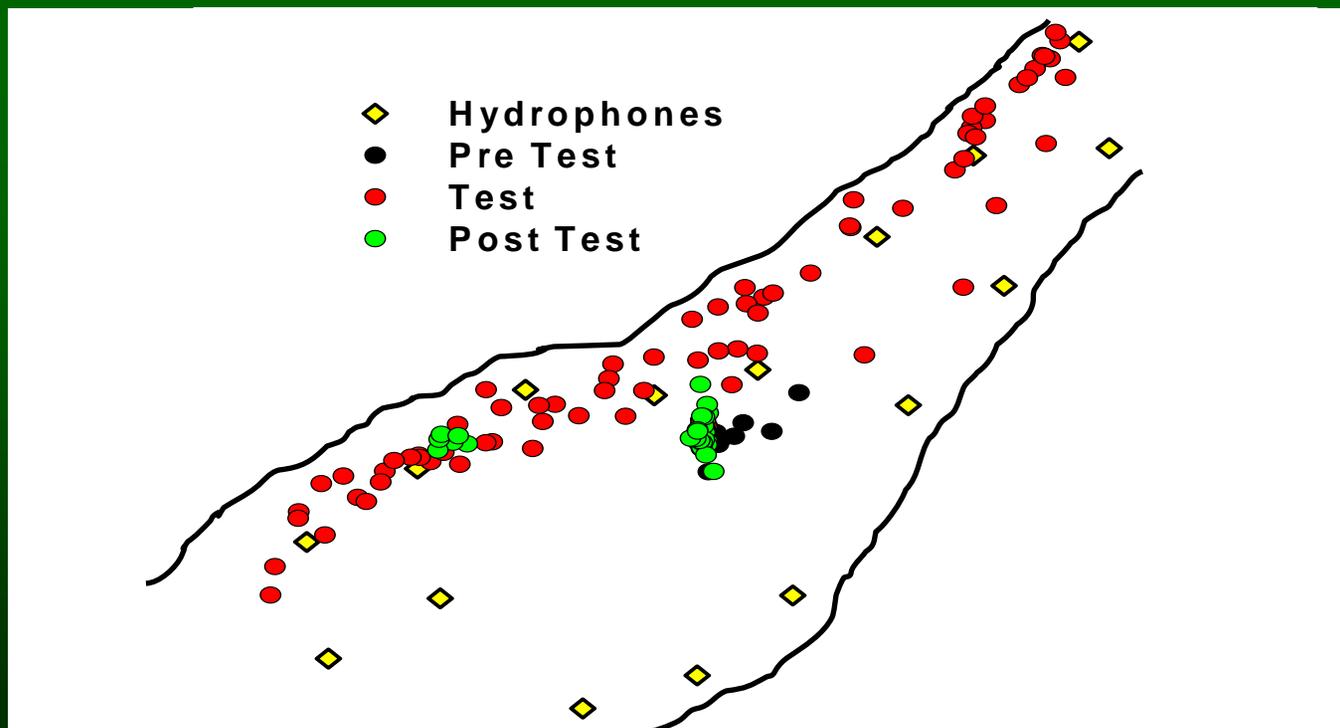
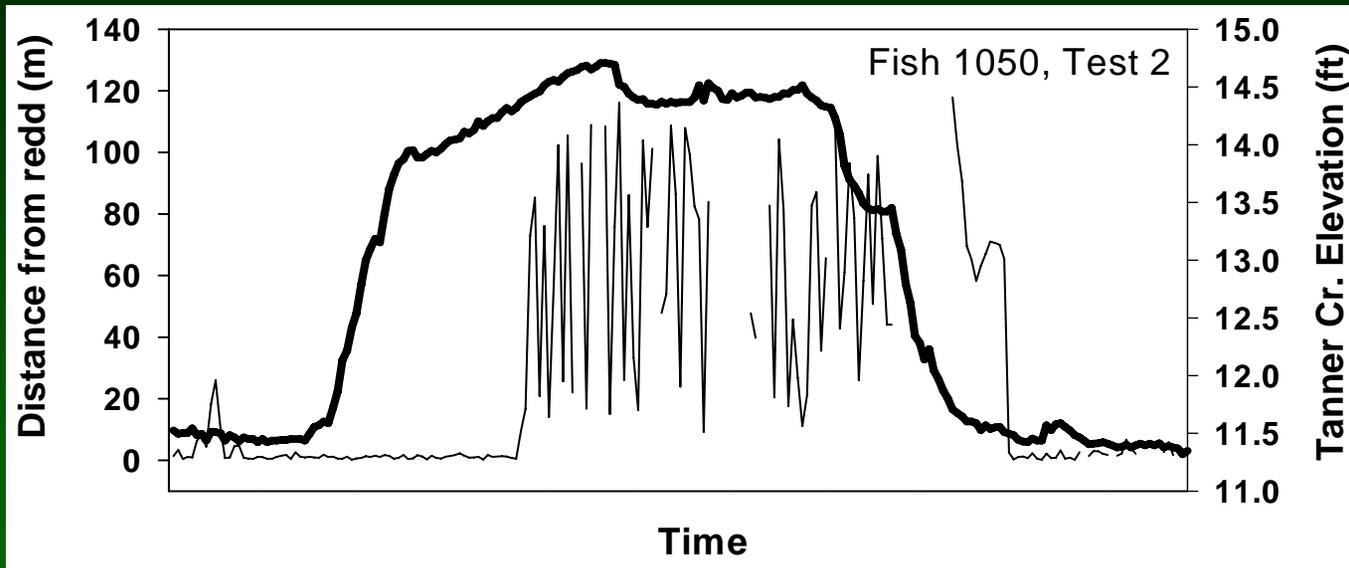
Redd Locations of Tagged Chum - 2005



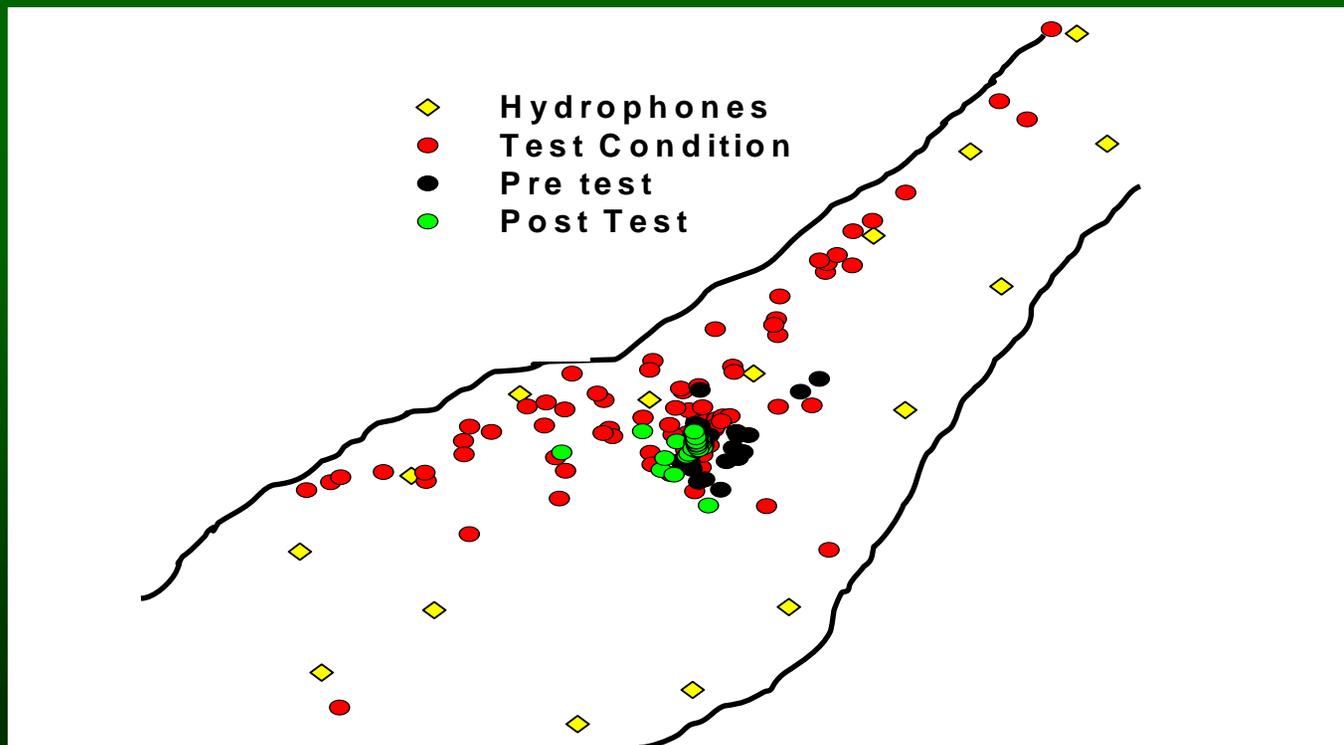
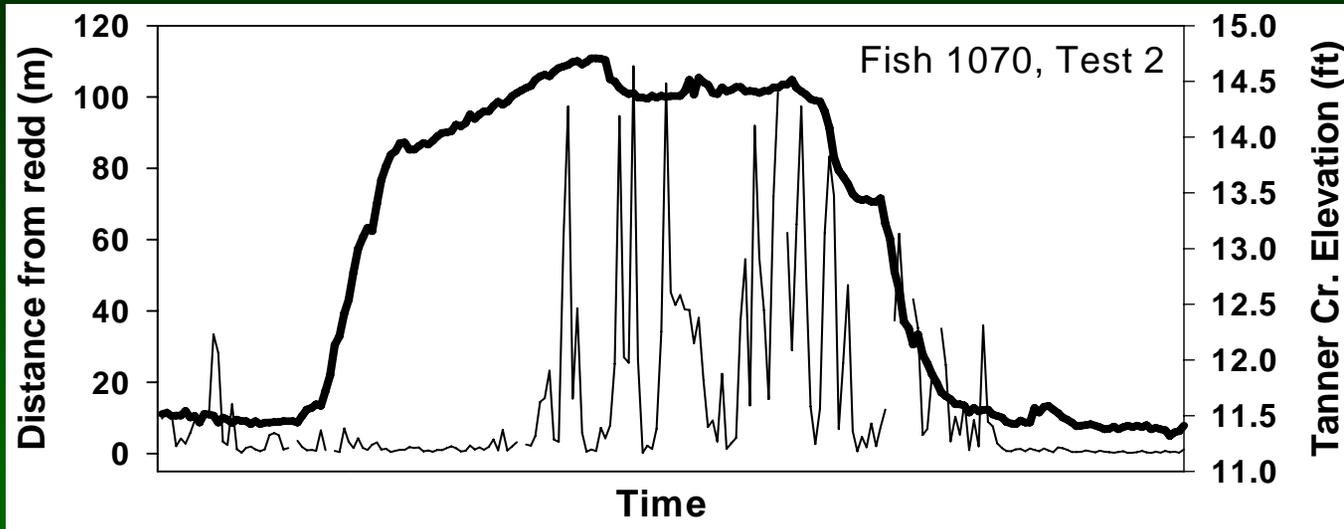
13.5 ft Tailwater Elevation



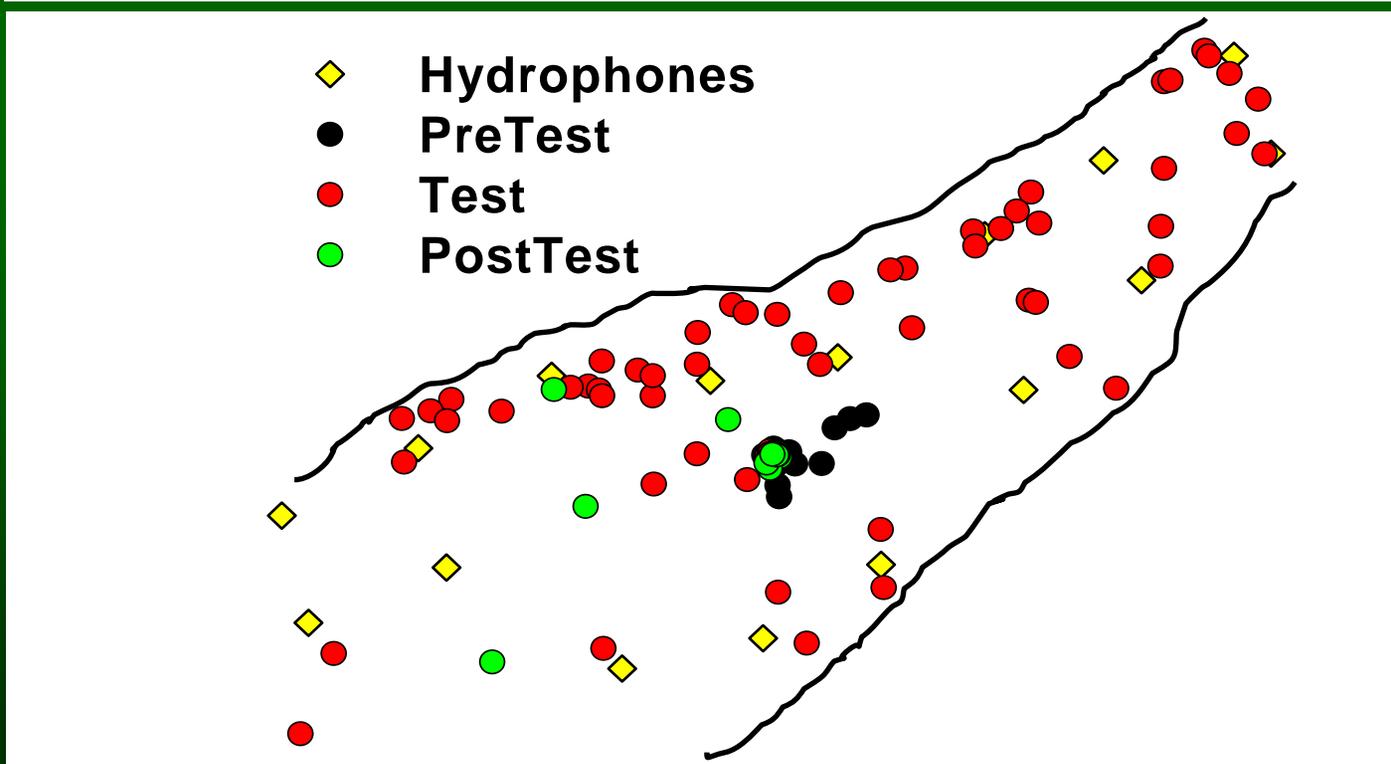
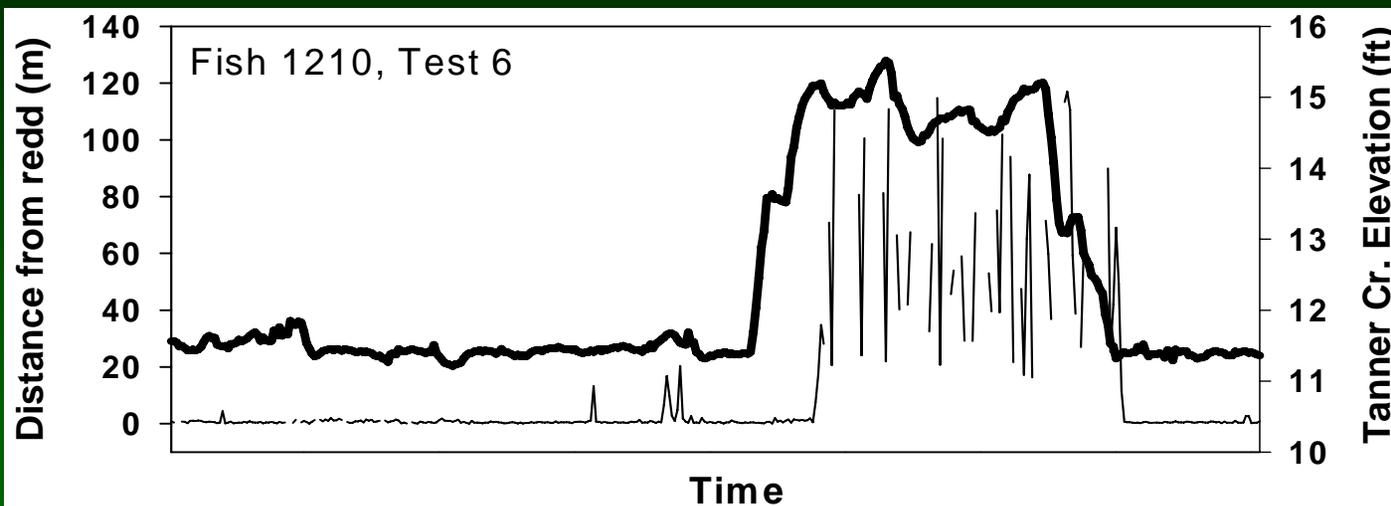
14.7 ft Tailwater Elevation



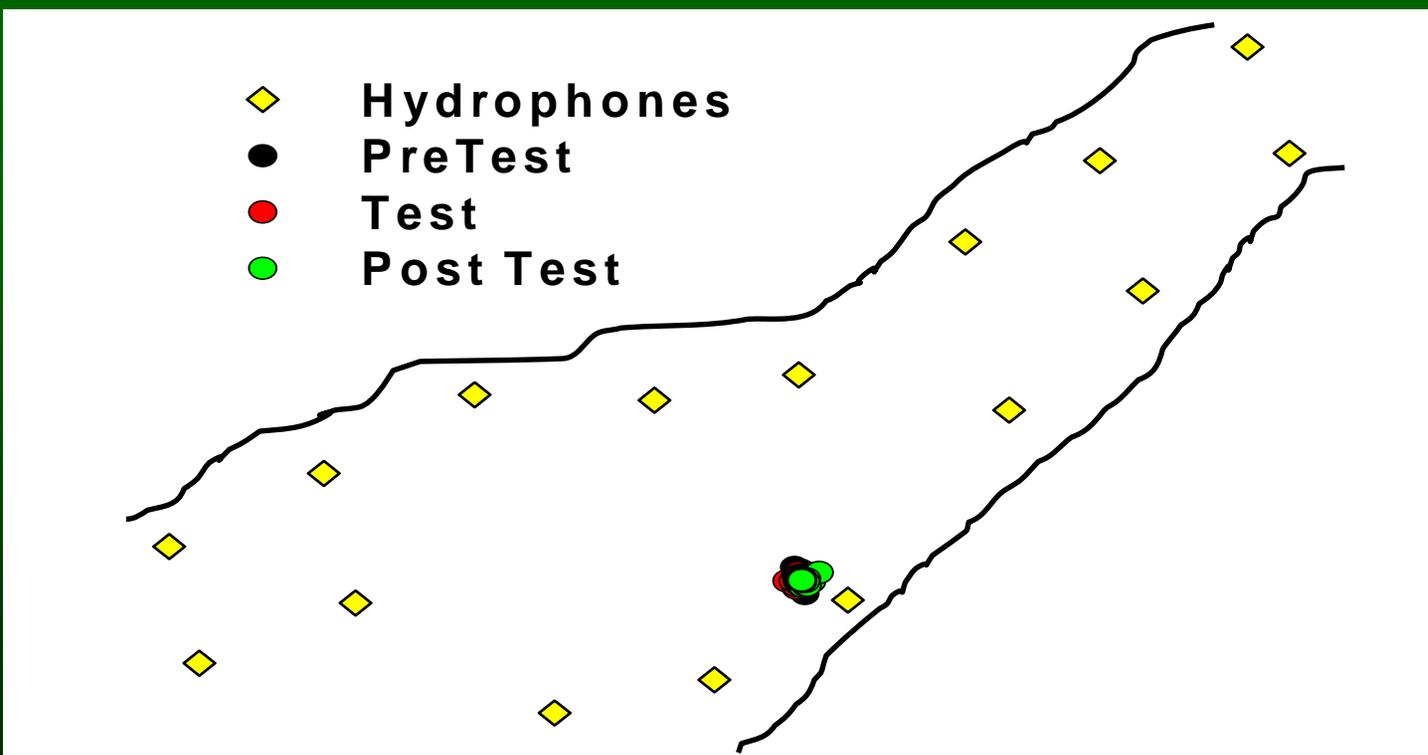
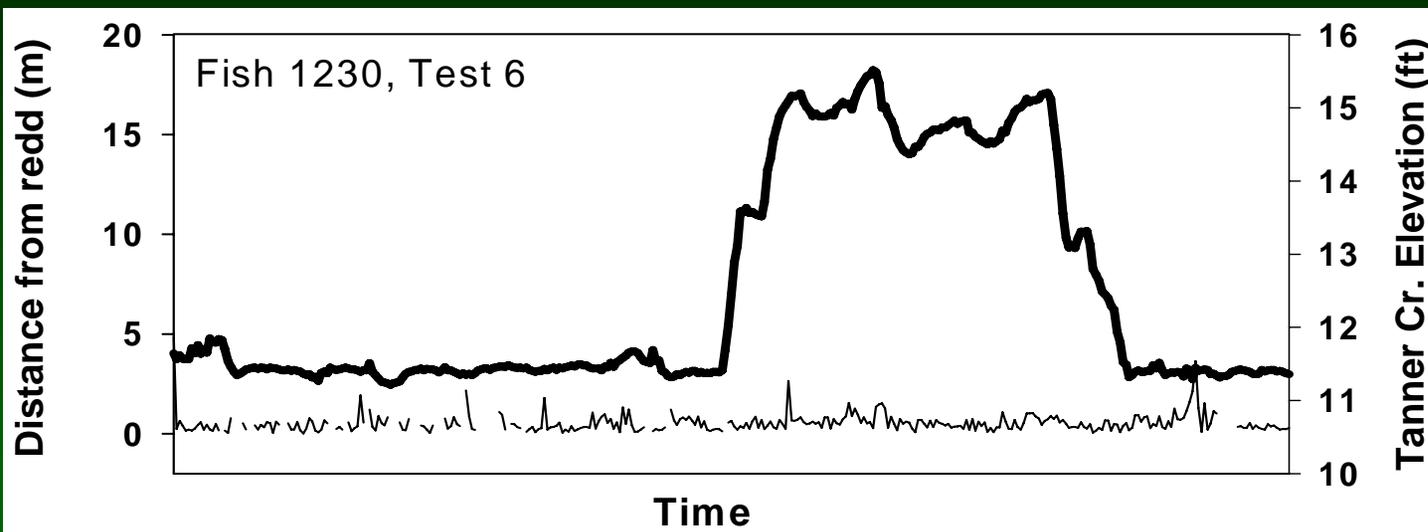
14.7 ft Tailwater Elevation



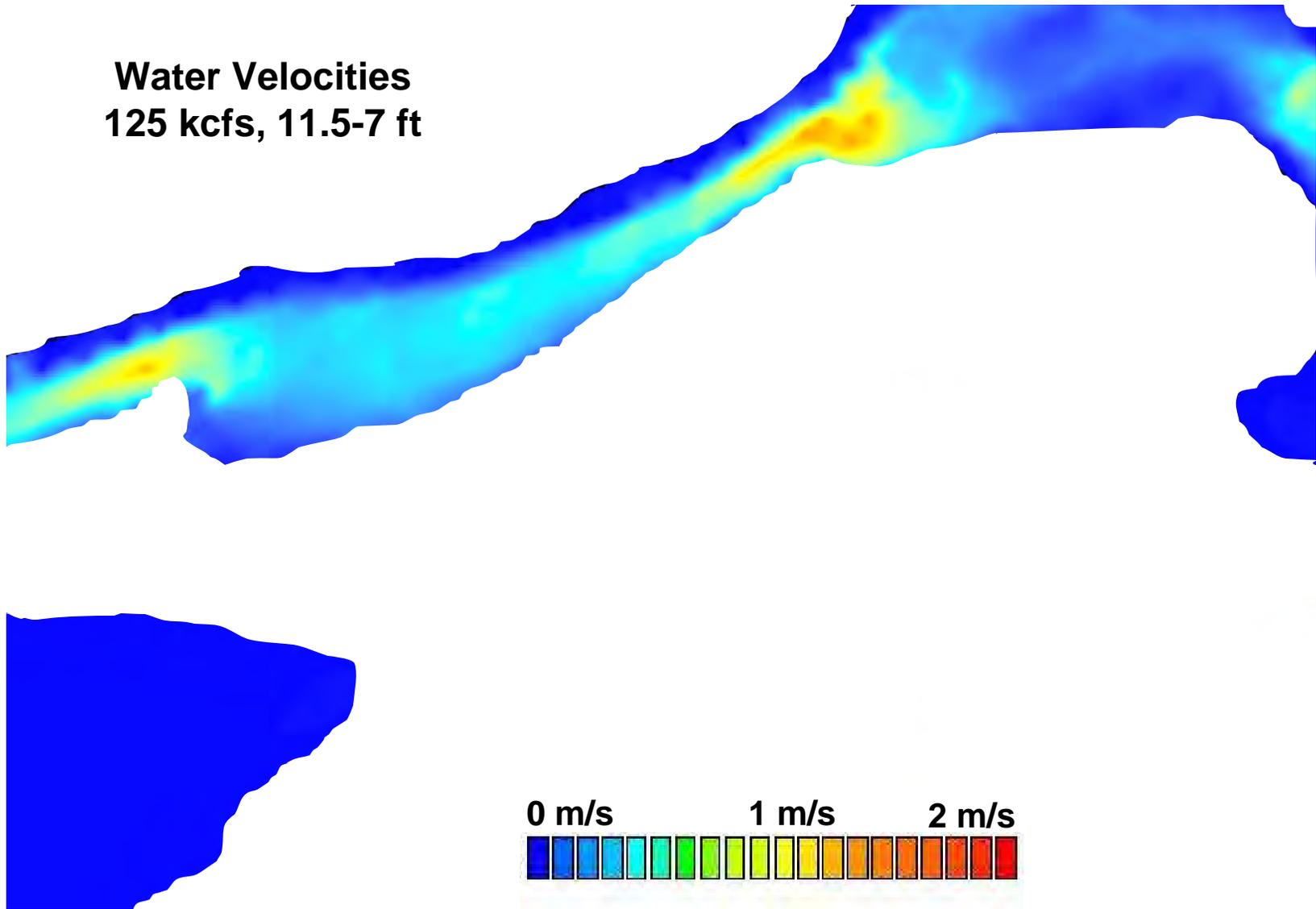
15.5 ft Tailwater Elevation



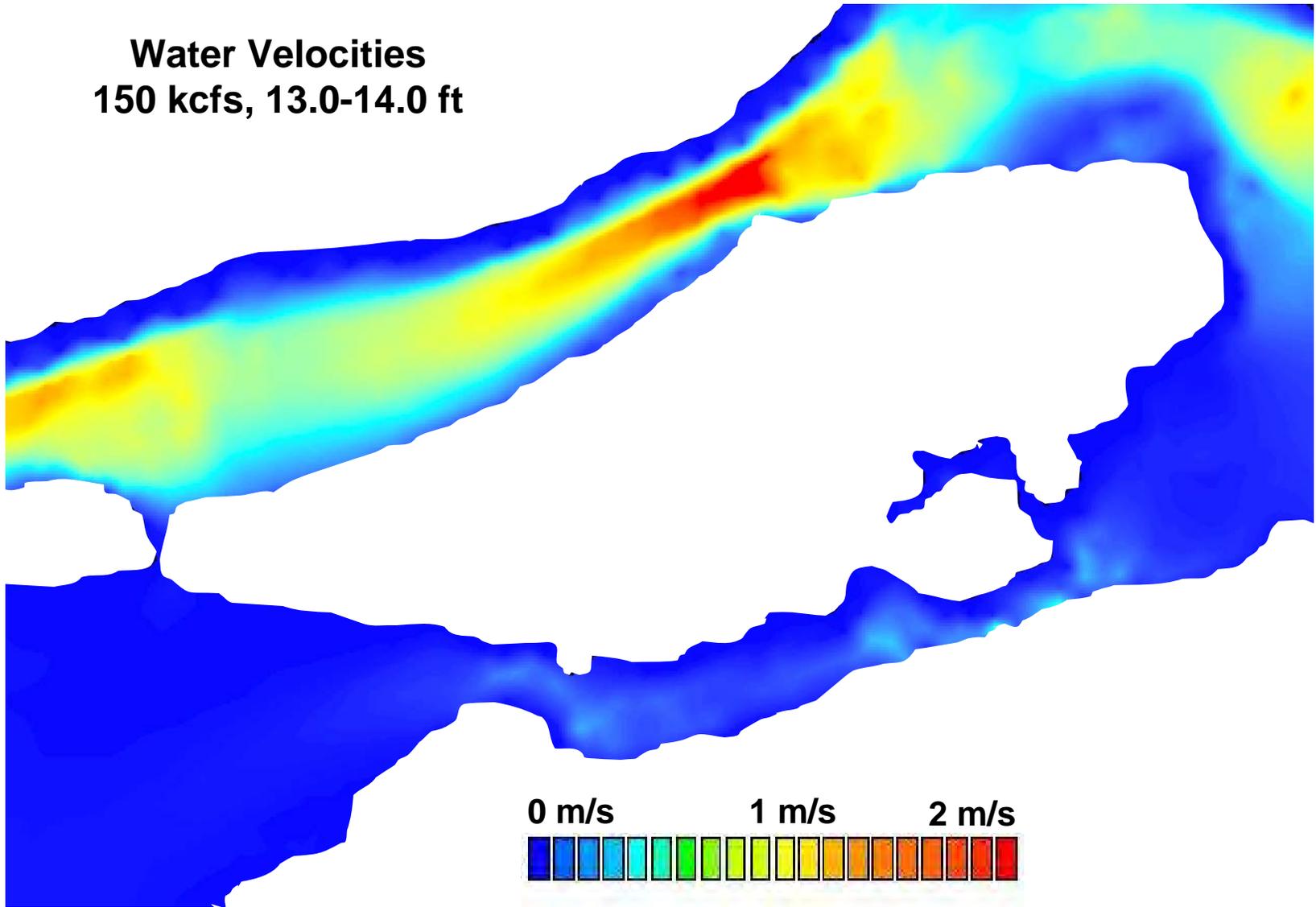
15.5 ft Tailwater Elevation



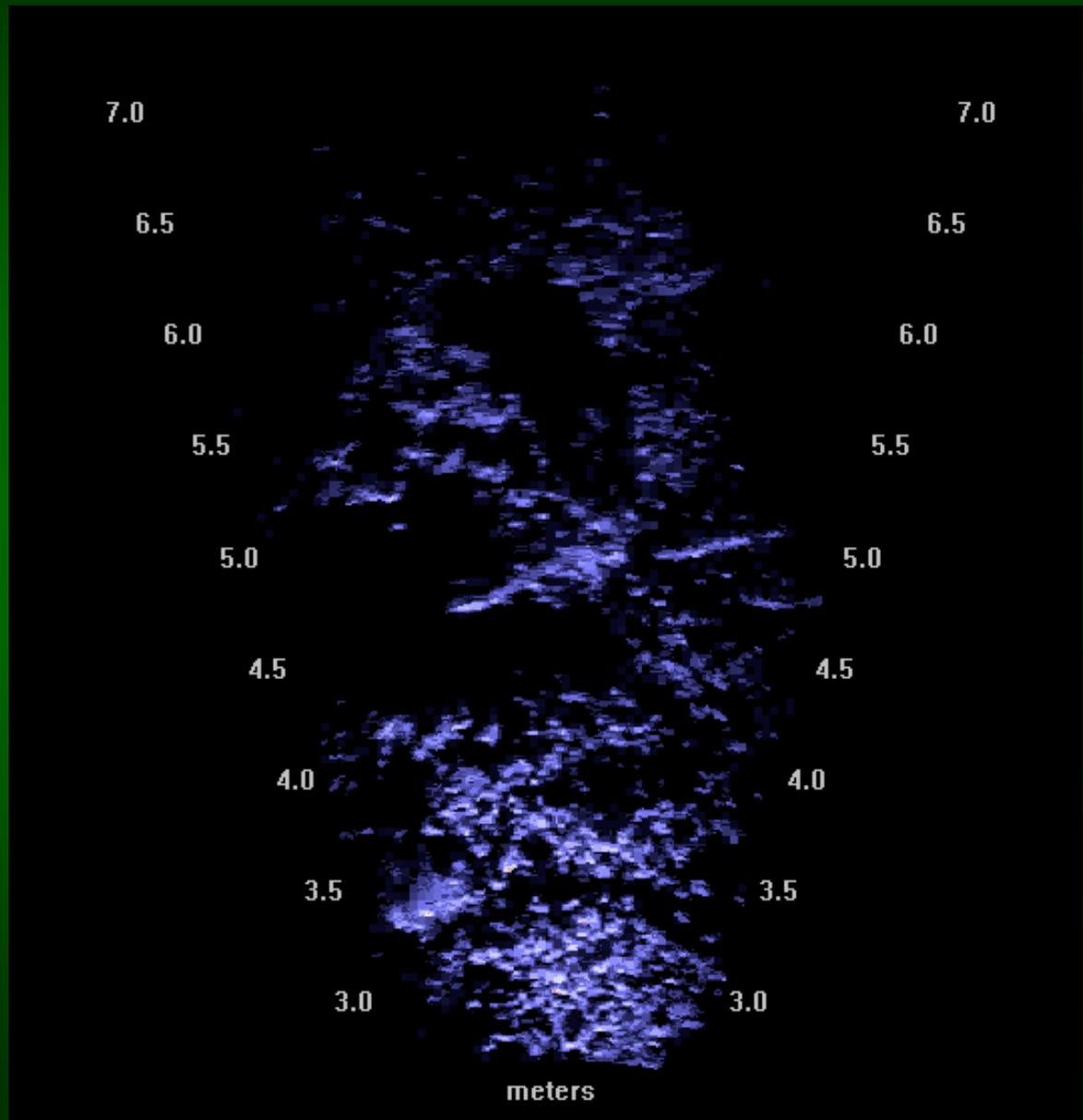
Water Velocities
125 kcfs, 11.5-7 ft



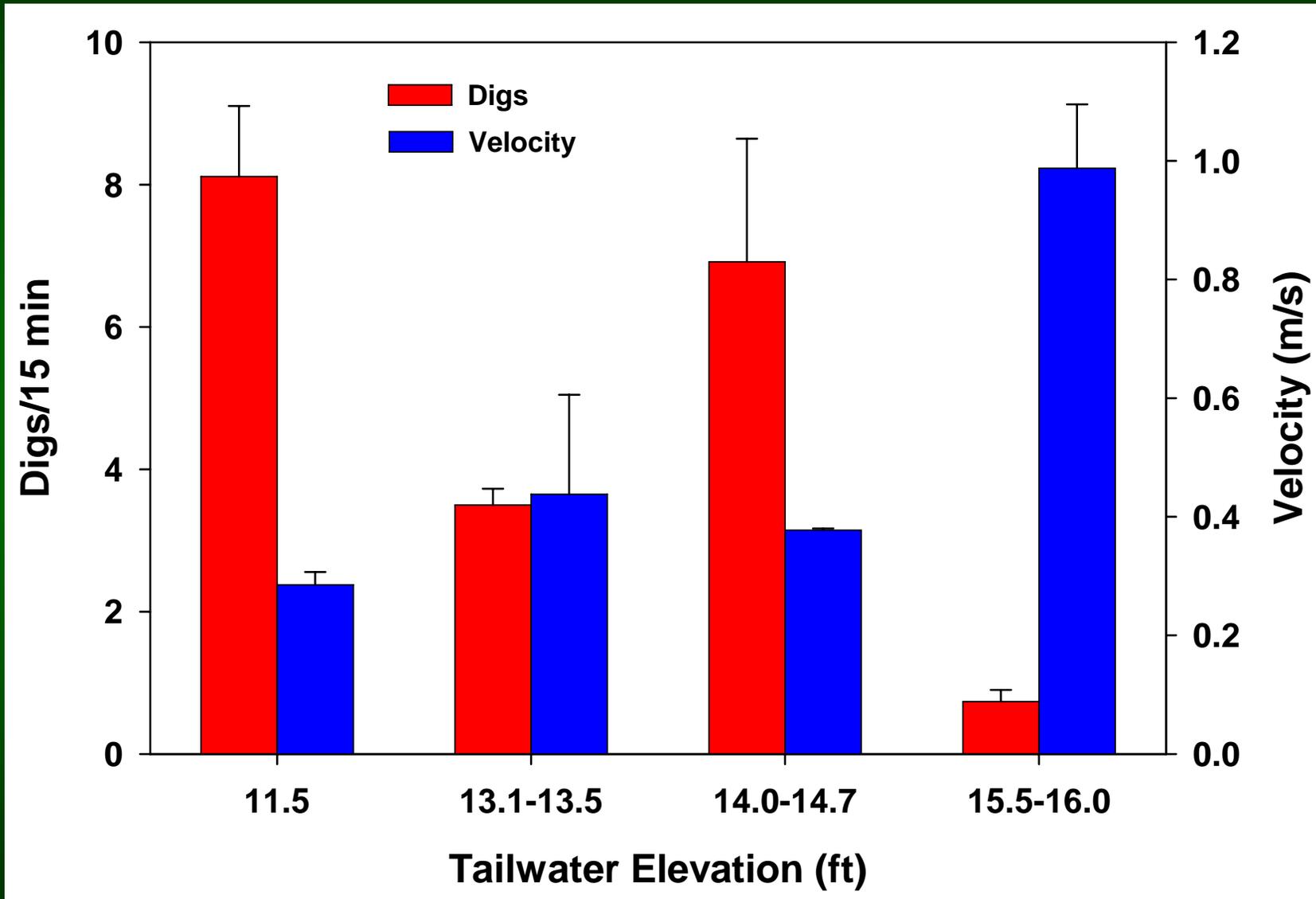
Water Velocities
150 kcfs, 13.0-14.0 ft



Chum Behavior monitored with a DIDSON Acoustic Camera



Digging Activity and Velocity vs Tailwater Elevation



Movement Summary

Acoustic-tagged	Tailwater elevation (ft)		
	13.1-13.5	14.7	15.5
# fish that moved	1	3	4
# fish that stayed	11	0	3

Spawning Summary

DIDSON-monitored fish	Number
Total	10
Spawned prior to test	2
Spawned during test	1
Spawned after test	6

Conclusions:

1. Most movement of chum salmon associated with a redd was observed at tailwater elevations of 14.7-15.5 ft . Almost no movement occurred at a tailwater elevation of 13.5 ft.
2. Fish that left their redd during a test moved substantially, often along shore in slower velocities. Some exited the study array at either the up or downstream ends for varying lengths of time. All tagged fish returned after flows returned to base levels.
3. Digging activity by female chum salmon generally declined at higher flows, most noticeably at a 15.5' tailwater elevation, when velocities increased to 1 m/s. Effects of flow tests appeared to be short-term as 6 fish spawned after tests.
4. Sample sizes were small, which limit conclusions and inferences.



MEMORANDUM

October 21, 2007

TO: Denise Hale, Chief Power Dispatcher
Power Dispatch

FROM: Chris Carlson, Biologist III

SUBJECT: Priest Rapids Dam Discharge For October 28, 2007

Discussion: On Sunday, October 28, 2007, please schedule Priest Rapids Dam discharge to be about 38 kcfs from 0600 to 1300 hours. The redd count will begin at 0900 hours with USGS gauging station flows needed at about 38 kcfs. This will be the third 2007 redd survey required by the 2004 Hanford Reach Fall Chinook Protection Program agreement. This redd count will be used to determine the 2007 initiation of spawning date. A Washington Department of Fish & Wildlife (WDFW) representative and several District staff will be present during the survey.

Please contact me if there are any problems or questions.

(VBCIFlowRqstM.doc)

c: Jeff Atkinson
Bill Berry
Scott Bettin
Bryan Bird
Steve Brown
Dennis Dauble
Steve Dietrich
Gary Donabauer
Tom Dresser
Dave Duvall
Paul Hoffarth
Greg Lange
Russell Langshaw
James Adams

Geoffrey McMichael
Sarah Morford
Bob Mueller
Kevin Nordt
Rod Noteboom
Casey Sprouse
Joe Taylor
Rudd Turner
Dawn Woodward
PRD Operators
WAN Operators
Hydro Planning & Scheduling
NR Records
Scott Boyd

MEMORANDUM

October 21, 2007

TO: Interested Parties
FROM: Chris Carlson, Biologist III
SUBJECT: Vernita Bar Redd Survey, October 21, 2007

Discussion: On Sunday, October 21, 2007 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 Mike Erickson (WDFW). Flows from Priest Rapids Dam at Vernita Bar were about 37 kcfs. Results of this survey are provided in the table below.

<u>Transect</u>	----- Redd Count by Flow Level (kcfs) -----						Total Number Of Redds
	<u>(36 – 50)</u>	<u>(50 – 55)</u>	<u>(55 – 60)</u>	<u>(60 – 65)</u>	<u>(65 – 70)</u>	<u>(Above 70)</u>	
Above A	0	0	0	0	0	0	0
A – AB	0	0	0	0	0	0	0
AB – B	0	0	0	0	0	0	0
Below B	0	0	0	0	0	0	0
C	0	0	0	0	0	0	0
Totals	0	0	0	0	0	0	0

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.

No redds were counted during last year’s October 22 redd count.

The next redd count will occur on October 28, 2007 and will require a USGS gauging station flow of 38 kcfs.

Please contact me if you have any questions.

(VBReddCountM.doc)

- | | | |
|----------------|--------------------|-----------------|
| c: Don Anglin | Jeff Atkinson | Bill Berry |
| Scott Bettin | Shane Bickford | Steve Brown |
| Bob Clubb | Dennis Dauble | Gary Donabauer |
| Sarah Morford | Russ George | NR Records |
| Kelly Harlan | Bob Heinith | Cathy Hlebechuk |
| Joe Taylor | Paul Hoffarth | Rick Klinge |
| Joe Lukas | Geoffrey McMichael | Robert Mueller |
| Greg Patton | Shane Scott | Rudd Turner |
| Bill Tweit | Paul Wagner | Dawn Woodward |
| Power Dispatch | FWWQ Team | PRD Operators |
| WAN Operators | James Adams | Scott Boyd |

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

October 24, 2007 TMT Meeting

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Gumpert

Notes: Erin Halton

The following notes are a summary of issues that are intended to point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the "record" of the meeting, only a reminder for TMT members.

Official Minutes/Facilitator Notes

The facilitator notes and official meeting minutes from the 9/26 TMT meeting were posted, and with no further comments or edits, were finalized during today's meeting.

Vernita Bar/Priest Rapids Operations

Russell Langshaw, Grant County PUD, referred TMT to a document linked to the agenda that showed a 10/21 survey found no redds on the ground but observed four potential spawners in the area. Langshaw said spawning would likely be initiated by 10/27-28, with flows expected to be in the range of 60 kcfs during the day and the low 70's during nighttime hours. Langshaw clarified that this was the third survey conducted this season and that no evaluation would be conducted as escapement goals were being met and inflows were low.

Action/Next Steps: Langshaw will provide TMT with an update at the 11/7 meeting.

2007 Water Supply Forecasting Techniques

Randy Wortman, COE, referred TMT to a water supply forecasting techniques presentation linked to the TMT agenda. He walked TMT members through several graphs, including seasonal flow characteristics, monthly flood control draft targets, ESP forecasts, and daily/monthly regression modeling. Wortman said that the COE uses these and other tools in their modeling, along with River Forecast Center (RFC) weekly ESP forecasts. He noted that for water year 2007, the ESP model calibration for Libby was adjusted by the NWRFC (i.e. the model structure for the Libby Basin was changed). Wortman noted that the NWRFC's monthly ESP forecasts are used by TMT and other groups for decision making and that there is promise for a future ability to utilize Natural Resources Conservation Service (NRCS) daily forecasts. Wortman clarified that the flood control draft points are determined by the COE's official regression forecasts, provided by the 10th of each month.

Study Results: Measuring Behavioral Responses of Spawning Chum Salmon to Elevated River Flows

Ken Tiffan, USGS, referred TMT to a presentation on 2005 chum spawning study results linked to the TMT agenda. The study focused on the effects of elevated flow levels on

chum spawning in the Ives Island area. Tiffan said that 10 eight-hour tests had been conducted using hydrophones and acoustic tags to determine fish movement, duration of their travel, and the timing of their return to their redds. Tiffan's slides included graphs of tracked fish movement/returns to redd locations for tailwater elevations of 13.5', 14.7' and 15.5'. Study results showed that fish typically moved up and down the shoreline when tailwater elevations were between 14.7-15.5' and returned to their redd locations once flows decreased. Tiffan said that the highest digging activity was observed at the lowest velocities/tailwater elevations, noting that activities associated with spawning (e.g. nest digging) appear to be greatly reduced at 15.5 feet.

Action/Next Steps: Cindy LeFleur, WA, said she will provide a schedule for weekly surveys near Ives Island, Multnomah Falls and I-205 planned in 2007 to post to the TMT web page, and that information gathered from the surveys will continue to be provided to the FPC. As chum typically arrive during the first week of November, there may be a need for a TMT call to discuss chum updates prior to the next scheduled meeting on 11/7.

Burbot Operations

There was no SOR or discussion of burbot operations. Jim Adams, COE, said that there likely would not be any SOR submitted for burbot operations this year.

2008 Draft Water Management Plan

Scott Boyd, COE, said comments on the draft 2008 WMP from Montana, USFWS, NWS and the BOR had been posted to the TMT web page. As was noted at the last TMT meeting, many are waiting until the next draft BiOp is released to provide any comment on the 2008 WMP.

Special Note: Facilitator Robin Gumpert reminded TMT members that the next IT meeting is scheduled for Thursday, November 8 from 9am-3:00 pm at the NPCC 11th floor conference room. The draft BiOp will be presented and discussed. TMT members were encouraged to attend that meeting.

TMT Year End Review Agenda

TMT members and other meeting attendees provided feedback and made edits to the TMT Year End Review agenda, with some discussion around which agenda items might be better placed at an upcoming 2008 TMT business meeting rather than the year end review. TMT members noted that it will be especially helpful to review both success stories and challenges of 2007 as we head into 2008.

Action/Next Steps: The Facilitation Team will revise the agenda and distribute the updated version to TMT members. The agenda will be finalized at the 11/7 TMT meeting.

Operations Review

Reservoirs – Libby was at elevation 2434.9' with in and out flows at 4.5 kcfs. Albeni Falls was at elevation 2057.4' with 13.2 kcfs in and 19.2 kcfs out. Dworshak was at elevation 1517.59' with 1.3 kcfs in and 1.5 kcfs out. Lower Granite averaged 20 kcfs inflows, and the 7-day average flows at McNary were in the range of 90-95 kcfs. Grand Coulee was at elevation 1287.2' with outflows in the range of 60-70 kcfs. Hungry Horse

was at elevation 3533.46', with outflows at 2 kcfs and meeting Columbia Falls minimums.

Fish – Paul Wagner, NOAA, reported that Fall Chinook passage numbers at Lower Granite were up to 1500 fish on 10/22; passage at McNary was in the low 400 per day range. Overall Steelhead passage was tracking close to the 10-year average. Snake River Fall Chinook were tracking a little above the 10-year average. Cindy LeFleur, WA, said that she would provide a summary on jack passage counts at the TMT year end review.

Power system – No report.

Water quality – No report.

Next TMT Meeting: 11/7, 9-noon **NOAA Fisheries Conference Room

An agenda will be developed for the next meeting. Items include:

- Finalize TMT Year End Review Agenda
- Chum Operations
- 2007 Zero Nighttime Flow

**Columbia River Regional Forum
Technical Management Team Conference Call
October 24, 2007**

1. Introduction

Today's conference call was chaired by Jim Adams (COE) and facilitated by Robin Gumpert (D.S. Consulting), with representatives from NOAA, COE, BPA, BOR, USGS, the Nez Perce Tribe, FPC, CRITFC, Montana, Washington, Oregon, and Idaho attending either in person or by phone. The following is a summary (not a verbatim transcript) of the topics discussed and decisions made at the meeting. Anyone with questions or comments about these notes should provide them to the TMT chair or bring them to the next meeting.

2. Review Meeting Minutes

There were no comments on either the facilitator's notes or official minutes for the September 26 meeting. These notes were therefore finalized.

3. Vernita Bar

Russell Langshaw, Grant County PUD, presented the October 28 Priest Rapids flow request and the results of the October 21 Chinook redd count linked to today's agenda. Four redds have already been found in the Vernita Bar area, so the finding of a fifth redd will trigger the initial date of spawning – possibly within the next week.

The spawning study Grant PUD had planned wasn't done this year for two reasons. Flows were too low to sustain even a one-hour peak, and escapement is low this year. Both factors would make it difficult to interpret the study results. Inflows continue to be low, with current projections of around 60 kcfs for daytime and in the low 70's at night.

Langshaw addressed widespread concerns about escapement at McNary into the Hanford Reach. Significant numbers of fish have been passing Priest Rapids Dam, but only a low percentage is anticipated to escape into the reach. Despite the fact that escapement is less than in recent years, escapement goals are being met.

Langshaw will give an update at the next TMT meeting November 7.

4. Comparison of Water Supply Forecasting Techniques

Randy Wortman (COE) described the various techniques available for forecasting seasonal water supply. Water supply forecasts are key to how the COE operates the reservoirs and sets flood control target elevations. Wortman

used the forecasts for January to June 2007 at Dworshak and Libby as an example for comparing the different forecasting techniques.

There are four types of forecasts currently available:

1. The COE uses its monthly regression forecasts as the basis for determining reservoir flood control elevations.
2. The Northwest River Forecasting Center produces monthly regression forecasts using a different regression technique than the COE uses.
3. The Northwest River Forecasting Center's weekly ESP forecast begins with a precipitation forecast for the first 10 days, followed by 45 years of historic temperature and precipitation sequences superimposed on each other. The average of these 45 forecasts can be used to produce an additional forecast.
4. Beginning last year, the Natural Resources Conservation Service began using an experimental demonstration technique to produce a daily regression forecast.

Jim Litchfield (Montana) asked whether forecasting weekly or biweekly instead of monthly increases forecasting accuracy. This presentation doesn't indicate that would be true, he said; Wortman agreed it just produces more forecasts. There was a problem last year with the Libby ESP model drifting off course, so the NWRFC made a major adjustment to it at the end of March, and the forecast dropped by a million acre-feet.

After using last year as a test case to compare all four forecasting techniques, Wortman found the COE's monthly principal components regression forecast meets or exceeds all the others in terms of accuracy. ESP forecasts are also useful, but there are concerns that the models won't be robust enough to be reliable until several more years of testing and verification have been completed. The new NCRS daily forecast is promising, but currently shows an unacceptable bias: the NRCS forecasts do not presently consider the observed inflow volumes. There was general agreement among TMT members that this is problematic. If daily forecasting becomes a tool the COE looks at more closely, MacKay asked the COE to let TMT know.

5. Chum Operations

A. USGS Study Results. Ken Tiffan (USGS) presented the results from a 2005 study of the effects of elevated flows on chum spawning in the Ives Island area. Data were collected at tailwater elevations of 13.5 to 15.5 feet (the base condition was 11.5 feet) at 5-minute intervals for periods of 8 consecutive hours. Using an acoustic telemetry array suspended above the water surface to detect

acoustically- tagged fish, the study focused on whether (and to what extent) higher flows displaced fish from their redds.

Three factors made the study results uncertain: small sample sizes, the difficulty of tagging fish in the productive phase of their spawning cycle; and pinpointing the exact location of redds. Of 40 tagged fish, 3 left the area and 15 didn't apparently have a redd, leaving 22 study subjects of which 3 were males.

Tiffan presented the findings from one day's research as an example. At a tailwater elevation of 13.5 feet, fish hovered near their redds, based on observation of 12 females. When flows raised the tailwater elevation to 14.7 feet, all of the tagged fish moved into areas near the shoreline with lower velocities. They returned to their original locations (presumably where the redds were) once flows came down again.

Flows above a tailwater elevation of 13.5 feet were likely to elicit movement away from redds and toward shorelines, Tiffan concluded. At 13.5 feet, only one fish in 12 moved during the 8 hour study period. Flows around 150 kcfs result in tailwater elevations of 13-14 feet at Ives Island, depending on tides. There was a lot of variation in fish behavior during the higher flows, probably depending on where they were in the spawning cycle. The tagged fish returned to their presumed redd locations when flows declined. Typically, chum spawn in the wider channel north of Ives Island, but if flows remain high long enough, the fish will spawn on the narrower side south of the island. Most fish can't dig in higher flows, especially at a 15.5 foot tailwater elevation.

B. Chum Operations. There are no chum yet, Cindy LeFleur (Washington) said. The expectation is for fish monitoring to continue over this period, and when fish are seen, flows will stabilize at about 11.5 foot tailwater elevation, Wagner said. MacKay pointed out that the next 10 days or so are predicted to be dry, with flows of 80-100 kcfs at Bonneville. We would need to draft ½ foot to a foot at Grand Coulee per day to increase flows under these conditions, she said. According to an STP run for Grand Coulee, flows should increase to 90 kcfs starting November 8 to achieve a tailwater elevation of 11.5 feet at Bonneville, Adams said. That's 25-30 kcfs more than Grand Coulee is putting out today, MacKay noted.

Traditionally, chum don't show up until around the first week of November, Rick Kruger (Oregon) said, so it might be a problem to wait until November 8 to start drafting Grand Coulee. Water in the lower river can be used for that without necessarily having to draft from Grand Coulee, Scott Bettin (BPA) pointed out. Washington will notify TMT when the chum have arrived and flows should begin. There could be a TMT conference call before the next regular meeting to coordinate the initiation of chum flows.

{The following day, Cindy LeFleur sent TMT members a schedule of 2007 chum surveys to be conducted in three areas on the mainstem Columbia River: Ives Island; Multnomah, Horsetail and St. Cloud; and I-205. Weekly counts will be sent to the Fish Passage Center and posted on their website. Chum surveys will also be conducted in the Grays River system and on gorge tributaries.}

6. Burbot Operations

Detailed discussion of this topic was postponed until a project leader is available to meet with TMT. Adams said his understanding is that there probably won't be an SOR submitted on Libby operations for burbot this year. Scott Bettin added that if an SOR is submitted it will only involve temperature management and TMT will not need to act on the operation.

7. 2008 Draft Water Management Plan

Scott Boyd (COE) gave a brief update. The Action Agencies have done some internal work on the draft, and now it awaits further revision until the Bi-Op is released on October 31. Robin Gumpert invited TMT members to attend the all-day IT meeting on November 8, which will involve detailed Bi-Op discussion.

8. TMT Year End Review Agenda

TMT members discussed the draft agenda for their year-end review on November 28. The group discussed ways of cutting the agenda so that all the items can be covered in a day. There was a suggestion to delete all non-operational issues from agenda item 5 and discuss the relevant study developments at TMT meetings throughout the year. TMT members discussed other issues and the best ways of handling them – year-end review or regular meeting? MacKay advocated using the year-end review as a forum to identify problems rather than solve them. The group agreed that scheduling topics on a calendar of TMT meetings throughout the coming year would be a useful year-end exercise.

Zero flow could be handled better in a regular meeting prior to December 1, when the zero flow window begins, rather than at the year-end review. This topic was moved to the next TMT meeting on November 7.

Hells Canyon operations was assigned to Rich Domingue (NOAA), who can inform TMT of what the final EIS says and how it will affect Idaho Power's operation of Hells Canyon Dam going forward.

TDG management needs to be addressed well ahead of spill season in order to increase everyone's comfort zone, Wagner said. It has been added to the year-end agenda under operations review.

Scheduled outages should be announced ahead of time so TMT members aren't surprised, MacKay said. A January agenda item could be a review of the scheduled outages in the Fish Passage Plan, Bettin suggested. LeFleur suggested adding mechanical issues and scheduled outages to the standard operations review at all TMT meetings.

Reservoir operations in some cases went extraordinarily well last year, Wagner said, particularly Dworshak operations and management of VAR-Q flows at Libby. He noted that the drafting rate for chum seemed excessive for a 13.5 foot tailwater elevation, though it worked out and Grand Coulee reached its April 10 target elevation.

Pacific lamprey passage discussion could focus on operations that might benefit lamprey without hurting salmon passage, Wagner said. There was interest in updates from the Pacific lamprey work group chaired by Dave Clugston.

Other topics to be scheduled on the TMT meeting calendar for the next year include juvenile migration, the water management plan, bird predation in the estuary, marine mammal research, and the impact of court oversight on river operations. There was general consensus that not all topics can be covered in the year end review, and some will be better addressed in regular TMT meetings.

It's important to get past successes on record, LeFleur and Wagner agreed. The group considered revising the agenda so the discussion moves from project to project, instead of from topic to topic, following the same logic Tony Norris recently used to reconfigure the WMP.

Gumpert will revise the agenda in light of today's conversation and send it out for TMT review prior to the November 7 meeting.

9. Operations Review

a. Reservoirs. Libby is at elevation 2,439 feet, with inflows and outflows running around 4.5 kcfs, Adams said. The year-end flood control elevation will be 2,411 feet on December 31, unless the December water supply forecast is less than 95% of normal. The maximum Libby elevation if the forecast is less than 88% of normal would be 2,426.5 feet.

Albeni Falls is at elevation 2,057.4 feet at the Hope gage, with inflows of 13.2 kcfs and outflows of 19.2 kcfs. The reservoir is being drafted to an elevation of 2,055 feet by November 20, with an expected elevation of 2,056 feet by October 31.

Dworshak forebay is at elevation 1,517.59 feet, with inflows of 1.3 kcfs and outflows of 1.5 kcfs. The 7-day inflow average at Lower Granite is 20 kcfs.

The 7-day inflow average at McNary is 90-95 kcfs. Bonneville outflows were 108 kcfs yesterday.

Hungry Horse is at elevation 3,533.46 feet, discharging an average of 2.0 kcfs, John Roache (BOR) said. Grand Coulee is at elevation 1,287.2 feet, with flows averaging 60-70 kcfs over the past few days.

b. Fish. Juvenile fall Chinook numbers are up quite a bit to 1,500 fish passing per day at Lower Granite, apparently an effect of recent rain, Wagner said. Adult returns are nothing unusual, LeFleur said. The fall escapement goal of 43,000 fish at McNary was met (53,000 fish to date). Steelhead passage peaked on a single day, but the overall run has been close to average. Only jack returns have been unusually high this past year; LeFleur will talk about that at the year-end review. There was discussion of Hanford runs vs. Snake runs, with greater apparent declines on the Hanford side. Jacks are generally up for all populations, Wagner said. Whether that can be credited to increased spill is questionable.

c. Power System. There is nothing to report, Robyn MacKay (BPA) said.

d. Water Quality. There is nothing to report, Jim Adams said.

9. Next Meetings

The next TMT meeting will be in person on November 7 in the Mount St. Helens room at NOAA's Portland offices. Topics discussed at that meeting will include the year-end review agenda, chum operations, and zero flow operations. There could be a TMT call before then if needed to initiate chum flows. This summary prepared by consultant and writer Pat Vivian.

Name	Affiliation
Jim Adams	COE
Jim Litchfield	Montana
Paul Wagner	NOAA
Laura Hamilton	COE
Robyn MacKay	BPA
John Roache	BOR
Scott Boyd	COE
Scott Bettin	BPA
Shane Scott	NWRP
Tony Norris	BPA
Steven Wallace	XX
Randy Wortman	COE
Bob Diaz	PPM Energy
Tim Heizenrader	Centaurus Energy
Ted Haskell	USGS

Russ George
Ruth Burris
Ken Tiffan
Cindy Lefleur
Rick Kruger

WMC
PGE
USGS
Washington
Oregon

Phone

Dave Statler
Russ Kiefer
Barry Espensen
Russell Langshaw
Bruce McKay
Richelle Beck
Margaret Filardo
Todd D. Cooke
Bob Heineth
Amy Reese

NPT
Idaho
CBB
Grant PUD
Consultant
DRH
FPC
Goldman Sachs
CRITFC
COE – Seattle

TECHNICAL MANAGEMENT TEAM

BOR : John Roache/Mary Mellema/Pat McGrane

BPA : Robyn MacKay/Tony Norris/Scott Bettin

NOAA-F: Paul Wagner/Richard Dominigue

USFWS : David Wills/Steve Haeseker

OR : Rick Kruger/Ron Boyce

ID : Russ Kiefer

WDFW : Cindy LeFleur

MT : Jim Litchfield/Brian Marotz

COE: Jim Adams/Cathy Hlebechuk/Bob Buchholz

TMT MEETING

Wednesday November 7, 2007 09:00 - 12:00

NOTE: This Week's Meeting Location

NOAA Fisheries
1201 N.E. Lloyd Blvd.
Portland, Oregon

Mt. St. Helens Room, 10th Floor Conference Room

Map Quest [\[Directions\]](#)

CONFERENCE PHONE LINE

Conference call line:203-310-2162; PASS CODE = 4703150

We have had disruptions on the phone because people are not hitting 'mute' after dial in.
Please MUTE your Phone

*All members are encouraged to call Robin Gumpert with any issues or concerns they would like to see addressed.
Please e-mail her at robin76@cnnm.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and Introductions
2. Review [\[Meeting Minutes\]](#)
3. TMT Year-End Review Agenda - All
 - a. [\[Agenda\]](#) 
4. Autumn Treaty Fishing Report - Kyle Dittmer, CRITFC
 - a. [\[2007 Autumn Treaty Fishery\]](#) 
5. Vernita Bar - Russell Langshaw, Grant PUD
 - a. [\[VB Redd Count\]](#) 
6. Chum Operations - Paul Wagner, NOAA Fisheries
7. Snake River Zero Nighttime Flow - Robyn Mackay, BPA
 - a. [\[Snake River Zero Generation\]](#) 
8. 2008 Draft Water Management Plan - Scott Boyd, USACE
 - a. [\[2008 Draft Water Management Plan\]](#) 
9. Operations Review
 - a. Reservoirs
 - b. Fish

- c. Power System
- d. Water Quality - *Jim Adams, COE*
 - 1. [\[Spill Information 2007\]](#)

10. Other

- Set agenda for next meeting - **November 21, 2007** [\[Calendar 2007\]](#) 

Questions about the meeting may be referred to [Jim Adams](#) at (503) 808-3938 or [Cathy Hlebechuk](#) at (503) 808-3942 or [Bob Buchholz](#) at (503) 808-3945.

TECHNICAL MANAGEMENT TEAM

BOR: John Roache/ Mary Mellema

BPA: Robyn MacKay/ Tony Norris

NMFS: Paul Wagner/Rich Domingue

USFWS: David Wills / Steve Haeseker

OR: Rick
Kruger

WA: Cindy
LeFleur

ID: Russ
Kiefer

MT: Jim Litchfield/Brian
Marotz

COE: Jim Adams/Cathy Hlebechuk

COLUMBIA RIVER REGIONAL FORUM

Technical Management Team

AGENDA Annual Review of Lessons Learned: 2007

Wednesday, November 28, 2007

9:00 am – 4:00 pm

Portland District COE

Robert Duncan Plaza

3rd Floor Conference Room

333 S.W. First Avenue Portland, OR 97204

(503) 808-5150

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DRAFT AGENDA

Questions about the meeting may be referred to Robin Gumpert at (503) 248-4703

Purpose: To provide an opportunity for TMT members and other interested parties to step out of the regular meeting format and review the management decisions and operations of the 2007 season in order to learn lessons that can enhance choices and decision making for 2008.

1. **9:00 Welcome, get settled and introductions**—Donna Silverberg, Facilitator
 2. **9:30 Conditions Review: What were the water, weather and fish conditions that existed throughout the year? How did this year compare to others?**
 - Weather – Kyle Dittmer, CRITFC
 - 2007 Water and Runoff Patterns - Comparison to Previous Years, project operations - Jim Adams, COE
 - Temperature/TDG Level Variations - Jim Adams, COE
 - Fish Conditions: Spring/Summer Migrants, Survival Rates and Timing, Transportation Percentages – Paul Wagner, Bill Muir, Steve Smith, NOAA; NMFS Science Center
 - Adult Fish Runs/Fisheries Review – Cindy LeFleur, WDFW
 - Spring/Summer/Fall Fish Passage – Jerry McCann, Fish Passage Center
 - Q&A and Lessons Learned from the 2007 Conditions Review
- (NOTE: A break will be taken around 10:45)**
3. **11:00 Review of Specific Operations: What was learned about specific operations that were requested by TMT members or other regional entities? How effective were these operations in achieving the intended goal? Should they be continued or modified in future years? Why or why not?**
 - Spring Creek Operations – Dave Wills, USFWS
 - Vernita Bar Operations – Russell Langshaw, Grant County PUD
 - MOP Operations
 - Transportation Operations
 - Emergency Spill Operations
 - TDG Management Impacts on Fish Passage
 - Navigation Issues
 - Mechanical Issues/Scheduled Outages
 4. **Noon – Break for Lunch**

5. 1:00 Reservoir Operations Review: How effective were the proposed actions (SORs) at achieving desired results? What changes might be necessary to enhance results in the future? How did this year compare to others?

- Libby & HH Spring/Summer Operations
 1. VARQ – Cathy Hlebechuk, COE, Brian Marotz, MT, and John Roache, BOR
- Dworshak Spring/Summer Operations – Greg Haller, Nez Perce and Jim Adams, COE
- Upper Snake/Hells Canyon Operations – John Roache, BOR and Rich Domingue, NOAA
- Grand Coulee Operations
 1. SOR 2007-1
 2. Other
- Bonneville Operations
- Q&A and Lessons Learned from the 2007 Operations Review

6. 3:00 Other Lessons Learned? Given the review of conditions, decisions and actions throughout the day, what are the overarching lessons that could impact future work of the TMT?

7. 4:00 Adjourn

NOTE: Lunch will be brought in for all participating in or attending the meeting. A \$6 contribution is requested.

RSVP date is November 21. Your RSVP is required to guarantee enough food for everyone!

Thank you in advance for participating.

Please note: Due to security at the location, you will need to be on the security list in advance of the meeting and will need identification to get into the building.

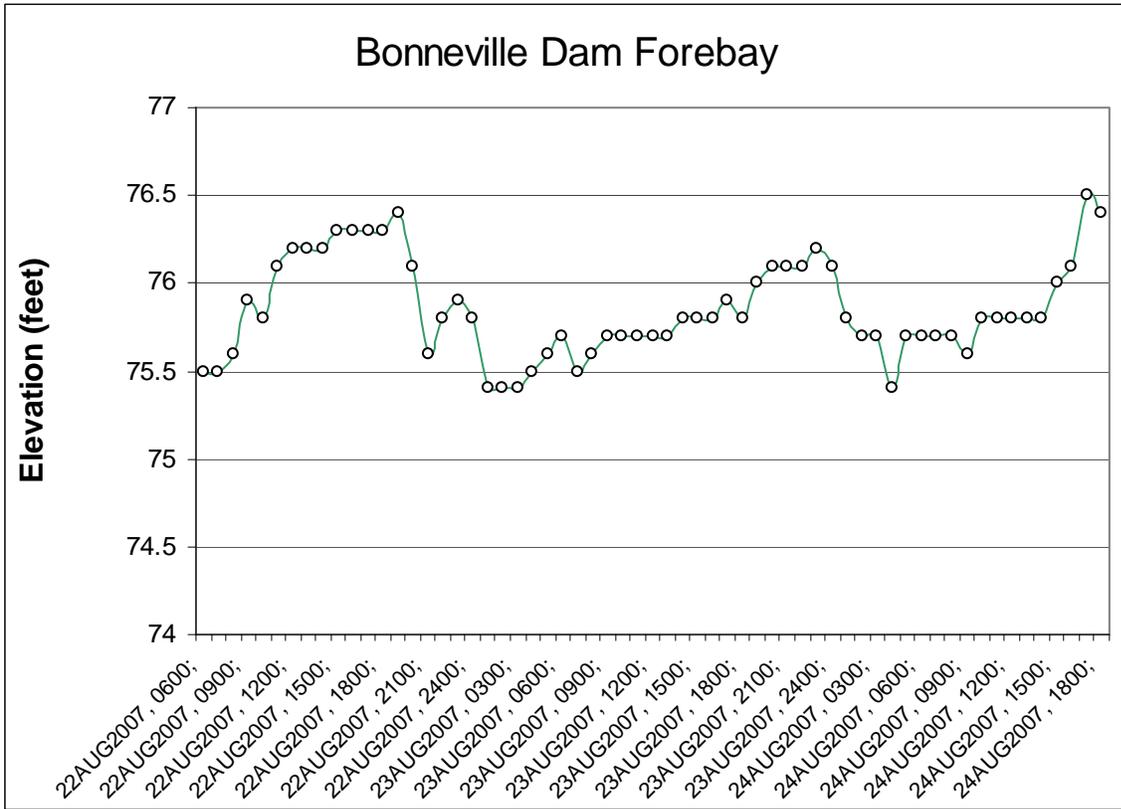


Figure 1. Observed BON pool elevations during August 22-24, 2007 autumn treaty fishing.

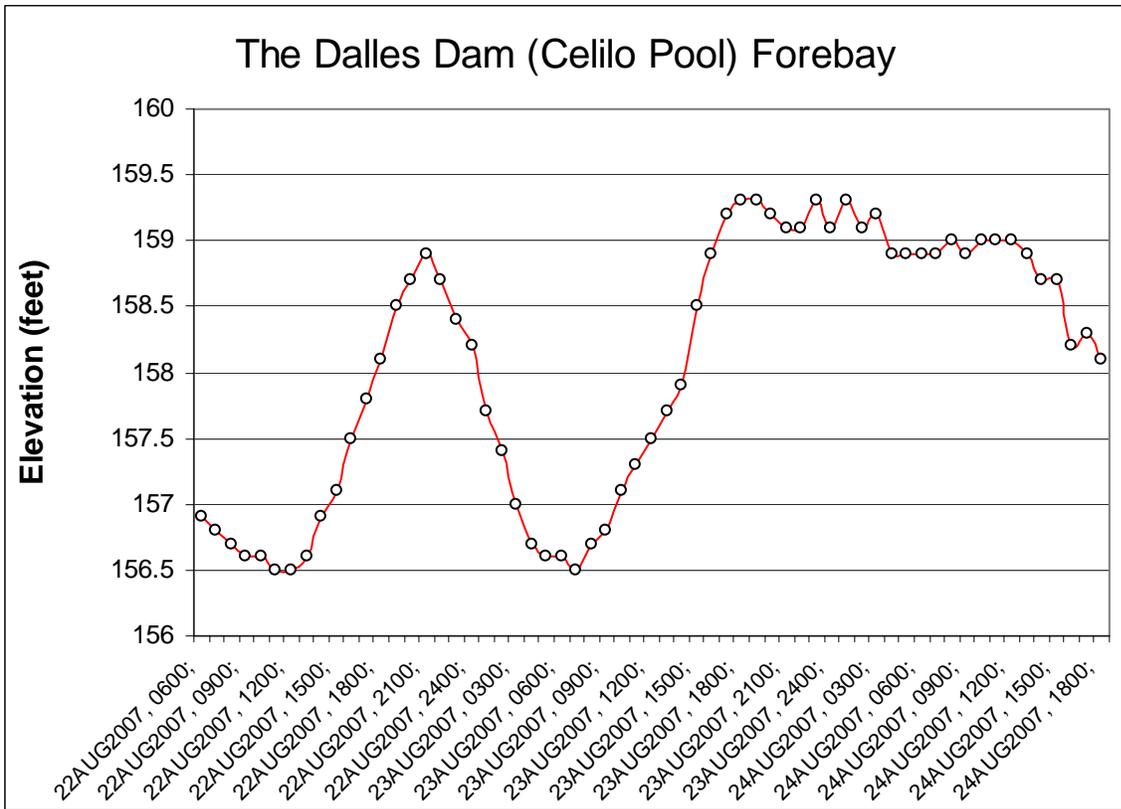


Figure 2. Observed TDA pool elevations during August 22-24, 2007 autumn treaty fishing.

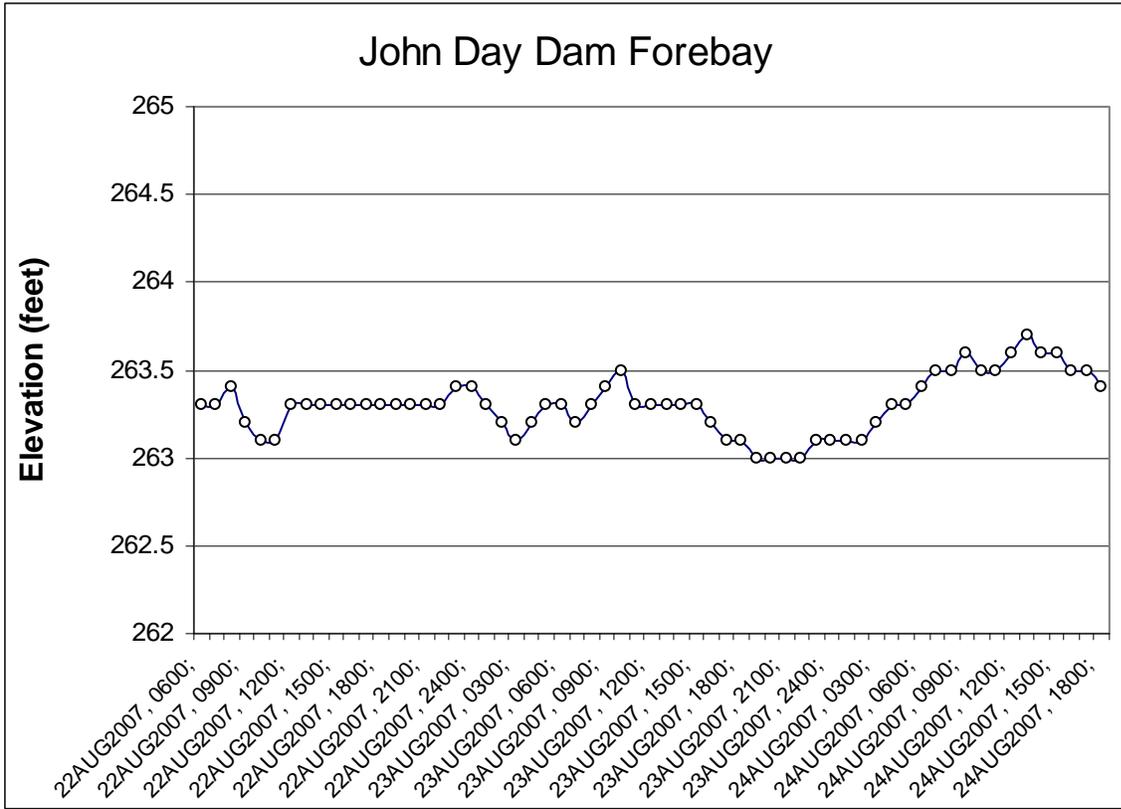


Figure 3. Observed JDA pool elevations during August 22-24, 2007 autumn treaty fishing.

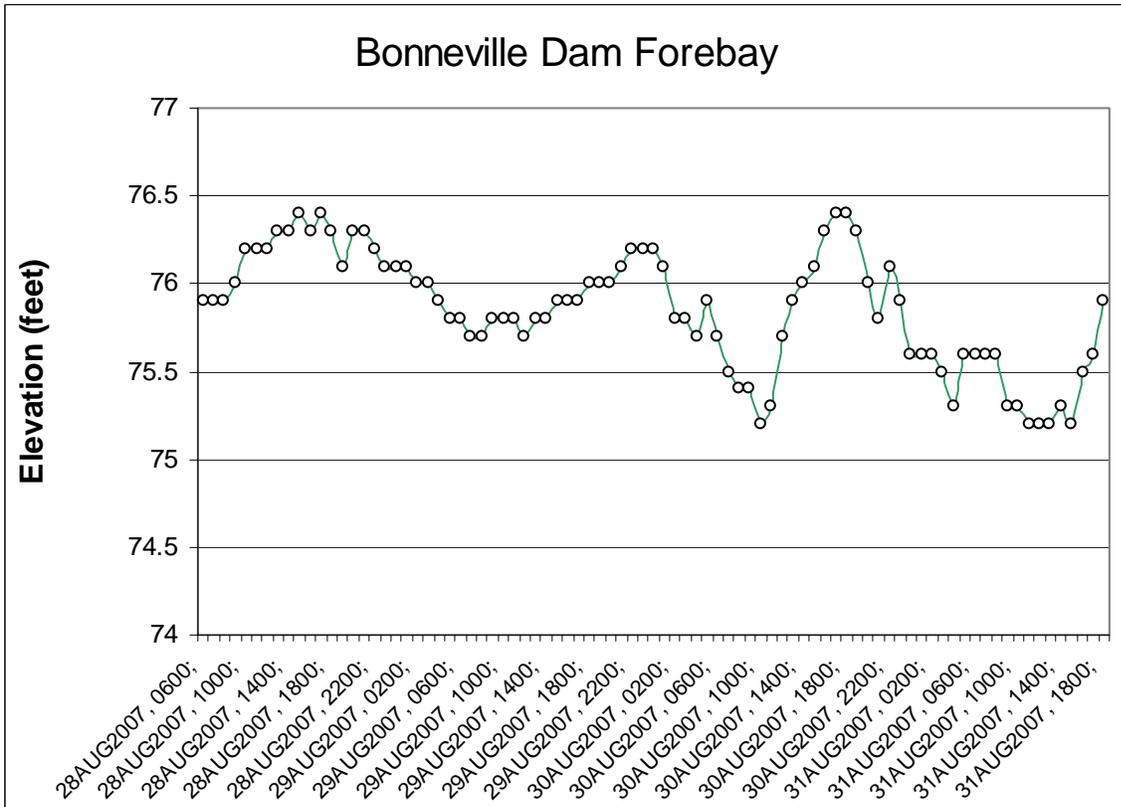


Figure 4. Observed BON pool elevations during August 28-31, 2007 autumn treaty fishing.

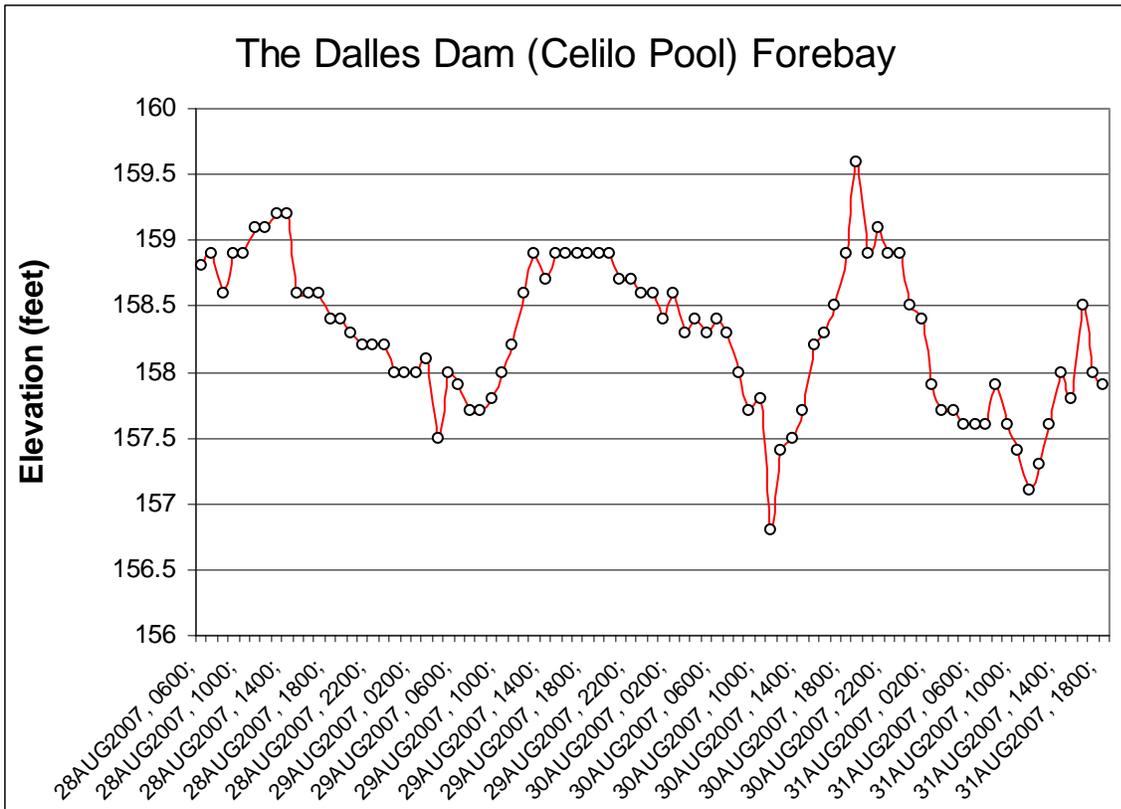


Figure 5. Observed TDA pool elevations during August 28-31, 2007 autumn treaty fishing.

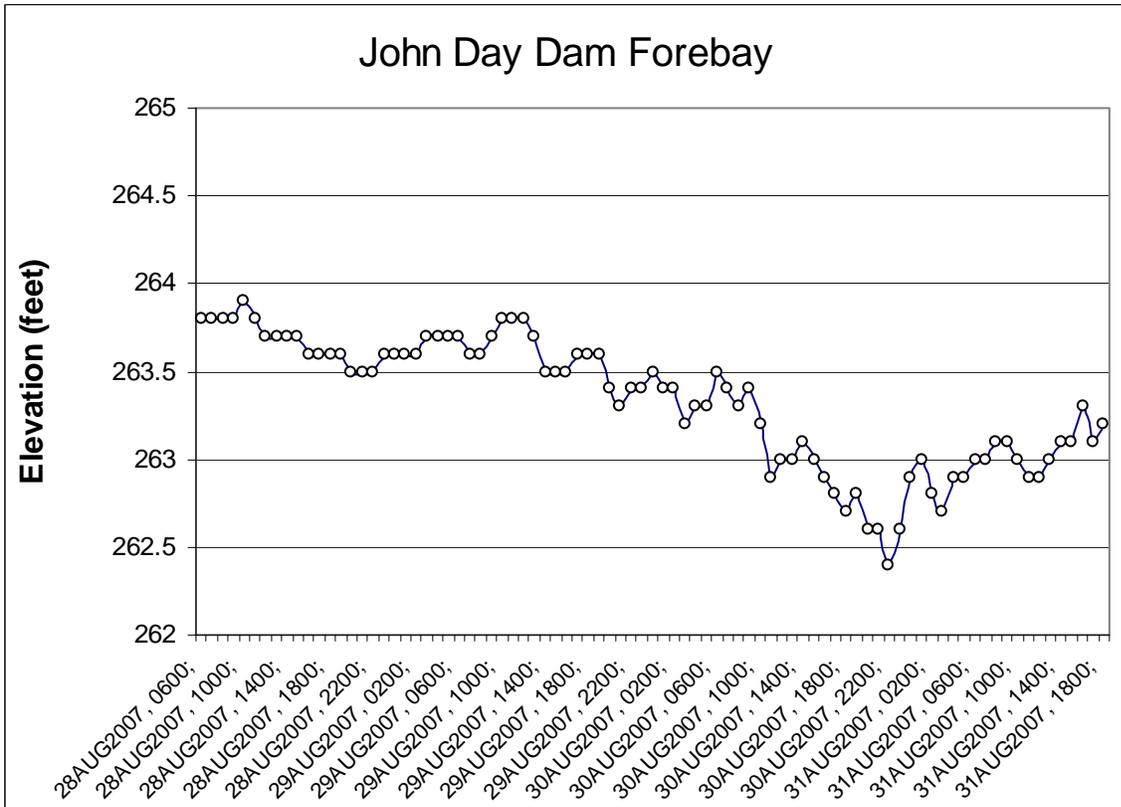


Figure 6. Observed JDA pool elevations during August 28-31, 2007 autumn treaty fishing.

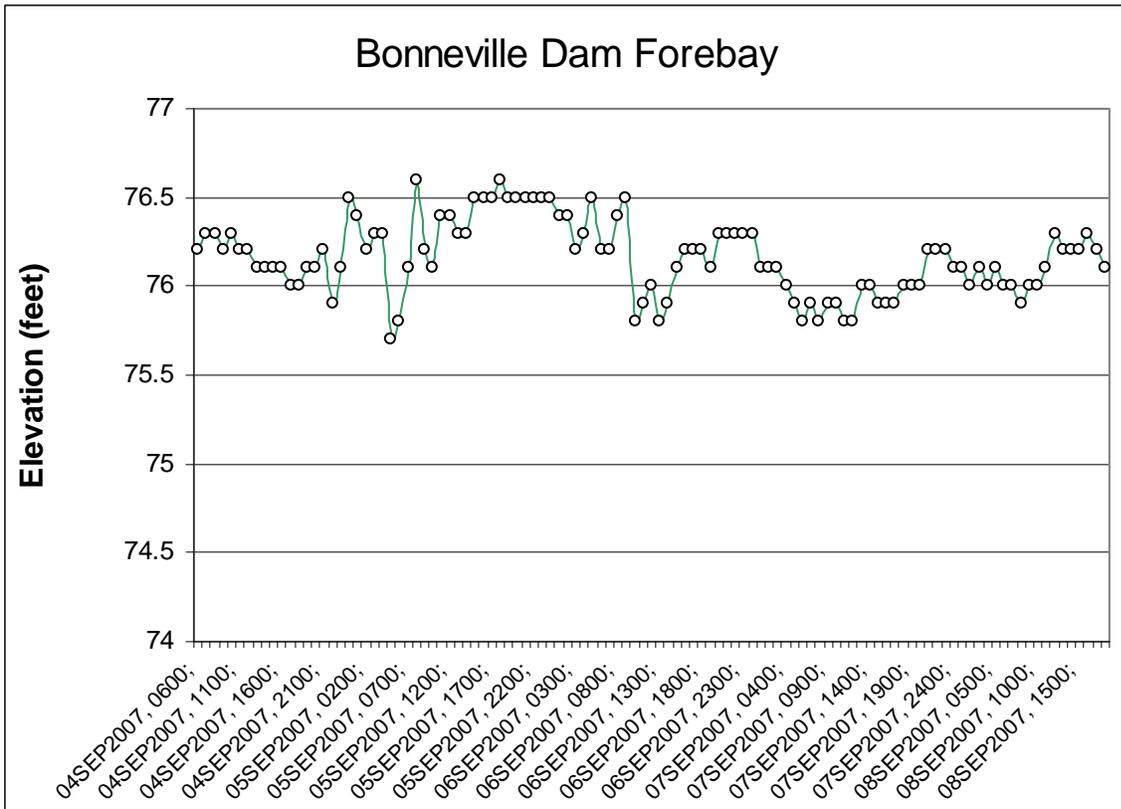


Figure 7. Observed BON pool elevations during September 4-8, 2007 autumn treaty fishing.

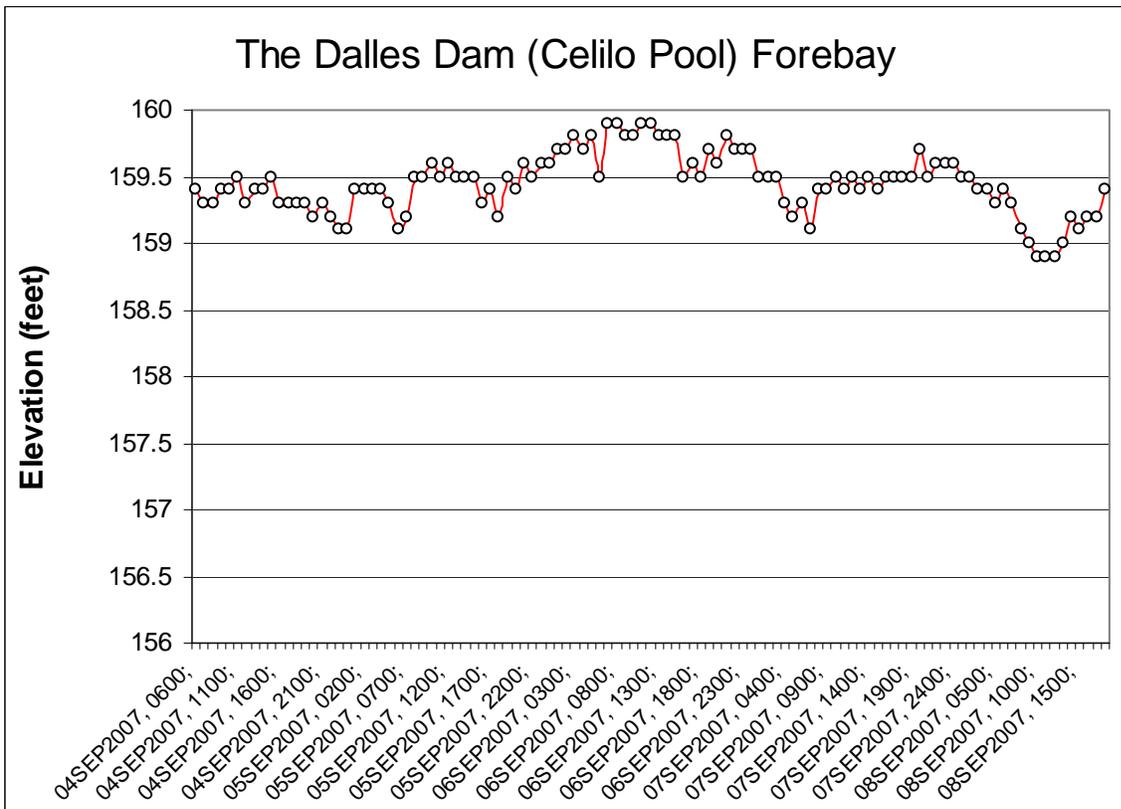


Figure 8. Observed TDA pool elevations during September 4-8, 2007 autumn treaty fishing.

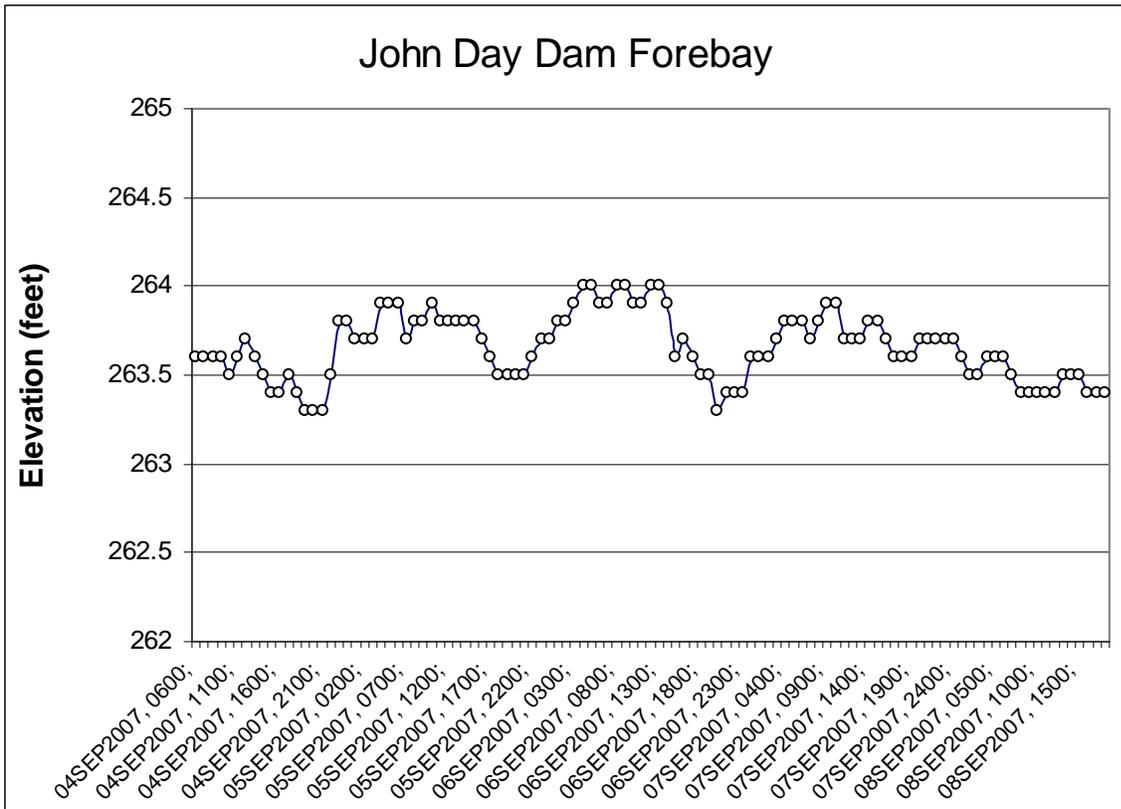


Figure 9. Observed JDA pool elevations during September 4-8, 2007 autumn treaty fishing.

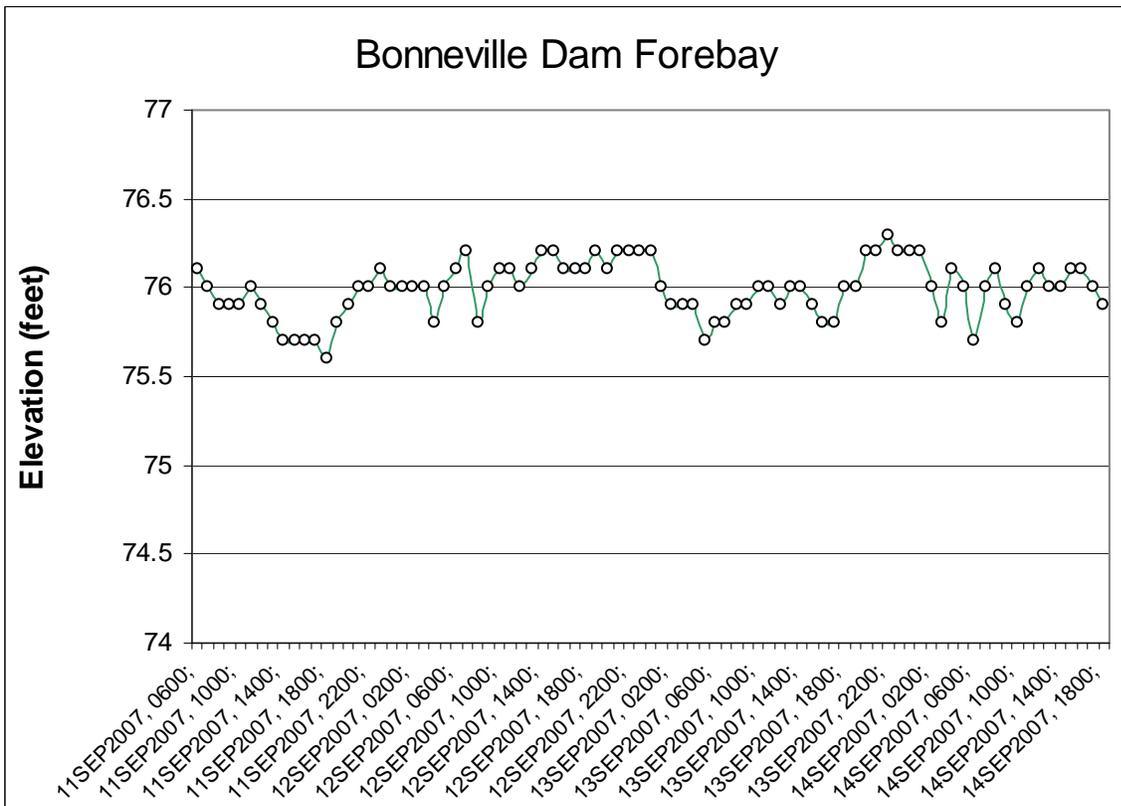


Figure 10. Observed BON pool elevations during September 11-14, 2007 autumn treaty fishing.

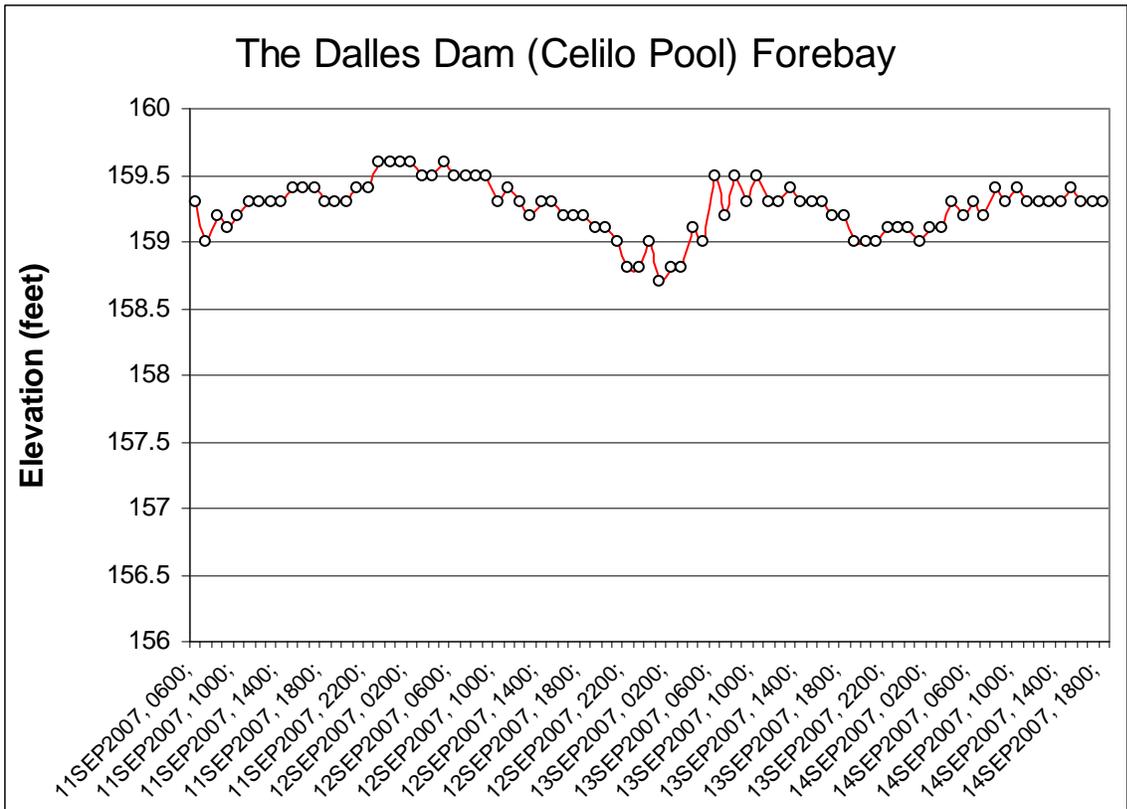


Figure 11. Observed TDA pool elevations during September 11-14, 2007 autumn treaty fishing.

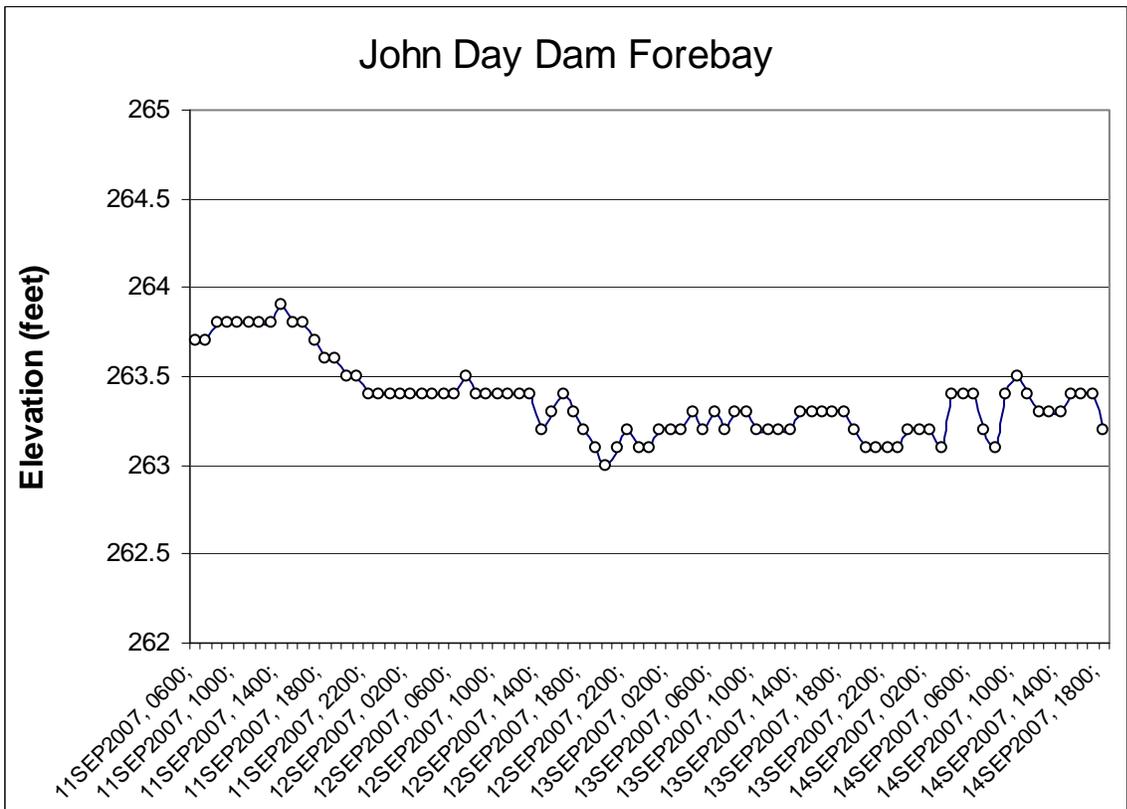


Figure 12. Observed JDA pool elevations during September 11-14, 2007 autumn treaty fishing.

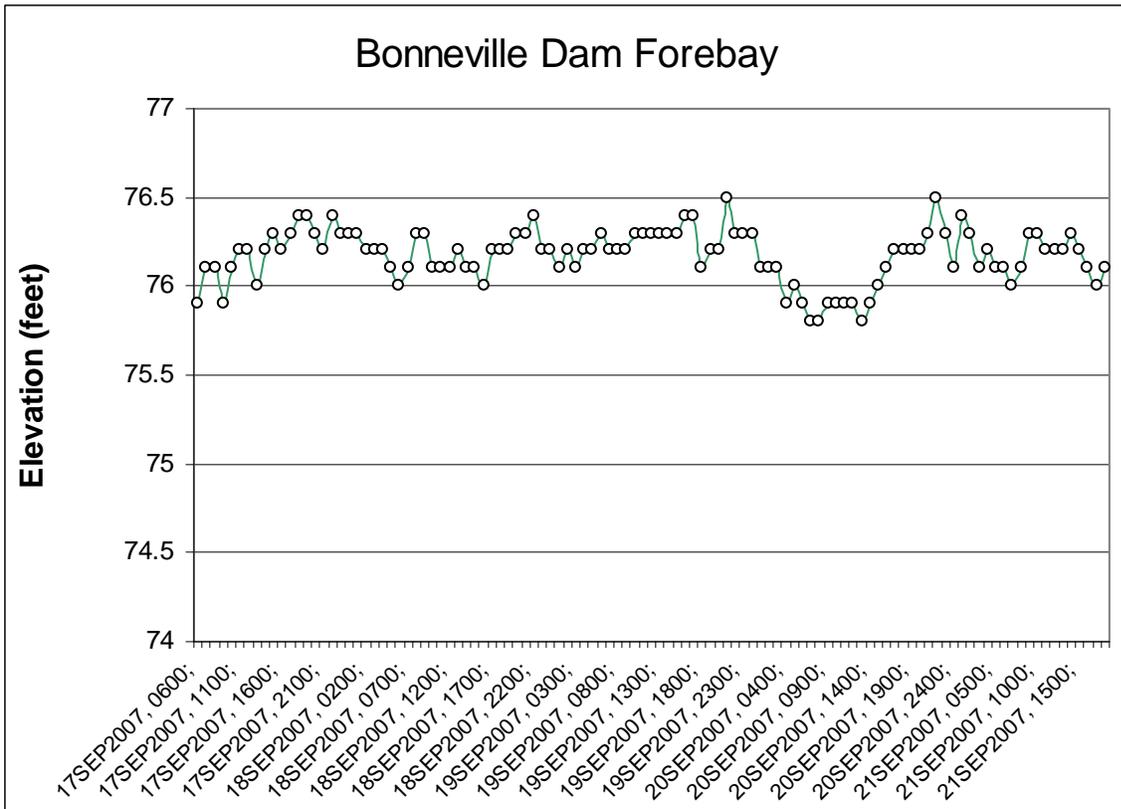


Figure 13. Observed BON pool elevations during September 17-21, 2007 autumn treaty fishing.

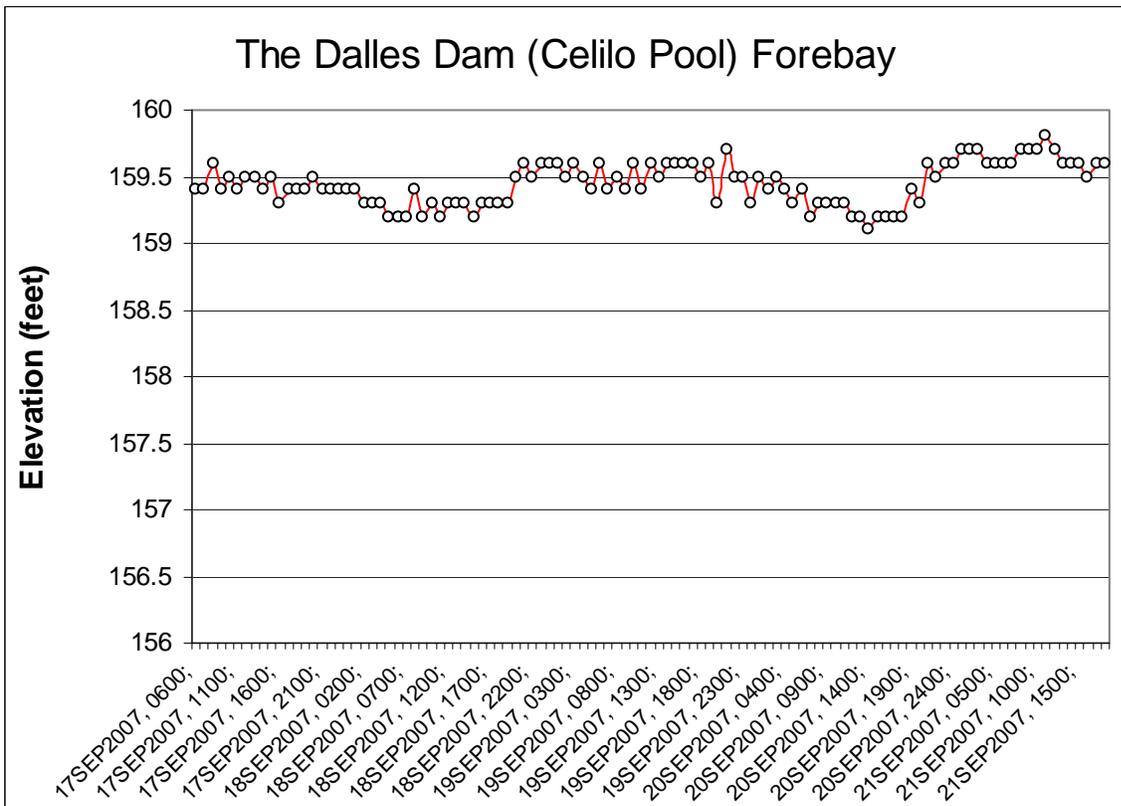


Figure 14. Observed TDA pool elevations during September 17-21, 2007 autumn treaty fishing.

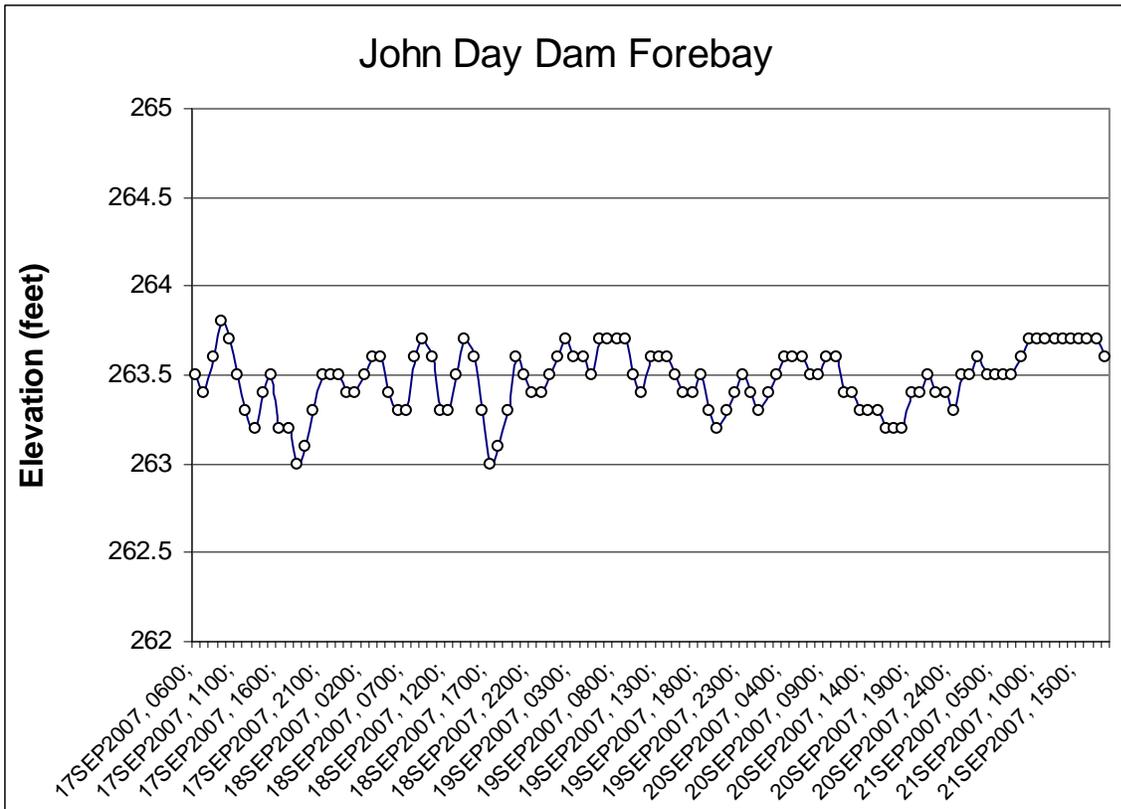


Figure 15. Observed JDA pool elevations during September 17-21, 2007 autumn treaty fishing.

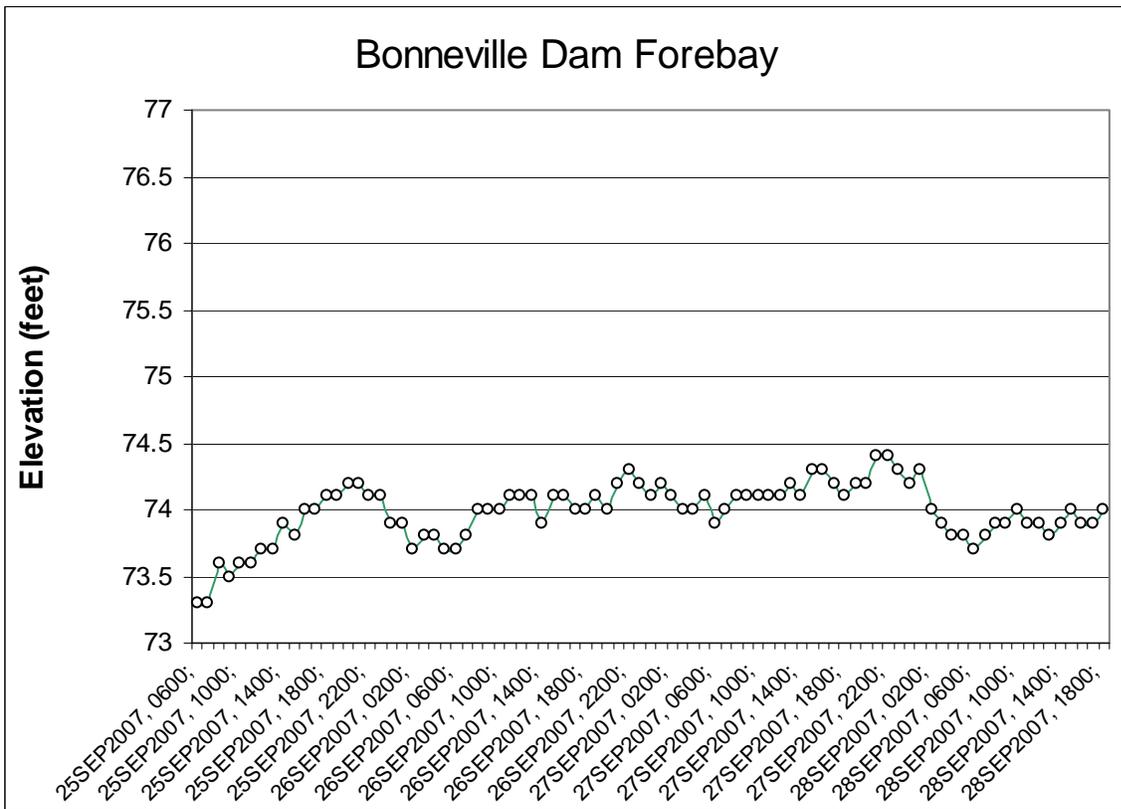


Figure 16. Observed BON pool elevations during September 25-28, 2007 autumn treaty fishing.

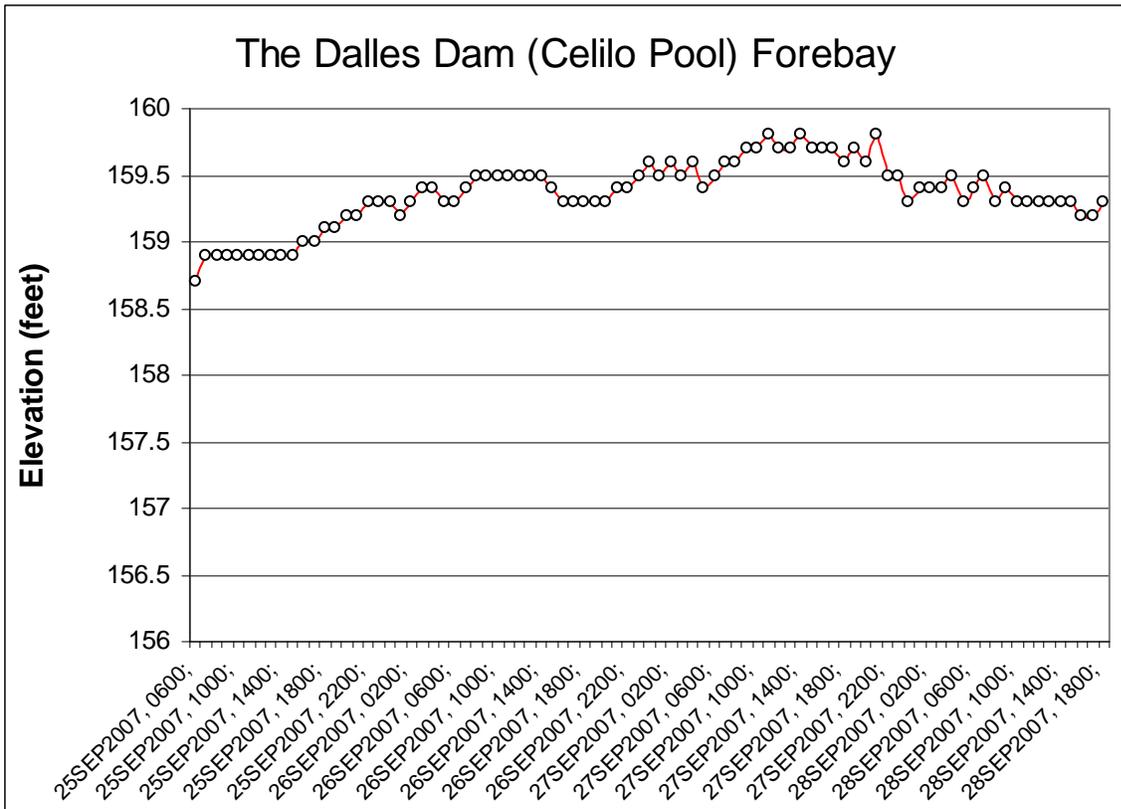


Figure 17. Observed TDA pool elevations during September 25-28, 2007 autumn treaty fishing.

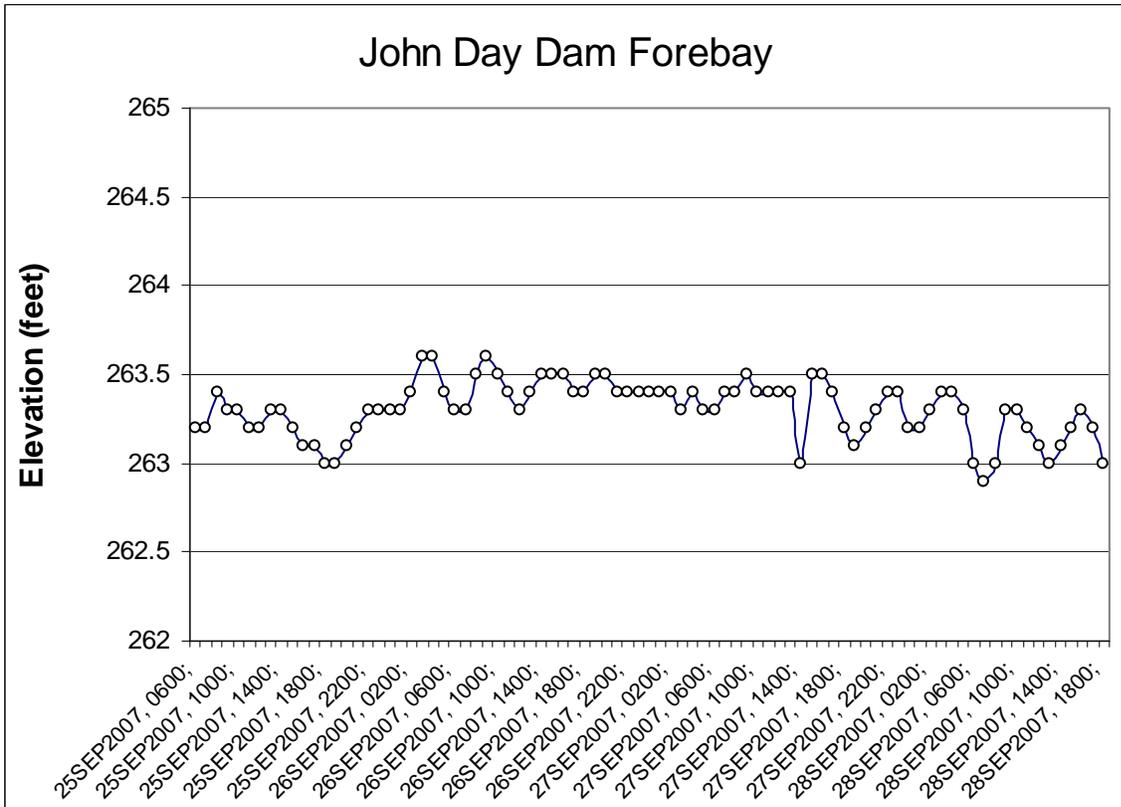


Figure 18. Observed JDA pool elevations during September 25-28, 2007 treaty fishing.

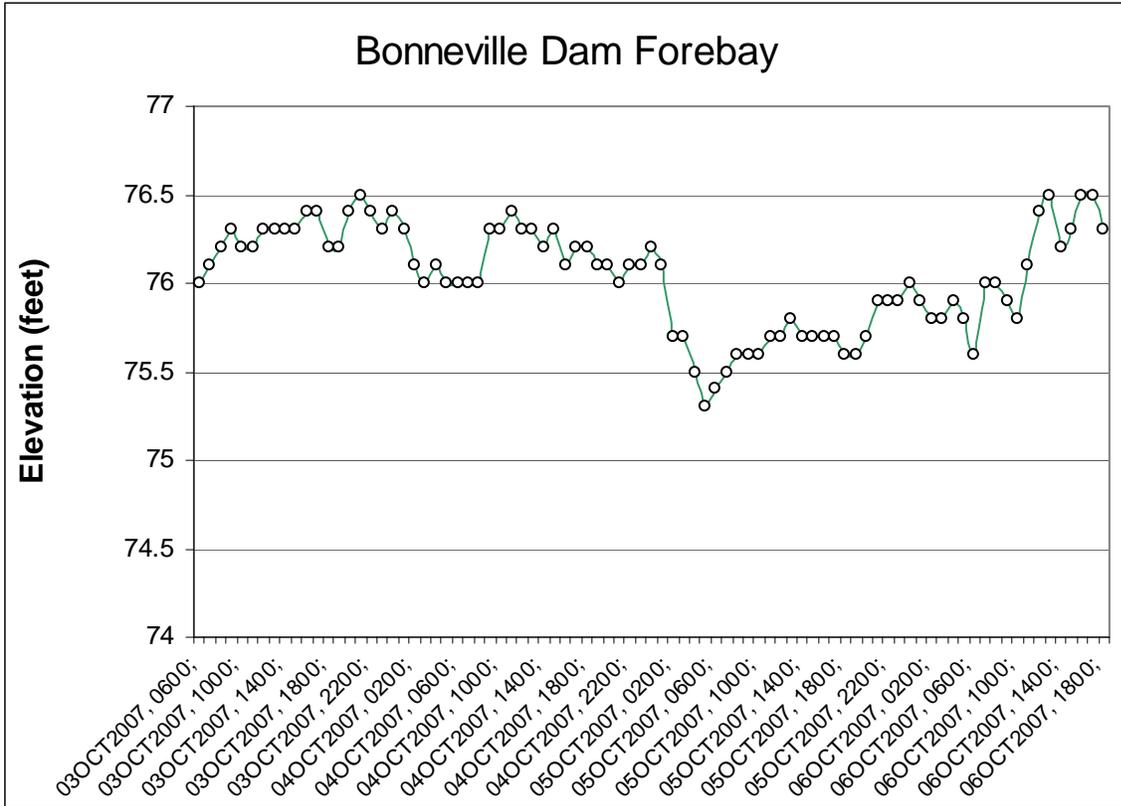


Figure 19. Observed BON pool elevations during October 3-6, 2007 autumn treaty fishing.

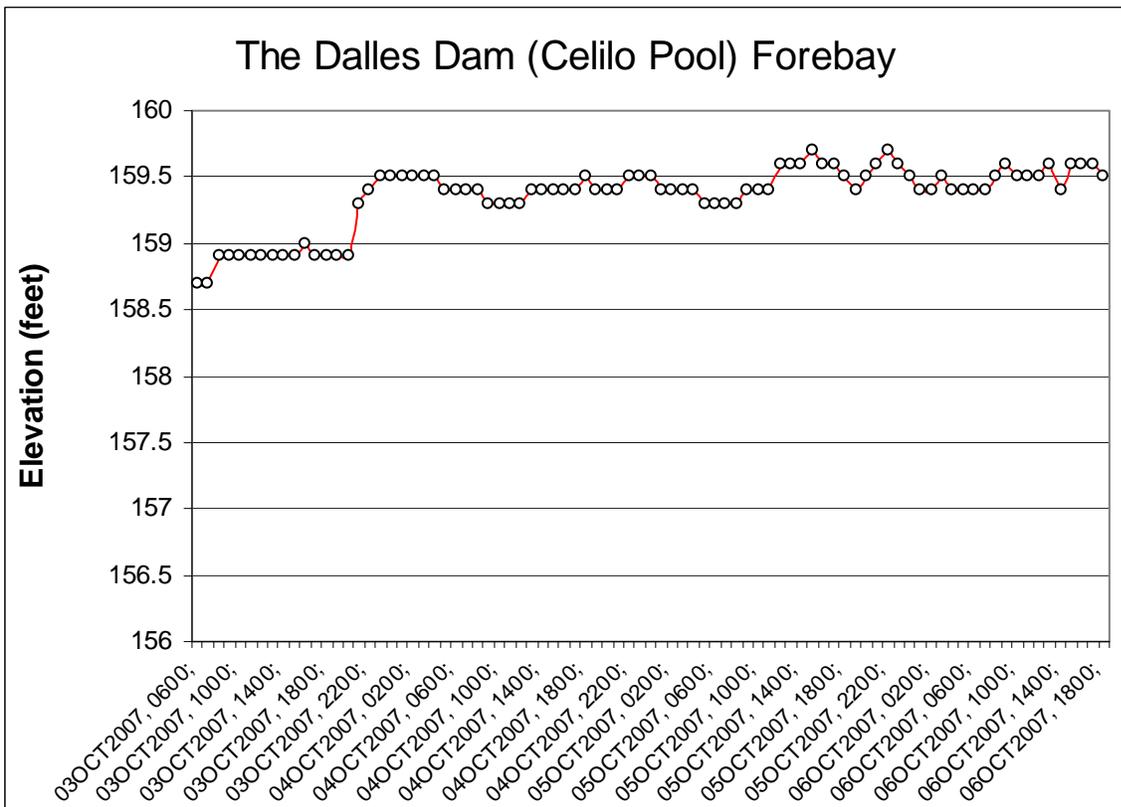


Figure 20. Observed TDA pool elevations during October 3-6, 2007 autumn treaty fishing.

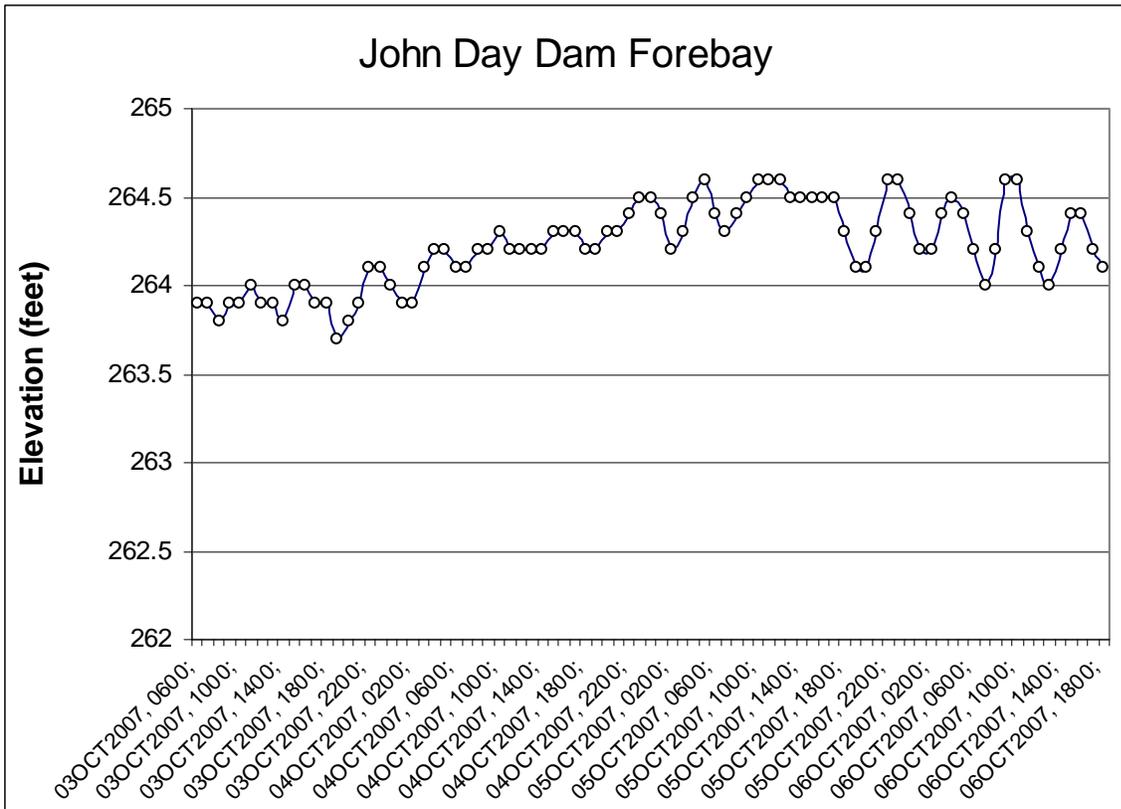


Figure 21. Observed JDA pool elevations during October 3-6, 2007 treaty fishing.

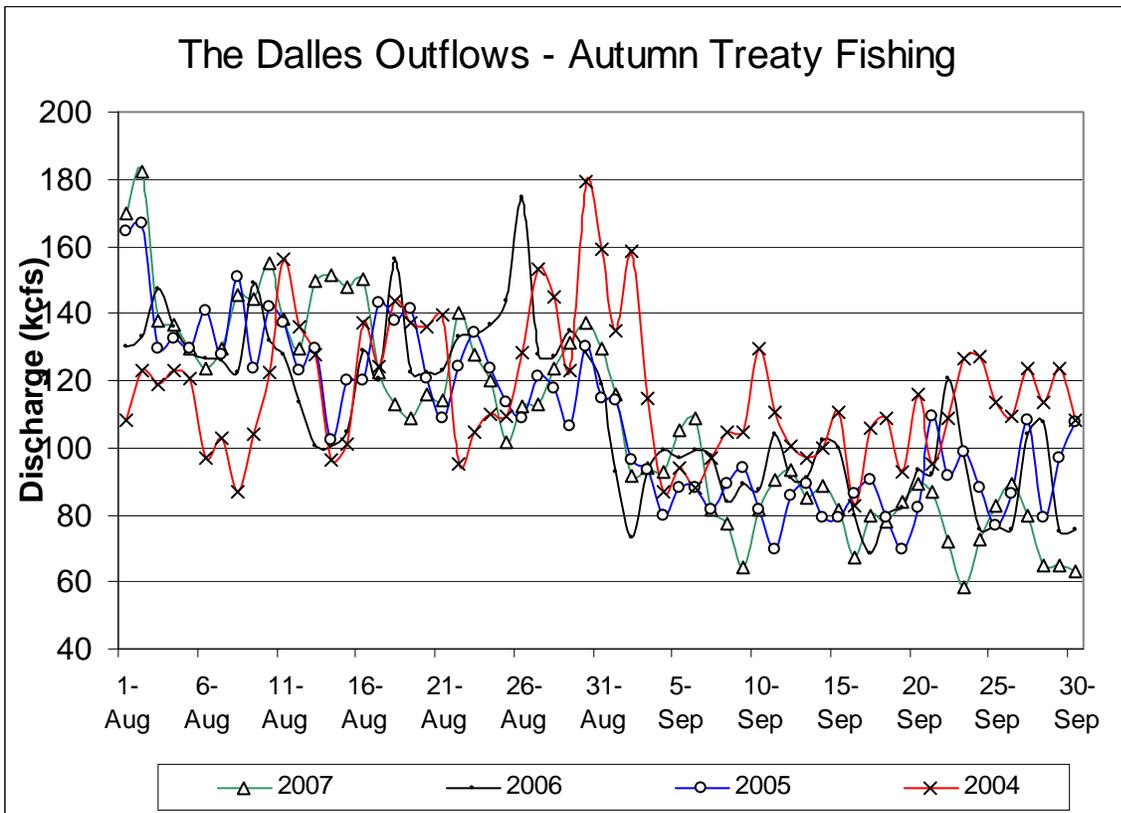


Figure 22. Observed TDA outflows during the autumn treaty fishing seasons of recent years.

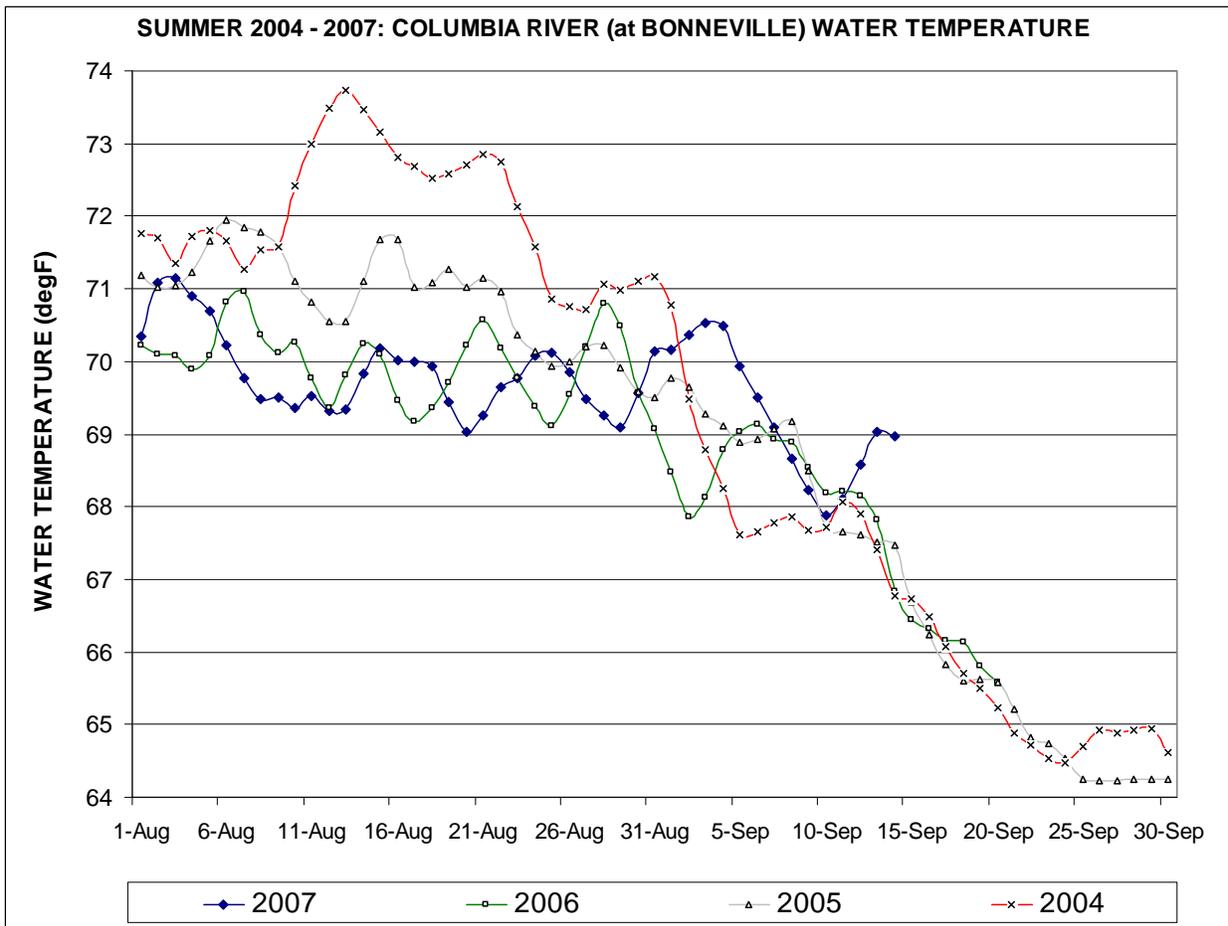


Figure 23. Water temperatures (WQM) during the autumn treaty fishing seasons of recent years.

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

November 7, 2007 TMT Meeting

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Gumpert

Notes: Erin Halton

The following notes are a summary of issues that are intended to point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the "record" of the meeting, only a reminder for TMT members.

Autumn Treaty Fishing

Kyle Dittmer, CRITFC, reviewed a summary of 2007 Autumn Treaty Fishery pool operations sent to TMT members on 11/6. He noted that there was 97% compliance at Bonneville dam with respect to the 1-foot hard constraint band requested by CRITFC for the six weeks of treaty fishing, with no major reports of incidence.

Please see the TMT website for a full version of the memo from CRITFC.

Action/Next Steps: Jim Adams, COE, said that the summary would be posted as a link to the agenda for today's meeting as soon as possible.

Official Minutes/Facilitator Notes

The facilitator notes and official meeting minutes from the 10/24 TMT meeting were posted, and with no further comments or edits, were finalized during today's meeting.

(Update: Russell Langshaw submitted an edit to the 10/24 notes following the meeting; the revised notes were sent out to the full TMT distribution list on 11/8.)

TMT Year End Review Agenda

Donna Silverberg, DS Consulting, referred TMT members to a revised TMT Year End Review agenda, posted as a link to the web. She clarified that the intent of the year end review is to reflect on 2007 operations, discuss lessons learned from management actions, and decide where changes should be made for 2008. She reminded TMT members and other meeting participants of the need to RSVP to DS Consulting, to be included in the lunch count and the list of attendees for the staff at Robert Duncan Plaza. The group discussed a few minor adjustments to the agenda and clarifications were made regarding the focus of the presentations.

Action/Next Steps: The Facilitation Team will revise the agenda and distribute the "final draft" version to the full TMT distribution list. The agenda will also be posted as a link to the TMT website.

Chum Operations

Paul Wagner, NOAA, reported that not many chum had yet been observed in the area near Ives Island. Robyn MacKay, BPA, said that tailwater elevations near Ives Island would be held as steadily as possible around the clock, as conditions allow.

Action/Next Steps: Tailwater elevations near Ives Island will be in the range of 11.3-11.7', with a target of 11.5', beginning the evening of 11/9. This item will be on the agenda for the 11/21 TMT conference call. *[Supplemental: In the event that surplus inflows at Bonneville Dam result in an inability to maintain target tailwater elevations, these surplus waters will be shaped during nighttime hours (1900-0700 hrs.) These flows will be shaped in time blocks of 4 hours or less as a soft constraint. This operation was coordinated between the COE and Paul Wagner, Chair of the Salmon Managers.]*

Snake River Zero Generation

Robyn MacKay, BPA, referred TMT to a chart linked to the agenda that showed the number and duration of occurrences of zero generation for the four Snake River Projects. From December 2006-February 2007, there were 69 occurrences, with 25 in the month of December. Paul Wagner, speaking on behalf of FPAC, noted that zero flow at Snake River projects has been debated since the late 1970's and an understanding was developed that it may be allowable [during winter months] when few if any fish were passing. Robyn MacKay, BPA, responded that a benefit is provided by zero nighttime flow by providing additional early morning generation to help meet daytime peak load constraints. Paul Wagner said that an SOR submitted in 2005 best describes the "few fish criteria" recommended for that year, and that for this season, zero generation may be signaled sometime in the range of mid-December to January 2008; criteria for its commencement will be determined at an upcoming TMT meeting. Jim Adams, COE, noted that no adult fish ladder maintenance was scheduled for anytime in December 2007, as it was last year. He said maintenance is scheduled to begin in January. It was clarified that video passage counts will continue through 12/15 at Lower Granite Dam and through 12/31 at McNary Dam; results are posted on the COE website within three days. TMT members thanked Robyn for providing the review of 2006-'07 zero flow.

Action/Next Steps: This will be on the agenda for the 11/21 TMT meeting, with more discussion on whether fish passage video could be enhanced and a check-in on criteria to be used for the 2007-'08 season.

Vernita Bar

Russell Langshaw, Grant County PUD, referred TMT to a document linked to the agenda that showed an 11/4 survey counted 29 redds in the 39-50 kcfs elevation range, signaling the initiation of spawning. One redd was observed in the 55-60 elevation range. Langshaw clarified that the Vernita Bar spawning zone is a 2-mile stretch, with PUD counts conducted within a half mile area near the bar.

Action/Next Steps: Counts will be ongoing over the next few weeks, and Langshaw will provide TMT with an update at the 11/28 TMT Year End Review meeting.

2008 Draft Water Management Plan

Jim Adams, COE, said the draft 2008 WMP was in a "holding pattern" until the next draft BiOp is released, with anticipated edits that will reflect new operational criteria. He noted that the COE does have an internal, revised draft that will be posted for further

revisions/comments. Russ Kiefer, ID, made a request to also have a redlined draft Fish Passage Plan (FPP) posted in order to coordinate commenting on draft 2008 documents.

Action/Next Steps: FPOM will be discussing draft 2008 documents at their next meeting on 11/13. The COE will post a revised redlined version of the draft 2008 WMP likely by the TMT meeting on 11/21, with FPP posting coordination anticipated from the COE district office.

Operations Review

Reservoirs – Grand Coulee was at elevation 1287.95' with drafting expected to support chum. Hungry Horse was at elevation 3532.08', with outflows at 2.0-2.1 kcfs and meeting Columbia Falls minimums. Libby was at elevation 2434.93' with inflows of 3.5-4.5 kcfs, outflows at 4.5 kcfs, and an end of December elevation target of 2411'. Albeni Falls was at elevation 2055.49' with inflows in the range of 7.5-10.5 kcfs and outflows of 14 kcfs. Dworshak was at elevation 1516.48' with inflows just under 1 kcfs and outflows of 1.5 kcfs. 7-day average flows at Lower Granite were 17.5 kcfs, McNary averaged 90 kcfs and Bonneville averaged 100-101 kcfs.

Fish – Paul Wagner, NOAA, reported that monitoring ended at Lower Granite and Little Goose on 11/1; overall yearling Chinook counts were very low, and sub yearling Chinook counts had seen a slight increase near the end of October. Adult counts were winding down near Bonneville, with steelhead passage also nearing the end of the season. Fall Chinook total passage count at Lower Granite was near 10,000, which was near the expected range and slightly above the 10-year average. Cindy LeFleur, WA, said that she would provide a summary on run counts at the TMT year end review.

Power system – No report.

Water quality – No report.

Other - Burbot Operations

Jim Adams, COE, provided an update to TMT, clarifying that a draft SOR regarding a temperature operation for Burbot is currently under review and will be forwarded to TMT as soon as it is received by the COE.

Next TMT Meeting: Conference Call on 11/21, 9-noon

Agenda items will include:

- Chum Operations
- 2007 Snake River Zero Flow
- 2008 Draft WMP
- Burbot SOR
- TMT Year End Review Prep
- Operation review

**Columbia River Regional Forum
Technical Management Team Meeting
November 7, 2007**

1. Welcome and Introductions

Today's TMT conference call was chaired by Jim Adams and facilitated by Robin Gumpert, with representatives from COE, BPA, NOAA, USFWS, BOR, CRITFC, Idaho, Oregon and others attending in person or by phone. The following is a summary (not a verbatim transcript) of the topics discussed and decisions made during the meeting. Anyone with questions or comments about these notes should give them to the TMT chair or bring them to the next meeting.

2. Autumn Treaty Fishing Report

Kyle Dittmer (CRITFC) gave a report on this year's treaty fishery:

- The Bonneville pool had an overall compliance rate of 97% with CRITFC elevation requests, a 4% increase over last year's treaty operations.
- The Dalles pool had 83% compliance, a 21% increase over last year.
- The John Day pool had 69% compliance, a decline of 30% since last year.

The fishing effort was focused this year mainly on the John Day pool, which held 45% of tribal nets throughout most of the fishing season, Dittmer noted. CRITFC will continue sending the COE its net flight reports with the hope that the COE will focus on meeting elevation requests in locations with the greatest usage. Pool fluctuations during the treaty fishery were:

- Bonneville: 0.2 to 1.2 feet (similar to last year)
- The Dalles: 0.3 to 2.7 feet (a little higher than last year)
- John Day: 0.2 to 0.7 feet (not much fluctuation)

Dittmer contacted the Hood River CRITFC law enforcement office to find out whether there were any specific problems with the tribal fishery this year. He has not been informed of any. Wagner asked which forecasts seem to be most accurate. That changes every year, Dittmer said.

{Supplementary note: Cathy Hlebechuk sent Dittmer an e-mail as follows, indicating he will need to update his % of compliance numbers.

I'm sorry I didn't notice this before but it appears the peak elevation at The Dalles and John Day are not correct. The normal range at TDA is 157' - 160' (3 feet, not 1.5 feet) and at JDA is 262.5 - 264' (not 263' - 264.5'). If CRITFC used the peak elevations and operating ranges shown on the memo, both CRITFC and Corps "% of compliance" will need to be adjusted accordingly.}

3. Review Meeting Minutes

There were no comments on either the facilitator's notes or the official minutes for the October 24 TMT meeting. Both are therefore considered final.

4. TMT Year End Review Agenda

Donna Silverberg distributed copies of the draft agenda for the November 28 TMT year-end review. There was general agreement that the agenda is packed, so each presentation should be no more than 5-10 minutes. The main purpose of the review is to identify issues that warrant further discussion and assign them to subsequent TMT meeting agendas.

The year end review will be held at Robert Duncan Plaza. Anyone who does not regularly attend TMT meetings and wants to attend the year end review should contact the COE and ask to be included on the security clearance list.

The facilitators will revise the agenda based on today's discussion and send it out again to TMT members. The discussion today covered several issues:

2007 water and runoff patterns. Cathy Hlebechuk (COE) will address this at the year end review.

Dworshak spring and summer operations and temperature/TDG variations. Jim Adams (COE) and Greg Haller (Nez Perce) will speak. Because these two topics are linked, they should be covered in conjunction with each other, Adams said.

Navigation issues and MOP operations. Cathy Hlebechuk asked TMT what kind of information they want presented. Review a summary of operations that deviated from the MOP process, looking at what changed and why, David Wills (USFWS) suggested. Include alternatives the tow boaters devised that worked, Wagner suggested. A report directly from a tow boater representative would be desirable. Focus on navigation issues where we had to adjust Bi-Op operations, including the lessons learned, Kiefer suggested.

Vernita Bar operations. Rick Kruger (Oregon) asked, what is TMT's stake in this operation? Does TMT make any decisions? The issue is transparency not decisionmaking, Wagner said. TMT has influence on these operations because conditions at Vernita Bar are a vital aspect of basinwide fish production.

Emergency spill operations. During passage season at Lower Monumental, fish were delayed in the forebay, and emergency spill appears to

have been beneficial, Wagner said. He will investigate getting one of the researchers to address this topic.

Transport operations. Wagner will work with the COE to find a speaker.

Impact of TDG management on fish passage. FPAC will handle this topic. Shane Scott (NWRP) asked what the purpose of this discussion will be. We'll cover what we did last year for TDG management and how that affected Bi-Op operations for fish passage, Wills said.

Mechanical issues and scheduled outages. The goal here is for maintenance to be scheduled at a time that is least disruptive to fish, Kiefer said. He wants discussion of how to do a better job of handling mechanical failures in ways that don't impede TMT's ability to follow through on planned fish protection measures. Donna Silverberg suggested focusing the discussion on specifics that occurred in 2007, saving comparisons with other years for another meeting. FPAC will take the lead on this topic.

Reservoir operations. John Roache (BOR) asked, should this discussion start with SOR-2007-1, or an overview of operations throughout the year? Start with the SOR and accompanying concerns that drafting Coulee would get ahead of flow needs for chum and flood control, Wagner said. [He asked for a seasonal forecast, with flows provided, the reservoir drafting rate and final outcome.] Roache and Tony Norris (BPA) will work together to address this topic.

Bonneville operations. Silverberg suggested moving Spring Creek operations to Bonneville operations, so there are now two subtopics, Spring Creek and chum. Wagner agreed that's a good idea.

Adaptive Management Team (AMT). This team was formed in response to Oregon's and Washington's requirement in their waivers of state water quality standards that management of the forebay monitors to 115% TDG be investigated, Shane Scott (NWRP) said. The focus should be on closing the gap between expectations of fish managers regarding spill vs. regulatory spill requirements, Wagner said. For example, last year there was a 5-day delay between actions at the project and their downstream effects, which resulted in spill decisions that were in accordance with forebay requirements but had negative impacts on fish. This problem won't be solved in the year end review, he emphasized. There's disagreement in the region on this issue, Shane Scott said. FPAC will take the lead in the year end review.

5. Vernita Bar

Russell Langshaw (Grant Co. PUD) gave an update. Last weekend, 29 redds were counted between the 36 and 56 kcfs elevations, which establishes the initiation of spawning in that zone. One redd was counted in the 55 to 60 kcfs

zone, which means another 4 redds are needed above 50 kcfs elevation to set the initiation of spawning in that zone. Another redd count will be conducted this weekend. An aerial survey counted 2,540 redds in the Hanford reach, with approximately 25% of those in the Vernita Bar area, which extends for approximately 2 miles from the spawning grounds south of Vernita Bar to about a mile upstream of the bar. Langshaw will provide a report on Vernita Bar operations at the year end review.

6. Chum Operations

Not many chum have been spotted below Bonneville Dam, but flows have been almost too low for that, Wagner said. Chum are definitely in the area. The plan is to provide a steady tailwater elevation ranging from 11.3-11.7 feet at Ives Island beginning November 9 or 10, as conditions allow. Coulee will be drafting to maintain a tailwater elevation targeted at 11.5 feet round the clock, Robyn MacKay (BPA) said. If additional water needs to be moved through the system, it would be pulsed at night. That would be the exception, not the rule, unless the current dry conditions change. TMT will revisit this issue at its next conference call November 21.

7. Snake River Zero Nighttime Flow

Robyn MacKay (BPA) introduced the document attached to this item on the TMT agenda. Typically the Snake River projects may go to zero generation in the December-February time frame. Last year, that occurred 25 times, Tony Norris (BPA) said, with the fewest occurrences at Ice Harbor Dam. The periods of zero generation usually last for 6 hours and occasionally for only 2 or 3 hours at a time, most frequently during the week after Christmas.

{Editor's note: Going to zero generation is authorized in the project's Water Control Manuals when few fish are present.}

Paul Wagner inquired whether data from video counts will be used to check project criteria, or will it be calendar driven? Video counting will continue at McNary through December 31 and at Lower Granite through December 15, Adams said. Both cameras will operate during the day, from 6 am to 4 pm at Lower Granite, and 4 am to 8 pm at McNary. The numbers from these counts are being posted to the COE website. TMT will revisit this issue at its next conference call November 21.

Jim Adams pointed out that the COE has a draft fish passage facility maintenance schedule, with maintenance starting no earlier than December 31.

8. 2008 Draft Water Management Plan

The WMP currently linked to the TMT website is based on the 2004 Bi-Op, Adams said. It needs revision based on the 2007 Bi-Op released just a few days

ago. Adams suggested that any WMP discussion be delayed until the November 21 conference call, by which time the updated version should be available.

Kiefer and Kruger asked to see the changes in one “track changes” version instead of multiple versions which are hard to follow.

9. Operations Review

a. Reservoirs. Grand Coulee is at elevation 1,287.95 feet and holding steady, Roache said. It will start drafting to meet chum flows this weekend, so the elevation can be expected to drop unless there’s rain.

Hungry Horse is at elevation 3,532.08 feet, discharging 2.0-2.1 kcfs to meet the Columbia Falls minimum.

Libby is at elevation 2,434.93 feet, with inflows of 3.5-4.5 kcfs and outflows of 4.5 kcfs. The December 31 flood control target is 2,411 feet. The only way the flood control elevation would be higher is if the water supply forecast in December is less than 95% of normal. The maximum possible target elevation is 2,426.5 feet on December 31.

Albeni Falls is at elevation 2,055.49 feet at the Hope gage, with daily average inflows of 7.5-10.5 kcfs and outflows of 14 kcfs. The target elevation for November 20 is 2,055 feet.

Dworshak is at elevation 1,516.5 feet, with inflows of just under 1 kcfs and steady outflows of 1.5 kcfs. The 7-day inflow average at McNary is 90 kcfs, at Lower Granite 17.5 kcfs, and at Bonneville 100-101 kcfs.

b. Fish. Smolt passage is about to end for the year, Paul Wagner (NOAA) reported. The smolt monitoring program at Lower Granite and Little Goose stopped on October 31. There was a bump in subyearling passage at Lower Granite of up to 500 fish per day, which is typical for this time of year. PIT tag detections will continue for another month to 6 weeks, but sampling will end for the year.

Adult passage is also winding down, with around 20 fall Chinook per day at Bonneville. Wild steelhead passage is ending, although steelhead passage at Ice Harbor has been exceeding all establish criteria at around 335 fish per day. The total number of fall Chinook for the year was around 10,000.

c. Power System. There is nothing to report, Robyn MacKay said.

d. Water Quality. There is nothing to report, Jim Adams said.

e. Other. Kiefer asked if there will be an SOR for Kootenai River burbot this year. We're expecting a draft SOR from the tribes on temperature operations at Libby, but don't know when it will arrive, Adams said. This issue will be covered on the November 21 conference call.

10. Next Meetings

There will be a conference call on November 21, including chum operations, Snake River zero nighttime flow, the 2008 WMP, the burbot SOR, regular operations review, and the year end review agenda. This meeting summary was prepared by consultant and writer Pat Vivian.

<i>Name</i>	<i>Affiliation</i>
Jim Adams	COE
Robyn MacKay	BPA
Paul Wagner	NOAA
Russ Kiefer	Idaho
Tony Norris	BPA
Dave Wills	USFWS
Rick Kruger	Oregon
John Roache	BOR
Donna Silverberg	DS Consulting
Cathy Hlebechuk	COE
Shane Scott	NWRP
Russ George	WMC
Karen McCarthy	BPA
Kyle Dittmer	CRITFC
Jennifer Miller	Susquehanna
Richelle Beck	DRH

Phone:

Rudd Turner	COE
Tim Heizenrader	Centaurus
Rob XX	PPM Energy
Glen Trager	Energy North America
Terry Weeks	PNGC
Barry Espensen	CBB
Cindy LeFleur	Washington
Ruth Burris	PGE
Jay Rubinstein	Morgan Stanley
Laura Hamilton	COE
Mike Butchko	Powerex
Margaret Filardo	FPC

December Through February ('06-'07) Snake River Zero Generation

Project	Number of occurrences in the 2400-0600 period	Number of hours at zero Generation
Lower Granite	13	76
Little Goose	19	90
Lower Monumental	22	100
Ice Harbor	15	73
Totals	69	339

MEMORANDUM

November 4, 2007

TO: Interested Parties
FROM: Chris Carlson, Biologist III
SUBJECT: Vernita Bar Redd Survey, November 4, 2007

Discussion: On Sunday, November 4, 2007 the forth 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 Joe Taylor (Mid-Columbia Coordinator), Mark Southern (WDFW), Dave Duvall (GCPUD) and Carson Keeler (GCPUD). Flows from Priest Rapids Dam at Vernita Bar were about 39 kcfs. Results of this survey are provided in the table below.

<u>Transect</u>	----- Redd Count by Flow Level (kcfs) -----						Total Number Of Redds
	<u>(36 – 50)</u>	<u>(50 – 55)</u>	<u>(55 – 60)</u>	<u>(60 – 65)</u>	<u>(65 – 70)</u>	<u>(Above 70)</u>	
Above A	0	0	1	0	0	0	1
A – AB	8	0	0	0	0	0	8
AB – B	16	0	0	0	0	0	16
Below B	4	0	0	0	0	0	4
C	1	0	0	0	0	0	1
Totals	29	0	1	0	0	0	30

Based on the above survey count and the Hanford Reach Fall Chinook Protection Program Agreement, the Initiation of Spawning for the 36 – 50 kcfs zone is established to be October 31 (the Wednesday before the weekend on which the Monitoring Team identifies five or more redds within the zone). Initiation of Spawning has not occurred for the zone above the 50 kcfs elevation.

The Initiation of Spawning in water deeper than 36 kcfs was set to be October 24 based on the Monitoring Team’s October 28 ground redd count and aerial redd count.

During last year’s November 5 redd count; 65 redd were counted in the 36-50 kcfs zone, 19 redds between 50 – 55 kcfs, 18 redds between 55 – 60 kcfs, 3 redds between 60 – 65 kcfs, 3 redds between 65 – 70 kcfs and no redds above the 70 kcfs zone.

The next redd count will occur on November 11, 2007 and will require a USGS gauging station flow of 50 kcfs.

Please contact me if you have any questions.

(VBReddCountM.doc)

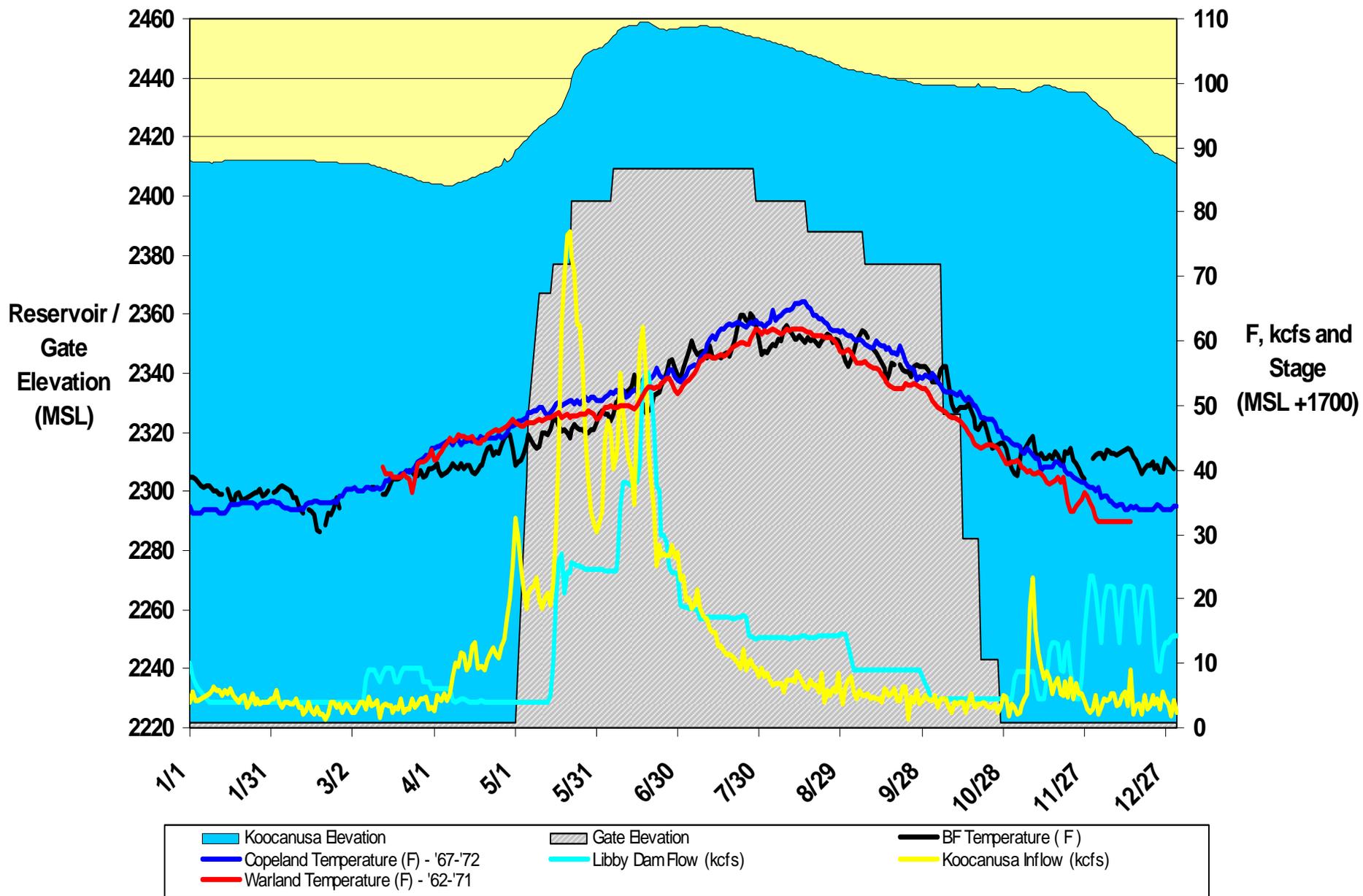
- | | | |
|---------------|--------------------|-----------------|
| c: Don Anglin | Jeff Atkinson | Bill Berry |
| Scott Bettin | Shane Bickford | Steve Brown |
| Bob Clubb | Dennis Dauble | Gary Donabauer |
| Sarah Morford | Russ George | NR Records |
| Kelly Harlan | Bob Heinith | Cathy Hlebechuk |
| Joe Taylor | Paul Hoffarth | Rick Klinge |
| Joe Lukas | Geoffrey McMichael | Robert Mueller |
| Greg Patton | Shane Scott | Rudd Turner |
| Bill Tweit | Paul Wagner | Dawn Woodward |

Power Dispatch
WAN Operators

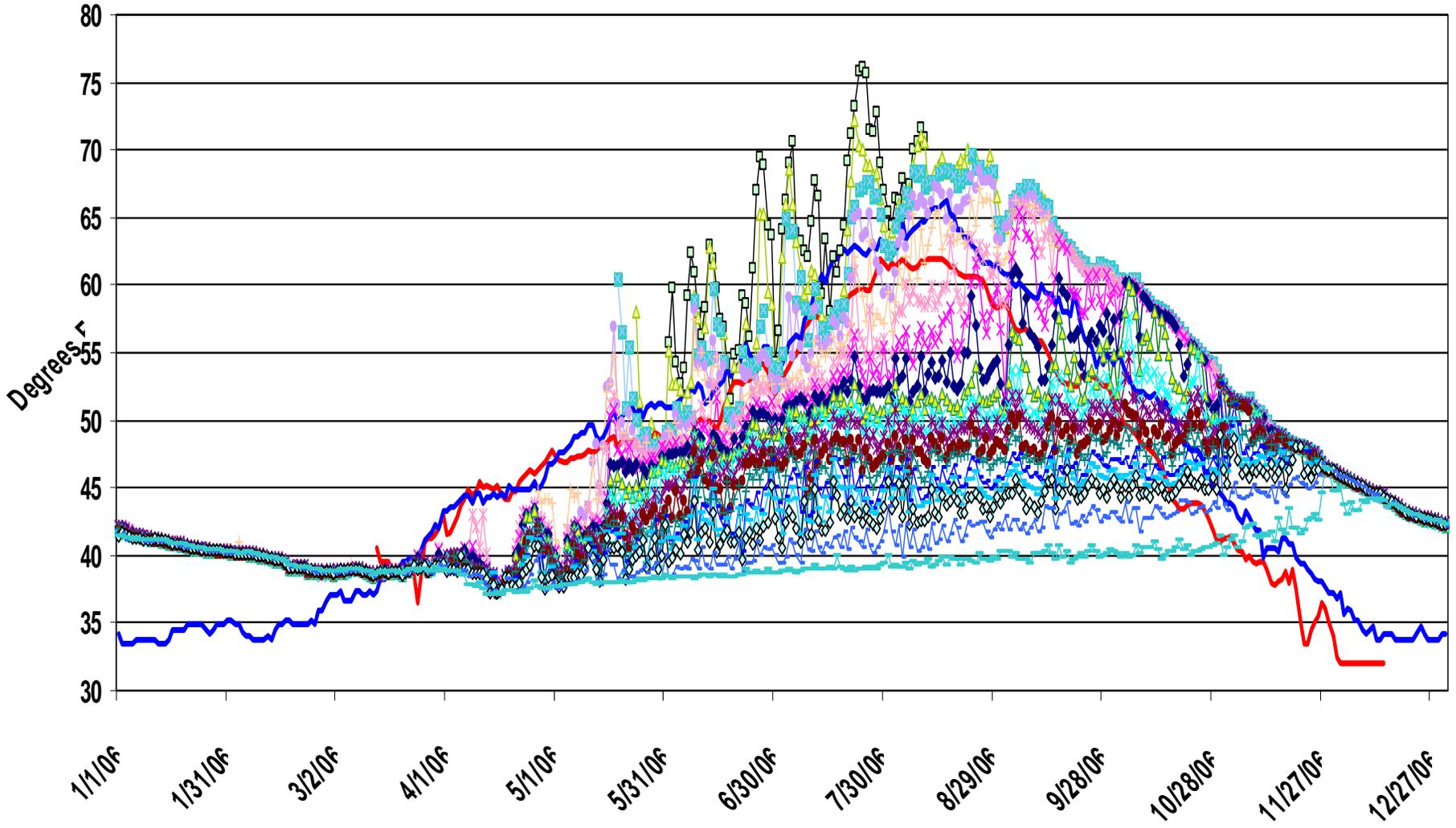
FWWQ Team
James Adams

PRD Operators
Scott Boyd

Kootenai River and Koocanusa Reservoir Temperatures 2006

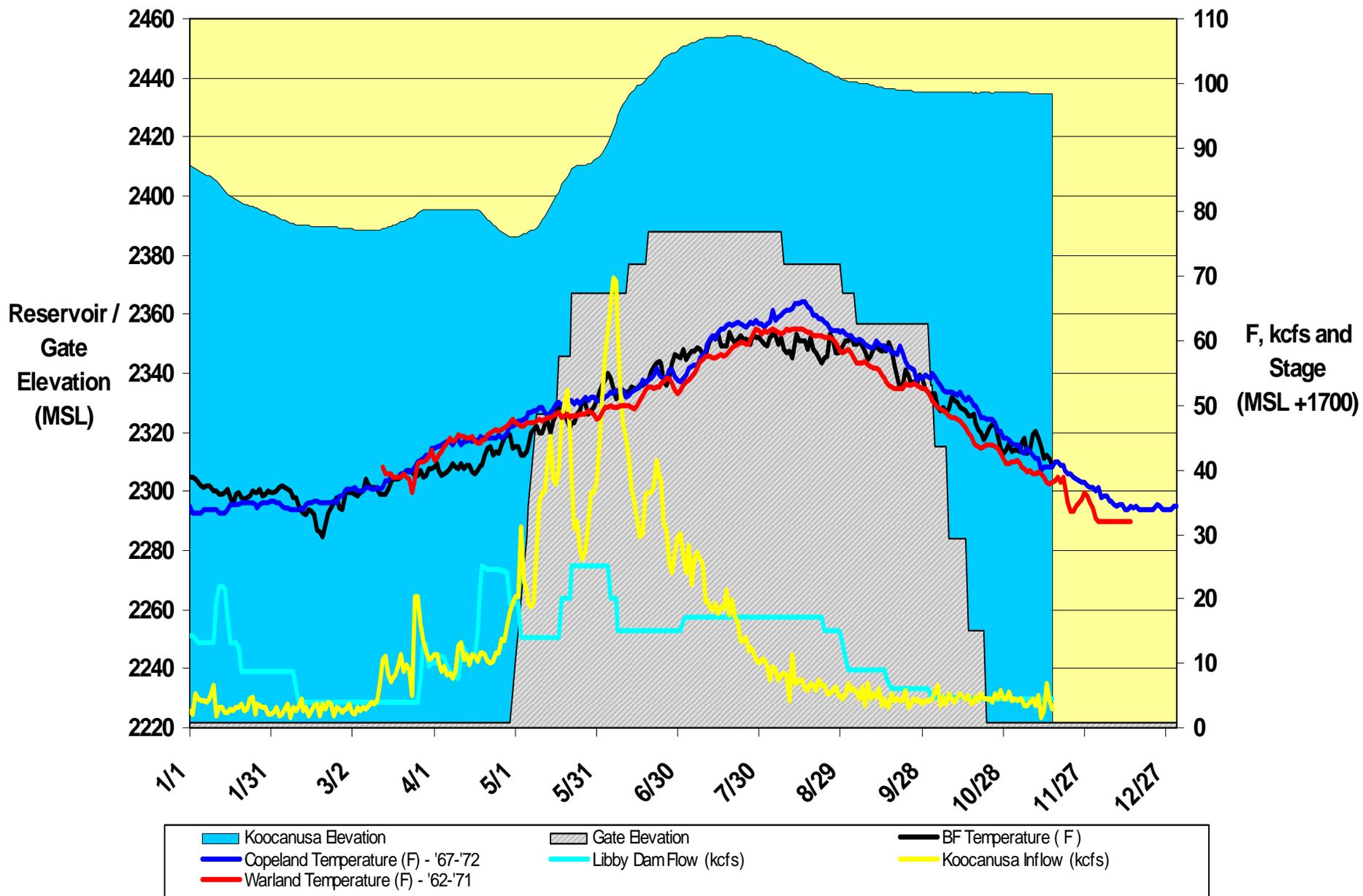


Kooacanusa Reservoir Temperatures 2006

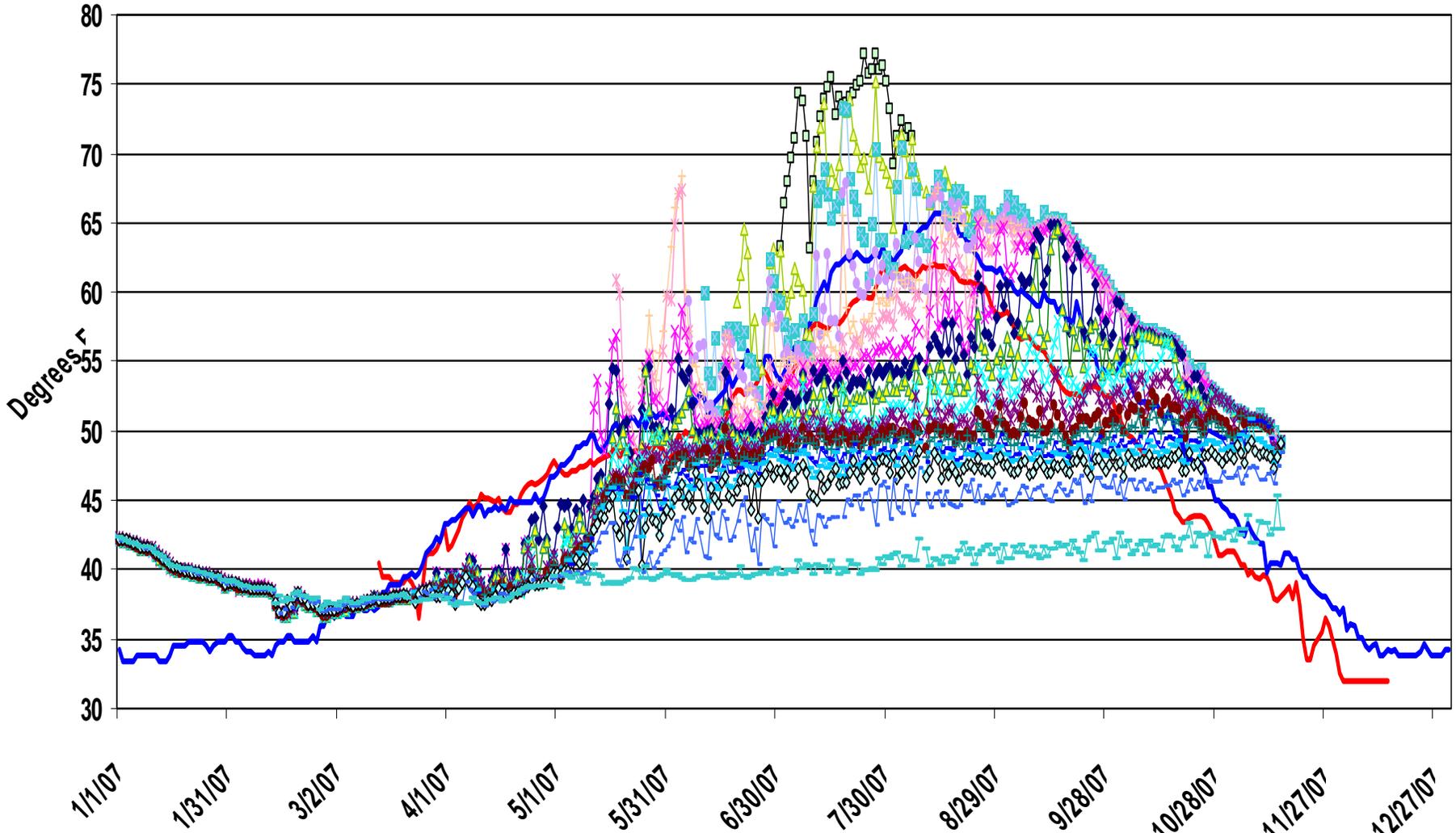


- | | | | | |
|--------|--------|--------|-------------------------------------|--------------------------------------|
| □ 2450 | △ 2440 | ■ 2430 | ◇ 2420 | ◇ 2410 |
| * 2400 | * 2390 | ◆ 2380 | △ 2370 | * 2360 |
| * 2350 | ● 2340 | + 2330 | — 2320 | — 2310 |
| ◇ 2300 | — 2275 | — 2225 | — Warland Temperature (F) - '62-'71 | — Copeland Temperature (F) - '67-'72 |

Kootenai River and Koocanusa Reservoir Temperatures 2007



Kooacanusa Reservoir Temperatures 2007



□ 2450	△ 2440	■ 2430	● 2420	○ 2410
* 2400	* 2390	◆ 2380	▲ 2370	* 2360
* 2350	● 2340	+ 2330	— 2320	— 2310
◇ 2300	— 2275	— 2225	— Warland Temperature (F) - '62-'71	— Copeland Temperature (F) - '67-'72

TECHNICAL MANAGEMENT TEAM

BOR : John Roache/Mary Mellema/Pat McGrane **BPA :** Robyn MacKay/Tony Norris/Scott Bettin
NOAA-F: Paul Wagner/Richard Dominigue **USFWS :** David Wills/Steve Haeseker
OR : Rick Kruger/Ron Boyce **ID :** Russ Kiefer
WDFW : Cindy LeFleur **MT :** Jim Litchfield/Brian Marotz
COE: Jim Adams/Cathy Hlebechuk/Bob Buchholz

TMT CONFERENCE CALL

Wednesday November 21, 2007 09:00 - 12:00

CONFERENCE PHONE LINE

203-310-2162

PASS CODE = 4703150

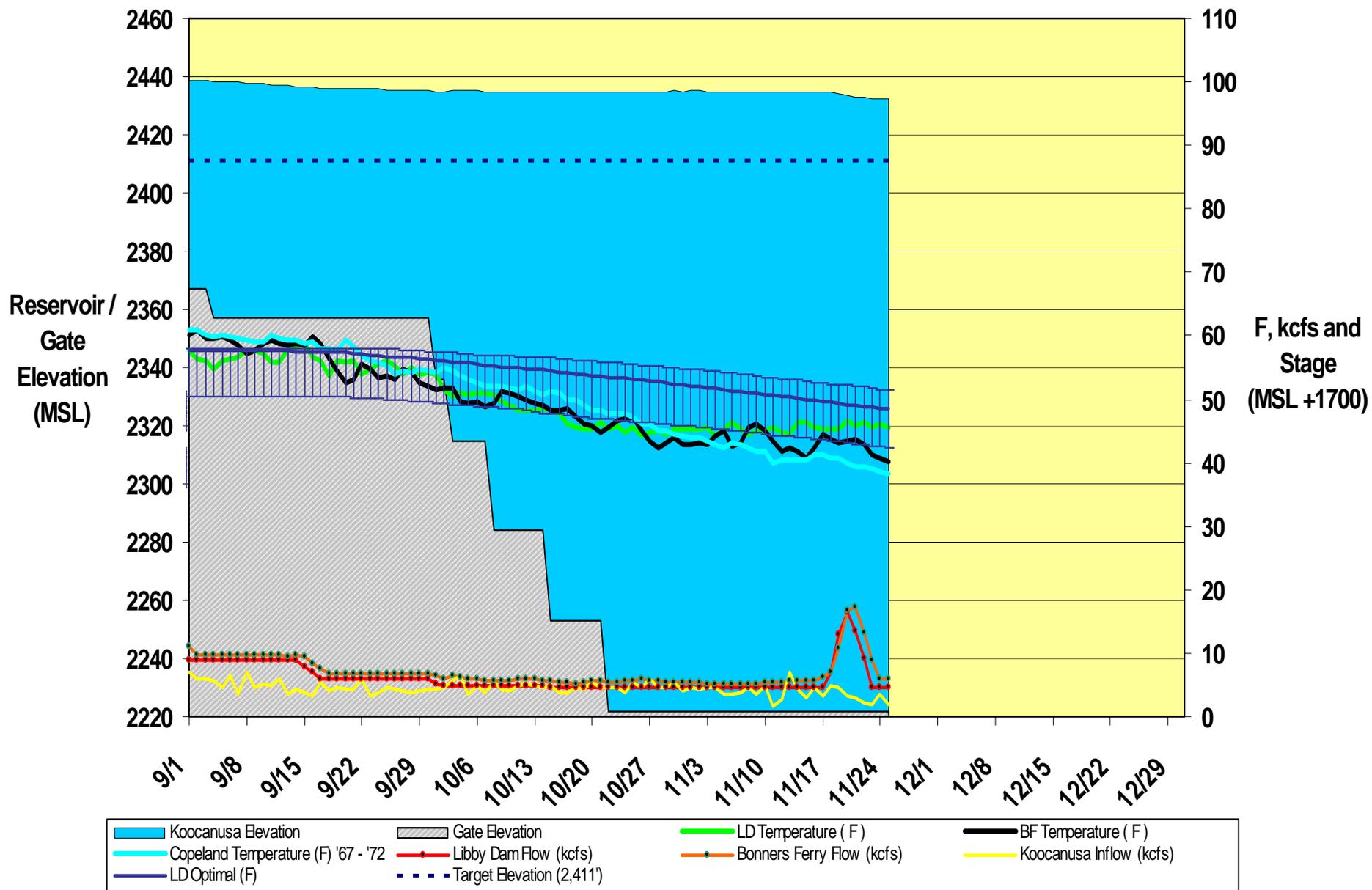
**We have had disruptions on the phone because people are not hitting 'mute' after dial in.
Please MUTE your Phone**

*All members are encouraged to call Robin Gumpert with any issues or concerns they would like to see addressed.
Please e-mail her at robin76@cnmw.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and Introductions
2. Review [\[Meeting Minutes\]](#) 
3. Chum Operations - Paul Wagner, NOAA
4. 2007 Snake River Zero Flow - Robyn Mackay, BPA
5. Burbot Operations - Jason Flory, USF&WS
 - a. [\[SOR 2007-FWS2\]](#) 
 - b. [\[Kooconusa and Kootenai Temperatures\]](#) 
 - c. [\[2006 and 2007 Kooconusa and Kootenai River Temperatures\]](#) 
 - d. 2008 Draft Water Management Plan - Jim Adams, USACE
 - a. [\[2008 Draft Water Management Plan\]](#) 
 - e. TMT Year End Review Preparation- All
 - f. Operations Review
 - a. Reservoirs
 - b. Fish
 - c. Power System
 - d. Water Quality- Jim Adams, USACE
 1. [\[Spill Information 2007\]](#)
 - g. Other
 - Set agenda for next meeting - **November 28, 2007**
[\[Calendar 2007\]](#) 

Kootenai River and Koocanusa Reservoir Temperatures 2007 Fall and Winter (1 September - 31 December)



COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

November 21, 2007 TMT Conference Call

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Gumpert

Notes: Erin Halton

The following notes are a summary of issues that are intended to point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the "record" of the meeting, only a reminder for TMT members.

Official Minutes/Facilitator Notes

The facilitator notes and official meeting minutes from the 11/7 TMT meeting were posted, and with no further comments or edits, were finalized during today's meeting.

Chum Operations

Paul Wagner, NOAA, reported that an 11/16 survey observed 11 chum and 6 redds in the Ives Island area. Wagner said the current operation, with tailwater in the range of 11.3-11.7' and a target of 11.5', was providing adequate habitat for that number of fish. The COE and BPA clarified that in the event surplus inflows at Bonneville Dam result in an inability to maintain the 11.5' target range, excess waters will be shaped during nighttime hours (1800-0600 hrs.) These flows will be shaped in time blocks of four hours and may be extended to eight hours, if necessary to maintain tailwater elevations of no higher than 13'.

Action/Next Steps: This item will be on the agenda near the end of the lunch period for the 11/28 TMT year-end-review.

Snake River Zero Generation

Tony Norris, BPA, had no update for TMT members. TMT members will check in on this item near the end of the lunch hour during the year-end-review on 11/28.

Burbot SOR

Jason Flory, USFWS, and Greg Hoffman, COE, referred TMT members to an SOR linked to the TMT agenda. The SOR gives detailed justification for incrementally removing the gates at Libby Dam, to aid Burbot migration and spawning in the Bonners Ferry vicinity. Hoffman clarified that the gate removals began on 10/22.

Action/Next Steps: Greg Hoffman will send the COE a copy of a year-to-year comparison graph, for posting to the web.

2008 Draft Water Management Plan

Jim Adams, COE, said the draft 2008 WMP remains in a "holding pattern." A status hearing for the new BiOP is scheduled for 12/12 and further development of the review process for the new BiOP is expected to be released after that time. Tony Norris

reminded TMT members that they are still welcome to submit comments on the draft document.

Action/Next Steps: This item will likely be on the agenda for the 12/19 TMT meeting.

TMT Year End Review 11/28/07

Facilitator Robin Gumpert reminded TMT members and other meeting participants of the need to RSVP to DS Consulting, in order to be included in the lunch count and the list of attendees for the staff at Robert Duncan Plaza.

Action/Next Steps: Year-end- review presenters should email their power point slides to Jim Adams, COE, by no later than the a.m. of 11/27.

Operations Review

Reservoirs – Libby was at elevation 2434.1' with inflows of 4.7 kcfs and outflows at 12.5 kcfs; flows will be shaped daily/weekly to reach the end of December elevation target of 2411'. Albeni Falls was at elevation 2055.35' with inflows/outflows at 12 kcfs; elevation will be held in the 2055-2055.5' range through 12/21. Dworshak was at elevation 1517.8' with inflows in the range of 1.5-5 kcfs and outflows of 1.5 kcfs. 7-day average flows at Lower Granite were 19 kcfs, McNary averaged 111.4 kcfs and Bonneville averaged 123 kcfs. Grand Coulee was at elevation 1285.2' and is operating to support chum. Hungry Horse was at elevation 3531.01', with outflows of 1.8 kcfs, meeting Columbia Falls minimums.

Fish – Paul Wagner, NOAA, reported that adult counts were winding down and that updated video counts from Lower Granite were pending. 11/16 counts showed 100-200 fish passing per day at the project. Dave Wills, USFWS, clarified that video counts record for one week, then download for 3-4 days. An 11/13 chum survey observed 11 chum in the Ives Island area and 20 in the woods area, with operations in place to support chum.

Power system – No report.

Water quality – No report.

Next TMT Meeting: year-end-review 11/28, 9 am-4pm

A TMT check-in will take place near 12:45 to discuss:

- Chum Operations
- 2007 Snake River Zero Flow

12/12/07 TMT Business Meeting:

- Chum Operations
- Operation Review

12/19/07 TMT Business Meeting:

- End of Chum Operations
- Operations Review
- Scheduling for 2008 TMT meetings

**Columbia River Regional Forum
Technical Management Team Conference Call
November 21, 2007**

1. Introduction

Today's conference call was chaired by Jim Adams (COE) and facilitated by Robin Gumpert (DS Consulting), with representatives from COE, NOAA, CRITFC, BPA, BOR, Washington, and others on the line. The following is a summary (not a verbatim transcript) of the topics discussed and decisions made at the meeting. Anyone with questions or comments about these notes should provide them to the TMT chair or bring them to the next meeting.

2. Review Meeting Minutes

The facilitator's notes and official minutes for the November 7 meeting were posted to the TMT web page as of November 16. USFWS, WDFW, BOR, BPA and NOAA representatives have reviewed them. There were no comments on them today.

3. Chum Operations

The current chum operation was initiated on November 9th, and it remains appropriate based on the number of chum seen, Paul Wagner (NOAA) said. As of Friday, November 16, there were only 6 redds and 11 chum in the Ives area, and the current operation is more than adequate to provide habitat for that number of fish.

The Salmon Managers have discussed the potential for increased flows in coming weeks, Wagner said. The preferred operation is to spread any increases over an 8-hour period at night, maintaining a nighttime cap of 13 feet on the tailwater elevation below Bonneville Dam. That is because recent data suggest that flows strong enough to raise tailwater elevations above 13 feet will displace chum from their redds for short periods.

Tony Norris (BPA) asked how higher flows should be handled if the volume of flow exceeds the 13-foot tailwater cap over the course of the 8 hour period. Should flows then be allowed to spike sometime during the 8 hours, or incrementally increased above 13 feet? Wagner didn't have an immediate answer to that, and believed the current plan would suffice for at least the next week. If necessary, TMT will check in on this issue briefly at the year-end review next week. For now, the operation will target an elevation of 11.3 to 11.7 feet during daytime, increasing to no more than 13 feet during the 8-hour period from 6 pm to 6 am (1800-0600 hours).

4. 2007 Snake River Zero Flow

There is not much to report on this, Tony Norris said. Fish are still moving in the river, and will probably continue to do so through the holidays. If necessary, TMT will check in on this briefly at the year-end review next week.

5. Burbot Operations (SOR 2007-FWS2)

Jason Flory (USFWS) presented this SOR (linked to today's agenda) on behalf of the Kootenai Valley Resource Initiative. Essentially the SOR calls for the same conditions as last year. The operation involves removing gates at Libby Dam to move cold water from the reservoir into the Kootenai River which aids burbot migration and spawning. The goal is to emulate pre-dam conditions.

Greg Hoffman (COE) reported that the COE began withdrawing gates on October 22, causing temperatures to drop. Figure 1 in the SOR depicts the cold water available in the reservoir from October into early December; Figure 2 shows forebay temperatures in Kooconusa Dam; and Figure 3 depicts conditions in 2006, which were similar to conditions now.

Paul Wagner wondered how closely the operation mimics pre-dam conditions. Hoffman said he'll provide a comparison graph of pre-dam and recent river temperatures, which will be linked to today's TMT agenda.

The operation outlined in this SOR is fine from NOAA's perspective, Wagner said. This takes care of the burbot operation for the year, and TMT shouldn't need to revisit it later, Dave Wills (USFWS) said.

6. 2008 Draft Water Management Plan

The WMP is on hold until a December 12 court hearing regarding the draft 2007 Bi-Op gives us a clearer sense of direction, Jim Adams said. The version of the WMP currently linked to the TMT agenda is still based on the 2004 Bi-Op. Comments on it would be welcome. However, many TMT members have already said they'll wait to comment until the WMP has been updated to reflect the 2007 Bi-Op, Gumpert recalled.

7. TMT Year End Review Preparation

TMT speakers should provide any graphic presentations in PowerPoint to Jim Adams by close of business Monday, November 26.

Adams is looking into the possibility of setting up conference phone access to the meeting. Anyone who wants to attend in person should RSVP by November 26 to Robin Gumpert and Erin Halton to ensure their name is on the security list to enter the building. The facilitators will provide a buffet lunch of

Mexican food costing 6\$ apiece. Notify Robin or Erin by November 26 if you want to partake.

8. Operations Review

a. Reservoirs. Libby is at elevation 2434.1 feet, with average inflows of 4.7 kcfs and outflows of 12.5 kcfs, which is an increase over the past few days. Expect to see load shaping on a daily and weekly basis as we move through the holidays, Adams said.

Albeni Falls is at elevation 2,055.35 at the Hope gage, operating within a range of 20.55 to 2055.5 feet through December 31. Inflows are 12.0 kcfs and outflows are 12.0 kcfs, as of yesterday's daily average.

Dworshak is at elevation 1,517.8 feet, with daily inflows fluctuating from 1.5 to 5 kcfs due to recent rain. Yesterday's average inflow was 3.3 kcfs, with outflows holding steady at 1.5 kcfs.

The 7-day average at Lower Granite is 19 kcfs; at McNary, 111.4 kcfs, and at Bonneville, 123 kcfs. There was a spike in the water supply this past weekend, and flows out of Bonneville increased to the equivalent of a 13.5 foot tailwater elevation for about 4 hours the night of November 19.

Grand Coulee is at elevation 1,285.2 feet, operating to meet the targeted tailwater elevation for chum below Bonneville Dam, John Roache reported. Hungry Horse is at elevation 3,531.01 feet, discharging 1.8 kcfs to meet the Columbia Falls minimum flow.

b. Fish. There has not been much adult activity, Paul Wagner said. The focus now is on passage at Lower Granite Dam. Approximately 200 fish (WHAT SPECIES) passed the dam on November 16, the most recent date for which data are available. There's about a 3 to 5 day lag time between data collection via video camera and data reporting.

Scott Bettin (BPA) asked how the data from this year compare with recent years. Last year, between December 6 and 9, the numbers dropped to levels specified in the SOR for 2005, Wagner said. He expects a similar performance this year, as water gets colder and fish slow down until February. Wagner offered no guarantees but said the region could expect a similar pattern this year during the second week of December.

c. Power System. There is nothing to report, Tony Norris said.

d. Water Quality. There is nothing to report, Jim Adams said.

7. Next Meetings

The TMT year-end review is November 28 at Robert Duncan Plaza in downtown Portland. If necessary, at the end of the lunch break TMT will briefly check in on chum operations and Snake River zero nighttime flow. The next regular face-to-face TMT meetings will be on December 12 and 19. This summary prepared by consultant and writer Pat Vivian.

<i>Name</i>	<i>Affiliation</i>
Jim Adams	COE
Dave Wills	USFWS
Scott Bettin	BPA
Kyle Dittmer	CRITFC
Tony Norris	BPA
Cindy LeFleur	Washington
John Roache	BOR
Jason Flory	USFWS
Bruce McKay	Consultant
Katrina Starr	USFWS
Dan Spear	BPA
Bob Buchholz	COE
Cathy Hlebechuk	COE
Richelle Beck	DRA
Paul Wagner	USFWS
Greg Hoffman	COE
XXX	EWEB

TECHNICAL MANAGEMENT TEAM

BOR : John Roache/Mary Mellema/Pat McGrane

BPA : Robyn MacKay/Tony Norris/Scott Bettin

NOAA-F: Paul Wagner/Richard Dominigue

USFWS : David Wills/Steve Haeseker

OR : Rick Kruger/Ron Boyce

ID : Russ Kiefer

WDFW : Cindy LeFleur

MT : Jim Litchfield/Brian Marotz

COE: Jim Adams/Cathy Hlebechuk/Bob Buchholz

TMT MEETING

Wednesday December 12, 2007 09:00 - 12:00

1125 N.W. Couch Street, Suite 4A34

Portland, Oregon 97209-4142

Map Quest [\[Directions\]](#)

CONFERENCE PHONE LINE

Conference call line:203-310-2162; PASS CODE = 4703150

To check into the building, take the elevator to the 5th floor and the guard will issue you an ID badge if you need one and will take you down to the meeting room on the 4th floor. If you have NOT attended a TMT meeting in the past you will need to call ahead and let Jim Adams (503) 808-3938, Cathy Hlebechuk (503) 808-3942, or Bob Buchholz (503) 808-3945 know, so you can be added to the TMT Visitor List and issued an ID badge. This badge may be used indefinitely. If you have attended TMT in the past you may re-use your ID badge indefinitely. If you are a federal employee you will also need to have an ID badge issued to you which can be used indefinitely.

We have had disruptions on the phone because people are not hitting 'mute' after dial in.

Please MUTE your Phone

All members are encouraged to call Robin Gumpert with any issues or concerns they would like to see addressed.

Please e-mail her at robin76@cnnv.net or call her at (503) 248-4703.

AGENDA

1. Welcome and Introductions
2. Review [\[Meeting Minutes\]](#) 
3. Water Management Reorganization - James Barton, Corps of Engineers
 - a. [\[W.M Reorganization Stakeholder Overview\]](#)
4. Chum Operations - Paul Wagner, NOAA
5. 2007 Snake River Zero Flow - Robyn Mackay, BPA
6. Operations Review
 - a. Reservoirs
 - b. Fish
 - c. Power System
 - d. Water Quality
 1. [\[Spill Information 2007\]](#)

7. Other

- Set agenda for next meeting - **December 19, 2007**

[\[Calendar 2007\]](#)



Questions about the meeting may be referred to:

[Jim Adams](#) at (503) 808-3938, or

[Cathy Hlebechuk](#) at (503) 808-3942, or

[Bob Buchholz](#) at (503) 808-3945.

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

December 12, 2007 Meeting

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Gumpert

Notes: Erin Halton

The following notes are a summary of issues that are intended to point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the "record" of the meeting, only a reminder for TMT members.

Official Minutes/Facilitator Notes

The facilitator notes and official meeting minutes from the 11/28 TMT year-end-review and short business meeting were not yet posted; they will be posted on the web for review and the 12/19 TMT conference call agenda will include time for comments and finalizing the notes.

COE Water Management Reorganization

Jim Barton, COE, provided TMT members with a power point presentation of a 'high level overview' of the background, current status and next steps for the COE's Water Management reorganization. He noted that many of the specific details remain to be worked out and that the desire is to have as minimal an impact on key stakeholders as possible. The goal is to increase interdependency and streamline coordination between the Northwest COE Division and District offices. Barton shared a power point and reviewed the general responsibilities for the division and district offices. His presentation was posted as a link to today's agenda on the TMT web page. A concern was raised regarding management of system-wide flood control.

Action/Next Steps: System-wide spill management will be a topic discussed at an internal COE meeting on 12/13. The reorganization is expected to be further developed, tested and refined during Phases I and II from January-October 2008, with a target of completion by October 2008. TMT will continue to receive updates and have opportunity to provide input on the process. This topic will be on a TMT agenda in January 2008.

Chum Operations

Paul Wagner, NOAA, reported that high water conditions on the Willamette and Lower Columbia Rivers since the last TMT meeting had affected the ability to maintain the desired 11.5' tailwater range to support chum spawning. Wagner said necessary steps were taken to allow the excess water to pass and keep flows at a sustained level to the extent possible. Wagner reported that no redds were stranded as observed with the latest chum survey, and that chum were still present in the observation area. Results from the 12/12 survey were not available at the time of this meeting. Wagner offered that those

results would inform whether short pulses to maintain coverage for higher spawning redds would be needed.

BPA clarified that they anticipated being able to maintain a daytime 11.3'-11.7' tailwater range, using reverse load factoring, and reiterated the contingency plan in the event surplus inflows at Bonneville Dam result in an inability to maintain the 11.5' target range. Excess waters would be shaped during nighttime hours (1800-0600 hours). These flows will be shaped in eight hour time blocks with tailwaters up to 13 feet from 1800-0600 hours. If this is insufficient to meet daytime elevation targets, flows will be shaped in four hour time blocks with tailwaters up to 15 feet from 2200-0400 hours. If these higher flows are still unable to meet the daytime target, the project is authorized to pass flows as necessary during the nighttime hours to meet the daytime target. NOAA recommended that if there was a need to move any additional flows during daytime hours, stepping up tailwater elevations by increments of .5', up to a maximum of 12.5' would be acceptable. The salmon managers present at the TMT meeting (USFWS, Idaho) did not object to NOAA's suggestion. They also acknowledged the risk to April 10 Grand Coulee refill if higher protection levels are set and maintained for chum.

Jim Adams, COE, provided an informational report that the B2 corner collector had been opened from 12/7-12/10, to allow debris to pass through the project. TDG levels exceeded 105% (up to 105.6%) for a few hours, but quickly receded without impact to fish.

Action/Next Steps: The operation laid out above will be implemented to support chum for the next week, and this item will be on the agenda at the 12/19 TMT conference call. Paul Wagner offered to share the results of today's spawning survey as soon as possible so that the action agencies could determine whether a pulsing operation would be needed. **UPDATE:** *Following the meeting, Paul Wagner reported that no redds were observed at higher elevations during the 12/12 survey. This information was forwarded to TMT members and other interested parties.*

Snake River Zero Nighttime Generation

Tony Norris, BPA, reported steelhead counts of over 300 on 12/8 and near 200 on 12/9 and so did not propose to allow zero nighttime generation in the Snake River at this point. Video counts will continue through 12/15, with results available around 12/17. Dave Wills, USFWS, suggested that any data available from video counts beyond the anticipated 12/15 end date would help build a historical database, even if results do not influence this year's operation. It was suggested that the video counts should end concurrent with the closing of the fish ladders (this year, on 12/31).

Action/Next Steps: The COE will inquire about continued video count monitoring for this year, and will work to build into future contracts the end date for video counts to coincide with fish ladders closing. TMT will revisit this item at the 12/19 conference call.

Operations Review

Reservoirs – Grand Coulee was at elevation 1285.9' and being held steady to support chum. Hungry Horse was at elevation 3528.9', with outflows at 2.2 kcfs. Libby was at elevation 2424.48' with inflows of .7 kcfs and increased outflows of 19.4 kcfs; an updated runoff forecast of 101% of average means flows will be shaped daily/weekly to reach the end of December elevation target of 2411'. Albeni Falls was at elevation 2055.3' with inflows of 16.7' and outflows at 17.2 kcfs; Dworshak was at elevation 1520.3' with inflows of 1.7 kcfs and outflows of 1.5 kcfs. 7-day average flows at Lower Granite were 25.5 kcfs and at McNary were 126.5 kcfs.

Fish – No report – see chum update.

Power system – No report.

Water quality – No report.

12/19/07 TMT Conference Call:

- Chum Operations
- Snake River Zero Nighttime Generation
- Operations Review
- Scheduling update for 2008 TMT meetings

**Columbia River Regional Forum
Technical Management Team Meeting
December 12, 2007**

1. Introduction

Today's TMT meeting was chaired by Jim Adams (COE) and facilitated by Robin Gumpert (D.S. Consulting). Representatives from USFWS, NOAA, COE, BPA, BOR, Washington, Idaho and others attended in person or by phone. The following is a summary (not a verbatim transcript) of the topics discussed and decisions made at the meeting. Anyone with questions or comments about these notes should provide them to the TMT chair or bring them to the next meeting.

2. Review Meeting Minutes

The facilitator's notes and official minutes from the year end review are not yet posted to the website. Notes from the November 21 meeting were posted recently; there were no comments today. TMT will revisit these summaries at its next meeting on December 19.

3. Water Management Reorganization

James Barton (COE) distributed copies of his PowerPoint presentation and explained the process of reorganizing the COE water management function, which began in 2005. Seven COE offices, including those at District and Division levels, manage the Columbia and Missouri rivers. The COE is looking for similarities in management practices, and ways to improve coordination and effectiveness.

Phase 1: The senior management team leading the reorganization has developed guidelines for the process, Barton said. One guideline to increase interoffice coordination is a shift of the responsibility for managing tributaries to local (district) COE offices rather than at the regional (division) level. Overall leadership will continue to come from the Northwest Division office in order to foster a "one door to the Corps" approach for the ease of stakeholders.

Another guideline calls for shifting technical expertise to the technical offices that are at the district level. The district and division offices will work together to coordinate the water management function. A third guideline calls for condensing the roles of three existing branches (power analysis and coordination, hydrological analysis and modeling, and the RCC) into two functions (reservoir control and technical support). This change could ultimately lead to fewer staff at the division level.

Phase 2: Work on Phase 2 of the plan started in September 2007. During this phase, changes to the water management function will be tested in a

simulated environment before real world changes take place. Phase 2 involves a number of technical teams (reservoir regulation, water quality, environmental compliance) working together to figure out how to accomplish this. There will be a number of training sessions and exercises during phase 2. Another major piece of phase 2 is stakeholder involvement. One of the main goals is to minimize impacts on stakeholders.

Phase 3: The implementation phase will run from July-September 2008. It involves preparing detailed transition plans and conducting exercises and testing before the actual changes take place. Many of these tests will be conducted during the coming fish spill season, Adams said.

TMT will continue to be managed at the division level. Anyone who is interested in learning more about the water management process or getting involved in a particular aspect should contact Jim Adams. More details will be available in early January 2008. Barton will make another presentation in January to solicit TMT's involvement as things unfold.

4. Chum Operations

Due to massive rains in early December, this operation was not carried out as described at the TMT year end review on November 28, Paul Wagner (NOAA) reported. The plan was to maintain an 11.5 foot tailwater at Bonneville during the daytime (no heavy rains were expected) and let any excess water out during 8 hour blocks at night. The 11.5 foot daytime tailwater elevation was impossible to maintain during the December storm, so a decision was made by the Corps, BPA, and available TMT members to let nature take its course and keep flows at a sustained level (around 15 foot tailwater elevation) in order to discourage spawning at higher elevations. Excess water was passed at night to the extent possible because mate selection and the initiation of spawning that happen in daylight. *{Supplemental Note: This operation was coordinated with Paul Wagner (NOAA Fisheries), David Wills (USF&WS), and Rick Kruger (ODFW), and Scot Bettin (BPA).}*

Not many chum have been observed in the Ives Island area, Wagner said. On December 10, survey crews found no high-elevation redds in the wake of the storm. The system transitioned back to an 11.5 foot tailwater after the storm ended and has been keeping a pulse every 8 hours to a 13-13.5 foot elevation in order to rewet any redds that might have been established during the high flows.

Tony Norris (BPA) asked if those 13.5 foot pulses could be discontinued during the day. We'll know soon, Wagner replied. TMT tentatively agreed to discontinue them unless new survey information reveals redds at risk. Shortly after today's meeting, Cathy Hlebechuk sent TMT a follow up email, "It was reported by Ken Keller, redd surveyor, to Paul Wagner they did not find any redds at higher elevations today. Therefore, no high pulse is needed."

TMT recommended the COE continue releasing excess flows at night to discourage high elevation spawning. The mid-Columbia reservoirs owned by PUDs are a wild card in planning the chum operation, Norris said. Because Bonneville Dam is at the end of the system, conditions are difficult to control. Russ Kiefer (Idaho) expressed dismay at the lack of coordination with mid Columbia PUDs in order to provide spring outflows that are in the best interests of listed fish. Libby discharges have no effect on chum protection levels, while Grand Coulee outflows do, Norris noted. This winter is following the La Nina weather pattern, meaning more water than usual, Kyle Dittmer said.

The Salmon Managers recommended that the COE continue to operate 11.3 to 11.5 ft during the day as a first priority. If not possible the recommended operation in order of priority was,
Raise the tailwater up to 13 ft for up to 8 hours between 1800 – 0600 hours
Raise the tailwater limit to 15 ft for a 4 hour period 2200 – 0400
Raise the nighttime (1800-0600 hours) tailwater as high as necessary to meet the daytime constraint
Raise the daytime tailwater to 11.8 to 12.2 ft.

5. 2007 Snake River Zero Flow

On December 8, over 300 fish were counted, almost 200 on December 9, Tony Norris (BPA) reported. It's still too early to go to zero nighttime flows.

Prior to today's meeting, Norris and Adams discussed the possibility of extending the contract for video counts at Lower Granite and Little Goose past December 15, the current ending date. Even if the contract could be modified quickly, the results wouldn't be available until after Christmas, Adams said. Then the ladders will be shut down December 31. The possibility of videotaping in 2008 until the ladders are taken out, at Lower Granite is also being investigated, Adams said. It would be worthwhile to continue the video count until the fish ladders are closed this year also if possible, Wills said. That would help to build a historical database. Adams will investigate the possibility of leaving the cameras on now to create a record, waiting to have the counts read until contractual details can be worked out next year. He suggested the Salmon Managers discuss this issue further at FPOM. TMT will revisit it on December 19.

6. Operations Review

a. Reservoirs. Grand Coulee is at 1,285.9 feet elevation and holding steady, supporting the chum operation, John Roache (BOR) reported. Hungry Horse is at 3,528.9 feet elevation with 2.2 kcfs discharges to meet the Columbia Falls minimum.

Libby forebay is at 2,424.48 feet elevation, with inflows of 0.7 kcfs and outflows of 19.4 kcfs, an increase from recent outflows of 9.1 kcfs, Adams said. A new runoff forecast says Libby is currently at 101% of normal outflows. Albeni Falls is 2,055.3 feet at the Hope gage, with 16.7 kcfs inflows and 17.2 kcfs outflows. Dworshak forebay is at elevation 1,520 feet, with inflows of 1.7kcfs and outflows of 1.5 kcfs. The Lower Granite 7 day average is 25.5 kcfs. The McNary 7 day average is 126.5 kcfs.

b. Fish. Wagner addressed this topic earlier today. Computer access was down so he couldn't access the online fish counts.

c. Power. There is nothing to report, Norris said.

d. Water Quality. On December 6, the COE shut off the B2 corner collector and flushed it to remove debris from the Bonneville forebay, Adams reported. As a result, TDG levels at the Warrendale gage briefly exceeded the 105% state water quality standard, then dropped again.

7. Next Meeting

The last TMT meeting in 2007 will be a conference call on December 19 with zero nighttime flows, video counts at Granite, and chum operations on the agenda. This summary prepared by consultant and writer Pat Vivian.

Name	Affiliation
Jim Adams	COE
David Wills	USFWS
Paul Wagner	NOAA
Tina Lundell	COE
Tony Norris	BPA
John Roache	BOR
Scott Boyd	COE
Rudd Turner	COE
Laura Hamilton	COE
Ruth Burris	PGE
Cathy Hlebechuk	COE
James Martin	COE water management
Russ George	WMC

Phone:

Tim Heizenrader	Centaurus
Bruce McKay	Consultant
Dave Benner	FPC
Kyle Dittmer	CRITFC
Greg Hoffman	COE
Shane Scott	NWRP

Margaret Filardo
Russ Kiefer
Richelle Beck

FPC
Idaho
DRA



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Corps of Engineers Water Management Reorganization Overview

December 12, 2007



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Topics

- **Reorganization - Background**
- **Reorganization - Phase I and II**
- **Reorganization - Next Steps**
- **Questions**



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Background

- **Corps initiated a review of overall Water Management organization in April 2005**
- **Review has gone through several phases over past two years**
- **In spring of 2007 a senior management team reviewed results of previous two years of analysis, and provided guidelines on future direction of water management organization**



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Background, cont.

- **Guidelines included:**
 - ◆ **Increasing interdependency between various Division and District offices**
 - ◆ **Shifting some responsibility for tributary regulation from Division offices to District offices.**
 - ◆ **Retaining responsibility for overall direction, management, Treaty, and system operations with Division office**



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Background, cont.

- **Guidelines included:**
 - ◆ **Shifting more technical expertise from Division office to District offices in Portland, Seattle, and Walla Walla**
- **Reorganization based on phased approach:**
 - ◆ **Phase I: Describe new end state organization based on new guidelines**
 - ◆ **Phase II: Prepare transition plan for transitioning to new end state organization**



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Phase I

- **Phase I Plan approved in September 2007**
- **Objective is to transition to new end state by Oct 2008**
- **Key objective is to take care of employees and ensure an orderly transition with minimal impact to stakeholders and mission**



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Phase I, cont.

- **Key decisions:**
 - ◆ **Tributaries will be managed using “control point” approach used in Corps Missouri River Basin water management office**
 - ◆ **Under this approach, Division office will set targets and objectives for tributary projects and work with Districts to ensure targets are met.**
 - ◆ **Portland District will be responsible for meeting Willamette system targets and objectives**
 - ◆ **Seattle District will be responsible for Libby and Albeni Falls**
 - ◆ **Walla Walla District will be responsible for Dworshak**



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Phase I, cont.

- **Key decisions, cont:**
 - ◆ **Division will retain responsibility for overall direction, management, Treaty, and system operations**
 - ◆ **Some technical work will be shifted to the Districts, who will provide technical support in areas such as water quality, hydrology, and others.**
 - ◆ **Division staff size reduced and likely reorganized from three branches into two (Reservoir Control and Technical Support)**



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Phase II

- Phase II is focused on how we transition to end state organization
- Goal is to develop details on new processes, procedures, SOPs, roles and responsibilities, training, exercises, etc.
- Phase II Plan under development
- Management team will oversee Phase II, and numerous technical teams will develop details



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Phase II, cont.

- **Technical teams will include staff from Corps offices, stakeholders, and will involve:**
 - ◆ **Reservoir Regulation**
 - ◆ **Water Quality**
 - ◆ **Environmental Compliance**
 - ◆ **Modeling and Forecasting**
 - ◆ **WCDS**
 - ◆ **Budget**
 - ◆ **Human Resources**
 - ◆ **Communication**



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Phase II, cont.

- **Phase II will be completed in stages:**
 - ◆ **Stage I: develop transition plans for each technical area describing new approach, SOPs, training, exercises, etc., to describe how transition to end state (by Mar 08)**
 - ◆ **Stage II: conduct training and exercises to test new processes and procedures (by June 08)**
 - ◆ **Stage III: revise processes and procedures as needed and complete transition to new end state (by Oct 08)**



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Next Steps

- **Oct – Dec 07: Inform stakeholders about new end state organization**
- **Oct – Mar 08: Complete detailed transition plans for transition to end state**
- **Apr – Jun 08: conduct training and exercises to test new approach**
- **Jul – Oct 08: complete transition**



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Questions?



TECHNICAL MANAGEMENT TEAM

BOR : John Roache/Mary Mellema/Pat McGrane **BPA :** Robyn MacKay/Tony Norris/Scott Bettin
NOAA-F: Paul Wagner/Richard Dominigue **USFWS :** David Wills/Steve Haeseker
OR : Rick Kruger/Ron Boyce **ID :** Russ Kiefer
WDFW : Cindy LeFleur **MT :** Jim Litchfield/Brian Marotz
COE: Jim Adams/Cathy Hlebechuk/Bob Buchholz

TMT CONFERENCE CALL

Wednesday December 19, 2007 09:00 - 12:00

1125 N.W. Couch Street, Suite 4A34
Portland, Oregon 97209-4142
Map Quest [\[Directions\]](#)

CONFERENCE PHONE LINE

Conference call line:203-310-2162; PASS CODE = 4703150

To check into the building, take the elevator to the 5th floor and the guard will issue you an ID badge if you need one and will take you down to the meeting room on the 4th floor. If you have NOT attended a TMT meeting in the past you will need to call ahead and let Jim Adams (503) 808-3938, Cathy Hlebechuk (503) 808-3942, or Bob Buchholz (503) 808-3945 know, so you can be added to the TMT Visitor List and issued an ID badge. This badge may be used indefinitely. If you have attended TMT in the past you may re-use your ID badge indefinitely. If you are a federal employee you will also need to have an ID badge issued to you which can be used indefinitely.

We have had disruptions on the phone because people are not hitting 'mute' after dial in.
Please MUTE your Phone

*All members are encouraged to call Robin Gumpert with any issues or concerns they would like to see addressed.
Please e-mail her at robin76@cnnw.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and Introductions
2. Review [\[Meeting Minutes\]](#) 
3. Chum Operations - Paul Wagner, NOAA
4. 2007 Snake River Zero Flow - Tony Norris, BPA
5. Operations Review
 - a. Reservoirs
 - b. Fish
 - c. Power System
 - d. Water Quality
 1. [\[Spill Information 2007\]](#)
6. Other
 - Set agenda for next meeting - **January 16, 2008**

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

December 19, 2007 Conference Call

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitator: Robin Gumpert

Notes: Erin Halton

The following notes are a summary of issues that are intended to point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the "record" of the meeting, only a reminder for TMT members.

Official Minutes/Facilitator Notes

The facilitator notes from the 11/28 short business meeting and 12/12 meeting were posted, and the COE said they would correct the link locations to corresponding dates on the TMT webpage. The facilitator notes from the 11-28 year-end-review, along with the official meeting minutes from 11/28 and 12/12 were not yet posted; they were expected to be posted soon and will be on the agenda for finalization at the TMT meeting on 1/16/08.

Chum Operations

Paul Wagner, NOAA, reported that one fish was observed on 12/18 in the Ives area but no redd count was provided from the latest chum survey. Discussion at the 12/18 FPAC meeting led to a recommendation from the salmon managers to continue the current chum protection operation of a daytime elevation target of 11.5' (11.3-11.7') until 12/24, when the operation could shift to a 24-hour 11.5' minimum hard constraint. Should spring water availability become a concern, Wagner said a slightly lower tailwater elevation might be acceptable. Wagner clarified that the existing redd locations had been tracked through GPS and that depending on contract funding, a model may be run to map this year's redds. The elevation of the redds could then be determined and a more informed decision on the effects of a lower tailwater elevation could be made. TMT members present on the call (NOAA, USFWS, BOR, BPA, COE, ID) did not object to the Salmon Manager's recommended operation.

Action/Next Steps: The COE planned to issue a teletype describing the following operation: Bonneville operators will target a daytime tailwater range of 11.3'-11.7'; excess waters will be shaped during nighttime hours (1800-0600 hours.) A hard constraint of minimum 11.5' tailwater will take effect at 0600 on 12/24 and will continue until further notice.

Snake River Zero Nighttime Generation

Tony Norris, BPA, said that in light of steelhead counts of 146 on 12/15 and 131 on 12/16, the recommendation is to hold off on implementing nighttime zero generation until 1/1/08, to coincide with the closing of the fish ladders. The COE clarified that video counts through 12/16 were posted on the web and that taping will continue until the

fish ladders go offline on 1/1/08. However, the data from 12/16 through 1/1/08 would not be read off the video tapes until a new contract has been completed and the contractor extracts the information. He added that steps are being taken to amend future contracts so that video counts do not end until the fish ladders close. NOAA and USFWS thanked Jim Adams, COE, for his efforts in extending the video count timeframe for this year.

Action/Next Steps: The operation shift will be made on January 1, 2008 to allow zero generation within a six hour block between the hours of 2200 and 0600, congruent with the closing of the fish ladders at Bonneville. (The auxiliary water supply will be shut down on 12/31 and dewatering will occur from 1/2–22/2008.) As requested, video results for dates beyond 12/16 will be posted sometime in the future. Language will be included in the 2008 Fish Passage Plan that requests video collection through the closing of the fish ladders; the contracting officer is expected to negotiate a contract in February of 2008.

Operations Review

Reservoirs – Grand Coulee was at elevation 1287.3' and being held steady to support chum. Hungry Horse was at elevation 3528.09', with outflows at 2.2 kcfs. John Roache, BOR, gave TMT a heads up on a G3 unit test scheduled at Hungry Horse for 1/14/08, which will require ramping up outflows to an estimated 3-3.2 kcfs for one day. Depending on required discharges for minimum flows, it may require 2 days to ramp flows back down (ramp rates are 600 cfs/day). Libby was at elevation 2418.8' with inflows of 3.4 kcfs and outflows of 21 kcfs; flows will be shaped daily/weekly to reach the end of December elevation target of 2411'. Based on December final forecasts, Libby will maintain outflows to 4.5 kcfs to reach the end of January elevation target of 2408'; the end of January flood control target and therefore the January operation is contingent upon the results of the January final forecast. Albeni Falls was at elevation 2055.4' with inflows of 21 kcfs and outflows at 18.2 kcfs; Dworshak was at elevation 1520.5' with inflows of 1.7 kcfs. 7-day average flows at Lower Granite were in the 20-21 kcfs range; McNary flows had dropped to an 80-90 kcfs range and Bonneville was averaging 127 kcfs.

Fish – No report – see chum update.

Power system – No report.

Water quality – No report.

1/16/08 TMT Meeting:

Agenda items may include the following:

- Final January Water Supply Forecast
- Lessons Learned from 2007
- Updates to the draft 2008 Water Management Plan
- Operations Review

**Columbia River Regional Forum
Technical Management Team Conference Call
December 19, 2007**

1. Introduction

Today's TMT meeting was chaired by Jim Adams (COE) and facilitated by Robin Gumpert (D.S. Consulting). Representatives from USFWS, NOAA, COE, BPA, BOR, Idaho and others were on the line. The following is a summary (not a verbatim transcript) of the topics discussed and decisions made at the meeting. Anyone with questions or comments about these notes should provide them to the TMT chair or bring them to the next meeting.

2. Review Meeting Minutes

The facilitator's notes and official minutes from the year end review on November 28 will be available for comment at the next TMT meeting January 16. Notes from the December 12 meeting will also be addressed on January 16.

3. Chum Operations

The Salmon Managers discussed this yesterday at FPAC and agreed on continuing the current operation until December 24, with daytime flows to maintain an 11.3-11.7 foot tailwater elevation below Bonneville, targeting 11.5 feet unless surplus flows are needed to be passed, Paul Wagner (NOAA) reported. At 0600 hours on December 24, the project will shift from chum spawning operations to chum incubation operations where a minimum tailwater elevation of 11.5 feet will be maintained 24 hours per day as a hard constraint. The 11.5 foot elevation is a minimum unless availability of water becomes an issue or chum survey crews report that a lower tailwater elevation would suffice. NOAA, BOR, BPA, USFWS and Idaho representatives agreed on these operations.

4. 2007 Snake River Zero Flow

Steelhead counts on the Snake River were 146 on December 15 and 131 on December 16, Tony Norris (BPA) reported. Therefore, BPA will hold off on implementing zero flow operations until the fish ladders go out of service January 1, 2008. NOAA, Idaho, USFWS and BOR representatives agreed to that operation. The COE will allow zero generation operations beginning at 2200 hours on the night of January 1. Thereafter, zero generation will be allowed for a 6 hour block between 2200 and 0600 hours each night until February 28, 2008.

Regarding video fish counts at Lower Granite, Adams reported that, when the current videotape runs out, the contractor overseeing the count will move a digital recorder device from McNary to Lower Granite and continue videotaping

through January 1, 2008. The tapes will be archived until the contract reopens. Furthermore, this year's Fish Passage Plan will contain language requesting that video counts continue until the fish ladder goes out of service.

5. Operations Review

a. Reservoirs. Grand Coulee is at elevation 1,287.30 feet supporting the chum operation. Hungry Horse is at elevation 3,528.09 feet, discharging 2.2 kcfs to meet the Columbia Falls minimum. On January 14, 2008, scheduled maintenance on G-3 (1 of 4 units) will require to run in the full range of generation up to an estimated 3-3.2 kcfs outflows that day. Depending on required discharges for minimum flows, it may require 2 days to ramp flows back down (ramp rates are 600 cfs/day).

Libby forebay is at elevation 2,418.8 feet, with inflows of 3.4 kcfs and outflows of 21 kcfs. This operation will continue with daily and weekly load shaping through end December to meet the target forebay elevation of 2,411 feet December 31. The COE is targeting an elevation of 2,408 feet by end January, based on the December water supply forecast which is 101% of average. The final January forecast will be available on January 7-8 and will determine the final end of January elevation target.

Albeni Falls is at elevation 2,055.4 feet at the Hope gage, maintaining a range of 2055.0-2055.5 feet, with inflows of 21.4 kcfs and outflows of 18.32 kcfs. Dworshak forebay is at elevation 1,520.5 feet, with outflows of 1.5 kcfs. The Lower Granite 7 day average is 20-21 kcfs. Inflows at McNary have come down recently to the 80-90 kcfs range, and were around 120 kcfs from December 13-15.

b. Fish. Wagner addressed chum flows earlier today. There was nothing else to report

c. Power. There is nothing to report, Norris said.

d. Water Quality. There is nothing to report, Adams said.

6. Next Meeting

The next TMT meeting will be on January 16 with the January water supply forecast, chum incubation status, water management plan update, and lessons learned from the 2007 season on the agenda. This summary prepared by consultant and writer Pat Vivian.

Name	Affiliation
Dave Wills	USFWS
Jim Adams	COE

Tony Norris	BPA
Paul Wagner	NOAA
John Roache	BOR
Barry Espensen	CBB
Shane Scott	NWRP
Bruce Mckay	consultant
Dan Bedbury	EWEB
Ruth Burris	PGE
Tom Le	Puget Sound Energy
Cathy Hlebechuk	COE
Tim Heizenrader	Centaurus
Russ George	WMC
Scott Boyd	COE
Richelle Beck	DRA
Russ Kiefer	Idaho