

TECHNICAL MANAGEMENT TEAM

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

TMT MEETING

Wednesday January 14, 2009 09:00 - 12:00

NOAA Fisheries
1201 NE Lloyd Blvd, Suite 1100
Portland, Oregon 97232-1274

CONFERENCE PHONE LINE

NOTE NEW CONFERENCE LINE NUMBER
Conference call line:888-285-4585; PASS CODE = 601714

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 rgumpert@cnnv.net or call her at (503) 248-4703.

AGENDA

1. Welcome and Introductions
2. Review Meeting Minutes for Nov 21, Dec 15 and 17, 2008 [\[Meeting Minutes\]](#)
3. Water Supply Forecasts/Flood Control - *Steve King, National Weather Service, River Forecast Center*
 - A. [\[Main water supply page - Overview\]](#)
 - B. [\[Current Month precip\]](#)
 - C. [\[Seasonal Month Precip\]](#)
 - D. [\[Snow\]](#)
 - E. Water Supply/ESP
 - i. [\[Libby\]](#)
 - ii. [\[Hungry Horse\]](#)
 - iii. [\[Albeni Falls\]](#)
 - iv. [\[Grand Coulee\]](#)
 - v. [\[Dworshak\]](#)
 - vi. [\[Brownlee\]](#)
 - vii. [\[Lower Granite\]](#)
 - viii. [\[The Dalles\]](#)
 - F. Climate Prediction Center Forecasts
 - i. 1-month outlook

- a. [\[Precipitation Probability\]](#)
 - b. [\[Temperature Probability\]](#)
 - ii. 90-day outlook
 - a. [\[Precipitation Probability\]](#)
 - b. [\[Temperature Probability\]](#)
- 4. Chum Operations Update - *Dan Feil, USACE*
 - a. [\[Chum December 17-24\]](#)
 - b. [\[Chum December 24-31\]](#)
 - c. [\[Chum Teletype #6\]](#)
 - d. [\[Post Spawn Operations Jan 1-13\]](#)
- 5. The Dalles Spillway Construction Update - *Pat Duyck, USACE*
- 6. Fish Operations Plan - *Dan Feil, USACE*
- 7. WMP Final - *Dan Feil, USACE*
 - a. [\[2009 Water Management Plan\]](#)
- 8. Operations Review
 - a. Reservoirs
 - i. [\[Dworshak Forecast Comparison 2009\]](#)
 - b. Fish
 - c. Power System
 - d. Water Quality
- 9. Other
 - a. Set agenda for next meeting - **January 29, 2009**
[\[Calendar 2009\]](#)

Questions about the meeting may be referred to:

[Jim Adams](#) at (503) 808-3938, or

[Cathy Hlebechuk](#) at (503) 808-3942, or

Wind in the BPA Balancing Authority Area



January 29, 2009
Portland, Oregon, USA

Steven B. Barton, P.E.
Power Operations Specialist
Bonneville Power Administration



Wind Generation in the BPA BAA



- 1,671 MW of wind generation capacity installed in the BPA BAA, or about 16% penetration (wind capacity : peak area load).
- Approximately 55% of all wind generation in the Northwest is interconnected to the BPA BAA.
- Less than a quarter of the capacity installed in the BPA BAA serves federal loads.



Wind Generation in the BPA BAA



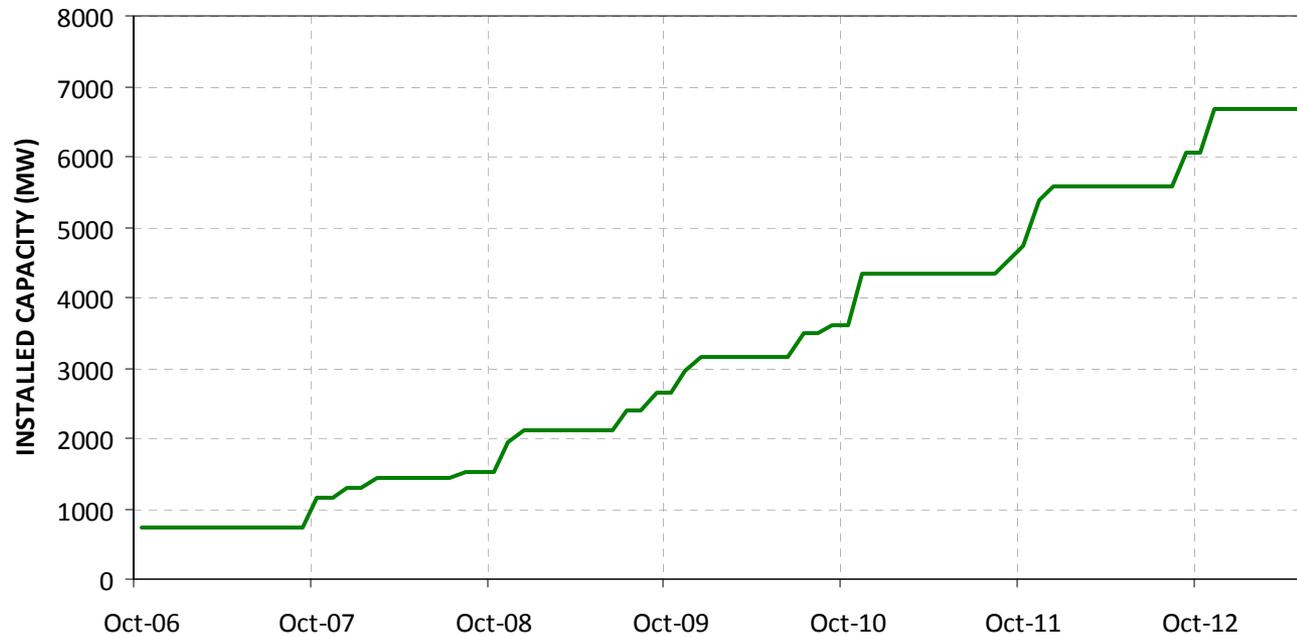
- Wind generation capacity is expected to grow above 3,000 MW by late 2009.
- Approaching 6,000 MW by 2012.
- Most projects are located in the Columbia River Gorge.
 - Geographic diversity is limited.
- Most new projects are expected to serve loads outside the BPA BAA.



Wind Generation in the BPA BAA

BPA BAA WIND FLEET GENERATION INSTALLED WIND FLEET CAPACITY PROJECTION

Projection based on information as of September 2008



Wind Generation in the BPA BAA



- Wind generation is backed up by hydro resources.
- Large penetration levels and wind generation serving non-BAA loads in a constrained, multi-purpose reservoir system pose unique operational challenges.



Wind Generation in the BPA BAA



- The intermittent nature of wind generation requires some level of reserves to be held on the balancing resources to manage within-hour variability and uncertainty (e.g. regulation, generation following).
- Forecasts lead to accurate schedules and can help by reducing uncertainty.
- Forecasts are not perfect, so the balancing resources must also stand ready to provide generation imbalance.



Wind Generation in the BPA BAA



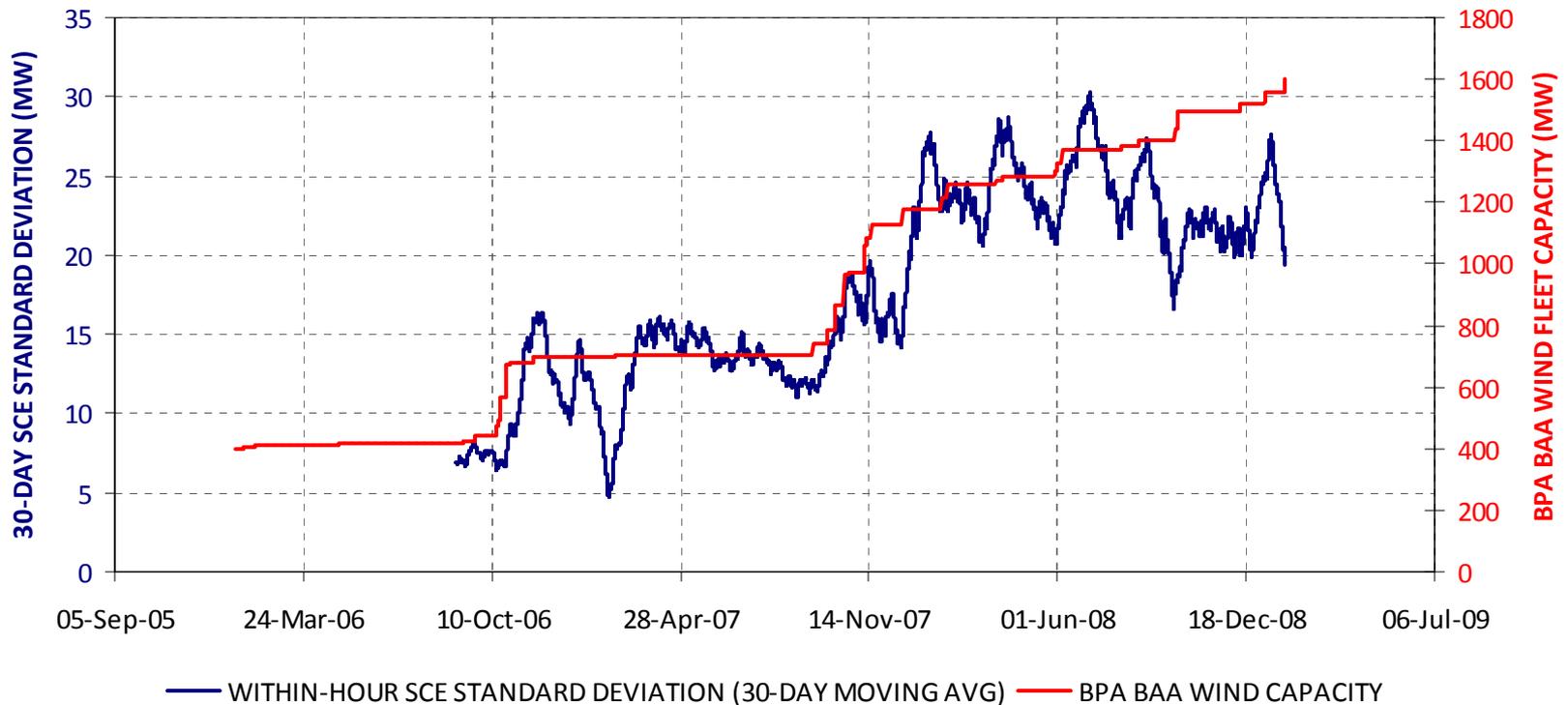
- Most efforts to date have concentrated on:
 - Quantifying the necessary reserves (regulation, following, and imbalance).
 - Improving scheduling accuracy.
 - Understanding the operational impacts of the added reserves and within-hour volatility.



Wind Generation Characteristics to Date

BPA BAA WIND FLEET GENERATION CAPACITY AND WITHIN-HOUR VARIABILITY

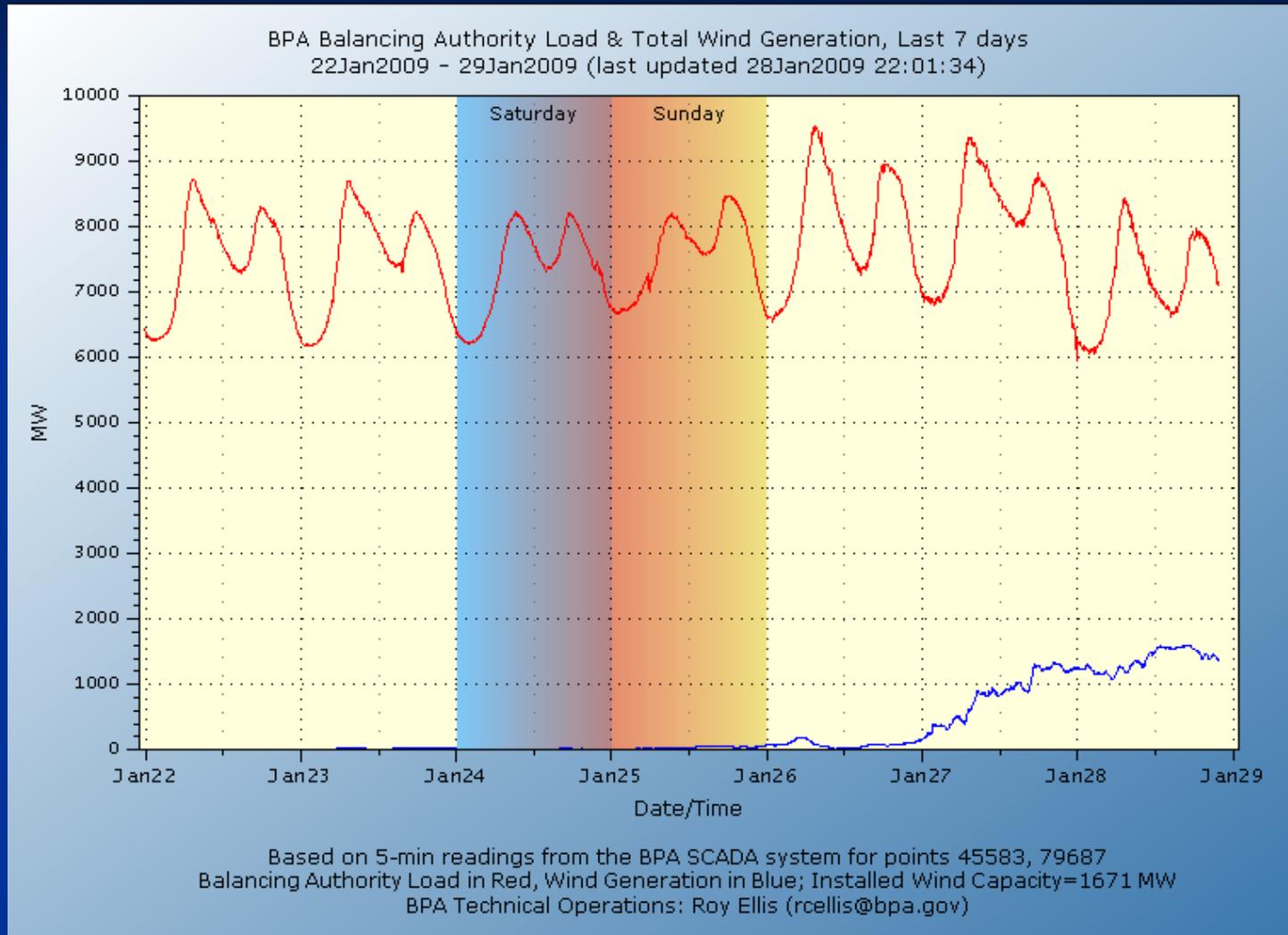
Data from 07 Jan 2007 to 28 Jan 2009



BPA has observed a direct relationship between the installed wind capacity and the level of within-hour volatility.



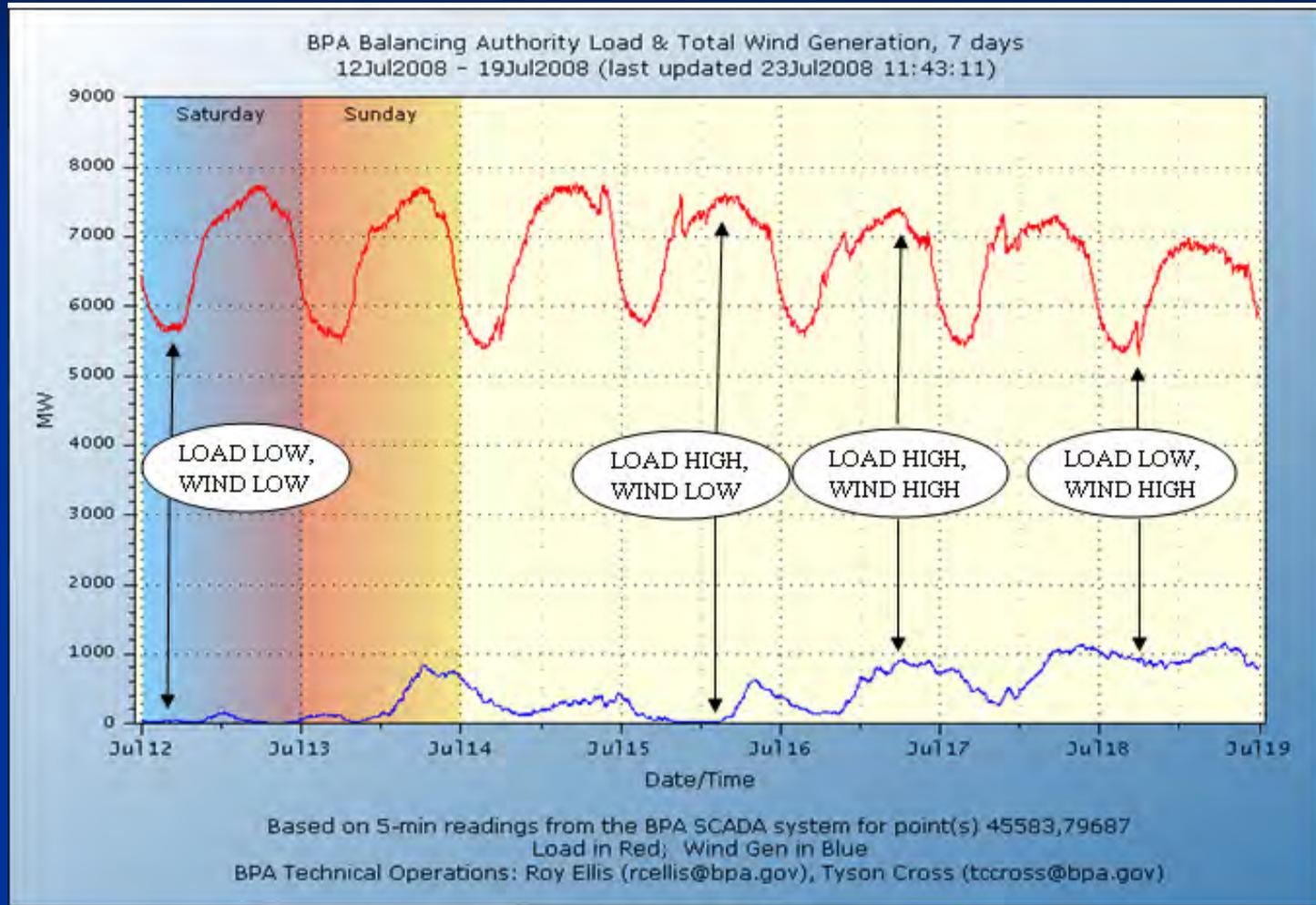
Wind Generation Characteristics to Date



Wind generation occurs when the wind blows; not necessarily when load needs it.



Wind Generation Characteristics to Date



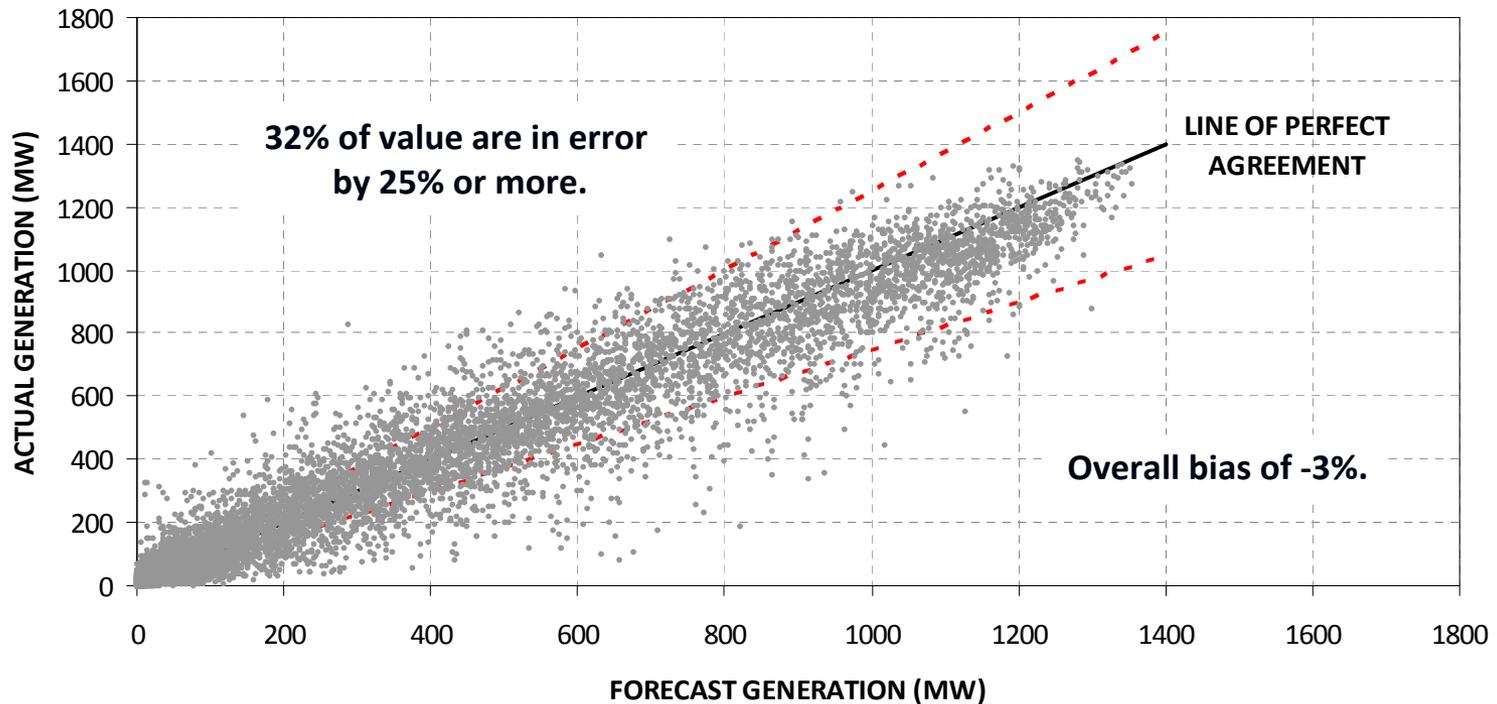
Wind generation occurs when the wind blows; not necessarily when load needs it.



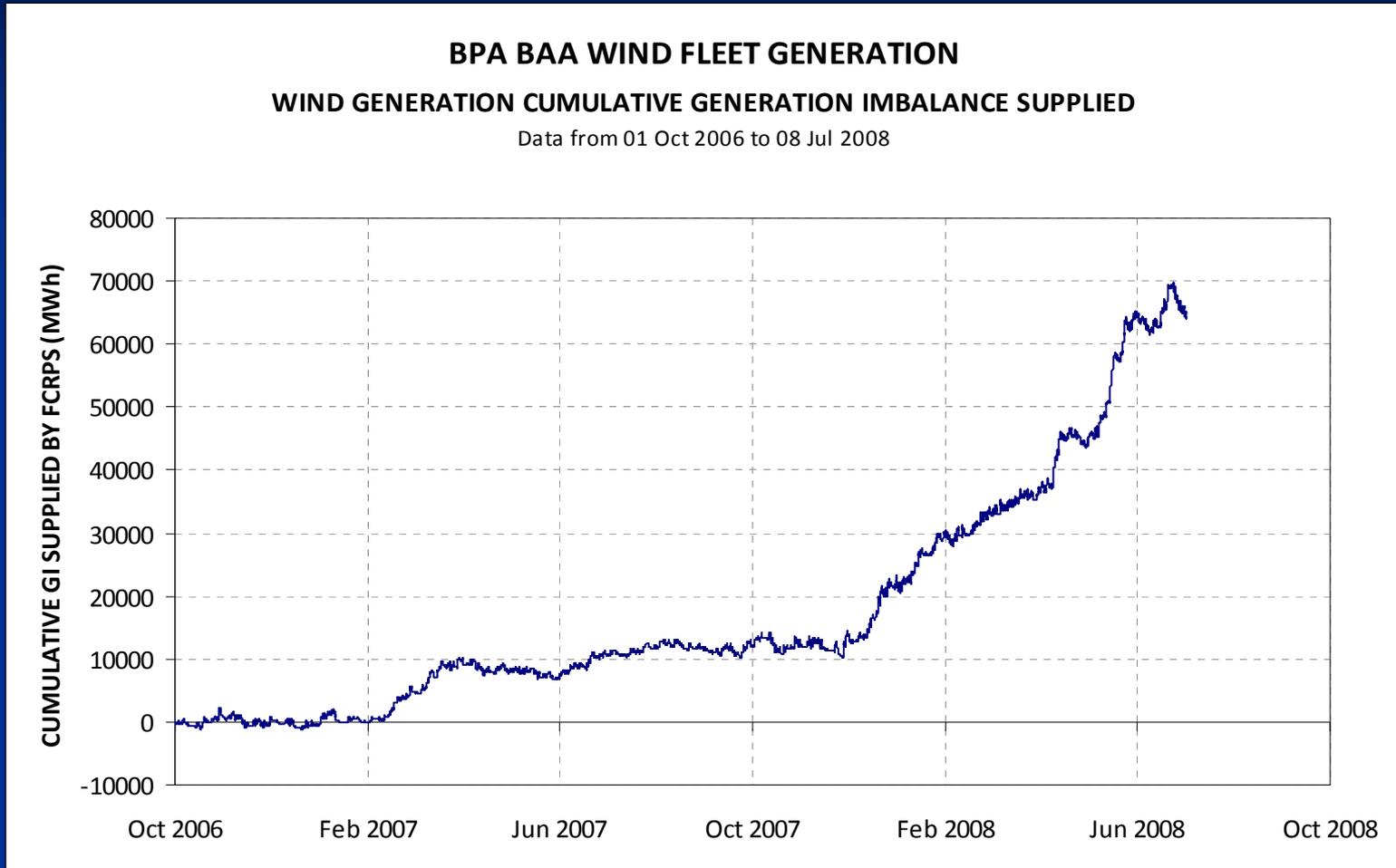
Wind Generation Characteristics to Date

BPA BAA WIND FLEET GENERATION WIND GENERATOR-SUPPLIED HOUR-AHEAD FORECAST

Data from 01 Jul 2007 to 11 Jul 2008



Wind Generation Characteristics to Date

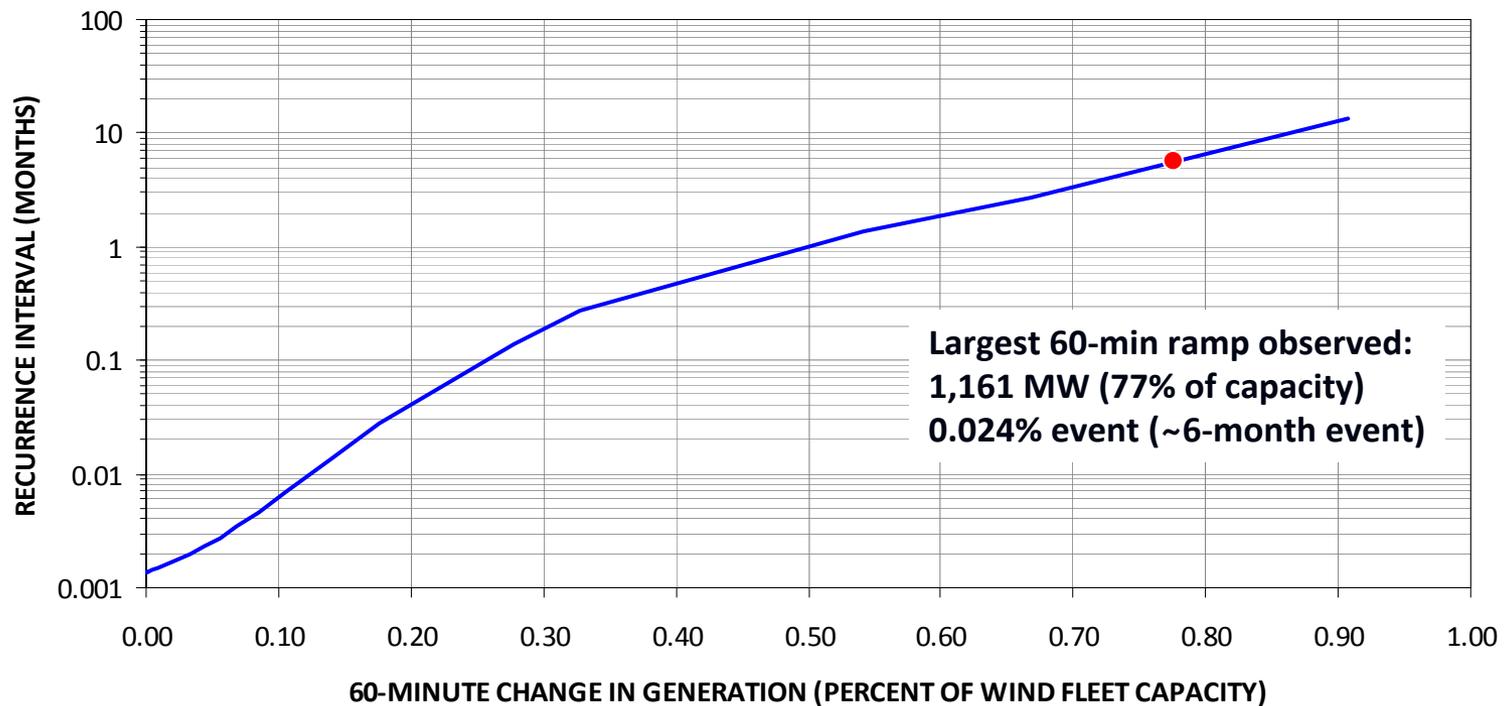


Positive values indicate wind over-generation relative to schedule, resulting in storage in the FCRPS.



Wind Generation Characteristics to Date

BPA BAA WIND FLEET GENERATION
60-MINUTE RAMP CUMULATIVE PROBABILITY DISTRIBUTION
Data from 01 Jan 2006 to 25 Jun 2008

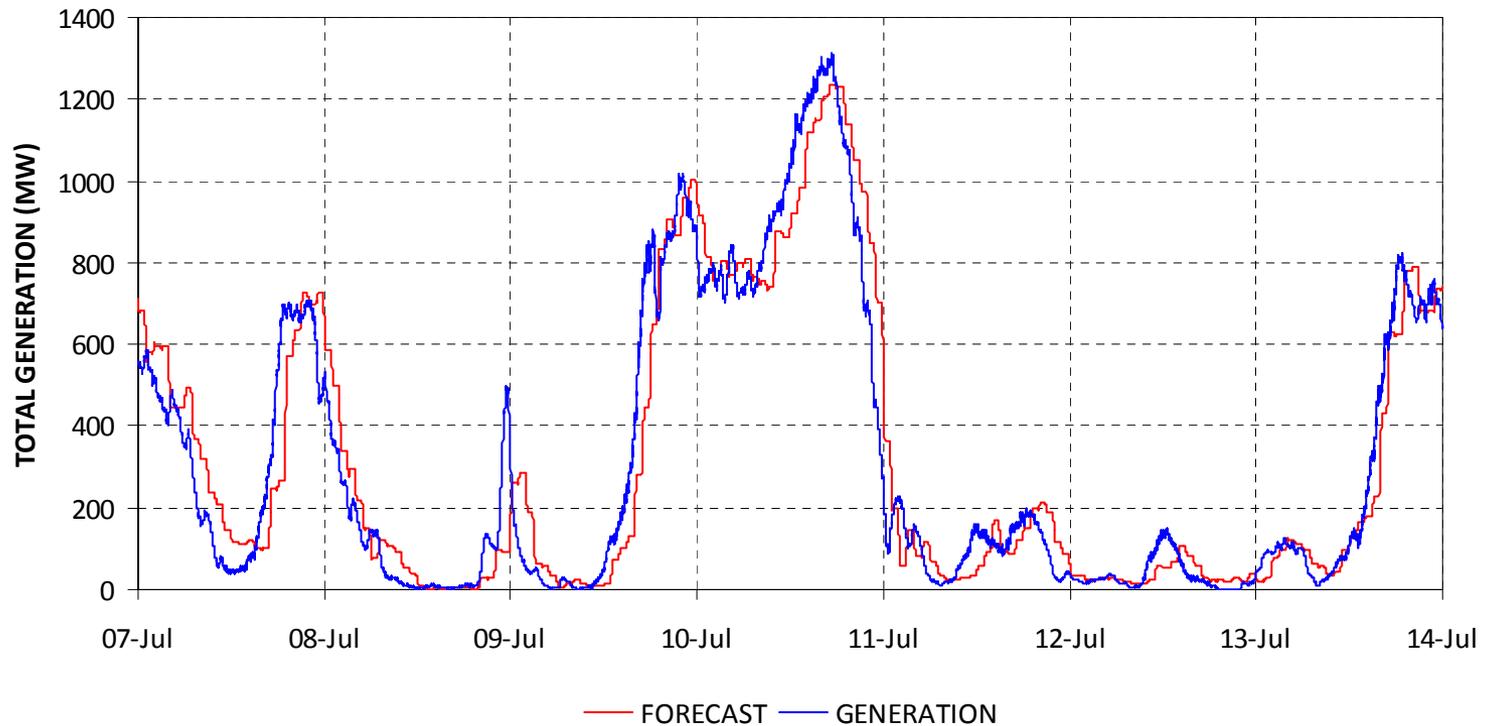


Wind Generation Characteristics to Date

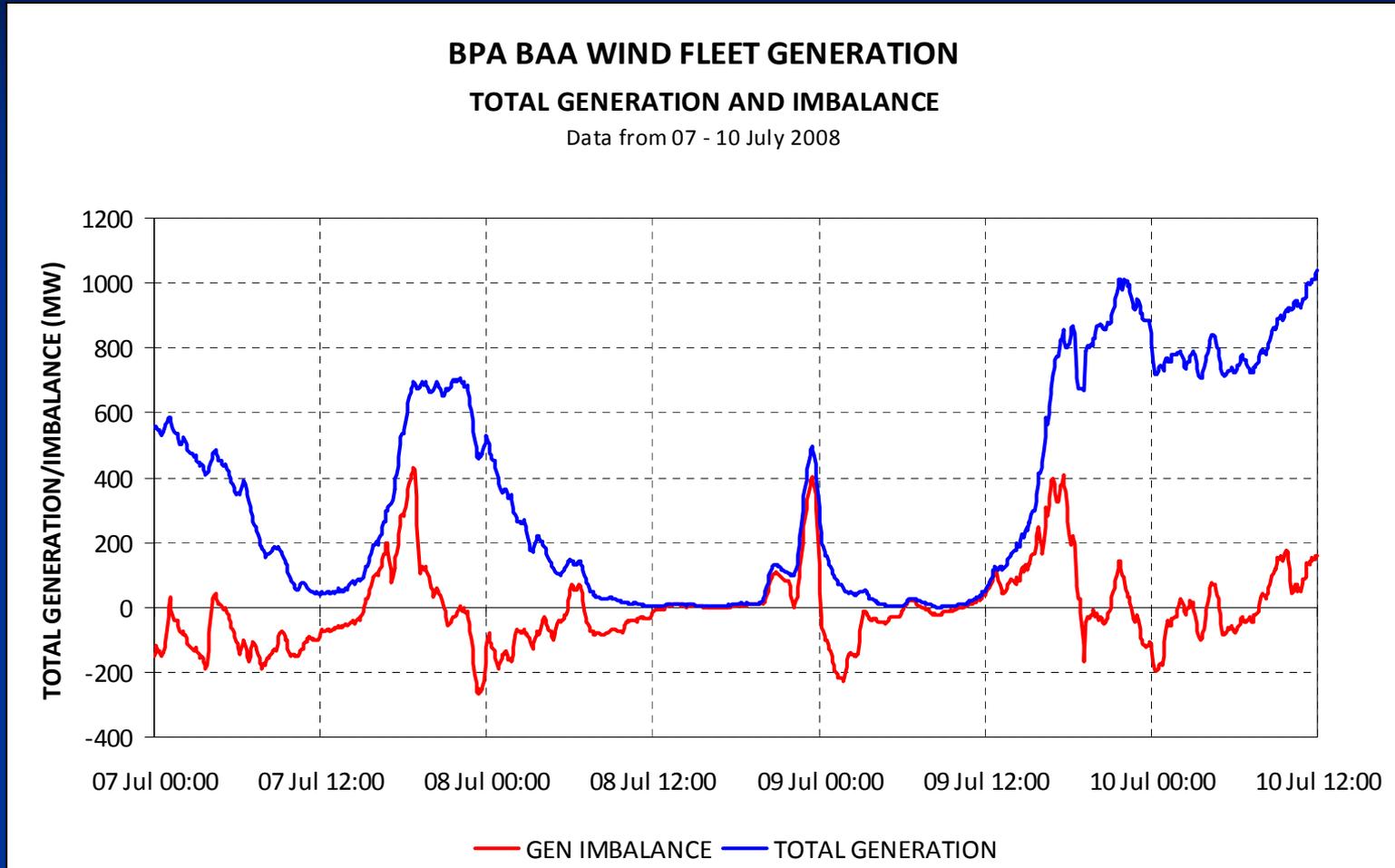
BPA BAA WIND FLEET GENERATION

ACTUAL AND FORECAST GENERATION

Data from 07 - 14 July 2008



Wind Generation Characteristics to Date

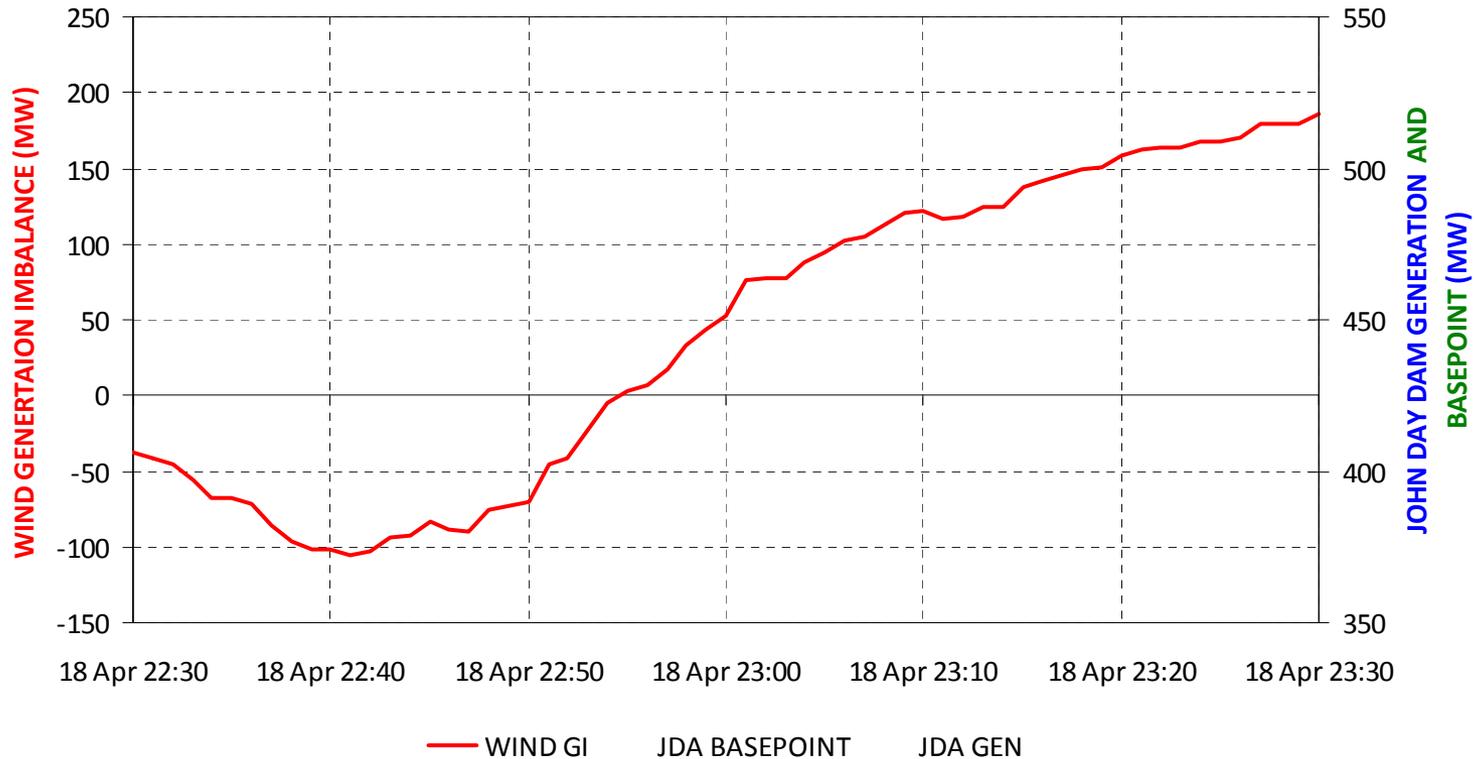


Largest 20-minute changes since May 8, 2008: -618 MW and +508 MW.



Operational Impacts

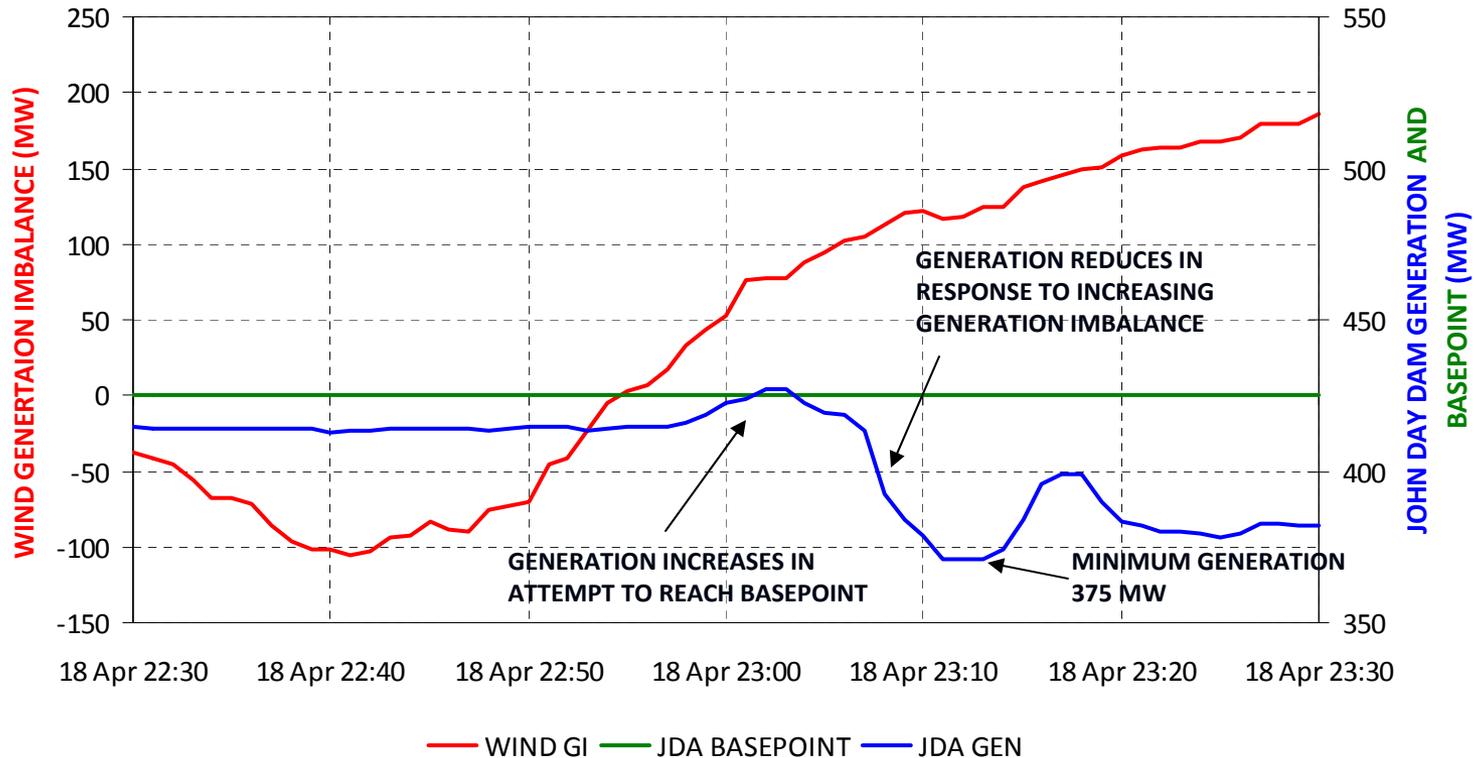
BPA BAA WIND FLEET GENERATION
EXAMPLE OF GENERATION IMBALANCE AFFECTING HYDRAULIC OPERATIONS



Operational Impacts

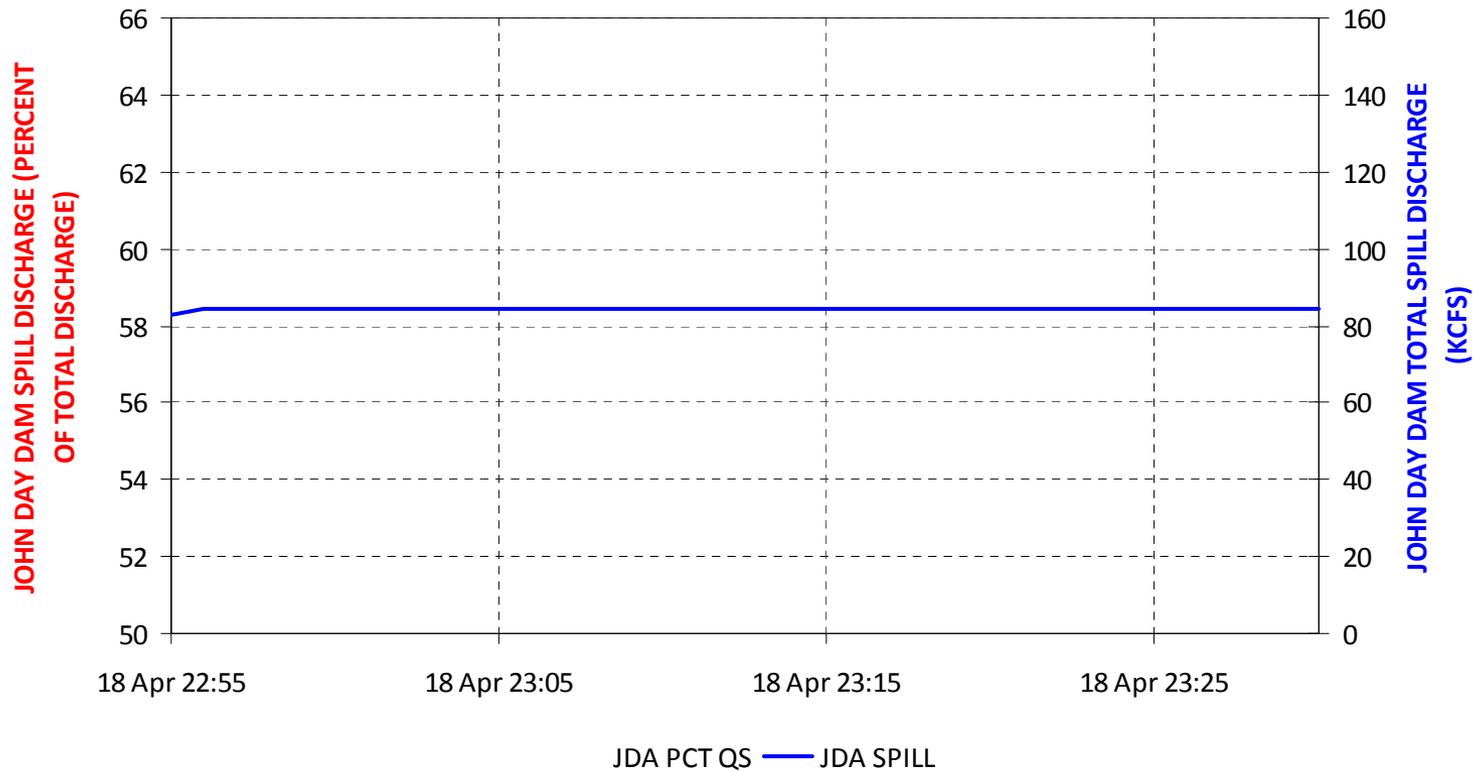
BPA BAA WIND FLEET GENERATION

EXAMPLE OF GENERATION IMBALANCE AFFECTING HYDRAULIC OPERATIONS



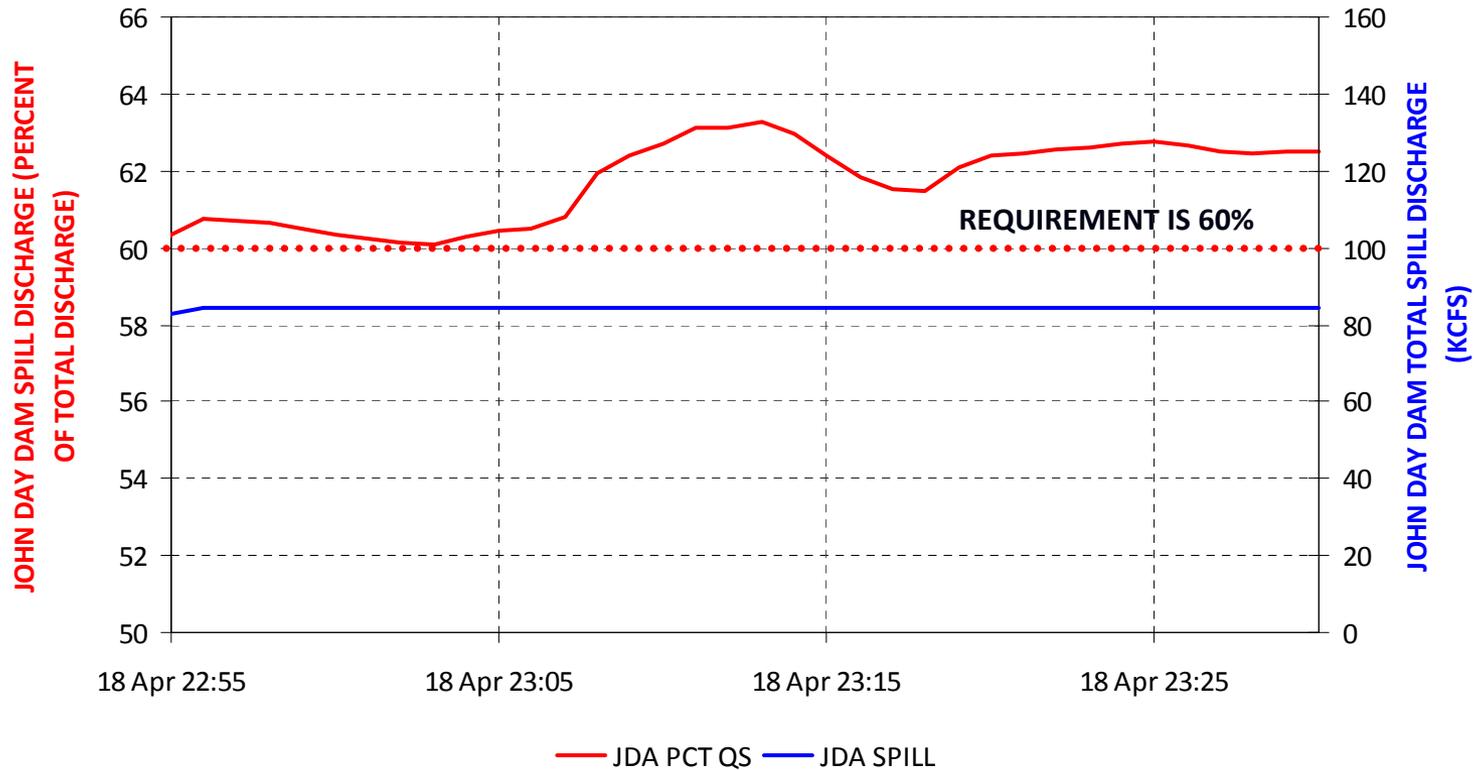
Operational Impacts

BPA BAA WIND FLEET GENERATION
EXAMPLE OF GENERATION IMBALANCE AFFECTING HYDRAULIC OPERATIONS



Operational Impacts

BPA BAA WIND FLEET GENERATION
EXAMPLE OF GENERATION IMBALANCE AFFECTING HYDRAULIC OPERATIONS



Operational Impacts



- Analysis completed in May 2008 suggested projects with percentage spill requirements, the number of adjustments required increased with the greater wind fleet capacity.
- For a 450 MW increase in fleet capacity, mid-hour adjustment increased:
 - McNary +1.8%
 - John Day +3.8%
 - The Dalles +7.7%



Operational Impacts



- Projects must operate to greater hourly minimum discharges.
- This is needed to provide the ability to decrease generation.



Operational Impacts



- Projects must operate to lower hourly capacities.
- This is needed to provide the ability to increase generation.



Operational Impacts



- Projects on response (e.g. AUTO AGC) will see larger fluctuations in actual generation.



Operational Impacts



- In spill due to lack of load conditions, BPA would like to be able to displace wind to avoid excessive TDG.



Next Steps

- Continue to monitor reserve requirements and enforcement mechanisms.
- Discuss displacement issue with utilities and the wind community.
- Continue efforts to support improved scheduling accuracy to minimize needed reserves.
- Explore new industry practices and products (3rd party supply of reserves, sub-hourly markets, ACE diversity, etc.)



COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

January 14, 2009 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.

Review of Minutes/Agenda

The 11/21 Year End Review, 12/15 and 12/17 facilitator notes and official meeting minutes were posted to the TMT webpage. Edits to the 11/21 and 12/3 official minutes were submitted by Kyle Dittmer, CRITFC:

- 11/21 minutes: on page 9, change "120%" to "102%" of normal
- 12/3 minutes: "Heinith" is misspelled on the last page.

Edits to the 12/17 official minutes were submitted by NOAA and the COE:

- 12/17 minutes: Wagner read aloud a suggested revision to the Joel Fenolio section on page 7. He handed a copy of the text to Jim Adams, COE, for editing.

With those changes made, all three sets of notes were considered final.

Action: Jim Adams, COE, will make the changes discussed following today's meeting and re-post the notes to the web

Water Supply Forecasts

Steve King, River Forecast Center, referred TMT to several web links posted to the meeting agenda. King reviewed October-December 2008 precipitation data and guided the group through links to 2009 regional water supply forecasts. He reviewed data for each project, noting that the RFC and official ESP forecasts aligned pretty closely for Libby (5490 KAF for the Jan-July time period.) King described the processes for official regression modeling and explained how some allowances are made for future conditions; he expressed a sense that the regression forecasts issued last week would be a bit higher if re-issued today. Kyle Dittmer, CRITFC, said that the three model prediction method used by CRITFC has produced slightly different data, perhaps signaling the need to find consensus across forecasts. King said that his office has been active in updated NWRFC regression procedures using techniques that are similar to what is employed by the NRCS and the COE. The new procedures will be tested internally during the 2009 forecast season. Products may not be made available to the public this season, but testing and coordination with partners including the COE will be ongoing.

King also referred TMT to links to the Climate Prediction Center and reviewed precipitation forecasts and seasonal outlooks. The three month outlook was for equal chance above/below normal conditions for much of the region. King reminded TMT that

a link off the main RFC page provides details on how to participate in “tele-web” water supply forecast briefings, which are typically held on the 8th or 9th of each month.

Randy Wortman, COE, referred TMT to a graph posted as a link to the COE’s April-July inflow volume forecast for Dworshak. The graph showed different forecasts, including the COE and RFC’s. The depiction was of wide-ranging variability, with data ranging between 2500-3800 KAF. Wortman clarified that COE forecasts meet a 95% confidence level, per its commitment through Canadian treaty agreements that requires a more conservative or “less risky” modeling technique.

TMT members thanked King and Wortman for their participation in today’s meeting and acknowledged that the take home message is that all the forecasts are predicting fairly close to normal precipitation conditions. They also agreed that it is early in the year and that inputs to the forecasting models (e.g., snowpack and precipitation) are likely to change over the course of the season ahead.

Chum Operations

Dan Feil, COE, referred TMT to links on the agenda of figures summarizing the last two weeks of spawning and also post-spawning operations that have occurred since 1/1. Chum spawning operations ended on 12/31. Feil noted that post-spawning or incubation operations began on 1/1 with the current teletype specifying a minimum tailwater elevation also available as a link on the agenda. Feil reminded TMT that all teletypes issued for chum operations that began on 11/7 have been posted to TMT meeting agendas. Tony Norris, BPA, commented that relatively low flows and fairly average precipitation helped efforts to maintain good habitat for chum spawning this year. Norris reminded TMT that next year there will be tighter constraints associated with The Dalles’ Spillway construction. Paul Wagner, NOAA asked whether data could be provided that would show the number of hours the recommended chum operations were maintained, to help supplement 10-year population trend data.

Action: Dan Feil, COE, will coordinate with Wagner offline on his data request summary.

The Dalles Spillwall Construction Update

Jim Adams, COE, announced that Lance Helwig, former project manager for The Dalles, had accepted a new position: Branch Chief of Design at the COE’s Portland District office. Helwig introduced TMT to Pat Duyck, the new project manger, who provided TMT an update on the status of construction at the project and shared plans for the 2009-10 season. Helwig acknowledged that the interface between construction and chum operations went well this past season, thanks in part to great coordination between the project, RCC and TMT. Duyck reported that 15 of 20 wall segments are currently in place, with a goal of all 20 segments (330 ft of wall) in place by this April. He also noted that 50% of the leveling slabs are currently in place. The spillwall will be 830 feet long when complete. Between April-October of this year, additional units will be cast and leveling slabs constructed. Pat and Lance described how sponsons floats are being installed on the work barges and will be used to assist with work in shallow areas (work performed this season was primarily in the deeper areas.) Helwig and Duyck said that the

300 foot crane being used will be removed for the summer months and re-installed at the construction site in September; this will require a short-term special operation but is not anticipated to conflict with spill. In-water work will take place between October 2009 and April 2010. Duyck suggested that the minimum tailwater ranges will be 76.5 ' daytime and 74' for nighttime hours. Duyck said he would coordinate closely with TMT, especially during the November-December 2009 chum spawning timeframe.

Next Steps: Regional Construction Task Force conference calls are held twice a month, on Thursdays at 9 a.m. Duyck invited TMT members for a site visit, suggesting late February as a good time. If any new construction developments arise, Duyck will contact TMT.

2009 Water Management Plan

Dan Feil, COE, reported that the 2009 Water Management Plan was finalized and posted.

Next Steps: Feil offered to talk with Russ Kiefer, ID, about comments submitted by the State that do not appear to be incorporated in the final version.

Note: the FOP is still under internal review and is expected to be released for region-wide review next month.

Operations Review

Reservoirs: Grand Coulee was at elevation 1289.2', and Hungry Horse was at elevation 3523.56', with outflows of 2.2 kcfs. Reclamation's January final operating forecast for Hungry Horse is 2193 kaf (Jan-Jul) which is 99% of average. Libby was at 2410.4', with inflows of 3 kcfs and minimum outflows of about 4 kcfs expected for the remainder of the month. Albeni Falls was at 2051.6'; Dworshak was at 1539.4', with inflows of 5.4 kcfs and outflows in the range of 6.5-7 kcfs. Seven day average inflows were 42 kcfs at Lower Granite, 157 kcfs at McNary and 188 kcfs at Bonneville.

Fish: Paul Wagner said that overall chum numbers from this past season were low.

Power System: Tony Norris, BPA, reported a unit trip [*note: Norris clarified after the meeting that the Powerhouse transmission line tripped off*] at Lower Granite on January 5-6th that caused the project to go to zero generation. In response to a question from the public, Norris clarified that there is no chance that spill will be required at Chief Joseph.

Water Quality: The COE is coordinating with BPA on formulating the plan for testing performance of the spill deflectors at Chief Joseph. Updates will be shared with TMT as they are made available.

Next face-to-face TMT Meeting: Thursday, 1/29 **Note: Special Day and Call-in #
Agenda items will include:

- Fish Operations Plan (?)
- WMP Fall/Winter Update
- Update - BPA Wind Integration Presentation (subject to availability)
- Operations Review

**Columbia River Regional Forum
Technical Management Team Meeting
Jan. 14, 2009**

1. Introduction

Today's TMT meeting was chaired by Jim Adams (COE) and facilitated by Robin Gumpert (DS Consulting) with representatives of COE, USFWS, BPA, BOR, NOAA, FPC, Washington, Idaho, the National Weather Service, and others participating. 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 for Nov. 21, Dec. 15, and Dec. 17, 2008

Nov. 21, 2008 Year End Review official minutes: On page 9, CRITFC's latest forecast is 102%, not 120%, of normal, Kyle Dittmer said.

Dec. 3, 2008 official minutes: In the discussion of Libby flood control, Paul Wagner (NOAA) revised the end of the first paragraph to say, "The WMP had stated that there's a variable draft methodology in place for operating Libby reservoir, which says that if the November/December SOI forecast is less than 95% of normal, a sliding scale methodology would be used to calculate the flood control elevation between 95% and 88% of normal. The reservoir would be drafted to elevation 2,413.2 feet by the end of December, given this year's 94% of normal precipitation forecast, Wagner said. The WMP for the past 3 years has suggested that less than 95% of normal precipitation would invoke this sliding scale methodology for flood control. NOAA and USFWS asked the COE to explain the discrepancy between the Corps planned operation and the WMP." In the following paragraph, 94% of average should be 95%.

3. Weather Service Water Supply Forecasts and Flood Control

Steve King (National Weather Service) gave a presentation on the National Weather Service's River Forecast Center forecasts for 2009, beginning with the main water supply forecast (linked to today's agenda). It's so early in the year that these forecasts are but a hint of things to come, he cautioned.

The official regression forecast, coordinated with other federal agencies, shows relatively normal water supplies for April-Sept. 2009 in the upper Snake River, Canada, and the Idaho panhandle. However, lower than normal water supplies are forecast for the Libby/Kootenai River area in upper Idaho. There are very low forecasts along the mainstem Snake River due to regulated conditions in the basin. October and November 2008 were dry, followed by the heavy snows of December. Fall runoff was above normal in the upper Snake River in Idaho and

in western Montana. Roughly 30% of the normal runoff at The Dalles comes from precipitation or snowpack in Canada and another 30% from western Montana. Both of these areas are critical for forecasting water supplies in the Northwest.

Seasonal precipitation plots also reflect large contributions to precipitation in December. There was additional precipitation in western Montana near Missoula, and above normal precipitation in the upper Snake, but conditions in British Columbia were on the dry side. Precipitation on the Columbia for December 2008 above Grand Coulee Dam was 96% of average (October through December precipitation was 91% of average). Precipitation on the Snake River above Ice Harbor Dam for December was 144% of normal, but only 107% of normal for October-December 2008. Precipitation in the upper Snake was 150% of normal for December but 11% of normal for the season. Precipitation in the Clearwater region was 132% of normal for December and 108% of normal for the season.

Snowfall was even lighter than precipitation across the region, until the recent storms. Snowfall in British Columbia has been around average, an encouraging trend for the long haul. However, snow accumulation on the upper Snake was less than normal until the end of December; it normally picks up around Nov. 1, a month and a half earlier than it did in 2008. Snowpack levels have risen to normal now, but nothing in the next 10-day forecast suggests more snow accumulation, so the normal trend might not continue.

The official regression forecast as of Jan. 9, 2009, was 5,490 maf at Libby Dam for January-July; the ESP forecast for Libby is also 5,490 maf. The ESP forecasts are issued weekly and typically represent the best thinking available at the time. At present, both models are operating with the same snow information, but it's best to look at the first ESP forecast following the official forecast to get an exact comparison, unless the two forecasts are issued simultaneously, King said. This is because the latest snow information is rarely input into the models at the same time. Snowfall predictions are heavily based on modeling because of the limited number of observation points, especially at higher elevations. Both models have methodologies to account for future conditions.

King showed TMT several forecasts for January-July 2009 at individual dams. The regression forecast for Hungry Horse Dam is 2,110 kaf (normal is 2,224 kaf), 95% of average. The ESP forecast for Hungry Horse is 2,107 kaf. The regression forecast for Albeni Falls Dam for the same period is 1,306 kaf, 89% of normal, but the ESP forecast came in quite a bit higher at 1,503 kaf. The regression forecast for Grand Coulee Dam is 58.2 kaf, 93% of normal; the ESP prediction is 60.1 kaf.

For April-July 2009, the regression forecast for Dworshak Dam is 2,409 kaf, 94% of normal, while the ESP forecast is 3,016 kaf, 115% of normal.

Comparatively, the 1978 and 1981 runoff years are most similar to the current 2009 coordinated regression forecast for Dworshak. Final forecasts are coordinated with other federal agencies, while the early bird and mid month forecasts reflect Weather Service models. In the case of Dworshak, regression models used by the National Weather Service and the National Resource Conservation Service are nearly identical, showing an upward trend, while the COE forecast has shown a downward trend over the past several months. For water supply volumes at Dworshak, the ESP and COE forecasts are a little over 3 maf, while the coordinated RFC forecast is around 2.5 maf.

There was discussion of why the COE and official coordinated Weather Service forecasts differ. The Columbia River treaty with Canada requires that operations be based on a 95% level of confidence, so the COE forecasts are calculated accordingly, Randy Wortman explained. This means the COE can't allow any subjective influence in their forecasts, or average their forecasts with anybody else's. This is why the COE issues an official forecast for Libby and Dworshak which differs from the Weather Service's official coordinated forecast.

For April-July 2009, the regression forecast for Lower Granite Dam is 18.4 maf, 85% of average, while the ESP forecast is 21.6 maf, with neither model forecasting natural conditions for the Snake River. In response to questioning about why the regression and ESP forecasts are so different, King explained the Snake system is heavily regulated, so trying to figure out what's going to happen operationally is difficult. Both models use different techniques for handling assumptions as to how water will be managed over the course of the year. It's easier to forecast for Grand Coulee, where the forecast represents natural flow conditions.

The ESP forecast for The Dalles is now 114% of normal, but will probably drop in the weeks to come because no additional precipitation is expected over the next 10 days.

For January-July 2008, the regression forecast is 94.7 maf, 88% of normal, while the ESP forecast is 104.5 maf, which is within 10% of normal or 107 maf. CRITFC's forecast for The Dalles, updated Jan. 5, is 111 maf, 103% of normal, Kyle Dittmer noted. The University of Washington's Jan. 1 forecast is 102 maf, 105% of normal, making all the forecasts within plus or minus 5% of normal.

John Roache (BOR) asked, if precipitation is around 100% of average above The Dalles, why is the official forecast only 88% of normal? Although precipitation was normal, King said, runoff was low in the fall, and snow accumulation to the north was below normal until mid December. In Canada and on the Kootenai River, seasonal precipitation was only 70-90% of normal. These things brought down the initial forecast of 150% of normal for the first week of January 2009. The ESP forecast for The Dalles is now 114% of normal, but will probably drop in the weeks to come because no additional precipitation is expected over the next 10 days.

The one-month outlook for precipitation, updated Dec. 31, 2008, shows that January 2009 has a slightly weighted slightly odds having above normal precipitation. Now the Weather Service is saying it's weighted slightly more towards normal, but still there's a 66% chance of conditions not being normal. The 90-day precipitation forecast also shows equal chances of above, below, or normal conditions. Below normal temperatures are forecast for January-March 2009. It's difficult at this point to extrapolate with this means for the region's water supply.

In response to a question about whether the Weather Service plans to revise the regression technique, King reported that work on a new statistical technique would undergo testing beginning this month. The new technique will be evaluated internally and, later, with federal partners. For those who wish to follow the forecasting process closely, the Weather Service offers live water supply briefings via their web page under the "water supply" tab. This link is also available on the TMT web page. It includes a calendar of release dates for the early-bird, mid-month and official forecasts.

4. Chum Operations Review

Results of the last two weeks of the chum spawning operation are linked to today's agenda, Dan Feil (COE) said. Two graphs, Dec. 17-24, 2008, and Dec. 24-31, 2008, show Bonneville Dam outflows and tailwater elevations, with peaks after 1500 hours each day when excess water was released to maintain the target daytime tailwater elevations. The third item linked to today's agenda is the teletype the COE sent to project operators. Currently the only restriction on post spawning operations is maintaining an 11.5-foot minimum tailwater elevation. Item 4, also linked to today's agenda, shows Bonneville outflows and tailwater elevations for post-spawning operations. The peak tailwater elevation was last week at around 21 feet, with outflows of around 220 kcfs.

In response to questioning about tailwater elevations for chum, Feil explained that the 11.3-11.7 foot range is maintained to limit spawning to the lower elevations so eggs won't have to be kept inundated next spring.

Next year, construction work on The Dalles spill wall will restrict forebay elevations at Bonneville, making it harder to provide flexibility for the chum operation, Tony Norris (BPA) said. Conditions in November and early December 2008 were unusually dry, which supported the chum operation this year. He cautioned people not to expect these results in 2009, especially with spill wall construction upstream at The Dalles. Paul Wagner (NOAA) requested a post season wrap-up of the Bonneville chum operation, a sort of 10-year retrospective, including how many hours the target elevation was maintained. Feil said he could provide that at the next TMT meeting. The wrap-up should be limited to elevation exceedances during daylight spawning hours, Norris said.

Wagner and Feil will work on this together off line and decide whether to present the results to TMT.

5. The Dalles Spill Wall Construction Update

Pat Duyck (COE project manager for The Dalles spill wall construction) and Lance Helwig (COE Portland District Design Engineering Branch Chief, formerly TDA spill wall construction manager) gave a presentation.

Helwig recalled his visit to TMT last November. TMT asked him to minimize effects on the 2008 chum operation, and Helwig worked with the contractor to accomplish that. Duyck gave an outlook on the second year of the two-year construction. The 830-foot spill wall is being built between bays 8 and 9, with the goal this year of completing the first 300 foot span to the end of the stilling basin. Work in 2008 was in the deep end of the stilling basin, while work in 2009 will be in the shallow end, using a 300-ton crane to move large blocks weighing about 200 tons apiece. This will probably require about 6.5 feet of water with engineering modifications, making management of the chum operation at Bonneville more challenging next year. To lighten the load on the derrick barge and the impacts downstream at Bonneville, the contractor has proposed using sponsons as ballast to stabilize the barge and minimize the depth needed for flotation. This would reduce the requirement for 8 feet of draft to 6.5 feet 24/7. This depth will be needed at night as well as in daytime because the huge crane, which is difficult to move, will remain in place for the duration of the work season Oct. 2, 2009, through April 2010.

Scott Bettin (BPA) asked, will the crane be removed during spring and summer? Duyck and Helwig expected the contractor to use the valuable equipment elsewhere this summer. When it demobilizes for spring and summer, no special operations will be needed to remove it, Helwig said. Sensitive times will be in October through April, mainly the November-December chum spawning period. More restriction at Bonneville next year will be very problematic, Tony Norris said. Minimum elevation will be 76-76.5 feet at The Dalles tailrace 24 hours a day, which equates to 74.5-75 feet in the Bonneville forebay, or about a 1-foot elevation drop. The normal operating range at Bonneville is 71.5-76.5 feet so this will be within normal.

Duyck offered to coordinate a site visit to The Dalles in early spring if TMT wants to view spill wall construction and receive an update before the 2009 spill season starts. Harkless suggested a site visit in late February. Dave Wills (USFWS) asked the COE to notify the salmon managers if anything changes before then. He and the other salmon managers will discuss their 2009 fishery management options and keep spill wall construction managers apprised of their thinking.

6. Fish Operations Plan

The 2009 spill/transport FOP is still under development, Feil said. The Action Agencies expect to have the planned spill operations out to the region within the next month, as an appendix to the Fish Passage Plan. Last week FPOM met and discussed a few updates to the FPP and made revisions; the revised draft is now posted.

7. Final Water Management Plan

The WMP has been finalized and is linked to today's agenda, Feil said. FPOM met last week and discussed updates to the plan; revisions were made. The spring/summer update will be available in a month or two. The fall/winter update is also posted, having been finalized at the end of the year. Russ Kiefer (Idaho) asked whether all comments were included; he and others will pursue this question further offline. The comments this year were generally excellent, greatly improving the value of the document, Tony Norris noted.

The FOP will be out for external review at the end of this month as Appendix E to the Fish Passage Plan. The deadline for comments on the FPP is Feb. 19. FPOM will meet that day to finalize the plan, which will be distributed in early March.

8. Operations Review

a. Reservoirs. Grand Coulee is at elevation 1,289.2 feet, the relatively high elevation is in part due to the heavy precipitation in early January. With the flow deflectors in place at Chief Joseph Dam, Grand Coulee Dam can now move a lot of water, Tony Norris said. Bonneville is the place of likely spill, which began today at 50 kcfs and will probably continue for several days. The Bonneville tailwater elevation is now around 16 feet.

Hungry Horse is at 3,523.56 feet elevation, discharging 2.2 kcfs. Reclamation's official operating forecast for Hungry Horse is 2193 kaf (Jan-Jul) which is 99% of average and is close to the River Forecast Center's forecast of about 95 percent of normal.

Libby is at elevation 2,410.4 feet. Inflows are around 3 kcfs, outflows have consistently remained 4 kcfs, basically 1 unit running at minimum outflows. The end of January flood control elevation for Libby, based on the water supply forecast, was 2,426 feet elevation; the reservoir elevation is currently 16 feet below that. The plan is to maintain minimum 4 kcfs outflows for the near future. There was brief discussion of the fact that planning for Dworshak includes use of both a 70-year average and a 30-year average for outflows.

Albeni Falls is at elevation 2,051.6 feet at the Hope gage, basically passing inflows and operating within a 1-foot elevation range of 51-52 feet. The plan is to continue operating that way until March.

Dworshak is at elevation 1,539.4 feet. Inflows, which were 5.4 kcfs yesterday, have been decreasing over the past few days. Outflows have been on minimum flows but recently came up to 6.5-7 kcfs, which will continue for a while in order to meet the end of January flood control elevation. The COE's water supply forecast for Dworshak is 3,075 kaf, 115% of average. The end of January flood control elevation is 1,528 feet, with 11 feet to draft out by then. Look for higher outflows from Dworshak for the rest of January, Adams said.

The 7-day average inflow at Lower Granite is 42 kcfs; at McNary, 157 kcfs; at Bonneville, 188 kcfs. A unit tripped out at Lower Granite in early January, and the plant has been off zero generation since then due to excessive flows, Tony Norris said.

b. Fish. Chum spawning season officially ended on Dec. 30, 2008. Chum numbers this year weren't impressive – the peak live count was 57 fish, similar to returns in the past few years, Wagner said. The peak in 2006 was 127 fish; in 2005 it was 122. In general there has been a downward trend in recent years due to multiple causes, Dave Wills said. There was brief discussion of monitoring tributaries.

c. Power System. There was nothing new to report today. BPA hasn't intentionally gone to zero generation on the Snake River since Jan. 5-6. There is no expectation of spill at either Grand Coulee or Chief Joseph dams at this point. The only possible spill point is Bonneville Dam. The flow deflectors at Chief Joseph Dam are mobilized and ready for the 2009 spill season. BPA, the COE and possibly BOR will be designing total dissolved gas testing either this year or next, Adams said.

d. Water Quality. Temperatures are cool and gas levels are low everywhere, Adams said.

9. Next Meeting

The next regular TMT meeting will be Jan. 29, 2009, a Thursday. The fall/winter update to the WMP, the FOP, a wind integration team update, and the standard operations review will be on that agenda.

The facilitation team requested responses to a facilitation services survey they recently emailed to all TMT members. Contact the facilitation team if you need a hard copy.

This summary prepared by consultant and writer Pat Vivian.

| Name | Affiliation |
|------------------|--------------------------|
| Jim Adams | COE |
| David Wills | USFWS |
| Randy Wortman | COE |
| Tony Norris | BPA |
| John Roache | BOR |
| Paul Wagner | NOAA |
| Steve King | National Weather Service |
| Kevin Birkhoff | National Weather Service |
| Rick Vandersweet | National Weather Service |
| Kyle Dittmer | CRITFC |
| Tim Heizenrader | Centaurus |
| Shane Scott | PPC |
| Mike Langeslay | COE Portland |
| Pat Duyck | COE |
| Lance Helwig | COE |
| Dan Feil | COE |
| Burt Den | EWEB |
| John Hart | EWEB |

Phone:

| | |
|-----------------|----------------------|
| Joel Fenolio | COE Seattle |
| Greg Hoffman | COE Libby Dam |
| Laura Hamilton | COE |
| Dave Benner | FPC |
| Cindy LeFleur | Washington |
| Russ Kiefer | Idaho |
| Barry Espensen | CBB |
| Russ George | WMC |
| Ruth Burris | PGE |
| Scott Bettin | BPA |
| Richelle Beck | DRA |
| Yuan Mei | Edison Mission Group |
| Steve Hall | COE |
| Brenda Anderson | BPA |
| Jeff Aris | JP Morgan |

TECHNICAL MANAGEMENT TEAM

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

TMT MEETING

Thursday January 29, 2009 09:00 - 12:00

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

CONFERENCE PHONE LINE

NOTE NEW CONFERENCE LINE NUMBER
Conference call line:877-807-5706; PASS CODE = 898087

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 or Cathy Hlebechuk (503) 808-3942 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 reuse 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 rgumpert@cnmv.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and Introductions
2. Review Meeting Minutes [\[Meeting Minutes\]](#)
3. Wind Integration Presentation -Steve Barton, BPA
 - a. [\[Wind Integration Presentation\]](#)
4. Operations Review
 - a. Reservoirs
 - b. Fish
 - c. Power System
 - d. Water Quality
5. Other
 - a. Set agenda for next meeting - **February 11, 2009**

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

January 29, 2009 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.

Review of Minutes/Agenda

The 1/14 facilitator notes and official meeting minutes were posted to the TMT webpage. An edit to the 1/14 facilitator notes was submitted by Kyle Dittmer, CRITFC:

- At the bottom of page 1, change text to read "Climate Prediction Center."

With that change made, the 1/14 facilitator notes were considered final. Edits to the 1/14 official minutes were submitted by Steve King, RFC; TMT members will review those edits and look to finalize the official minutes at the 2/11 TMT meeting.

Wind Integration Presentation

Steve Barton, BPA/member of the wind integration technical team, provided TMT with a power point presentation linked to the agenda. The presentation included information on wind integration status, challenges/issues the team is facing, how they plan to address those issues and how the issues impact the hydro system. Barton said that one unique aspect of wind integration in the northwest is that only a couple hundred megawatts (25% of total generation) actually serve northwest loads. Barton said that the wind generation capacity is expected to grow to above 3,000 mega watts by late 2009 and to approach 6,000 mega watts by 2012; he clarified that most new generation project sites will serve loads outside of the BPA balancing authority. The presentation included slides that outlined how the wind generation supplements hydro generation and how scheduling at the projects is affected by fluctuations in wind direction/velocity and load demands for the region. Barton acknowledged the regional interest in minimizing the amount of energy needed in reserves and the need to balance that with meeting federal liability requirements. Barton noted the many economic issues at play, which drive the capacity of storage systems currently in place. Barton said that management efforts would be supported by access to more frequent real time wind weather data, similar to that used by the aviation industry, and by an improved ability to capture the diversity by integrating a bigger "geographic footprint".

Regarding potential impacts to hydro operations, Barton noted the following:

- Projects must have the flexibility to operate to greater hourly minimum discharges and decreased hourly generation capacities.
- More fluctuations in actual generation for those projects on auto-response.

- When there is a need for spill during lack of load, BPA would like to be able to displace wind and avoid excessive TDG. (This issue has been brought up at the last two wind integration technical team meetings and they are working with other stakeholder partners in the wind community to address this.)
- Increased volatility (depending on the ability to improve load scheduling accuracy.)
- Impacts to spill fluctuations are likely to be observed during the runoff season.

Action/Next Steps for the Wind Integration Team:

- Continue to monitor reserve requirements and enforcement mechanisms;
- Discuss displacement issue with utilities and the wind community;
- Continue efforts to support improved scheduling accuracy to minimize needed reserves;
- Explore new industry practices and products (3rd party supply of reserves, sub-hourly markets, ACE diversity, etc.);
- Coordinate with many external partners and look for cross-agency coordination opportunities that will lead to better transmission regionally and nationally.
 - BPA is scheduled to meet with the NPCC in March to discuss funding support for improvements to the regional wind forecasting network.

TMT members thanked Barton for coming to the meeting and sharing his insights; Barton said he is optimistic that there will be improvements to wind energy integration performance because of the increased collaborative efforts and financial incentives.

Next Steps for TMT:

- Agendas for the Wind Integration Technical Team meetings are available online. (at http://www.bpa.gov/corporate/About_BPA/wind/meetings.cfm)
- TMT will coordinate with Barton on when to schedule an update for a TMT meeting.
- Barton will coordinate with Tony Norris, BPA, when wind integration activities that affect the hydro system are imminent; to give TMT a head's up.

Operations Review

Reservoirs: Grand Coulee was at elevation 1280.4', and Hungry Horse was at elevation 3520.79', with outflows of 3-3.2 kcfs. Early bird forecasts for February showed a drop in snow pack. Libby was at 2409', with inflows of 2 kcfs and minimum outflows of about 4 kcfs expected for the near term. Albeni Falls was in the range of 2051 - 2052' and passing inflows of about 16 kcfs. Dworshak was at 1528.97', with outflows of 6 kcfs. Seven day average inflows were 33.5 kcfs at Lower Granite, 164 kcfs at McNary and 174.6 kcfs at Bonneville.

Other: Jim Adams, COE, reported that a crane boom collapsed at The Dalles on 1/26 (no one was hurt ☺). All spill wall construction was suspended through at least 1/28; the extent of damage to the wall was not yet known. **Action:** Adams will share information

with TMT as it is made available. The Bonneville pool will be held as steady as possible while damage is assessed.

Fish: Nothing at this time.

Power System: Tony Norris, BPA, said that the Snake River projects were on zero generation at night for a few days, for the first time this year.

Water Quality: Nothing at this time.

Next face-to-face TMT Meeting: February 11, 2009

Agenda items will include:

- Updated Water Supply Forecasts
- Flood Control Updates
- HEC 3-D Cam Updates
- Status of FPP / FOP
- The Dalles Spillwall Update (if any available)
- Operations Review

**Columbia River Regional Forum
Technical Management Team Meeting
Jan. 29, 2009**

1. Introduction

Today's TMT meeting was chaired by Jim Adams (COE) and facilitated by Robin Gumpert (DS Consulting) with representatives of COE, BPA, Montana, BOR, NOAA, USFWS, FPC and others participating. 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 for Jan. 14, 2009

Jan. 14, 2009, facilitator's notes: In the last paragraph on page 1, change "Climate Control Center" to "Climate Prediction Center," Kyle Dittmer (CRITFC) said. With this change, the facilitator's notes were deemed final.

Jan. 14, 2009, official minutes: These were posted on the web, after which Steve King (National Weather Service) sent comments regarding his presentation, Adams reported. Under The Dalles spill wall construction update, the Jan. 14 facilitator's notes cite an additional operational constraint that isn't included in the Jan. 14 official minutes, Tony Norris (BPA) said. Under the power system update, add a sentence explaining that the powerhouse tripped offline at Lower Granite only, not for the whole Snake River system. The official minutes for Jan. 14, 2009 will be finalized at the Feb. 11 TMT meeting.

3. Wind Integration and the Columbia River Hydro System

Steve Barton (BPA wind integration team) gave a slideshow presentation on effects that wind power integration into the Northwest power supply is having on regional hydropower operations.

The Northwest currently has 1,671 MW of wind generation capacity installed in BPA's wind balancing authority area (BAA), which represents about 16% of the BAA's peak load.

Wind generation capacity is expected to grow steadily over the next several years, nearly doubling to 3,000 MW by late 2009 and to 6,000 MW by 2012. This is roughly the equivalent of another Grand Coulee Dam in terms of installed capacity. These projections are based on actual integration requests BPA has received.

A little over half the wind generation connected to the Northwest grid is in the BAA; however, less than a quarter of that actually serves federal loads. This

is not the case in other wind power-producing areas of the country, and it creates unique difficulties in integrating wind power with hydro system operations.

Furthermore, most of the wind farms in the Northwest are clustered in the Columbia Gorge between The Dalles and Boardman, so the region's wind energy supply lacks geographic diversity. Because they're subject to similar wind patterns, the generators in the Gorge all tend to operate as a group rather than offsetting each other's energy production. As an example of the effect geographic diversity has on energy production, slide 9 of Barton's presentation shows that power generation in the Northwest wind resource area was zero this winter while the wind howled fiercely in the gorge's west end.

Litchfield asked whether the projections of rapid growth in wind capacity include potential effects of the recession; Barton said no. Most new wind generation sited between now and 2012 in the BAA is expected to serve investor-owned and public utility customers in the Northwest, as well as customers in California and elsewhere outside the region.

Wind power production in the Northwest is currently backed up by hydropower generation. Wind generation requires backup because it's an intermittent resource, producing energy whenever the wind blows and not in response to demand. Studies have found zero correlation between wind power production in the Northwest and demand. In order to maintain load-resource balance, loads versus generation must equal zero. This means another resource must be available within the hour to follow the intermittency and variability of wind generation.

BPA faces unique challenges in this situation, given that (1) large portions of wind power are serving non-BAA loads, and (2) wind generation is so difficult to predict. Wind energy providers submit production schedules to BPA, which uses them to plan residual loads on the federal system. Most of BPA's efforts to study wind have been to quantify the reserves wind generation requires. BPA is also working with providers on improving scheduling accuracy. In planning for the bi-directional hydro reserves that would be necessary to maintain system reliability by 2012-13, BPA found that a hydro equivalent of 25-35% of the installed wind fleet capacity would need to be held in reserve. However, the reserve requirements associated with a given wind fleet size could drop substantially in response to improved wind scheduling accuracy.

A third area of concern is gaining understanding of the impacts that maintaining reserves within an hour of volatility has on hydro system operations. Litchfield asked whether this means the 3,000 MW of wind capacity expected by the end of 2009 will be backed by a third (1,000 MW in both directions, or 2,000 total MW) of reserve hydro capacity which could be needed at any time to respond to changes in wind generation. Barton said that is correct. There is interest in holding smaller reserves on the system, but that will depend on

whether scheduling accuracy improves. At present, a third of scheduling values were more than 25% in error, and roughly half were more than 20% in error, as depicted in slide 11 of this presentation. In response to this instability, the wind integration public forum has begun to explore the need for an enforcement mechanism to ensure that the hydrosystem doesn't get over-deployed.

Barton presented numerous slides depicting BPA's analysis of the situation, all of which are linked to today's agenda and are also available on BPA's website. Dan Feil (COE) asked what physically happens to the hydro system if 1500 MW of wind generation drops to 800 MW. If wind generation drops by 700 MW, the balancing resource needs to increase generation by 700 MW, assuming all other factors are constant, Barton said. There has to be sufficient capacity on the system to counteract the dips and peaks in wind production.

Impacts on fish operations could be significant. In general, wind power schedules predict fewer megawatts than actual production levels. This has created a net storage effect on the federal system. From October 2006 to now, the accumulated error peaked at 70,000 MWh of generation imbalance supplied by the FCRPS in the form of stored energy. The FCRPS essentially stores this energy for free, and it has become a water management issue, as wind power can ramp up very abruptly – for example, from zero to full load or 1,500 MW in just 90 minutes last Christmas season. The largest 60-minute ramp-up seen was 1,161 MW, or 77% of capacity within an hour. Efforts are underway to predict these extreme ramps because they are what drive reserve requirements. Slide 17 depicts a real-life example at John Day in April 2008 of what can happen when the hydro system follows a sudden wind power ramp-up. As the wind imbalance at John Day grew to 200 MW, the impact of unexpected wind generation spread to Grand Coulee. Once a project hits its minimum generation level to accommodate wind, the response shifts to any project that can respond.

FCRPS projects could end up with spill variances as a result, Litchfield said. Slide 19 depicts a time when John Day Dam went from its planned 60% spill level to nearly 64% spill, exceeding the +/-1% bandwidth (the COE's definition of a spill variance) while following increases in wind generation, Barton said.

The situation has potential for more gas generation, David Wills (USFWS) observed. It implicates how the region handles its ESA responsibilities for water quality and fish. BPA shares that concern and has been studying spill impacts, specifically the increase in mid-hour spill adjustments. For a 450 MW increase in wind fleet capacity (from 730 to 1,180 MW), there was a 1.8% increase in the number of mid-hour spill adjustments made at McNary, a 3.8% increase in mid-hour spill adjustments at John Day, and a 7.7% increase in mid-hour spill adjustments at The Dalles. In other words, Barton said, as wind power capacity increases, so does system volatility. BPA transmission managers are aware that

there's a finite amount of reserves the FCRPS projects can carry, especially in light of congested transmission pathways to Grand Coulee and Chief Joseph dams. Quantifying how much the hydrosystem can handle is a challenge.

A few wind projects are planned in eastern Washington, the Kittitas Valley, and near Walla Walla, which could increase geographic diversity, Barton said. Adams asked about the potential for chemical energy storage of wind power. That's a research issue now, Barton replied. Present storage technologies are cost-prohibitive, but BPA is looking for ways to do it more cheaply. There was discussion of transmission costs involved in shipping power to population centers from the remote, unpopulated areas where wind usually blows strongest. Wind power production in the eastern gorge currently has an annual 30% capacity factor, meaning that a 100-megawatt wind power facility can be expected to produce 30 MW annually, Barton said.

Paul Wagner (NOAA) asked about seasonal variations in wind capacity. The wind tends to blow in response to the weather fronts that bring spring and fall rains, and it tends to stop blowing when cold, stagnant air or hot air predominates. That means wind power tends to be unavailable when demand peaks in winter and summer. Spring 2008 was a good wind season, with capacity factors of around 45% for most wind facilities in the Northwest, Barton reported.

Laura Hamilton (COE) asked how many more MWs of wind power BPA expects to place on the system before and during 2009 spill season. Barton gave a preliminary estimate of 1,700-2,000 MW.

To address concerns regarding spill and TDG levels, BPA is working with the wind community on developing incentives to displace wind generation with hydro at times when spill volumes are high and tailrace TDG levels might exceed the 120% state water quality standard. BPA is also working with providers on fiscal incentives to improve scheduling accuracy and adjust wind operations to conform to the schedule. Possibilities for developing region-wide wind forecasting are also being explored, as well as proposals to build transmission in remote, windy areas with the intent of increasing regional wind power capacity and geographic diversity. Kyle Dittmer (CRITFC) asked: "What specific weather information would be needed to improve wind generation operations." Barton said having surface observations at 5-minute intervals (to help with rapid ramping up/down), a new National Weather Service product for wind-power users (currently geared for aviation users), and surface wind forecasts.

USFWS, Montana and the COE requested that BPA keep TMT apprised of issues that wind integration brings to the hydro system so any problems that arise can be dealt with quickly.

4. The Dalles Spill Wall Update

On Jan. 26, a crane boom collapsed onto the derrick barge Alameda, Adams reported. There were no injuries, but spill wall construction has been suspended, and the contractor has requested that the Bonneville pool be kept as flat as possible until the crane can be removed and repaired to prevent any further damage. The schedule, which was already behind, will need to be revised accordingly. The crane has to be removed before damage to the wall can be assessed.

5. Operations Review

a. Reservoirs. Grand Coulee is at elevation 1,280.4 feet, slowly drafting.

Hungry Horse is at elevation 3,520.79 feet, with discharges of 3-3.2 kcfs to meet the Columbia Falls minimum flow.

Libby is at its minimum elevation of 2,409 feet, with inflows of around 2 kcfs and outflows of 4 kcfs. The RFC April-August precipitation forecast is 89% of average.

Albeni Falls is at elevation 2,051-2,055 feet, passing inflows of 16 kcfs.

Dworshak is at elevation 1,428.97 feet, a foot above the end of January target of 1,528 feet elevation. Outflows are 6 kcfs daily as the pool drafts down to its January elevation. The RFC April-September precipitation forecast is 89% of average.

The 7-day average inflow is 33.5 kcfs at Lower Granite, 164 kcfs at McNary, and 174.6 kcfs at Bonneville.

b. Fish. There was nothing to report today.

c. Power System. Over the past few days, and for this first time this winter, Lower Snake projects have gone to zero generation at night per specifications, Norris reported.

d. Water Quality. Temperatures are cool and gas levels are low throughout the system, Adams reported.

6. Next Meeting

The next regular TMT meeting will be Feb. 11, 2009. The agenda will include finalizing notes for Jan. 14 and today; the February water supply forecast; updates on flood control, The Dalles spill wall construction, the Fish Passage Plan and Fish Operations Plan; and the standard operations review.

The following TMT meeting Feb. 25 could include a site visit to The Dalles to view spill wall construction in progress. This summary prepared by consultant and writer Pat Vivian.

| <i>Name</i> | <i>Affiliation</i> |
|--------------------|---------------------------|
| Jim Adams | COE |
| Tony Norris | BPA |
| Dan Feil | COE |
| Jim Litchfield | Montana |
| John Roache | BOR |
| Paul Wagner | NOAA |
| David Wills | USFWS |
| Steve Barton | BPA |
| Laura Hamilton | COE |

| <i>Phone:</i> | |
|----------------------|----------------------|
| Kyle Dittmer | CRITFC |
| Russ Kiefer | Idaho |
| Margaret Filardo | FPC |
| Tim Heizenrader | Centaurus |
| Russ George | WMC |
| Yuan Me | Edison Mission Group |
| Ruth Burris | PGE |
| Tom Le | Puget Sound Energy |
| Scott Bettin | BPA |
| Richelle Beck | DRA |

TECHNICAL MANAGEMENT TEAM

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

TMT MEETING

Wednesday February 11, 2009 09:00 - 12:00

NOAA Fisheries
1201 N.E. Lloyd Blvd.
Portland, Oregon
Map Quest [\[Directions\]](#)

Mt. St. Helens Room, 10th Floor Conference Room

CONFERENCE PHONE LINE

NOTE NEW CONFERENCE LINE NUMBER
Conference call line:888-285-4585; PASS CODE = 601714

*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 rgumpert@cnnw.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and Introductions
2. Review Meeting Minutes for Jan 14 & Jan 29 [\[Meeting Minutes\]](#)
3. HDC 3-D Cams Updates - Dan Ramirez, COE HDC
4. Updated Water Supply Forecasts - Joel Fenolio, COE NWS; Kevan Schneidmiller, COE NWW
5. Status of FPP/FOP - Dan Feil, COE RCC
6. Operations Review
 - a. Reservoirs
 - b. Fish
 - c. Power System
 - i. [Wind Generation Capacities](#) 
 - ii. [\[BPA Balancing Authority Load & Total Wind Generation\]](#)
 - d. Water Quality
7. Other
 - a. Set agenda for next meeting - **February 25, 2009 (TDA Site Visit & TMT Meeting)**
[\[Calendar 2009\]](#)

| WIND GENERATION NAMEPLATE CAPACITY IN THE BPA BALANCING AUTHORITY AREA (as of Feb-09) | |
|--|----------------------------------|
| Plant | Nameplate Capacity MW |
| Arlington Wind | 103 |
| Big Horn Wind | 200 |
| Biglow Canyon Wind | 126 |
| Condon Wind | 50 |
| Goodnoe Hills Wind | 96 |
| Hopkins Ridge Wind | 157 |
| Klondike I Wind | 24 |
| Klondike II Wind | 76 |
| Klondike III Wind | 226 |
| Klondike 3a Wind | 75 |
| Leaning Juniper Wind | 100 |
| Nine Canyon Wind (BPA pt) | 51 |
| Pebble Springs Wind | 100 |
| Stateline Wind | 90 |
| Vansycle Wind | 25 |
| White Creek Wind | 200 |
| Willow Creek Wind | 72 |
| TOTAL WIND GEN CAPACITY | 1771 |

BPA Transmission Technical Operations/TOT/4Feb09

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

February 11, 2009 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.

Review of Minutes/Agenda

The 1/29 facilitator notes and official meeting minutes were posted to the TMT webpage. An edit to the 1/29 sets of notes was submitted by Kyle Dittmer, CRITFC:

- In the section on wind integration, add the following to both sets of notes: "Kyle Dittmer (CRITFC) asked what specific weather information would be needed to improve wind generation operations. Steve said having surface observations at 5-minute intervals (to help with rapid ramping up/down), new NWS product for wind-power users (currently geared for aviation users), and surface wind forecasts."

With that change made, the 1/29 sets of notes were considered final.

Water Supply Forecast Updates

COE representatives Kevan Schneidmiller, Joel Fenolio and Jim Adams reported on updated water supply forecasts for Dworshak and Libby. Dworshak's current elevation was 1527', with a "February final" April-July volume flow forecast of 100% of average (down from 115%) and an end of February elevation target of 1524.5'. Dworshak will likely use a one full unit (2.4 kcfs outflow) operation through the end of the month. Kyle Dittmer, CRITFC, noted a discrepancy between the COE (100%) and RFC (94%) forecast for Dworshak; the COE noted Dittmer's comment and said they were investigating the forecast differences and conferring with the RFC directly as to why the two forecasts were not more closely aligned. Results of that investigation will inform whether there will be any change to the planned operation. Libby's current elevation was 2407.9', with inflows of 2.6 kcfs and minimum outflows of 4 kcfs. Libby's "February final" April-August volume flow forecast was 86% of average and the end of February elevation target is 2436.4'. Libby will likely operate with minimum outflows for the remainder of February. Adams said the COE is also conferring with the RFC as to the downward trend in supply forecast percentages. Dittmer cautioned the federal agencies to proceed with caution, given the gap between Libby's current elevation and the end of February elevation target.

Fish Operations Plan / Fish Passage Plan Update

Jim Adams, COE, reported that the Fish Operation Plan (FOP) will likely be released for regional review sometime the week of February 16th. The Fish Passage Plan (FPP)

comment period is underway, with comments due back to the COE by 2/18; the COE will coordinate with FPOM and begin assimilating the ‘final’ version of the FPP on 2/19.

Operations Review

Reservoirs: Albeni Falls was in the range of 2051 - 2052'. Seven day average inflows were 26.3 kcfs at Lower Granite, 113 kcfs at McNary and 126 kcfs at Bonneville. Grand Coulee was at elevation 1280.3', with a slight increase to its end of the month elevation target of 1267'. Hungry Horse was at elevation 3518.11', with outflows in the range of 2.9-3 kcfs.

Fish: Nothing at this time.

Power System: Tony Norris, BPA, said that there will be two new standing links on the TMT homepage under “wind generation.”

Water Quality: Nothing at this time.

Other: Jim Adams, COE, said that 2009 Pinniped monitoring reports will be posted to the TMT homepage; he noted the Stellar sea lion count is higher this year compared to similar dates in previous years.

Next TMT Meeting: February 25th, 2009 – at NOAA.

Agenda items will include:

- HDC 3-D Cam Updates
- Status of FPP / FOP
- Hanford Reach Protection Flows
- Operations Review

**Columbia River Regional Forum
Technical Management Team Meeting
Feb. 11, 2009**

1. Introduction

Today's TMT meeting was chaired by Jim Adams (COE) and facilitated by Robin Gumpert (DS Consulting) with representatives of COE, BPA, NOAA, USFWS, BOR, FPC, Idaho and others participating. 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 for Jan. 14 and 29, 2009

Jan. 14, 2009: There were no comments today on either the facilitator's notes or official minutes.

Jan. 29, 2009, regarding wind energy development: Kyle Dittmer (CRITFC) provided the following comment on his exchange with Steve Barton (BPA wind integration team): "Kyle Dittmer (CRITFC) asked what specific weather information would be needed to improve wind generation operations. Barton said that having surface observations at 5-minute intervals (to help with rapid ramping up/down), a new National Weather Service product for wind-power users (currently geared for aviation users), and surface wind forecasts." If the region is serious about developing wind energy, Dittmer said, we need to know the specific weather information needed. Weather Service products at present are geared more toward aviation than wind users. This comment will be added to the official minutes and facilitator's notes.

3. Update on HDC 3-D Cam's

This presentation was postponed to another TMT meeting, possibly Feb. 25, 2009, or sometime in March.

4. Updated Water Supply Forecasts

There's a general downward trend in the water supply forecasts. In an effort to conserve what water is available, the COE plans to operate one small unit at Dworshak until the end of February, Kevan Schniedmiller (COE) reported. The small unit passes 2300 cfs, and an additional 100 cfs flows through the hatchery, for a total outflow of around 2.4 kcfs.

The current elevation of Dworshak reservoir is 1,527 feet, about 2.5 feet above the end of February flood control elevation, 1,524.5 feet. There was discussion of the significant disparity between COE and RFC water supply

forecasts for Dworshak, which are 100% vs. 94% of average. The COE has been working with the RFC to reconcile the gap of 6 percentage points between the two. They use different methods – the COE does a principal components forecast and the RFC does a regression forecast, Tony Norris (BPA) said. Paul Wagner (NOAA) asked whether the Dworshak operation will change if the forecast changes as a result of the conversation between the COE and RFC. That's possible, depending on the outcome, Adams said.

Libby is currently at elevation 2,407.9 feet, with inflows of around 2.6 kcfs. The project is operating at minimum outflows of 4.0 kcfs. Because the pool elevation is nearly 30 feet below the flood control elevation of 2,436.4 feet which is set by the February forecast of 5436 KAF– the planned operation is to continue minimum outflows for the foreseeable future, rather than operating to a flood control elevation, Adams said.

There is no large gap between the COE and RFC forecasts for Libby like there is for Dworshak, Joel Fenolio (COE Seattle) reported. The RFC February forecast for April-August is about 5,250 KAF looking at the graph of forecast comparisons between the Corps and RFC, and the COE forecast is 5,436 KAF, 86% of average. This week the RFC's ESP forecast for Libby inflows dropped by about 500 KAF, a significant dip, so the COE is looking into that. Dittmer expressed concern about the low elevation at Libby and asked the Action Agencies to proceed with caution, given the potential for the reservoir not to refill by late spring. The project has been operating at minimum flows since the end of December and can't go lower than that, Norris said. The average outflow from Libby in December 2008 was 18,000 cfs to achieve the end of December flood control elevation (2411 feet).

5. Status of Fish Operations Plan/Fish Passage Plan

The FOP is currently under internal review at the COE and will be released next week to the region for comments, Adams said. Meanwhile, the FPP comment period is already underway. The FPP comment deadline is Feb. 18. However, changes could be made to the FPP and the FOP depending on the outcome of the March 6th court hearing. Adams will email TMT when the Draft FOP is ready for review.

6. Pinniped Update

The COE is now posting weekly sea lion hazing reports, Adams reported. They can be accessed from the TMT page in the upper right hand corner under Other Fish-Related Documents. At least 6 California sea lions, 17 Steller sea lions, and 2 harbor seals have been seen. The number of Steller sea lions is higher than usual this year, Wills noted. Norris asked whether the sturgeon harvest will be restricted because of their impact; Wills said that's up to the states

of Oregon and Washington. Dittmer asked whether the COE is using any new hazing techniques this year; Adams hadn't heard of any.

7. Operations Review

a. Reservoirs. Grand Coulee is at elevation 1,280.3 feet, holding its elevation and not drafting much, John Roache (BOR) reported. The end of April flood control elevation is 1,267 feet. The project is operating to meet the 11.5-foot tailwater elevation at Bonneville and maintain minimum flows of 60 kcfs at Vernita Bar.

Hungry Horse is at elevation 3,518.11 feet, with outflows of 2.9-3.0 kcfs. The January forecast was 99% of normal and the February forecast is 102% of normal. BOR does both a regression and principal components (PCA) forecast, which matched each other this month. The upper Snake basin has 95-100% of average snowpack and water supply, so it's one of the few basins doing well in terms of water supply at present. *{Additional clarification from John Roache: Reclamation identifies the Upper Snake Basin as that part of the Snake River Basin in the headwaters of the Snake River in eastern Idaho and western Wyoming. Reclamation calculates a water supply forecast for the Snake River at Heise, this forecast is coordinated with the Corp and sets flood control requirements for Palisades and Jackson Reservoirs. The "operating" February Water Supply Forecast for the Snake River at Heise is 95% of normal}.*

Libby is at elevation 2,407.9 feet; Dworshak is at elevation 1,527 feet. See the above discussion under Water Supply Forecasts.

Albeni Falls will continue to operate within the 1-foot range of 2,051-2,052 feet for the foreseeable future.

Seven-day average inflows are 26.3 kcfs at Lower Granite, 113 kcfs at McNary, and 126 kcfs at Bonneville.

b. Fish. There was nothing to report today.

c. Power System. For those who want to monitor wind generation development, Tony Norris (BPA) introduced two links to BPA's web page. The first is to a graph showing installed wind generation capacity, which has been continually increasing. As of Feb. 4, the region had 1,771 MW of installed wind capacity.

The second link is to a graph showing system loads in BPA's balancing authority area in comparison to actual wind generation (not capacity). At present, wind generation is only a few hundred MW, but on Feb. 9 it was almost 1,200 MW. This graph is updated every 5 minutes. Norris reminded TMT there is no

correlation between wind generation and loads. For future reference, these graphs will be linked to the TMT web page under miscellaneous reports.

d. Water Quality. There was nothing to report today.

6. Next Meeting

The next regular TMT meeting will be Feb. 25, 2009, followed by a site visit to The Dalles to view spill wall construction. The agenda will include an update on the Fish Passage Plan/Fish Operations Plan, Hanford protection flows, possibly the 3-d camera update; and the standard operations review. This summary prepared by consultant and writer Pat Vivian.

| <i>Name</i> | <i>Affiliation</i> |
|--------------------|---------------------------|
| Jim Adams | COE |
| David Wills | USFWS |
| Paul Wagner | NOAA |
| Tony Norris | BPA |
| Kyle Dittmer | CRITFC |

Phone:

| | |
|---------------------|-----------------------|
| John Roache | BOR |
| Rob Diaz | Integral Renewables |
| Tom Le | Puget Sound Energy |
| Dave Benner | FPC |
| Kevan Schneidmiller | COE |
| Joel Fenolio | COE Seattle |
| Russ Kiefer | Idaho |
| Jonathon Hart | Eugene Water/Electric |
| Richelle Beck | DRA |
| Mike Butchko | Powerex |
| Tim Heizenrader | Centaurus |
| Shane Scott | PPC |
| Ruth Burris | PGE |
| Barry Espenson | CBB |

TECHNICAL MANAGEMENT TEAM

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

TMT MEETING

Wednesday February 25, 2009 09:00 - 11:00

NOAA Fisheries
1201 N.E. Lloyd Blvd.
Portland, Oregon
Map Quest [\[Directions\]](#)

Mt. St. Helens Room, 10th Floor Conference Room

CONFERENCE PHONE LINE

NOTE NEW CONFERENCE LINE NUMBER
Conference call line:888-285-4585; PASS CODE = 601714

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 rgumpert@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome and Introductions
2. Review Meeting Minutes for Feb 11 [\[Meeting Minutes\]](#)
3. Hanford Reach Protection Flows - Russell Langshaw, Grant County PUD
4. HDC 3D Cam Updates - Dan Ramirez, COE HDC [\[3D Cam Controller Update\]](#) 
5. Status of FPP/FOP - Dan Feil, COE RCC
6. Operations Review
 - a. Reservoirs
 - b. Fish
 - c. Power System
 - d. Water Quality
7. Other
 - a. Set agenda for next meeting - **March 11, 2009**
[\[Calendar 2009\]](#)

Questions about the meeting may be referred to:



3D Cam Controller Update

Dan Ramirez

Hydroelectric Design Center, Portland District

TMT Meeting

25 Feb 09



Objectives

- Provide Update of 3D cam controller operation
- Address troubleshooting efforts, hardware modifications and programming revisions taken to improve reliability
- On-going effort to ensure efficient turbine operation



Background

- New versions of 3D cam controllers installed in NWW plants (2001-2006)
 - Add-on to existing mechanical governors
 - McN, IH, LGO, LMO, LGR
- High accuracy telemetry
 - Wicket gate and blade position
 - Head input
- Updated PLC based software
- Revised cam tables installed



Are 3D cam controllers functioning as intended?

- Operation within 1% MW limits being adhered to
- Initial evaluations based on limited on-site surveys
- Recent Evaluations: Review of Operational Data
 - Twice annually, beginning in Fall '07
 - Archived GDACS data used
 - Approx. 3 months of hourly data
 - Unit by unit evaluation



Overall Results

- Improvement in 3D cam operation
 - Troubleshooting efforts by project personnel
 - Code revisions by GDACS Maintenance Team
 - Hardware modifications
 - Increased awareness of importance of 3D cams



Specific Results

- Lower Monumental and Lower Granite
 - Latest surveys showed no significant 3d cam controller issues identified
 - Controller functioning as intended vast majority of time (blade positioning error within +/- 0.5 deg of target)
 - Results consistent with previous surveys

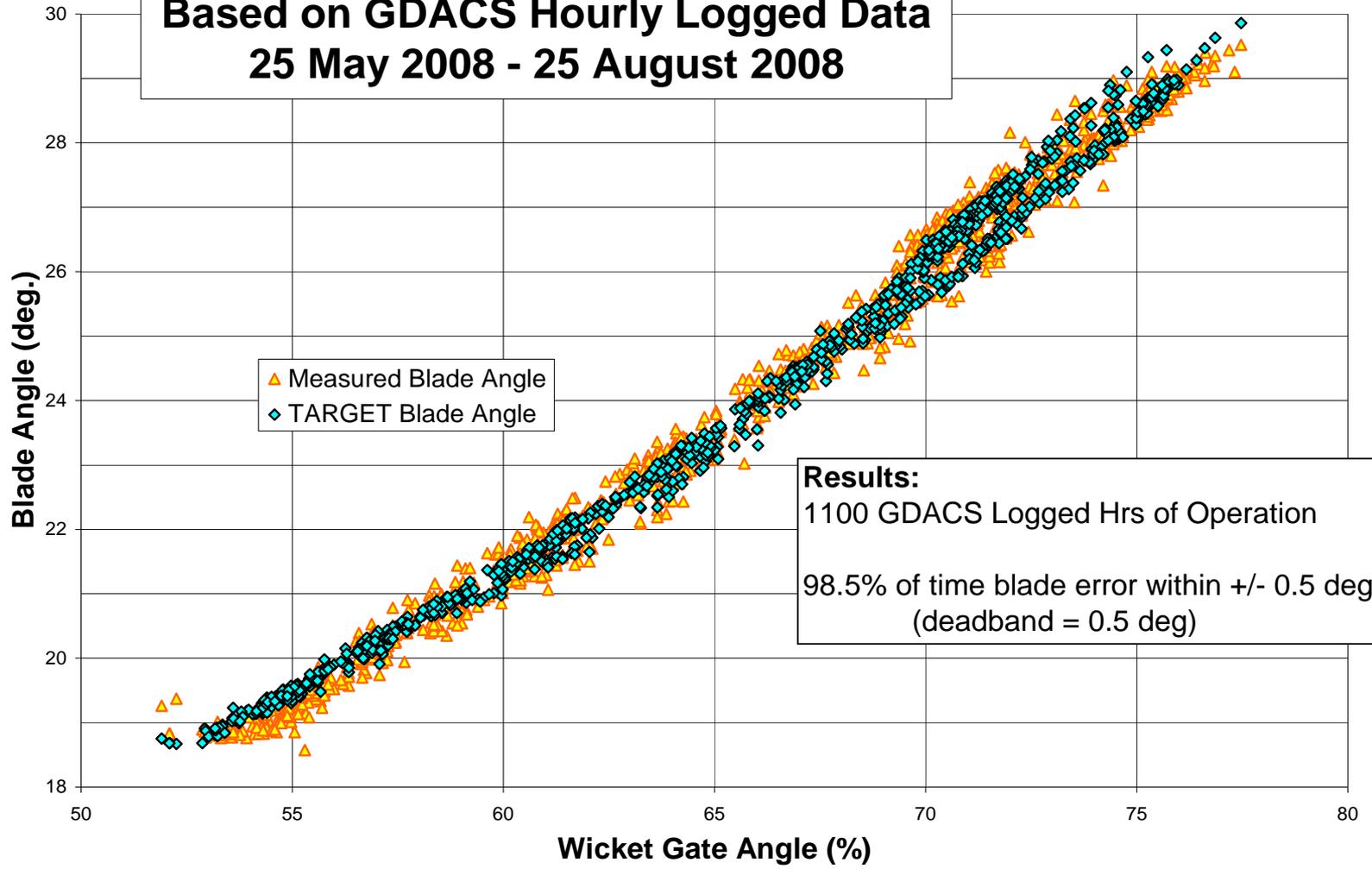


LMO and LGR Results

| | Lower Monumental | | Lower Granite | |
|--------|------------------|----------|------------------|----------|
| | Hrs of Operation | 3D cam % | Hrs of Operation | 3D cam % |
| Unit 1 | 1065 | n/a | 1100 | 98.50% |
| Unit 2 | 2189 | 96.50% | 0 | n/a |
| Unit 3 | 1692 | 97.70% | 1493 | 97.70% |
| Unit 4 | 1350 | 98.50% | 1117 | 98.90% |
| Unit 5 | 2015 | 99.70% | 1444 | 97.90% |
| Unit 6 | 955 | 87.90% | 1196 | 98.90% |

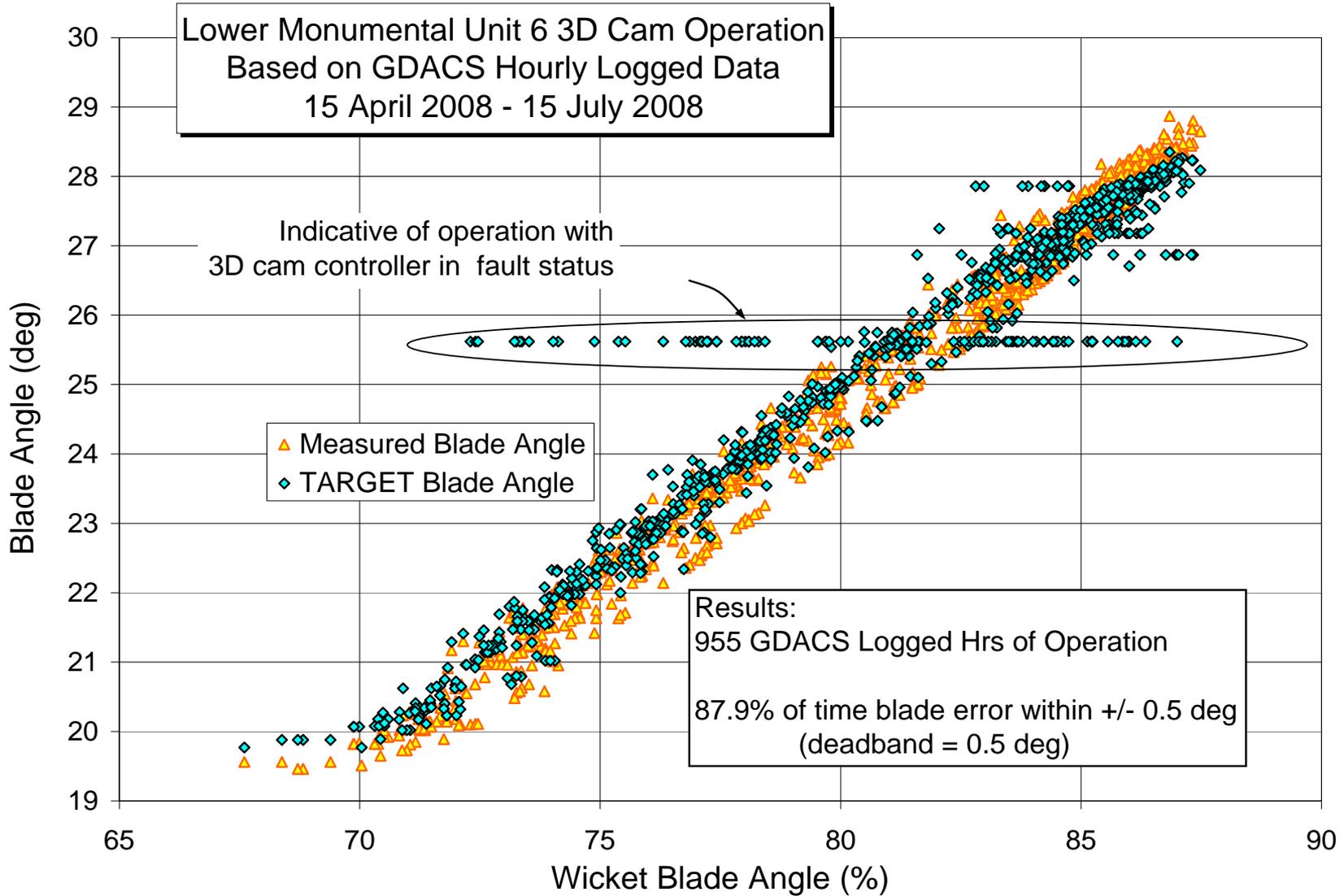


Lower Granite Unit 1 3D Cam Operation Based on GDACS Hourly Logged Data 25 May 2008 - 25 August 2008





US Army Corps of Engineers Portland District





McNary Results

- Previous surveys identified several issues:
 - Excessive deadband
 - Head indication failure (effecting 5 units)
 - Frequent 3d cam faults (attributed to binding in mechanism blade position indicator)
- Issues have been addressed, except:
 - blade position indicator modifications on-going (being addressed concurrent with scheduled outages)



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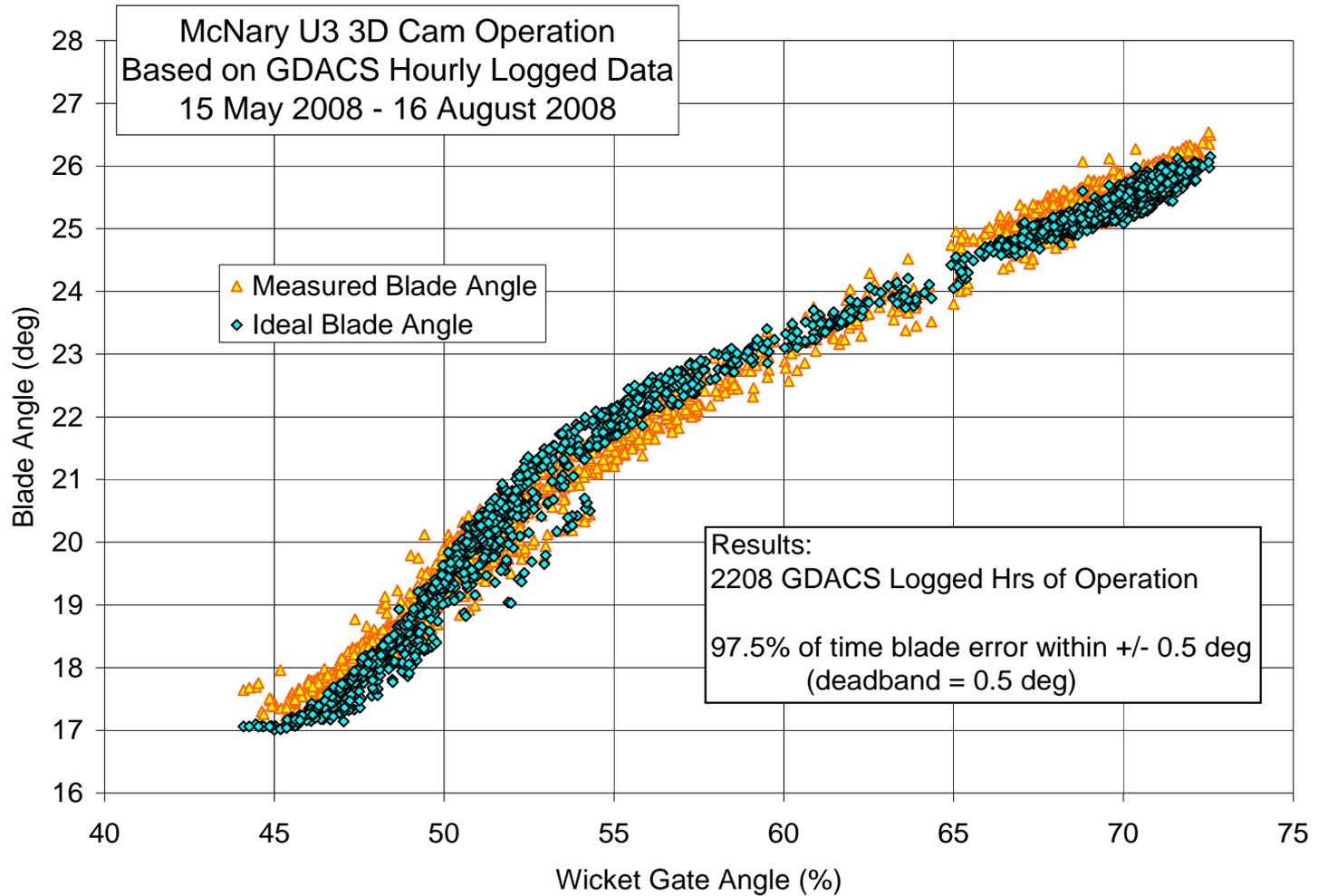


McNary

| | Aug 08 | | Mar 08 | |
|---------|------------------|----------|------------------|----------|
| | Hrs of Operation | 3D cam % | Hrs of Operation | 3D cam % |
| Unit 1 | 2238 | 96.6% | 1114 | 86.2% |
| Unit 2 | 2229 | n/a | 1550 | 91.6% |
| Unit 3 | 2208 | 97.5% | 996 | 82.1% |
| Unit 4 | 1424 | 99.0% | 1425 | 81.8% |
| Unit 5 | 1286 | 99.4% | 1301 | 92.8% |
| Unit 6 | 1345 | 99.2% | 1609 | 89.0% |
| Unit 7 | 1286 | 98.4% | 1631 | 74.7% |
| Unit 8 | 1641 | 98.5% | 1681 | 93.2% |
| Unit 9 | 1767 | 96.9% | 1604 | 82.7% |
| Unit 10 | 1987 | 98.5% | 1631 | 86.4% |
| Unit 11 | 1993 | 98.4% | 1616 | 92.4% |
| Unit 12 | 2240 | 98.2% | 1688 | 92.0% |
| Unit 13 | 2142 | 99.8% | 1329 | <80% |
| Unit 14 | 2119 | 95.1% | 1413 | 85.8% |



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Ice Harbor Results

- Initial Dec '07 survey identified :
 - Frequent 3d cam controller faults
 - Extended operation with controller in fault status
- Corrective efforts taken:
 - Significant troubleshooting and fault response efforts by project personnel
 - Program logic changes by GMT

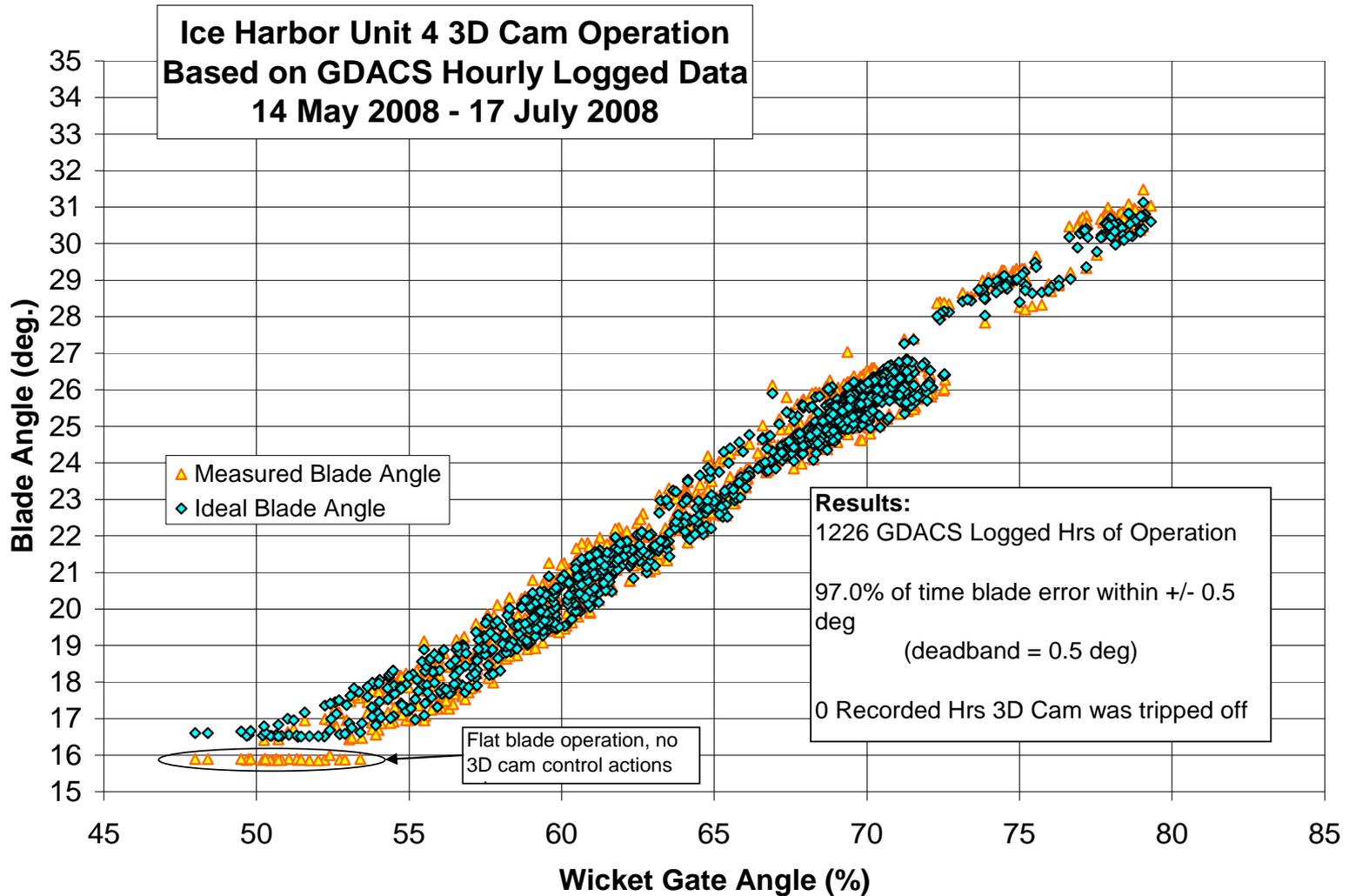


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Ice Harbor

| | Aug 08 | | Mar 08 | |
|--------|------------------|----------|------------------|----------|
| | Hrs of Operation | 3D cam % | Hrs of Operation | 3D cam % |
| Unit 1 | 1200 | 98.4% | 483 | 90% |
| Unit 2 | 940 | n/a | 272 | n/a |
| Unit 3 | 2369 | 99.2% | n/a | n/a |
| Unit 4 | 1226 | 97.0% | 770 | 93% |
| Unit 5 | 1081 | 97.8% | 649 | 77% |
| Unit 6 | 390 | 95.4% | 0 | n/a |





Little Goose Results

- Initial Sept '07 survey identified :
 - Extended operation with controller in fault status

- Corrective efforts taken:
 - GMT traveled to site 17 Dec 07 3D cam programming restored



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Little Goose

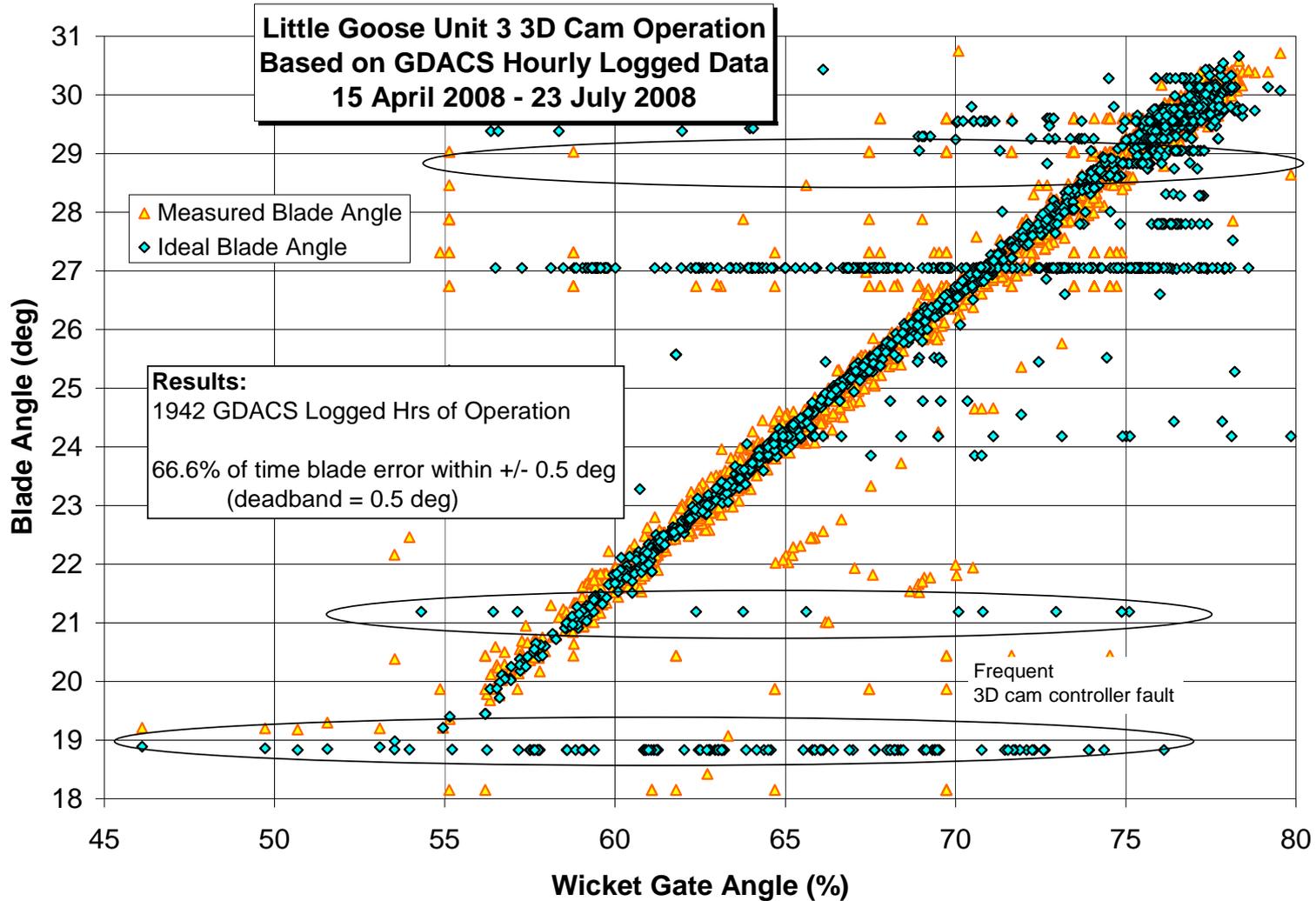
| | Jul 08 | | Mar 08 | |
|--------|------------------|----------|------------------|----------|
| | Hrs of Operation | 3D cam % | Hrs of Operation | 3D cam % |
| Unit 1 | 2363 | 98.7% | 416 | 62% |
| Unit 2 | 2104 | 95.2% | 495 | 89% |
| Unit 3 | 1942 | 66.6% | 314 | 82% |
| Unit 4 | 1500 | 95.9% | 82 | 96% |
| Unit 5 | 1093 | 84.2% | 1177 | 97% |
| Unit 6 | 0 | n/a | 0 | n/a |



US Army Corps of Engineers Portland District



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On-going Effort

- Prioritize units / plants where attention is needed
- Surveys scheduled Mar-Apr '09
- Repeat surveys scheduled Jul-Aug '09

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

February 25, 2009 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.

Review of Minutes/Agenda

The 2/11 facilitator notes and official meeting minutes were posted to the TMT webpage. With no further edits made during the meeting, the 2/11 sets of notes were considered final.

Hanford Reach Protection Flows

Russell Langshaw, Grant County PUD, reported that current temperature units were at 853. Langshaw added that 1000 temperature units are required for emergence/daily protection flow bands, and they are currently accumulating at a rate of about 5 units per day, so it will likely be a month down the road before emergence is declared. He clarified that the timing is tracking fairly closely to that of previous years.

Action/Next: This item will be on the agenda for the March 11 TMT meeting.

3D Cam Controller Update

Dan Ramirez, COE Hydro-electric Design Center, provided TMT with a power point presentation to update on 3D cam controller operations. [Note: the power point was posted to the agenda following the meeting.] Ramirez reviewed the troubleshooting efforts, hardware modifications, and the programming revisions made to improve reliability. He described the on-going efforts to ensure turbine operation and clarified that the 3D cam is an add-on to the physical cam in existing governors and said that the 3D cam provides linkages to perform minor blade adjustments independent of gate movement. The presentation included slides that showed how issues previously identified at Ice Harbor, McNary and Little Goose have been addressed and how those adjustments have increased the percentages of time that blades are within .5° of their target. Ramirez reported that while most projects are functioning well at this point, unit 3 at Little Goose is still experiencing frequent faults and corrections are not performing as expected; the COE is working closely with project staff to ensure corrective actions are taken. TMT members thanked Ramirez for the update, noting that the tables in the presentation were particularly useful.

Action/Next Steps: Ramirez said the COE will be conducting performance surveys during March-April and July-August 2009; he offered to provide updates via tables and/or in person to TMT on an as-requested basis.

Fish Operations Plan / Fish Passage Plan Update

Jim Adams, COE, reported that the regional review period on the Fish Passage Plan (FPP) has closed. Adams also reported that the Fish Operation Plan (FOP) will be out for review and comment after the March 6th BiOP hearing date. Rick Kruger, OR, said that postponing the review period denies regional representatives the opportunity to prepare FOP-related statements for the hearing. Adams said he would carry that message back to his COE colleagues.

Action/Next: This item will be on the agenda for the March 11 TMT meeting.

Operations Review

Reservoirs: Grand Coulee was at elevation 1280.6' and operating to maintain the 11.5' tailwater elevation below Bonneville. Hungry Horse was at elevation 3514.92', with outflows in the range of 2.8-9 kcfs. Libby forebay elevation is at 2406.5 feet and was passing minimum flows of 4.0 kcfs. Albeni Falls was in the range of 2051 - 2052' and passing inflows. Seven day average inflows were 24.4 kcfs at Lower Granite, 113.3 kcfs at McNary and 129.6 kcfs at Bonneville; Jim Adams noted that these flow levels were fairly low for this point in the season.

Fish: Paul Wagner, NOAA, noted the promising forecasts for adult returns in 2009; with predictions for 183,000 sockeye, 298,000 spring Chinook and 70,000 for summer Chinook.

Power System: **Action:** Jim Adams said he would correct and re-post the wind generation data web link on the TMT page.

Water Quality: Nothing at this time.

Next TMT Meeting: 9 a.m., March, 11 2009 – at NOAA Fisheries.

Agenda items will include:

- Hanford Reach Protection Flows Update
- BiOP Status Hearing Update
- Status of FPP / FOP
- Updated Water Supply Forecasts / Flood Control Operations
- Operations Review

**Columbia River Regional Forum
Technical Management Team Meeting
Feb. 25, 2009**

1. Introduction

Today's TMT meeting was chaired by Jim Adams (COE) and facilitated by Robin Gumpert (DS Consulting) with representatives of COE, USFWS, BOR, BPA, NOAA, Oregon, Montana, Idaho and others participating. 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 for Feb. 11, 2009

There were no comments today on either the facilitator's notes or the official minutes for Feb. 11, so both were deemed final.

3. Hanford Reach Protection Flows

The latest cumulative reading was 853 temperature units as of yesterday, Russell Langshaw (Grant PUD) reported. Rearing and emergence period protections begin at 1,000 temperature units, which he estimated will occur in approximately one month. Langshaw will provide updated information on temperature units at the next TMT meeting March 11.

4. HDC 3D Cams Update

Dan Ramirez (COE) gave a slideshow presentation. Since his last report to TMT in April 2008 regarding 3-d cam controller operation on plants in the Walla Walla District, the COE has addressed several problems that were identified in earlier surveys.

From 2001-06, the 3-d cams were installed at McNary, Ice Harbor, Little Goose, Lower Monumental and Lower Granite, in that order. Observations during Index testing and limited operational surveys indicated that some 3-d cam controllers were not functioning as intended. This is a different issue than operating within the 1% megawatt limits, which are being adhered to, Ramirez pointed out. Within the specified 1% operating range, the 3-d cam controller has to function properly to ensure efficient turbine operation. Proper 3-d cam controller operation is especially important when operating near lower or upper end of limits. Snapshot surveys in 2004-05 found intermittent problems with the 3-d cam controllers. In 2007, the COE identified several issues at several Walla Walla projects.

Ramirez showed TMT a graph depicting successful 3-d cam controller operations and gave a project-by-project status report on 3-d cam operations.

Lower Monumental and Lower Granite: These were the last projects at which 3-d cam controllers were installed, so they have benefited from lessons learned. Historically, Lower Monumental and Lower Granite have had few 3-d cam operational issues. The most recent survey, conducted in August-September 2008, showed that for most of that time the 3-d cams successfully positioned the blades within the dead-band or 0.5% of target position. This is consistent with past findings at both projects.

McNary: Index test data surveys in December 2007 identified several 3-d cam issues at McNary. First, the dead-band was set incorrectly, meaning that correction of the blade wasn't as tight as it should be. Also, equipment that was providing forebay information to five units failed, resulting in head errors of up to 5 feet at these units. There were also frequent 3-d cam faults caused by binding of the mounting mechanism. Since these problems were identified, the COE has redesigned the mounting mechanism, tightened up the dead-band, corrected the head error problem, and is now in the process of replacing all of the faulty blade position mounting mechanisms at McNary. Units still awaiting this replacement require ongoing physical adjustments by project staff. March 2008 surveys indicated that progress has been made. Unit 14 at McNary is still experiencing frequent faults because the blade angle mechanism hasn't been replaced yet. However, overall 3-d cam operation at McNary has improved significantly.

Ice Harbor. In 2007, there were numerous 3-d cam faults and long periods of operation with the controllers in fault status. Ice Harbor was one of the first projects to have 3-d cams installed, and it has experienced significant problems since installation. Updating the programming logic and other troubleshooting resulted in significant improvements by March 2008. During a recent survey, Unit 6 came back on line after being out of service, which caused problems. However, subsequent surveys may show that the 3-d cams in unit 6 are operating correctly. Like McNary, Ice Harbor has shown significant improvements in the functioning of its 3-d cam controllers.

Little Goose. In December 2007, GDACS maintenance teams found the 3-d cam program at Little Goose had been overwritten or corrupted, resulting in frequent faults of extended duration. They rebuilt the program, which has been operating fairly effectively at all units except Unit 3. The problems at Unit 3 have been addressed successfully according to project staff and unit is not experiencing faults at frequency shown in Fall 2008 survey. Repeat surveys will be performed before the 2009 fish passage season to confirm that any problems at Unit 3 have been addressed.

Robyn MacKay (BPA) asked Ramirez to give TMT an update when the next survey results for Little Goose are released. David Wills (USFWS) suggested posting updated 3-d cam operations graphs for all of the projects on

the TMT web page when they become available. Ramirez said he'll follow up on both requests.

5. Status of Fish Operations Plan/Fish Passage Plan

The comment period for the Fish Passage Plan has ended, but the FPP awaits finalization of the Fish Operations Plan, Adams said. The COE is waiting for the outcome of the March 6 BiOp court hearing to update the FOP and expects to release it a week to 10 days after the BiOp hearing takes place.

Rick Kruger (Oregon) objected to that. Oregon wants the opportunity to review the updated FOP before March 6 so any FOP-related issues can be raised at the hearing, he explained. Adams said he would notify Corps policy personnel of this request. TMT will revisit FOP and FPP development at its next meeting March 11.

6. Operations Review

a. Reservoirs. Grand Coulee is at elevation 1,280.6 feet, operating conservatively which currently is pretty close to passing inflows. Maintaining the 11.5-foot tailwater at Bonneville for chum is driving the Grand Coulee operation and will continue to do so for the near future, John Roache (BOR) reported. Hourly data shows that BPA is running power generation at Grand Coulee very close to criteria because of limited water supply for the Bonneville chum operation, Tony Norris (BPA) noted. Streamflows have been quite low over the past week.

Hungry Horse is at elevation 3,514.92 feet, releasing 2.8-2.9 kcfs. Russ Kiefer (Idaho) noted that the current elevation is below the flood control target and asked what the minimum outflow requirement is. The Columbia Falls minimum, which is driving Hungry Horse operations at present, is 3.5 kcfs Columbia Falls flows are running around 3.5-3.7 kcfs now, which includes Hungry Horse discharges and the unregulated portions of the basin, Roache replied. Minimum flow criteria will be updated when the March forecast is released. The project minimum now is 900 cfs, which is not expected to change. It's not unusual for Hungry Horse to be below its flood control elevation at this time of year, unless there's a wet forecast.

Libby is at elevation 2,406.4 feet, approximately 30 feet below its flood control elevation, operating at minimum flows of 4.0 kcfs as it has for quite some time. This operation will continue for the foreseeable future.

Albeni Falls is still operating between 2,051-2,052 feet elevation, passing inflows of 14-18 kcfs most days, which is expected to continue for a while.

Dworshak is at elevation 1,524.9 feet, doing some daily load shaping and drafting to an end of February flood control elevation target of 1,524.5 feet. Kiefer expressed concern that water being released now to meet flood control elevation targets will be needed later for fish passage. TMT will discuss this in further detail at its next meeting, when the March water supply forecasts and flood control elevations will be available. The RFC's final March forecast will be posted to the web on March 10, the day before TMT meets next.

Seven-day average inflows are 24.2 kcfs at Lower Granite, 113.3 kcfs at McNary, and 129.6 kcfs at Bonneville.

b. Fish. There was nothing new to report today. TMT reviewed last year's run forecasts for 2009 – 183,000 sockeye, 298,900 adult upriver spring Chinook, and 70,000 spring Chinook, which is 128% of the 2008 return.

c. Power System. Tony Norris (BPA) showed TMT the latest wind generation statistics, accessible from a link in the upper right corner of the TMT web page. With added funds from the stimulus package, the BPA transmission business line will install a 75-mile line from John Day to McNary to increase the region's capacity for transmitting wind power generated in the Columbia Gorge. Installation will begin soon, as all NEPA work is already complete and the line will follow existing rights-of-way.

d. Water Quality. Temperatures are still cool and gas levels low, Adams said. The most recent pinniped report shows that several repeat offenders are back in the Bonneville Dam area. Trapping operations will begin soon.

6. The Dalles Spill Wall Site Visit

Following today's meeting, TMT members went to The Dalles to view construction of the spill wall between bays 8 and 9 that will guide fish away from a shallow area near the shoreline where they get picked off by predators. Pat Duyck, the COE manager of spill wall construction, used a model to explain to TMT the intricacies of constructing a wall in giant blocks that must be anchored together.

7. Next Meeting

The next regular TMT meeting will be March 11, 2009. The agenda will include updates and discussion of the March 6 BiOp hearing, Hanford protection flows, the Fish Operations Plan, water supply forecasts, flood control operations, and the standard operations review. This summary prepared by consultant and writer Pat Vivian.

| Name | Affiliation |
|--------------|--------------------|
| Jim Adams | COE |
| David Wills | USFWS |
| John Roache | BOR |
| Tony Norris | BPA |
| Robyn MacKay | BPA |
| Rick Kruger | Oregon |
| Paul Wagner | NOAA |
| Brian Marotz | Montana |
| Dan Ramirez | COE |
| Russ George | WMC |

Phone:

| | |
|------------------|---------------------|
| Scott Bettin | BPA |
| Barry Espenson | CBB |
| Tim Heizenrader | Centaurus |
| Holli Krebs | JP Morgan |
| Richelle Beck | DRA |
| Shane Scott | PPC |
| Steve Hall | COE Walla Walla |
| Bob Diaz | Integral Renewables |
| Tom Le | Puget Sound Energy |
| Russell Langshaw | Grant PUD |
| Russ Kiefer | Idaho |

TECHNICAL MANAGEMENT TEAM

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

TMT MEETING

Wednesday March 11, 2009 09:00 - 12:00

NOAA Fisheries
1201 N.E. Lloyd Blvd.
Portland, Oregon
Map Quest [\[Directions\]](#)

Mt. St. Helens Room, 10th Floor Conference Room

CONFERENCE PHONE LINE

CONFERENCE LINE NUMBER
Conference call line:888-285-4585; PASS CODE = 601714

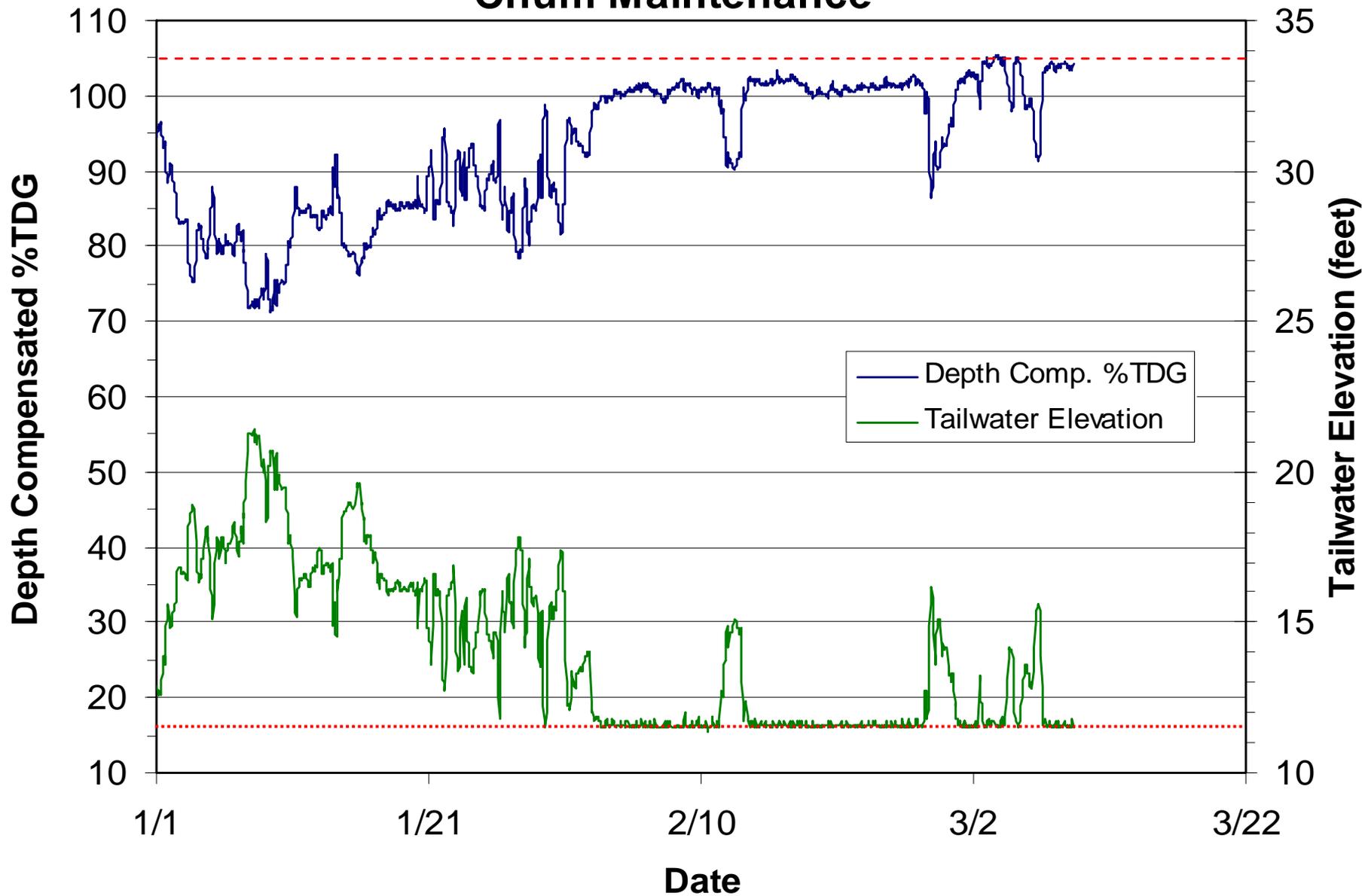
*We have had disruptions on the phone because people are not hitting 'mute' after dial in.
Please MUTE your Phone*

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

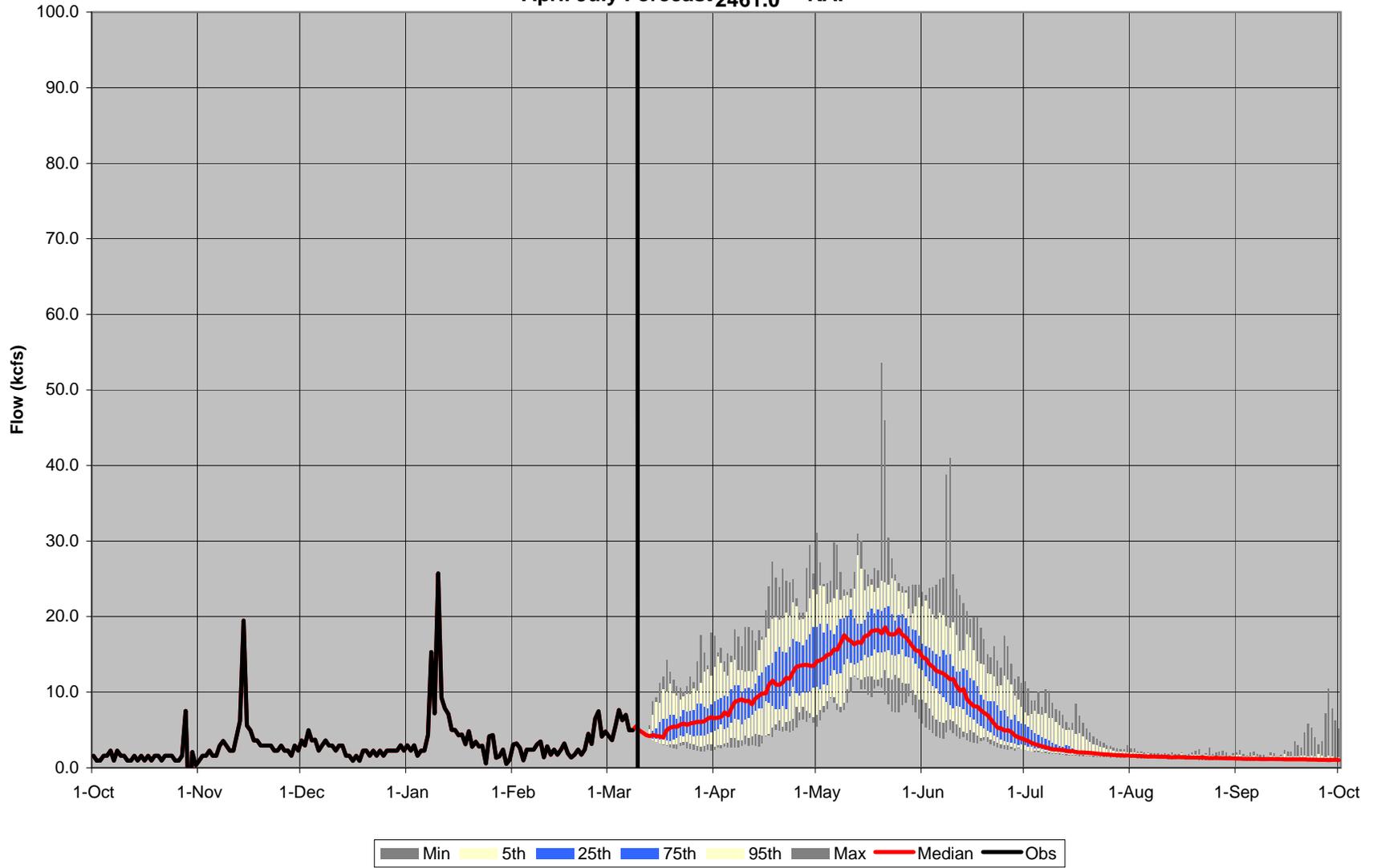
AGENDA

1. Welcome and Introductions
2. Review Meeting Minutes for Feb 25 [\[Meeting Minutes\]](#)
3. Hanford Reach Protection Flows - Russell Langshaw, Grant County PUD
4. Dworshak Operations - Steve Hall, USACE [\[Dworshak March 2009\]](#) 
5. Updated Water Supply Forecasts/Flood Control Operations - USACE
6. 2009 Fish Operations Plan (FOP) Update - USACE
7. [SOR 2009-01](#) 
8. Operations Review
 - a. Reservoirs
 - i. [2009 Chum Operations](#) 
 - b. Fish
 - c. Power System
 - d. Water Quality
9. Other
 - a. Set agenda for next meeting - **March 25, 2009**

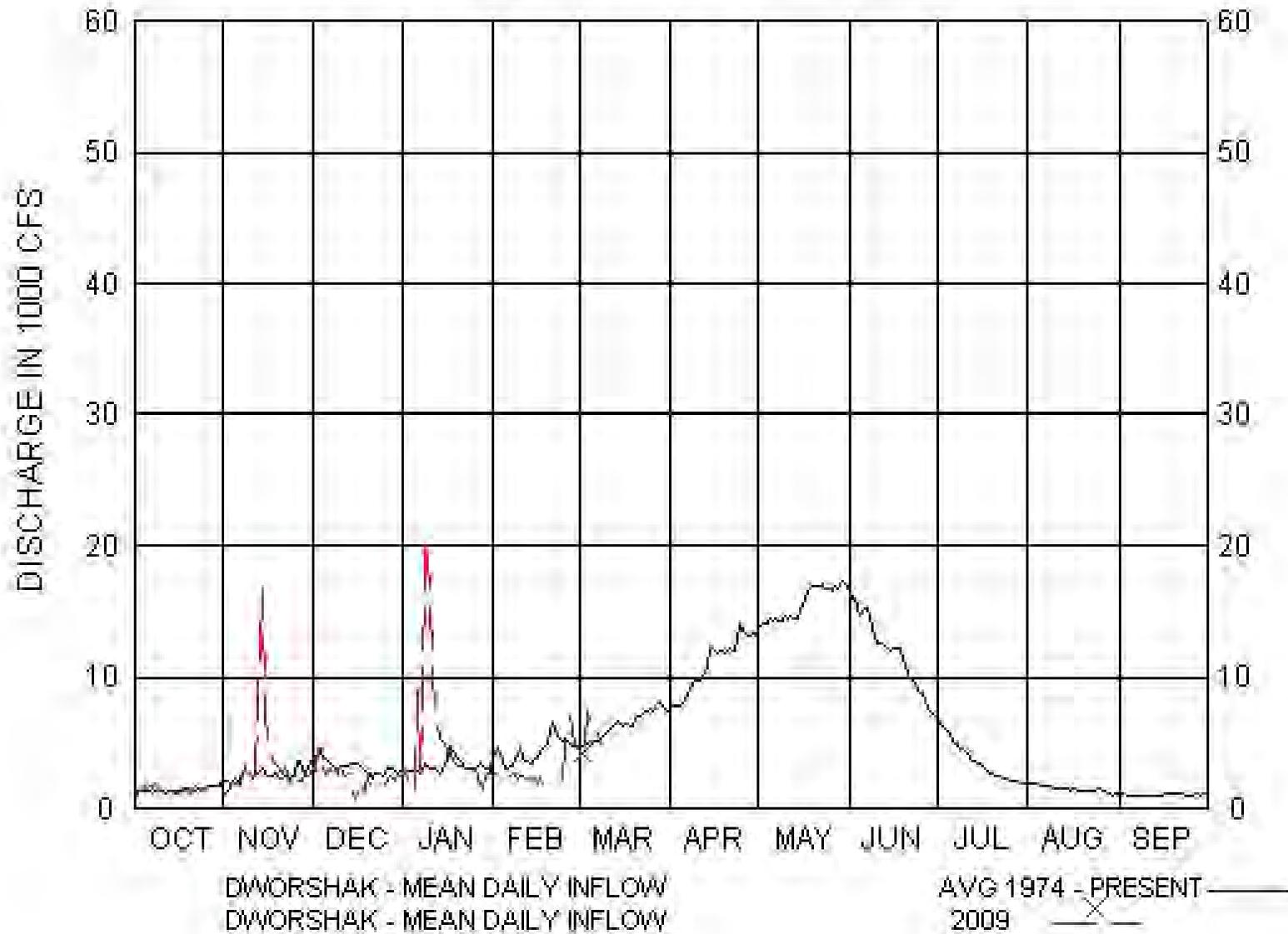
Depth Compensated %TDG @ WRNO During 2009 Chum Maintenance



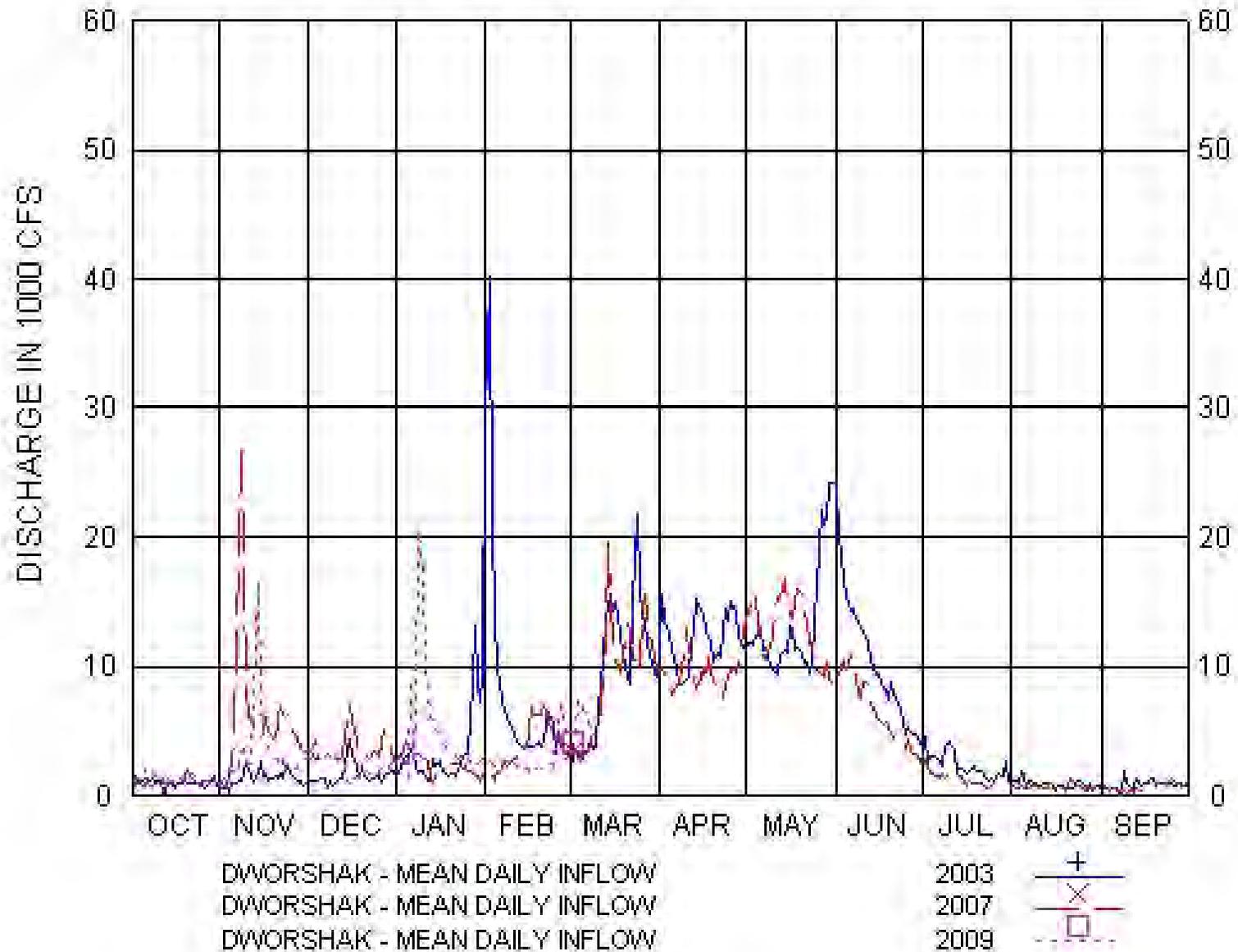
ESP Inflow Statistics
44 ESP Inflows
April July Forecast 2461.0 KAF



US ARMY ENGINEER DISTRICT, WALLA WALLA
ENGINEERING DIVISION, HYDROLOGY BRANCH
HYDROLOGIC DATA (DISCHARGE IN 1000 CFS)



US ARMY ENGINEER DISTRICT, WALLA WALLA
 ENGINEERING DIVISION, HYDROLOGY BRANCH
 HYDROLOGIC DATA (DISCHARGE IN 1000 CFS)



COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

March 11, 2009 Meeting

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.

Review of Minutes/Agenda

The 2/25 facilitator notes had been posted with edits from TMT members. With no further edits, they were considered final. TMT members had not had a chance to review the Official Meeting Minutes from the 2/25 meeting, so they will be finalized at the 3/25 TMT meeting.

Hanford Reach Protection Flows

Paul Wagner, NOAA, reminded TMT members that the previous update from Russell Langshaw, Grant County PUD, indicated that river temperatures were tracking well with previous years, and that Hanford Reach protection flow operations were expected to begin sometime in the next few weeks. At this point, 800 of the 1,000 temperature units had been reached. TMT Chair Jim Adams will coordinate with Russell Langshaw to provide an update at the March 25 TMT meeting.

Dworshak Operations

Steve Hall, Walla Walla District COE, shared ESP plots modeled after the COE's March 1 water supply forecast, indicating a total 2460 kaf at Dworshak during the April-August period. The ESP plots were provided to show expected flows needed to reach an end of April flood control elevation while staying within TDG limits. By definition, the end of April flood control target elevation is an un-shifted target. ESP traces indicated Dworshak would operate 10-14 kcfs during the second half of April to reach the target. Average daily discharge above inflows is expected to range about 4 kcfs into mid-April, and 0-2 kcfs through the end of the month to meet the target. Steve also showed a 2009 forecast comparison to '03 and '07 historic data, which showed that this year is tracking well with those two years. The COE's intention is to operate to the maximum allowable shift – 134 kaf – by the end of March. The current plan for achieving these objectives is to continue operating minimums (1.5 kcfs) until the end of March. On April 15th, the COE plans to reduce the shift to 100 kaf, resulting in about 14 kcfs out of the project, through the end of April. Steve noted that this operation plan is within the COE's acceptable level of risk for meeting flood control elevation targets, but are contingent on the forecast and inflows not changing significantly. He added that the RO's at the project are anticipated to be fully functioning by the end of March and that no flow volume limitations are anticipated.

Paul Wagner, FPAC chair, said FPAC had discussed the latest information and operating plan for Dworshak, and the salmon managers present for the discussion agreed that the COE's proposal would meet the objectives of higher elevations at Dworshak earlier and higher flows later in April to support fish passage. They noted the concern that if Dworshak does not achieve its elevation objective, Grand Coulee would be drafted the shifted volume regardless of the elevation achieved at Dworshak, and acknowledged that this known risk was acceptable.

Dave Statler, Nez Perce Tribe, asked the COE for Dworshak elevation estimates, to which the COE responded that, based on the current forecast of 2.4 MAF, the project will reach elevation 1542.1 by the end of March, 1532.7' on April 15, and 1526' at the end of April. Dave also expressed, on behalf of Nez Perce and other salmon managers, the desire to refill Dworshak earlier than July 1 to the extent possible. The COE acknowledged this desire and offered that while there are too many uncertainties at this point to confirm a refill plan, current information suggests the project may refill earlier, and the COE is supportive of this within the limitations of flood control requirements. The COE plans to monitor conditions closely and will employ the use of snow flights as necessary to inform their operation decisions. Dave Statler also added that temperature cooling benefits downstream as a result of this operation are an important consideration.

Finally, it was noted that end of month flood control constraints are a 'hard constraint' target and mid-month are softer constraints, given the water supply forecasting tools used to set the respective targets.

Water Supply Forecast/Flood Control Operations

Amy Reese, Seattle District COE, reported on the latest water supply forecast and operations plan at Libby. As of March 6, the April-August water supply forecast showed 5296 kaf, and a flood control target of 2442.6 feet. The project was currently at elevation 2405 feet. The COE has been and planned to continue operating at minimums (about 4 kcfs) through the end of March, and perhaps beyond. It was noted that the RFC and COE forecasts for Libby were very similar.

Action/Next: Amy will provide reservoir operation scenarios for Libby that include consideration of bull trout minimum flows and the sturgeon pulse operation, at a TMT meeting in April.

John Roache, BOR, reported that the Hungry Horse water supply forecast for March-July was 1936 kaf (93%), similar to the RFC forecast and a decrease from February final forecasts. Hungry Horse has a flood control elevation of 3536.2 feet for the end of April, and the project was currently over 20 feet below that elevation. The BOR planned to continue to operate the project at minimums. John also noted that the Grand Coulee shifted flood control elevation for the end of March was 1281.6 feet.

Fish Operations Update

Rudd Turner, COE, introduced Kim Johnson, a new addition to the COE who will be working on NEPA, water quality and other environmental issues out of the COE's

Environmental Resources office. He went on to report that the 2009 FOP had not yet been released; however, at the March 6 hearing with Judge Redden over the 2008 BiOp, Federal agencies agreed to implement spring 2009 spill operations similarly to 2008. Two spill changes were described; first, John Day would spill at 30% 24 hours/day starting April 10 (instead of 0/60% as was implemented last year) and Little Goose would operate at 30% spill consistently for testing of the new TSW (i.e., forego the 14 nights of spill to the TDG cap as occurred last year). Parties to the litigation were continuing discussions that would inform the COE's spring spill and transportation operations plan. With regards to transportation, the COE planned to initiate transportation similarly to 2008, beginning between April 20 and May 1 at Lower Granite Dam and employing a staggered start on the Lower Snake projects – the specifics of which would be informed by in-season management discussions at TMT.

It was suggested that TMT and the region consider how to shape flows at Little Goose during the transition into low flows given the new installation of the RSW at the project. It was further clarified that FFDRWG discussions led to a decision to perform a single treatment, 'modified bulk' pattern, test of the RSW – which would retain juvenile benefits while having the least impact to adults passing the project.

Rudd also reported that, as in 2008, spring spill end dates in 2009 were expected to be June 20 on the Snake River and June 30 on the Columbia River, with the exception of those projects undergoing tests that might require a different schedule (e.g. Lower Monumental, McNary and Bonneville). Finally, he noted that transportation tests to evaluate seasonal effects and latent mortality would occur at Lower Granite in April and would involve barging and trucking fish. In response to a question, Rudd said that summer spill operations were not developed at this point.

SOR 2009-1

Tom Lorz, as Vice Chair to FPAC, presented an SOR signed by ODFW, WDFW and the Nez Perce Tribe, with a note that the same issue was being discussed directly between CRITFC and three Accord tribes, and the action agencies pursuant to the Fish Accords. The request was to begin operating the B2 corner collector on Thursday, March 12 (after completion of BGS inspection and once all divers were out of the area) and to continue operating it through the spill season. From a biological perspective, this operation would support kelt passage as indicated by studies conducted in 2007 and 2008 and, from a process perspective, it would be consistent with a rollover from 2008 operations. Tom offered that one objective of bringing the issue to TMT was to ask the COE what and how much lead time would be needed to implement the request, if a decision to do so was made.

Biological and operational considerations were raised, including TDG impacts relative to chum, spring flow impacts and impacts to other reservoir operations. The COE suggested that given the current TDG levels below Bonneville (a graph was posted to the agenda indicating current levels around 104-106% at the Warrendale gage), and the anticipated increase in TDG levels from operation of the corner collector, more depth compensation would be needed to support chum below Bonneville – an expected change in operations

from an 11.5 feet tailwater to about 12.5 feet tailwater. In response to a question, the COE's Jim Adams suggested that the current TDG levels were likely due to gas build up in the spillway from not running the adult attraction flows, and possibly impacts from upstream projects.

Rudd Turner said that from a process standpoint, the COE was intending to begin corner collector operations on April 10 coinciding with spring spill operations, not last year's earlier implementation that involved a test of the corner collector in March. The Portland District COE was working on a white paper regarding kelt passage which, Rudd said, could inform decisions this year. The white paper was not yet available at the time of today's meeting. The group acknowledged that discussions around this operation were also occurring in other forums outside TMT, and that it could be useful to fold TMT input on biological and operational considerations into those discussions and this year's and/or future year decisions. As such, TMT agreed to reconvene on March 18 to continue their technical discussions with more information. The following actions/information will feed into the next TMT meeting:

- Portland District COE white paper: Rudd will encourage finalization of the paper as soon as possible, and will share it with Jim Adams to pass to TMT when it is available.
- The COE and others will analyze the potential impacts to chum and other operations in the system.
- Tom Lorz, CRITFC, will share information that was used as biological support for the SOR with Jim Adams, who will pass the information on to TMT prior to Wednesday's call.
- FPOM was scheduled to meet on 3/12 and any relevant information from that discussion will be brought back to TMT.
 - Jim Adams will assist Dave Statler in getting linked in to the FPOM process. It was suggested that an FPOM website with all relevant information, discussion and decisions, would provide better access to this important group.
- Paul Wagner and Jim Adams will work to secure a room and phone line for the 3/18 TMT meeting.
- Rudd Turner will talk with management and Bonneville operators about what would need to happen at the project to set it up for implementation of the request, if a decision is made to open the corner collector before April 10. He will share that information with TMT.

The COE acknowledged receipt of the SOR during the meeting, and said they would not likely start operating the corner collector on March 12 as specified in the request. If any changes to operations are made, they will notify TMT.

Operations Review

Reservoirs: Jim Adams reported on COE projects: Libby was at elevation 2405.2 and passing inflows, targeting 2442 feet at the end of March. Albeni Falls continued to operate between 2051-2052 feet. Dworshak was at elevation 1529.6 feet with 1.6 kcfs out. 7-day average inflows were 39.2 kcfs at Lower Granite, 108.3 kcfs at McNary and

128.9 kcfs at Bonneville. Grand Coulee was at elevation 1284.2 feet and operating to meet the 11.5 feet tailwater objective at Bonneville. Regarding chum operations, Tony Norris, BPA, requested that the salmon managers begin discussions about low flows and prioritization relative to chum, Vernita Bar and April 10 Grand Coulee elevation targets. John Roache reported on BOR projects: Grand Coulee was targeting 1281.9 feet on April 10. Hungry Horse was at elevation 3512.02 feet with 3 kcfs out. John Roache noted that the BOR expected summer refill of Hungry Horse to be met.

Fish: Paul Wagner, NOAA, reported on juvenile counts. Yearling chinook passage at Bonneville was about 400/day; subyearlings were about 200/day and coho and steelhead were each showing 5/day. Paul suggested that, given today's SOR, it would be useful to have consistent kelt passage counts at Bonneville in the future. FPOM will discuss this issue.

Power System: Tony Norris, BPA, said there was little change to the wind generation graphs shared at the 2/25 TMT meeting.

Water Quality: Nothing to report.

Upcoming TMT Meetings: Please note: TMT meetings will likely be held at NOAA Fisheries at least through April due to phone system issues in the Columbia Room at the COE. Please check the meeting agendas for location confirmation.

- **Conference call, March 18, 9:00 AM** to discuss SOR 2009-1. Location and conference line TBD.
- **Face to face, March 25, 9-noon at NOAA Fisheries.** Agenda items include:
 - Hanford Reach Protection Flows Update
 - Follow up on B2 corner collector operations discussion
 - Status of spring spill / FOP
 - Chum, VB and Grand Coulee April 10 target: Feedback from salmon managers and TMT discussion about priorities
 - (Tentative): NMFS Science Center report on 2006-07 transportation study results
 - BPA's Generation Emergency Actions List: review
 - Spring spill priority list: review
 - Operations Review

**Columbia River Regional Forum
Technical Management Team Meeting
March 11, 2009**

1. Introduction

Today's TMT meeting was chaired by Jim Adams (COE) and facilitated by Robin Gumpert (DS Consulting) with representatives of NOAA, Oregon, COE, BPA, BOR, Idaho, Washington, USFWS, CRITFC, the Nez Perce Tribe, and others participating. 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 for Feb. 25, 2009

Finalization of the official minutes for Feb. 25 was postponed until the next regular TMT meeting on March 25. The facilitator's notes have been reviewed.

3. Hanford Reach Protection Flows

Two weeks ago, things were proceeding on schedule, and Grant Co. PUD was targeting end March for the beginning of protection flows, Paul Wagner (NOAA) reported in the absence of Russell Langshaw (Grant Co. PUD). The river is at 800 temperature units, which means another 3 weeks of temperature increases until incubation, shifting to maintenance around April 1, Adams said. TMT will revisit this topic at its next regular meeting March 25.

4. Dworshak Operations

Steve Hall (COE) gave a presentation on slides linked to this agenda item. The first plot shows ESP traces for Dworshak inflows. The March 1 water supply forecast for Dworshak is 2.4 maf (or 2,460 kaf), which is 92% of normal. That's a bit higher than other forecasts in the basin, but close to the RFC's forecast of 2.17 maf and the COE's regression forecast of 2.36 maf.

Flood Control Shift: The COE is working on setting operations for the shift of flood control space from Dworshak to Grand Coulee. The first graph linked to today's agenda shows ESP inflow traces at Dworshak, the second and third show the amount of shift available through March and April 15. The rule for a flood control shift is that Dworshak has to be back down to its unshifted flood control elevation by the end of April. The goal of the shift is to generate outflows of about 14 kcfs throughout the last half of April. Dworshak discharges are limited to 14 kcfs by the TDG water quality standard. During the last half of April, the average inflow of ESP traces ranges between 10-14 kcfs. This indicates there won't be much discharge capacity to draw the reservoir down beyond inflows. By

mid-April, around 4 kcfs of discharge capacity (over inflows) will be available for drafting every day. By the end of April, that capacity is expected to drop down to 0-2 kcfs.

Inflow forecasts and snow conditions throughout the basin indicate that the 2009 water year could resemble 2003 and 2007. Plotting these conditions led to a goal of operating the shift at 14 kcfs from the end of the first week of April to the end of April. That's contingent on the forecast not changing dramatically. The COE calculated the maximum allowable shift at the end of March to be 134 kaf, putting Dworshak reservoir at elevation 1,542.7 feet instead of its flood control target of 1,532.9 feet.

In light of this information, the COE recommends limiting the shift to 100 kaf on the 15th of April. For now, the COE expects to operate Dworshak turbines at minimum flows of 1.5 kcfs until the shift occurs because flows of 1.3 kcfs cause cavitation of the turbine units. A shift of 100 kaf would amount to an average of 4 kcfs per day during the last half of April.

Hall gave a status report on the repair of RO gate #2 at Dworshak. Most of the equipment is back in place, and the COE is confident that the gate will be operational by end March. It's important that the RO gate be operational by April because the high reservoir elevation will require using the RO gates to discharge flows above 10.4 kcfs. This weeks STP trace show flat flows from the project during the first half of April, at 10.2 kcfs. The STP trace doesn't show the reservoir elevation reaching elevation 1,542.7 feet, although it did show substantial inflows in April. In summary, the proposed operation, based on current conditions, shows Dworshak discharges reaching 14 kcfs on April 10 and continuing through the end of April.

Yesterday at FPAC, the Salmon Managers discussed the flood control shift proposal and decided that it appears to be effective, Wagner reported. It will achieve the objective of moving more water to a higher elevation at Dworshak at times that will benefit fish. The Salmon Managers recognize and acknowledge the risk that if Dworshak reservoir doesn't achieve its target elevation, the Grand Coulee reservoir elevation will still be lower than it would have been without the shift. The difference between the Grand Coulee shifted and unshifted reservoir elevation on April 10 is about 1.4 feet, John Roache (BOR) said. The effect of the shift at Dworshak is significant, while the effect at Grand Coulee is extremely minor, Tony Norris (BPA) said.

Dave Statler (Nez Perce Tribe) asked for an estimate of what Dworshak elevations would be under the COE's flood control shift proposal. The target elevations are 1,542.7 feet on March 31 and 1,534.1 feet on April 15, based on a 2.6 maf forecast, Hall replied. Those numbers will change if the forecast changes. Statler wondered what the refill part of the flood control operation will look like with a target refill date of July 1. He expressed the Nez Perce Tribe's

preference for refilling Dworshak before the end of June, then passing inflows to provide spill for fish. That would depend largely on when inflows start picking up, Hall said. In the similar water years 2003 and 2007, there was a substantial increase in inflows during the last half of March, which led to a tendency to refill reservoirs earlier than planned. There's a likelihood that Dworshak reservoir will also refill early in 2009. However, another cold snap could delay runoff like last year. The COE will be watching this situation closely. Statler requested that the COE consider the temperature cooling benefits of river flows which could be needed during the first week of July.

The COE's short term plan is to continue operating the project at minimum flows of 1.5 kcfs through the end of March, depending on inflows. If 2009 turns out to be like 2003 and 2007, the maximum shift could happen before the end of March. The intent is for the reservoir to reach elevation 1,542.7 feet by the end of March in preparation for maximum outflows April 10-30 for fish migration. The COE doesn't anticipate changing the volume of the shift until the April final forecast is released around April 7. The April 10 objectives are based on March final forecast flood control elevations, Norris said. Because the April flood control elevation won't be available until a few days after the April final forecast is released, it will be difficult to alter system operations in time for the start of spill on April 10, just 1 or 2 days later.

5. Updated Water Supply Forecasts and Flood Control Operations

Libby Dam: The updated water supply forecast for inflows at Libby was released on Friday, March 6, Amy Reese (COE Seattle) reported. The low forecast volume for April was 5,296 kaf, 84% of normal, with a March 31 target elevation of 2,442.6 feet. The current elevation of Libby pool is 2,405.2 feet, 37 feet below the end of March target, based on releasing minimum flows of 4 kcfs. The project is still drafting slowly at the rate of about a tenth of a foot per day, and is expected to remain at minimum outflows until refill starts. The RFC forecast matched the COE forecast at 84% of normal, Adams noted. Both forecast volumes are 5.25 maf.

This forecast makes 2009 a tier 2 year for sturgeon, with 0.8 maf of sturgeon volume and a 7,000 cfs bull trout minimum in July and August, Reese said. If the project continues to operate at minimum flows, the end of April elevation will be 2,404 feet. These forecasts are iffy, Reese emphasized, because they're projecting two months out (May). The COE will present information on summer operations to TMT, but it's still early. The ESP runs posted to the TMT page are the most recent inflow estimates available, Adams said. Inflows at Libby are currently 3-3.5 kcfs, and minimum outflows are 4 kcfs. Wagner expressed interest in seeing modeling of potential reservoir scenarios when the time is right.

Statler asked whether the present low elevation at Libby is unusual for this time of year, and whether it could lead to refill problems. The end of December target for Libby is low, so it's not uncommon for the reservoir to be below its flood control elevation in March and April, especially with VARQ flood control in effect, Reese replied. Libby doesn't refill reliably every year. TMT will revisit this issue again when the April forecast becomes available.

Hungry Horse and Grand Coulee: The BOR's forecasted volume for March-July 2009 at Hungry Horse is 1,936 kaf, about 93% of normal, Roache reported. That's close to the RFC forecast of 91% of normal. Columbia Falls and Hungry Horse minimum flows of 3,500 cfs at the falls and 900 cfs below the project will remain in effect. A flood control shift of 100 kaf would put the April 15 elevation of Grand Coulee at 1,282 feet, Norris said. The April 15 flood control elevation is above the March 31 flood control elevation because the graph assumes less than a full shift on April 15 vs. a full shift on March 31. However, there won't be a full shift on April 15. The Grand Coulee reservoir elevation of 1,282 feet on April 15 will be about 280 kaf less than it would be without the shift.

6. 2009 Fish Operations Plan Update

Rudd Turner (COE) gave an update on Fish Operations Plan development. The COE is preparing the plan for spill and transport operations in 2009. Federal defendants at the March 6 BiOp hearing agreed to continue 2008 spring spill operations again in spring 2009. Thus the COE is working now to define spring operations at projects in the 2009 FOP. The principal litigants in the case will discuss this plan again within the next week or so.

In agreeing to continue the 2008 operation, Defendants indicated that two projects will operate differently this year than last, John Day and Little Goose. In 2008, spill levels of zero daytime and 60% nighttime flows were in effect at John Day when spill season began. After discussion, TMT changed the John Day spill regime to 30% daytime and 30% nighttime, and the same operation is planned for John Day in 2009 beginning April 10. The spill pattern at Little Goose will be altered this year to test the new removable spillway weir which is adjustable, with flows in the 6-7 kcfs and 9-10 kcfs ranges depending on whether the weir crest is set high or low. In order to maintain a consistent 30% spill for test conditions, the 2009 plan will forego the 14 nights of spill to the TDG cap which occurred in 2008.

The 2009 FOP will also describe transportation, Turner said. As in 2008, the 2009 transport operation at Lower Granite Dam will begin between April 20 and May 1, with staggered start dates shortly thereafter at Little Goose and Lower Monumental. The discussion of specific transport start dates for 2009 will occur at TMT. Last year, fish collection began on May 1 at Lower Granite, May 9 at Little Goose, and May 12 at Lower Monumental dams.

FFDRWG has discussed the spill plan for Little Goose in 2009, and if extended periods of low flow are expected in spring, they recommend using the high crest of the spillway weir, Rick Kruger (Oregon) pointed out. Apparently the higher crest creates a better spill pattern for fish. Kruger cautioned against changing the reservoir elevation while testing the TSW.

Last year, TMT dealt with a generation deadband issue at Little Goose by implementing an 11 kcfs flat spill regime as the basin moved into a low flow situation, Norris recalled. Spring 2009 could also turn out to be a low flow season. Norris suggested that TMT members think about how operation of the newly installed RSW will affect the generation deadband issue in 2009.

In 2008, the COE initiated spill at all four Lower Snake projects on April 3 and plans to do so again this year, Turner reported. The April 10, 2008, start of spill date for Lower Columbia projects will also be repeated in 2009. Wagner asked whether the three test spill operations that occurred in 2008 at Little Goose will be repeated this year. In 2009, it will be a single-treatment test with a modified bulk spill pattern, which appears to be the safest operation for juveniles with the least risk of impacting adult passage, Tom Lorz (CRITFC) replied. Flat spill patterns don't work with a TSW.

As in 2008, spring spill will end on June 20 for projects on the Snake River and on June 30 for projects on the lower Columbia, Turner recalled. Tagging of subyearlings in the Snake could affect the June 20 end of spill date for 2009. Tagging could also affect the 2009 end of spring spill dates on the lower Columbia, for example at McNary and Bonneville dams. Studies of seasonal effects and latent mortality in 2009 will involve collecting and trucking fish at Lower Granite Dam in April, which is similar to what happened in 2008. The spill operation at McNary Dam will vary from 2008 if a decision is made to move one of the new TSWs from bay 20 to bay 4, a possibility now under consideration.

7. Bonneville Corner Collector Operation (SOR 2009-01)

Signed by WDFW, ODFW and the Nez Perce Tribe, the first system operational request of 2009 asks the Action Agencies to begin operating the Bonneville Dam 2nd powerhouse corner collector on March 12, 2009, as soon as divers inspecting the fish screens are out of the water. CRITFC and three Fish Accord tribes didn't sign the SOR because they are pursuing the request pursuant to the Fish Accords. Tom Lorz noted that he signed it as vice chair of the Salmon Managers, not as a CRITFC representative.

The justification for operating the Bonneville corner collector is to aid steelhead kelt passage, Lorz explained. The corner collector opened on March 15, 2008; Lorz asked how the rollover would be handled in 2009. The COE's planned operation is to open the corner collector the morning of April 10, pending the findings of a white paper being prepared by the Portland district, Turner

replied. While corner collector operation was part of the FOP last year, during March 2008 it was a test operation, and the COE has not agreed to corner collector operation as a spring routine.

Lorz asked whether the COE is prepared to operate the corner collector if a decision is made to open it on March 15. If the needed equipment is ready, it is possible the corner collector could be opened within a day or two of notification depending on the status of work in the navigation lock, Turner replied. He said the project would need to be contacted to answer this. He suggested that FPOM discuss technical information regarding early corner collector operation. Wagner asked when opening and closing the corner collector would become a dedicated operation. There's money in the 2010 or 2011 budget to automate it, Lorz said. Lack of a working TIE crane has made corner collector operation more difficult than anticipated.

Brett Hall (Umatilla Tribes) recalled an earlier proposal to begin operating the corner collector on March 13 or 16, 2009. A NOAA memo on kelt passage written by Gary Fredricks could be considered, Turner said in response to questioning. Lorz explained the rationale behind today's SOR. Tests in 2007 and 2008 found that the corner collector passed 172 and 223 steelhead kelts from March 1 to April 10, 2007 and 2008, respectively. During corner collector operation, few adults were detected in the juvenile bypass facility.

There was discussion of possible TDG impacts on the chum operation as a result of opening the corner collector early. Adams showed TMT a graph of the chum operation, linked to today's agenda. At present, TDG levels at the Warrendale gage are 104-106%. The elevation of the corner collector outfall is 16 feet, while the chum protection minimum elevation is 11.5 feet. Depth compensation would be required in order to keep TDG levels below the state standard of 105%. Generally, TDG levels of 108% at the Warrendale gage will require a foot of depth compensation to protect chum sac fry in the gravel beds. In the absence of attraction flows, the fish ladders at Bonneville generate TDG levels of up to 124% at the Cascades Island gage. Flows of 2.4 kcfs or more through the fish ladder provide sufficient hydraulic pressure to move the gas downriver. Gas levels upstream at The Dalles tailrace are in the 101-102% range, so something is clearly happening between The Dalles tailrace and downstream of Bonneville to raise TDG levels.

SOR 2009-1 was posted mid-meeting, so the COE will need time to review it before giving a response. Release of a white paper on kelt passage by Corps biologists is expected sometime next week. There was general acknowledgement that the final decision on corner collector operation will not be made at TMT. A tentative meeting was planned for a week from today so TMT can coordinate the operational response.

There were no comments on SOR 2009-1 from USFWS, Washington or Idaho today. The issue needs to come back to TMT because other forums don't include BOR representation, John Roache said. Kruger advocated treating the corner collector operation as a repeat of 2008 operations. Because 2009 looks like a low flow year, Norris advised TMT members to begin thinking about tradeoffs involved in providing depth compensation now for corner collector operation vs. achieving April 10 storage objectives and their effects on spring flows. Any extra water spilled now will probably be subtracted from flows during the April 10-30 migration period, as well as from flows in June and July.

8. Operations Review

a. Reservoirs. Grand Coulee is at elevation 1,284.2 feet. The two main objectives are maintaining the minimum tailwater elevation of 11.5 feet at Bonneville and hitting the April 10 refill target.

Hungry Horse is at elevation 3,512.02 feet, with releases of 3.0 kcfs. Air temperatures are below zero, so the water supply is blocked. The forecast is 93% of normal, so refill probably won't be a problem this summer.

Libby is at elevation 2,405.2 feet, passing minimum flows of 4.0 kcfs for the foreseeable future. The end of March flood control elevation is 2,442 feet; the around 37 feet above the current elevation.

Dworshak is at elevation 1,529.6 feet, with minimum outflows of 1.6 kcfs through end March to avoid cavitation problems. The plan is to move toward a shifted elevation of 1,542.7 feet on March 31.

Albeni Falls is still operating between 2,051-2,052 feet elevation, passing inflows of 15-20 kcfs.

Seven-day average inflows are 39.2 kcfs at Lower Granite, 108.3 kcfs at McNary, and 128.9 kcfs at Bonneville.

b. Fish. This is the beginning of juvenile migration season, Wagner reported. Bonneville is the only project recording passage numbers at present. Yearling Chinook have passed the project at a rate of nearly 400 per day over the past week, while sub-yearlings passage is around 200 per day. Coho have been averaging about 5 fish per day. In light of today's SOR it would be good to have kelt passage counts for Bonneville accessible online, but at this point data on kelt passage are documented separately from juvenile bypass counts, Wagner noted. Because kelts prefer surface passage, the juvenile bypass isn't a good route for them. FPAC will discuss the kelt accounting issue further. Previous counts indicate that a substantial number of non-hatchery fish are part of the sub-yearling passage counts at Bonneville, David Wills (USFWS) said. Kelt

counts at the separator are sporadic, so while the historic data indicate the presence of kelts, the numbers aren't quantitatively valid, Margaret Filardo (FPC) said.

c. Power System. There was nothing new to report today, Tony Norris (BPA) said. The total installed wind capacity in BPA's balancing authority area is still 1,871 MW, same as last time.

d. Water Quality. There was nothing new to report today.

9. Next Meeting

A tentative TMT conference call was planned for 9 am, March 18, 2009, to discuss the Bonneville operation for kelts. The next regular TMT meeting will be on March 25, 2009. That agenda will include a Hanford Reach update, follow-up on the Bonneville corner collector operation, chum operations in relation to Vernita Bar flows and Grand Coulee refill, an update on the FOP and water supply forecasts, spill and MOP operations strategies, the BPA generation plan emergency action list, preliminary Science Center findings regarding transport operations in 2006 and 2007 (if available), and the standard operations review. This summary prepared by consultant and writer Pat Vivian.

| <i>Name</i> | <i>Affiliation</i> |
|--------------------|---------------------------|
| Paul Wagner | NOAA |
| Rick Kruger | Oregon |
| Tim Heizenrader | Centaurus |
| Steve Hall | COE Walla Walla |
| Jim Adams | COE |
| Tony Norris | BPA |
| John Roache | BOR |
| Rudd Turner | COE |
| Kim Johnson | COE |

Phone:

| | |
|------------------|----------------------|
| Pete Hassemer | Idaho |
| Cindy LeFleur | Washington |
| Kyle Dittmer | CRITFC |
| Barry Espenson | CBB |
| John Hart | EWEB |
| David Wills | USFWS |
| Margaret Filardo | FPC |
| Bob Diaz | Integral Renewables |
| Shane Scott | PPC |
| Yuan Mei | Edison Mission Group |
| Tom Lorz | CRITFC |
| Russ George | WMC |

Tom Le
Richelle Beck
Laura Hamilton
Dave Statler
Amy Reese
Brett Hall

Puget Sound Energy
DRA
COE
Nez Perce Tribe
COE Seattle
Umatilla Tribes

TECHNICAL MANAGEMENT TEAM

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

TMT MEETING

Wednesday March 18, 2009 09:00 - 11:00

NOAA Fisheries
1201 N.E. Lloyd Blvd.
Portland, Oregon
Map Quest [\[Directions\]](#)

Columbia Conference Room, 11th Floor Conference Room

CONFERENCE PHONE LINE

CONFERENCE LINE NUMBER

Conference call line:888-285-4585; PASS CODE = 601714

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 rgumpert@cnnw.net or call her at (503) 248-4703.

AGENDA

1. Welcome and Introductions
2. Bonneville B2CC Operation - [SOR 2009-01](#) 
 - a. [Kelt White Paper](#) 
 - b. [Corner Collector and TDG Production](#) 

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

Bonneville Dam Corner Collector Operation and
Ives Island Chum Redd Protection
Draft March 17, 2009

As a component of flow management at Bonneville Dam (BON) to protect chum redds near Ives Island, total dissolved gas (TDG) levels, as measured at the Warrendale fixed-monitoring station, are monitored to ensure that TDG does not exceed 105 percent (depth compensated) in those waters near chum redds. Water quality standards for the State of Oregon include a provision that TDG levels in “hatchery-receiving waters and other waters of less than two feet in depth” the concentration of total dissolved gas relative to atmospheric pressure at the point of sample collection may not exceed 105 percent of saturation (OAR 340-041-0031). The Corps and other federal, state, and tribal agencies have interpreted this criteria to apply to the waters below BON when chum are present in redds and that the Warrendale gage TDG data be used to represent TDG conditions at chum redds near Ives Island.

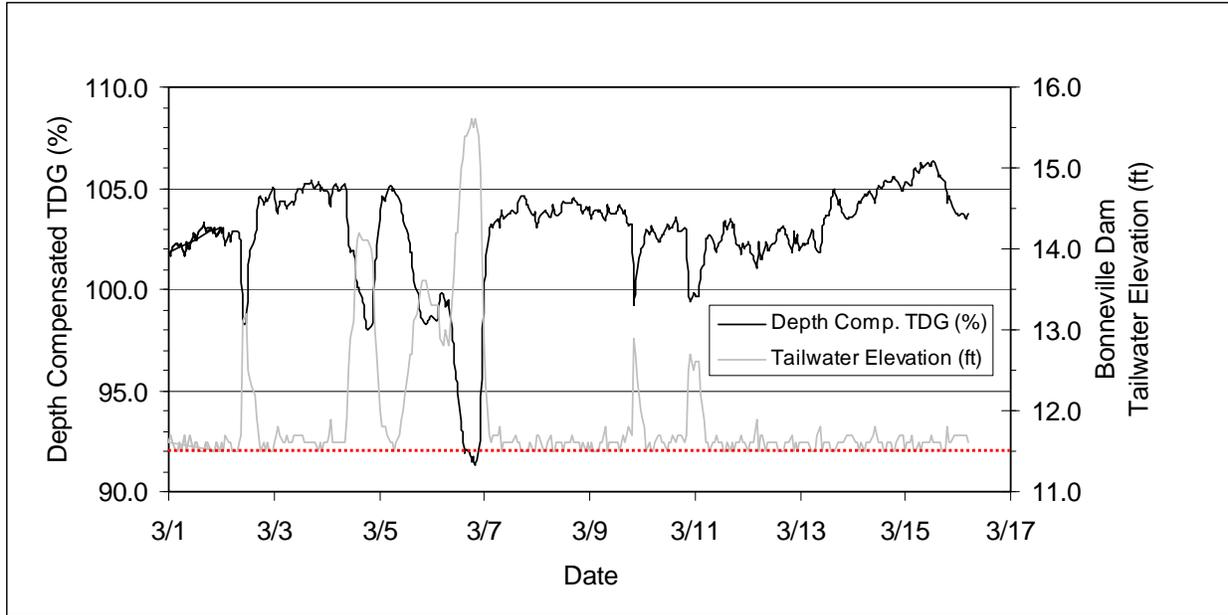
Current operations at BON that can elevate TDG levels downstream at the Warrendale gage are:

1. Daily adult attraction spill out of spill bays 1 and 18 (2.3 kcfs)
2. Fish ladder diffusers at the lower end of the ladders which generate TDG

Since attraction spill levels are low and the volume of water discharged from fish ladder diffusers is small, TDG levels at the Warrendale gauge are typically below 105 percent.

Operation of the BON powerhouse II corner collector (B2CC) will likely result in additional TDG production. The B2CC outfall elevation is 16 ft with the BON tailwater elevation being approximately 11.5 ft. Operation of the B2CC allows approximately 5.0 kcfs outflow to plunge from a height of at least 4.5 feet and can result in significant TDG production. Studies conducted by the Corps indicate that TDG production can result in a 2-3 percent TDG increase measured at the Warrendale station due to B2CC operation. Given current conditions, operation of the B2CC could result in TDG levels that exceed 109 percent at the Warrendale station. Since March 1, depth compensated TDG has ranged from 91.3 to 106.4 percent (Figure 1). In order to meet the Oregon TDG criteria, additional depth compensation would be needed below BON if TDG exceeds 105 percent. As a general rule of thumb, 1 ft of additional water depth provides depth compensation for a 3 percent increase in TDG. If TDG levels at the Warrendale station exceed 109 percent, BON tailwater elevation would need to be maintained at a minimum of 12.75 ft in order to provide adequate depth compensation for chum redds and meet Oregon’s Standard. Current estimates indicate that every additional foot of tailwater depth would require an additional 10-15 kcfs of outflow from BON. This additional flow could be drafted from Grand Coulee (GCL) and may reduce the likelihood of reaching the April 10 refill target at GCL. Based on current forecasts, GCL would be about 1 ft below the April 10 target elevation by March 31 and about 3 ft below the target elevation on the April 10. Quantifying the level of risk of not meeting the April 10 target elevation requires modeling; that information is not yet available for this draft document. A decision to operate the B2CC in March needs to weigh the potential impact of elevated TDG levels on chum redds at Ives Island and missing the GCL April 10 refill target against any benefit afforded by the March B2CC operation to steelhead kelt or early migrating juvenile salmonids.

Figure 1.—Depth compensated percent total dissolved gas at the Warrendale fixed monitoring station and Bonneville Dam tailwater elevation during March 1-16, 2009.



Iteroparity in lower Columbia River Steelhead (*Oncorhynchus mykiss*): a review of research in relation to B2CC operations from 1 March to 10 April

This paper provides a brief review of scientific information regarding iteroparity rates of Columbia River steelhead populations in relation to the BiOp FCRPS operations (NMFS 2008). The specific objectives are to review the scientific record regarding kelts from the mid Columbia and Snake rivers and apply this knowledge to early spring operation of the Bonneville (BON) Dam Powerhouse II Corner Collector (B2CC) to benefit ESA-listed lower Columbia River (LCR) steelhead.

Steelhead in the LCR differ from upriver stocks. Both ESA-listed winter (ocean maturing) and summer (stream maturing) steelhead varieties spawn in tributaries that discharge into the reservoir created by BON, the sole FCRPS reservoir affecting both steelhead varieties (Withler 1966; Busby et al. 1996). Iteroparity rates in a tributary discharging into the reservoir created by BON have been reported at over 9% for summer and over 13% for winter steelhead; whereas, iteroparity rates over 15% for summer and over 21% for winter steelhead have been measured in tributaries to the unimpounded reach below BON (Leider et al. 1986; Olsen 2004).

The hypothesis being addressed is that B2CC operation prior to 10 April would benefit wild LCR steelhead iteroparity rates for stocks originating upstream of BON. This hypothesis is founded on the assumption that like upriver kelts - LCR kelts are: 1) in good morphological condition, 2) female (> 80%), and 3) naturally produced (Evans et al. 2004; Boggs et al. 2008). Coupled with swift gonadal re-maturation and returns from kelts (consecutive and skip [ocean overwintering] spawning cycles) these fish presumably provide the potential for a rapid influx of desirable genetic material to typically male-skewed populations (e.g., Keefer et al. 2008). Assumptions fundamental to obtaining a benefit from B2CC operations include: 1) Rapid conveyance (reduce passage delay), 2) Benign or 'optimal' conveyance compared to other BON routes, and 3) adequate numbers to justify operations. An assessment of data in relation to these assumptions will provide insight into whether B2CC March operations are warranted.

Rapid Conveyance

Results demonstrate that median forebay residence times at B2 with the B2CC operating in 2004 were significantly shorter relative to 2002 when the sluiceway was not operating (Wilcoxon rank-sum test: $P < 0.0001$). Average river discharge at B2 during the study period (April to June) in 2004 was 101.9% (3,048 m³/s) of the 2002 average (2,991 m³/s), indicating nearly identical conditions, making such a direct comparison reasonable (Wertheimer 2007). Median times were reduced from roughly 6 hours (h) in 2002 to 0.3 h in 2004; whereas, the third quartile (75%) was reduced from > 23 h to 1 h during the same period. It is unclear whether such reductions in residency time affect kelt outmigration survival or return rates.

Benign Conveyance

Boggs et al. (2008) provided the first quantitative data regarding return rates from upriver summer steelhead with known FCRPS dam passage routes, including route-specific

passage and returns from kelts passing BON. However, due to the number and complexity of factors affecting returns rates from these upriver summer steelhead stocks (e.g., Keefer et al. 2008), caution should be applied when assigning a return probability to one known dam passage event, after multiple unknown dam passage events.

Return rates were variable within and among BON routes from 2001 to 2004 (Table 1, modified from Boggs et al. 2008). The range of return rates – by route – in descending magnitudes were: 1) juvenile bypass system (JBS, 0% to 23.3%), 2) Sluiceway (0% to 18%), turbine units (TU, 3% to 13%), and spillway (5% to 8%). Cumulative return proportions ranged from 2001 (11.7%) to 2004 (5.7%).

Samples sizes of kelts passing BON TU were similar in 2001 (n=38) and 2004 (n=31). Return proportions from TU were roughly 3% in 2001 and 9% in 2004, indicating the effects of small numbers of returnees from 2001 (n=1) and 2004 (n=3) on TU return proportions. In 2001, 38% of all passing kelts navigated BON via TU; whereas, in 2004 only 9% of kelts passed BON via TU. Operation of the B2CC in 2004 was a likely mechanism for the low proportion of kelts passing BON TU in 2004 (Wertheimer 2007).

Table 1: The population of kelts passing specific Bonneville Dam (BON) routes (N), the percentage of the fish subsequently detected passing upstream at BON (%), and the sample size of kelts detected passing upstream at BON (n); (N; %; n).

| | 2001 | 2002 | 2004 | Route - Totals |
|-----------|--------------|-------------|-------------|----------------|
| JBS | 30; 23%; 7 | 31; 13%; 4 | 15; 0%; 0 | 76; 14%; 11 |
| Spill | 24; 8%; 2 | 144; 6%; 8 | 97; 5%; 5 | 265; 6%; 15 |
| Sluiceway | 11; 18%; 2 | 15; 0%; 0 | 15; 0%; 0 | 41; 5%; 2 |
| Turbines | 38; 3%; 1 | 23; 13%; 3 | 32; 9%; 3 | 93; 8%; 7 |
| B2CC | NA | NA | 191; 6%; 12 | 191; 6%; 12 |
| Totals | 103; 12%; 12 | 213; 7%; 15 | 351; 6%; 20 | 667; 7%; 47 |

Screened bypass systems with orifices were designed with criteria for passing juveniles, not pre-spawn adult salmonids or steelhead kelts (Boggs et al. 2004). Wagner (1991) estimated that 40% of adult fallback at McNary Dam had fresh injuries, in varying degrees of severity; that were attributed to bypass system passage. During kelt sampling at FCRPS facilities (2001–2002), fresh injuries (e.g., head scrapes, damaged fin rays, descaling) were identified on roughly 30% of sampled kelts (Wertheimer et al. 2002; 2003). Based upon the placement and types of injuries most were attributed to screen and orifice passage. Subsequent recaptures of injured fish at downstream facilities indicate the fate of an unknown percentage of these injured kelts was mortality; attributed to the rapid spread of fungi (*Saprolegnia spp.*) on injured areas.

Inferring a benefit from B2CC operations - for LCR steelhead - from studies of upriver steelhead stocks alone is problematic. Determination is even more difficult as data from these summer steelhead stocks are characterized by: 1) small sample size, 2) return variability by passage route, 3) return variability by passage year, 4) return variability by passage timing, 5) unreported morphometrics (e.g., origin, sex, condition), and 6)

unknown prior passage histories to tagging (i.e., dam passage routes). Passing salmonids using a surface flow as compared to other routes (i.e., spill, screened systems, TU) is hypothesized to reduce stress as a result of decreases in pressure changes and turbulence (ISG 2000; Budy et al. 2002). Data supporting this hypothesis for TU are provided by Coutant and Whitney (2000), which indicate larger fish suffer greater mortality during turbine passage than smaller fish. Despite this; results do indicate that kelts passing all BON routes – including TU – are returning on subsequent spawning migrations.

Kelt Use During B2CC Early Operations

The effects of B2CC operations during March on LCR steelhead return rates have not been evaluated. However, adult steelhead B2CC passage during March was enumerated using hydroacoustics in 2007 and 2008 (Weiland et al. 2008; 2009). In these studies, 172 and 223 kelt-sized fish were estimated to have passed the B2CC from 1 March to 10 April in 2007 and 2008, respectively. Daily passage ranged from 4 to 7 fish per day. Temporal passage appeared fairly constant through the study period with some higher peaks in early April.

Visual counting of downstream passing adult steelhead and salmon at the B2 SMF Primary Dewatering Structure (PDS) occurs intermittently 24 hours day; providing a potential presence/absence index of passing kelts. Visual enumerations of kelts at the B2 PDS indicate significant variability in yearly passage numbers (Table 2). Passage numbers at the PDS range from five-steelhead in 2008 to over 450 in 2003. In the absence of B2CC operations approximately 50% of kelts would be expected to pass via TU (Table 3). Thus, data from the PDS in 2003 conservatively suggest approximately 600 adult steelhead passed via TU during the period from 1 March to 10 April, 2003.

Table 2. Bonneville B2 PDS Fallback Data 2003-2008. Data acquired at Bonneville Juvenile Fish Monitoring Facility PDS Adult Fish and Debris Separator

| Year | Period | Adult Fish ByPassed | | |
|-------|----------------------|---------------------|-----|---------|
| | | Sthd | Sal | Unk Sal |
| *2003 | 10 March to 10 April | 458 | 122 | 15 |
| 2004 | 2 March to 10 April | 33 | 4 | 1 |
| 2005 | 2 March to 10 April | 145 | 0 | 2 |
| 2006 | 2 March to 10 April | 40 | 1 | 0 |
| 2007 | 2 March to 10 April | 40 | 0 | 0 |
| 2008 | 3 March to 10 April | 5 | 1 | 0 |

*B2CC became operational in 2004

Table 3¹: Kelt guidance efficiency (GE) at Bonneville (BON) in 2001, 2002, and 2004.

| Project | Year | n | GE % | Comments |
|---------|------|----|------|--------------------|
| BON | 2001 | 55 | 47 | Non-Spill Spill |
| BON | 2001 | 27 | 70 | |
| BON | 2002 | 50 | 58 | |
| BON | 2004 | 43 | 35 | |

¹Wertheimer 2007 and Wertheimer and Evans 2005.

Operational Cost

Determining the cost of operating B2CC relates directly to the value of water from power generation. During March, revenues for a Megawatt-hour (mw/h) of power generation typically range from a low of approx \$30 mw/h up to \$85 mw/h and beyond. Assuming an average of \$45 mw/h and based upon 960 hours of time during the preseason period (1 March to 10 April) B2CC operational costs are qualitatively estimated to average roughly \$1,000,000 but can range anywhere from a low of approximately \$600,000 up to \$1.7 million and above (BPA personnel personal Communication). An analysis of the costs of operating the B2CC from 1 March to 10 April of a given water year would add insight into actual costs.

Water Management Concerns

Since, the operation of the B2CC can generate increased TDG levels in the vicinity of the chum redds downstream of the Bonneville Dam additional flow from Bonneville may be required to provide sufficient depth compensation to remain within the Oregon water quality standards. Approximately 1 foot of depth compensation is required for a typical B2CC operation when operating the project near the chum protection level. To provide the additional 1 foot of tailwater (TW) approximately 10 to 15 kcfs additional outflow may be required. There are many variables that determine what actual discharge is required from Bonneville Dam to provide the TW and also how much flow augmentation may be required from storage projects upstream to support any additional outflow. A condition of low streamflows in March and April can occur regardless of the expected water supply condition. Therefore, the additional water to support the required outflow from Bonneville Dam may require flow augmentation volumes that would otherwise be delivered to the Mid-Columbia during the April 10 to April 30 period.

Benefits

Benefit to LCR steelhead stocks from March B2CC operations are the 'delta' or difference in return rates between TU, JBS, and the B2CC. In fact, little is known regarding behaviors and characteristics of the target steelhead populations for these operations. More quantitative field studies of passage route effects on return rates are needed to understand benefits of BON configurations and operations on kelt return rates and return timing. The use of passive and or active tags (e.g., PIT, JSATS) may be one means of beginning to obtain such data for LCR steelhead populations passing BON.

Conclusions

The intent of this review was to evaluate assumptions fundamental to operating the B2CC for kelt prior to operations for juvenile salmonid passage. Results demonstrate that the B2CC provides the most rapid conveyance mechanism for adults passing BON. Based upon design criteria it is presumable the B2CC represents the most benign or 'optimal' adult fish passage system available at BON. Fundamentally, the issue becomes the level of kelt passage that warrants operation. As discussed earlier, kelt presence at BON, whether observed in the JBS or B2CC, appears to be highly variable between years. In 2003, the B2CC would have been expected to pass in excess of 1000 steelhead during 1 March to 10 April (based upon 50 % FGE from Table 3), passage numbers (Table 2), and B2CC kelt Passage efficiency (0.82) from 2004 (Wertheimer 2007). In other years, even

when corner collector flow was provided (e.g., 2007 & 2008) the numbers of kelts present during March are greatly reduced. Future data that would be helpful to address outstanding technical questions to develop management alternatives could also include determining stocks representation and their composition (e.g., kelts v. fallbacks).

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COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

March 18, 2009 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.

SOR 2009-1

As follow up to the 3/11 TMT meeting’s discussion of SOR #2009-01, submitted by ODFW, WDFW and the Nez Perce Tribe, today’s TMT conference call was scheduled to discuss several relevant documents that were to be shared with TMT members and other regional representatives. Dan Feil, COE, reported that two documents had recently been posted as links to the agenda: a kelt white paper drafted by Bob Wertheimer, COE Portland District, and a March 17 Memo regarding operation of the Bonneville Dam Corner Collector (B2CC) and the effects on tdg downstream.

Feil said that preliminary estimates showed that operation of the B2CC may increase TDG levels by 2-3% near the Warrendale gauge; he clarified that the estimates were uncertain and more recent data from USGS is needed. Feil said that the COE planned to update the memo with the most recent TDG and depth compensation (and un-compensated) data as soon as possible. Feil reported that TDG levels at the Warrendale gauge were at 108% on 3/15.

Feil reported that maintenance on Bonneville’s navigation lock has rendered it out of service, and the crane at the project will need to stay in position on the south side for the repair through the end of March. As the B2CC is located on the north end of the project, a new crane would need to be brought in if a decision was made to operate B2CC before April 1. Feil clarified for TMT that discussions regarding the SOR were still underway and that no COE operational decision had yet been made.

Wertheimer provided a brief synopsis of the six-page white paper; he said that studies show that early migrants have a higher return rate than those that migrate later. The studies showed the B2CC to be the most benign route for kelt passage, especially compared to turbine passage. Wertheimer noted the significant variances between data in Table 1, which indicated the difficulty in equating one life history event/factor that affected return rates. He reviewed visual counting passage data from the B2 Primary Dewatering Structure (PDS), which conservatively suggests approximately 600 steelhead passed through the turbine units between March 1 - April 10 of 2003. Hydroacoustic tag data from studies conducted in 2007 and 2008 showed 172 and 223 kelt-sized fish passed through the B2CC from March 1 – April 10, respectively. So far this season, three kelt

were observed passing the project on 3/16. Wertheimer also clarified that during cooler water years, migration tends to be later.

TMT members thanked Wertheimer for his helpful summary. Action Agency representatives Dan Feil, COE, and Tony Norris, BPA, acknowledged the uncertainties around effects the proposed operation might have on TDG levels, depth compensation, and, given the dry conditions so far this year, achieving April 10 refill at Grand Coulee. Norris said that there are no guarantees at this point that the coming natural flows will support the necessary depth compensation to support chum redds. Feil clarified that a new crane could be brought in to help open and close B2CC in real time should TDG levels become an issue for downstream chum redds, but there are uncertainties around the net cost this option would entail. Again, Feil and Norris said no decision on the request had yet been made.

The following parties weighed in on the information associated with the request that had been presented during the call:

- OR: although there are many benefits associated with operating the B2CC, they should be balanced with meeting April 10 refill targets at Grand Coulee and providing depth compensation for chum redds. If B2CC could be operated in a way that TDG could be managed to protect chum redds, OR would support that. OR would like to see system operations managed in a way that this proposed operation could be a viable option in the future.
- WA: support those statements made by OR. Given the discussion today, the Action Agencies may not be set up to perform the requested operation at this point. Would like this option to be considered in the future.
- ID: support downstream Salmon Managers' positions; concerned about risks to April 10 refill, as it is critical for good out migrating conditions later in the year. If there was a way to meet April 10 refill and operate the B2CC in a way that provided good conditions for steelhead kelts, ID would support that, but not at the risk of missing April 10 refill.
- BOR: priority is for meeting April 10 refill at Grand Coulee; if this can happen, BOR does not object to the proposed operation.
- NOAA: appreciate the opportunity to have the conversation this year, as the data and discussions will help inform operational decisions to support steelhead kelt passage in future years.
- CRITFC: it is unfortunate that a series of crane-related events have minimized flexibility around operations for this year.

Action/Next Steps:

- Tom Lorz, CRITFC, will share information that was used as biological support for the SOR with DS Consulting, who will forward the documents to the broad distribution list.
- The COE will continue to hold discussions both internally and with Lower River Tribal representatives between now and the next TMT meeting on 3/25.
- The COE's current plan of opening the B2CC on April 10 stands for the time being.

- TMT will revisit this issue at their 3/25 meeting.

Next TMT Meeting: *Please note: TMT meetings will likely be held at NOAA Fisheries at least through April due to phone system issues in the Columbia Room at the COE. Please check the meeting agendas for location confirmation.*

March 25th, 9-noon at NOAA Fisheries:

Agenda items include:

- Hanford Reach Protection Flows Update
- Follow up on B2 corner collector operations discussion
- Status of spring spill / FOP
- Chum, VB and Grand Coulee April 10 target: Feedback from salmon managers and TMT discussion about priorities
- (Tentative): NMFS Science Center report on 2006-07 transportation study results
- BPA's Generation Emergency Actions List: review
- Spring spill priority list: review
- Operations Review

**Columbia River Regional Forum
Technical Management Team Meeting
March 18, 2009**

1. Introduction

Today's TMT meeting was chaired by Dan Feil (COE) and facilitated by Robin Gumpert (DS Consulting) with representatives of NOAA, COE, Idaho, BOR, BPA, Oregon, CRITFC and others participating. 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. Bonneville 2nd Powerhouse Corner Collector Operation (SOR 2009-01)

Follow up on this issue from last week's TMT meeting was the reason for meeting today. Signed by WDFW, ODFW and Nez Perce Tribe, SOR 2009-01 asked the Action Agencies to begin operating the Bonneville Dam 2nd powerhouse corner collector on March 12, 2009. The SOR was introduced at the last TMT meeting March 11, where members discussed the fact that forums outside of TMT were also dealing with this issue. It was noted that not all of the Action Agencies have representation in other forums so the issue should come back to TMT.

As of today's meeting, the COE posted (1) a white paper on kelt passage at Bonneville Dam and (2) a memo describing total dissolved gas (TDG) production due to corner collector operation and the potential need to increase Bonneville tailwater elevation to provide adequate compensation depth for chum redds by drafting Grand Coulee. Operating the corner collector does generate TDG, Feil reported. Past studies have found a 2-3% increase in TDG levels at the Warrendale gage with the corner collector open. A figure at the end of the TDG memo shows depth compensated TDG levels since March 1, 2009, with depth compensation measured at the Warrendale gage. Rick Kruger (Oregon) suggested that actual gage readings as well as computed depth compensation values be provided; Feil will update the TDG memo to include this information.

The COE is performing maintenance to the Bonneville navigation lock which requires dedicated use of the only available crane through the end of March. If a decision is made to open the corner collector before April 1, the COE would have to lease a crane. Yesterday the COE met with the Accord parties to discuss the two new documents and the SOR itself. At this point, there has been no decision to open the corner collector before April 10. However, the issue is still being discussed.

Feil introduced Bob Wertheimer, author of the white paper on kelt passage, who summarized the findings, which are based on studies of radio and

PIT tagged fish at McNary, Lower Granite and John Day dams (i.e. the lower Columbia River). Bonneville is the only reservoir whose operation affects both winter and summer steelhead migration. There is a potential for large numbers of these fish to migrate early. Findings from studies of upriver stocks show that early out-migrants have significantly higher adult returns than later runs.

These studies also found that use of the corner collector, as compared to data in 2002 before the corner collector existed, results in significantly shorter residence times in the forebay. The indication of rapid migration past the dams is presumed to have spawning benefits. The corner collector is presumed to be the most benign passage route for adults. Passage through fish screens can cause injury, which in kelts often induces a deadly fungal infection. It is also known that large fish suffer greater mortality rates from turbine passage than smaller fish do. Wertheimer highlighted the large variation in return rates, from zero to 23%, shown in the table on page 2 of the white paper. It is very difficult to evaluate adult return rates based on a single passage or life history event.

The real issue is whether the number of fish passing warrant a special operation, Wertheimer said. This kind of monitoring was done in 2007 and 2008. In March 2007, 172 steelhead kelts passed through the corner collector; in March 2008, 223 passed through it. Kelts typically have the highest return rates when their populations are at their lowest levels. That's when kelts may provide the most overall benefit to their species. Because they are larger, kelts lay larger eggs which have increased odds of survival. Kelt migration is based on water temperatures, which drive them to spawn. Creeks with southern exposure can produce many fish. Tom Lorz (CRITFC) will provide several background documents on the biological justification for opening the corner collector early for distribution to all TMT members.

TMT members then stated their views of SOR 2009-01.

COE – Due to Oregon water quality standards, if gas levels at the Warrendale gage exceed 105% while the corner collector is operating, the COE is required to provide compensation depth downstream to protect the chum redds. This flow augmentation might have to come from Grand Coulee Dam if conditions become dry. Therefore, operation of the corner collector early entails the risk of not meeting April 10 refill targets. At this point, the COE can't guarantee that natural flows will provide adequate depth compensation.

BPA – Flow augmentation needed from Grand Coulee for corner collector operation could consume water that would otherwise be available for downstream migration from April 10-30. The current elevation of Grand Coulee reservoir is approximately 1,283 feet, drafting toward a flood control elevation of 1,281.6 feet. The April 1-10 timeframe is expected to be the most crucial for maintaining a 12.5-foot tailwater elevation at Bonneville 24 hours a day in order to protect chum redds and have enough water to achieve the April 10 objective.

The Salmon Managers need to consider whether the potential risk of withdrawing water from the spring period to support depth compensation for corner collector operations is an acceptable tradeoff.

Oregon – There is great benefit in operating the corner collector early, but Oregon is unwilling to sacrifice April 10 refill to achieve that goal. Changes are needed in future to address this unacceptable tradeoff. Early corner collector operation should have been considered part of the rollover operation agreed to by the Action Agencies at the March 6 BiOp hearing. Nonetheless, Oregon will not object if the COE and BPA decide not to operate the corner collector early this year due to potential impacts on chum.

Washington – Concurs with Oregon's approach.

Idaho – Protecting kelts is important, particularly since they tend to carry large numbers of eggs per female. However, hitting April 10 elevations to provide spring flows for this year's out-migration is of paramount concern. Idaho would not object to early corner collector operation as long as April 10 refill is not significantly jeopardized.

CRITFC - Suggested opening the corner collector, monitoring it closely while keeping a crane attached to the gate, and closing the corner collector if TDG levels become a problem. The lack of a crane dedicated this year to operating the corner collector is frustrating. CRITFC will provide additional biological information on corner collector operation for TMT members to consider.

BOR – Has no objection to opening the corner collector early as long as Grand Coulee can meet all the relevant requirements, including sufficient depth compensation for chum and meeting the April 10 elevation objective. This decision is a matter of prioritizing impacts.

NOAA – Focused on how this issue will be dealt with in future years, and how the Action Agencies will incorporate corner collector use into the strategy for managing kelts.

The planned operation at present is to open the corner collector on April 10, 2009, pending further discussion. The COE will update the TDG memo and provide a link to TMT members so they can monitor current data at the Warrendale gage. The corner collector issue will be added to the agenda for the next TMT meeting. Rudd Turner (COE) suggested providing the latest kelt counts from the smolt monitoring operation at that time.

3. Next Meeting

The next regular TMT meeting will be March 25, 2009. That agenda will include a Hanford Reach update; follow-up on the Bonneville corner collector operation; chum operations in relation to Vernita Bar flows and Grand Coulee refill; an update on the FOP and water supply forecasts; spill and MOP operations strategies; the BPA generation plan emergency action list; preliminary Science Center findings regarding 2006 and 2007 transport operations (if available) and the standard operations review. This summary prepared by consultant and writer Pat Vivian.

| <i>Name</i> | <i>Affiliation</i> |
|--------------------|---------------------------|
| Paul Wagner | NOAA |
| Dan Feil | COE |
| Bob Wertheimer | COE |
| Russ Kiefer | Idaho |
| John Roache | BOR |
| Tony Norris | BPA |
| Tim Heizenrader | Centaurus |
| Dave Benner | FPC |
| Margaret Filardo | FPC |
| Tom Le | Puget Sound Energy |
| Jay XX | Centaur Energy Trading |
| Barry Espenson | CBB |
| Rudd Turner | COE |
| Kim Johnson | COE |
| Richelle Beck | DRA |
| Cindy LeFleur | Washington |
| Rick Kruger | Oregon |
| Glen Trager | Shell Energy |
| Tom Lorz | CRITFC |
| Ryan XX | Ebcor |

TECHNICAL MANAGEMENT TEAM

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

TMT MEETING

Wednesday March 25, 2009 09:00 - 12:00

NOAA Fisheries
1201 N.E. Lloyd Blvd.
Portland, Oregon
Map Quest [\[Directions\]](#)

Mt. St. Helens Room, 10th Floor Conference Room

CONFERENCE PHONE LINE

CONFERENCE LINE NUMBER
Conference call line:888-285-4585; PASS CODE = 601714

*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 rgumpert@cnnw.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and Introductions
2. Review Meeting Minutes for February 25, and March 11, 2009 [\[Meeting Minutes\]](#)
3. Hanford Reach Protection Flows - *Russell Langshaw, Grant County PUD*
4. SOR 2009-01 Follow-up - *Dan Feil, USACE*
 - a. [SOR2009-01](#)
 - b. [Warrendale TDG](#)
 - c. [Bonneville Kelt Counts](#)
5. Draft 2009 Spring Fish Operations Plan (FOP) -*USACE*
 - a. [Draft 2009 Spring Fish Operations Plan](#)
6. BPA Generation Emergency Actions: Review - *Tony Norris, BPA*
7. Spring Spill Priority List - *Jim Adams, USACE*
 - a. [Spill Priority List](#)
8. Little Goose Low Flow Operations - *Dan Feil, USACE*
9. Operations Review
 - a. Reservoirs

- b. Fish
 - c. Power System
 - d. Water Quality
10. Other
- a. Set agenda for next meeting - **April 1, 2009**
[\[Calendar 2009\]](#)

Questions about the meeting may be referred to:

*[Jim Adams](#) at (503) 808-3938, or
[Cathy Hlebechuk](#) at (503) 808-3942, or
[Dan Feil](#) at (503) 808-3945*

2009 Spring Fish Operations Plan

DRAFT

BACKGROUND

The 2009 Spring Fish Operations Plan (FOP) describes the U.S. Army Corps of Engineers (Corps) planned operations for fish passage at its mainstem Federal Columbia River Power System (FCRPS) dams during the 2009 spring fish migration season, generally April through June. The 2009 spring spill operations are consistent with the 2008 Court ordered spring spill operations except for two operational changes. At John Day Dam, prior to the spillway weir test, there will be 30%/30% day/night spill instead of the 0%/60% spill that occurred in 2008. Otherwise, 2009 spring spill operations will remain the same as in spring 2008. At Little Goose Dam, in order to test the newly installed spillway weir, spill will be maintained at a consistent 30%/30% day/night for the entire duration of 2009 spring spill operations. The Corps will not spill for 14 nights to the total dissolved gas (TDG) cap as this would interfere with testing the new spillway weir.

The 2009 Spring FOP is consistent with the adaptive management provisions in the 2008 NOAA Fisheries FCRPS Biological Opinion (2008 BiOp) and the Corps' Record of Consultation and Statement of Decision (ROCASOD) adopting the project operations contained in and the Columbia Basin Fish Accords (Accords).

As in 2008, the 2009 Spring FOP incorporates planned operational adjustments necessary to perform essential research, and to accommodate the installation or adjustment of surface bypass structures or other features for the 2009 spring migration season. The FCRPS water management and project operations not specifically addressed in this 2009 Spring FOP also are consistent with the 2008 BiOp, and other operative documents including the 2009 Water Management Plan (WMP), seasonal WMP updates, and the 2009 Fish Passage Plan (FPP). As in 2008, operations may be adjusted through coordination with regional sovereigns.

The following sections describe: factors that influence management of fish operations during various runoff conditions, including TDG management, spillway operations, and minimum generation; specific spring operations for fish passage at each mainstem project; the juvenile fish transportation program operations; protocols for emergencies; coordination with the region; and, monthly reporting.

GENERAL CONSIDERATIONS FOR FISH OPERATIONS

For planning purposes, the Corps' 2009 Spring FOP assumes "average" run-off conditions as summarized in Table 1 below. However, because actual run-off conditions vary in timing and shape and may be higher or lower than average, adjustments in spill levels (kcfs discharge rates, spill percentages, or spill caps) will be adaptively managed in-season as needed to avoid or minimize poor juvenile or adult fish passage conditions, navigation safety concerns, or to accommodate powerhouse or transmission constraints. Actual spill levels may be adaptively managed from those displayed in the table below for research or other conditions and will be coordinated through the Technical Management Team (TMT) or other appropriate regional forum. Such conditions are discussed in more detail below.

Management of Spill for Fish Passage

The Corps will continue to manage spill for fish passage to avoid exceeding 120% in the project tailrace, and 115% in the forebay of the next project downstream consistent with the current State of Washington total dissolved gas (TDG) saturation upper limits.¹ These levels are referred to as "gas caps." The project maximum flow rate or spill discharge level that meets but does not exceed the gas caps, is referred to as the "spill cap." The gas caps are constant, whereas, spill caps may vary daily depending on flow, temperature, and other environmental conditions.

As noted above, the spill rates presented in Table 1 are the planned spring spill operations and assume average runoff conditions; however, adjustments to these spill rates may be necessary for the following reasons:

1. high runoff conditions where flows exceed the powerhouse hydraulic capacity with the specified spill rates;
2. navigation safety concerns;
3. generation unit outages that reduce powerhouse capacity;
4. power system or other emergencies that reduce powerhouse discharges; and,
5. a lack of power demand resulting in an increase in the rate of spill.

Spill below the specified rates could also occur during low runoff conditions when meeting minimum generation levels at a project requires reducing spill rates. This would most likely occur in April. Minimum generation and spill rates are included below in the project specific information.

The Corps' Reservoir Control Center (RCC) is responsible for daily management of TDG responsive to changing conditions. In order to manage gas cap spill rates consistent with the States' TDG saturation limits, RCC establishes the spill caps for each project on the lower Columbia and Snake rivers on a daily basis throughout the fish passage season.

¹ In February 2009, the State of Oregon modified its waiver for 2009 to remove the 115% forebay TDG limit. However, the Corps will continue to manage to 120% and 115% (the Washington TDG standard) in 2009.

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These spill caps are set so that resultant TDG percent saturation levels are not expected to exceed the 120%/115% TDG limits, measured as the average of the highest 12 hourly readings each day.

Within any given day, some hours of measured TDG levels may be higher or lower than the gas caps due to changing environmental conditions (wind, air temperature, etc.). The process of establishing daily spill caps entails reviewing existing hourly data at each dam (including flow, spill, temperature, and TDG levels) and taking into consideration a number of forecast conditions (including total flow, flow through the powerhouse, wind and temperature forecast, etc.). This information is used as input into the System TDG (SYSTDG) modeling tool. The SYSTDG model estimates TDG levels in the rivers several days into the future, and is a tool integral to daily decision-making when establishing spill caps at individual dams.

Spill caps set by RCC in daily spill priority requests will be met at the projects by using the spill pattern in the appropriate FPP spill table which most closely corresponds to the requested spill (i.e. may be slightly over or under). During the spring freshet when flows are often expected to be greater than hydraulic capacity with the specified spill rates at the dams, or if a lack of power load results in an increase in the spill rate, the Corps will attempt to minimize TDG on a system-wide basis. In this case, spill caps are also developed for 125%, 130%, or 135% saturation to minimize TDG throughout the system.

The Corps will initiate spill at 0001 hours, or shortly after midnight, at each of the projects on the start dates specified in the project by project sections below. Spill caps will be established at the specified amounts and will continue unless conditions require changing to maintain TDG within the upper limits of 120% in the tailwater of a dam and 115% in the forebay of the next project downstream (and at Camas/Washougal). Spill will transition to summer levels at 2359 hours, or shortly before midnight, at each project on the end dates specified.

Operations to manage TDG will continue to be coordinated through the TMT.

Spillway Operations

The Action Agencies will meet the specified spill levels to the extent feasible; however, actual hourly spill quantities at dams will be slightly greater or less than specified in Table 1 below. Actual spill levels depend on the precision of spill gate settings, flow variations in real time, varying project head (the elevation difference between a project's forebay and tailwater), automatic load following, and other factors.

Operations Considerations:

- **Spill discharge rates:** Due to limits in the precision of spill gates and control devices, short term flow variations, and head changes, it is not possible to discharge exactly the spill rates stated in Table 1, or as stated in RCC spill requests (teletypes) to projects that call for specific spill discharges. Therefore, spillway gates are opened to

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the settings in FPP spill pattern tables, which provide discharges that are the closest to the spill discharge rates. The spill rates in Table 1 coincide with specific gate settings in the FPP spill tables. Actual spill may be higher or lower than the identified spill rate due to low flow conditions, periods of minimum generation, spill cap limitations on spill amounts, spill curtailment for navigation safety, and other circumstances.

- **Spill percentages:** Spill percentages are considered target spill levels. The project control room operator and BPA duty scheduler calculate spill rates to attempt to be within +/- 1% of the target percentage for the following hour (or +/- 1.5% at Little Goose Dam when flows are less than 30 kcfs). These percentages may not be attained due to low flow conditions, periods of minimum generation, spill cap limitations on spill amounts, spill curtailment for navigation safety, and other circumstances. Operators and schedulers will review the percentages achieved during the day and adjust spill rates in later hours, with the objective of ending the day with a day average spill that achieves the target.

Minimum Generation

The Corps has identified minimum generation flow values derived from FPP tables which specify turbine operation within the 1% of best efficiency range. These values are approximations and do not account for varying head or other small adjustments that may result in variations in the reported minimum generation flow and spill amount.

Conditions that may result in minor variations include:

1. Varying pool elevation: as reservoirs fluctuate within the operating range, flow rates through the generating unit change.
2. Generating unit governor "dead band": the governor controls the number of megawatts the unit should generate and cannot precisely control a unit; variations can be +/- 1% to 2% of generation.
3. System disturbances: once the generator is online and connected to the grid, it responds to changes in system voltage and frequency. These changes may cause the unit to increase flow and generation slightly within an hour.
4. Individual units may operate slightly differently or have unit specific constraints.
5. Generation control systems regulate megawatts (MW) generation only, and not flow through turbines.

All of the lower Snake River powerhouses may be required to keep one generating unit on line at all times for power system reliability, which may result in a reduction of spill at that project. During low flows, one generator runs at the lower end of the 1% of best efficiency range. All of the Snake River plants have two "families" of turbines with slightly different capacities. In most cases one of the smaller units, with somewhat less generation and flow, will be online during these times. The smaller units are generally numbered 1 – 3 and are the first priority for operation during the fish passage season. An exception to this is at Ice Harbor Dam, where the unit priority list has been modified to accommodate the transformer bank outage at Sacajawea. Also, if smaller units are unavailable, one of the larger units may be used. Further, at Lower Monumental, generating unit 1, which is the first priority unit during fish passage, was damaged, then

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welded and consequently cannot operate at the low end of the design range. In addition, Ice Harbor units cannot be operated at the lower end of the 1% of best efficiency range. These units experience cavitation at a generation level somewhat higher than the lower 1% limit, which damages the turbine and can be detrimental to fish. Therefore, Ice Harbor units will operate at their lower cavitation limits. Minimum generation flows are 50kcfs at McNary, John Day and The Dalles and 30 kcfs at Bonneville.

Low Flow Operations

Low flow operations on Lower Snake projects are triggered when inflow is not sufficient to provide for both minimum generation and the planned spill levels. In these situations, the projects will operate one unit at minimum generation and spill the remainder of flow coming into the project. As flows transition from higher flows to low flows, there may be situations when flows recede at a higher rate than forecasted. In addition, inflows provided by nonfederal projects upstream are variable and uncertain. The combination of these factors may result in instances where unanticipated changes to inflow result in forebay elevations dropping to the low end of the Minimum Operating Pool (MOP). Since these projects have limited operating flexibility, maintaining minimum generation and the target spill may not be possible on every hour.

During low flow conditions, when the navigation lock is being emptied, the total spill remains unchanged but the spill stated as a percent of total flow may be temporarily reduced below the target spill percentage. This occurs because the volume of water needed to empty the navigation lock during periods of low flow is a greater percentage of the total flow than when flows are higher.

At Little Goose Dam, when day average flows in the lower Snake River are below about 40 kcfs, achieving 30% spill requires changing turbine operations between 2 units at the low end of the 1% of best efficiency range and one unit at the high end of the 1% range. This operation is incompatible with the more constant discharge upstream at Lower Granite Dam. It is also difficult to meet the constant FOP spill level downstream at Lower Monumental Dam. The unsteady flow at Little Goose also impacts that project's reservoir operation and can cause inadequate navigation depths at the downstream sill of the Lower Granite navigation lock. In 2008, through coordination with TMT during these low flow periods, Little Goose spill changed from the 30% level in the FOP to a flat spill pattern of approximately 11 kcfs to smooth out Little Goose discharges, meet Lower Monumental spill levels, and maintain the MOP operating range at Little Goose. A similar operation, modified as necessary to include any configuration or operational changes, will be implemented in 2009 if needed during low flow periods, in coordination with TMT.

Operations during Rapid Load Changes

Project operations during hours in which load and/or intermittent generation changes rapidly may result in not meeting planned hourly spill level because projects must be available to respond to within-hour load variability to satisfy North American Electric

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Reliability Council (NERC) reserve requirements (“on response”). This usually occurs at McNary, John Day and The Dalles dams. In addition to within-hour load variability, projects on response must be able to respond to within hour changes that result from intermittent generation (such as wind generation). During periods of rapidly changing loads and intermittent generation, projects on response may have significant changes in turbine discharge within the hour while the spill quantity remains the same within the hour. Under normal conditions, within-hour load changes occur mostly on hours immediately preceding and after the peak load hours, however, within-hour changes in intermittent generation can occur at any hour of the day. Due to the high variability of within-hour load and intermittent generation, these load swing hours may have a greater instance of reporting actual spill percentages that vary more than the +/- 1% requirement than other hours.

Turbine Unit Testing around Maintenance Outages

Turbine units may be operationally tested for up to 30 minutes by running the unit at speed no load and various loads within the 1% of best efficiency range to allow pre-maintenance measurements and testing and to allow all fish to move through the unit. Units may be operationally tested after maintenance or repair efforts but before a unit comes out of a maintenance or forced outage status. Operational testing may consist of running the unit for up to 30 minutes before it is returned to operational status. Operational testing of a unit under maintenance is in addition to a unit in run status (e.g. minimum generation) required for power plant reliability. Operational testing may deviate from unit operating priorities and may use water that would otherwise be used for spill if the running unit for reliability is at the bottom of the 1% of best efficiency range. Water will be used from the powerhouse allocation if possible, and water diverted from spill for operational testing will be minimized. The Corps will coordinate this testing with the region through the Fish Passage Operations and Maintenance Coordination Team (FPOM).

Navigation Safety

Short-term adjustments in spill may be required for navigation safety, primarily at the lower Snake projects but may also be necessary at the lower Columbia projects. This may include changes in spill patterns, reductions in spill discharge rates, or short-term spill stoppages. In addition, adjustments to pool elevation in the Little Goose pool of up to 1.0 foot above the MOP operating range may be necessary to accommodate safe navigation at Lower Granite Dam during periods of low flow (approximately 40 kcfs or less). These adjustments may be necessary for both commercial tows and fish barges.

2009 SPRING SPILL OPERATIONS

Lower Snake River Projects

Spring spill will begin on April 3 at Lower Granite, Little Goose, Lower Monumental, and Ice Harbor dams. Spring spill operations will continue through June 20. However, at

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Lower Monumental, fish run timing and research schedules may require an earlier transition date to summer operations. Such changes will be coordinated through TMT. Spring spill levels are shown in Table 1.

Lower Columbia River Projects

Spring spill will begin April 10 at McNary, John Day, The Dalles, and Bonneville dams through June 30. Spring spill operations will continue through June 30 at McNary, John Day, and The Dalles dams, and through June 20 at Bonneville Dam. However, fish run timing and research schedules may require an earlier transition date to summer spill operations at McNary Dam. Such changes will be coordinated through TMT. Spring spill levels are shown in Table 1.

Table 1 - Summary of 2009 spring spill levels at lower Snake and Columbia River projects.²

| Project | Planned Operations for Spring 2009 (Day/Night) | Comments |
|------------------|--|---|
| Lower Granite | 20 kcfs/20 kcfs | Same as 2008 |
| Little Goose | 30%/30% | To accommodate new spillway weir testing, discontinue 14 nights of gas cap spill used in 2008 |
| Lower Monumental | gas cap/gas cap | Same as 2008 |
| Ice Harbor | 30%/30% vs. 45 kcfs/gas cap | Same as 2008 |
| McNary | 40%/40% | Same as 2008 |
| John Day | 30%/30% on pre-test days; 30%/30% vs. 40%/40% | Was 0%/60% on pre-test days in 2008 |
| The Dalles | 40%/40% | Same as 2008 |
| Bonneville | 100 kcfs/100 kcfs | Same as 2008 |

² Table 1 displays in summary form planned spring spill operations, however, more specific detail governing project operations is in the section entitled "Spring Fish Operations By Project."

SPRING FISH OPERATIONS BY PROJECT

The following describes the 2009 spring spill operations for each project. Included in the description are planned research activities identified in the 2008 BiOp. The Corps, regional agencies, and Tribes are interested in the continuation of project research studies under the Corps' Anadromous Fish Evaluation Program (AFEP). The 2009 studies have been through the annual AFEP review process with the regional agencies and Tribes, with the study designs being finalized in an interagency meeting held on January 15, 2009. The studies are intended to provide further information on project survival and assist the region in making decisions on future operations and configuration actions to improve fish passage and survival at the lower Snake and Columbia River dams.

Lower Granite

Spring Spill Operations April 3 through June 20, 2009: 20 kcfs (including approximately 6 kcfs from the RSW and 14 kcfs from training spill) 24 hours per day.

Changes in Operations for Research Purposes:

- Spring research operations: Normal spring spill patterns and rates as described in the FPP will be used. There will be no alternate spill operations for testing.

Operational Considerations:

- Lack of power load or unexpected unit outages could cause involuntary spill at higher total river discharges that could result in exceeding the gas cap limits.
- During periods of high flow spring runoff when involuntary spill occurs, there may be periods where certain spill levels create hydraulic conditions that are unsafe for fish barges crossing the tailrace and/or while moored at fish loading facilities. If such runoff conditions occur, spill may be reduced temporarily when fish transport barges approach or leave the barge dock or are moored at loading facilities. If conditions warrant a spill reduction, Lower Granite pool MOP elevation restrictions will be temporarily exceeded until the barge exits the tailrace safely.
- Unit outages will occur for required maintenance activities. The outage schedule for the project is shown in the FPP. Dates are subject to change.

Little Goose

Spring Spill Operations April 3 through June 20, 2009: 30% spill 24 hours per day.

Changes in Operations for Research Purposes:

- Spill duration for testing: Juvenile passage and survival will be studied throughout the spring spill period.
- Preseason testing for direct injury of the spillway weir will occur using minimal spill from March 11 to April 3 in spill bays 1 and 8.

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- Spring research operations: 30% spill 24 hour/day. Spillway weir plus one uniform spill pattern will be tested in the spring. Final test conditions will be coordinated through FPOM and/or the Studies Review Work Group (SRWG).
- Objectives of the biological test: The objectives of this study include: (1) Determine the timing and route of passage for yearling Chinook salmon, and juvenile steelhead relative to spillway weir spill and powerhouse operations; (2) Estimate route-specific and overall concrete survival of hatchery yearling Chinook and hatchery steelhead; (3) Determine the effects of spillway weir operation and associated training spill, as well as powerhouse operations, on smolt approach paths in the forebay; (4) Determine direct survival and injury rates of fish passing through the spillway weir and spill bay 8; (5) Estimate survival (concrete) as the first year to determine if BiOp performance standards are being met with the tested configuration and operation.
- Spill pattern during the biological test: The test spill patterns will be developed in coordination with SRWG. Additional modeling efforts at ERDC may be needed if spill test results reveal unacceptable impacts on adult or juvenile fish passage.

Operational Considerations:

- Day average flows in the lower Snake River below about 40 kcfs can result in incompatible operations with Lower Monumental Dam and cause spill quantity fluctuations. Little Goose operations to resolve this issue are described in the Low Flow Operations section above (page 5).
- Unit outages will occur for required maintenance activities. The outage schedule for the project is shown in the FPP. Dates are subject to change.
- Turbine Unit 1 Operation: For 2009, a new more limited operating range will be set within the GDACS program for Little Goose Dam to restrict Turbine Unit 1 operation to approximately the upper 25% of the 1% of best efficiency range (about 16 kcfs). This will ensure a strong flow along the south shore to counter the strong eddy that forms during certain spill conditions. A strong south shore current is important for both adult fish passage and juvenile fish egress. Special turbine operations are expected to continue through the spring and summer spill periods until river flow can support only one operating turbine unit. Once low flow conditions occur, the full 1% of best efficiency range will be restored.

Lower Monumental

Spring Spill Operations April 3 through approximately June 20, 2009: Spill to the 115/120% TDG spill cap 24 hours per day with the RSW operating.

Changes in Operations for Research Purposes:

- Spill duration for testing: The test is expected to start in mid-April (contingent on juvenile fish numbers) and will last until early June. The dates of testing will be dependent on the size of fish and fish availability. Final dates for testing will be coordinated through FPOM and/or SRWG.

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- Spring research operations: A two treatment test will be conducted, utilizing the 2008 modified bulk spill pattern versus the 2003 uniform (flat) pattern modified for the RSW in spill bay 8. Pattern changes will occur at 0530 hours. However, if the runoff forecast is high, a one treatment study would be conducted as the higher the spill levels the more similar the two patterns become. The modified bulk spill pattern will be used on non-test days.
- Objectives of the biological test: The objectives of the study are to assess passage distribution and efficiency metrics, forebay retention, tailrace egress, vertical distribution of run-at-large fish passing over the RSW, and survival for yearling Chinook and steelhead for two spill pattern treatments, a bulk spill pattern and a uniform pattern in conjunction with RSW operation. This will be the second year of testing of the RSW at Lower Monumental Dam. An additional objective will be to estimate survival (concrete) to determine if BiOp performance standards are being met with the tested configuration and operation.
- Spill pattern during the biological test: Spill patterns used during the 2008 study will be used again in 2009.

Operational Considerations:

- Daily average flows near 30 kcfs results in incompatible operations with Little Goose Dam and results in spill quantity fluctuation.
- The Lower Monumental spill cap is affected by Little Goose Dam operations. Therefore, spill discharge could be lower than 27 kcfs.
- The RSW was installed in March 2008 and will continue to operate with biological testing in 2009.
- Transit of the juvenile fish barge across the Lower Monumental tailrace, then docking at and disembarking from the fish collection facility, may require the level of spill to be reduced due to safety concerns. The towboat captain may request that spill be reduced or eliminated during transit. During juvenile fish loading operations, spill is typically reduced to 15 kcfs, but can be reduced further if needed for safety reasons. Loading periods can take up to 3.5 hours. Because of the time needed to complete loading at Lower Monumental, the Little Goose Project personnel will notify the Lower Monumental personnel when the fish barge departs from Little Goose. This ensures that BPA scheduling is provided advance notice for spill control at Lower Monumental Dam. Reducing spill may cause Lower Monumental to briefly operate outside of MOP conditions.
- Operating units within the 1% of best efficiency range yields up to 19 kcfs per unit at each of the 6 units for a maximum hydraulic capacity of approximately 114 kcfs. The expected spill cap is 27 kcfs. Therefore, if total river discharge is greater than 141 kcfs the gas cap will be exceeded. Either lack of power load or unit outages can also cause forced spill above spill cap limits at higher total river discharges.
- Unit outages will occur for required maintenance activities. The outage schedule for the project is shown in the FPP. Dates are subject to change.

Ice Harbor

Spring Spill Operations April 3 through June 20, 2009: In accordance with the test schedule, alternate between 45 kcfs day/spill cap night and 30% /30% with the RSW operating, similar to that used in 2008. Nighttime spill hours are 1800 – 0500.

Changes in Operations for Research Purposes:

- Spring research operations: Normal spring spill patterns and rates as described in the FPP will be used. Radio tagged fish will be monitored for passage route and survival. The test is expected to start in mid-April (contingent on juvenile fish numbers), following release at Lower Monumental Dam, and will last until early June. The dates of testing will be dependent on the size of fish and fish availability. Spill will be 45 kcfs day / spill cap night on non-test days. Final dates for testing will be coordinated through FPOM and/or SRWG.
- Objectives of the biological test: The objectives of the test are to determine passage routes and estimate route-specific and concrete survival under the two spill conditions for yearling Chinook and steelhead.
- Spill pattern: Spill patterns will be verified and coordinated through FPOM and/or SRWG.

Operational Considerations:

- Powerhouse capacity at Ice Harbor is approximately 94 kcfs with all 6 units operating within the 1% of best efficiency range, while spill cap rates are about 100 kcfs. If total river flows exceed about 194 kcfs, TDG levels may exceed the limits set by the States of Oregon and Washington.
- Minimum generation or higher powerhouse operation will occur at all times during the 2009 spring fish spill season. This is due to a transformer failure at BPA's Sacajawea transmission facility near the project. Mobile capacitor groups remain in use at BPA's Franklin transmission facility to partially resolve power system issues. In addition, continuous generation is required at Ice Harbor Dam for power system stability and reliability. Normal unit operating priorities will be re-established when the Sacajawea transformer is returned to service.
- Unit outages will occur for required maintenance activities. The outage schedule for the project is shown in the FPP. Dates are subject to change.
- STSs will be installed by April 1. The normal juvenile bypass operation will be to route fish through the full flow bypass pipe, which has interrogation capability to monitor for PIT tags. From April 1 through July 31, juvenile fish will be sampled every 3 to 5 days to monitor fish condition and then bypassed to the river. Sampling activity may be terminated early should juvenile bypass fish numbers drop to the point where valid sampling is no longer feasible (100 fish of the most dominant species present are needed to properly assess fish condition). Sampling may also cease if the cumulative number of fish sampled for the season reach the permitted maximum.

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- In November 2006, a major transformer failed at the Sacajawea Substation which in turn restricts turbine operations at Ice Harbor Dam. Transformer design, build and replacement are expected to be completed by July 2009. Additionally, powerhouse transformer TW-6 is experiencing gassing during operation due to internal arcing. Because of power distribution restrictions, the turbine unit priority will be 3, 1, 4, 5, 2 and 6 until the transformers are replaced. If unit 3 is not available, unit 4 will become the first priority unit.

McNary

Spring Spill Operations April 10 – approximately June 30, 2009: 40% spill 24 hours per day with spillway weirs operating. See Table 1 for operational spill levels.

Changes in Operations for Research Purposes:

- Spill duration for testing: Approximately April 20 to early June (tentative). The dates of testing will be dependent on the size of fish, fish availability, and the number of treatments needed for testing. Final dates for testing will be coordinated through the SRWG.
- Spring research operations: 40% spill 24 hours/day with a single treatment for the third year of spillway weir testing. One project spill configuration will be tested. The same spill level as past years will be used, in order to maximize the power to detect the effect of spillway weir location. Final test conditions will be coordinated through the SRWG.
- Objectives of the biological test:
 - Primary objective: Determine the effect of spillway weir location on the behavior, passage distribution, and passage efficiencies of yearling Chinook and juvenile steelhead.
 - Secondary objective: Estimate route specific, dam, and concrete survival of yearling Chinook and juvenile steelhead for the tested configuration and operation.
- Spill pattern: As outlined in an addendum to the FPP. The Corps' Walla Walla District will coordinate with Tribes and regional fishery managers to evaluate modifications to the 2008 spill pattern for the 2009 configuration with ERDC general model observations. Test spill patterns are provided in the FPP.

Operational Considerations:

- Spillway weir 1 (relocated from spill bay 19) is located in spill bay 4. Spillway weir 2 remains in spill bay 20.
- During the periods when total river discharge exceeds approximately 320 kcfs, involuntary spill in excess of the States' TDG limits for fish passage may occur.
- In addition, low power demand may also necessitate involuntary spill during any given spill treatment at total river discharges of less than 320 kcfs.
- Unit outages will occur for required maintenance activities. The outage schedule for the project is shown in the FPP. Dates are subject to change.

John Day

Spring Spill Operations April 10 – June 30, 2009: 30% spill 24 hours per day prior to testing, then 30% spill vs. 40% spill 24 hours per day during the test. Spill levels will be alternated every two days. Spill level changes will occur at 0600. See Table 1 for operational spill levels.

Changes in Operations for Research Purposes:

- Spill duration for spillway weir testing: Testing in late April through early June. The dates of testing will be dependent on the size of fish, fish availability, and the number of treatments needed for testing. Final dates for testing will be coordinated through the SRWG.
- Spring research operations: A repeat of the 2008 spillway weir test is presented here for planning purposes, however details such as spill pattern, spill level, and spill duration may change based on 2008 study results. These changes will be coordinated through the SRWG and TMT. Two spillway weirs that pass about 10 kcfs spill each are installed in spill bays 15 and 16. Training spill patterns to support the spillway weir jets and provide good downstream egress for juvenile salmonids have been developed by modeling at ERDC and coordination with regional agencies. These are included in the FPP. Two spill levels will be tested to provide spill / spillway weir efficiency curves. These data will be used to design surface flow outlet and tailrace improvements at John Day Dam.
- Objectives of the biological test: The objectives of the study are to assess passage distribution and efficiency metrics, forebay retention, tailrace egress, and survival for yearling Chinook, and juvenile steelhead for two spill treatments.
- Spill pattern during biological test: Spill bays 15 and 16 have the spillway weirs installed, which are not easily opened and closed. Spill patterns for 30% and 40% spill have been developed at ERDC in coordination with regional agencies. These patterns are included in the FPP. Pending review of 2008 results, pre-test spill in 2009 will utilize the 30% spillway weir spill pattern developed and tested in 2008. From late April through early June, 30% spill versus 40% spill will be evaluated.

Operational Considerations:

- Unit outages will occur for required maintenance activities. The outage schedule for the project is shown in the FPP. Dates are subject to change.
- Unit outages and spillway outages may be required to repair hydrophones and other research equipment. These will be coordinated through FPOM and TMT as needed.

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The Dalles

Spring Spill Operations April 10 – June 30, 2009: 40% spill 24 hours per day. See Table 1 for operational spill levels.

Changes in Operations for Research Purposes:

- Spill pattern during the biological test: No testing is planned for 2009. The spill patterns in the FPP will be used.

Operational Considerations:

- When high river flows are such that available spill bays 1 – 9 cannot maintain 40% spill, FPOM and TMT will discuss the preferred spill pattern and rate. The project may maintain 40% spill of the total river flow and depart from the spill pattern, or spill less than 40% of the total river flow using a pattern other than that shown in the FPP. At no time is spill recommended on the south side of the spillway (Bays 14-22) as this creates a poor tailrace egress condition for spillway-passed fish.
- Spill bays 10, 11, 13, 16, 18, 19, and 23 are not operational due to wire rope, structural, and concrete erosion concerns.
- One or two full spillway outages may be required to conduct hydro surveys during the period June 10 – 20, to assess the condition of the mud leveling slab at the spill wall under construction between spill bays 8 and 9. Each zero spill operation will last 3 – 6 hours to accommodate this work. The hydro surveys will be coordinated through the Fish Facility Design Review Work Group (FFDRWG), FPOM, and RCC.
- The spill pattern in the FPP is based on a nominal Bonneville forebay elevation of 74 feet.
- Unit outages will occur for required maintenance activities. The outage schedule for the project is shown in the FPP. Dates are subject to change.

Bonneville

Spring Spill Operations April 10 – June 20, 2009: 100 kcfs spill 24 hours per day. See Table 1 for operational spill levels.

Changes in Operations for Research Purposes:

- Spill duration for testing: No special spill operations are required for 2009 biological tests. FPP spill patterns and durations will be used.
- Spring research operations: 100 kcfs spill 24 hours/day.
- Objectives of the biological test: Estimate juvenile yearling Chinook and steelhead passage distribution in response to a behavioral guidance structure at the second powerhouse.
- Spill pattern during the biological test: Spill patterns in the FPP will be used.

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Operational Considerations:

- Minimum spill discharge rate is 50 kcfs. This is to provide acceptable juvenile fish egress conditions in the tailrace.
- At total spring flows less than about 135 kcfs, spill will be less than 100 kcfs to maintain minimum powerhouse generation of 30 kcfs plus fish ladder and facility spill (e.g. second powerhouse corner collector).
- TMT will consider the possible effects of TDG on emerging chum salmon downstream of Bonneville Dam. TMT may request special operations such as flow increases or spill reductions to protect ESA-listed fish.
- Unit outages will occur for required maintenance activities. The outage schedule for the project is shown in the FPP. Dates are subject to change.
- Actual spill levels at Bonneville Dam may range from 1 to 3 kcfs lower or higher than specified in Table 1. A number of factors influence this including hydraulic efficiency, exact gate opening calibration, spillway gate hoist cable stretch due to temperature changes, and forebay elevation (a higher forebay results in a greater volume of spill since more water can pass under the spill gate).
- The second powerhouse Corner Collector (5 kcfs discharge) will operate from the morning of April 10 to the afternoon of August 31, 2009.
- A mid-season spillway outage will be required to survey the stilling basin for erosion. Pending the outcome of this survey, the 2009 spill operation may be altered to maintain dam safety. Changes to spill operations may include changing the spill pattern to avoid further erosion or discontinuing spill until repairs can be made. The mid-season survey will take approximately ½ day to complete. The Corps will coordinate this work through FFDRWG, FPOM, and TMT.
- Fish releases from the Spring Creek National Fish Hatchery in April and May may result in turbine flow reductions at the second powerhouse for safer fish passage, in coordination with TMT.

JUVENILE FISH TRANSPORTATION PROGRAM OPERATIONS

As noted above, the Corps' planned spill operations assume average runoff conditions. The following explains the juvenile fish transportation program under all runoff conditions and is consistent with the 2008 transport operations derived from agreements reached in 2007. The lower Snake River projects are described first, followed by McNary project operations. Detailed descriptions of project and transport facility operations to implement the program are contained in FPP Appendix B.

Lower Snake River Dams - Operation and Timing

If the Snake River projected seasonal average (April 3 – June 20) flow is greater than 70 kcfs, the Corps will initiate transportation at Lower Granite Dam no earlier than April 20 and no later than May 1. The seasonal average flow projection will be based on the Corps' Single Trace Procedure (STP) model and the April final water supply forecast for Lower Granite. The actual start date in 2009 will be determined through coordination with TMT as informed by the in-season river condition (e.g. river flow and temperature)

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and the status of the juvenile Chinook and steelhead runs (e.g. percentage of runs having passed the project). Also if the projected flow is greater than 70 kcfs, transportation will start up to 8 days and up to 11 days after the Lower Granite Dam start date for Little Goose and Lower Monumental dams, respectively. The actual start dates at Little Goose and Lower Monumental dams will be further considered through the TMT process, depending on in-season river conditions and the status of the juvenile Chinook and steelhead runs.

In exceptionally low water years, when the projected seasonal average flow is less than 70 kcfs, the Corps will begin transportation on April 20 at all three Snake collector projects. Spill for fish passage will occur under all flow conditions.

April 20 – June 20: The collection of fish at lower Snake River projects for transportation will commence at 0700 hours on the agreed to start dates. Barging of fish will begin the following day and collected juvenile fish will be barged from each facility on a daily or every-other-day basis (depending on the number of fish) throughout the spring. Transport operations will be carried out concurrent with spill operations at each project and in accordance with all relevant FPP operating criteria.

Transportation operations may be adjusted due to research, conditions at the collection facilities, or through the adaptive management process to better match juvenile outmigration timing or achieve/maintain performance standards.

Transportation Considerations:

Transportation operations will be carried out concurrent with the 2009 FOP spill operations at each project and in accordance with all relevant FPP operating criteria.

- Lower Granite: All ESBSs will be installed by March 30. If projected seasonal average flow is greater than 70 kcfs, juvenile fish will be bypassed via normal separator operations and routed to the mid-river release outfall starting March 30 through April 20. All juvenile fish collected will be interrogated for PIT tags and normal 24-hour sampling for the Smolt Monitoring Program will take place. On April 6, juvenile fish collection will begin for research (Seasonal SAR and Reach Survival Studies), followed by tagging on April 7 and 8. The first research barge will leave on April 9 and every Thursday thereafter, until operational fish transportation begins.
- Little Goose and Lower Monumental: All ESBSs and STSs will be installed by March 31. If the projected seasonal average flow is greater than 70 kcfs, juvenile fish will be interrogated for PIT tags at the full flow PIT tag detector. All juvenile fish will be interrogated for PIT tags and limited sampling may take place every 3 to 5 days to monitor fish condition. A full sample may be taken every other day to monitor species composition to help inform a decision on initiating transportation at these projects. At Lower Monumental, daily smolt monitoring for the avian predation study will occur beginning April 1 and 100 steelhead, each day or total for the test, will be PIT-tagged to assess avian prey selection. Study fish for the Lower

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Monumental survival study will be collected at Lower Monumental. Study fish for the Little Goose survival study will be collected at Little Goose.

McNary Dam - Operation and Timing

Spring: Juvenile fish collected at McNary during the spring, April 1 through June 20, will be bypassed to the river. The normal operation will be to bypass fish through the full flow bypass pipe, which has interrogation capability to monitor for PIT tags. Every other day, however, in order to sample fish for the Smolt Monitoring Program, fish will be routed through the separator, interrogated for PIT tags, and then bypassed to the river.

Transportation operations may be adjusted for research purposes, due to conditions at the collection facilities, or as a result of the adaptive management process (to better match juvenile outmigration timing and/or to achieve or maintain performance standards). If new information indicates that modifying (or eliminating) transportation operations at McNary Dam is warranted, adaptive management will be used to make appropriate adjustments through the TMT coordination process.

All ESBSs at McNary will be installed by April 17, as agreed to in consultation with the Tribes and NOAA. This is part of the Corps' consideration of lifting (or waiting to install) some turbine intake screens during periods of significant juvenile lamprey passage. Effects to both salmon and lamprey have been considered.

The normal operation will be to bypass fish through the full flow bypass pipe, which has interrogation capability to monitor for PIT tags. However, in order to sample fish for the Smolt Monitoring Program, fish will be routed through the separator on an every other day basis for PIT tag interrogation and then bypassed to the river.

TRANSPORT, LATENT MORTALITY, AND AVIAN RESEARCH

Seasonal Effects of Transport

A study will be conducted to determine seasonal effects of transporting fish from the Snake River to optimize a transportation strategy. At Lower Granite, fish will be collected for this study starting on April 5, with marking beginning on April 6, 2009. Depending on the number of fish available, fish will be collected 1-2 days with tagging occurring on the day following collection. A barge will leave each Thursday morning with all fish collected during the previous 1-3 days. By barging all fish (minus the in-river group) during 1 to 3 days of collection, barge densities will be maintained at a level similar to what would occur under normal transport operations that time of year. This pattern will occur in the weeks preceding general transportation and will be incorporated into general transportation once that operation begins. The desired transported sample size is 6,000 wild Chinook and 4,000 - 6,000 wild steelhead weekly for approximately eight weeks.

Latent Mortality

A study will be conducted to evaluate latent mortality associated with passage through Snake River dams. The goal of this study is to determine whether migration through Snake River dams and reservoirs causes extra mortality in Snake River yearling (spring/summer) Chinook salmon smolts. Specifically, the study will determine if life-cycle survival downstream from McNary Dam is significantly higher for yearling hatchery Chinook salmon released into the Ice Harbor Dam tailrace than for counterparts which must pass three additional dams and reservoirs after release into the Lower Granite Dam tailrace. Fish will be collected at Lower Granite Dam beginning April 20, 2009 with the goal of tagging approximately 120,000 smolts, about 2/3 of which will be released into the tailrace of Lower Granite Dam, and 1/3 transported by truck and released in the tailrace of Ice Harbor Dam.

Avian Predation

A study will be conducted to evaluate the impacts of avian predation on salmonid smolts from the Columbia and Snake rivers. The study will determine how various biotic and abiotic factors are associated with differences in steelhead smolt vulnerability to predation by Crescent Island terns and Foundation Island cormorants. The study requests PIT tagging both hatchery and wild steelhead collected in the smolt monitoring sample at Lower Monumental and Ice Harbor dams, beginning April 1 and continuing through July. The recorded condition of a fish will be attached to a specific tag code and vulnerability to avian predation will be evaluated using PIT tag recovery data collected from the avian bird colonies. The study needs a minimum sample of 100 fish each day that are collected for condition by the smolt monitoring program.

EMERGENCY PROTOCOLS

The Corps and the Bureau of Reclamation will operate the projects in emergency situations in accordance with the WMP Emergency Protocols (WMP Appendix 1). The Protocols define emergency conditions and situations that may arise while operating the FCRPS projects, and the immediate actions that may be taken in the face of the emergency. The most recent version of the Emergency Protocols is located at: <http://www.nwd-wc.usace.army.mil/tmt/documents/wmp/2008/final/emerproto/>

COORDINATION

To make adjustments in response to changes in conditions, the Corps will utilize the existing regional coordination committees. Changes in spill rates when flow conditions are higher or lower than anticipated will be coordinated through the TMT. This could include potential issues and adjustments to the juvenile fish transportation program. Spill patterns and biological testing protocols that have not been coordinated to date will be finalized through the Corps' AFEP subcommittees, which include the SRWG, FFDRWG, and FPOM.

REPORTING

The Corps will provide periodic in-season updates to TMT members on the implementation of 2009 fish passage operations. The updates will include the following information:

- the hourly flow through the powerhouse;
- the hourly flow over the spillway compared to the spill target for that hour; and,
- the resultant 12-hour average TDG for the tailwater at each project and for the next project's forebay downstream.

The updates will also provide information on substantial issues that arise as a result of the spill program (e.g. Little Goose adult passage issues in 2005 and 2007), and will address any emergency situations that arise.

The Corps will continue to provide the following data to the public regarding project flow, spill rate, TDG level, and water temperature.

- Flow and spill quantity data for the lower Snake and Columbia River dams are posted to the following website every hour:
<http://www.nwd-wc.usace.army.mil/report/projdata.htm>
- Water Quality: TDG and water temperature data are posted to the following website every six hours: <http://www.nwd-wc.usace.army.mil/report/total.html> These data are received via satellite from fixed monitoring sites in the Columbia and Snake rivers every six hours, and placed on a Corps public website upon receipt. Using the hourly TDG readings for each station in the lower Snake and Columbia rivers, the Corps will calculate both the highest and highest consecutive 12-hour average TDG levels daily for each station. These averages are reported at:
http://www.nwd-wc.usace.army.mil/ftppub/water_quality/12hr/html/

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BON R 032609 1200 AA

ATTENTION: COLUMBIA RIVER BASIN PROJECTS AND BPA
SUBJECT: REVISE SPILL PRIORITY LIST

**** REVISED SPILL PRIORITY
**** INITIAL SPILL CAPS FOR 2009 SPILL SEASON

1. THIS TELETYPE PROVIDES GUIDANCE ON PROJECT OPERATION TO PROVIDE VOLUNTARY AND INVOLUNTARY SPILL.
2. UNTIL FURTHER NOTICE DURING PERIODS OF INVOLUNTARY SPILL PROJECTS SHOULD SPILL IN THE FOLLOWING ORDER: LWG,LGS, LMN,IHR, WAN,WEL,RRH,RIS,PRD,MCN,JDA,BON,CHJ, GCL & DWR, TDA.
3. CURRENT SPILL CAPS FOR THE VARIOUS TDG LEVELS, SUBJECT TO PERIODIC CHANGES BASED ON REAL-TIME DATA. VOLUNTARY AND INVOLUNTARY SPILL SHOULD BE IN THE FOLLOWING ORDER.

PRO----TDG%-TDG%-TDG%-TDG%-TDG%--TDG%
JECT---110--115--120--125--130---135

LWG----20--30---41---90--125---200-- * Changes
LGS----10--15---32---80--150---250--
LMN----10--15---27---95--180---250--
IHR----30--45---95---125--180---240--
WEL----10--15---25---45--130-----
RRH----05--10---20---30--150-----
RIS----05--10---20---30--150-----
WAN----10--15---20---50--100-----
PRD----20--30---40---40--40-----
MCN----40--80---145---230--290---450--
JDA----20--60---120---240--450---600-
BON----50--65---100---150--225---270-
CHJ----20--30---30---33---50-----
GCL(a)--0-----5---10---20---35---50--
GCL(b)--0---15---30---75---120--130--
DWR----37%--42%---50%---60%---70%-----
TDA----20--60---125---160--160---160--

4. WHEN GRAND COULEE FOREBAY ELEVATION IS LESS THAN 1266 FT USE GCL(a) SPILL CAPS ASSOCIATED WITH OUTLET TUBES. WHEN GRAND COULEE FOREBAY ELEVATION IS GREATER THAN 1265.5 FT, USE GC(b) SPILL CAPS ASSOCIATED WITH DRUMGATES.
5. SINCE THERE IS CONSTRUCTION AT TDA, IT IS DESIRABLE TO AVOID SPILLING OVER 160 KCFS. WHEN IT IS NECESSARY TO SPILL OVER 160 KCFS DURING INVOLUNTARY SPILL CONDITIONS, COORDINATE WITH RCC, USE THE SPILL PATTERN AND BEGIN SPILLING AT BAY 23.
6. CHIEF JOSEPH SPILL CAPS ARE ESTIMATES AND ARE NOT BASED ON STUDIES.
7. THE REVISED SPILL PRIORITY LIST WAS COORDINATED WITH TONY KLEMENT(BPA);MARK POIRIER(LWG);CLARK SIMPFEDERFER(LGS) DON GRENSEMAN(LMN); DARBY KRAMER(IHR); SHANE DOUTHITT(MCN); RICK HOWICK(JDA);RAY VERGORI(TDA); JEFF FAUTH(BON)

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BON R 032609 1200 AA

ATTENTION: COLUMBIA RIVER BASIN PROJECTS AND BPA
SUBJECT: REVISE SPILL PRIORITY LIST

**** REVISED SPILL PRIORITY
**** INITIAL SPILL CAPS FOR 2009 SPILL SEASON

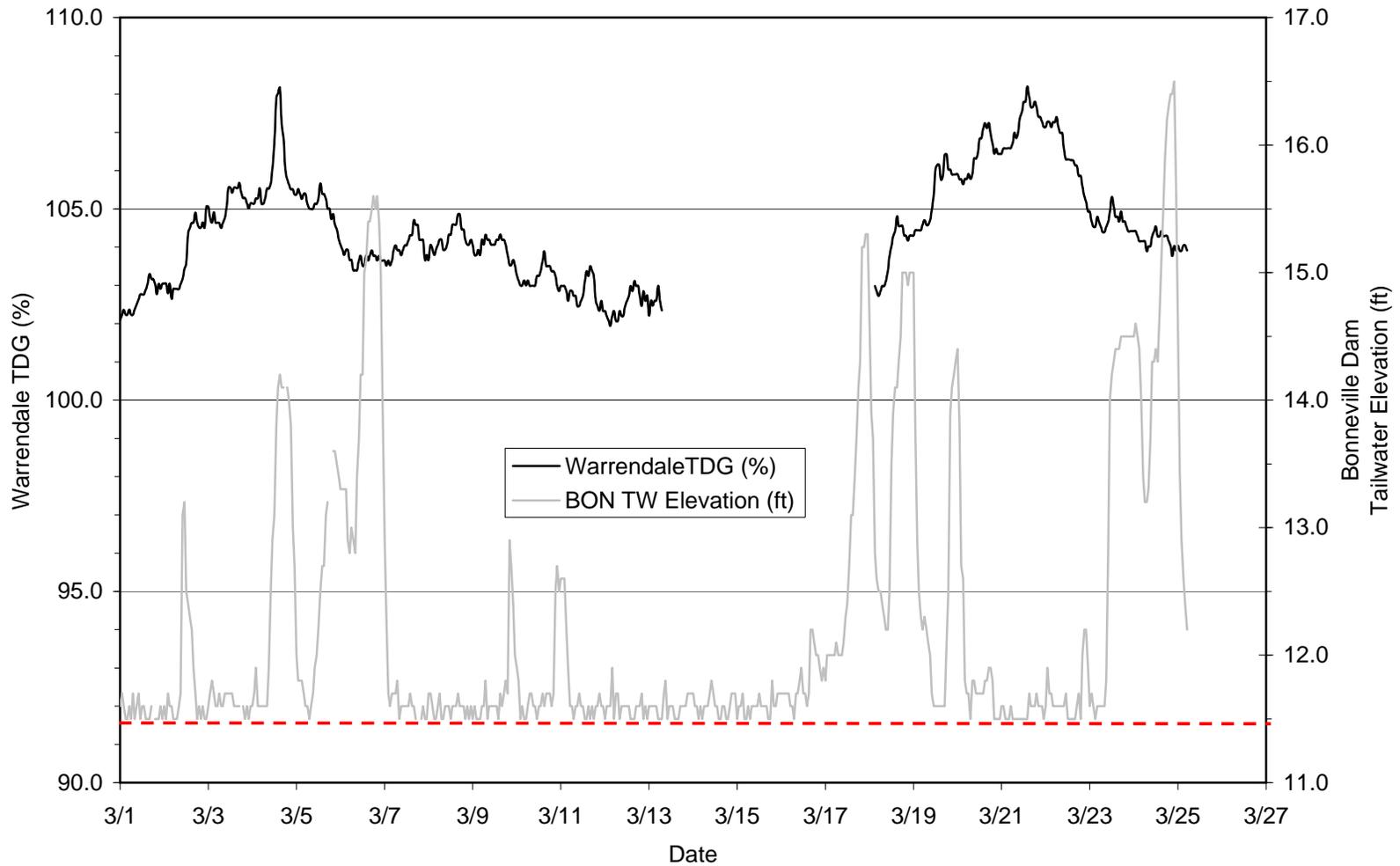
1. THIS TELETYPE PROVIDES GUIDANCE ON PROJECT OPERATION TO PROVIDE VOLUNTARY AND INVOLUNTARY SPILL.
2. UNTIL FURTHER NOTICE DURING PERIODS OF INVOLUNTARY SPILL PROJECTS SHOULD SPILL IN THE FOLLOWING ORDER: LWG,LGS, LMN,IHR, WAN,WEL,RRH,RIS,PRD,MCN,JDA,BON,CHJ, GCL & DWR, TDA.
3. CURRENT SPILL CAPS FOR THE VARIOUS TDG LEVELS, SUBJECT TO PERIODIC CHANGES BASED ON REAL-TIME DATA. VOLUNTARY AND INVOLUNTARY SPILL SHOULD BE IN THE FOLLOWING ORDER.

PRO----TDG%-TDG%-TDG%-TDG%-TDG%--TDG%
JECT---110--115--120--125--130---135

LWG----20--30---41---90--125---200-- * Changes
LGS----10--15---32---80--150---250--
LMN----10--15---27---95--180---250--
IHR----30--45---95---125--180---240--
WEL----10--15---25---45--130-----
RRH----05--10---20---30--150-----
RIS----05--10---20---30--150-----
WAN----10--15---20---50--100-----
PRD----20--30---40---40--40-----
MCN----40--80---145---230--290---450--
JDA----20--60---120---240--450---600-
BON----50--65---100---150--225---270-
CHJ----20--30---30---33---50-----
GCL(a)--0----5----10---20---35----50--
GCL(b)--0----15---30---75---120--130--
DWR----37%--42%---50%---60%----70%-----
TDA----20--60---125---160--160---160--

4. WHEN GRAND COULEE FOREBAY ELEVATION IS LESS THAN 1266 FT USE GCL(a) SPILL CAPS ASSOCIATED WITH OUTLET TUBES. WHEN GRAND COULEE FOREBAY ELEVATION IS GREATER THAN 1265.5 FT, USE GC(b) SPILL CAPS ASSOCIATED WITH DRUMGATES.
5. SINCE THERE IS CONSTRUCTION AT TDA, IT IS DESIRABLE TO AVOID SPILLING OVER 160 KCFS. WHEN IT IS NECESSARY TO SPILL OVER 160 KCFS DURING INVOLUNTARY SPILL CONDITIONS, COORDINATE WITH RCC, USE THE SPILL PATTERN AND BEGIN SPILLING AT BAY 23.
6. CHIEF JOSEPH SPILL CAPS ARE ESTIMATES AND ARE NOT BASED ON STUDIES.
7. THE REVISED SPILL PRIORITY LIST WAS COORDINATED WITH TONY KLEMENT(BPA);MARK POIRIER(LWG);CLARK SIMPFEDERFER(LGS) DON GRENSEMAN(LMN); DARBY KRAMER(IHR); SHANE DOUTHITT(MCN); RICK HOWICK(JDA);RAY VERGORI(TDA); JEFF FAUTH(BON)

**Total Dissolved Gas at Warrendale
and Bonneville Dam Tailwater Elevation
March 1 - March 25**



COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

March 25, 2009 Meeting

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.

Review of Minutes/Agenda

The 2/25 and 3/11 Facilitator and Official Meeting Minutes were finalized. Notes from the 3/18 and today's (3/25) meeting will be finalized at the 4/1 TMT meeting.

Hanford Reach Protection Flows

Russell Langshaw, Grant County PUD, shared a quick update that temperature units at Hanford Reach were at 952, and that protection flows were expected to begin on April 1. Russell will provide updates to TMT as the season progresses.

Follow up on SOR 2009-01

Dan Feil, COE, shared follow up information that was requested at the 3/18 TMT meeting. The information included updated uncompensated TDG data at the Warrendale gauge for the period March 1-24. He also shared daily kelt counts per observations at the Bonneville juvenile bypass system. Rick Kruger, OR, noted that while there is not enough known about guidance efficiency, current thinking estimates that 50% of the adults entering the powerhouse pass through the bypass system. Dan reported that the COE plans to open the corner collector on the morning of April 10.

In response to a question about causes for increased TDG, Jim Adams shared that investigations suggest that high Bonneville tailwater TDG levels outside of the fish passage season are a result of TDG production in the adult fish ladder diffusers, particularly the ones near the ladder entrance. During the night (when the 2.4 kcfs attraction flows are turned off) TDG from the diffusers accumulates in the tailwater channel at Bonneville. When the attraction flows are turned on, there is enough inflow to the tailwater channel to cause a flow into the P2 main tailwater channel resulting in lowered TDG levels. This effect is seen immediately prior to the fish passage season in March and in September when the fish passage season concludes. Recorded TDG levels during these times can reach 124%. This issue has previously been reported to TMT as well as to the Water Quality Team, Adams said. It was suggested that the region take a closer look at this issue given that it has had impacts on other operations in the system.

ACTION: Dan Feil and Rick Kruger, OR, will bring this issue to FFDRWG. It was suggested this issue might also be taken up by SCT and/or FPOM.

2009 Spring Fish Operations Plan

Rudd Turner, COE, briefed TMT on the draft 2009 Spring Fish Operations Plan, which was linked to the TMT agenda. He referred to a table on page 7 describing the spring spill plan, noting that the COE developed the plan based on direction from Judge Redden to implement 2008 spring spill operations during the March 6 BiOp status hearing; and per regional agreement for specific tests that would require a deviation from the spill that was implemented in 2008. At Little Goose, he reported, 14 days of nighttime spill to the gas cap provided last year was not built into the study design for the TSW test this year, so the COE planned to instead implement Little Goose at 30% day and night for the duration of the spill season. At John Day, the COE will implement 30%/30% on pre-test days as opposed to 0/60% as was implemented in 2008.

Oregon raised concerns that the Little Goose spill plan described in the FOP was different from technical recommendations that had been made that suggested the TSW could still be tested while providing 14 day gas cap spill, if more tags were made available. The COE responded that their objective with the spill plan is to meet performance standards and implement changes to spill based on high priority tests this year.

Idaho raised concerns that the Studies Review Work Group (SRWG), a collaborative regional team, was not consulted on the operation in a way that allowed them to provide input to the decision – from their perspective, applying the backup condition would be useful in the event that the 30% spill did not allow the region to meet its performance standards. Russ Kiefer suggested he would be willing to work on this issue some more before the FOP is finalized.

Rudd continued with his overview of the draft FOP, noting that testing at Ice Harbor will begin when a sufficient size and number of fish are observed at Lower Monumental (this was a similar process as was used in 2008); and that TSWs at McNary will be moved for a test this year. Again, Oregon raised concerns that this plan did not reflect the discussions and recommendations from technical work groups in the region.

ACTION: The COE felt that the operating plans for Little Goose and McNary had been coordinated with the region through the AFEP process earlier this year. That said, the COE acknowledged the concerns and said they would take any feedback from SRWG and other technical work groups about these issues and discuss them internally and with the Plaintiffs to the lawsuit for consideration before finalizing the FOP. Rudd Turner offered to contact Walla Walla District to make sure their representatives were aware of the request for a SRWG meeting. Rudd suggested the feedback be sent directly to him, and that it needed to happen by early next week if it was to be considered before sending the document to the court.

Rudd suggested TMT look at the transportation section and noted the need for in-season management and that the COE will need a couple days lead time to get barges in place to begin the operation – similarly to previous years.

A question was raised about a new turbine testing section that was added, and a concern that maintenance would disrupt fish passage operations. Rick Kruger requested more information about when maintenance might occur, how often, and at what incremental level. The COE clarified that they will coordinate with the region for any maintenance needs that would require more than 30 minute deviations from planned operations – and will do their best to coordinate on any unscheduled maintenance actions that are less than 30 minutes in duration.

BPA Generation Emergency Actions Review

Tony Norris, BPA, requested the salmon managers look at the current Emergency Actions list (Attachment 1 of the Emergency Protocols in the Water Management Plan) and provide any suggested revisions at the next TMT meeting. FPAC will take this issue up at their 3/31 meeting and TMT will revisit on 4/1.

Spring Spill Priority List

Jim Adams, COE, shared the latest draft spring spill priority list for spill operations. He also requested feedback from the salmon managers before sending the list to the project operators in time for the spill season. A few points were made:

- The Mid-Columbia projects were included as reference for spill caps, not for having the flexibility that other projects on the list do.
- Dworshak is described as a percentage on the list, and this is a new way of characterizing it – the COE will provide a descriptor of this just below the list in the document.
- The Dalles has been moved to the bottom of the list, per spillwall construction.
- Grand Coulee was moved to below Chief Joseph now that spill deflector construction has ended at Chief Joe. Grand Coulee numbers might change through the season based on forebay elevations and TDG levels.

The salmon managers will provide feedback to Jim Adams prior to the 4/1 TMT meeting, during which the COE will look to finalize the list.

Little Goose Low Flow Operations

Dan Feil shared the COE's contingency plan for operating Little Goose when low flows are at risk of causing fluctuations and wave action at the Lower Granite navigation lock, causing safety issues. Last year, TMT addressed this issue by recommending MOP+1 and flat spill (11 kcfs) and the COE planned to use that contingency plan again this year. Dan did note that further investigation by Walla Walla District COE staff found that the issue occurs at flows up to about 50 kcfs so would need to move to the flat spill/MOP+1 operation during those conditions.

In response to a question, the COE said this operation would not impact the Little Goose study since the low flow issue would occur at the beginning and/or end of the spill season.

Operations Review

Reservoirs: John Roache reported on BOR projects: Grand Coulee was at elevation 1284.3 feet and targeting 1281.6 feet at the end of March. Hungry Horse was at elevation 3509.68 feet with 1.8 kcfs outflows and slight increases to inflows over the past couple days. Jim Adams reported on COE projects: Libby was at elevation 2404 feet with 4 kcfs outflows and 2-4 kcfs in. Albeni Falls was operating between 2051-2052 feet. Dworshak was at elevation 1536.4 feet with minimum outflows and 5-8 kcfs in. The end of March target at Dworshak is 1542 feet. Steve Hall, Walla Walla District, noted that the COE had received a request from the hatchery to increase flows to support the spring chinook release and as such may not meet the specific target at the end of the month. He also noted that RO 2 is back on line and fully functional. 7-day average inflows were 40.7 kcfs at Lower Granite; 117 kcfs at McNary and 138.4 kcfs at Bonneville.

Tony Norris, BPA, shared that meeting all system objectives, including April 10 fill at Grand Coulee, chum protection flows and Vernita Bar requirements might be supported by an earlier start toward refill at Albeni Falls. He put out an informal request to TMT to consider moving toward filling Albeni Falls in March rather than waiting until April 1 so water could be moved to provide increased inflows to Grand Coulee in April. Tony asked for TMT feedback on this issue:

- Idaho: This proposal would not have an adverse impact on kokanee, however current restoration work in the area may be impacted and would need to be coordinated on with project coordinator from IDFG. If there is no impact to the restoration work, Idaho supports the proposal.
- NOAA: The proposal sounds beneficial and NOAA would support so long as there is no impact to chum.
- Oregon: No comment
- Washington: No comment
- BOR: Barring any negative local impacts, the BOR supports the proposal.
- COE: Would like to discuss the implications of the operation further with BPA and IDFG.

ACTION: Russ Kiefer, Joel Fenolio (Seattle District COE) and Tony Norris will coordinate this operation off line with the restoration coordinator at IDFG. Any resulting changes to the operations will be shared with TMT at the 4/1 meeting.

Fish: Paul Wagner, NOAA, reported that juvenile migrants were beginning to show up in the Snake River; and that with Bonneville screens in place, the juvenile bypass system was showing some increases in yearling and subyearling chinook.

In response to a question, Paul suggested that since there is not much monitoring of chum at this point, solid information is lacking on which to base whether emergence has ended. That said, Paul suggested (on behalf of the salmon managers) that while they would prefer operations to support all fish needs throughout the system, if a management decision needed to be made, they would prefer spill for upriver stocks at this point. BPA said they were not seeing an issue at this point but will continue to monitor this closely and will likely need to revisit the question with the salmon managers at a future TMT

meeting. It was also suggested that TMT members engage in discussions about a longer term monitoring plan for chum that is being coordinated at SCT.

For adults, Paul said steelhead counts were ranging between 25 and 50 per day and that few spring chinook had arrived.

TMT briefly looked at the latest Pinniped Report, March 20, linked to the TMT home page. At this point, hazing efforts are underway and two sea lions were euthanized due to a virus.

Power System: Tony Norris, BPA, shared the latest wind generation report.

Water Quality: Jim Adams directed TMT to the spill link on the TMT home page, and noted that all gauges were installed and operating, and that at this point in the season, TDG levels were not too high.

Next TMT Meeting, April 1: Please note: TMT meetings will likely be held at NOAA Fisheries at least through April due to phone system issues in the Columbia Room at the COE. Please check the meeting agendas for location confirmation.

Agenda items include:

- Hanford Reach Protection Flows Update
- Little Goose Low Flow Operations
- Fish Operations Plan Update
- BPA's Generation Emergency Actions List: Feedback from salmon managers
- Spring spill priority list: Feedback from salmon managers
- MOP Operations? (Note: At the end of today's meeting, it was noted that the salmon managers prefer a cascading start to MOP operations as they have recommended in the past. This issue may need to be revisited at the next TMT meeting.)
- Operations Review

**Columbia River Regional Forum
Technical Management Team Meeting
March 25, 2009**

1. Introduction

Today's TMT meeting was chaired by Jim Adams (COE) and facilitated by Robin Gumpert (DS Consulting) with representatives of COE, BOR, NOAA, OR, BPA, WA, USFWS, WA, CRITFC and others participating. 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 for Feb. 25 and March 11, 2009

The official minutes for Feb. 25, and the facilitator's notes and minutes for March 11 were all finalized today. Facilitator's notes and official minutes for March 18 will be reviewed at the next TMT meeting.

3. Hanford Reach Protection Flows

As of March 23, 952 temperature units had accumulated at the rate of about 5 TU's per day, Russell Langshaw (Grant PUD) reported. At that rate, 1,000 TU's will probably accrue by April 1, triggering emergence and rearing protection flows. Langshaw will give another update at the next TMT meeting.

4. Follow-Up on SOR 2009-01

Dan Feil (COE) presented follow-up information that was requested at the last TMT meeting regarding SOR 2009-01. The first link for this item on today's agenda is to the SOR itself. The second link is to an updated figure showing TDG uncompensated values at Warrendale gage from March 1 through this morning. There is a gap in the data from March 13-18. Beginning around March 20-23, the TDG saturation levels in the Bonneville forebay began to rise above the 105% Oregon state standard.

The third link for this item on today's agenda is to the Fish Passage Center website that shows daily steelhead counts that have been observed passing through the Bonneville PHII juvenile bypass system. These are likely kelts, Feil said. Rick Kruger (OR) suggested that guidance efficiency for these fish has been estimated at about 50%, but that is speculative since no empirical data exists to support that estimate. They are by no means the total number of steelhead passing the project, just those that went through the juvenile bypass system and were observed on the separator. Meanwhile, there has been no agreement reached regarding operating the corner collector before April 10.

5. TDG Levels at Cascade Island

TMT discussed the recently high TDG saturation levels at Cascade Island gage, which tend to rise at night to levels as high as 124% then decline to normal levels when attraction flows are turned on in the morning. These TDG spikes have been attributed to circulation in the spillway channel that traps gas generated by the diffusers at the entrance of the adult fish ladder at Bonneville. During the day, when 2.4 kcfs of attraction flows are moving through, the gas gets pushed into the river where it dilutes and moves downstream. At night, when attraction flows stop, the gas gets trapped in the channel and TDG levels rise again, Adams said. This phenomenon is observable in September and March when the CCIW gauge is operating, but no fish passage spill is occurring. A limited investigation suggests that modifications to the fish ladder intake could resolve it. TMT agreed to refer this problem to the Fish Facilities Design Review Work Group and other regional forum groups for further investigation.

6. Draft 2009 Spring Fish Operations Plan (FOP)

Rudd Turner (COE) presented the draft 2009 Fish Operations Plan, which is linked to today's agenda. Table 1 on page 7 of the FOP outlines the spring 2009 spill operation. Part of the court agreement on March 6, 2009, was to roll over the 2008 spring spill operation this year, which is the plan for all of the federal projects except two, John Day and Little Goose.

John Day – Spring spill levels were planned as zero nighttime spill and 60% daytime spill in 2008, but actually went to 30% day and night for last year's spillway weir test. This year, the plan is to spill 30% day and night beginning April 10th and continue while running the test later in April. There were no objections today to this change.

Little Goose – For the past two years, Little Goose has spilled for 14 nights to the gas cap, scheduled between April 22 and May 15 at the Salmon Managers' discretion. This year, beginning April 3rd, the operation will be 30% 24 hours a day throughout the entire spring fish passage season. The 14 nights of spill to the gas cap are being discontinued to provide for consistent spillway operations during weir testing.

Oregon objected to this change. Rick Kruger (OR) advocated purchasing 600 more tags, which researchers have told him they could use to conduct a valid scientific study even with 14 nights of spill to the gas cap. Last year, the 14 nights of spill to the spill cap took place without impacting the study. In 2008, test operations were rolled over at Ice Harbor although there was no test planned, and Camas Washougal gage was rolled over although it's no longer required. Oregon portrayed this as an arbitrary attempt to reduce spill, an assumption the COE challenged. The 30% nighttime and 30% daytime spill regime proposed for John Day Dam this year actually represents a spill increase over the 0% nighttime and 60% daytime spill regime of 2008, Turner pointed out

This decision should go to the Study Review Work Group, Russ Kiefer (Idaho) suggested. It might have been possible to incorporate 14 nights of gas cap spill in a block design into the spring 2009 FOP, a change that might provide the region with more information than a one-treatment test this spring. Idaho offered to work quickly with the COE now to design a study that will provide the best scientific information. Turner will investigate the possibility of altering the scope of the research at this late date. Kruger and Kiefer agreed to work on scheduling a SRWG call soon. There's no certainty that the 2009 spring spill plan will be open for negotiation, and answers on it are needed by this time next week, Turner pointed out.

Lower Monumental and McNary – End-of-spill dates are flexible for these two projects. Research studies will begin when there are enough yearling fish to begin tagging and evaluation. Other than Lower Monumental and McNary dams, all the federal projects have fixed dates for ending spring spill.

At McNary, temporary spillway weir #1 is being relocated from bay 19 to bay 4, with TSW #2 remaining in bay 20. The Salmon Managers were opposed to moving TSW #1 to bay 4 when FFDRWG discussed it in February 2009, Kruger recalled. They preferred to remove TSW #1 from bay 19 and to perform a test using a single TSW in bay 20. From Oregon's perspective, this issue remains unresolved.

A discussion of regional coordination and the connections between technical information and policy decisions ensued. NOAA, BPA, BOR and possibly USFWS worked together on the FOP in response to the March 6 hearing at which the Action Agencies agreed to a rollover, Feil explained. The changes they made to the FOP this year are to accommodate testing. Data show that performance standards for McNary won't be met at 40% spill, and a higher level is needed, therefore FFDRWG advocated a 40/60% spill regime with a single TSW, Kruger said. Scott Bettin (BPA) reminded everyone that the Action Agencies have the responsibility to make decisions regarding fish operations after hearing recommendations from the Regional Forum.

Ice Harbor – This project will spill 45 kcfs during the day and to the spill cap at night when spill begins on April 3rd. This spill operation will continue until the RSW testing begins. When the testing begins, the operations will alternate between 45 kcfs day/spill cap at night and 30% of outflow 24 hours per day. The RSW test is expected to start mid-April contingent on juvenile fish numbers following release at Lower Monumental and last until early June. Fish from Lower Monumental will be used for the study; no fish will be radio tagged and released immediately above Ice Harbor. The test will begin a few days after tagging and release of fish begins at Lower Monumental. Therefore the specific date for beginning spring spill might differ from 2008. It's possible the Sacajawea transformer might be repaired by July 2009, which could also impact spill.

John Day – This is the other project besides Little Goose that will operate differently than it did in 2008. It is an operational change, not for testing purposes. Spring spill at JDA will be 30% for 24 hours a day prior to the spill test, then 30/40% throughout the test. This means zero/60% spill will be eliminated at John Day this year.

The Dalles – This project will operate as it did in 2008 with regard to spring spill. There was discussion of spill bays and patterns. The COE is proposing operating bays 14-22 only at high spill levels. There is erosion under bay 23, Bettin noted. We might need to review spill patterns for The Dalles because modeling showed that bay 22 would cause flows to re-circulate in the stilling basin, Kruger said. Bay 22 would only be used as a last resort because it creates poor egress conditions, Turner replied.

Bonneville – This project will operate the same as it did last spring, with 100 kcfs spill for 24 hours a day.

In terms of changes to the FOP, timing is critical, Turner said. The COE expects the FOP spill operation will be included in a court order, which is needed before April 3 in time for spill to start on the Snake River. That means the FOP should go to the court early next week. The Salmon Managers will coordinate any recommended changes with Turner.

Transportation in 2009 – Turner encouraged people to review the transport section of the FOP. The low flow threshold this year is 70 kcfs, with transport beginning at Lower Granite on April 20, and following a staggered start at other projects, similar to last year. If flows are projected to be above the 70 kcfs threshold, transport would begin at Lower Granite between April 20 and May 1. The exact date to start transport will be made by TMT. The April final forecast is due April 7. Until then, the COE is using STP runs which indicate that flows will be above 70 kcfs.

There is one small change: in 2008, transportation downstream followed Lower Granite, beginning 8 days later at Little Goose and 11 days later at McNary. This year, the actual dates will be up to TMT discretion. A few days' lead time will be needed to get the barges going.

Turbine testing – Referring to the turbine testing section on page 6 of the FOP, Kruger wondered about the meaning of a new paragraph that was added in response to a change request to include it in the Fish Passage Plan. Kruger asked why maintenance is being done during fish passage season that would result in this operation. FPOM is concerned about how often it would happen and whether it would detract from spill. More information is needed so the Salmon Managers could get a better sense of what's involved.

During a low flow operation, when this operation might impact spill, the Action Agencies would avoid it if possible, Turner replied. He couldn't say how often it might need to occur, but it would be coordinated through FPOM on a case by case basis.

The blanket approval requested in the change order is limited to periods of less than 30 minutes, Bettin said. If an unforeseen outage occurs with potential negative impacts, the Action Agencies will coordinate it. The draft FOP covers this at the top of page 9, which says that final test conditions will be coordinated through FPOM and/or SRWG, Kiefer noted. The present situation should be used as an opportunity to provide better information for future management decisions. TMT will revisit the turbine testing issue at its next meeting April 1.

7. Review of BPA Generation Emergency Actions

Tony Norris (BPA) led a discussion of Generation Emergency Action Plan's emergency actions list for 2009, which is Attachment 1 of the TMT emergency protocols, which are available on the TMT web page. The Salmon Managers will review this document for discussion at their FPAC meeting on March 31, 2009.

8. Spring Spill Priority List

Every year on April 2, the COE sends a spill priority list to project operators, which lists for each project what level of spill is expected to produce a given percentage of TDG saturation, Adams said. The order in which the projects are listed is flexible. The general strategy at the start of spill season is to spill at upriver projects first to give juveniles an extra push downriver. The draft 2009 spill priority list is linked to today's agenda, open to comments and suggestions from regional participants.

Mid-Columbia project operators follow their own spill protocols, so the COE doesn't send them the spill priority list, but they are included here for the sake of BPA's real time schedulers, Adams said.

Dworshak TDG percentages are very dependent on outflows. The percentages on the spill priority list are percentage of spill related to total outflow at Dworshak. Adams will follow up on a suggestion to add a footnote to the chart explaining this to BPA's schedulers.

Chief Joseph is on the spill priority list, with spill caps that are about the same as they were in the past. This is due to uncertainty regarding the impacts of spilling over the newly constructed deflectors. The Dalles is at the very bottom of the list, due to concerns about flow conditions over the partly constructed spill wall, the leveling slab in particular.

Grand Coulee is now below Chief Joseph on the list. One problem with spill at Grand Coulee is that the fixed monitoring station is 6 miles downstream. Therefore, forebay TDG levels at Grand Coulee have a big impact on TDG levels measured at the tailrace gage. Spill caps for Grand Coulee may need to be adjusted depending on river conditions in coordination with BOR, Adams said. John Roache will check to see if any catwalks are installed that need to be removed before spilling over the drum gates. TMT will revisit the spill priority list at its next meeting April 1. In the meantime the Salmon Managers will provide feedback to the COE on it.

9. Little Goose Low Flow Operations

Dan Feil (COE) led a discussion of problems at Little Goose Dam. Last year, the combination of 30% spill, MOP operations and low flows caused elevations to drop below the necessary depth at the entrance to the navigation lock. The cause of this is a wave in the reservoir created by having to switch back and forth between a one-unit and two-unit operation in order to keep forebay elevations within MOP constraints.

Last year, the COE dealt with the problem by raising the pool level to MOP plus 1 foot, and also went to 11 kcfs flat spill later in the season. This year, because of potential low flows, the latest estimate is there may be a need to operate the Little Goose pool at MOP+1 to MOP+2 and possibly adopt a flat spill operation when flows are in the range of 40-50 kcfs at Little Goose. There was discussion of how low the percentage of spill might have to go in relation to TDG exceedances. This concern is based on elevations measured at the navigation lock, not at the powerhouse gage, Adams said. Feil alerted people that the COE will likely go to a flat spill pattern at Little Goose if flows get down to a range that threatens navigation. The flat spill rate would be coordinated at TMT.

Flow levels associated with navigation problems may be different than flows that cause problems for spill, Laura Hamilton (COE) pointed out. This relates to impacts downstream caused by switching between the two operations at Little Goose, Bettin added. Flat spill would help solve that problem, Norris said. This will probably happen before the study begins at Little Goose on the third or fourth week from April, Feil said. Spill at Little Goose will be a likely topic for the next several weeks on TMT meeting agendas.

10. Albeni Falls Operations

As of today things look good in terms of meeting chum emergence, April 10 refill, and Vernita Bar minimum flows, Norris said. However, that assumption is based on streamflow predictions and aren't certain to occur. As a tool to help ensure there is enough water to meet these objectives TMT could consider refilling at Albeni Falls early, which would probably put the end of month elevation approximately 1 foot above the end of March elevation. The project

typically refills gradually from April 1 to April 30, from approximately 2,052-2,056 feet. This action would increase inflow into Grand Coulee in April. BPA is proposing to begin refill as soon as possible and refill on at trajectory that reaches 2056 by April 30. It's expected to have several benefits downstream, including adding to Coulee inflows in April and improving the odds of achieving April 10 refill. The difference equals about 5 kcfs. That's about 6 inches above elevation 2,052 feet, Joel Fenolio (COE Seattle) said.

Norris asked Kiefer whether the proposal would affect kokanee spawning in Idaho. Kiefer said that kokanee would not be affected by an early refill. Then TMT members voiced their views.

Idaho – Rehabilitation work at the Pac River delta might mean waiting until April 1 to start refill at Albeni Falls. Idaho does not object as long as there are no significant impacts to the restoration work. The proposal offers some potential benefits if it doesn't interfere with restoration.

NOAA – The proposal will move more water into April at the expense of March. The water is not really needed in March from a BiOp perspective, other than to meet the chum incubation objectives. Therefore NOAA has no objections.

Oregon – No comment at this time.

WA – This proposal doesn't sound like a problem. No objection.

BOR – Barring any local impacts at Albeni Falls, the proposal would have positive effects. BOR supports it, barring local impacts.

CRITFC – No comment at this time.

BPA, IDFG and the COE will coordinate on this proposal and report back to TMT soon.

11. Operations Review

a. Reservoirs. Grand Coulee is at elevation 1,284.3 feet, headed to a March 31 flood control elevation of 1,281.6 feet. The April 10 elevation is 1,281.9 feet, which essentially means passing inflows after April 1.

Hungry Horse is at elevation 3,509.68, discharging 1.8 kcfs, Inflows have come up the past few days so the project is almost passing inflows.

Libby is at elevation 2,404 feet, with outflows at the 4.0 kcfs minimum. Inflows are hovering between 2-4 kcfs, so the reservoir is being slightly drafted. Minimum outflows are expected for a while.

Dworshak is at elevation 1,536.4 feet, still operating at minimum outflows of 1.6 kcfs. Inflows are running between 5-8 kcfs. The end of March elevation is approximately 1,542 feet. A March 24 request from Dworshak Hatchery to increase flows today and tomorrow for the spring Chinook release means the reservoir will probably be below its target elevation of 1,542 feet at the end of March. The RO #2 gate is now fully functional in time for spring flows.

Albeni Falls is still operating between 2,051-2,052 feet elevation, slowly filling. See above discussion under agenda item 10.

Seven-day average inflows are 40.7 kcfs at Lower Granite, 117 kcfs at McNary, and 138.4 kcfs at Bonneville.

b. Fish. Smolts have been showing up in traps along the Snake River, Paul Wagner (NOAA) reported. There was a recent bump of 4,800 yearling Chinook passing Bonneville. Low number of coho and steelhead are now passing Bonneville daily. Adults are passing Bonneville Dam at the rate of 25-50 steelhead per day, and about 10 spring Chinook per day.

According to temperature data on the FPC web site, chum emergence is estimated to be nearly done, Wagner reported. However, there isn't much information available. Tony Norris (BPA) asked how the Salmon Managers would prioritize chum emergence protection vs. meeting April 10 objectives if a choice must be made. The preference would be to support both operations, Wagner said, but the April 10 operation would probably have highest priority. Forecast information regarding the April 10 objective is not yet available, Norris said. At present, current streamflow forecasts show that we expect to achieve all the objectives. The intention is to provide both operations. However, there have been years in which it wasn't an option. If that situation arises in 2009, TMT would discuss it and weigh the relative risks.

Conditions look good below Bonneville between now and the end of March because the BOR needs to draft 2 to 3 feet of water from Grand Coulee Dam before the end of March, Roache reported. After March 31, Grand Coulee will essentially be passing inflow until April 10 but under the current forecast, it looks like all fish objectives will be met. There was discussion of probable dates when chum emergence ended in previous years, based on river and groundwater temperature data.

As of March 20, 2 sea lions had been trapped below Bonneville Dam and euthanized because they had a contagious virus, according to the weekly sea lion hazing report published on the TMT website.

c. Power System. There have been recent days of wind generation at 1,700 aMW, Norris said. Other than that, there was nothing to report today.

d. Water Quality. All gages in the Columbia and lower Snake are currently installed and operating, Adams reported. TDG levels are not terribly high except at Cascade Island gage for the reasons discussed earlier today.

9. Next Meeting

The next regular TMT meeting will be on April 1, 2009, location to be determined. The agenda will include follow-up on the Fish Operations Plan; any revisions to the BPA emergency actions list and the spring spill priority list; Little Goose operations; chum operations in relation to Vernita Bar flows and Grand Coulee refill; and the standard operations review. This summary prepared by consultant and writer Pat Vivian.

| <i>Name</i> | <i>Affiliation</i> |
|--------------------|---------------------------|
| Jim Adams | COE |
| John Roache | BOR |
| Paul Wagner | NOAA |
| Dan Feil | COE |
| Rick Kruger | Oregon |
| Tony Norris | BPA |
| Laurie Rice | COE |
| Rudd Turner | COE |
| Scott Bettin | BPA |

Phone:

| | |
|------------------|---------------------|
| Joel Fenolio | COE Seattle |
| Cindy LeFleur | Washington |
| Kyle Dittmer | CRITFC |
| David Wills | USFWS |
| Laura Hamilton | COE |
| Karl Kanbergs | COE |
| Bob Wertheimer | COE |
| Barry Espenson | CBB |
| Tim Heizenrader | Centaurus |
| Shane Scott | PPC |
| Jason XX | EWEB |
| Russell Langshaw | Grant PUD |
| Bob Diaz | Integral Renewables |
| Russ George | WMC |
| Tom Le | Puget Sound Energy |
| Jeff Harris | JP Morgan |
| Steve Hall | COE Walla Walla |
| Russ Kiefer | Idaho |
| Richelle Beck | DRA |

TECHNICAL MANAGEMENT TEAM

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

TMT MEETING

Wednesday April 1, 2009 09:00 - 12:00

NOAA Fisheries
1201 N.E. Lloyd Blvd.
Portland, Oregon
Map Quest [\[Directions\]](#)

Mt. St. Helens Room, 10th Floor Conference Room

CONFERENCE PHONE LINE

CONFERENCE LINE NUMBER
Conference call line:888-285-4585; PASS CODE = 601714

*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 rgumpert@cnnw.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and Introductions
2. Review Meeting Minutes for March 18, and March 25, 2009 [\[Meeting Minutes\]](#)
3. Hanford Reach Protection Flows - *Russell Langshaw, Grant County PUD*
4. Dworshak Operations - *Stephan Hall, USACE*
5. B2 Corner Collector Operation Update - *Dan Feil, USACE*
6. Draft 2009 Spring Fish Operations Plan (FOP) - *USACE*
 - a. [Draft 2009 Spring Fish Operations Plan](#)
7. BPA Generation Emergency Actions: Review - *Tony Norris, BPA*
8. Spring Spill Priority List - *Jim Adams, USACE*
 - a. [Spill Priority List](#)
9. Little Goose Low Flow Operations - *Dan Feil, USACE*
10. Operations Review
 - a. Reservoirs
 - b. Fish
 - c. Power System

- d. Water Quality
- 11. Other
 - a. Set agenda for next meeting - **April 8, 2009**
[\[Calendar 2009\]](#)

Questions about the meeting may be referred to:

*[Jim Adams](#) at (503) 808-3938, or
[Cathy Hlebechuk](#) at (503) 808-3942, or
[Dan Feil](#) at (503) 808-3945*

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

April 1, 2009 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.

Review of Minutes/Agenda

The 3/18 facilitator notes and official meeting minutes were finalized. The following edits to the 3/25 facilitator's notes were made during the meeting:

- On page 1, under Hanford Reach, change temperature units to “952”.
- On page 1, first paragraph under SOR 2009-1, change “juveniles” to “adults”.

With those changes made, the 3/25 facilitator's notes were considered final. Edits to the 3/25 official meeting minutes will be shared at the 4/8 TMT meeting.

Hanford Reach Protection Flows

Russell Langshaw, Grant County PUD, shared a quick update that temperature units at Hanford Reach were at 991, and that rearing protection flows would begin on April 2. Russell clarified that the daily delta maximums are based on project inflows and that plans are to maintain protection flows until 400 temperature units beyond emergence (typically into June.)

Next Steps: Langshaw will provide updates to TMT for the 4/15 meeting.

Dworshak Operations

Stave Hall, COE, reported that Dworshak pool elevation was 1540.5'; the pool was shy of its end of March elevation target of 1542.7', due to increased discharges to support the Dworshak Hatchery releases. Hall noted that the latest water supply forecast shows the April-July volume at 2.66 MAF (99% of average); this new forecast has shifted the end of April flood control elevation target to 1515.6', which is ten feet lower than previously forecasted. Hall said that current inflows and outflows at the project were at 10 kcfs and that the COE likely would increase outflows to 14 kcfs later in the day; Jim Adams, COE said the latest STP run showed inflows rising to 15 kcfs by the end of April, but that estimate was based on an estimated April 1 inflow level of 7.9 kcfs. Hall said if rising water supply conditions persist, there may be a need to spill up to and potentially above the gas cap. Also, depending on Initial Flood Control (ICF) data, refill may need to begin in April. Hall clarified that the objective of the shift is to minimize risks to the extent possible while waiting for the April final forecast to be released next week.

Dave Statler, Nez Perce Tribe, expressed concern for the sharp decrease in the end of month elevation target and for management actions that may result in dramatic elevation

movement. Statler asked whether it might be possible to pass inflows while waiting for the final forecast, thereby using caution up front and ensuring ample water supply later in the year; the COE acknowledged the suggestion and said that it could not deviate from the flood control requirements it is obligated to provide and reiterated that this change in operation is in response to a high probability of higher than anticipated inflows. Hall referred to the 2004 water year, when the COE performed an operation similar to what Statler was proposing; this resulted in high outflows (over 15 kcfs) in June, which is what the COE is intending to avoid this year. The COE acknowledged that there is always room for improvements when it comes to forecasting, but because Dworshak inflows can increase rapidly, it has an obligation to prepare as best it can for dramatic fluctuations in a way that provides good conditions for meeting all interests downstream of the project.

Action/Next Steps: The COE planned to increase discharges up to 14 kcfs later in the day; this item will be on the agenda for the 4/8 meeting.

Follow up on SOR 2009-01

Dan Feil, COE, shared follow up information that as a result of continued regional discussions, the COE plans to open the corner collector on the morning of April 3rd. Feil noted that a crane had become available for use at the project and the OR state waiver began on 4/1, superseding the 105% standard. Paul Wagner, NOAA, noted that the timing was favorable, as chum emergence looked to be completed by 4/1. Feil added that the COE's kelt passage white paper was available for regional review and that discussion on the paper will help guide operations in future years.

Tony Norris, BPA, asked the Salmon Managers whether the timing was right to lift the 11.5' tailwater restriction at Bonneville. Paul Wagner said that FPAC discussion on 3/31 recommended holding the 11.5' to preserve connectivity of flows, so long as it doesn't interfere with other operations or protection measures. Scott Bettin, BPA, encouraged TMT members to weigh in on SCT's review of the monitoring strategy, specifically regarding the placement of gauges. TMT members agreed that long-term data would help support future operational recommendations.

Action/Next Steps: BPA agreed to hold the 11.5' Bonneville tailwater restriction for the short term (up to 10 days); TMT will follow up on this discussion at their 4/8 meeting.

2009 Spring Fish Operations Plan

Rudd Turner, COE, reported that no changes had been made to the draft 2009 Spring Fish Operations Plan as it was presented to TMT last week. Per discussion at the 3/25 TMT meeting, Turner said that the COE had coordinated with the Portland District office and the technical Studies Review Work Group (SRWG) regarding the Little Goose 14 days of nighttime spill to the gas cap provided last year. A technical memo was sent to the COE on 3/31 which made a conclusion that the study could be conducted without purchase of additional PIT tags. However, the COE said this was not built into the study design for the TSW test this year, and the COE plans to operate per the 2008 BiOP and operate Little Goose at 30% day and night for the duration of the spill season. Rick Kruger, OR,

referred to conclusions included in the technical memo and suggested that tests conducted in 2009 would not be useful for testing to the performance standards because the protocols for performance standard testing has not been finalized. The COE acknowledged that the communication to the region regarding the 14 days of nighttime spill could have been clearer, and Turner reiterated that the COE's objective with the spill plan is to meet performance standards and implement changes to spill based on high priority tests this year.

Action/Next Steps: Turner clarified that the 2009 FOP will incorporate the new date for the B2CC opening; a court hearing was scheduled for 4/2.

BPA Generation Emergency Actions Review

FPAC is still reviewing the document; chair Paul Wagner will coordinate offline with Tony Norris, BPA, with any recommendations the group suggests and report any changes to TMT at a future meeting.

Spring Spill Priority List

FPAC is still reviewing the document; chair Paul Wagner will coordinate offline with Jim Adams, COE, regarding any changes group suggests and report any changes to TMT at a future meeting.

Little Goose Low Flow Operations

Dan Feil, COE, reported that spill on the Snake River was scheduled to begin the morning of 4/3. Feil clarified that the COE will use a MOP+1 operation at Little Goose, but will use a 30% spill operation (as opposed to the flat flow operation discussed at the 3/25 meeting) until such time that hourly flows are consistently lower than 30 kcfs or over 50 kcfs. Feil said that operations and recommendations will be discussed at TMT as in previous years. He noted that the TSW will begin in the low crest (higher discharge) position and will likely shift to the high crest position for summer.

Operations Review

Reservoirs: Jim Adams reported on COE projects: Libby was at elevation 2403.5' feet with outflows of 4 kcfs inflows of 2-3.5 kcfs. Albeni Falls was in the range of 2051-2052', with and end of April elevation target of 2055.5'. Dworshak was at elevation 1540.5' with in and outflows of 10 kcfs. The COE is planning to increase outflows up to 14 kcfs soon. 7-day average inflows were 45.3 kcfs at Lower Granite; 142.7 kcfs at McNary and 167.8 kcfs at Bonneville. John Roache reported on BOR projects: Hungry Horse was at elevation 3509.25' with outflows of 2.2 kcfs and inflows in the range of 1.2-1.4 kcfs. Grand Coulee was at elevation 1281.35'; Roache said that objectives ahead were to meet the Vernita Bar Fall Chinook protection flow minimums of 60 kcfs and the April 10 elevation target of 1281.9', however it will be difficult to meet both objectives. Roache and Tony Norris, BPA, clarified that the Action Agency's priority between the two objectives would be to meet minimums at Vernita Bar perhaps at the expense of meeting the April 10 target of 1281.9 feet and asked TMT members present to provide input:

- . NOAA: no objection.

- USFWS: no objection.
- ID: no objection.
- Nez Perce Tribe: no objection.
- COE: no objection.

Fish: Paul Wagner, NOAA, reported that yearling and subyearling Chinook were picking up, with sub-yearling Chinook passing Bonneville at the rate of 1,000 per day. Kokane and Steelhead were beginning to pass Lower Granite.

Power System: Nothing to report at this time.

Water Quality: Jim Adams directed TMT to the spill link on the TMT home page, and noted that all gauges were installed and operating; he noted errors in gauge readings on 3/31 had been corrected. Adams said the COE would be coordinating closely with Paul Wagner, NOAA regarding setting spill caps throughout the season.

Next TMT Meeting: April 8: at NOAA

Agenda items include:

- Notes review (3/25 and 4/1)
- Water Supply Forecasts
- Dworshak Operations
- Little Goose Operations
- Operations Review

**Columbia River Regional Forum
Technical Management Team Meeting
April 1, 2009**

1. Introduction

Today's TMT meeting was chaired by Jim Adams (COE) and facilitated by Robin Gumpert (DS Consulting), with representatives of COE, BOR, BPA, NOAA, USFWS, Idaho, the Nez Perce Tribe, CRITFC and others participating. 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 for March 18 and March 25, 2009

There were no comments today on the facilitator's notes or the official minutes for March 18. The facilitator's notes and official minutes for March 25 will be re-posted with comments incorporated and reviewed at the next TMT meeting.

3. Hanford Reach Protection Flows

As of yesterday, 991 temperature units had accumulated, Russell Langshaw (Grant PUD) reported. Tomorrow will bring the 1,000 TU mark, at which point Grant PUD will initiate emergence and rearing protection flows. These flows are daily delta maximums based on project inflows. They begin at the time of emergence and continue until 400 TU's have accumulated after the end of emergence. Typically, the protection flows end in June. Paul Wagner (NOAA) asked if protection flows will start with a 30 kcfs band. The daily delta would be 20 kcfs if inflows are less than 60 kcfs, Langshaw replied. He will provide an update at the April 15 TMT meeting.

4. Dworshak Operations

As of last night, Dworshak pool elevation rose to 1,540.5 feet, Stephan Hall (COE) reported. It didn't reach the shifted end of March flood control target of 1,542.7 feet, partially due to discharges made on March 25-26 for hatchery spring releases.

The updated Dworshak water supply forecast shows an April-July volume of 2.66 maf, 99% of average. That forecast has driven the end of April flood control elevation target down to 1,515.6 feet, more than 10 feet below the unshifted end-of-March target of 1,526.9 feet. This situation led the COE to increase operations to two small units last night, then to full powerhouse (10 kcfs) this morning. The plan now is to increase outflows to the gas cap limit of

approximately 14 kcfs in response to rising inflows and forecast volumes. If these conditions persist, it could be necessary to release flows above the gas cap, Hall said. The forecasts are uncertain, but all indications are that inflows will continue to increase. Another factor is whether the initial controlled flow (ICF) begins early. If so, Dworshak could shift into refill mode before the end of April, the typical month for transitioning from flood control to a refill operation. (The ICF is a trigger for refill to begin on the Columbia River headwater projects.)

Wagner asked what the current plan is for Dworshak in terms of inflows vs. outflows. Current inflows are around 10 kcfs, and the STP run indicates that outflows will increase from today's rate of 7.19 kcfs to 15 kcfs at the end of April, Adams replied.

Dave Statler (NPT) asked how the new forecast influences the mid-month shifted flood control elevation. Analysis of the flood control shift is being worked on now, Hall replied. In general, the difference between the shifted and unshifted elevation at Dworshak equals the difference between an elevation that provides local flood control to the communities below the dam, and the system flood control requirement. The shift must also take into account how much volume Grand Coulee can accept.

Earlier plans for the Dworshak/Coulee shift were based on normal or average inflows, Hall said. Given the rising forecast in inflows, the COE no longer plans on limiting the flood control shift to 100 kaf by April 15. Instead, the COE will be trying to release as much water as possible. The risk of doing a flood control shift is that above-normal inflows and an increasing forecast can make it difficult to achieve the end of month flood control target, while below-normal inflows can result in not being able to maximize the potential of the shift.

Statler acknowledged these risks, while pointing out that the flood control shift provides an additional benefit – it buys time, allowing forecasting information to become more accurate before final decisions must be made. A provisional operation now would reduce the risk of undershooting or overshooting refill targets and would allow better management of the reservoir during evacuation and refill, while avoiding major swings from minimum flows to full powerhouse, Statler said.

The mid-month shifted Dworshak elevation, based on last month's forecast and a limited shift of 100 kaf was 1,534.1 feet, Hall said. That elevation will go lower because of the increase in forecasted volumes. Essentially, the COE is planning to aid early spring juvenile outmigration by providing 15 kaf of outflows in April and May, which means pushing high flows out of Dworshak in April. The full shift operation typically sets up high flows in April, followed by lower discharges in May and June.

Typically, the Nez Perce Tribes sets a minimum flow target of around 5-6

kcfs during the refill period, Statler said. He advocated taking a middle ground approach now, matching outflows with inflows to the extent possible until mid-April, while capping outflows at 14 kcfs until a more definite forecast is available.

A new federal interagency group (Columbia River Forecast Group) has formed to work on Columbia River forecasting, and Dworshak flow management would be a perfect topic for them, Kyle Dittmer (CRITFC) said. New forecasting technologies are available that could be used to improve the Dworshak operation. Dittmer offered to serve as a connection between TMT and that group. He expressed frustration that flood control needs seem to have priority over fish needs. How can we maximize the use of water for fish and also still meet flood control objectives? That's a balance TMT ought to strive for. Unfortunately, the way the projects are operated, fish are always the last priority. Dan Feil countered, saying that was not true and that the whole reason for the shift operation was to benefit fish in late April and May.

The COE is obligated to manage Dworshak so that it provides the flood control benefits it was authorized to provide, Hall said. As the project refills, it must follow a refill curve that balances flood control with refill objectives. The COE is doing its best to provide flows for fish within the flood control limits.

The flood control shift has yet another benefit – it guards against a falling forecast, Tony Norris (BPA) added. Forecasting for Dworshak was done using the latest information and a modern method, principal components forecasting. The COE is utilizing the latest information to operate in a prudent manner in terms of evacuating the required volume required by flood control without exceeding water quality standards.

The point, Statler said, is that at this point the forecast is still preliminary. There's an opportunity over the next 15 days to take advantage of the flood control shift and release water slowly until there is more assurance regarding the runoff forecast.

In 2004, that essentially was the operation, and it resulted in outflows above 15 kcfs, which is what we're trying to avoid, Hall said. The final April forecast will be released tomorrow, the final shift analysis at the end of this week or early next week. Given rising inflows, the COE will have to increase flows just to meet the previous April 15 shifted target. TMT will revisit Dworshak operations at its next meeting April 8.

5. B2 Corner Collector Operation Update

In response to SOR 2009-01, in coordination with Accord signatories, the COE will open the Bonneville 2nd powerhouse corner collector the morning of April 3, 2009, Dan Feil (COE) reported. A crane will be available to perform the work. Since the Oregon TDG waiver kicks in as of today, the 105% TDG criteria

in hatchery waters and waters less than 2 feet in depth is no longer applicable. Therefore, additional depth compensation due to increased TDG levels generated by the B2CC will not be necessary.

Tony Norris (BPA) asked whether the 11.5-foot minimum tailwater elevation below Bonneville could be relaxed. There's not much risk to chum at this time, Wagner said. As discussed at last week's TMT, based on temperature units, emergence should be complete for all known redds. Total dissolved gas levels are therefore not a concern now. However, tailwater elevations still need to be maintained at 11.5 feet below Bonneville for a different reason – maintaining channel connectivity below Ives Island and Hamilton Creek. It might be possible to go lower than 11.5 feet elevation and keep that area wet, but the actual elevation is uncertain. FPAC has discussed this issue, Wagner said, and the desire is to maintain 11.5 feet elevation below Bonneville if at all possible. The absolute minimum is 10.5 feet, Scott Bettin (BPA) said.

Feil announced the availability of a white paper on kelt passage at Bonneville. The COE expects the region to discuss and consider that information and, sometime over the next year, to define optimal operation of the corner collector for kelt passage. In future years, the corner collector will be automatically opened and won't require a crane, making plans easier. The COE wants feedback from regional technical forums on a plan for determining when the corner collector should operate in response to numbers of kelts observed.

The FPAC recommendation is to maintain a fish operation that is advantageous if it doesn't conflict with any other, Wagner said. When the operation shifts from chum protection to operation of the corner collector for kelts, there's a potential tradeoff between allowing passage for kelts and downstream juvenile migrants, and any chum that might still be incubating. If April is a transition period, it would be better to maintain continuity in the April operation if possible so there is some level of protection throughout. If there's a low cutoff point in flows, it should be identified because half a foot or a foot of elevation can make a big difference in spring discharges, Norris said.

Bettin asked TMT members to provide feedback on temperature monitor locations and the long-term protocol BPA uses to manage them. There was acknowledgement that operations will be tight this year in terms of meeting all objectives. For the next 10 days at least, maintaining the 11.5-foot minimum elevation below Bonneville without exceeding Vernita Bar minimum flows should not be a problem, Norris said. TMT will revisit this topic at its next meeting.

6. Draft 2009 Spring Fish Operations Plan (FOP)

The draft spring 2009 FOP, posted on March 24, 2009, remains the current version, Rudd Turner (COE) reported. Meanwhile the spring 2009 FOP is being discussed in other regional arenas, including litigation and the

policy/executive level. Last week, two new issues arose:

The first was concern about discontinuing 14 nights of springtime gas cap spill at Little Goose for the sake of conducting a single-treatment test of the newly installed spillway weir. This change was not highlighted, although the Little Goose configuration and operations plan was discussed at length. On March 30, SRWG discussed the provision for 14 nights of gas cap spill. On the following day, the COE received a joint technical staff memo on the issue.

One thing SRWG agreed on is that the CRFM budget won't absorb an additional \$300,000-600,000 in costs to purchase more tags so the test could be conducted while allowing for 14 nights of gas cap spill, Turner said. The RPA in the BiOp for Little Goose doesn't include 14 nights of gas cap spill, but it does specify a 30% spill operation to meet the performance standard at Little Goose. Therefore, a key objective of the test, from the Action Agency perspective, is to evaluate the new spillway weir at 30% spill.

There's no need for more tags because the study can be done including 14 nights of gas cap spill with the same level of precision, Rick Kruger (Oregon) said. Therefore, the study should be done with the tags available. He recalled that the SRWG discussed Little Goose operation in terms of testing to BiOp performance standards and decided that would be premature this year, for two major reasons: (1) the outfall is being moved; and (2) the protocol for testing to the performance standards isn't complete, and the current methodology needs work because sometimes it yields test results of over 100%. Therefore SRWG concluded that it's not appropriate to test to BiOp standards at this time. They did agree the new spillway weir should be tested to ensure that it's operating properly. In the context of a rollover, Kruger said, operating to BiOp standards at Little Goose is inconsistent.

If everything is assumed to be a single treatment regardless of the operations that occur, the study can be done with the same degree of precision, Turner said. However, as far as research is concerned, the 14 nights would represent a changed condition, which would have to be dealt with in the analysis. The study results for 30% spill round-the-clock (the BiOp level) would then be based on only the beginning and end of migration season. SRWG suggested that the 14 nights could be broken up rather than consecutive, but that would still require additional tagging for each species being evaluated. The goal of testing the spillway weir under 2008 BiOp spill operations is a top concern for operating this project. In the past, the court has accepted minor changes to rollover operations for the purpose of testing a new structure. Therefore, the COE sees that change this year as consistent with previous operations.

Even 30% flat spill this year won't be useful for determining performance standards compliance because the conditions will change, Kruger said. The Action Agencies are now in the implementation period of the 2008 BiOp and are

responsible for meeting the performance standards in 2009, even with new metrics and a new outfall coming, Turner replied. The new outfall is high on SCT's priority list. Nevertheless, an estimate of survival rates at Little Goose under the BiOp operation is needed, even if it's not a final estimate. Research shows that 30% spill will achieve the Little Goose performance standard for survival, and if 30% spill falls short, that's what subsequent studies are for.

In the meantime, the 30% operation being proposed is the culmination of work at the staff and supervisory level as a good approach to managing fish operations and research at Little Goose in 2009 with the new spillway weir in place. Turner expressed regret that this aspect of Little Goose operations wasn't discovered and aired sooner in the SRWG review process. For now, the COE plans to initiate spill operations on April 3 per the draft FOP. The corner collector will now open on April 3 as well, not April 10 as the current draft says. For the next few days, pending the outcome of a meeting in Judge Redden's chambers tomorrow, the COE will operate according to the draft FOP.

The COE will keep TMT apprised of any changes. TMT will review the spring FOP at its next meeting April 8.

Tom Lorz (CRITFC) asked when the summer FOP will be released. Turner said he did not know, but possibly before the end of June.

7. Review of BPA Generation Emergency Actions List

The FPAC is reviewing this list at present, Wagner said. Norris and Wagner agreed to finalize the list outside of TMT.

8. Spring Spill Priority List

This list is also under FPAC review, Wagner said. He didn't expect the priorities to change, but consensus hasn't been reached on that yet. FPAC members did agree that The Dalles is rightly placed at the bottom of the list. The COE will send the list as-is to project managers, and Wagner will notify TMT if it needs to be discussed again.

9. Little Goose Low Flow Operations

Dan Feil (COE) led discussion of the latest developments regarding Lower Granite Dam navigation lock problems. Apparently, the MOP elevation of 633-634 feet for the Little Goose pool, combined with a 30% spill operation at Goose and flows of less than 50 kcfs, can result in navigation problems at Lower Granite. The COE will keep a close eye on the navigation lock elevations at Lower Granite and will begin spill operations with a Little Goose forebay operating between MOP+1 and MOP+2. As soon as hourly flows are consistently higher than 50 kcfs, the Corps will lower the pool to the normal MOP

range.

FPAC has reviewed this operation and expressed a preference for handling it on a case by case basis, Wagner said. There was mention of steps to the flat spill, which Wagner and Wills agreed they didn't understand at the time it was first discussed. The FOP says this will be coordinated at TMT, Norris pointed out. Flat spill of 11 kcfs isn't necessarily a magic number, Adams added. The spillway weir at Little Goose will be in the low crest position for spring, discharging 11-12 kcfs depending on inflows. For summer, the spillway weir crest will be in the high position, with a lower rate of discharge.

To sum up, the operational plan for Little Goose is to begin by implementing a MOP+1 operation based on inflows. The operation will begin with 30% spill at the beginning of spill season. If hourly flows are consistently above 50 kcfs, it will trigger a transition from MOP+1 to MOP operations.

10. Operations Review

a. Reservoirs. Libby is at elevation 2,403.5 feet, with outflows steady at the 4 kcfs minimum. Inflows are ranging from 2-3.5 kcfs.

Albeni Falls has been operating between elevations 2,051-52 feet. Beginning today, the project will start filling. The expected end-of-April elevation is 2,055.5 feet.

Hungry Horse is at elevation 2,509.25 feet, discharging 2.2 kcfs. Inflows are ranging from 1.2-1.4 kcfs, and the reservoir is slowly drafting.

Seven-day average inflows are 45.3 kcfs at Lower Granite, 142.7 kcfs at McNary, and 167.8 kcfs at Bonneville.

Dworshak, discussed above under agenda item 4, is currently at elevation 1,540.5 feet. Until yesterday, it operated at minimum outflows of 1.6 kcfs. Yesterday the operation went to two small units, and then ramped up around midnight to one big unit. By 2 am, outflows were 10 kcfs. This operation will continue until the forecast is more definite. Within a few days, outflows could increase to 14 kcfs in response to the need to release water to get to the end of April flood control elevation. While waiting for the final April forecast, the operational plan is to minimize the risk of having to exceed 14 kcfs outflows later.

Grand Coulee is at elevation 1,281.35 feet. Yesterday Grand Coulee reservoir achieved its end of March flood control elevation of 1,281.6 feet. The current objective is to reach the April 10 refill goal of elevation 1,281.9 feet. It will be difficult to meet all the fish management objectives as Grand Coulee this year, John Roache said. If choices must be made, the BOR preference is to maintain Vernita Bar minimum flows of 60 kcfs and hope that the pool elevation hits the April 10 target within a foot or so.

Even a modest increase in the forecast for The Dalles will produce some flood control draft at Grand Coulee, and the change can be dramatic, Norris pointed out. Based on preliminary STP runs, Grand Coulee reservoir is expected to hit elevation 1,279.7 feet on April 10, a bit short of the April 10 refill goal of 1,281.9 feet, Adams said. Norris observed that the February water supply forecast is about 3 maf above the March final forecast, and the April 30 flood control elevation based on the February forecast was 1,267 feet at Grand Coulee. This demonstrates that even a small change in forecast can have a dramatic effect on Grand Coulee's April 30 flood control elevation. Considering the prospect of at least some flood control draft, it is prudent to follow Vernita Bar flows as the primary operation. The goal of this operation is to avoid dewatering Vernita Bar with the consequence of not achieving the April 10 elevation goal. Norris and Roache asked the Salmon Managers whether they'll object if Grand Coulee doesn't meet its current April 10 elevation target of 1,281.9 feet. Roache pointed out that this elevation was based on the March forecast and the shifted flood control elevations at Dworshak and Grand Coulee. TMT members gave their views:

NOAA – Supports the proposed operation because the April 10 target is open to change. TMT can make adjustments to this proposal as needed, which is very much in the spirit of adaptive management.

USFWS – Supports the operation for the reasons NOAA stated.

Idaho – Has no objection to the proposed operation.

COE – Agrees with the proposed operation.

There was no representation from Oregon (Rick Kruger left the meeting following the discussion of Item #6), Washington, or Montana on this issue at today's meeting.

b. Fish. Juveniles – Yearling Chinook are on the move, Wagner reported. Passage indices at Lower Granite, with fish screens in place, range from 200-500 fish per day. At Bonneville, 500 fish recently passed, while 145 recently passed John Day. Subyearling Chinook are passing Bonneville at the rate of about 1,000 fish per day. Coho have been relatively inactive. Steelhead are beginning to show up at Lower Granite Dam, but not yet in the traps. Kokanee are beginning to migrate out of Dworshak.

Adults – Steelhead passage has been holding steady at the rate of about 40 fish per day at Bonneville. About 10 spring Chinook adults per day are passing Bonneville. Kelt passage has increased to about 4-5 fish per day over the past few days. According to PIT tag data, these are subyearlings, but they are big fish.

c. Power System. There was nothing to report today.

d. Water Quality. All gages in the Columbia and lower Snake were installed and operating as of last week, Adams said. TDG levels in the Bonneville forebay have been 148% due to gas from the fish ladders. Early next week, the gas from the first days of spill can be expected to hit downstream gages, at which time the COE will make needed spill adjustments. In general, it will take 10-12 days to establish TDG equilibrium on the Snake.

9. Next Meeting

The next regular TMT meeting will be April 8, 2009. The agenda will include review of final Dworshak and Libby water supply forecasts for April; follow up on Dworshak operations; the Little Goose low flow operation; finalizing minutes for March 25 and April 1; and the standard operations review. This summary prepared by consultant and writer Pat Vivian.

| <i>Name</i> | <i>Affiliation</i> |
|--------------------|---------------------------|
| John Roache | BOR |
| Tony Norris | BPA |
| Paul Wagner | NOAA |
| David Wills | USFWS |
| Jim Adams | COE |
| Adam XX | BPA |
| Cheryl XX | BPA |
| Kim Johnson | COE |
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| Scott Bettin | BPA |
| Tiffany Jenks | BPA |
| Russ George | WMC |
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| Karl Kanbergs | COE |
| Russ Kiefer | Idaho |
| Dave Statler | Nez Perce |
| Kyle Dittmer | CRITFC |
| Glen Trager | Shell Energy |
| Tim Heizenrader | Centaurus |
| Margaret Filardo | FPC |
| Richelle Beck | DRA |
| Bob Diaz | Integral Renewables |
| Tom Le | Puget Sound Energy |
| Ruth Burris | PGE |

Barry Espenson
Tom Lorz
Steve Hall
Russell Langshaw
Cathy Hlebechuk
John Hardy

CBB
CRITFC
COE
Grant PUD
COE
EWEB

TECHNICAL MANAGEMENT TEAM

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

TMT MEETING

Wednesday April 8, 2009 09:00 - 12:00

NOAA Fisheries
1201 N.E. Lloyd Blvd.
Portland, Oregon
Map Quest [\[Directions\]](#)

Mt. St. Helens Room, 10th Floor Conference Room

CONFERENCE PHONE LINE

CONFERENCE LINE NUMBER

Conference call line:888-285-4585; PASS CODE = 601714

*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 rgumpert@cnnw.net or call her at (503) 248-4703.*

AGENDA

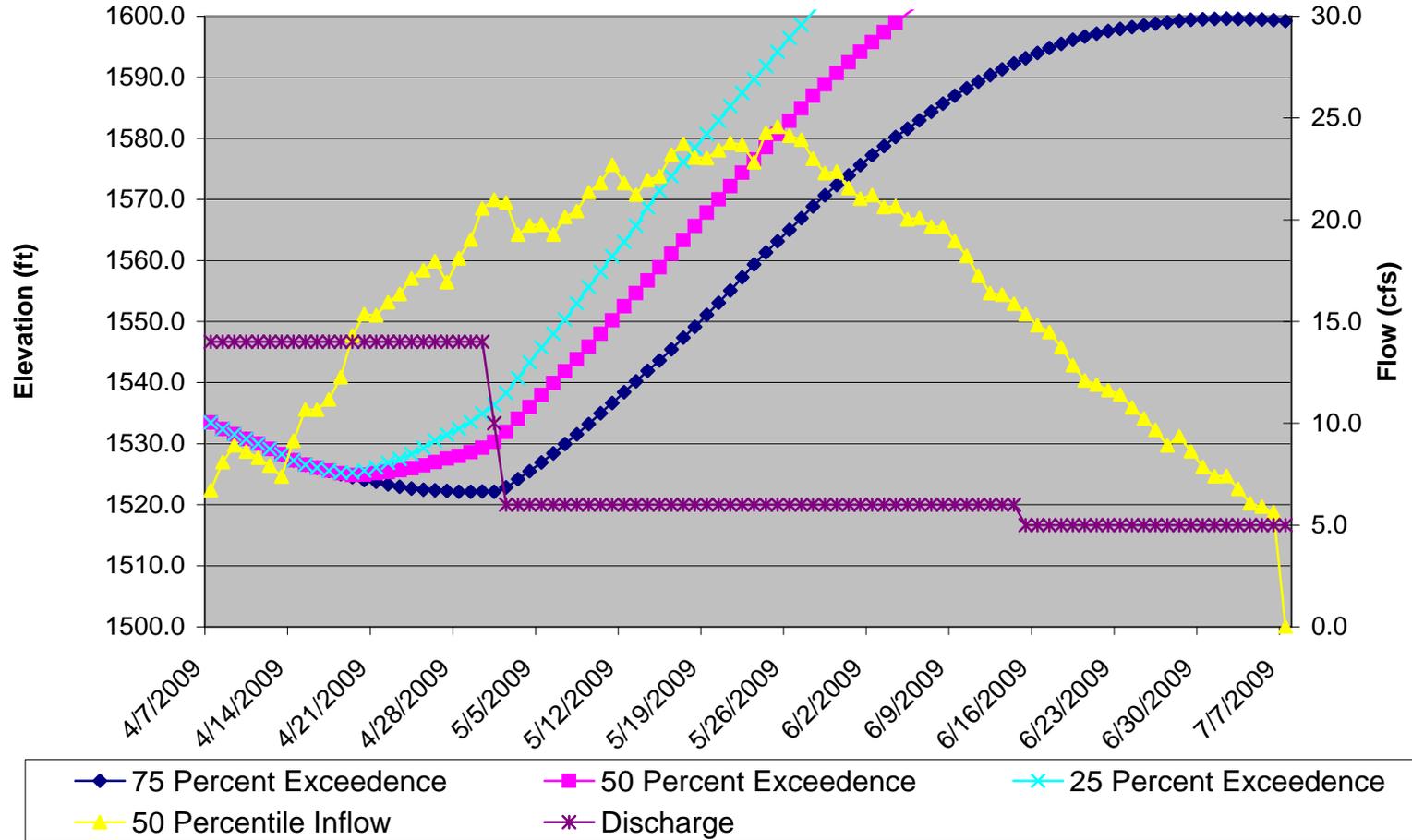
1. Welcome and Introductions
2. Review Meeting Minutes for March 25, and April 1, 2009 [\[Meeting Minutes\]](#)
3. Water Supply Forecasts Links
 - a. [\[Libby\]](#)
 - b. [\[Hungry Horse\]](#)
 - c. [\[Albeni Falls\]](#)
 - d. [\[Grand Coulee\]](#)
 - e. [\[Dworshak\]](#)
 - f. [\[Brownlee\]](#)
 - g. [\[Lower Granite\]](#)
 - h. [\[The Dalles\]](#)
4. Dworshak Operations - *Stephan Hall, USACE*
 - a. [Dworshak Operations - ESP Percent Exceedence](#)
5. Grand Coulee Operations - *John Roache, BOR*
6. Little Goose Low Flow Operations - *Dan Feil, USACE*

7. Operations Review
 - a. Reservoirs
 - b. Fish
 - c. Power System
 - d. Water Quality
8. Other
 - a. Set agenda for next meeting - **April 22, 2009**
[\[Calendar 2009\]](#)

Questions about the meeting may be referred to:

*[Jim Adams](#) at (503) 808-3938, or
[Cathy Hlebechuk](#) at (503) 808-3942, or
[Dan Feil](#) at (503) 808-3945*

Dworshak Operations ESP Percent Exceedence



COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

April 8, 2009 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.

Review of Minutes/Agenda

The following edits to the 4/1 official meeting minutes were made during the meeting:

- In the Little Goose Low Flow section, change "spill" to "flow".
- In the FOP section, under Bonneville, change "1,000" kcfs to "100".
- In the Dworshak Operations section, Kyle Dittmer referred to the "Columbia River Forecast Group".

As Rick Kruger, OR, had additional edits to the 4/1 facilitator's notes, TMT decided to finalize both sets of 4/1 and 4/8 notes at the 4/22 TMT meeting.

Water Supply Forecasts

Jim Adams, COE, referred TMT to several links posted to the TMT agenda to the River Forecast Center's (RFC) April final water supply forecasts. Adams also referred TMT to the COE's updated forecasts for each project; he noted that overall, most projects have a water supply forecast that has increased 5-10% from their March forecast. Adams reported that Libby had an RFC April-August forecast of 88% of average and a COE forecast of 90% of average. John Roache, BOR, reported that the Hungry Horse May-September (which determines flood control curves) RFC forecast was 96% of average and the BOR forecast was 99% of average (May-Sep volume of 1816 kaf). Roache reported that Grand Coulee had an April-September forecast of 92% of average and The Dalles had an April-August forecast of 89% (up 8 MAF, a significant increase, from the March forecast.) Roache clarified that The Dalles forecasts drive flood control targets at Grand Coulee. Steve Hall, COE, reported that Dworshak had an RFC April-July volume forecast of 102% of average and the COE forecast was 99% of average; Hall said the COE has a high level of confidence in their forecast for Dworshak, as their regression forecast was also 99% of average. The end of April flood control elevation target for Dworshak remains 1515.6', and the un-shifted April 15 flood control elevation is 1502.8'.

Dworshak Operations

Steve Hall, COE, referred TMT to an ESP graph posted as a link to the agenda; the COE's anticipated inflows to increase from 10 kcfs to 15 kcfs as April progresses. As the gas cap criteria is approximately 14 kcfs, Hall said it will be highly unlikely that the COE will drop outflows below 14 kcfs anytime in April. Hall gave TMT a head's up the COE is having internal discussions as to the possibility of filing for a variance from the mid-

month flood control target; due to the significant change in forecast, the COE expects to miss April 15 and might also miss the April 30 elevation target as well. Hall added that the COE has a high probability for refilling the project while maintaining discharges of at least 5-6 kcfs during refill (May and June). As conditions can change rapidly, the COE will continue to perform thorough systems analysis as the month progresses. Kyle Dittmer, CRITFC, noted that from a meteorologist perspective, the outlook looks good for conditions staying cool with average precipitation. The COE acknowledged that forecasts are considered as they make risk management decisions. Paul Wagner, NOAA, said so far the current and forecasted operation looks good from a fish perspective.

Action/Next Steps: The COE planned to increase discharges up to 15 kcfs later in the day; this item will be on the agenda for the 4/22 meeting.

Grand Coulee Operations

John Roache, BOR, reported that the project did achieve its end of March elevation target of 1281.6' and was operating to meet Vernita Bar flow targets. Roache said the dramatic increase in the forecast for The Dalles has dramatically decreased the end of April flood control elevation for Grand Coulee and gave TMT a head's up that the BOR estimates the April 30 target will be in the range of 1256-1258' and the April 15 target will be in the range of 1272-1275'. Grand Coulee will begin drafting soon, probably by April 9, in order to achieve the April 15 and April 30 flood control elevations. Salmon Managers noted the conditions look good from a fish perspective.

Action/Next Steps: The official flood control elevation will be determined on Thursday, April 9. This item will be on the agenda for the 4/22 meeting and updates will be posted to the TMT webpage as the month progresses.

Little Goose Low Flow Operations

As follow up from the 4/1 meeting, Dan Feil, COE, reported that hourly data observed on 4/5 showed flows were consistently above 50 kcfs, so the project returned to a MOP-MOP+1 operation, with pool elevation ranging between 633-634'. Feil said that this 30% spill operation (outflows ranging from 50-60 kcfs) was having no adverse impact on the downstream navigation sill depth at Lower Granite. The COE will continue to closely monitor the system. TMT will likely need to revisit this item in July.

Operations Review

Reservoirs: John Roache reported on BOR projects: Hungry Horse was at elevation 3508.48' with outflows of 1.8 kcfs and Grand Coulee was at elevation 1281.4'. Jim Adams reported on COE projects: Libby was at elevation 2403.5' feet with outflows of 4 kcfs and inflows in the range of 2-3.5 kcfs. Albeni Falls elevation was 2052.04', with inflows of 16.5 kcfs and outflows of 16.1 kcfs; the end of April target elevation range is 2054-2056'. Dworshak was at elevation 1532.3' with outflows ramping up to 15 kcfs and a plan to hold as closely to the 110% TDG criteria as possible. 7-day average inflows were 60.7 kcfs at Lower Granite; 143.8 kcfs at McNary and 162.2 kcfs at Bonneville. Spill was planned to begin on the four lower Columbia River projects at one minute after midnight on 4/10.

Fish: Paul Wagner, NOAA, reported that juveniles were picking up, with passage rates of 1-2,000 per day at most upper Snake River projects. Adult migration appears to be later than the 10-year average but tracking closely with recent past years; Wagner referred TMT to the Fish Passage Center website to compare 2008 to 2009 data.

Power System: Nothing to report at this time.

Water Quality: Jim Adams directed TMT to the spill link on the TMT home page, and noted that TDG had been fairly low throughout the system up until the previous weekend, when Ice Harbor TDG went up to 116% in the forebay. As a result, flows were ramped down to 27 kcfs on 4/6; the COE planned to monitor TDG closely and lower the flows further if levels were still high by 4/10.

Other: Dave Wills, USFWS, informed TMT that the Spring Creek Hatchery release was scheduled for Monday, 4/13. The WMP and FOP describe an operation similar to that implemented in 2008, with operations at the low end of 1% at B2 and shifting remaining flows to B1 up to full capacity within the 1% range, then going back to B2 only if spill would exceed gas cap limits. Wills added that 90-95% passage would likely take 3-4 days. The COE and USFWS will coordinate closely to make sure operations align with unit tests planned for this year.

Action: The COE will email operational specifics out to TMT members next week and report back to TMT at the 4/22 meeting.

Next TMT Meeting: April 8: at NOAA

Agenda items include:

- Notes review
- Hanford Reach Update
- Dworshak Operations
- Grand Coulee Operations
- The Dalles Construction Status and Planning Update
- May Release – Spring Creek Hatchery
- Operations Review

**Columbia River Regional Forum
Technical Management Team Meeting
April 8, 2009**

1. Introduction

Today's TMT meeting was chaired by Jim Adams (COE) and facilitated by Robin Gumpert (DS Consulting), with representatives of COE, NOAA, BPA, USFWS, BOR, CRITFC, and others participating. 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 for March 25 and April 1, 2009

There were changes to the March 25 official minutes: Under Section 9, Little Goose Low Flow Operations, the second paragraph refers to spill, which should be flow. Under Bonneville in the section covering the Fish Operations Plan, 1,000 kcfs should be 100 kcfs. In the April 1 minutes, the federal interagency group referred to on page 7 is officially called the Columbia River Forecast Group. The revised minutes will be re-posted to the TMT page. Review of the April 1 facilitator's notes was postponed until the next TMT meeting.

3. Water Supply Forecasts

Links were included on today's agenda to RFC water supply forecasts for Libby, Hungry Horse, Albeni Falls, Grand Coulee, Dworshak, Brownlee, Lower Granite and The Dalles dams as of April 7. Most of the projects have seen a 5-10% increase in flows over the past month, due to more precipitation throughout the basin than was forecast, Adams reported. The April-August early bird forecast for The Dalles is 8 maf over the March final forecast, a dramatic change, Tony Norris (BPA) said.

Libby – The current RFC and COE forecasts for April-August are close, Adams reported. The RFC's forecast is 5,500 kaf, 88% of average. The COE forecast was 5,672 kaf, 90% of average. That's an increase of more than 300 kaf over the COE's end of March forecast for the same period.

Hungry Horse – The RFC forecast for April-September is 96% of average, John Roache reported. BOR does a May-September forecast, which is used to establish flood control rule curves, and an April-August forecast, which is used to determine minimum flows below the project and at Columbia Falls. The Columbia Falls minimum flows, based on the March final forecast, is 3,500 cfs and the minimum flow below Hungry Horse is 900 cfs for the rest of 2009 until BOR releases its January 2010 forecast. For May-September, the forecast was 1,816 kaf, 99% of average. The April-July forecast was 1,978 kaf, 99% of average.

Grand Coulee – The April-September forecast is 92% of average, an increase of 4% from the March final forecast, which was 88% of average. There was further discussion of Grand Coulee operations under section 5 below.

The Dalles – The April-August forecast is 82.4 maf, 89% of average, an increase of 9% over the end of March forecast, which was 80% of average. That's a huge increase in comparison to the previous forecast. This increase in inflow projections will impact Grand Coulee operations, Roache said (as discussed below in section 4). The Dalles is the control point for system flood control, Norris noted.

Lower Granite – The April-August forecast is 21.5 maf, 94% of average. This represents almost a 25% increase over the March forecast, which was 75% of average, also a dramatic change.

4. Dworshak Operations

Stephan Hall (COE) led a discussion of Dworshak operations in light of current inflow predictions. The RFC forecast for April-July, the period of concern, is 2.7 maf, 102% of average, with the RFC and COE forecasts in close agreement. The end of month elevation is therefore 1,515.6 feet, a crucial elevation that will be difficult to reach. The unshifted April 15 elevation is 1,502.8 feet, also a critical number primarily due to the change in the Grand Coulee forecast. However, getting the reservoir down to that elevation would require excessive outflows, probably more than 25 kcfs, because there are just a few days left to get the water out by April 15. For Grand Coulee to accept an April 15th shift, it must draw down below its normal flood control elevation by the April 15th in order to absorb an April shift of reservoir space.

Hall showed TMT a graph comparing the ESP traces for various scenarios, linked to today's agenda. None of the traces – including average inflows, 25% and 75% inflows, with a potential operation of 14-15 kcfs outflows through April – show Dworshak reaching its shifted April 15 flood control elevation of 1,515 feet. The unshifted April 15 flood control elevation is 1,502.8 feet. It's unlikely that target will be met, unless there's a major change in forecasted inflows. The COE is therefore planning to request a variance to be above required flood control on April 15. This problem is a direct result of shifting March flood control space to Grand Coulee, combined with a big change in the inflow forecast, Hall said.

There's a high probability the project will refill while maintaining an average discharge during refill of 5-6 kcfs. While this paints a good picture for fish, it is a risky situation in terms of flood control, Hall emphasized. There's a high likelihood the COE will spill above TDG limits at some point this spring if conditions deteriorate rapidly. Maintaining the current operation of 5-6 kcfs

outflows would allow the project to fill by the beginning of June, which would be dangerous from a flood control standpoint.

The likelihood of a “pineapple express” is low, Kyle Dittmer (CRITFC) replied. Current conditions suggest that this spring will be a borderline La Nina season, with below-normal temperatures and late runoff like last spring, so flooding is unlikely. Nevertheless, the headwater projects are susceptible to thunderstorms, Norris said, and it wouldn’t take a major rainstorm in the basin to produce a dramatic rise in inflows.

These factors will be analyzed as part of the COE’s request for a deviation from the April 15 flood control target, Hall said. Getting to 1,503-1,510 feet elevation would require outflows in excess of 25 kcfs. That said, the COE’s current strategy is to ramp up to 15 kcfs outflows and release as much water as possible without exceeding the gas cap. That operation is expected to draw the reservoir down to 1,522-3 feet elevation by the end of April. The local flood control elevation is 1,537.8 feet, higher than the reservoir elevation at present.

The current operation has been beneficial so far for fish, Paul Wagner (NOAA) said. TMT will revisit Dworshak operations at its next meeting on April 22. Meanwhile, the COE will notify TMT of any significant changes via email.

5. Grand Coulee Operations

John Roache (BOR) gave an update on Grand Coulee operations. The reservoir hit its March 31 flood control elevation of 1,281.6 feet. The April 10 objective is 1,281.9 feet based on the end of March forecast, a target the BOR has been trying to meet while maintaining 60 kcfs flows below Vernita Bar.

The large increase in the inflow forecast for The Dalles means flood control challenges for BOR as well as COE. Roache gave TMT preliminary ranges where flood control elevations will be for April 15 and April 30. The end of April elevation for Grand Coulee will be in the 1,256-8 range, as opposed to 1,281.7 feet, an increased draft of 20-25 feet of water. The April 15 target was 1,282 feet and is now in the 1,272-5 foot range. The BOR will start drafting soon, probably tomorrow, in an effort to maintain a smooth operation while targeting the new April 30 flood control elevation.

6. Little Goose Low Flow Operations

Dan Feil (COE) gave an update. Since last week’s TMT meeting, the COE carried out the plan to start a MOP+1 operation at Little Goose when spill began on April 3. Beginning on April 5, flows were consistently greater than 50 kcfs for over 24 hours, so the COE issued a teletype instructing the project to shift Little Goose pool operation to the MOP-MOP+1. Outflows seem to holding steady at 50-60 kcfs with this operation in effect. It’s the 30% operation combined with

switching from a one-unit to a two-unit operation at Little Goose that triggers navigation problems at Lower Granite. The COE doesn't plan to go to a MOP+1-2 operation unless there are further problems at the Lower Granite sill.

The Little Goose pool reached a threshold of 634 feet at 6:00 pm on April 6. The project never went to a fixed spill operation and remained at 30% throughout, Adams reported. This issue will not need TMT's attention again until probably July or August.

7. April Spring Creek Hatchery Release

On April 13, Spring Creek Hatchery will release the April batch of fish, Dave Wills reported. As specified in the Water Management Plan and the Fish Operations Plan, TMT considered operating the Bonneville turbines differently for a few days to accommodate these fish. The desired operation for the turbines is at the low end of 1% efficiency, with higher priority given to generation at the 2nd powerhouse. Last year, the Bonneville 2nd powerhouse units operated at the lower end of the lower quarter, with flows greater than the capacity of Powerhouse 2 being shifted to the 1st powerhouse, Feil said. If flows increased to the point where spill would begin to exceed the gas cap, flows through the 2nd powerhouse units would be raised higher than the lower quarter of the 1% peak efficiency range.

Wills estimated that flows this year will amount to 50 kcfs through the 1st powerhouse. He asked that Dean Ballinger (Pacific States) notify USFWS when the fish arrive so USFWS can monitor passage for 3-4 days after that.

The goal is to maintain the above operation until 90% of fish have passed, as long as the operation doesn't impact test schedules at the project. USFWS and the COE will coordinate this operation. Feil will email the teletype of last year's operation to TMT members. TMT will revisit this issue on April 22, at which time it may also discuss the Bonneville operation for the May release.

8. Operations Review

a. Reservoirs. Libby is at elevation 2,402.9 feet, with outflows of 4.0 kcfs and inflows of 2.5-3.5 kcfs.

Albeni Falls is at elevation 2,052.04 feet at the Hope gage. Inflows yesterday were 16.5 kcfs and outflows 16.1 kcfs, so the project is in slow refill mode. The end of April elevation target will be in the range of 2,054-6 feet.

Hungry Horse is at elevation 3,508.48 feet, discharging 1.8 kcfs and passing inflows at present. However, inflows are starting to increase and runoff is expected soon.

Seven-day average inflows are 60.7 kcfs at Lower Granite, 143.8 kcfs at McNary, and 162.2 kcfs at Bonneville. Spill will begin on the Columbia River projects on 1 minute after midnight on April 10.

Dworshak, discussed above under agenda item 4, is currently at elevation 1,532.3. Outflows have been 14 kcfs, which will increase as much as possible without exceeding 110% TDG.

Grand Coulee, discussed above under agenda item 4, is at elevation 1,281.4 feet and will start drafting toward an April 30 elevation of 1,256-8 feet.

b. Fish. Juveniles – Yearling Chinook index numbers are 1-2,000 per day at most traps, Wagner reported. Most of the passage is at Lower Granite, 5-6,000 fish per day. At Little Goose, a few hundred fish are passing per day. Passage in the lower river is not in full swing yet, with a few hundred per day at both Lower Monumental and Bonneville. Steelhead passage is slower to begin than yearling Chinook passage, with counts of less than 100 per day at most traps, and 1,000 per day at Lower Granite.

Adults – April 6 marked passage of the first 100 spring Chinook at Bonneville, which is similar to the past few years. In terms of the 10-year average, however, there should be a few thousand adults passing per day at this time. Recent years have been unlike the past 10 years in terms of averages, with a tendency for migration season to start later. The reason for that is unclear; it could be the result of lower river temperatures or plentiful ocean food supplies.

c. Power System. There was nothing to report today. BPA anticipates no problems with the initiation of spill on April 10.

d. Water Quality. Total dissolved gas levels on the lower Snake River have generally been low recently. Spill started at 20 kcfs at Lower Granite and will continue, with tailwater values of 108-109% TDG, and the highest reading at 109.7%. The Lower Monumental forebay has a relatively low TDG level of 113.6%, so on April 6 the spill cap at Lower Monumental was increased from 27 to 32 kcfs. The results are: TDG levels of 116.6% in the Ice Harbor forebay, and recently up to 117.7%. As a result, the spill cap was reduced back to 27 kcfs. The spill cap at 27 kcfs might need to be lowered again, due to TDG levels at the Ice Harbor forebay.

When flows went to 32 kcfs at Lower Monumental, the TDG tailwater values went down, Kiefer noted. A modified bulk spill pattern was used there prior to initiation of the TSW spill test. When the test begins, the spill pattern will alternate between flat spill and modified bulk spill, Adams said. Because of varied spill patterns, there isn't a direct correlation between spill quantities and TDG levels. This phenomenon is also prominent at John Day.

9. Next Meeting

The next regular TMT meetings will be April 22 and May 6, 2009. The April 22 agenda will include an update on Hanford Reach protection flows, more discussion of Dworshak and Grand Coulee operations, an update on The Dalles spill wall construction, Bonneville operations for Spring Creek Hatchery's April and May releases, and the standard operations review. This summary prepared by consultant and writer Pat Vivian.

| Name | Affiliation |
|-----------------|--------------------|
| Jim Adams | COE |
| Paul Wagner | NOAA |
| Tony Norris | BPA |
| David Wills | USFWS |
| John Roache | BOR |
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| Joel Fenolio | COE Seattle |
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| Margaret Filardo | FPC |
| Rob Hollerman | Deutsch Bank |
| Barry Espenson | CBB |
| Russ Kiefer | Idaho |
| Ruth Burris | PGE |
| Tom Le | Puget Sound Energy |
| Bob Diaz | Integral Renewables |
| Kyle Charles | JP Morgan |
| Richelle Beck | DRA |
| Dan Feil | COE |
| Tom Lorz | CRITFC |
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WDFW : Cindy LeFleur **MT** : Jim Litchfield / Brian Marotz
COE: Jim Adams / Cathy Hlebechuk / Dan Feil

TMT MEETING

Wednesday April 22, 2009 09:00 - 12:00

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

CONFERENCE PHONE LINE

Conference call line:888-285-4585; PASS CODE = 601714

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 or Cathy Hlebechuk (503) 808-3942 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 rgumpert@cnnv.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and Introductions
2. Review Meeting Minutes for April 1 and 8, 2009 [\[Meeting Minutes\]](#)
3. Hanford Reach Update - *Russell Langshaw, Grant County PUD*
 - a. [Hanford Reach Discussion](#)
4. Chief Joseph Spill Test - *Lynne Melder, COE-NWS*
 - a. [Chief Joseph 2009](#)
5. Dworshak Operations - *Steve Hall, COE-NWW*
 - a. [Alternative Operations](#)
6. The Dalles Construction Status and Planning Update - *Pat Duyck, COE-NWP*
7. Spring Creek Hatchery May Release - *Dave Wills, USFWS*
8. Start of Fish Transport - *Dan Feil, COE-RCC*
 - a. [LGR April Passage Index](#)

9. Operations Review
 - a. Reservoirs
 - b. Fish
 - c. Power System
 - d. Water Quality
10. Other
 - a. Set agenda for next meeting - **April 29, 2009**
[\[Calendar 2009\]](#)

Questions about the meeting may be referred to:

*[Jim Adams](#) at (503) 808-3938, or
[Cathy Hlebechuk](#) at (503) 808-3942, or
[Dan Feil](#) at (503) 808-3945*

Chief Joseph Dam Gas Abatement Project Spill Test April 2009

HE hour ending

Flows in kcfs

QT Turbine discharge

QS Spill

Turbine flow will be with the range specified for each event.

Events "grouped" by test criteria see tab "kcfs per bay."

Events within SAME Group # must have same Turbine Flow

Turbine discharge in non-test hours will be used to manage GCL draft, CHJ forebay, and meet load.

Any numbers to the right of the decimal point may be somewhat presumptuous.

CHJ Forebay will draft below 950', no lower than 947' from 0600-2400 when it will rise above 950'.

| Tue 4/28 | HE | QT - range | | QS | GROUP # |
|----------|----|------------|----|-------|---------|
| | 1 | | | | |
| | 2 | | | | |
| | 3 | | | | |
| | 4 | | | | |
| | 5 | | | | |
| | 6 | | | | |
| | 7 | | | | |
| Test 12 | 8 | 30 | 30 | 17.9 | 6 |
| | 9 | 30 | 30 | 17.9 | 6 |
| | 10 | 30 | 30 | 17.9 | 6 |
| Test 14 | 11 | 30 | 30 | 57.6 | 6 |
| | 12 | 30 | 30 | 57.6 | 6 |
| | 13 | 30 | 30 | 57.6 | 6 |
| | 14 | | | | |
| | 15 | | | | |
| | 16 | | | | |
| Test 15 | 17 | 30 | 30 | 100.3 | 6 |
| | 18 | 30 | 30 | 100.3 | 6 |
| | 19 | 30 | 30 | 100.3 | 6 |
| | 20 | | | | |
| | 21 | | | | |
| | 22 | | | | |
| | 23 | | | | |
| | 24 | | | | |

CHJ Forebay will draft below 950', no lower than 947' from 0600-2400 when it will rise above 950'.

| Wed 4/29 | HE | QT - range | | QS | GROUP # |
|----------|----|------------|-------|------|---------|
| | 1 | | | | |
| | 2 | | | | |
| | 3 | | | | |
| | 4 | | | | |
| | 5 | | | | |
| | 6 | | | | |
| | 7 | | | | |
| Test 2 | 8 | 140 | 180 | 37.1 | 2 |
| | 9 | 140 | 180 | 37.1 | 2 |
| | 10 | 140 | 180 | 37.1 | 2 |
| Test 8 | 11 | 140 | 180 | 37.3 | 2 |
| | 12 | 140 | 180 | 37.3 | 2 |
| | 13 | 140 | 180 | 37.3 | 2 |
| | 14 | | | | |
| | 15 | | | | |
| Test 10 | 16 | 100.4 | 150.4 | 99.6 | 4 |
| | 17 | 100.4 | 150.4 | 99.6 | 4 |
| | 18 | 100.4 | 150.4 | 99.6 | 4 |
| | 19 | | | | |
| | 20 | | | | |
| | 21 | | | | |
| | 22 | | | | |
| | 23 | | | | |
| | 24 | | | | |

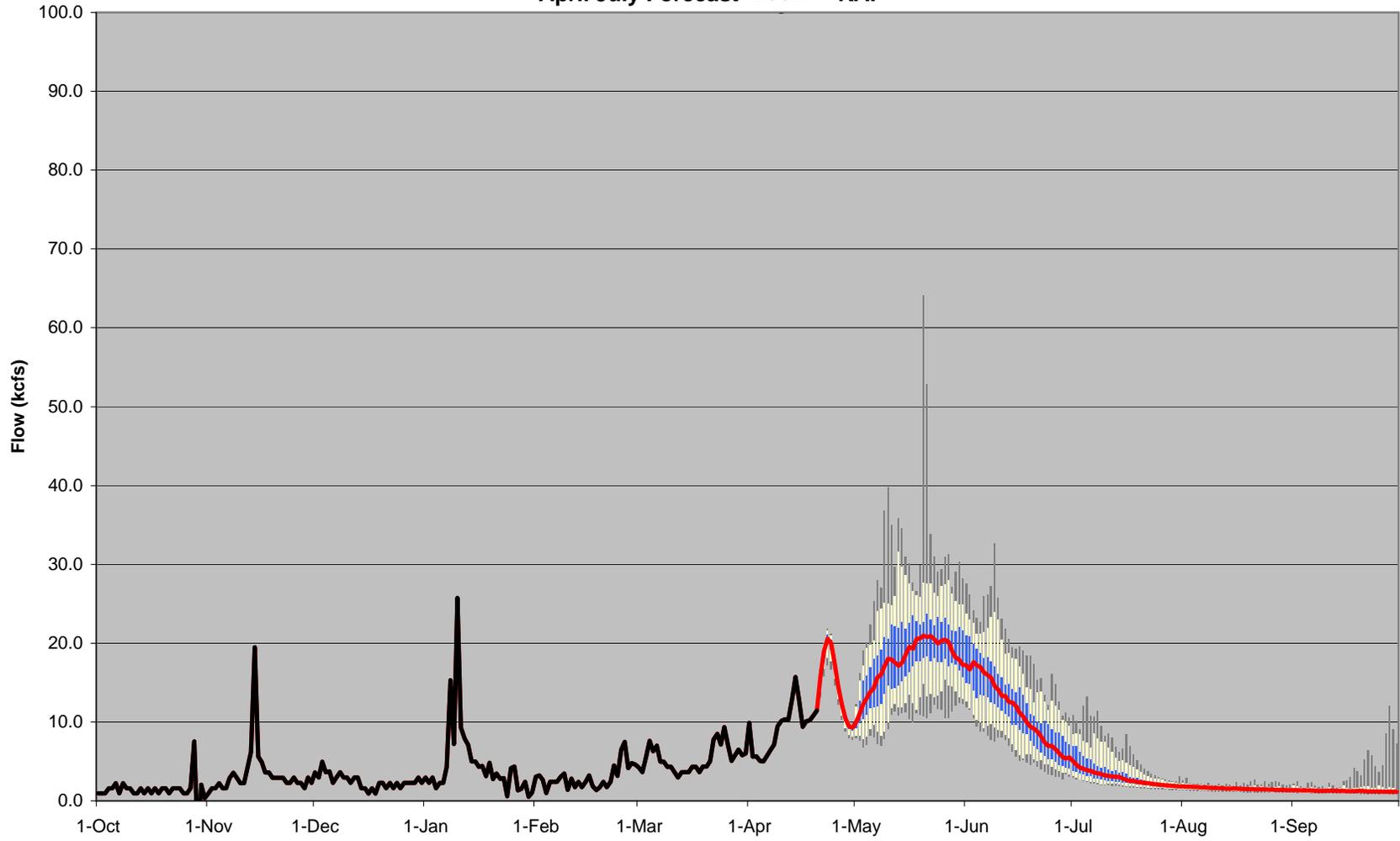
CHJ Forebay will draft below 950', no lower than 947' from 0600-2400 when it will rise above 950'. Line outage T3 - units 9-12 not available 0800-1800 - Total QT = 150 kcfs.

| Thur 4/30 | HE | QT - range | | QS | GROUP # |
|-----------|----|------------|-------|------|---------|
| | 1 | | | | |
| | 2 | | | | |
| | 3 | | | | |
| | 4 | | | | |
| | 5 | | | | |
| | 6 | | | | |
| Test 11 | 7 | 80 | 107 | 143 | 5 |
| | 8 | 80 | 107 | 143 | 5 |
| | 9 | 80 | 107 | 143 | 5 |
| | 10 | | | | |
| | 11 | | | | |
| | 12 | | | | |
| Test 1 | 13 | 140 | 180 | 17.9 | 1 |
| | 14 | 140 | 180 | 17.9 | 1 |
| | 15 | 140 | 180 | 17.9 | 1 |
| Test 5 | 16 | 80 | 105.4 | 145 | 5 |
| | 17 | 80 | 105.4 | 145 | 5 |
| | 18 | 80 | 105.4 | 145 | 5 |
| | 19 | | | | |
| | 20 | | | | |
| | 21 | | | | |
| | 22 | | | | |
| | 23 | | | | |
| | 24 | | | | |

CHJ Forebay will draft below 950', no lower than 947' from 0600-2400 when it will rise above 950'.

| Fri 5/1 | HE | QT - range | | QS | GROUP # |
|---------|----|------------|-------|------|---------|
| | 1 | | | | |
| | 2 | | | | |
| | 3 | | | | |
| | 4 | | | | |
| | 5 | | | | |
| | 6 | | | | |
| | 7 | | | | |
| Test 3 | 8 | 140 | 180 | 57.6 | 3 |
| | 9 | 140 | 180 | 57.6 | 3 |
| | 10 | 140 | 180 | 57.6 | 3 |
| Test 9 | 11 | 140 | 180 | 57.8 | 3 |
| | 12 | 140 | 180 | 57.8 | 3 |
| | 13 | 140 | 180 | 57.8 | 3 |
| | 14 | | | | |
| | 15 | | | | |
| Test 4 | 16 | 99.7 | 147.7 | 100 | 4 |
| | 17 | 99.7 | 147.7 | 100 | 4 |
| | 18 | 99.7 | 147.7 | 100 | 4 |
| | 19 | | | | |
| | 20 | | | | |
| | 21 | | | | |
| | 22 | | | | |
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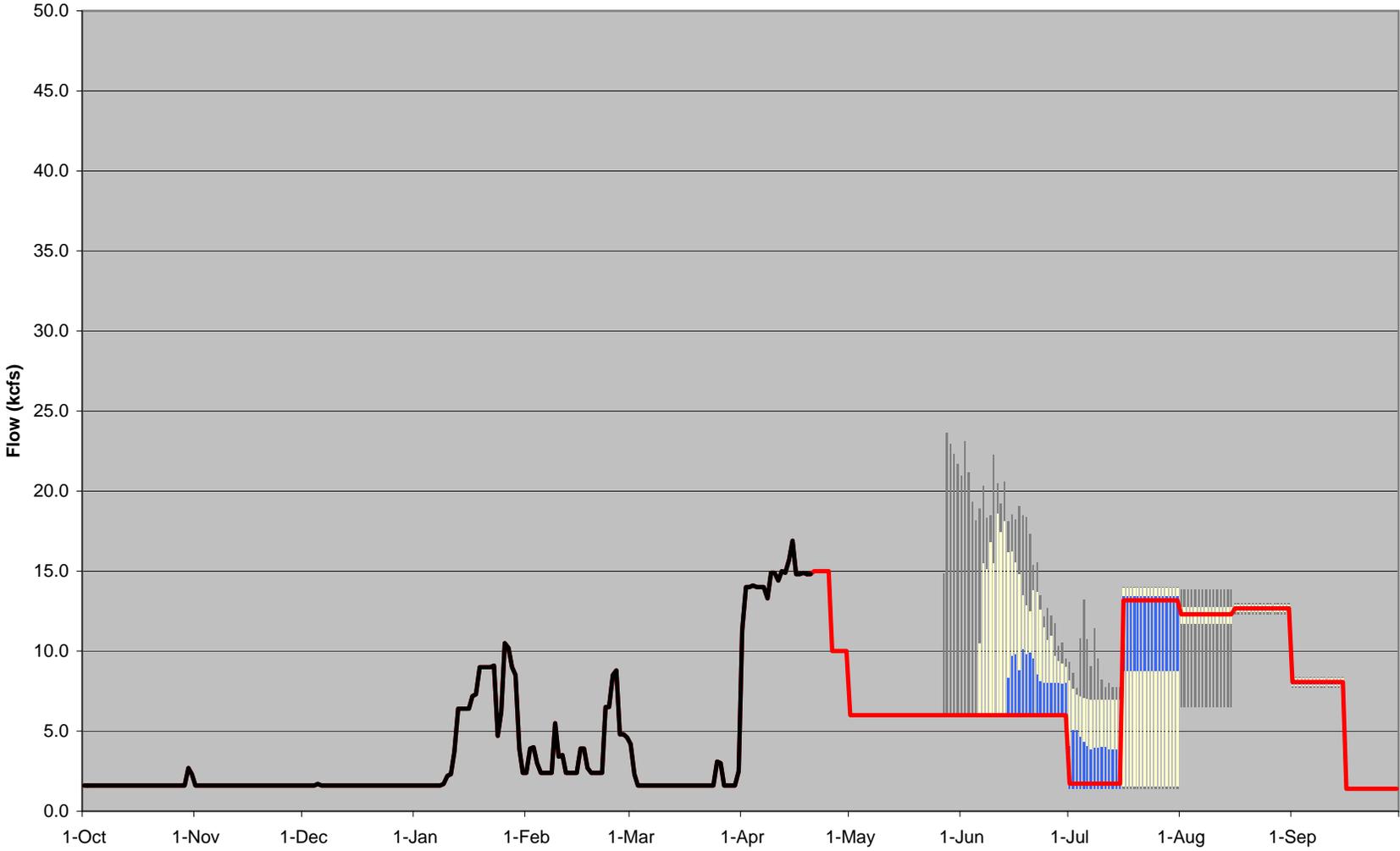
ESP Inflow Statistics
44 ESP Inflows
April July Forecast 2662. KAF



Min 5th 25th 75th 95th Max Median Obs

ESP Outflow Statistics Alternative 1

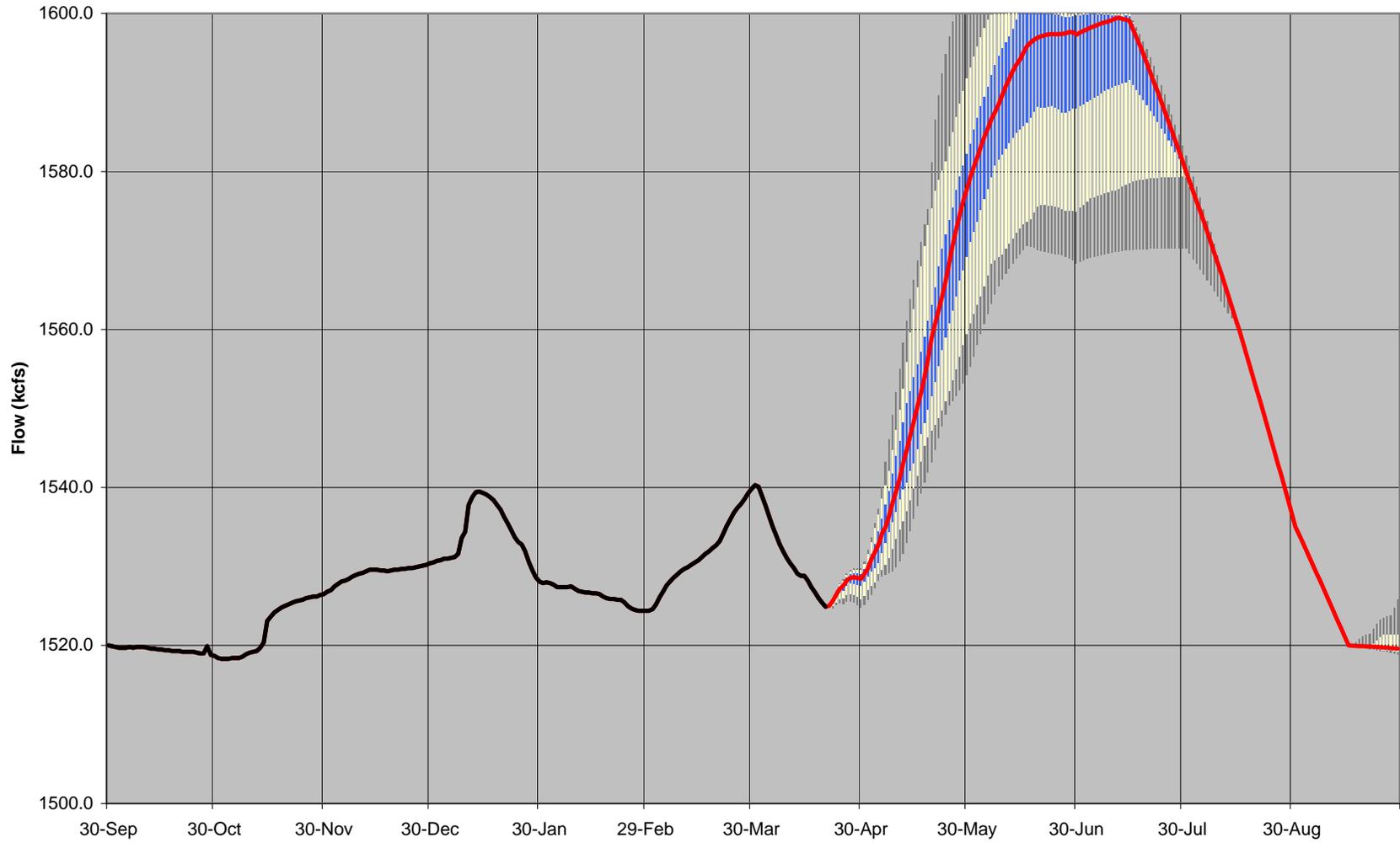
April July Forecast 2662. KAF



Min 5th 25th 75th 95th Max Median Obs

ESP Elevation Statistics Alternative 1

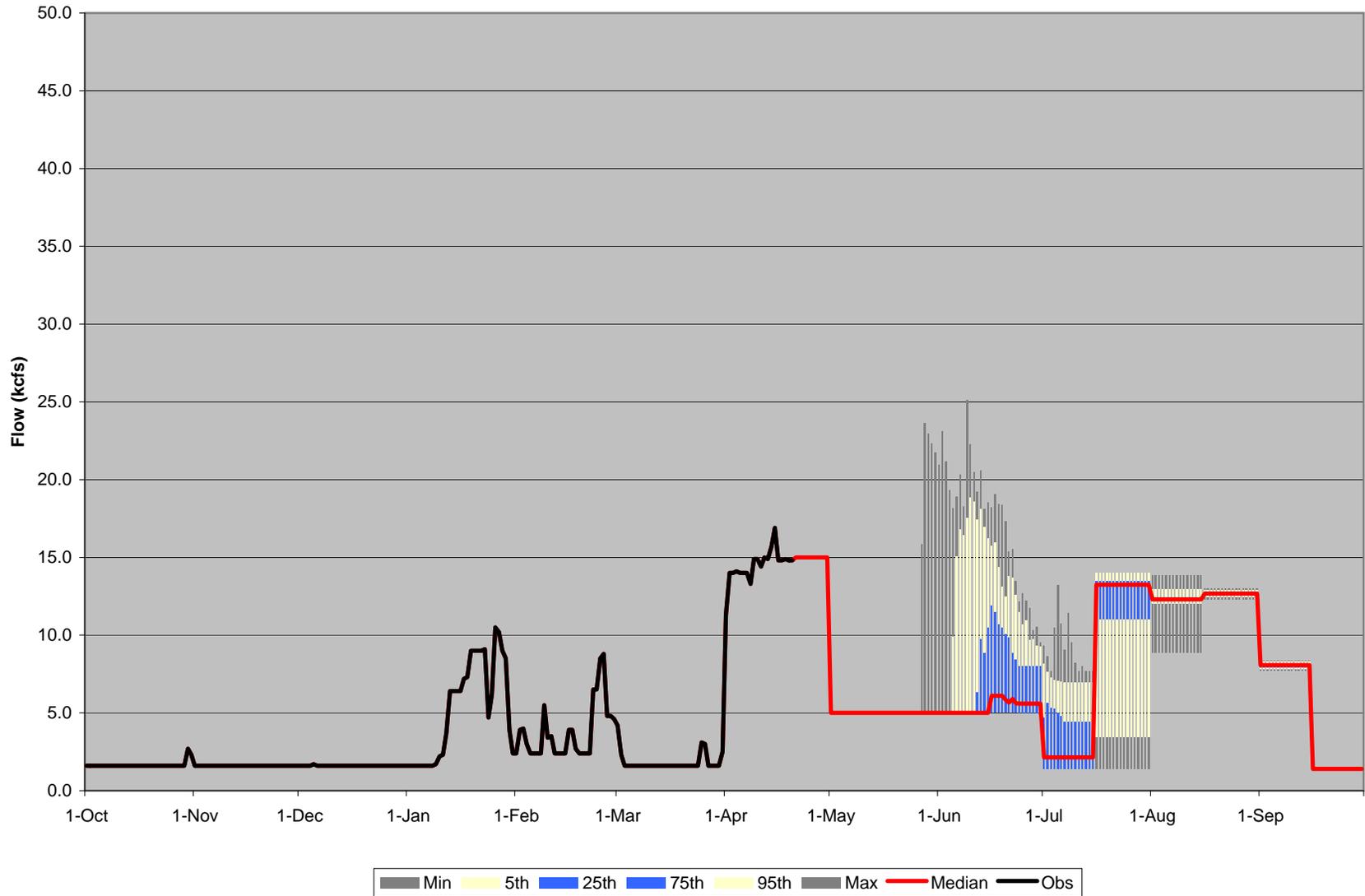
April July Forecast 2662. KAF



Min 5th 25th 75th 95th Max Median Obs

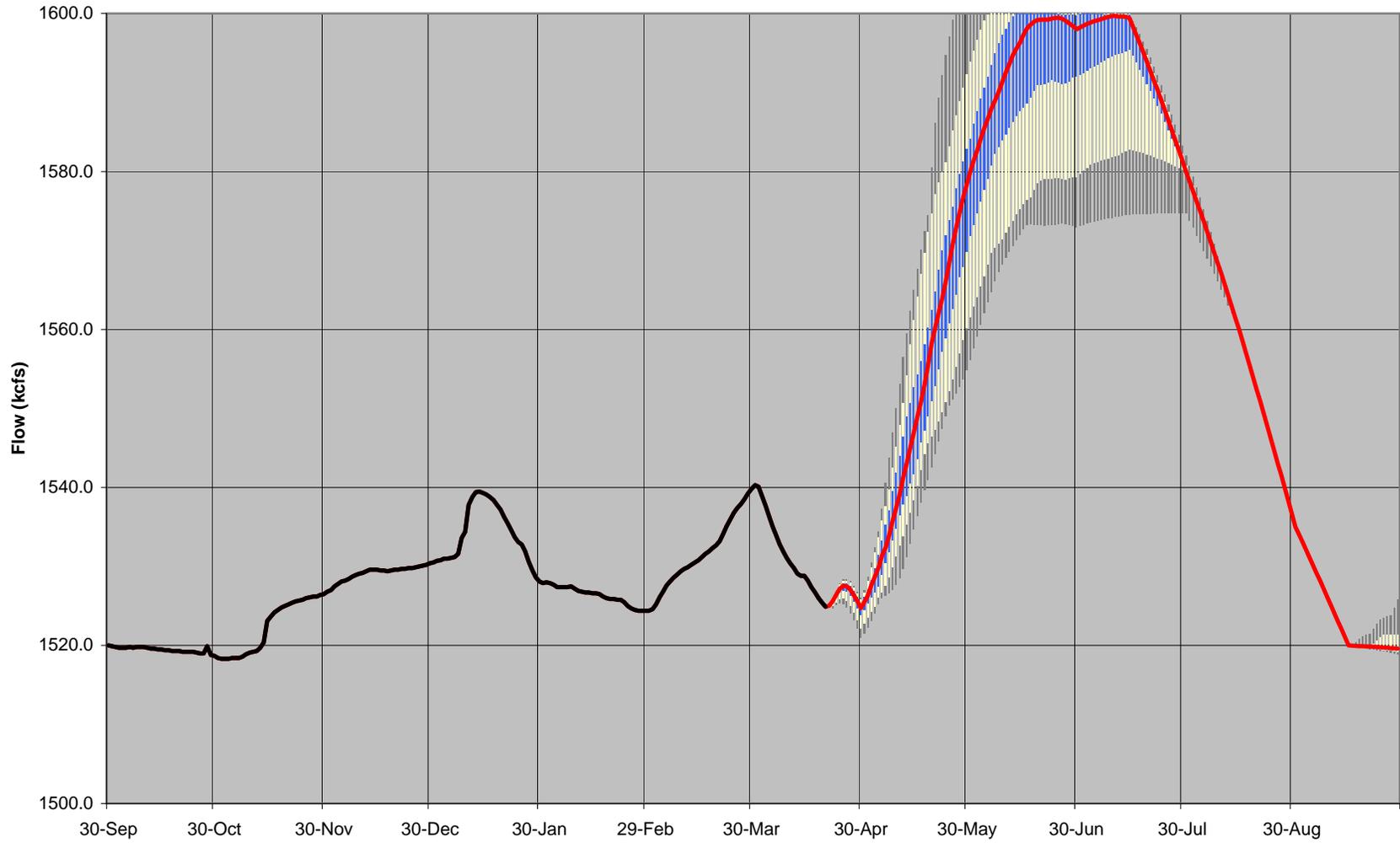
ESP Outflow Statistics Alternative 2

April July Forecast 2662. KAF

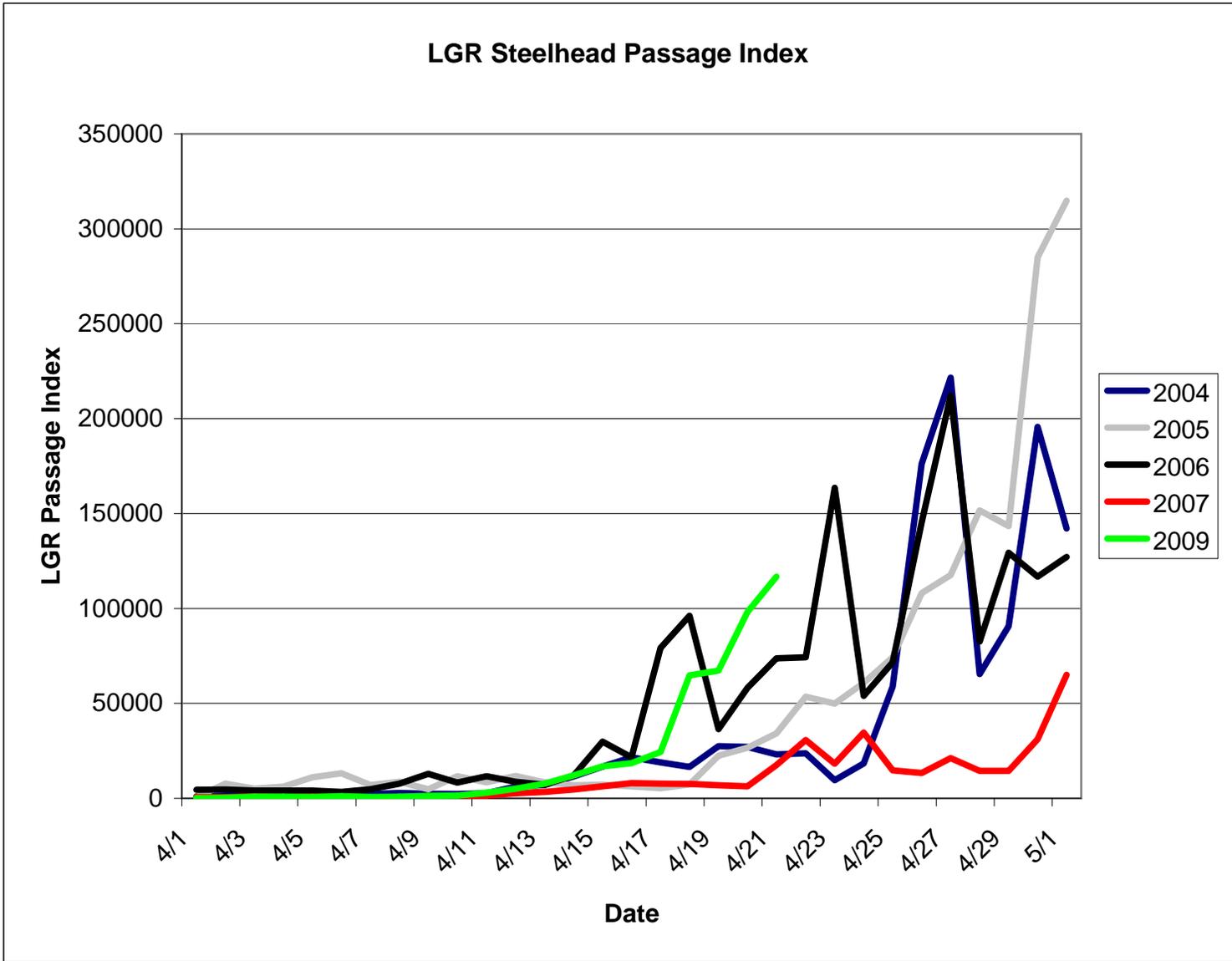


ESP Elevation Statistics Alternative 2

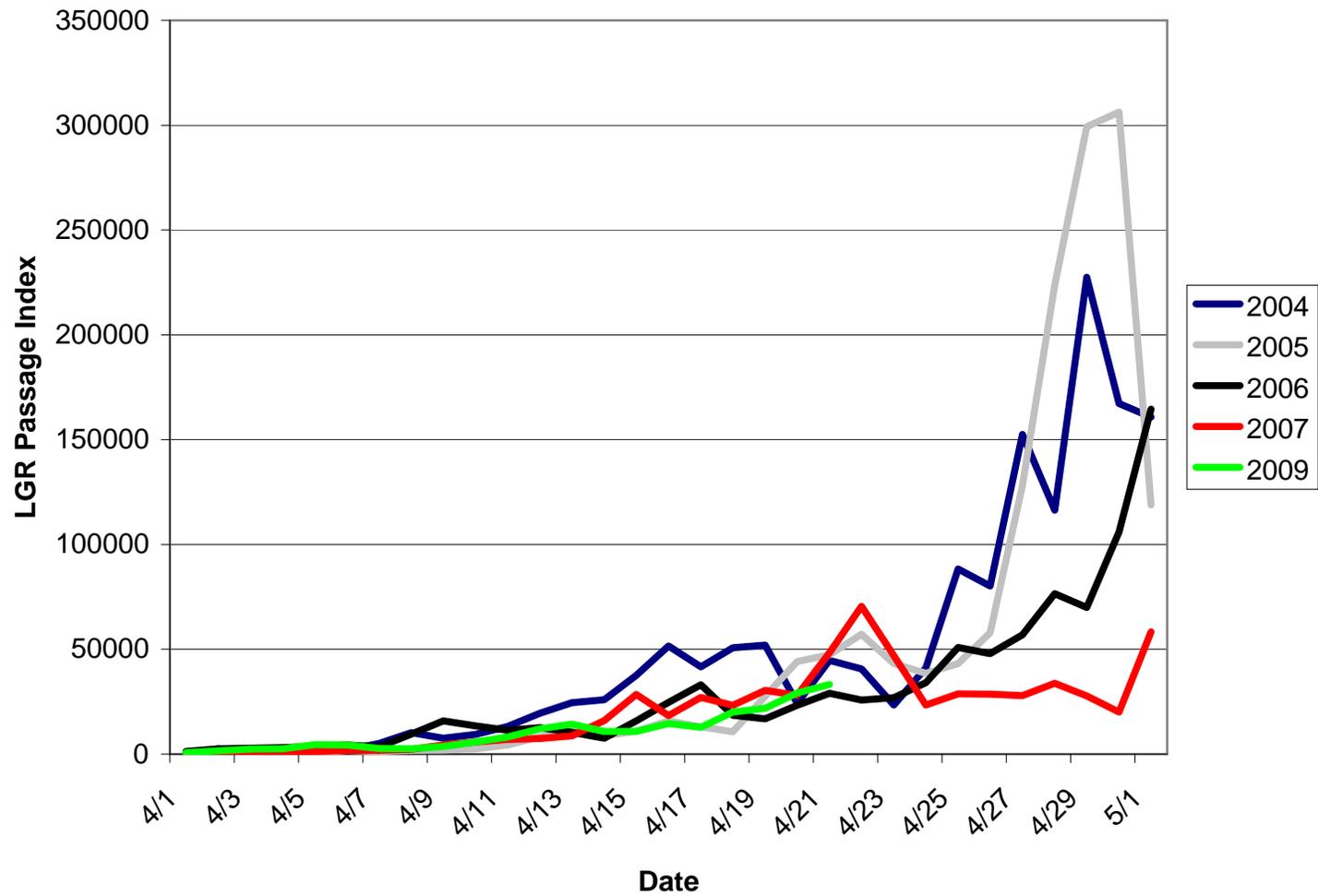
April July Forecast 2662. KAF



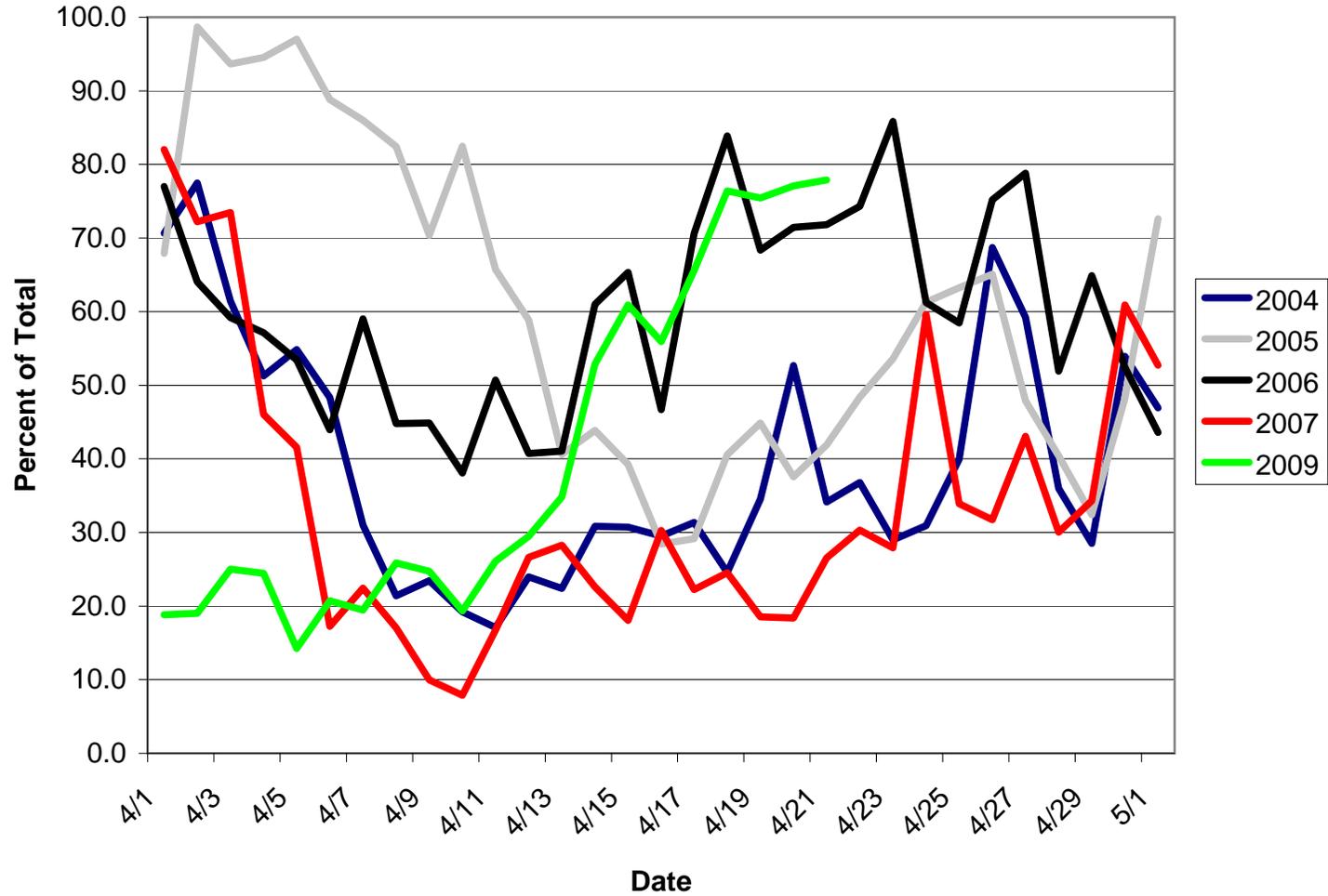
Min 5th 25th 75th 95th Max Median Obs



LGR Chinook Passage Index

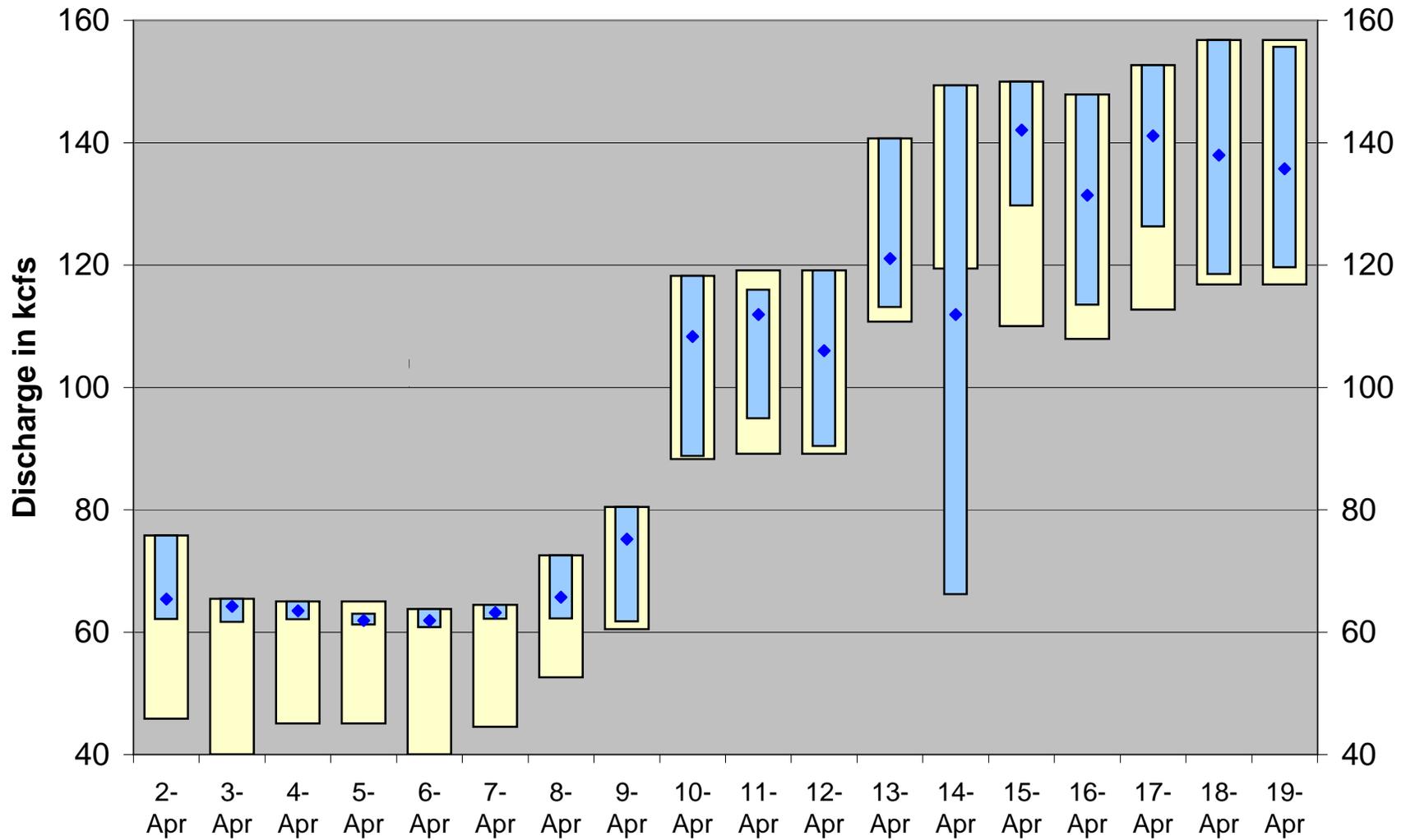


LGR Steelhead Percent of Total
(Chinook and Steelhead)



Priest Rapids Operations 2009

Number of exceedances: 1



COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

April 22, 2009 Meeting

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.

Review of Minutes/Agenda

A change was made to the 4/8 Facilitator Notes to clarify the Bonneville April Spring Creek hatchery release operation; under Dworshak Operations, Steve Hall clarified that the COE would pursue a variance from its mid-month flood control target due to the significant change in forecast expected, and that discharges of 5-6 kcfs were expected during refill (May/June timeframe).

With the above changes, the April 1 and 8 Facilitator Notes and Official Meeting Minutes were finalized.

Hanford Reach Update

Russell Langshaw, Grant County PUD, reported that protection flows began on 4/2 and the past week saw one exceedance on 4/14 due to internal coordination issues and higher than anticipated inflows. He said that the PUD will be working to improve internal coordination, and, in response to a question, suggested that there was no juvenile monitoring happening this year. 680 temperature units from the end of spawning, he expected to get to 800 temperature units and trigger weekend protection flow operations in 3-4 weeks. Russell will continue to share updates with TMT as the season progresses.

Chief Joseph Spill Test

Lynn Melder, Seattle District COE, reported on a spill test scheduled at Chief Joe to measure total dissolved gas concentrations resulting from spilling over the newly installed flow deflectors to determine the most efficient pattern for minimizing TDG in the Columbia River. as part of a broader gas abatement project. The test is scheduled to begin on 4/28, duration of 4 days with 12 spill events throughout the four days. Lynn shared links with the specifics of the spill test and said that gas levels would likely increase and that coordination with all appropriate regional partners had occurred and was on-going. Partners included NOAA, BPA, BOR, Mid-Columbia PUDs, Colville Tribes, WDOE and USFWS. She noted that water will be provided from Grand Coulee and Chief Joseph to conduct the test (John Roache, BOR, added that Grand Coulee's drawdown target for Coulee April 30 flood control would be delayed by two days to allow for more flexibility for this test). It was also noted that the COE is doing the study at this time to take advantage of the extra water already traveling through the system. Additional monitoring will be done concurrent with the spill test to look at extra debris

and erosion in the stilling basin that may have impacts to dam safety, and impacts to the hatchery entrance. The COE will change the spill cap limits to “0” for Chief Joe and Grand Coulee on the spill priority list, but the projects will not move on the priority list. It was suggested that a footnote be added indicating the reason for the change.

Dworshak Operations

Steve Hall, Walla Walla District COE, shared graphs depicting inflow forecasts and a hydrograph that he said was typical for this time of year at this project. He also included two alternative scenarios for operating Dworshak. The first scenario would reduce outflows to full powerhouse on 4/26 to allow for more water during the refill period, and showed an average discharge of 6 kcfs through the refill period. The second scenario would hold the project at ~15 kcfs through 4/30 and flows would be around 5 kcfs through the refill period. From a refill and flood control perspective, the two scenarios were not substantially different. He asked the salmon managers to consider their preference. After a caucus, the salmon managers recommended that if flows at Lower Granite were above 100 kcfs (as they were forecasted to be), reduce to full powerhouse on 4/26; if not, stay at ~15 kcfs through the end of April. The salmon managers preferred to save any water in excess of 100 kcfs for later in the season.

Action/Next Steps: The COE planned to use the 4/23 outflow model to determine Lower Granite flows and set up the operation according to the recommendation, with the caveat that if inflows came in dramatically higher than anticipated (greater than 22 kcfs) causing refill to occur too quickly, the COE would need to maintain maximum discharges at Dworshak. TMT will revisit this issue next week (4/29) to discuss conditions, operations, the latest forecasting model with accurate Brownlee discharges and recommendations for shaping flows in early May.

The Dalles Spillwall Construction Update and Planning

Pat Duyck, Project Manager for The Dalles spillwall construction, thanked TMT for their continued support of the project, and expressed his hope that the field trip held in February was useful. He reported that construction for season 1 was completed; although the length of wall fell short of its originally scheduled distance by about 80 feet, spill did begin on time. Construction of the remaining distance (plus the 80 feet not completed this year) for last season will need to be folded into plans for the upcoming season. The contractor is in the process of setting plans for next season using lessons learned from season 1, in coordination with the COE. Duyck noted that they are exploring some engineering alternatives to help expedite the process without compromising the integrity of the product. In-water work will likely begin on September 8 (this new, earlier date was coordinated and cleared by NOAA) and will require minimum tailwater elevations of 76.5 feet during work hours and 76.0 feet at night/off hours at The Dalles. In November, additional work will be done that may involve double shifts to address a tight schedule. Pat emphasized to TMT that the contractor and the COE will do their best to provide as much operational flexibility as possible to Bonneville during the chum spawning season. The forebay elevations at Bonneville would likely be around 75.5-77 feet given the predicted elevation at The Dalles tailwater.

TMT began preliminary discussions about how they might best manage chum operations given the information shared today. Some ideas that came forward (but no decisions) included: providing a greater operating range at Bonneville to give more flexibility to meet expectations, and reserving the 18 allowed exceedance days to operate outside the operating range at Bonneville for that time period. The salmon managers said they would discuss ideas to manage chum from a biological perspective given the expected constraints, and asked the action agencies to do the same from an operations perspective.

Action/Next Steps: Pat will work with Jim Adams to update TMT once the plans are more finalized and the specific constraints are known (if different than what was presented today); TMT members will discuss options well in advance of the beginning of the chum spawning season to get ahead of and manage expectations around operations for this year. They tentatively planned to revisit in June and again in August. Tony Norris, BPA, reminded everyone that the unique weather conditions and associated river flow into the Bonneville pool and the lower river at that time will be an important unknown factor outside their control, and that those conditions will play a large role in directing management of the operation. Pat will join TMT during an August meeting to provide an update prior to the start of construction work.

Spring Creek May Release

Dave Wills, USFWS, provided a quick update that the next Spring Creek release, of 4.75 million fish, was scheduled for May 4 and that the USFWS would work with BPA and the COE to set up an operation similar to that for the April release.

Transportation Operations

Dan Feil, COE, reported that per the Spring FOP, transportation on the Lower Snake should begin between April 20 and May 1. He shared the steelhead passage index indicating that steelhead numbers were ramping up earlier than in recent past years. Chinook were tracking closely but slightly lower than past years. He noted that the barge and tug operators need three days' notice to begin operations. Paul Wagner, on behalf of FPAC, said that given good flow and temperature conditions, the salmon managers recommended leaving the fish in-river until May 1. This recommendation was consistent with the ISAB's and would provide additional information for future decision-making. In terms of how to stagger the start of transport at each of the projects, the salmon managers needed to have further discussions but said they were leaning toward a more condensed timeframe this year.

Action/Next Steps: The COE will notify the tug and barge operators to begin transportation operations at Lower Granite on May 1. TMT will revisit the staggering schedule at the April 29 TMT conference call. It was confirmed that Montana, Idaho, NOAA, CRITFC, BPA and the BOR all concurred with the recommended plan for start of transportation.

Operations Review

Reservoirs: John Roache reported on BOR projects: Grand Coulee was at elevation 1266.3 feet and expecting a maximum flood control elevation of 1257.7 feet on May 2 (two day delay to accommodate the Chief Joe spill test). Hungry Horse was at elevation 3513.49 feet, minimum outflows of 900 cfs and inflows around 8 kcfs. The project would operate to meet VARQ on May 1 with discharges estimated at around 6 kcfs. Jim Adams reported on COE projects: Libby was at elevation 2403.39 feet with 4 kcfs out and 6.9 kcfs in. Albeni Falls was at elevation 2053.83 feet. Dworshak was at elevation 1525 feet with 14.8 kcfs out and 15.9 kcfs in. 7-day average inflows were: 87.8 kcfs at Lower Granite, 241 kcfs at McNary and 245 kcfs at Bonneville. It was noted that the McNary spring objective was 228 kcfs and the Lower Granite objective is 100 kcfs.

Little Goose is planning a full powerhouse outage on April 29-30 to reconnect Unit 6. It will involve increasing spill and possibly exceeding MOP. Powerhouse discharge operations will consist of one unit being operated at 5 kcfs (speed/no load and the remaining flow in the river will be spilled up to a level that would not exceed 125% TDG). Russ Kiefer stated Idaho's preference for exceeding MOP rather than 125% TDG, which the COE agreed was the priority. Research at Lower Monumental on 4/28 will have the project alternating spill patterns; Ice Harbor will go to alternating between 30% and 45 kcfs Day/Spill Cap Night; and John Day will be alternating between 30% and 40%. BPA requested an official end of chum emergence declaration to remove the 11.5 feet tailwater restriction at the project; the salmon managers declared the end of chum emergence.

Fish: Paul Wagner, NOAA, reported that adult counts had reached about 1,000/day at Bonneville. Juveniles were in the 10,000 range at Lower Granite. Steelhead numbers were in the 100,000 range at Lower Granite. Subyearling chinook peaked at 871,000. Russ Kiefer, Idaho, noted that the sockeye counts were not from the Stanley Basin but rather were likely kokanee. His agency has offered to test any of the mortalities that come through to verify this. **Action:** Dan Feil said he would pass this offer on to the Walla Walla District. Adult chinook numbers were well below the 10 year average, according to DART. River flow was at or above the 10 year average for outflows at Lower Granite and temperature was approaching the 10 year average at Bonneville. TDG matched the 10 year average at Lower Granite and was higher at Ice Harbor.

Power System: *Nothing to report at this time.*

Water Quality: Jim Adams reported on TDG exceedances at the Ice Harbor forebay and said it could be due to the increase in temperatures. Russ Kiefer requested that the COE wait to make any spill cap changes until today's TDG results were in, considering travel time to see changes made from an upstream project. Bonneville forebay TDG had increased and to address this, the COE lowered the spill cap at Bonneville.

Other: The Idaho Fish and Game email addresses have changed. Russ Kiefer provided his new contact address: russ.kiefer@idfg.idaho.gov.

Next TMT Meeting: April 29 Conference Call

Agenda items include:

- Dworshak Operations
- Transportation Operations: Stagger schedule

**Columbia River Regional Forum
Technical Management Team Meeting
April 22, 2009**

1. Introduction

Today's TMT meeting was chaired by Jim Adams (COE) and facilitated by Robin Gumpert (DS Consulting), with representatives of COE, NOAA, BPA, USFWS, BOR, CRITFC, Idaho, Montana, and others participating. 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 for April 1 and 8, 2009

April 1 – There were no comments on the facilitator's notes or official meeting minutes, so both were deemed final.

April 8 – There were two changes to the facilitator's notes. Under Spring Creek Hatchery Release, Dave Wills (USFWS) clarified the description of the Bonneville operation for the April release to say that the lower end of 1% operation occurred at the B2 powerhouse only. Under Dworshak Operations, Steve Hall (COE) clarified that the COE is filing for a variance from the mid-April, not the end of April, flood control target due to significant changes in the forecast. There were no changes to the April 8 official minutes.

3. Hanford Reach Update

Grant County PUD began protection flows on April 2, Russell Langshaw reported. For the first week or so, discharges were on the verge of minimum flows, but inflows have picked up since then. From April 2-19, mean daily discharges ranged from 62-142 kcfs. Minimums ranged from 61-130 kcfs, and maximums, 63-157 kcfs. Daily deltas ranged from 2-83 kcfs. At 680 temperature units from the end of spawning, the 2009 operation is just beginning.

An exceedance occurred April 14 due to a combination of internal communication problems and much higher inflows than predicted. Grant PUD responded by instituting new internal processes for coordination with operational constraints. The brief dip below daily minimums was followed by increased discharges, so over time the impacts should have been minimal. Russ Kiefer (Idaho) asked whether visual inspections were done for evidence of significant impacts, e.g. stranding of age-0 fall Chinook that were migrating at the time. WDFW does visual inspections; Langshaw will follow up with them and report back to TMT as needed. TMT will revisit this agenda item soon, either the April 29 conference call or the next regular meeting May 6.

4. Chief Joseph Spill Test

Lynne Melder (COE) reported on the Chief Joseph spill test to evaluate the effectiveness of the newly constructed deflectors. Seattle District is making use of high inflows and the flood control draft underway at Grand Coulee to conduct the test. The test will begin April 28, 2009. Melder showed TMT the projected schedule of spill and powerhouse flows for each day of the test, linked to today's agenda. There were 4 days of spill testing, with 12 spill events each lasting for 4 hours. The tests were designed to evaluate TDG levels at multiple tailwater and powerhouse levels, and with varying spill rates. The maximum spill level was 143 kcfs, using a uniform spill pattern of 7-8 kcfs across each spillway.

The individual tests that will be performed will be 3 hours apiece, and spill could go as high as 250 kcfs. Melder emphasized that the two highest spill events, planned for April 30 and again on May 1, will be several hours apart on both days to allow the resulting gas to dissipate. Grand Coulee will draft about a foot per day to provide water for these tests. The COE will monitor TDG levels closely and is coordinating the tests with BPA, BOR, WDOE, NOAA, USFWS, the mid-Columbia PUDs, and the Colville Tribe, which owns an adjacent hatchery.

Ruth Burris (PGE) asked what tailwater elevation would be required at Wells Dam for the tests. The COE anticipates Wells tailrace would be at 780 feet elevation, but is prepared to work with dam operators on forebay elevations, Melder replied. The main issue will be keeping flow deflectors submerged. One goal of the test is to measure TDG production at a range of tailwater elevations, so varying tailrace levels are planned, Adams said. At an elevation of 780 feet at Wells Dam, any discharges over 180 kcfs from Chief Joseph Dam would have to be spilled at Wells, resulting in TDG exceedances, Burris cautioned. Melder and Adams explained that's why the COE is coordinating with WDOE on these tests.

Grand Coulee will be operated slightly differently to provide water for the tests, John Roache (BOR) said. To allow more flexibility, BOR will delay the 1,257.7-foot flood control elevation target by 2 days (from April 30 to May 2). The purpose of the delay is to ensure that the spill test has sufficient water to complete the test.

Jim Litchfield (Montana) asked about the dam safety issues at Chief Joseph. There have been erosion problems during high flows when turbulence tends to fling debris back into the stilling basin, Melder said. The COE will watch closely for this phenomenon during spillway deflector testing.

Another component of the tests will be ensuring that the effects of spill don't impact the spring Chinook operation at the Colville Hatchery, Bettin said. Hatchery fish enter the Chief Joseph fish ladder directly from the hatchery.

For the testing, the COE will modify the spill priority list, Adams reported. The order of the projects won't change, but all spill caps will be set at zero for the duration of testing, which reduces the risk of having to spill at the projects. The COE will give TMT an update on Chief Joseph in May after the tests are completed.

5. Dworshak Operations

Inflows in early April spiked at 15 kcfs, Steve Hall (COE) said. The forecast this weekend is for inflows to rise to 20 kcfs, then drop down again and continue to rise along with snowmelt in the upper basin. Hall asked the Salmon Managers for feedback on two alternative Dworshak operations. From a flood control and refill perspective, the COE regards the two alternatives as roughly equivalent. Either operation would put the reservoir close to its 1,525.4-foot elevation target at the end of April. The current reservoir elevation is 1,524 feet.

Alternative 1 – Reduce discharges to 10.6 kcfs on April 26 and hold 10.6 kcfs through the end of April, then drop to an average of about 6 kcfs through the remainder of the refill period. Essentially this means filling the reservoir in mid to late June. This option offers a high probability of refill because it allows flexibility. The estimated reservoir elevation under this scenario would be 1,528 feet at the end of April.

Alternative 2 – Hold outflows at 15 kcfs through April 30 and drop to an average of about 5 kcfs outflows through the remainder of the refill period. This operation would drop the pool elevation slightly before going into refill mode. The estimated elevation under this scenario would be 1,524.8 feet at the end of April.

The Salmon Managers caucused and advised the COE. If inflows are above 100 kcfs, reduce outflows to 10.6 kcfs (full powerhouse). However, if inflows are expected to drop below 100 kcfs, raise outflows to 14.6 kcfs, or 110% TDG, until the end of April. The COE will coordinate on the hatchery effects of this recommendation with Dave Statler (Nez Perce Tribe) who did not attend today's TMT meeting.

There was discussion of updated STP runs. The current STP assumes 6.8 kcfs discharge from Dworshak through May, Hall said. However, a dry spring could damage prospects of refill.

The COE's interim plan until April 24, or later if needed, is to hold outflows at 15 kcfs, then potentially drop over the weekend. Dropping outflows on April 24 or later would be acceptable to the Salmon Managers, Wagner said. Kiefer asked whether the COE would be willing to go to full powerhouse now; the answer was not until this weekend because of high inflows (above 20 kcfs).

The current prediction is for Lower Granite inflows to be 104 kcfs later this month, Wagner and Kiefer noted. If inflows drop below 100 kcfs, they advised keeping outflows at 14.6 kcfs until the end of April. This is because there isn't much biological benefit associated with flows above 100 kcfs at Lower Granite, so the Salmon Managers want to save any water in excess of 100 kcfs for later, Litchfield explained. The goal now is to maintain 100 kcfs total flow at Lower Granite.

For the sake of flood control, if Dworshak inflows rise above 22 kcfs, the COE will have to maintain maximum discharge to avoid filling the pool too quickly, Hall said. Otherwise, outflows will remain at 15 kcfs until April 24, when they will go to full powerhouse if Lower Granite flows are above 100 kcfs. Throughout the operation, if Lower Granite flows drop below 100 kcfs, Dworshak outflows will increase up to 14.6 kcfs. Adjusting Dworshak outflows as needed to provide 100 kcfs at Lower Granite was discouraged because it would jeopardize operation of the RO gates, which were not designed to be opened and closed repeatedly. TMT scheduled a conference call in a week to revisit refill operations.

6. The Dalles Construction Status and Planning Update

In order to finish work by the April 10, 2009, spill date, the contractor stopped 80 feet short of the anticipated construction this year, Pat Duyck (COE) reported. The delays were due to bad weather, a crane failure and other issues. The plan for next year is to start the in-water work season Sept. 8, 2009, and finish construction of the spill wall by April 10, 2010.

The contractor has been looking at ways to minimize impacts on next year's chum operation, when elevation constraints will be even tighter than they were this year. One possibility is to reduce the size of the pre-cast construction units, which reduces the depth needed for the barge (another is using sponsons, or floats, to keep the barge from rolling, as discussed at a previous TMT meeting). The contractor has reduced depth requirements from 13 feet to 6 feet over the rock shelf, nearly halving the water depth requirement.

Nevertheless, this year's construction will require a minimum tailwater elevation of 76.5 feet during working hours. The corresponding tailwater elevation requirements at Bonneville (75.5 feet under certain flow regimes) mean all the flexibility is gone from the 2009 chum operation, with the exception of half a foot (a 76 foot tailwater elevation at The Dalles) during weekend and evening hours. Even this bit of flexibility could vanish when the contractor schedules 24-hour shifts starting in November. And raising the Bonneville forebay elevation requirements above 76.5 feet (normal operating range is 71.5' – 76.5') – which might allow chum redds to be kept inundated at higher elevations – would require a revision to the project water control manual and possibly an EIS and public review due to flooding concerns.

Tony Norris (BPA) emphasized that the chum operation is very difficult to maintain when we have the normal amount of operational flexibility. There are so many variables that influence the chum operation that an added half a foot or a foot of operational flexibility won't be enough to guarantee a successful chum spawning operation in 2009. A larger range for a tailwater operation downstream gives a bigger target but it does not guarantee success. The operation can still be overtaken by west side rain events. Things happened to turn out well in 2008 but it was largely due to the relatively dry fall.

Wagner observed that the current dilemma essentially moves the system control point from Bonneville to The Dalles. The Bonneville operation will be limited to passing inflows. The Salmon Managers asked the Action Agencies to work toward setting parameters on their expectations for this fall – i.e. how much flexibility would it take from the typical 11.5-foot Bonneville tailwater requirement to make a successful 2009 chum operation possible? The Action Agencies noted how difficult that will be, given all the variables involved. There was general acknowledgment that this could end up being a Grand Coulee storage problem if drafting is required to keep chum redds inundated at elevations above 11.5 feet. TMT will revisit this issue before in-water construction begins next September.

7. May Spring Creek Hatchery Release

On May 4, Spring Creek Hatchery will release 4.75 million fish, Dave Wills (USFWS) reported. USFWS, the COE and BPA will work together to craft an operation resembling the one that took place in April. The May operation will start on May 5 when fish arrive at Bonneville Dam and continue for the next 4 days.

8. Start of Fish Transport

As stated in the spring 2009 Fish Operations Plan, transport will start sometime between April 20 and May 1, 2009, at Lower Granite Dam, Dan Feil (COE) reported. He showed TMT data linked to today's agenda showing steelhead and Chinook passage index numbers for previous years. Steelhead passage index numbers are definitely picking up at Lower Granite compared to recent years – 80% of the fish passing now are steelhead. Tug and barge operators will need 3 days' notice to begin transporting fish. Feil asked TMT for recommendations on how transportation should proceed.

While the BiOp says transportation could have begun two days ago on April 20, this is another rollover year, Wagner said. The Salmon Managers, however, believe it's okay to leave fish in the river past April 20 this year, given the plentiful flows and low temperatures. This management strategy is consistent with ISAB's finding that more clarity is needed on details of the tradeoff in benefits for steelhead and wild spring Chinook before a definitive transport start date can be established.

A visit to the FPC web page showed that some 95% of steelhead passing Lower Granite on April 19 were hatchery fish. These fish have management value although they aren't ESU-listed, Wagner and Litchfield agreed. While steelhead numbers are plentiful this year, the migration isn't earlier than expected based on the 10-year average for steelhead, Wagner said. Because the migration appears to be delayed this year, the Salmon Managers had discussed a start date of May 1 at Granite, but hadn't yet considered subsequent start dates downstream. The Salmon Managers advocated a more condensed timeframe than 8 days between Lower Granite and Little Goose – 3 days was deemed more appropriate for conditions this year.

Idaho suggested the Salmon Managers provide a more definitive recommendation next week, meanwhile leaving fish in the river; NOAA did not object to that. The April 20 date was originally chosen to balance the needs of steelhead and wild Chinook, which don't benefit from transport in late April, Wagner said. TMT came to consensus on May 1 as a start date for transport at Lower Granite. Further discussion of staggered start dates downstream will happen in next week's conference call.

9. Operations Review

a. Reservoirs. Grand Coulee is at elevation 1,266.3 feet, drafting about a foot a day to meet the maximum elevation of 1,257.7 feet on May 2, Roache reported. Hungry Horse is at elevation 3,513.49 feet, discharging 900 cfs, with inflows of 8 kcfs yesterday and rising. It is expected to discharge about 6 kcfs during controlled refill.

Libby is at elevation 2,403.4 feet, with outflows of 4.0 kcfs. Inflows have picked up over the past few days to 6.9 kcfs yesterday.

Albeni Falls is at elevation 2,053.83 feet at the Hope gage, with inflows of 29.8 kcfs and outflows of 31.1 kcfs. The end of May elevation target is 2,056 feet.

Dworshak is at elevation 1,525 feet, with outflows of 14.8 kcfs. Inflows have risen to 15.9 kcfs.

Seven-day average inflows are 87.8 kcfs at Lower Granite, 241 kcfs at McNary, and 245 kcfs at Bonneville. Spring flow objectives are 228 kcfs at McNary and 100 kcfs at Lower Granite. Scott Bettin proposed that the 11.5-foot tailwater restriction be officially lifted at Bonneville. It has been functionally irrelevant since the end of chum spawning, and the Salmon Managers had no objection to lifting the restriction.

TMT then discussed two additional topics, a planned full-powerhouse outage at Little Goose, and the beginning of research operations at the lower Columbia River projects.

The Little Goose outage in late April will involve putting 5 kcfs through the powerhouse at speed/no load, hopefully for no longer than an hour, Feil reported. This is expected to increase spill, but not above 125%, an hourly cap set by the COE in order to remain within Oregon's water quality standards for TDG values expressed as a daily average. If the outage is designed and implemented correctly, gas levels should remain within the 125% hourly and 120% daily average criteria. The schedule isn't firm yet, but the outage will occur sometime between April 28 and 30. It is being coordinated with the scheduling of spill for TSW testing at Little Goose.

Research at all three lower Columbia River projects will begin on April 28. Lower Monumental will maintain the same operation, but will alternate between two spill patterns. Ice Harbor, currently spilling 45 kcfs during daytime and to the gas cap at night, will alternate that operation with a 30% spill regime. John Day, currently spilling 30% round the clock, will go to a 30%/40% operation for the duration of the research.

b. Fish. Nearly 40,000 spring Chinook smolts passed Lower Granite, 20,000 at Little Goose, and 20,000 at Bonneville, Wagner reported.

Over a thousand adults (1,164 exactly) are passing Lower Granite now, and temperatures have been slowly rising. More than 100,000 steelhead passed Lower Granite, and 50,000 at Little Goose. A peak of 171,000 spring Chinook from the April Spring Creek release passed Bonneville on April 14; the current index count is 10,000 spring Chinook a day.

The size of sockeye in the Stanley basin indicates they are kokanee, Kiefer said. Idaho is willing to provide any samples of mortalities found to the COE for genetic analysis. The distinguishing factor between sockeye and kokanee, which are genetically the same species, is anadromous behavior. Idaho is looking for ways to study the conversion from sockeye to kokanee without impacting critically listed sockeye.

In general, passage numbers at Bonneville, McNary and Ice Harbor are way below the 10-year average, but similar to the past 3 years' returns, Wagner said. Outflow temperatures have been at or above the 10-year average at Lower Granite and Bonneville, contradicting an earlier theory that fish counts were low because of cooler temperatures and late migration.

c. Power System. BPA has a lot of water to move out of Coulee, but otherwise no problems Norris reported.

d. Water Quality. There were 3 TDG exceedances today, Adams reported. The first was at Lower Monumental, where the gas cap was lowered to 24 kcfs from 29 kcfs. The gas cap at Little Goose is 32 kcfs and at Lower

Granite, 41 kcfs. So far, there have been no TDG problems with spilling 20 kcfs at Lower Granite and meeting the 30% BiOp spill requirement at Little Goose. Lower Monumental flows have been steadily rising over the past few days, putting increasing gas pressures on the river. Travel time from Lower Monumental tailwater to Ice Harbor is approximately 2 days or more at 100 kcfs average flow. The Lower Monumental gas cap was lowered from 29 to 24 kcfs on April 20, and the impact of that change has appeared in Ice Harbor forebay.

On the lower Columbia, McNary is spilling 40% steadily without any gas issues. TDG levels in the John Day forebay have remained under 115% with a 30% spill requirement. TDG levels in The Dalles forebay have risen from 110% to 113% recently.

There have been exceedances in the Bonneville forebay, 115.4 % yesterday, so the spill cap was lowered from 100 to 95 kcfs on April 20 and still exceedances are occurring at Camas Washougal gage. The COE is therefore considering lowering spill caps at John Day and The Dalles in order to minimize reductions in the Bonneville spill cap. Wagner observed that the actions taken to date seem to be working.

9. Next Meeting

TMT will follow up on Dworshak operations and scheduling the staggered start dates for transportation in a conference call on April 29. The next regular TMT meeting will be May 6, 2009. This summary prepared by consultant and writer Pat Vivian.

| <i>Name</i> | <i>Affiliation</i> |
|--------------------|---------------------------|
| Russ Kiefer | Idaho |
| John Roache | BOR |
| Tony Norris | BPA |
| Cathy Hlebechuk | COE |
| Jim Litchfield | Montana |
| Jim Adams | COE |
| Paul Wagner | NOAA |
| David Wills | USFWS |
| Ruth Burris | PGE |
| Tim Heizenrader | Centaurus |
| Holli Krebs | JP Morgan |
| Bob Diaz | Integral Renewables |
| Scott Bettin | BPA |
| Shane Scott | PPC |
| Dan Feil | COE |

Phone:

Lynne Melder COE Seattle

| | |
|------------------|--------------------|
| Kyle Dittmer | CRITFC |
| John Hart | EWEB |
| Russ George | WMC |
| Dave Benner | FPC |
| Steve Hall | COE Walla Walla |
| RobAllerman | Deutsch Bank |
| Margaret Filardo | FPC |
| Richelle Beck | DRA |
| Lance Elias | PPL |
| Christine XX | Cargill |
| Tom Le | Puget Sound Energy |
| Russell Langshaw | Grant PUD |
| Kyle Jones | JP Morgan |
| Barry Espenson | CBB |

TECHNICAL MANAGEMENT TEAM

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

TMT MEETING

Wednesday April 29, 2009 09:00 - 12:00

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

CONFERENCE PHONE LINE

Conference call line:888-285-4585; PASS CODE = 601714

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 or Cathy Hlebechuk (503) 808-3942 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 rgumpert@cnnv.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and Introductions
2. Review Meeting Minutes for April 22, 2009 [\[Meeting Minutes\]](#)
3. Dworshak Operations - Steve Hall, USACE NWW
 - a. [Dworshak Operations Analysis](#)
 - b. [Flow Augmentation with Higher Flows through 6 May](#)
4. Transportation Operations - Dan Feil, USACE RCC
5. Operations Review
 - a. Reservoirs
 - b. Fish
 - c. Power System
 - d. Water Quality
6. Other

- a. Set agenda for next meeting - **May 6, 2009**
[\[Calendar 2009\]](#)

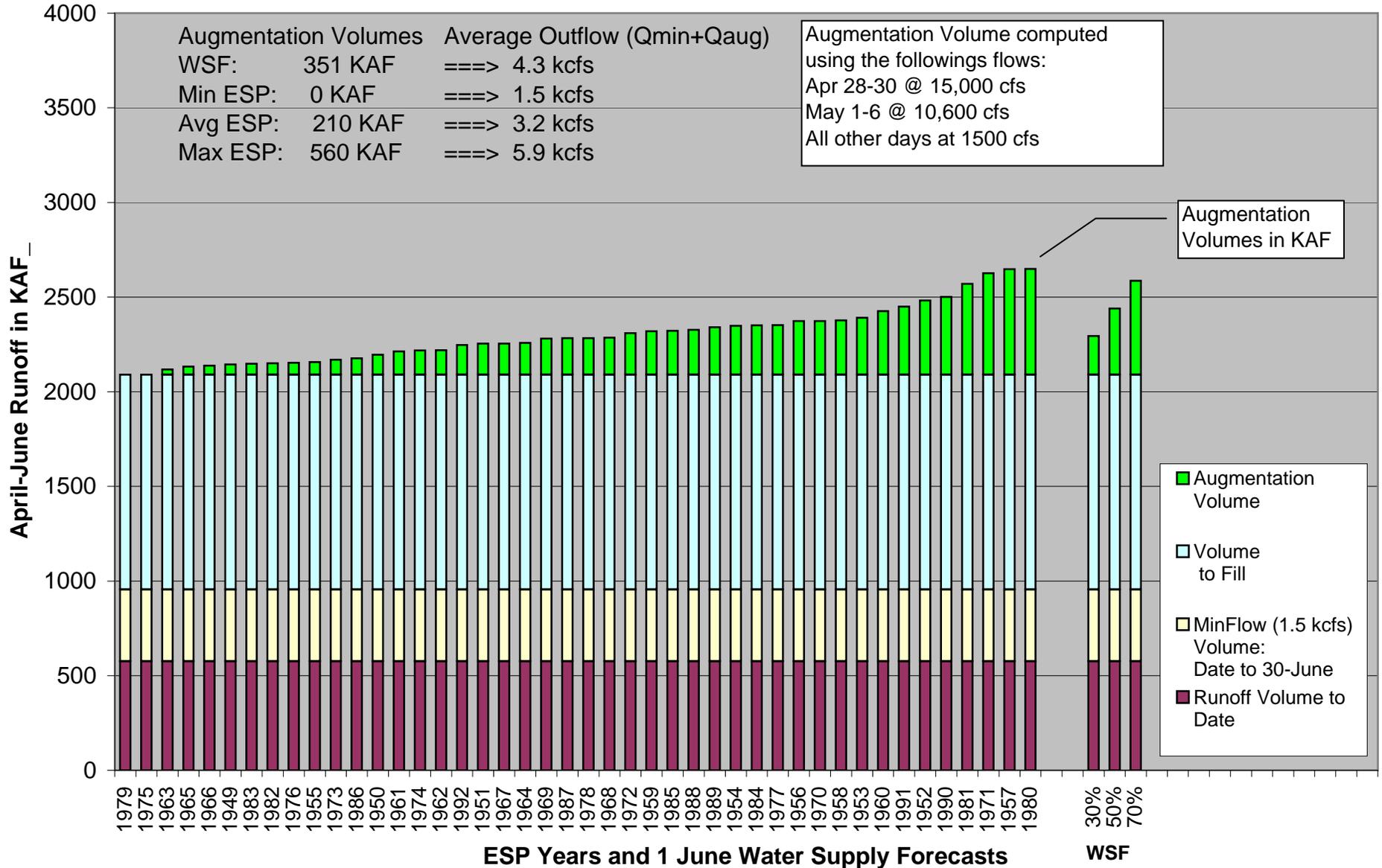
Questions about the meeting may be referred to:

*[Jim Adams](#) at (503) 808-3938, or
[Cathy Hebechuk](#) at (503) 808-3942, or
[Dan Feil](#) at (503) 808-3945*

Dworshak Augmentation Volumes

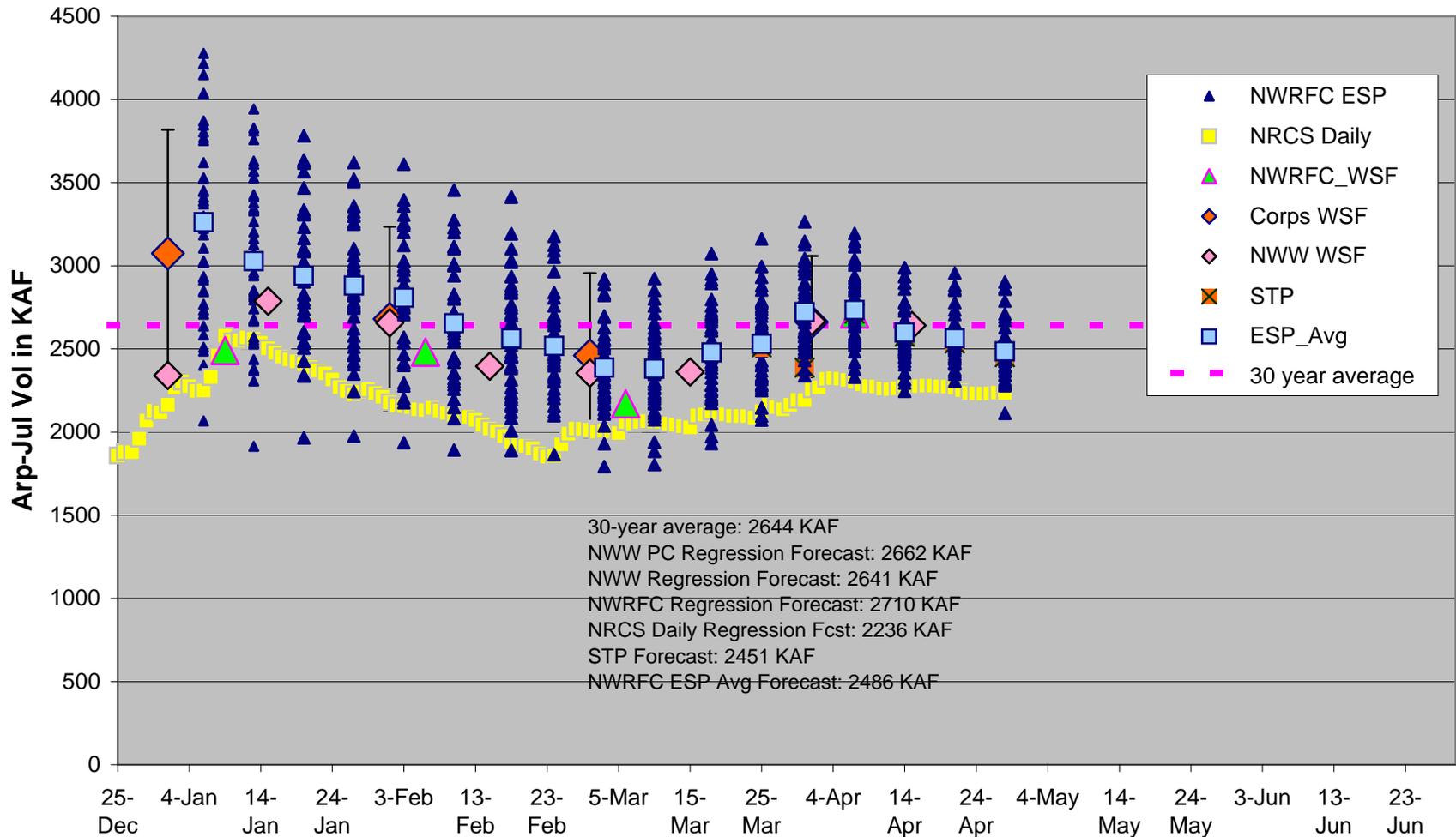
ESP inflows and 01-Apr Water Supply Forecast

Observed data through **27-Apr-2009**



Dworshak, ID April-July Inflow Volume Forecast Comparison

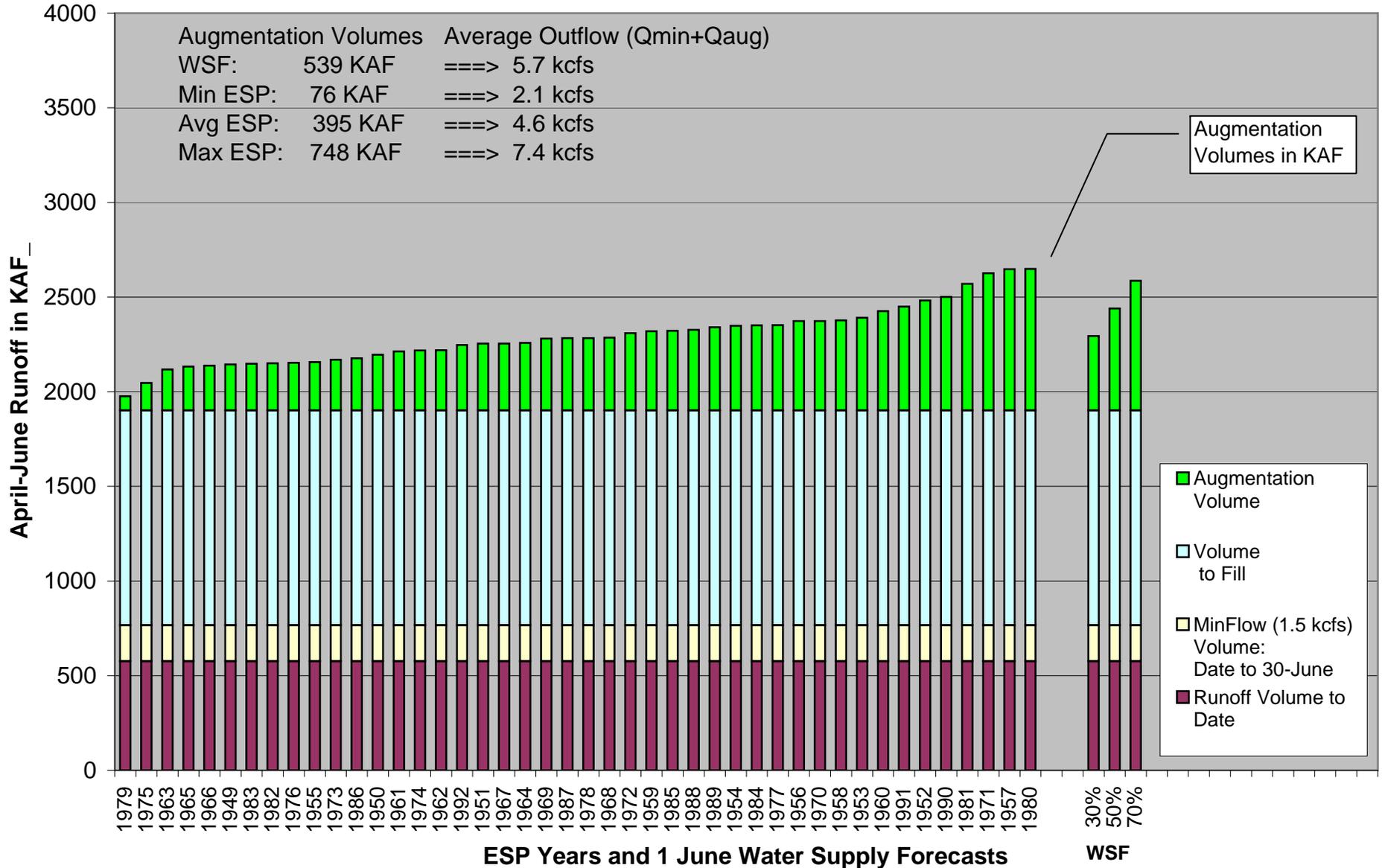
updated 28-Apr-2009



Dworshak Augmentation Volumes

ESP inflows and 01-Apr Water Supply Forecast

Observed data through **27-Apr-2009**



<< Enter Water Year

| | Period | Minimum Flow kcfs | Maximum Flow kcfs | Target Flow kcfs | Target Elev feet | Target Stor kaf |
|----|-----------|-------------------|-------------------|------------------|------------------|-----------------|
| | 30 Sep | | | | | N/A |
| 15 | 1-15 Oct | 1.4 | 14.0 | | | N/A |
| 16 | 16-31 Oct | 1.4 | 14.0 | | | N/A |
| 15 | 1-15 Nov | 1.4 | 14.0 | | | N/A |
| 15 | 16-30 Nov | 1.4 | 14.0 | | | N/A |
| 15 | 1-15 Dec | 1.4 | 14.0 | | | N/A |
| 16 | 16-31 Dec | 1.4 | 14.0 | | | N/A |
| 15 | 1-15 Jan | 1.4 | 14.0 | | | N/A |
| 16 | 16-31 Jan | 1.4 | 14.0 | | | N/A |
| 14 | 1-14 Feb | 1.4 | 14.0 | | | N/A |
| 15 | 15-29 Feb | 1.4 | 14.0 | | | N/A |
| 15 | 1-15 Mar | 1.4 | 14.0 | | | N/A |
| 16 | 16-31 Mar | 1.4 | 14.0 | | | N/A |
| 5 | 1-5 Apr | 1.4 | 15.0 | 15 | | N/A |
| 5 | 1-10 Apr | 1.4 | 15.0 | 15 | | N/A |
| 5 | 11-15 Apr | 1.4 | 15.0 | 15 | | N/A |
| 5 | 16-20 Apr | 1.4 | 15.0 | 15 | | N/A |
| 5 | 21-25 Apr | 1.4 | 15.0 | 15 | | N/A |
| 5 | 26-30 Apr | 1.4 | 15.0 | 15 | | N/A |
| 15 | 1-15 May | 1.4 | 5.7 | | | N/A |
| 16 | 16-31 May | 1.4 | 5.7 | | | N/A |
| 15 | 1-15 Jun | 1.4 | 5.7 | | | N/A |
| 15 | 16-30 Jun | 1.4 | 5.7 | | 1600.0 | 3468.0 |
| 15 | 1-15 Jul | 1.4 | 14.0 | | 1600.0 | 3468.0 |
| 16 | 16-31 Jul | 1.4 | 14.0 | | 1580 | 3109.6 |
| 15 | 1-15 Aug | 1.4 | 14.0 | | 1560 | 2794.0 |
| 16 | 16-31 Aug | 1.4 | 14.0 | | 1535 | 2438.6 |
| 15 | 1-15 Sep | 1.4 | 14.0 | | 1520 | 2238.0 |
| 15 | 16-30 Sep | 1.4 | 14.0 | | | N/A |

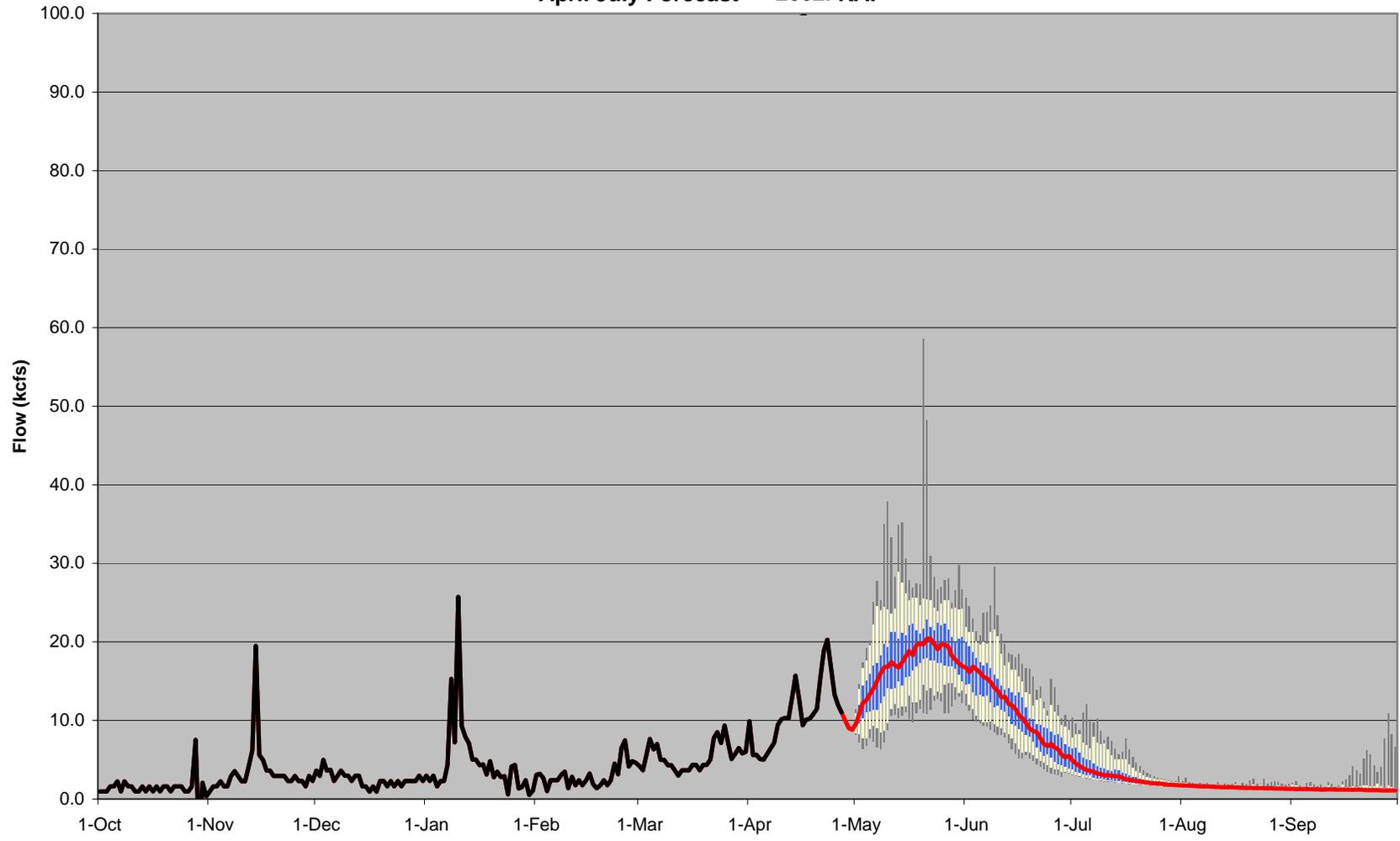
Volume Adjustments

Adjust? (dropdown)

AprJul Volume

Standard Deviation

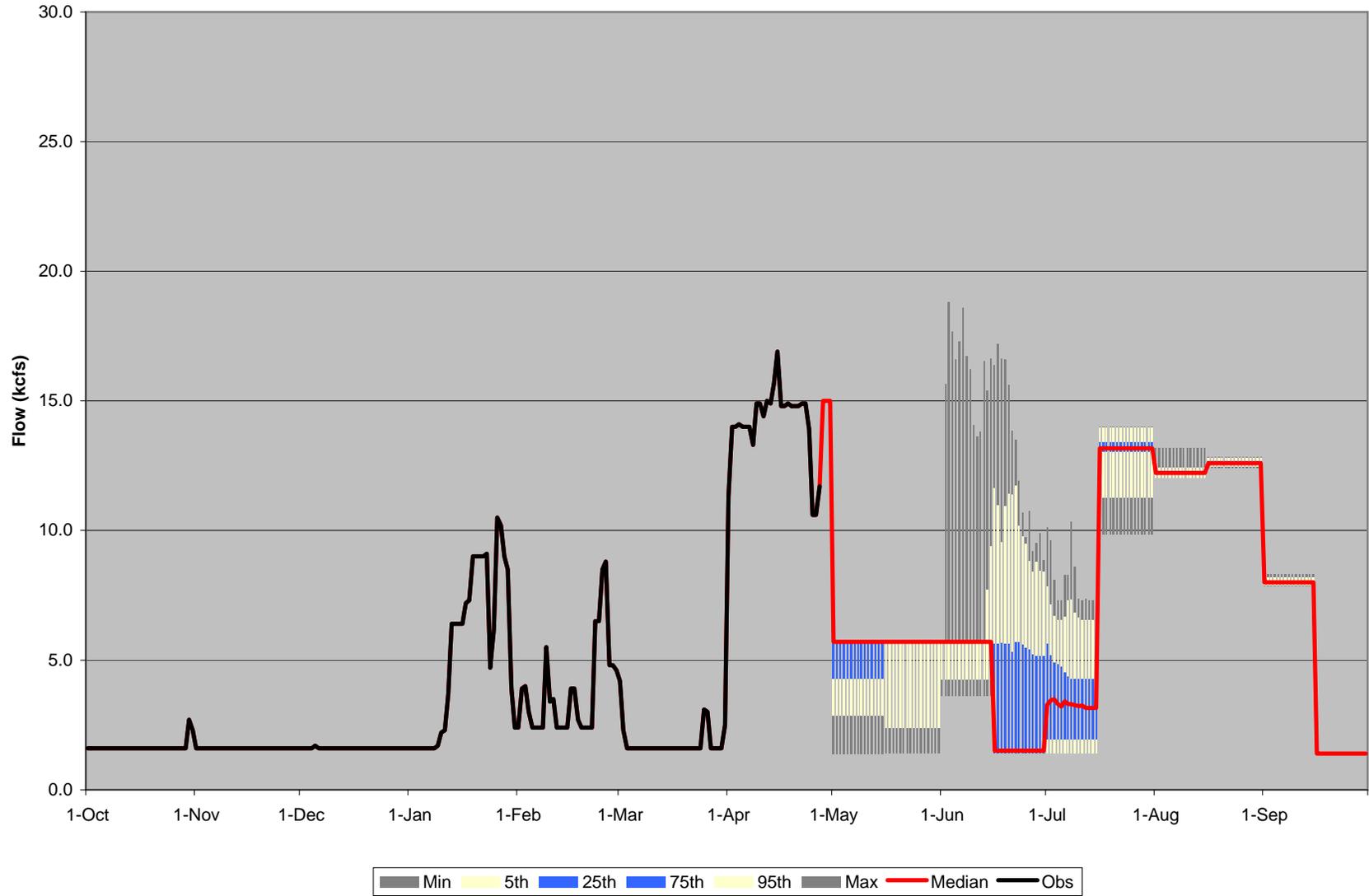
ESP Inflow Statistics
44 ESP Inflows
April July Forecast 2662. KAF



Min 5th 25th 75th 95th Max Median Obs

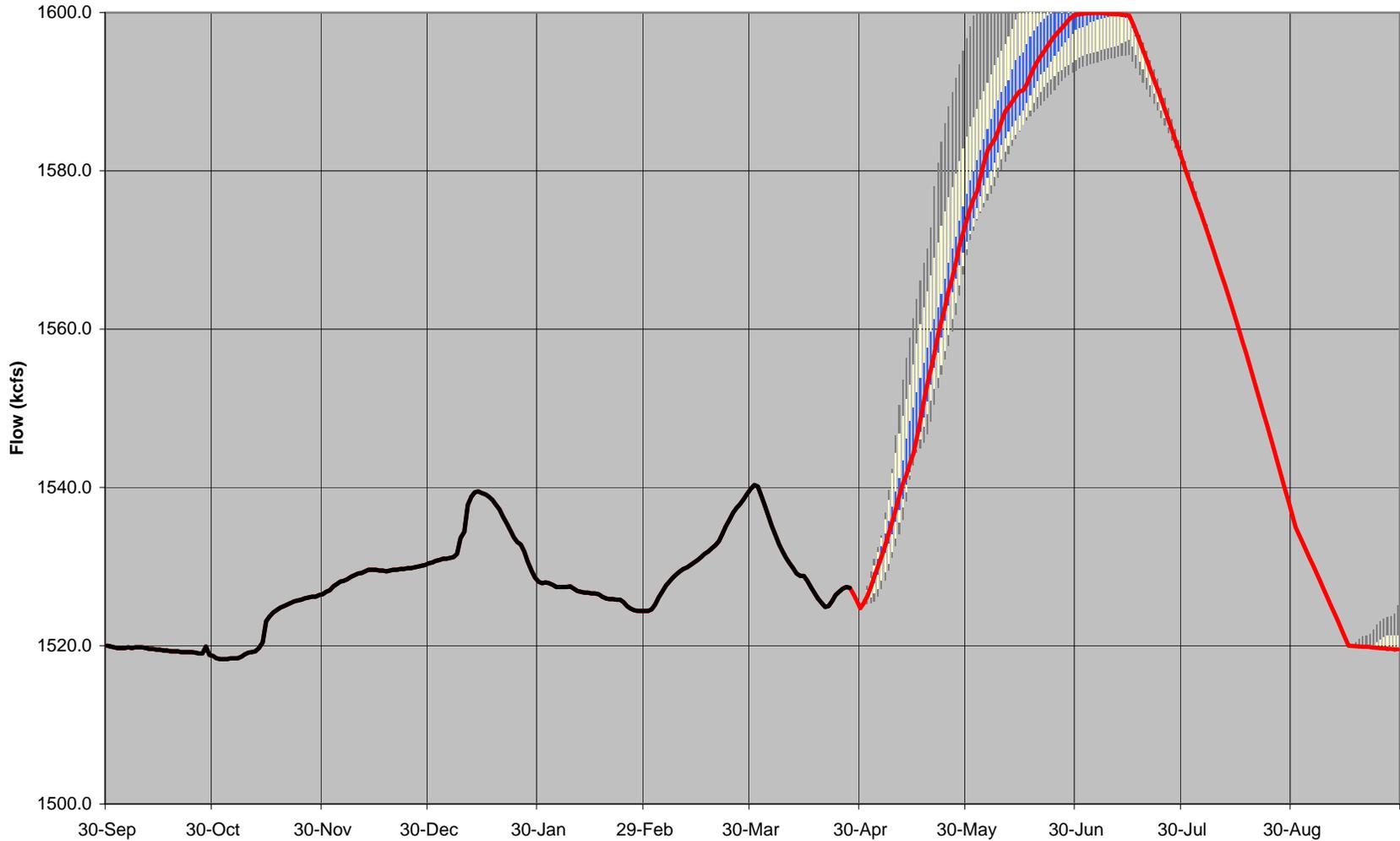
ESP Outflow Statistics

April July Forecast 2662. KAF



ESP Elevation Statistics

April July Forecast 2662. KAF



Min 5th 25th 75th 95th Max Median Obs

<< Enter Water Year

| | Period | Minimum Flow kcfs | Maximum Flow kcfs | Target Flow kcfs | Target Elev feet | Target Stor kaf |
|----|-----------|-------------------|-------------------|------------------|------------------|-----------------|
| | 30 Sep | | | | | N/A |
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| 15 | 1-15 Nov | 1.4 | 14.0 | | | N/A |
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| 15 | 1-15 Dec | 1.4 | 14.0 | | | N/A |
| 16 | 16-31 Dec | 1.4 | 14.0 | | | N/A |
| 15 | 1-15 Jan | 1.4 | 14.0 | | | N/A |
| 16 | 16-31 Jan | 1.4 | 14.0 | | | N/A |
| 14 | 1-14 Feb | 1.4 | 14.0 | | | N/A |
| 15 | 15-29 Feb | 1.4 | 14.0 | | | N/A |
| 15 | 1-15 Mar | 1.4 | 14.0 | | | N/A |
| 16 | 16-31 Mar | 1.4 | 14.0 | | | N/A |
| 5 | 1-5 Apr | 1.4 | 15.0 | 15 | | N/A |
| 5 | 1-10 Apr | 1.4 | 15.0 | 15 | | N/A |
| 5 | 11-15 Apr | 1.4 | 15.0 | 15 | | N/A |
| 5 | 16-20 Apr | 1.4 | 15.0 | 15 | | N/A |
| 5 | 21-25 Apr | 1.4 | 15.0 | 15 | | N/A |
| 5 | 26-30 Apr | 1.4 | 15.0 | 15 | | N/A |
| 15 | 1-15 May | 1.4 | 7.4 | | | N/A |
| 16 | 16-31 May | 1.4 | 5.7 | | | N/A |
| 15 | 1-15 Jun | 1.4 | 5.7 | | | N/A |
| 15 | 16-30 Jun | 1.4 | 5.7 | | 1600.0 | 3468.0 |
| 15 | 1-15 Jul | 1.4 | 14.0 | | 1600.0 | 3468.0 |
| 16 | 16-31 Jul | 1.4 | 14.0 | | 1580 | 3109.6 |
| 15 | 1-15 Aug | 1.4 | 14.0 | | 1560 | 2794.0 |
| 16 | 16-31 Aug | 1.4 | 14.0 | | 1535 | 2438.6 |
| 15 | 1-15 Sep | 1.4 | 14.0 | | 1520 | 2238.0 |
| 15 | 16-30 Sep | 1.4 | 14.0 | | | N/A |

Volume Adjustments

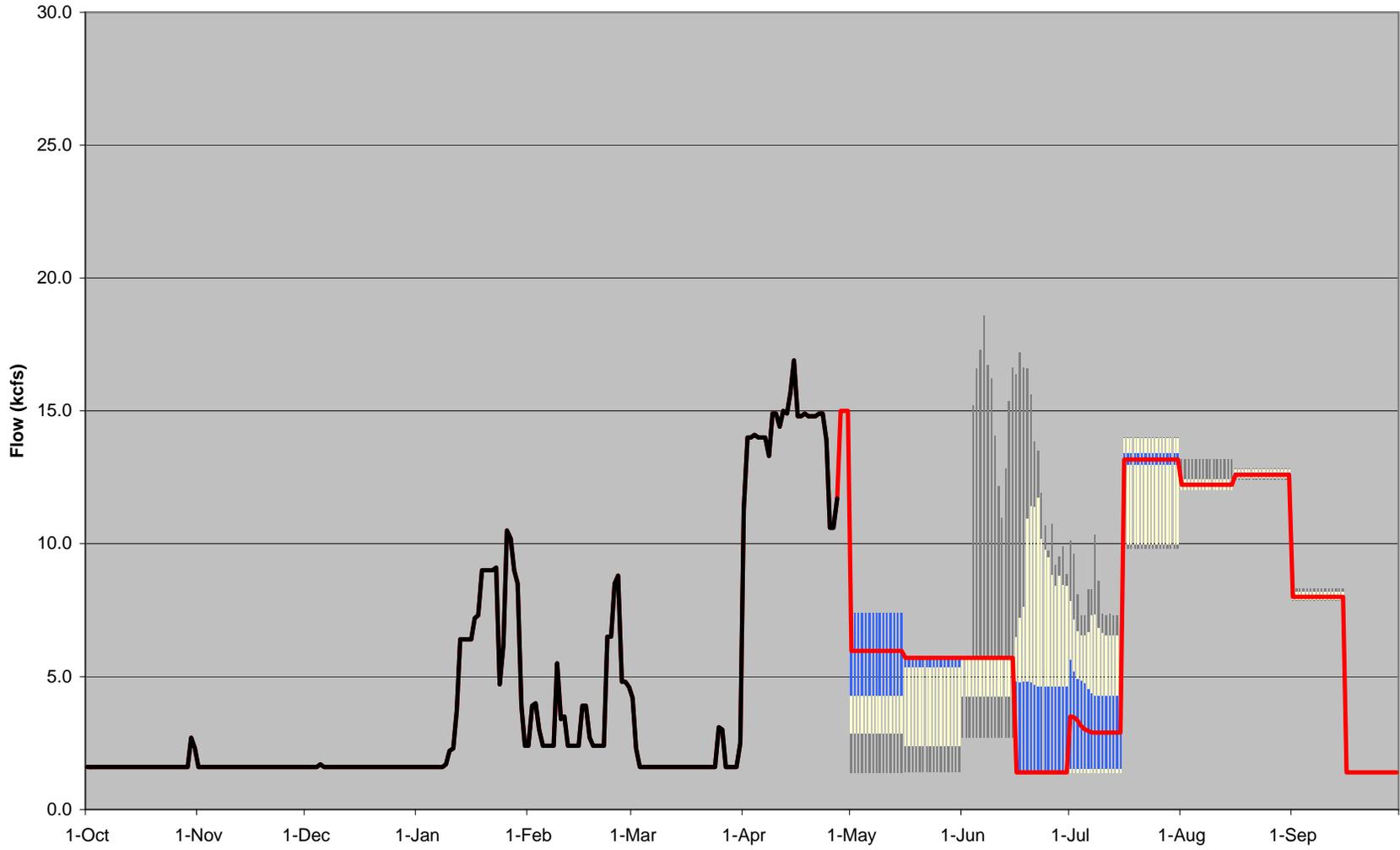
Adjust? (dropdown)

AprJul Volume

Standard Deviation

ESP Outflow Statistics

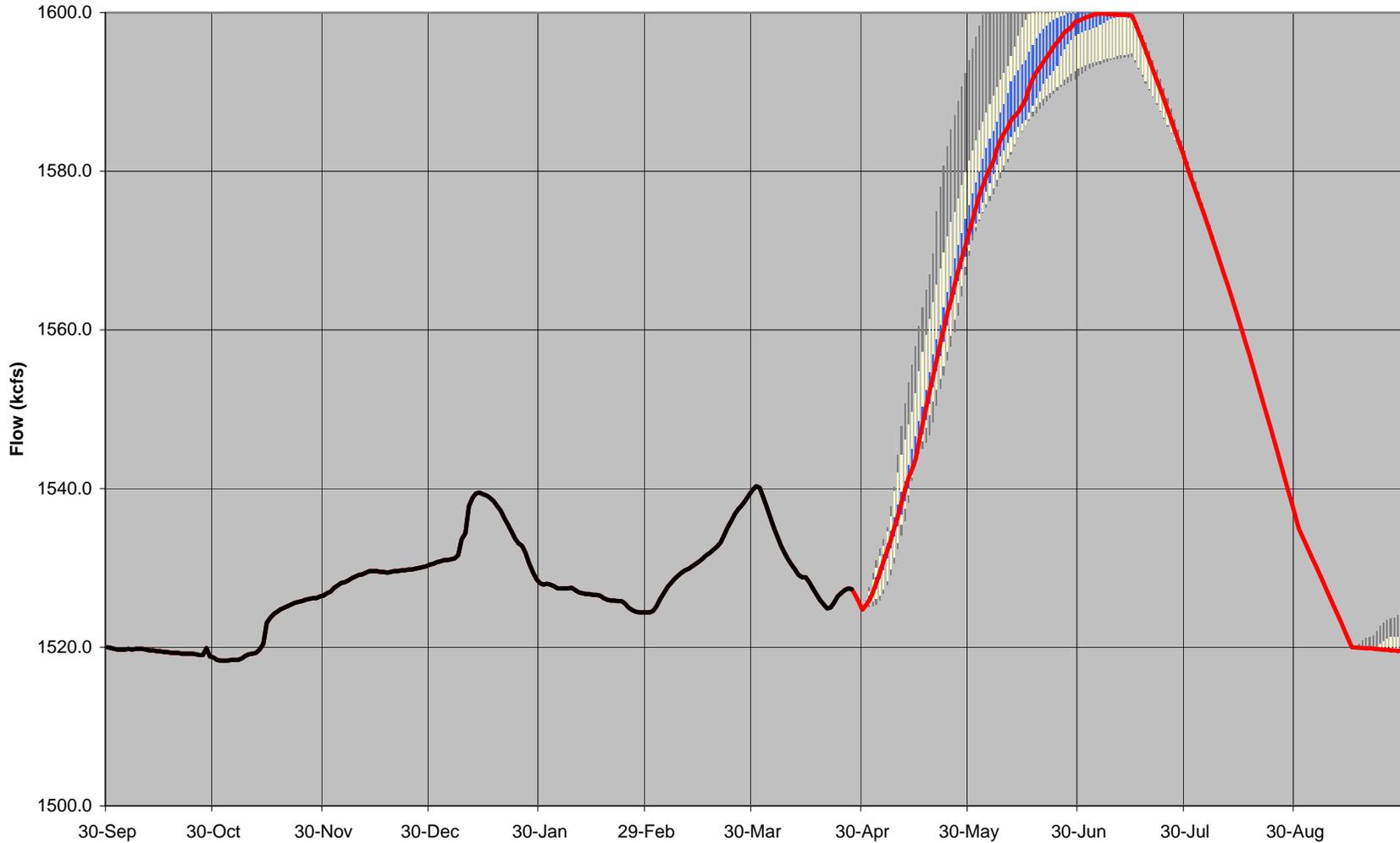
April July Forecast 2662. KAF



Min 5th 25th 75th 95th Max Median Obs

ESP Elevation Statistics

April July Forecast 2662. KAF



Min 5th 25th 75th 95th Max Median Obs

**Columbia River Regional Forum
Technical Management Team Conference Call
April 29, 2009**

1. Introduction

Today's TMT meeting was chaired and facilitated by Jim Adams (COE), with representatives of COE, NOAA, BPA, BOR, CRITFC, Idaho, Montana, Washington and others participating. 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.

Russ Kiefer has a new email address: russ.kiefer@idfg.idaho.gov.

2. Review Meeting Minutes for April 22, 2009

Discussion of the facilitator's notes and official meeting notes for April 22 was postponed until next week.

3. Dworshak Operations

Steve Hall (COE) presented an analysis of Dworshak operations (Attachment (a) to today's agenda), which shows that the inflow volume forecast has been steadily declining. The current COE inflow forecast at Dworshak is 2.66 maf (2,662 kaf), and the ESP average is 2.4 maf. The Weather Service also predicts that precipitation throughout the basin will be normal or slightly less than normal, with normal or slightly higher than normal temperatures. These forecasts all point to a trend of decreasing inflows. COE estimates of augmentation volumes result in discharges ranging from 2.1 to 7.4 kcfs, with an average of 4.6 kcfs, based on ESP traces.

The COE is therefore very concerned about guaranteeing refill of Dworshak to 1600 feet by about June 30 as specified in the BiOp. Attachment (b) depicts possible results of the operation the Salmon Managers have proposed to date: Hold 15 kcfs discharge through the end of April, and then run full powerhouse, or 10.6 kcfs outflows, from May 1-6. The COE's low estimate shows this operation could leave zero water for augmentation during refill after May 6, so the project would simply be passing minimum flows through the end of refill. The COE's high estimate is about 5.9 kcfs average outflows through the refill period, with a mid-point of 3.2 kcfs.

The purpose of the graphs in Attachments (a) and (b) is to illustrate the possible effects of the proposed operation, Hall said. They depict the difference between the proposed operation and what could have happened if the project had dropped to lesser flows a few days ago. Both sets of graphs are based on

observed data through April 27. The May 1 COE forecast, which will be available by the next time TMT meets May 6, will give a much clearer picture of inflows.

Attachment (a) also depicts projected augmentation volumes if the project maintains 15 kcfs outflows through April 30, then drops to 5.7 kcfs outflows. Another slide depicts the Dworshak inflow forecast. The median inflow barely reaches 20 kcfs and drops off rapidly under the proposed operation.

The message here, Hall emphasized, is that early reservoir refill in 2009 will be essential. Even with outflows of 5.7 kcfs, the median forecast shows the project at minimum outflows through the last half of June. If outflows drop on May 1, there will probably be less than 5 kcfs outflows during the refill period, according to these forecasts. In terms of reservoir volumes, the 25th and 75th percentiles show the reservoir refilling as early as June 20 under the high forecast and close to being full on June 30 under the low forecast, which reaches full sometime during the first week of July.

The COE requested a discussion among the Salmon Managers of the tradeoffs involved in their proposed operation. The Salmon Managers are aware of the inflow situation and discussed it at yesterday's FPAC meeting, Paul Wagner (NOAA) replied. They considered a modified operation that would begin with 7 kcfs outflows and rise to 8 kcfs, but finally decided they still want to maintain 10 kcfs outflows until the next FPAC meeting May 5, when the final May forecast will be available. The reason: April 22 until May 10-15 is prime time fish migration season for the year, a time when augmentation flows are clearly at their most beneficial to fish survival.

Discussion turned to the role of the flood control refill curve (FCRC) in the current situation. The FCRC is based on 95% probability of reservoir refill and was used to set the end of April target of 1,525.4 feet for Dworshak, Steve Hall (COE) explained. Normally, that elevation is considered the lower bound of the Dworshak operation this time of year because any deeper draft would jeopardize refill probability. Continuing the current operation and holding 10 kcfs outflows during the first 5 days of May is projected to put the reservoir elevation at 1,522.8 feet, several feet below the end of April FCRC, a red flag in terms of refill. The original end-of-April flood control target was 1,515 feet elevation until the refill curve intersected the FCRC on April 18th. Once the two curves intersect, the FCRC becomes the ruling curve in terms of reservoir operations.

Hall asked the Salmon Managers whether fully understood that their proposal increased the risk of not refilling Dworshak reservoir by July 1. Cathy Hlebechuk proposed a pass-inflow operation instead of trying to hold flat flows for the first 5-6 days of May. The Salmon Managers have made their recommendation after informed discussion and acknowledge the risks involved, Wagner replied. If inflows drop, the Salmon Managers won't be surprised if Dworshak goes to minimum outflows soon, Russ Kiefer (Idaho) agreed.

Dave Statler (Nez Perce) asked how the 95% probability of refill is calculated. The FCRC is based on the official water supply forecast, and is also based on average inflows for the remainder of the season – for spring 2009, it's based on the 2,662 kaf April-July volume forecast and average inflows forecasted for May and June, Hall replied. The 2009 volume forecast for Dworshak was based on a number of factors, including observed snowpack at several COE official measuring sites, the September 2008 SOI weather forecast which incorporates La Nina trends, and observed Dworshak inflows. It is calculated using the COE's official principal components regression method.

Adopting the Salmon Managers' recommendation would make the probability of refill less than 95%, but the risk of not refilling would still be low, Wagner said.

The COE is indeed confident of refilling by the end of June if the current forecast holds, or if there's even a slight reduction in inflows, Adams said. A significant drop in the forecast, however, could mean not achieving refill. Another factor to consider is that Dworshak basin is prone to sublimation, a phenomenon involving significant loss of snowmelt and runoff due to dry winds and evaporation, Hall added.

The Nez Perce Tribe still considers Dworshak refill an extremely high priority, Statler said. Discussion moved to the 200 kaf Nez Perce operation in September, after Dworshak pool drafts to elevation 1,535 feet at the end of August. The COE's commitment is to a volume draft from 1,535 to 1,520 feet, regardless of whether the refill target of 1,600 feet elevation is met at the end of June, Adams said. If the reservoir doesn't refill, the consequences, although unlikely, would be reduced flows in July and August, which could impact temperature control in the Snake River downstream. TMT members then stated their views of the Dworshak operation:

NOAA – Despite the risk of minimum flows later, it's important to keep Dworshak outflows at 10 kcfs until the May 1 forecast is released and can be discussed at the FPAC and TMT meetings May 5 and 6. Suggested dropping flows to 12.5 kcfs tonight, April 29.

Idaho – There is an established correlation between flows of 70-85 kcfs during this migration period and direct survival benefits. The unusually cool weather and lower-than-normal runoff volume now makes it even more imperative to release flows from Dworshak to support in-river migration. Idaho advocated a flat flow regime over the next two weeks over a pass-inflow operation.

Washington – Supports NOAA's and Idaho's positions.

Montana – Requested a discussion of impacts the Salmon Managers’ proposed operation would have on flows at Lower Granite. Daily average inflows at Lower Granite have been dropping steadily for the past 6 days, from 139 to 92.3 kcfs, Adams said. With 10 kcfs outflows, the Lower Granite elevation will be 73.3 feet on May 3, based on the current STP 10-day forecast, Hall said. Montana and the COE agreed that the proposed Dworshak operation will not make a significant difference in flows at Lower Granite.

Nez Perce – Emphasized the importance of peak flows to keeping fish moving. Nez Perce advocated a Dworshak operation that mimics the natural freshet more closely than current flood control procedures allow. A closer focus on the intersection of the refill and FCRC curves during spring spill is warranted. It’s important to balance the two objectives, i.e. not create refill problems in the process of addressing flood control risk.

BOR – Deferred to the COE on this decision. The BOR would not object to either operation, i.e. passing inflows or following the Salmon Managers’ recommendation.

BPA – Deferred to the COE.

CRITFC – Supported the rationale for 10 kcfs outflows. Agreed with the Nez Perce Tribe that flood control is currently based on an artificial deadline of April 30, and encouraged a more flexible process that incorporates information on new weather patterns which have been changing rapidly.

COE – Higher Dworshak flows now could have potential impacts on refill and temperature augmentation this summer. In response to a suggestion from NOAA, the COE proposed the following operation: reduce outflows to approximately 12 kcfs tonight through the evening of April 30, at which point outflows drop again to full powerhouse, or 10.6 kcfs, through May 5. Then outflows go to approximately 5.5 kcfs, or the single large unit, until TMT meets May 6 and makes further adjustments.

There were no objections to this operation.

4. Transportation Operations

Fish collection at Lower Granite will begin May 1, Dan Feil (COE) reported. The first barge will leave May 2. TMT discussed the schedule for transport at Little Goose and Lower Monumental. The Salmon Managers recommended that transportation start on May 5 at Little Goose, and on May 8 at Lower Monumental.

There were no objections to this operation.

5. Operations Review

a. Reservoirs. Grand Coulee is at elevation 1,259.7 feet, drafting about a foot per day until May 2 or a maximum elevation of 1,257.7 feet, John Roache reported. The latest forecast for the initial controlled flow date is May 12-13. *{Editors note: The ICF date has been determined to be May 8. The project will operate within a range of 1256.7 feet to 1259.7 feet until 2400 hrs on May 5th. Sometime on May 6th, the project will need to be at elevation 1258.2 feet. On May 7th, the project may begin refill}.*

Hungry Horse is at elevation 3,519.49 feet and slowly filling, with 1.0 kcfs outflows until the evening of April 30. Project outflows will increase in two steps, starting the evening of April 30. Outflows will be at 6 kcfs by May 2.

Libby is at elevation 2,405.3 feet, with inflows of 6.3 kcfs and outflows of 4.0 kcfs, Adams reported. Albeni Falls is at elevation 2,055.7 feet, with inflows of 39.8 kcfs and outflows of 37.1 kcfs. Dworshak (discussed at length above) is at elevation 1,526.6 feet, with outflows of 15 kcfs and inflows of 10.3 kcfs.

Seven-day average inflows are 117.5 kcfs at Lower Granite, 278.1 kcfs at McNary, and 296.9 kcfs at Bonneville. There was discussion of operations at Bonneville for the Spring Creek release on May 1. The COE will provide reduced loading of the Bonneville 2nd powerhouse beginning the morning of May 2 and will monitor passage of the hatchery release. That operation will continue until 90-95% of the fish have passed.

Inflows at McNary are projected to reach 173.6 kcfs on May 3 according to the latest STP run, which is apparently 100 kcfs lower than they're running now. There was discussion of this discrepancy. It would be a dramatic draft during prime migration season, Wagner said – a range of 210-220 kcfs outflows is desirable at McNary now. The discrepancy is largely driven by natural conditions, Tony Norris (BPA) said. The COE will double-check the 100 kcfs figure.

b. Fish. This is prime time in terms of juvenile passage numbers, Wagner reported. About 100,000 subyearling Chinook are passing Lower Granite per day, and 25,000 are passing both Little Goose and Bonneville per day. Steelhead passage peaked at 332,000 per day at Lower Granite and 330,000 per day at Little Goose.

In terms of adult passage, approximately 17,000 spring Chinook have passed Bonneville to date, Cindy LeFleur (Washington) reported. There should be many more in the river by now. In 2006, the spring Chinook run didn't peak until May.

c. Power System. There was nothing to report today.

d. Water Quality. Total dissolved gas levels increased due to involuntary spill last week, but flows have since declined and gas levels are under control, Adams reported. Current spill caps are 100 kcfs at Bonneville, 90 kcfs at Ice Harbor (to be increased to 95 kcfs today), 24 kcfs at Lower Monumental, and 20 kcfs at Lower Granite, which is spilling steadily. John Day, The Dalles and Little Goose have been spilling their BiOp-required percentages (40%, 30% and 30%, respectively) without any water quality problems. Wagner expressed approval of the way these spill caps were managed.

Water temperatures are 44 degrees F at the Orofino gage, 39.8 degrees F at Dworshak, 48 degrees F at Lower Granite tailwater, and 49.8 degrees F at Ice Harbor tailwater. On the lower Columbia, average temperatures are 48.1 degrees F (50 degrees F at both Bonneville tailwater and the Camas Washougal gage).

9. Next Meeting

The next regular TMT meeting will be in person on May 6 at the COE Portland office. This summary prepared by consultant and writer Pat Vivian.

| Name | Affiliation |
|-----------------|---------------------|
| Jim Adams | COE |
| Cathy Hlebechuk | COE |
| Rudd Turner | COE |
| Tim Heizenrader | Centaurus |
| Kim Johnson | COE |
| Bob Diaz | Integral Renewables |
| Dan Feil | COE |
| Tony Norris | BPA |
| Jim Litchfield | Montana |
| John Roache | BOR |
| Cindy LeFleur | Washington |
| Dave Statler | Nez Perce Tribe |
| Steve Hall | COE Walla Walla |
| Kyle Charles | JP Morgan |
| Kyle Dittmer | CRITFC |
| Barry Espenson | CBB |
| Russ Kiefer | Idaho |
| Shane Scott | PPC |
| Richelle Beck | DRA |
| Russ George | WMC |
| Holli Krebs | JP Morgan |
| Ruth Burris | PGE |
| Glen Trager | Shell Energy |
| Paul Wagner | NOAA |

TECHNICAL MANAGEMENT TEAM

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

TMT CONFERENCE CALL

Wednesday May 6, 2009 09:00 - 12:00

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

CONFERENCE PHONE LINE

Conference call line:888-285-4585; PASS CODE = 601714

**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 rgumpert@cnnw.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and Introductions
2. Review Meeting Minutes for April 29, 2009 [\[Meeting Minutes\]](#)
3. Dworshak Operations - Jim Adams, USACE NWW
 - a. [May Runoff Forecast & Flood Control Calculation](#)
4. Transportation Operations - Jim Adams, USACE RCC
5. Upper Snake River Flow Augmentation - John Roache, USBR
 - a. [2009 Flow Augmentation Estimates](#)
6. Operations Review
 - a. Reservoirs
 - b. Fish
 - c. Power System
 - d. Water Quality
7. Other
 - a. Set agenda for next meeting - **May 20, 2009**
[\[Calendar 2009\]](#)

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

Dworshak : May Runoff Forecast & Flood Control Calculation

WY 2009

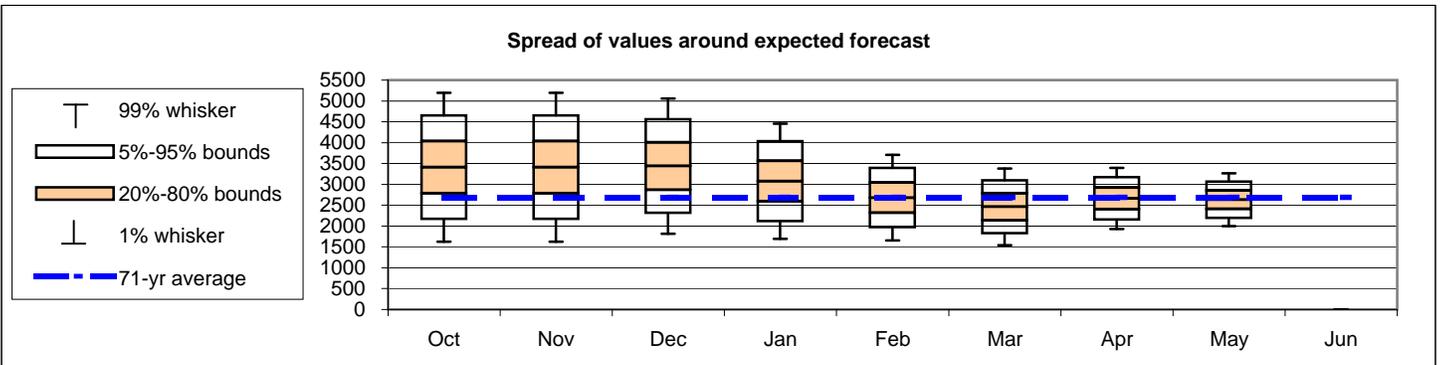
Runoff Forecast and Flood Control

| | | | |
|-----------------------------|---------|------|-----|
| Most Probable Runoff Volume | Apr-Jul | 2631 | KAF |
| | May-Jul | 1998 | KAF |

| | |
|-------------------|--------------------|
| 1929-1999 Average | Percent of Average |
| 2683 | 98% |
| 1980 | 101% |

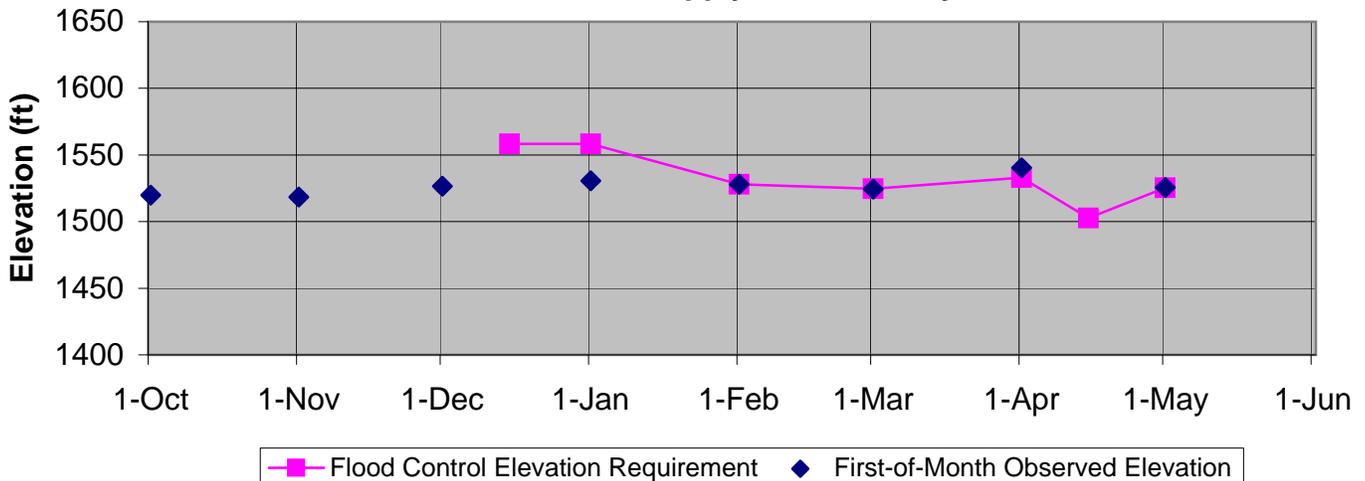
Seasonal Flood Control (assumes no shift of flood control space to Grand Coulee)

| Forecast Date>> | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun |
|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|-----|
| Apr-Jul Runoff Forecast | 3409 | 3409 | 3437 | 3075 | 2681 | 2461 | 2662 | 2631 | |
| First-of-Month Elev | 1519.9 | 1518.4 | 1526.7 | 1530.6 | 1528.0 | 1524.4 | 1540.5 | 1525.5 | |
| Date >> | 15-Dec | 31-Dec | 31-Jan | 28-Feb | 31-Mar | 15-Apr | 30-Apr | | |
| Flood Control Space | -- | 700 | 700 | 1124 | 1170 | 1057 | 1442 | 1159 | |
| Flood Control Elevation | -- | 1558.2 | 1558.2 | 1528.0 | 1524.5 | 1532.9 | 1502.8 | 1525.4 | |



Dworshak Flood Control Elevations - 2009

Latest water supply forecast: May



Notes:

1. The given forecast is the official Corps of Engineers forecast for Dworshak. If you have any questions please contact Tracy Schwarz (509 527 7522), or Steve Hall (509 527 7550).
2. Due to updated values for precipitation, snow or streamflow, subsequent forecasts may be different from the forecast published herein.
3. 15-Dec and 31-Dec flood control space is fixed at 700 KAF.
4. 30-Apr flood control elevation is based on the 95% confidence Flood Control Refill Curve as computed on 1 April.

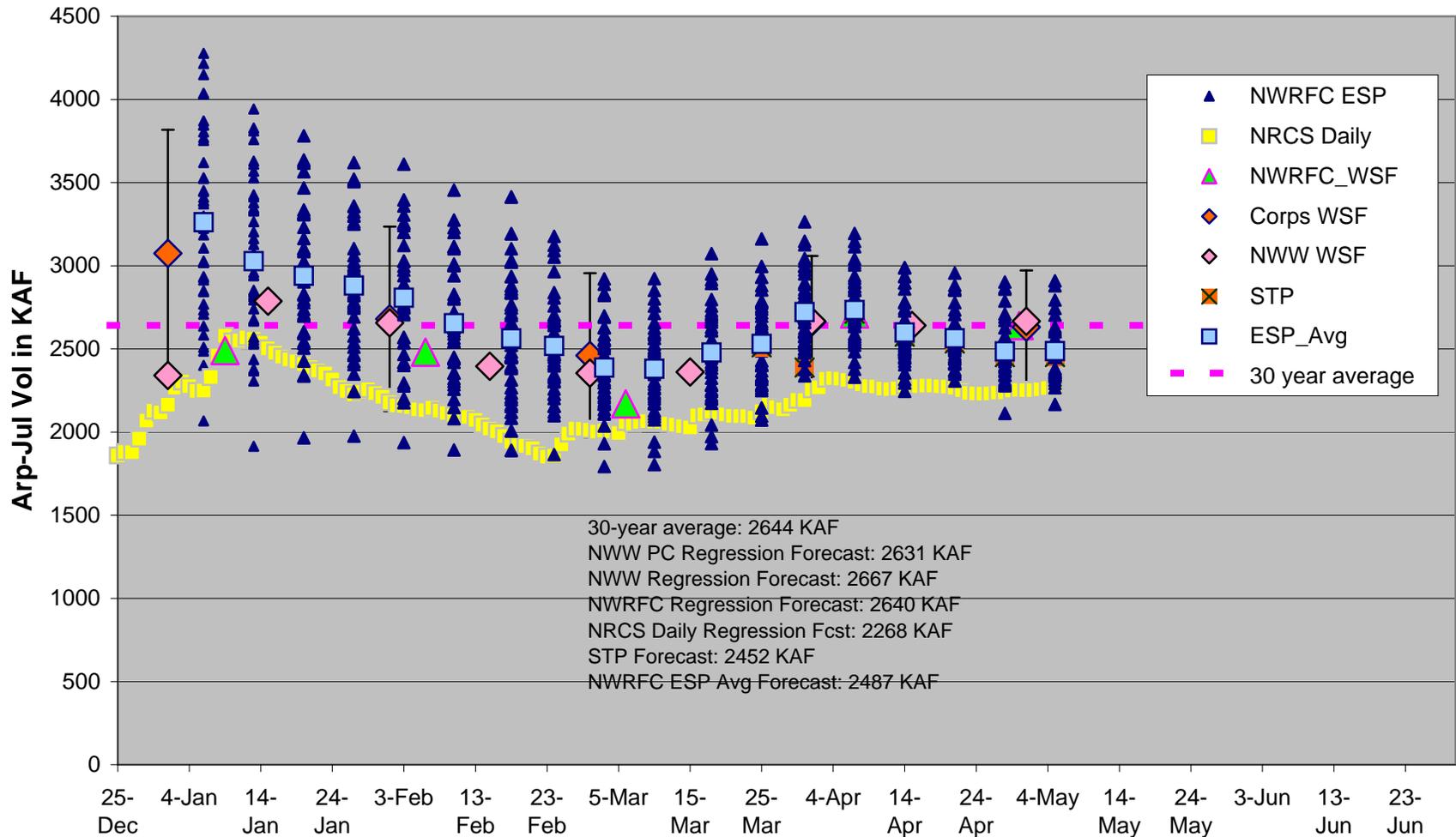
Dworshak : May Runoff Forecast & Flood Control Calculation

| May-Jul Runoff Forecast Calculation: | | | | | |
|--------------------------------------|-------|----------------|--------------|------------------------|-----------------------|
| Variable | Month | Observed Value | % of Average | Regression Coefficient | Marginal Runoff (KAF) |
| | | A | | B | =A*B |
| SOI | Sep | 1.50 | | 84.14 | 126.2 |
| Elk Butte SWE | 1-May | 32.70 | 90% | 10.77 | 352.1 |
| Hemlock Butte SWE | 1-May | 48.70 | 102% | 9.66 | 470.4 |
| Hoodoo Basin SWE | 1-May | 40.60 | 88% | 9.57 | 388.6 |
| Shanghi Summit SWE | 1-May | 21.90 | 119% | 11.37 | 249.0 |
| Lost Lake SWE | 1-May | 53.40 | 88% | 7.54 | 402.6 |
| Intercept | | 1 | | 9.13 | 9.1 |
| 1-May Forecast (KAF) | | | | Σ | 1998.1 |

| Data Station | Sept | Nov | Dec | 1-Jan | 1-Feb | 1-Mar | 1-Apr | 1-May | 1-Jun |
|--|------|------|------|-------|-------|-------|-------|-------|-------|
| Climate (Stdzd SOI) | | | | | | | | | |
| September SOI | 1.50 | | | | | | | | |
| Precipitation (monthly depth, inches) | | | | | | | | | |
| Headquarters, ID | | 6.49 | 4.52 | | | | | | |
| Snow Water Equiv (first of month SWE depth, inches) | | | | | | | | | |
| Elk Butte, ID | | | | 12.5 | 20.0 | 23.9 | 33.9 | 32.7 | -- |
| Hemlock Butte, ID | | | | 16.9 | 29.5 | 33.8 | 49.1 | 48.7 | -- |
| Hoodoo Basin, MT | | | | 13.0 | 23.9 | 28.9 | 37.5 | 40.6 | -- |
| Pierce RS, ID | | | | 6.1 | 10.1 | 9.5 | | | |
| Shanghi Summit, ID | | | | | | | 29.1 | 21.9 | |
| Lost Lake, ID | | | | | | | | 53.4 | -- |
| Streamflow (monthly volume, KAF) | | | | | | | | | |
| Dworshak Inflow | | | | Jan | Feb | Mar | Apr | May | Jun |
| | | | | 288 | 161 | 322 | 633 | -- | -- |

Dworshak, ID April-July Inflow Volume Forecast Comparison

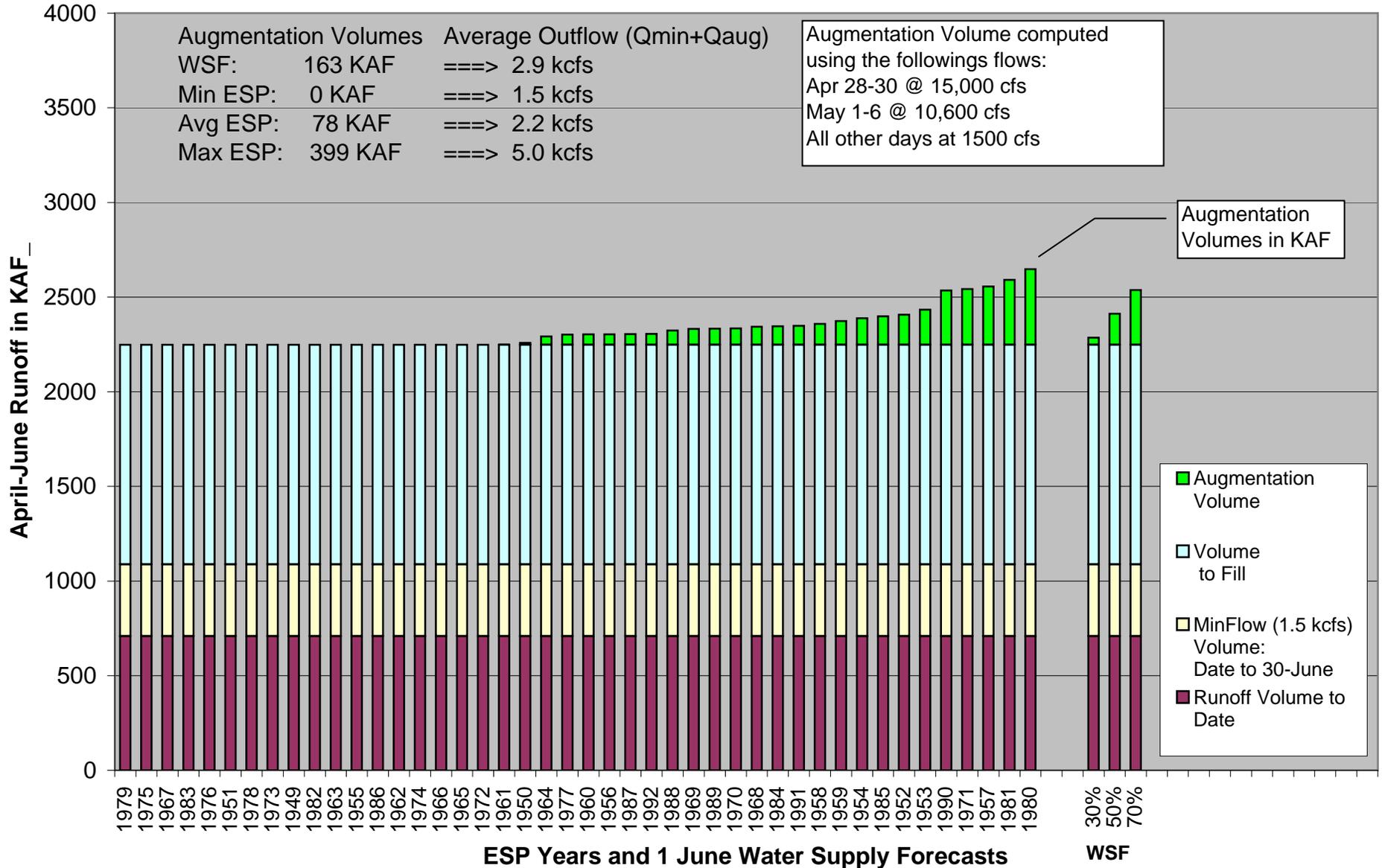
updated 05-May-2009



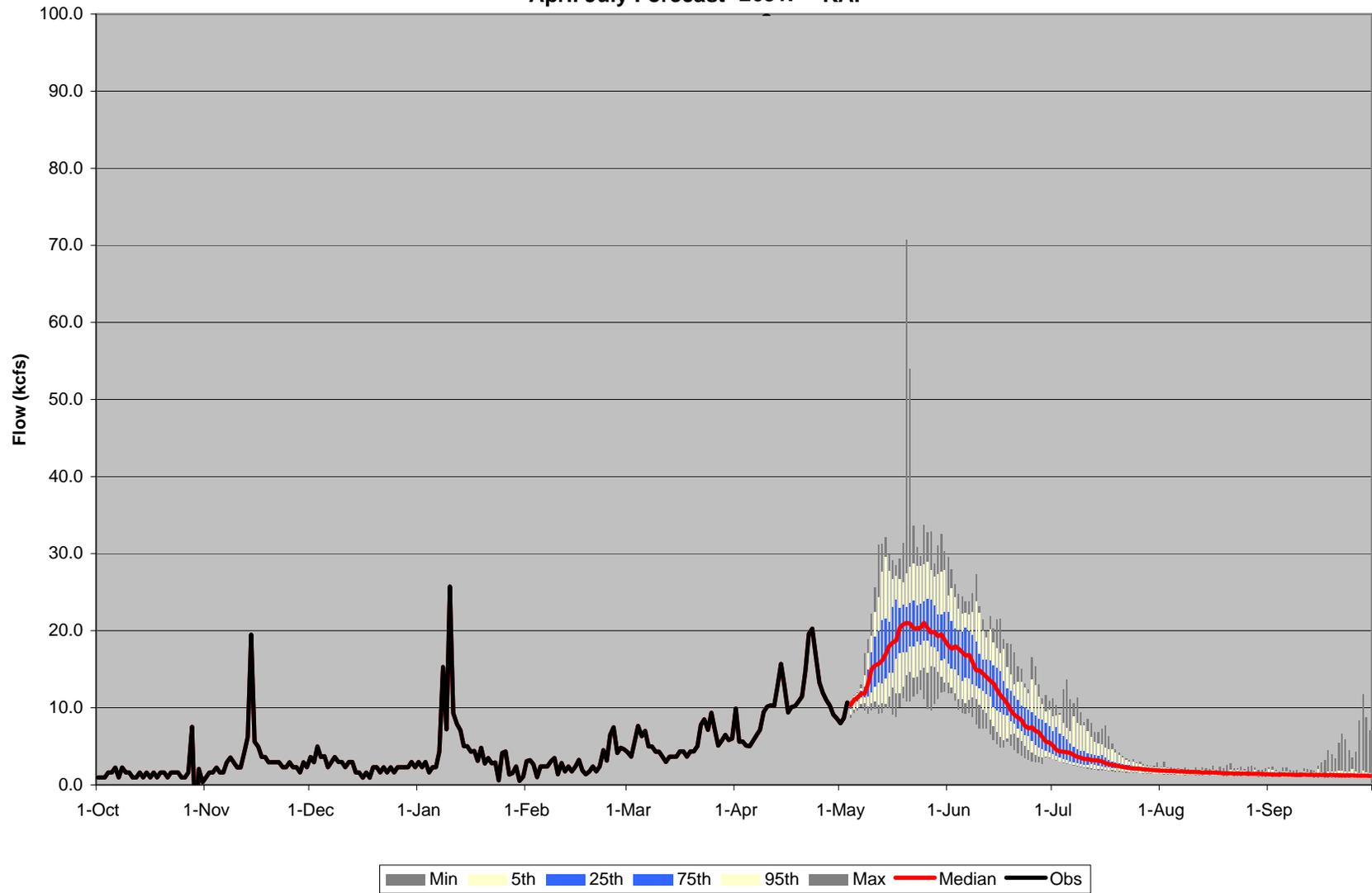
Dworshak Augmentation Volumes

ESP inflows and 01-May Water Supply Forecast

Observed data through **4-May-2009**



ESP Inflow Statistics
44 ESP Inflows
April July Forecast 2631. KAF



<< Enter Water Year NOTE - I HAVE NOT CHANGED THE WATER YEAR, IT CAUSES THE MACROS TO FAIL. I WILL HAVE JOHN FIX L

| | Period | Minimum Flow kcfs | Maximum Flow kcfs | Target Flow kcfs | Target Elev feet | Target Stor kaf |
|----|-----------|-------------------|-------------------|------------------|------------------|-----------------|
| | 30 Sep | | | | | N/A |
| 15 | 1-15 Oct | 1.4 | 14.0 | | | N/A |
| 16 | 16-31 Oct | 1.4 | 14.0 | | | N/A |
| 15 | 1-15 Nov | 1.4 | 14.0 | | | N/A |
| 15 | 16-30 Nov | 1.4 | 14.0 | | | N/A |
| 15 | 1-15 Dec | 1.4 | 14.0 | | | N/A |
| 16 | 16-31 Dec | 1.4 | 14.0 | | | N/A |
| 15 | 1-15 Jan | 1.4 | 14.0 | | | N/A |
| 16 | 16-31 Jan | 1.4 | 14.0 | | | N/A |
| 14 | 1-14 Feb | 1.4 | 14.0 | | | N/A |
| 15 | 15-29 Feb | 1.4 | 14.0 | | | N/A |
| 15 | 1-15 Mar | 1.4 | 14.0 | | | N/A |
| 16 | 16-31 Mar | 1.4 | 14.0 | | | N/A |
| 5 | 1-5 Apr | 1.4 | 15.0 | 15 | | N/A |
| 5 | 1-10 Apr | 1.4 | 15.0 | 15 | | N/A |
| 5 | 11-15 Apr | 1.4 | 15.0 | 15 | | N/A |
| 5 | 16-20 Apr | 1.4 | 15.0 | 15 | | N/A |
| 5 | 21-25 Apr | 1.4 | 15.0 | 15 | | N/A |
| 5 | 26-30 Apr | 1.4 | 15.0 | 15 | | N/A |
| 15 | 1-15 May | 1.4 | 8.0 | | | N/A |
| 16 | 16-31 May | 1.4 | 8.0 | | 1580 | 3109.6 |
| 15 | 1-15 Jun | 1.4 | 8.0 | | 1595.0 | 3374.2 |
| 15 | 16-30 Jun | 1.4 | 8.0 | | 1600.0 | 3468.0 |
| 15 | 1-15 Jul | 1.4 | 14.0 | | 1600.0 | 3468.0 |
| 16 | 16-31 Jul | 1.4 | 14.0 | | 1580 | 3109.6 |
| 15 | 1-15 Aug | 1.4 | 14.0 | | 1560 | 2794.0 |
| 16 | 16-31 Aug | 1.4 | 14.0 | | 1535 | 2438.6 |
| 15 | 1-15 Sep | 1.4 | 14.0 | | 1520 | 2238.0 |
| 15 | 16-30 Sep | 1.4 | 14.0 | | | N/A |

Volume Adjustments

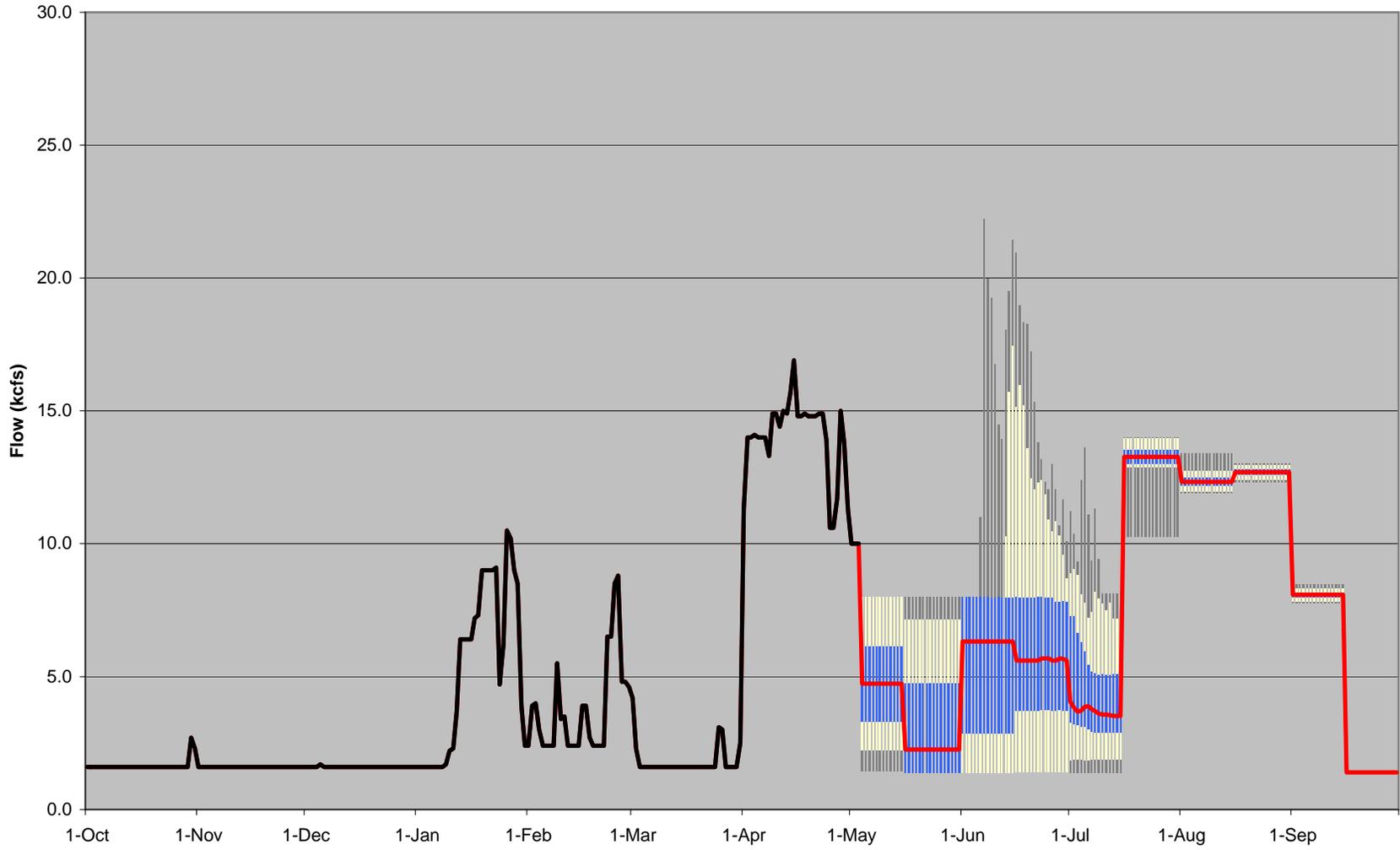
Adjust? (dropdown)

AprJul Volume

Standard Deviation

ESP Outflow Statistics

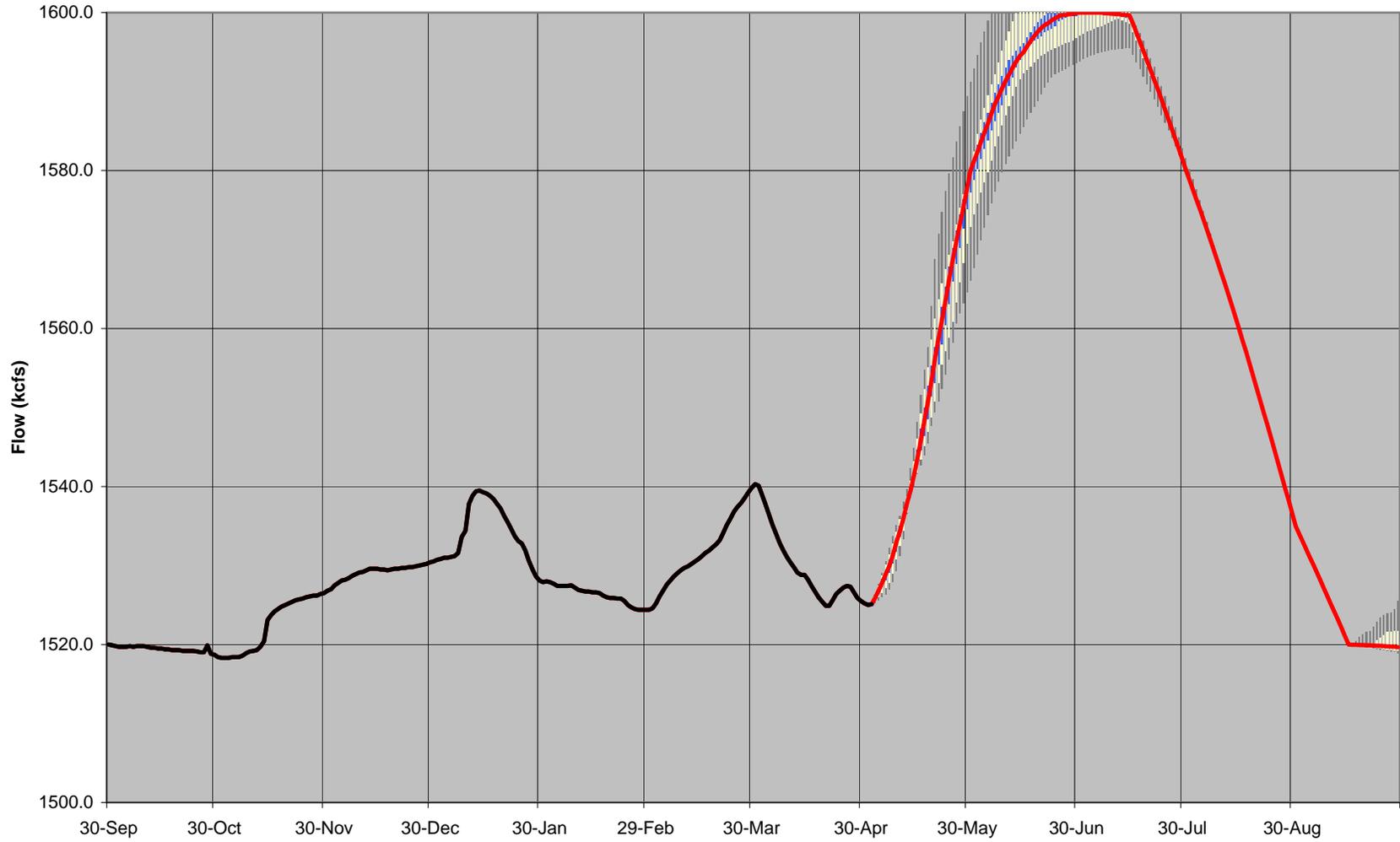
April July Forecast 2631. KAF



Min 5th 25th 75th 95th Max Median Obs

ESP Elevation Statistics

April July Forecast 2631. KAF



Min 5th 25th 75th 95th Max Median Obs

2009 Flow Augmentation Estimates

System and Source

Upper Snake

| | |
|------------------------------|--------------|
| Palisades Powerhead | 0 |
| WD01 rentals(Colorful Chart) | 150000 |
| Reclamation Space | 20000 |
| Additional Rentals | 30000 |
| <hr/> | |
| Total above Milner | 200000 |

Natural Flows

| | |
|---------|-------|
| Idaho | 60000 |
| Skyline | 17649 |

Payette

| | |
|---------------------------------|-------------|
| Reclamation Space | 95000 |
| WD65 rentals (based on history) | 65000 |
| Additional WD65 rentals | 5000 |

Boise

| | |
|-------------------------------------|-------------|
| Lucky Peak | 41351 |
| Anderson Ranch Inactive (powerhead) | 0 |
| Additional WD63 rentals | 3000 |

| | |
|---|--------|
| Total without additional sources | 449000 |
| Total with additional sources | 487000 |

Dates of Delivery (estimated)

| | |
|-------------|-----------------|
| Upper snake | Jun 1 - Jun 30 |
| Payette | Jun 15 - Aug 30 |
| Boise | Jun 1 - Jun 30 |

Natural flows amount to about 220 cfs daily beginning April 3.

This information should be considered the best estimate available as of May 5, 2009 and is subject to change as the final water supply situation develops. The values in red font represent Reclamation's resolve to find additional sources of flow augmentation in order to provide 487,000 acre-feet.

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

May 6, 2009 Conference 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.

Review of Minutes/Agenda

TMT members needed more time to review the past meeting notes. Edits to the 4/22 and 4/29 notes are due by 5/13. The meeting summaries from the 4/22, 4/29 and today's meeting will be finalized at the next TMT meeting on 5/20.

Dworshak Operations

TMT began with a review of last week's TMT discussion of Dworshak operations, during which a plan was made to reduce outflows to ~10 kcfs through Wednesday, 5/6 and check in during today's meeting to determine next steps. Jim Adams, COE, reported that the salmon managers offered a new recommendation on 5/5: reduce flows to 7.5 kcfs during the evening of 5/5 and reduce further on 5/6 to two small units, ~4.8 kcfs, and holding for a week. The COE had reduced flows at the project to 7.5 kcfs the evening of 5/5.

Steve Hall, Walla Walla District COE, shared updated information during today's meeting on the May runoff forecast, showing the new forecast runoff at 2.683 MAF (98%). He showed graphs with the various inflow forecast comparisons, augmentation volumes, ESP inflow and outflow statistics. The latest forecast information, Steve summarized, suggested that flexibility to manage flows was reduced and this could potentially impact the COE's ability to refill the project.

Paul Wagner, NOAA, responded that the information shared during today's meeting was new and different from what the salmon managers were working with the previous day. As a result, the recommendation was modified to reduce flows to one unit or minimums sooner.

Dave Statler, Nez Perce, shared that the loss of flexibility to refill this year due to flow augmentation operations was of concern, and that TMT needs to address management of flood control and transition to refill operations to find a better balance – one suggestion is to begin the transition management earlier in April. Given the most current information, Nez Perce supported reducing flows to minimums, using a gradual shift down to avoid flow fluctuations.

Jim Litchfield, Montana, said that considering Lower Granite flows were at 100 kcfs, he supported a reduction to minimum flows at Dworshak as soon as possible.

Paul Wagner, NOAA, offered that the Clearwater fish could be better supported with a slightly higher flow but the degree of benefit is unknown. He said he would like to use input from the Nez Perce Tribe to inform the decision, and, given the uncertainties, would prefer to reduce flows to 2.5 kcfs (rather than minimums) for the next week.

Action: The COE made the decision to reduce flows to minimums (about 1.5 kcfs) starting at 10:00 pm (2200 hours) on 5/6, using a two-step ramp down. Jim Adams shared that this decision was based on input from the region and upon a determination that the planned operation would maximize the potential for refill, as a high priority.

A final comment was shared by one TMT member that the region has managed the transition given the information that was available and the conditions that were presented, and that the decisions were made consciously using the best available information.

Transportation Operations

Jim Adams, COE, provided a quick update that fish were collected at Lower Granite on 5/1 and transported the following day; another round of fish was collected at Little Goose on 5/5 and would be transported today; another round of fish would be collected at Lower Monumental on 5/8 and released the next day.

Upper Snake Flow Augmentation Accounting

John Roache, BOR, introduced Ted Day, Boise BOR, who is responsible for the BOR's forecasts. Ted provided a summary of estimated flow volumes and potential sources for this year's Upper Snake River flow augmentation. He shared that the total estimated volume, 487 kaf, was very likely to be provided, and that the sources listed on the summary might shift some. He also noted that the water would be released earlier this year (in June) per the finalized Upper Snake River BiOp. A question was raised about how this operation will be coordinated with Idaho Power to ensure the water is released into the system, to which Ted suggested that this year will be monitored and lessons learned will be shared with the region. John also suggested that he did not anticipate any conflicts concerning Idaho Power passing Upper Snake Flow Augmentation through Brownlee Reservoir.

Operations Review

Reservoirs: Jim Adams reported on COE projects: Libby was at elevation 2405.5 feet with 7.4 kcfs in and 5.8 kcfs out. It was clarified that Libby elevation guides how VARQ is set, and that the COE will pass inflow at the project until VARQ inflows are reached. Albeni Falls was at elevation 2056.4 feet. 7-day average inflows were 82.1 kcfs at Lower Granite; 221.6 kcfs at McNary; and 232.1 kcfs at Bonneville. Dave Wills, USFWS, shared that the May Spring Creek hatchery release was underway and that the migration timing was matching that of 2007. (Around 85% had passed as of the last report.) The USFWS will continue to work closely with the COE and BPA to communicate when the run has passed, which will trigger a return to a more flexible operating range at

Bonneville powerhouse 2. John Roache, BOR, reported that Grand Coulee was at elevation 1257.4 feet. The ICF date had been set for May 8, which triggers the option to begin refill –actual refill will be based on river conditions and flood control guidance from the COE. The project will be held to an elevation around 1257.7 feet until May 7. Hungry Horse was at elevation 3519.75 feet with 6 kcfs outflows.

Fish: Paul Wagner, NOAA, reported on juveniles: Yearling chinook counts were near their peak at Lower Granite, with counts at about 100,000 per day. Steelhead were also near peak at Lower Granite, with counts at about 60,000 per day. Cindy LeFleur, WDFW, reported on adults: The latest count was 7,000 per day at Bonneville with some fluctuations in counts over the last couple days. It was uncertain whether adult migration was peaking. She noted that the run was very late.

Power System: Nothing to report at this time.

Water Quality: Jim Adams reported that TDG levels had been reduced recently and TDG levels were staying within criteria. Spill caps had been set at 32 at Little Goose, alternative 25/36 at Lower Monumental (for a study) and 101 at Bonneville.

Next TMT Meeting: May 20th Face to Face

Agenda items include:

- Finalize 4/22, 4/29 and 5/6 Facilitator Summary and Official Meeting Minutes
- Dworshak Operations
- Hanford Reach Update
- Sturgeon Operation at Libby
- Snake River Flow Augmentation Volumes Update (placeholder for any new information)

**Columbia River Regional Forum
Technical Management Team Conference Call
May 6, 2009**

1. Introduction

Today's TMT meeting was chaired by Jim Adams (COE) and facilitated by Robin Gumpert (DS Consulting), with representatives of COE, NOAA, BPA, BOR, CRITFC, Idaho, Montana, Washington, USFWS, the Nez Perce Tribe, the FPC and others participating. 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 for April 22 and 29, 2009

Review of the facilitator's notes and official minutes for April 22 and the official minutes for April 29 was postponed until the next TMT meeting on May 20. Send any comments on these notes to Jim Adams by May 12.

3. Dworshak Operations

Steve Hall (COE) gave an update on Dworshak operations and conditions. For the past week, the COE has operated the project in accordance with the Salmon Managers' April 29 request to drop outflows from 15 kcfs to 12 kcfs, then to 10 kcfs and maintain that level through May 5 (yesterday). At that point, Paul Wagner (NOAA) gave the COE an updated recommendation which the Salmon Managers had generated at FPAC that morning. They recommended dropping Dworshak outflows from 10 kcfs to 7.5 kcfs last night, then to approximately 5 kcfs outflows (4.8 kcfs, or 2 units running at near optimal conditions) from tonight until May 13. However, the conditions that drove that recommendation have changed, so the Salmon Managers have modified their recommendation, Wagner said. At the time, flows from Lower Granite were predicted to be about 85 kcfs; current inflows at Lower Granite are now 110 kcfs.

Hall showed TMT updated information on Dworshak reservoir, based on the COE's May 1 water supply forecast for an April-July total volume of only 2,631 kaf, or 2.63 maf, 98% of average. Last month's April-July volume forecast was 2,662 kaf. A volume inflow comparison chart shows that ESP traces have leveled off over the past few weeks. A graph projecting Dworshak augmentation volumes as of May 4 showed that average outflows will be 2.9 kcfs, based on the current water supply forecast. A graph of the average ESP traces shows 2.2 kcfs outflows through the rest of refill, just barely above the minimum discharge of 1.5 kcfs. The maximum ESP trace is 5.0 kcfs through refill. According to these ESP traces, very little flexibility remains in the use of augmentation flows as the

reservoir moves toward refill. Flexibility is what allows the COE to respond to changes or forecasting errors.

Dave Statler (Nez Perce) asked where that flexibility went. Into holding 10 kcfs outflows from Dworshak for the past week, Hall replied. Russ Kiefer (Idaho) disagreed, saying that five days of full powerhouse flows for fish doesn't amount to much water, and TMT coordinated well this year on bringing the reservoir to its May 1 flood control elevation. Kiefer asked whether that elevation could have gone higher than 1,525 feet as of May 1 according to the COE flood control process. It could have been up to 4 feet higher, or anywhere from 1,525 -1,529 feet elevation, Adams replied.

The ESP graphs of Dworshak flow augmentation volume show that, according to the May 1 ESP traces, the reservoir needs to be on minimum discharge from this point forward and could fail to refill in 20 of the 44 ESP traces, while last week's comparable analysis showed the reservoir refilling in all 44 years with some augmentation flows. In other words, going to minimum outflows now would provide approximately a 50% chance of refill based on the 44 ESP traces, Hall said. The message here is that Dworshak outflows should go to minimums as soon as possible. The COE is very concerned about the risk of missing the Dworshak refill date.

Wagner presented the Salmon Managers' revised recommendation based on the May 1 updated water supply forecast, per their FPAC discussion yesterday: Instead of 5 kcfs of steady outflow, drop Dworshak to 2.5 kcfs outflows, or one unit operating in efficiency mode, beginning tonight. Jim Litchfield (Montana) asked, why not go to minimum outflows now and avoid further risk of not refilling? Conditions in the north fork of the Clearwater River pose problems for resident fish, particularly Pacific lamprey, when flows drop below the natural hydrograph which is about 2.5 kcfs flows right now, Wagner replied. NOAA would find minimum flows acceptable if the Nez Perce Tribe agrees.

The Nez Perce would not object, Dave Statler replied. Making flow changes gradually is as important to lamprey as mimicking the natural hydrograph because Pacific lamprey are vulnerable to sudden fluctuations. Statler re-emphasized the comment he made last week regarding the need for better balance between flood control and refill objectives during the spring transition period. Brian Marotz (Montana) asked whether lamprey could make use of higher flows at night; Statler didn't think so.

Wagner then proposed on behalf of the Salmon Managers that Dworshak outflows drop from 10 kcfs to 7.5 kcfs and transition quickly to 2.5 kcfs beginning tonight. He also expressed interest in exploring alternate weather forecasts on which to base Dworshak operations than the May 1 COE water supply forecast.

In light of serious concerns about missing the refill target and being able to moderate temperatures on the Snake, the COE proposed to drop Dworshak outflows from 7.8 kcfs to minimum flows (1.5 kcfs) in two steps beginning at 10 pm tonight. Minimum flows will consist of 1.5 kcfs through the powerhouse and 100 cfs for the Nez Perce hatchery. Dworshak will stay at minimum flows for the near future, and the COE will keep TMT informed of any changes in conditions that could affect this operation. There were no objections to this plan.

4. Transportation Operations

Fish collection began May 1 at Lower Granite, and transportation began there May 2, as previously agreed upon, Adams reported. Fish collection began at Little Goose on May 5, and transportation there begins today. Fish collection will begin at Lower Monumental on May 8, transportation on May 9.

5. Upper Snake Flow Augmentation

John Roache and Ted Days (BOR) presented estimates of the flow augmentation volume the Bureau of Reclamation plans to provide this year, as called for in the Upper Snake BiOp. According to data presented in a table attached to today's agenda, BOR is confident of supplying at least 449,000 acre feet, up to 487 kaf of flow augmentation starting in June 2009. This is the first year BOR has looked actively for ways to shape augmentation flows earlier in the season. At this point, BOR is projecting that the majority of augmentation volume will be released from June 1-30 after flood control operations wind down.

There was discussion of how to plan around flows from Brownlee Dam on the upper Snake River, owned by Idaho Power. BOR has been communicating with Idaho Power on moving water past Brownlee Dam, Roache said. Brownlee Reservoir is typically full by June 1. Then passes inflow or slowly drafts through the summer. The COE has been coordinating with Idaho Power on a gradual refill, Cathy Hlebechuk (COE) said.

Kyle Dittmer (CRITFC) asked how long BOR has had a June 1 refill target for projects in the upper Snake. It's not a refill target but a projection of when augmentation flows will begin, Ted Day replied. The BOR's goal at present is a smooth transition from the end of flood control to flow augmentation at whatever rate is needed to move the water during June.

6. Operations Review

a. Reservoirs. Libby is at elevation 2,405.05 feet. Inflows are 7.4 kcfs, up from 4.7 kcfs on April 29. Outflows were raised from 4.0 to 4.6 kcfs beginning May 1 as part of VARQ flow requirements. Libby began refilling on April 27 and is now regulated by VARQ operating procedures. The VARQ flow for Libby, based on the April inflow forecast, is 15.5 kcfs. Because inflows are currently less than

that, Libby will be passing inflows for the near future. A new forecast will be released later this week, which will be used to establish new VARQ flows. That forecast will also be used to establish the sturgeon volume and tiered bull trout minimum flows.

Brian Marotz asked whether there has been an attempt, based on plans to release 0.8 maf of stored sturgeon flows, to introduce flexibility in the VARQ discharge protocol. Yes, the Libby elevation will be taken into consideration during VARQ flows, Hlebechuk replied. Libby is required to start refilling 2 days before the initial controlled flow, which will begin on May 8 this year.

Albeni Falls is at elevation 2,056.4 feet, in slow refill mode. The reservoir is expected to fill by the end of June and will operate within a half-foot range of 2,062-2062.5 feet elevation. Dworshak (discussed at length above) is at elevation 1,526.2 feet, with daily average flows of 7.8 kcfs that will drop to minimum flows tonight.

Grand Coulee is at elevation 1,257.14 feet, with a current flood control elevation of 1,257.7 feet. The project will be held to an elevation around 1257.7 feet until May 7, John Roache reported. The initial controlled flow date of May 8 will trigger refill operations beginning on May 7. The BOR will not refill the project at a rate that causes flows to rapid decrease rapidly.

Hungry Horse is at elevation 3,519.75 feet, with 6.0 kcfs outflows, calculated according to VARQ. This discharge is expected to continue for awhile.

Seven-day average inflows are 82.1 kcfs at Lower Granite, 221.6 kcfs at McNary, and 232.1 kcfs at Bonneville, where the 2nd powerhouse unit has been operating at the lower quarter of 1% efficiency for the Spring Creek Hatchery release. An estimated 85-90% of the release has passed Bonneville, Dave Wills (USFWS) reported. USFWS and the COE are working together on concluding the lower 25% of the 1% best efficiency range of operation.

A planned two-line outage into The Dalles will put powerhouse units 13 through 22 out of service, Don Faulkner (COE) reported. It appears the COE will be able to continue to spill 40% in the remaining bays, but might have to spill more briefly during the outage.

b. Fish. Juveniles: The passage index count for yearling Chinook peaked at 100,000 fish per day at Lower Granite and Little Goose dams, Wagner reported. Approximately 50% of the yearling Chinook run has passed Lower Granite. Steelhead passage peaked at 300,000 earlier this month at Lower Granite and is now down to 60,000 fish per day. These numbers could pick up if flows increase. There was nothing to report in terms of subyearling or sockeye passage.

Adults: Up to 7,000 adults were passing Bonneville per day, but it's not yet clear that was the peak, Cindy LeFleur (Washington) reported. The run is turning out to be late again in 2009. The upriver spring Chinook run generally tends to be under-predicted. However, if counts continue to be low, the assumed relationships between cohorts will probably be reexamined. At present, the preseason projections for 4-year-olds are based on last year's jack counts, and for 5-year-olds on last year's 4-year-old fish counts.

c. Power System. There was nothing to report today.

d. Water Quality. Total dissolved gas levels have generally been low, Adams reported. Problem areas since May 1 have been the Ice Harbor and Bonneville dam forebays. Spill caps are 32 kcfs at Little Goose, 101 kcfs at Bonneville, and alternating between 25 kcfs for bulk spill and 36 kcfs for uniform spill at Lower Monumental.

Results of the spill test at Chief Joseph showed that gas generation from the deflector is low. After spilling up to 145 kcfs on two occasions, gas levels went no higher than 116.5% in the tailrace, Adams said. Wagner asked whether the results of the test will change Chief Joseph's position on the spill priority list. That hasn't been decided yet, Adams said. Based on the test results, the COE is working on a new strategy for handling generation shifts between Chief Joseph and Grand Coulee dams. Stay tuned for more information on this.

9. Next Meeting

The next regular TMT meeting will be on May 20 at the COE Portland office. Dworshak operations, a Hanford reach update, the sturgeon operation, upper Snake flow augmentation, and review of meeting minutes for April 22, 29 and May 6 will be on the agenda. This summary prepared by consultant and writer Pat Vivian.

| Name | Affiliation |
|-----------------|--------------------|
| Jim Adams | COE |
| Cathy Hlebechuk | COE |
| Dan Feil | COE |
| Paul Wagner | NOAA |
| Tony Norris | BPA |
| Scott Bettin | BPA |
| Russ Kiefer | Idaho |
| John Roache | BOR |
| Cindy LeFleur | Washington |
| Steve Hall | COE Walla Walla |
| Ted Days | BOR Boise |
| Tim Heizenrader | Centaurus |
| Ruth Burris | PGE |

| | |
|------------------|---------------------|
| Rob Diaz | Integral Renewables |
| Barry Espenson | CBB |
| Richelle Beck | DRA |
| Kyle Dittmer | CRITFC |
| Margaret Filardo | FPC |
| Dave Benner | FPC |
| Glen Trager | Shell Energy |
| Dave Statler | Nez Perce Tribe |
| Jim Litchfield | Montana |
| Dave Wills | USFWS |
| Rob Wallen | Deutsch Bank |
| John Hart | EWEB |
| Brian Marotz | Montana |
| Don Faulkner | COE |

TECHNICAL MANAGEMENT TEAM

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

TMT CONFERENCE CALL

Wednesday May 13, 2009 09:00 - 12:00

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

CONFERENCE PHONE LINE

Conference call line:888-285-4585; PASS CODE = 601714

**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 rgumpert@cnnw.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and Introductions
2. Dworshak Operations - *Jim Adams, USACE NWW*
 - a. [SOR to Provide Improved Migration Conditions in the Snake River](#)
 - b. [Dworshak Augumentation Volumes](#)
3. Operations Review
 - a. Reservoirs
 - b. Fish
 - c. Power System
 - d. Water Quality
4. Other
 - a. Set agenda for next meeting - **May 20, 2009**
[\[Calendar 2009\]](#)

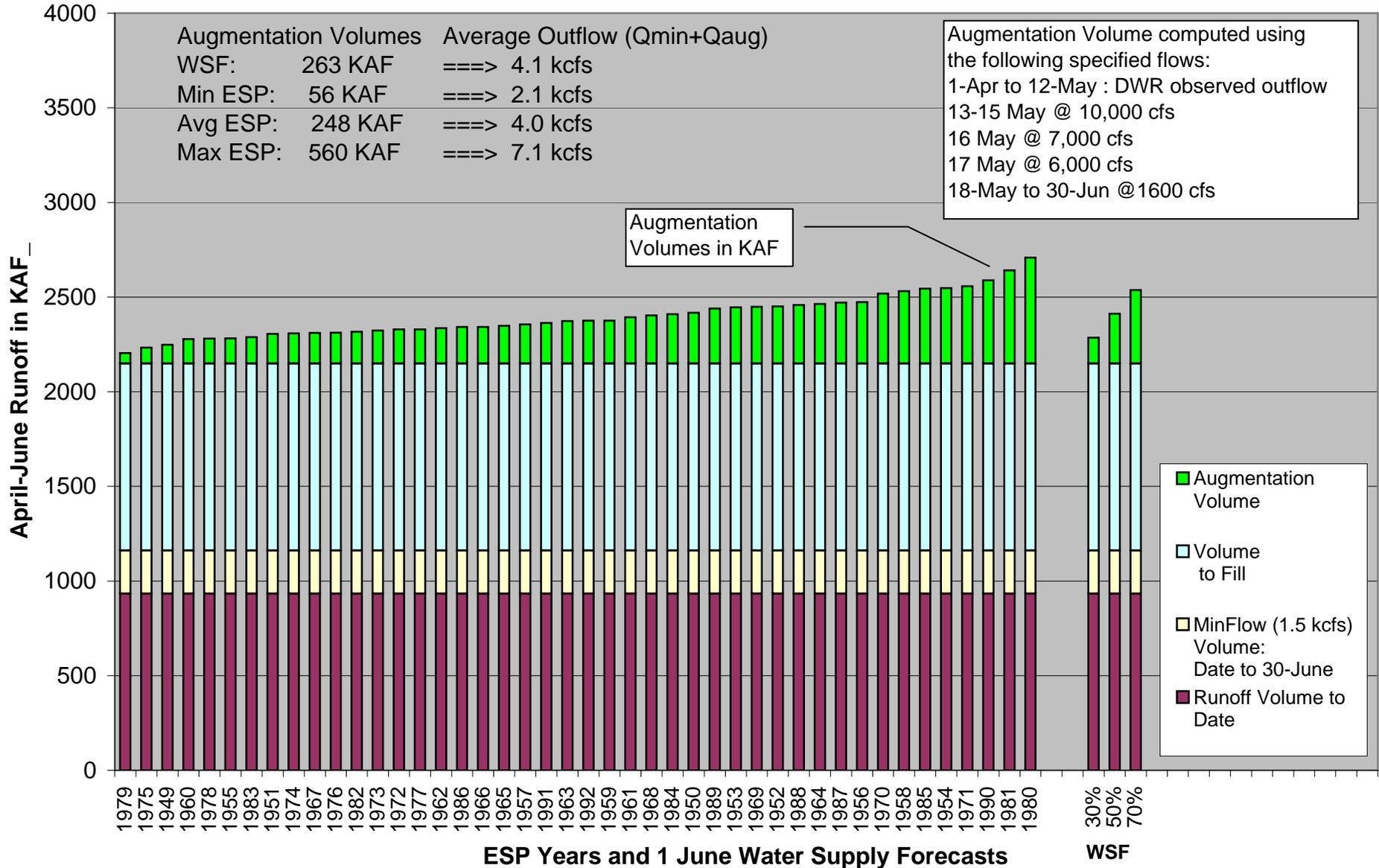
Questions about the meeting may be referred to:

*[Jim Adams](#) at (503) 808-3938, or
[Cathy Hlebechuk](#) at (503) 808-3942, or
[Dan Feil](#) at (503) 808-3945*

Dworshak Augmentation Volumes

ESP inflows and 01-May Water Supply Forecast

Observed data through **11-May-2009**



COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

May 13, 2009 Conference Calls

FACILITATOR'S SUMMARY NOTES ON FUTURE ACTIONS

Facilitators: Erin Halton & 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.

SOR #2009-2

Paul Wagner, on behalf of the signatories to SOR #2009-2, reviewed the request to increase discharges at Dworshak to 10 kcfs beginning today and maintain for a period of up to five days. Wagner noted the justification for the request was to support Spring Chinook and steelhead passage. He clarified that signatories to the SOR felt it was essential to maintain higher flows through this weekend and based on conditions observed in prior years, weather conditions were likely to see increased temperatures and flows were likely to increase naturally as May and June unfold.

Jim Adams, COE, said that since the SOR had been received at 3 p.m. on Tuesday, the COE had little time to consider the request. However, they did produce an ESP graph posted to the agenda that was their interpretation of the effects of the proposed operation. Adams noted the May 12 ESP run that could be found off the TMT home page showed fairly similar inflow forecast comparisons and flow augmentation volumes might be expected whether the SOR was implemented or not. Steve Hall, Walla Walla District COE, said that although the new forecast information (increased by 100 KAF) suggests more flexibility to manage flows than was discussed at last week's TMT meeting, actual conditions over the next month might negatively impact the COE's ability to refill the project by June 30. Rudd Turner, COE, asked whether NOAA could clarify whether there is any implied flexibility in the 2008 BiOP regarding the June 30 date for refill of Dworshak; Wagner stated that as refill at Dworshak has been achieved between July 4th and July 7th in recent prior years, yes - there is some flexibility around the date.

The COE asked for those parties present during the call to weigh in on the request:

- Dave Statler, Nez Perce Tribe: more thorough analysis and additional STP runs for May 12 – June 30 would help provide input on the request. Based on the data shared today, the proposed operation is not likely to negatively impact fish on the Clearwater. No objection to the SOR, but would suggest a gradual the flow increase and subsequent step-down over a couple days.
- BOR: Do not object to SOR, but defer decision to the COE.
- BPA: Do not object to SOR, but defer decision to the COE.
- OR: support SOR as written.

- USFWS: support SOR as written and acknowledge balancing act between maintaining flows for passage now and flows/cool water available to support fish later in the season; opinion is it is more important to provide flows as specified in the request though this weekend.
- ID: support SOR as written and acknowledge that signatories did not enter in to this SOR lightly; the updated forecast is encouraging and think the SOR is the right decision for spring smolts.
- Kyle Dittmer, CRITFC: general agreement to the principles in the SOR, but also have concerns for refill of Dworshak.

After a brief caucus, the COE suggested more time for internal analysis and discussion of the request and asked to resume the conversation at 3:00 pm.

As the afternoon portion of the conversation began, the COE reiterated that while it recognized the near term potential benefits of the request, they had reached a decision to implement a compromised operation: daily average outflows of ~7.9 kcfs (one big unit and one small unit) beginning at 2200 hrs on 5/13; shift down to ~5.6 kcfs (1 big unit) on 5/16; shift down to ~4.6 kcfs (2 small units) on 5/18; finally, shift down to minimum flows on 5/19. The COE said that the rationale for this compromise was to maintain reserves in case they are needed next week and to also meet the seasonal flow objective of 100 kcfs specified in the BiOP. The COE added that Brownlee may be stepping up flows over the weekend. The following TMT members provided feedback to the COE on their decision.

- Paul Wagner, NOAA: the request was intended to support steady flows through this weekend; acknowledge that natural flow levels ahead are hard to predict. The compromised plan is a step in the right direction, but if the COE could re-consider the SOR, it would be appreciated.
- Russ Kiefer, ID: would commit to not asking for higher flows next week if the COE would be willing to implement the request as it was written.
- Rick Kruger, OR: also would commit to not asking for higher flows next week if the COE would be willing to implement the request as it was written.
- Dave Wills, USFWS: also would commit to not asking for higher flows next week if the COE would be willing to implement the request as it was written.
- Cindy LeFleur, WA: the COE's ESP run shows that refill would be achieved on June 30 if the request were implemented as written – what information was used to make the decision? Answer: The compromise was a decision made based on technical and policy-level input.
- BPA: defer to the COE.
- BOR: defer to the COE.

Action: The COE planned to implement the compromise operation as stated above.

Next TMT Meeting: May 20th Face to Face

Agenda items include:

- Finalize 4/22, 4/29 and 5/6, 5/13 Facilitator Summaries and Official Meeting Minutes.

- Dworshak Operations
- Hanford Reach Update
- Sturgeon Operation at Libby
- Snake River Flow Augmentation Volumes Update (placeholder for any new information)

**Columbia River Regional Forum
Technical Management Team Conference Call
May 13, 2009**

1. Introduction

Today's TMT call was chaired by Jim Adams (COE) and facilitated by Erin Halton and Robin Gumpert (DS Consulting), with representatives of COE, NOAA, BPA, BOR, USFWS, CRITFC, FPC, the Nez Perce Tribe, Idaho, Oregon, Washington, and others participating. 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. Dworshak Operations – SOR 2009-02, Snake River Migration

Today's meeting split into two segments, a morning discussion and an afternoon regrouping so the COE would have time for technical and policy review of SOR 2009-2, which was submitted late yesterday afternoon and covers Dworshak operations over the next week.

Paul Wagner (NOAA) introduced the system operational request, signed by NOAA, USFWS, Oregon, Idaho and Washington, which calls for Dworshak Dam to support Snake River spring Chinook and steelhead migration by operating as follows: Beginning tonight, increase Dworshak outflows to full powerhouse (approximately 10 kcfs) for up to 5 days, tentatively through May 17 as needed to help achieve 100 kcfs flows at Lower Granite Dam. The SOR is attached to today's agenda.

The purpose is to aid yearling Chinook and steelhead spring migration. In almost half the years during which the effects of transportation were studied, steelhead who passed Lower Granite after mid-May never returned to spawn, regardless of whether they were transported or allowed to migrate in-river. May 20 appears to be a pivotal date. Not all of the Salmon Managers signed the SOR, and later in the meeting the non-signers gave their reasons for not signing.

Adams showed TMT Attachment 2b to today's agenda, which depicts the projected effects of the proposed operation as the COE interpreted it on short notice. The graph puts Dworshak outflow volumes at 10 kcfs (full powerhouse) on May 13-15; 7 kcfs on May 16, 6 kcfs (one big unit) on May 17; and back to minimum flows on May 18. For the sake of comparison, the Dworshak augmentation volumes chart available on the TMT page under ESP Forecasts depicts Dworshak operations during the same timeframe without implementation of the SOR.

Steve Hall (COE Walla Walla) then presented comparative ESP predictions for this week and last week, when 20 of the 44 years of record would have had no water volume left for augmentation. This week's inflow forecast is markedly improved by a 100 kaf increase – which is subject to the same kind of sudden change downward again. Runoff volume could be 2.4-2.8 maf, which will make a big difference in terms of how much water is available to release. The risk of not refilling is markedly less this week than it was last week according to these ESP data. Refilling the project is a high priority for the COE. There's still a significant risk of not refilling, even if the project continues to release minimum flows, Adams said.

Signatories to the SOR are aware of forecasting inaccuracies as well as the tradeoff between the spring freshet and summer flow augmentation, Wagner said. While they recognize that refilling Dworshak remains a high priority, they believe it's possible to achieve both. They have also considered the balance between the risk of not refilling and the risk to migration now if supplemental flows are not provided. The SOR represents their consensus on the best way to achieve balance between the spring and summer operations.

The BiOp states refill targets for some projects in terms of probability percentages, but it just says Dworshak will refill sometime near June 30, Rudd Turner (COE) said. Does this mean it would be permissible under the BiOp to refill Dworshak in early July and start drafting then? Typically Dworshak doesn't start drafting until after the 4th of July weekend, which will be July 7 this year, Wagner said. So yes, there's some flexibility in the Dworshak refill date. *{Editors Note: The 4th of July is on a Saturday in 2009, so the weekend will end the night of July 6th}*

Dave Statler (Nez Perce Tribe) expressed doubt that the Dworshak pool elevation will rise after July 1 unless inflows are substantial and/or due to water demands downstream for cooling the lower Snake River. If water temperatures on the lower Snake stay low, it's possible that inflows could be passed during that time and the pool held steady. Wagner recalled that last year, the pool filled on July 5 and maintained near its full elevation until July 10.

Adams asked, if Dworshak pool ends the 2009 season at 8 feet below full and never gets to within a foot or two of full, would that be construed as meeting BiOp criteria? It would be if a decision today to implement SOR 2009-02 led to that consequence, Wagner replied.

Statler asked about the relationship of STP runs to ESP flow predictions. What would be the impact of 10 kcfs flows now on conditions later during refill, not only in terms of refill probability but discharge patterns while refill is occurring? The April-July single trace volume was 2.56 maf, which would have been 70 kcfs, so instead of flows of 6.4 kcfs for a month, flows would have gone to about 2 kcfs for a month, Greg Bowers said. The COE is planning a

presentation on ESP and STP forecasting methodologies at a future TMT meeting, Adams said.

Adams asked, what would the impacts be on the Clearwater River of a 25% increase in flows from Dworshak, or 10 kcfs outflows, then dropping to 7 and 6 kcfs and back to minimum flows? Unregulated flows in the Clearwater will probably be increasing over the next week, which would tend to dampen the impacts of such an operation, Statler replied.

Adams asked, if inflows at Lower Granite are still 90 kcfs or less by May 15, would the SOR signatories expect 10 kcfs outflows to continue for another day? Yes, the weekend operation is really driven by other reservoir operations in the basin, Wagner replied. The intent of covering the weekend in the SOR is to include expected releases from Brownlee Dam. If natural flows come up, Dworshak could drop back down to minimum flows and still meet the intent of the SOR. There was discussion of how to establish a flow level for the weekend, given that project operators won't be able to respond to updated forecasts.

Hall asked, if weather predictions for 80 degrees on Sunday don't materialize, will the fish managers want another 4-5 days of full powerhouse releases? There was discussion of ramp rates for the proposed operation. Half a day to ramp up would be acceptable to the Nez Perce, Statler. Dave Wills (USFWS) asked what period of time is covered by the augmentation volumes in Attachment 2b. The graph covers May 12 through the end of June, Hall replied.

TMT members stated their views of SOR 2008-2 for the record.

Nez Perce – Didn't sign the SOR due to concerns that it might force operations in the later spring freshet to go to base flows. In light of the latest forecast for an additional 100 kaf, a revised operation would be more acceptable than a full 5 days of 10 kcfs outflows from Dworshak. Gradual ramp rates of at least half a day are preferred.

CRITFC – Agrees with the principles of the SOR but refrained from signing because CRITFC supports the Nez Perce position on balancing refill with flow augmentation.

BOR – Would not object if the SOR is implemented. Deferred to the COE on this decision.

BPA – Deferred to the COE on this decision. Recommended operating to a specific discharge for management purposes.

USFWS – Signed the SOR and supports implementation as written. Believes that providing flows now for spring migration is worth the risk of a water shortage later this summer for flow augmentation.

COE – After adjourning for internal consultation, proposed a compromise operation to balance the risk of not refilling Dworshak reservoir with efforts to meet the seasonal flow objective of 100 kcfs at Lower Granite. The compromise operation consists of 7.9 kcfs outflows (a large and small unit at optimal efficiency) beginning at 10 pm tonight through May 16, when flows drop to 5.6 (one big unit at optimal efficiency). On May 17, flows drop again to 4.6 kcfs (2 small units), and will return to minimum flows on May 19. The Corps' proposal to not implement the SOR as written was partly out of concern that the Salmon Managers might request additional water next week. However, might provide supplemental releases next week if flows continue to be low.

NOAA – Gave high priority to maintaining 10 kcfs outflows from Dworshak over the coming weekend. In terms of peaks in the historical hydrograph, runoff is consistently high on the Snake River over the next week, which should reduce the demand on Dworshak pool. This historical tendency, plus the added 100 kaf in the flow forecast makes refill highly likely if the SOR were implemented as written. Offered not to sign an SOR next week requesting additional water if flows are provided now as requested in this SOR.

Idaho – Supports the SOR in light of the increased flow forecast. Suggested the COE set a weekend flow rate based on Friday's streamflow predictions in a best-faith effort to implement the SOR as written. Seconded NOAA's offer not to sign another SOR next week if flows are provided now as requested, and agrees with NOAA's position that runoff in the Snake basin will be adequate next week without much supplemental flow from Dworshak.

Oregon – Signed the SOR and believes that providing flows now for the spring migration is worth the risk to flow augmentation this summer. Seconded the offer not to sign another SOR next week if flows are provided now as requested.

Washington – Signed the SOR and asked the COE questions about the probability of refill according to the most recent ESP traces. The 50% confidence level says that Dworshak pool will refill

The COE will implement its compromise operation, which begins tonight with ramping up to 7.9 kcfs, then down to 5.4 kcfs and again to 4.6 kcfs and returning to minimum flows on May 19, a day before TMT's next meeting.

3. Next Meeting

The next regular TMT meeting will be on May 20 at the COE Portland office. Dworshak operations, a Hanford reach update, the sturgeon operation, upper Snake flow augmentation, and review of meeting minutes for April 22, 29

and May 6 will be on the agenda. This summary prepared by consultant and writer Pat Vivian.

| <i>Name</i> | <i>Affiliation</i> |
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| Jim Adams | COE |
| Paul Wagner | NOAA |
| Tony Norris | BPA |
| Russ Kiefer | Idaho |
| John Roache | BOR |
| Cindy LeFleur | Washington |
| Steve Hall | COE Walla Walla |
| Ruth Burris | PGE |
| Barry Espenson | CBB |
| Richelle Beck | DRA |
| Kyle Dittmer | CRITFC |
| Margaret Filardo | FPC |
| Dave Benner | FPC |
| Glen Trager | Shell Energy |
| Dave Statler | Nez Perce Tribe |
| Dave Wills | USFWS |
| Rick Kruger | Oregon |
| Denny Rohr | DRA |
| Cathy Hlebechuk | COE |
| Dan Feil | COE |
| Rudd Turner | COE |
| Richelle Beck | DRA |
| Denny Rohr | DRA |

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TMT MEETING

Wednesday May 20, 2009 09:00 - 12:00

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

CONFERENCE PHONE LINE

Conference call line:888-285-4585; PASS CODE = 601714

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 or Cathy Hlebechuk (503) 808-3942 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 rgumpert@cunnv.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and Introductions
2. Review Meeting Minutes for April 22 and 29, May 6 and 13, 2009 [\[Meeting Minutes\]](#)
3. Hanford Reach Update
 - a. [Priest Rapids Operation](#)- Russell Langshaw, Grant County PUD
4. Sturgeon Operations at Libby - Jim Adams, COE RCC
 - a. [SOR-FWS#1](#)- Jason Flory, USFWS
 - b. ["Kootenai River/Reservoir Temps"](#)- Greg Hoffman, COE NWS
 - c. ["Libby Forecasts and Operations"](#)- Joel Fenolio, COE NWS
5. Chief Joseph Spill Test Update - Amy Reese, COE NWP
6. Transmissions Emergency Action Plan - Tony Norris, BPA
 - a. [TEAP](#)
7. Operations Review

- a. Reservoirs
 - [Fish Managers recommendation for Order of Spill Priority](#)
 - b. Fish
 - c. Power System
 - d. Water Quality
8. Other
- a. Set agenda for next meeting - **May 27, 2009**
[\[Calendar 2009\]](#)

Questions about the meeting may be referred to:

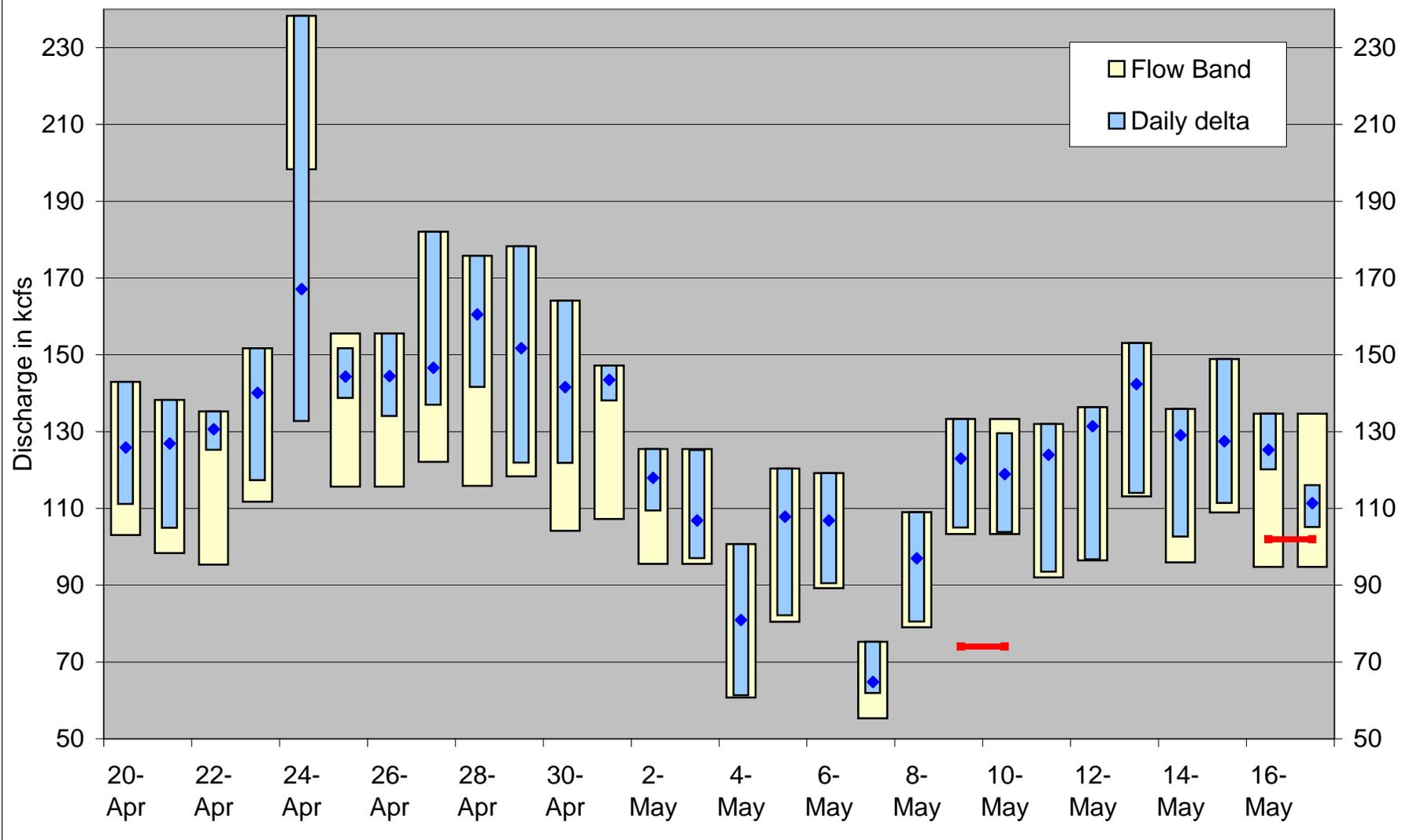
*[Jim Adams](#) at (503) 808-3938, or
[Cathy Hlebechuk](#) at (503) 808-3942, or
[Dan Feil](#) at (503) 808-3945*

FPAC recommendations for spill priority list for the Federal projects, revised May 19, 2009

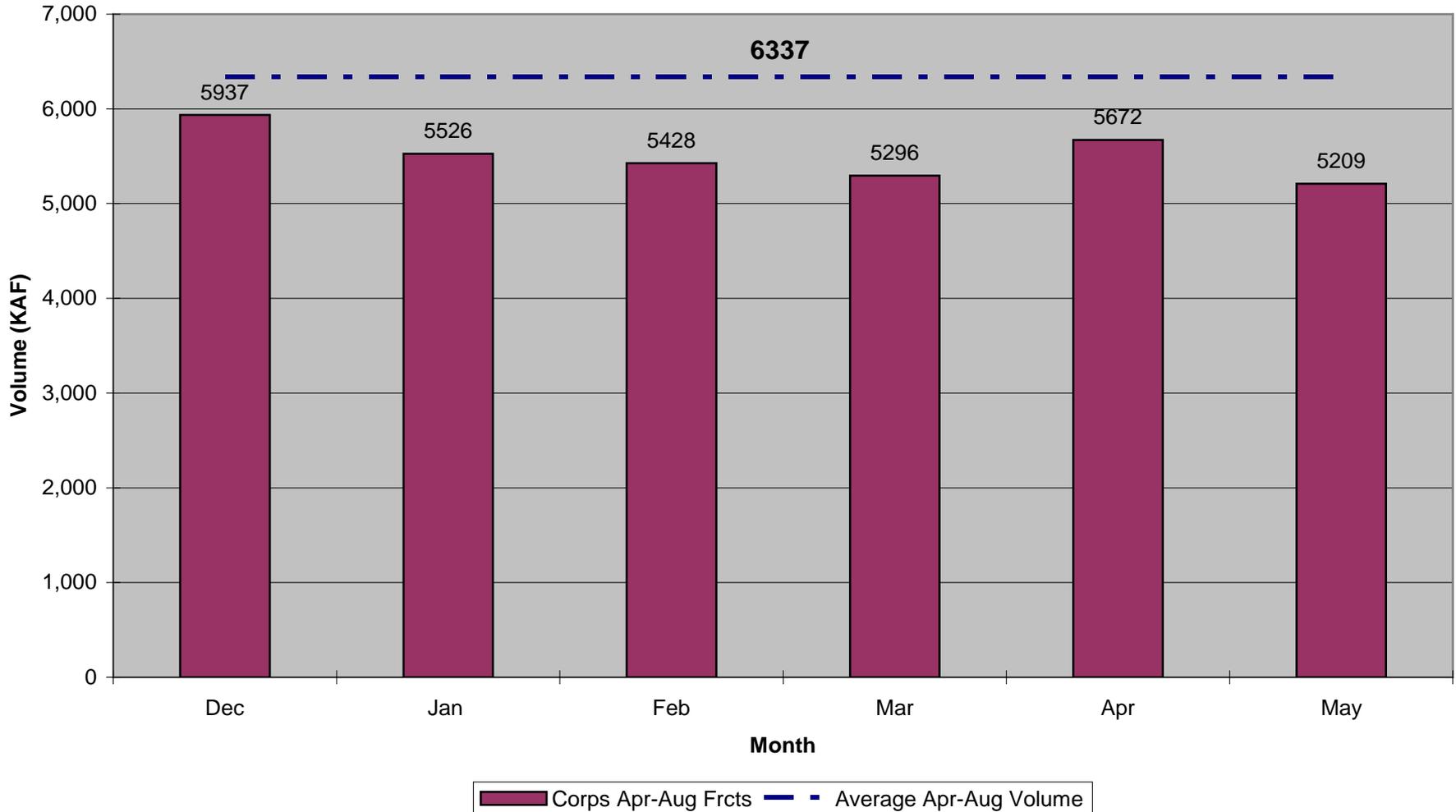
1. Bonneville. Spill up to 120 kcfs daytime and 150 kcfs at night
2. Ice Harbor
3. McNary
4. Lower Monumental: change bulk to uniform pattern
5. Little Goose: Spill to 125% during night hours. During day time hours fully load power house before spilling above 30%.
6. Lower Granite
7. Chief Joe
8. Grand Coulee
9. The Dalles
10. Dworshak

Priest Rapids Operations 2009

Number of exceedances: 1



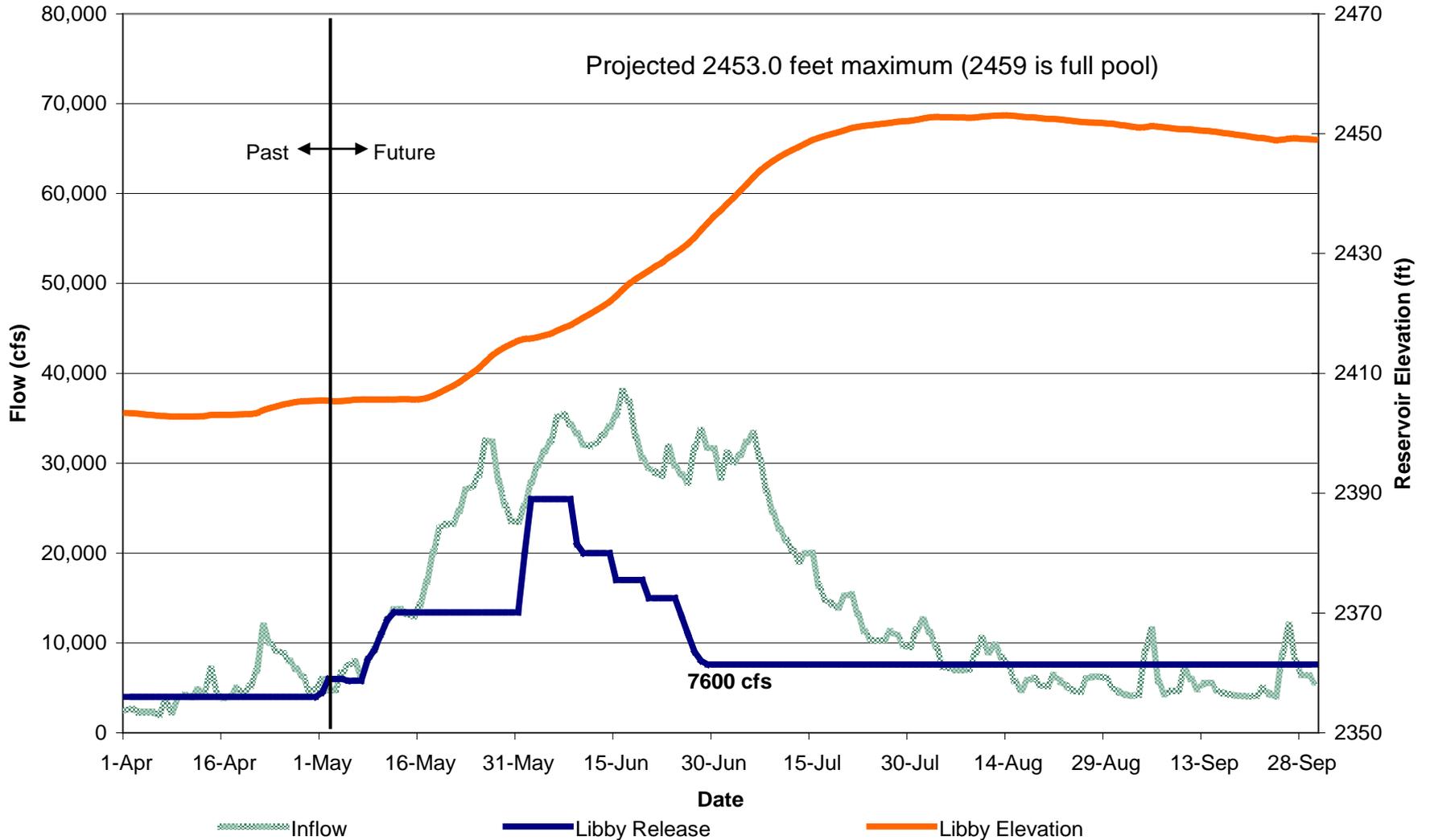
Libby Dam April - August Volume Inflow Forecasts Thousand Acre-feet (KAF)



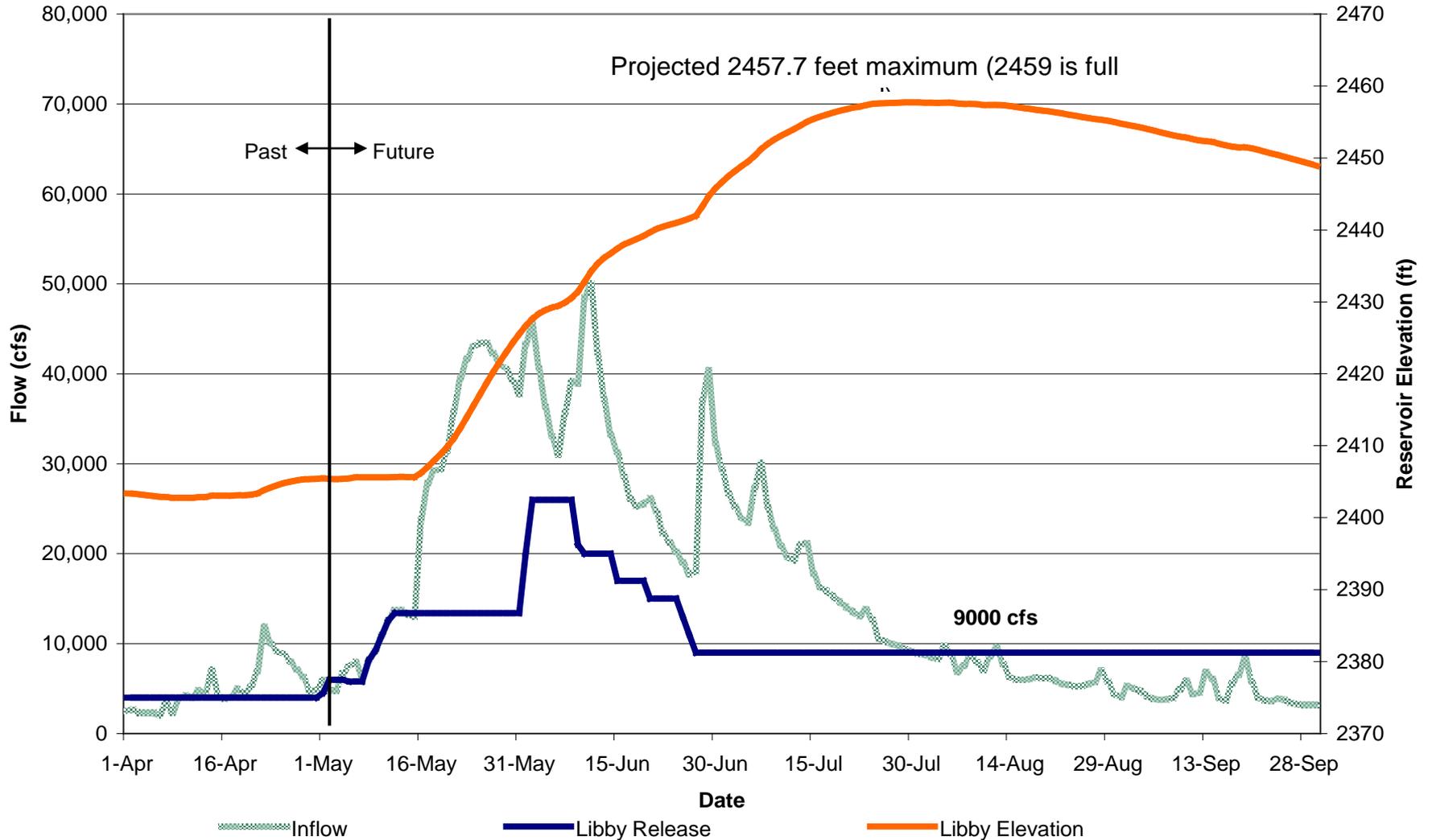
Libby Dam Water Supply Forecast for May

- The May WSF is 5209 KAF or 82% of average.
- The May WSF sets the sturgeon volume and the tiered Bull Trout minimum flow.
 - Sturgeon Volume for the year is 0.80 MAF
 - Bull Trout Minimum after the Sturgeon Pulse and through Aug 31st is 7,000 cfs

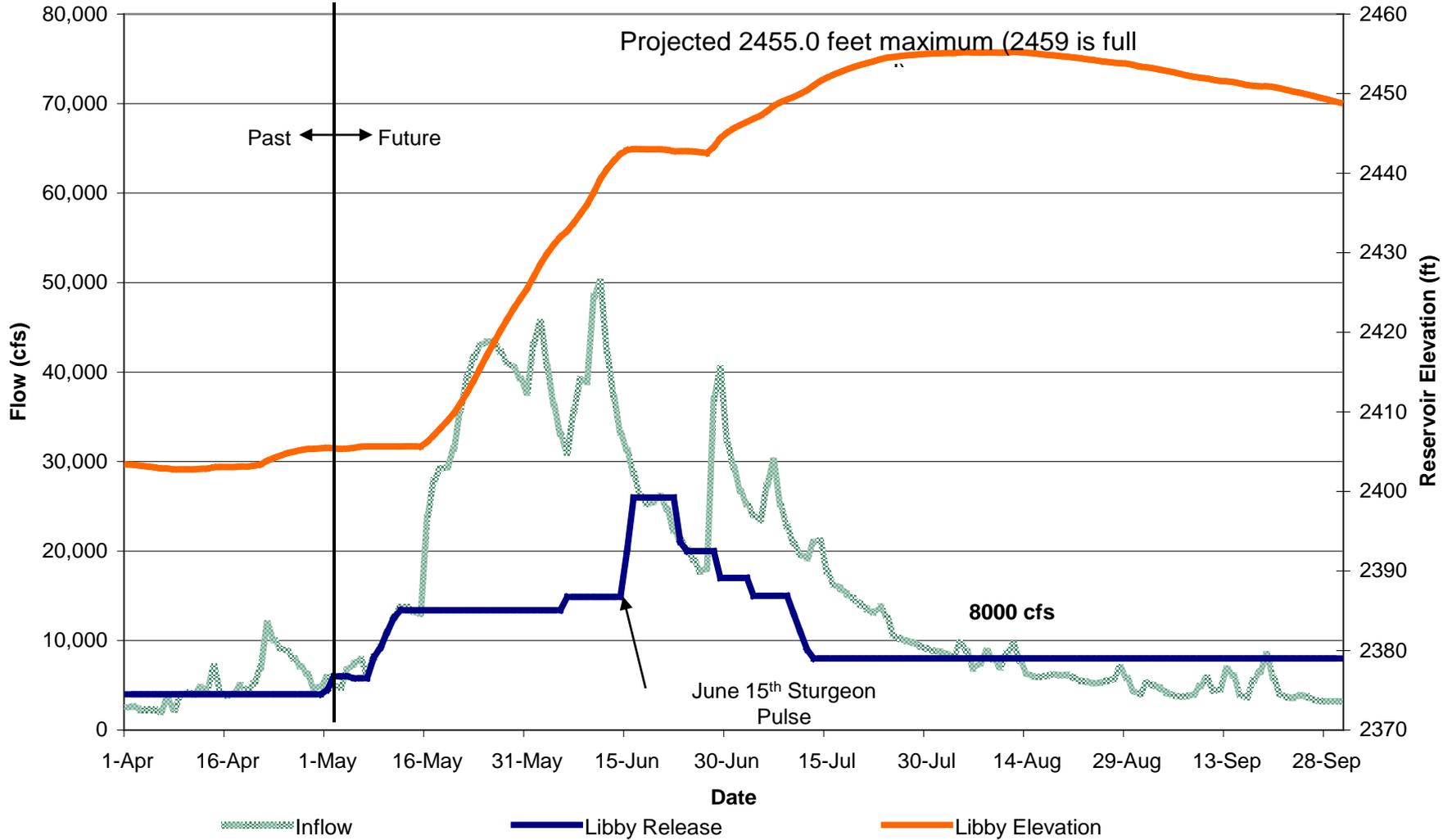
Libby Reservoir April 1, 2009 - Sept. 30, 2009
 Assumed April-Aug. Forecast Volume equal to 93% of current WSF
 Assumed draft to 2,449 ft. by Sept. 30th



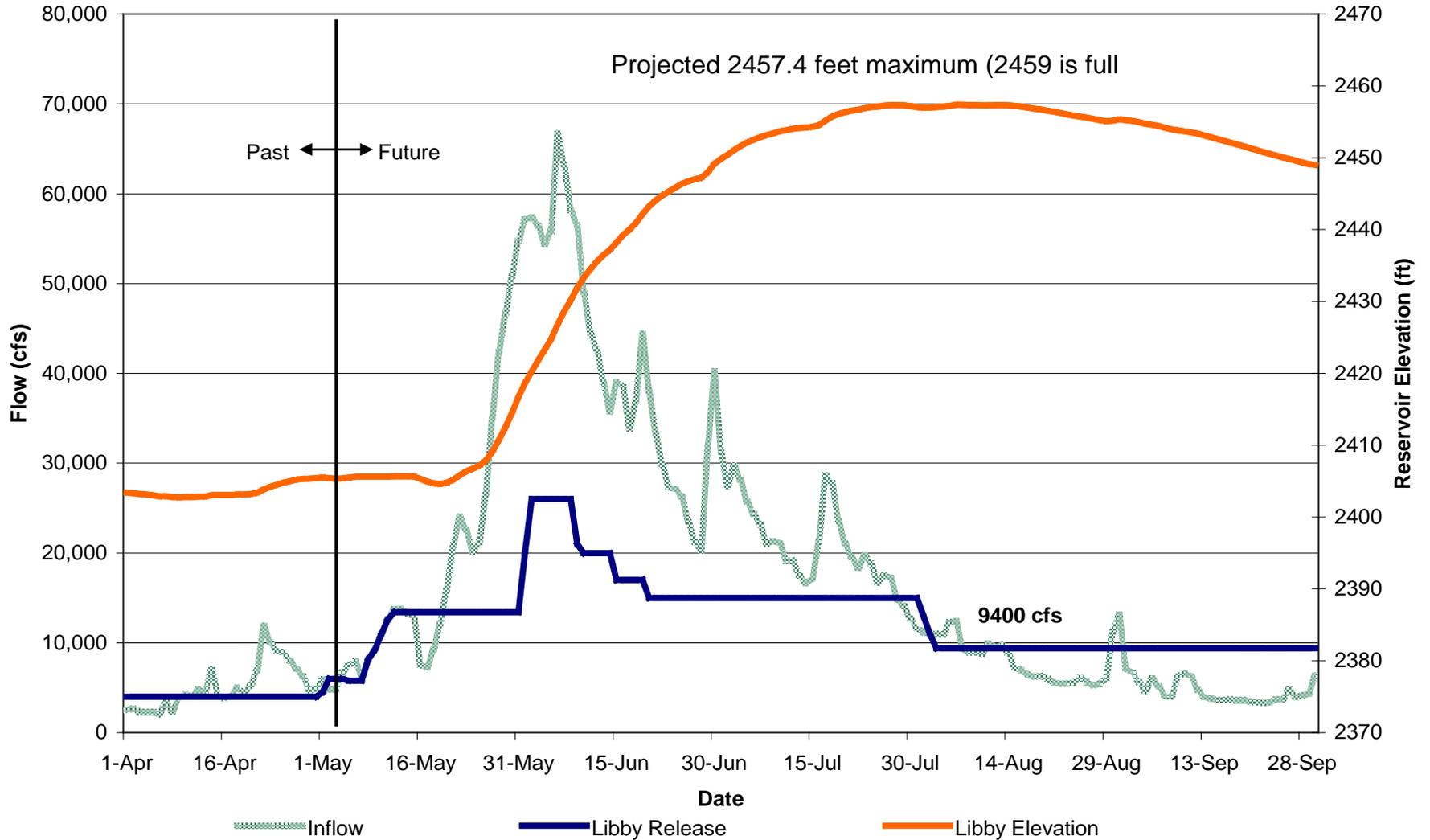
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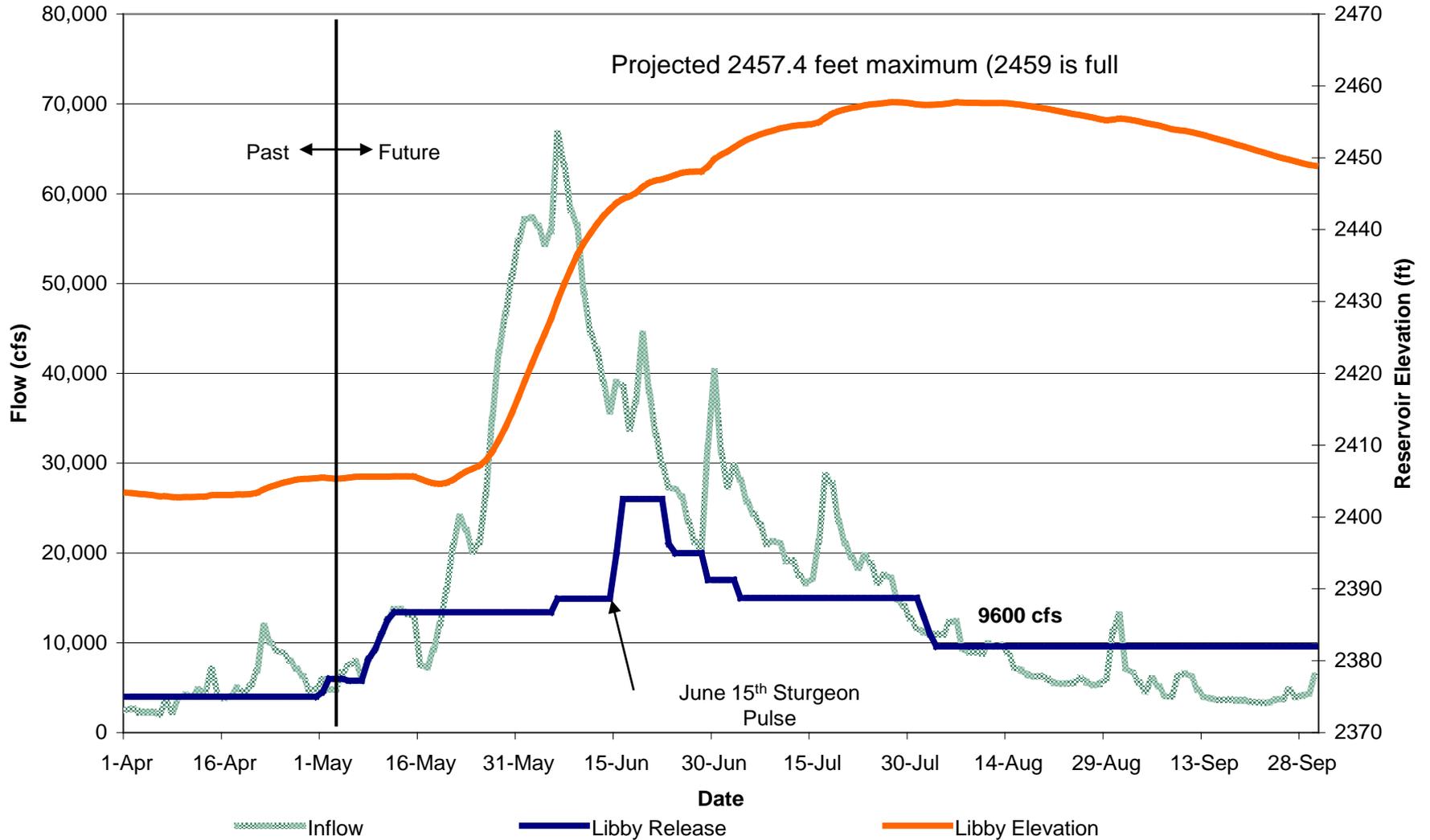
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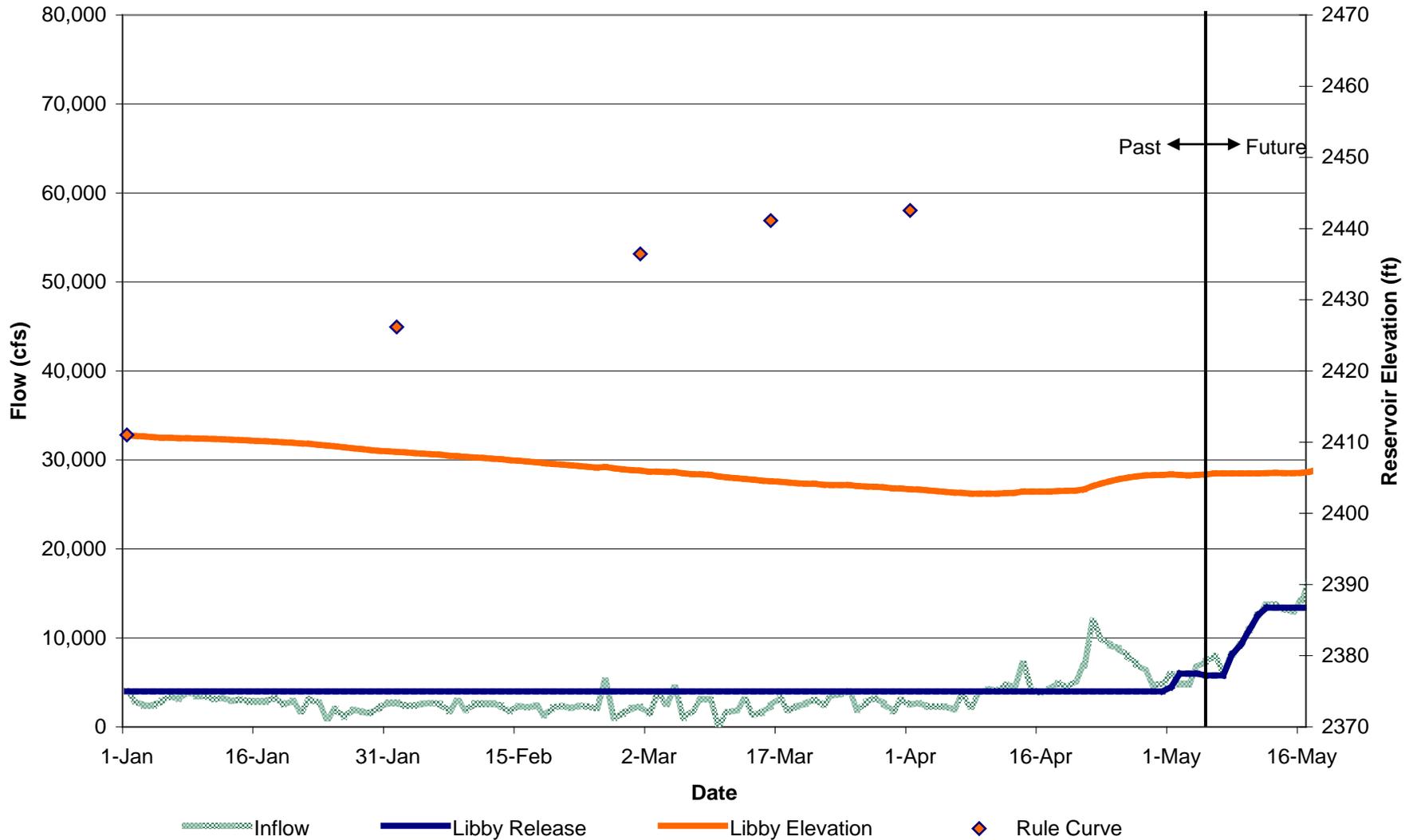
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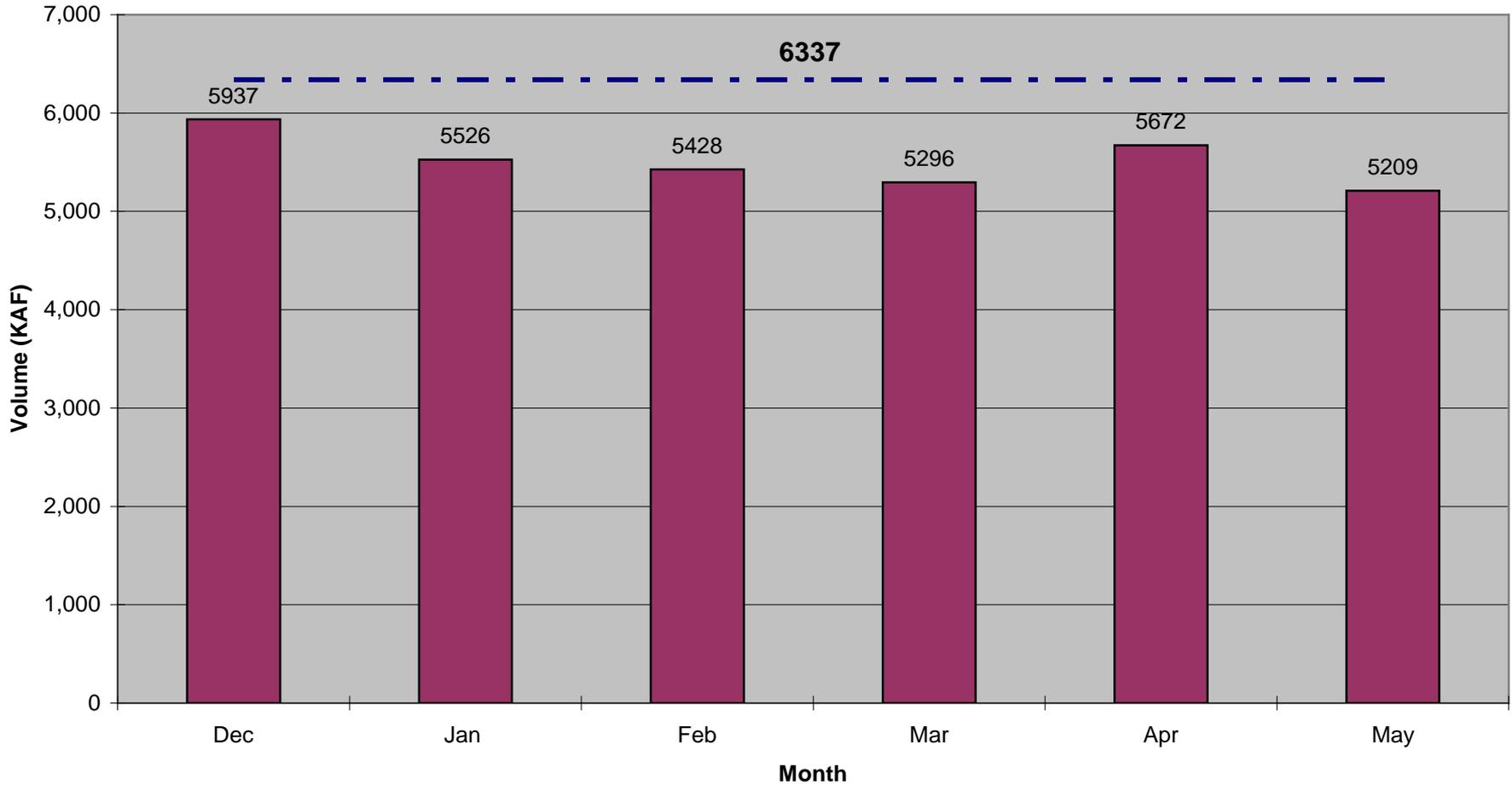
Libby Reservoir April 1, 2009 - Sept. 30, 2009
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 Assumed draft to 2,449 feet by Sept. 30th



Libby Operations January 1, 2009 - May 17, 2009



Libby Dam April - August Volume Inflow Forecasts Thousand Acre-feet (KAF)

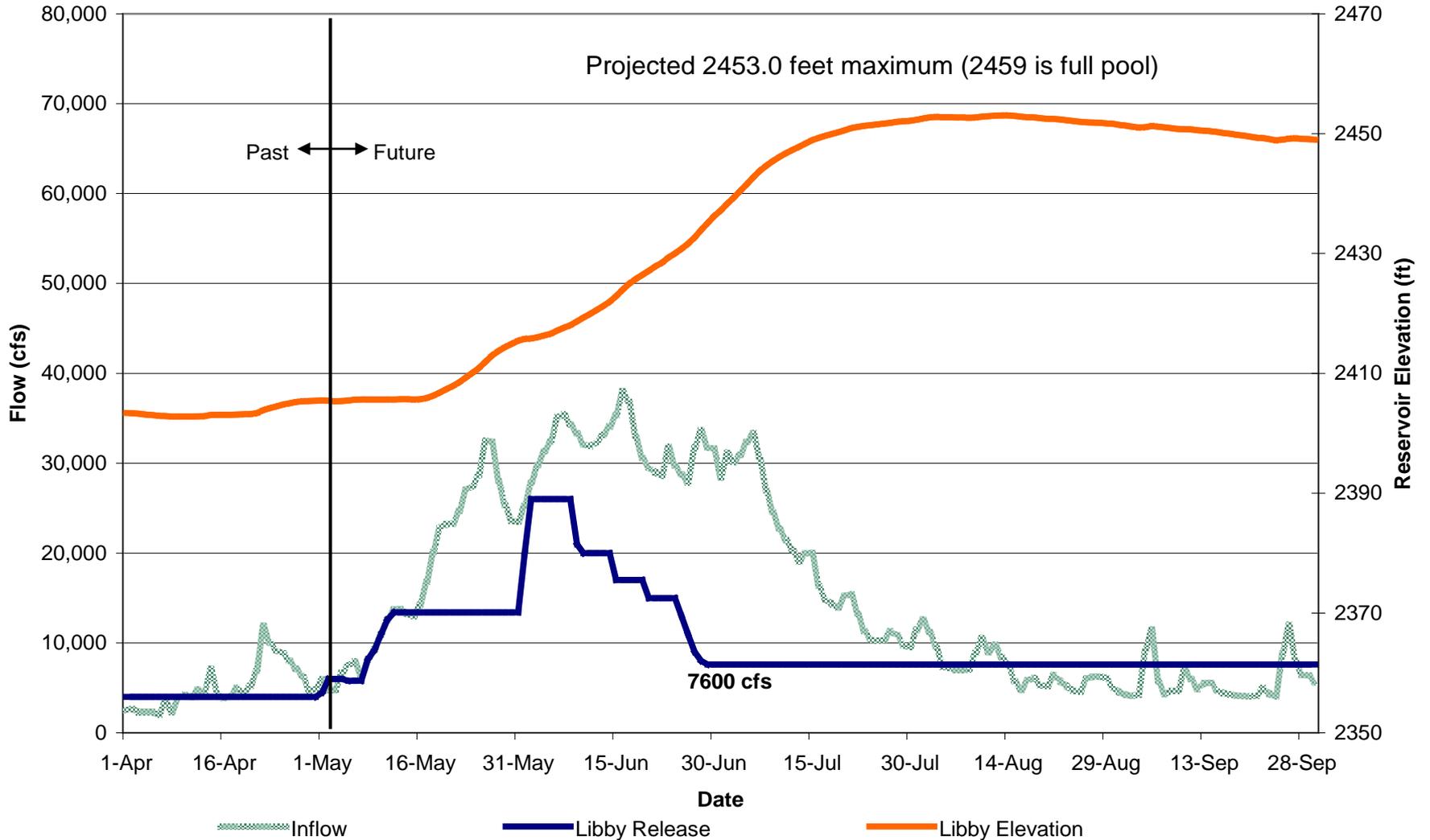


Corps Apr-Aug Frcts Average Apr-Aug Volume

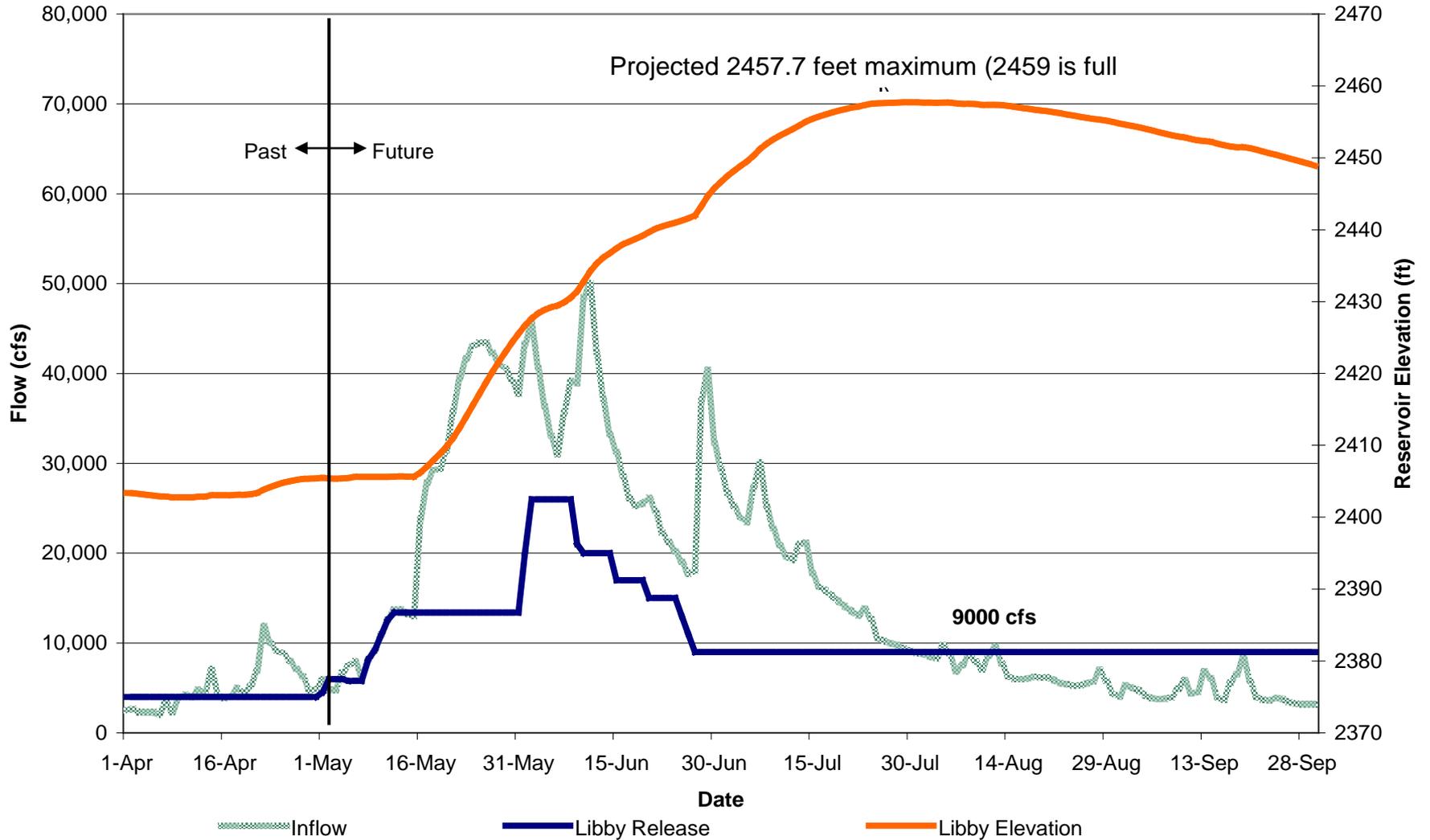
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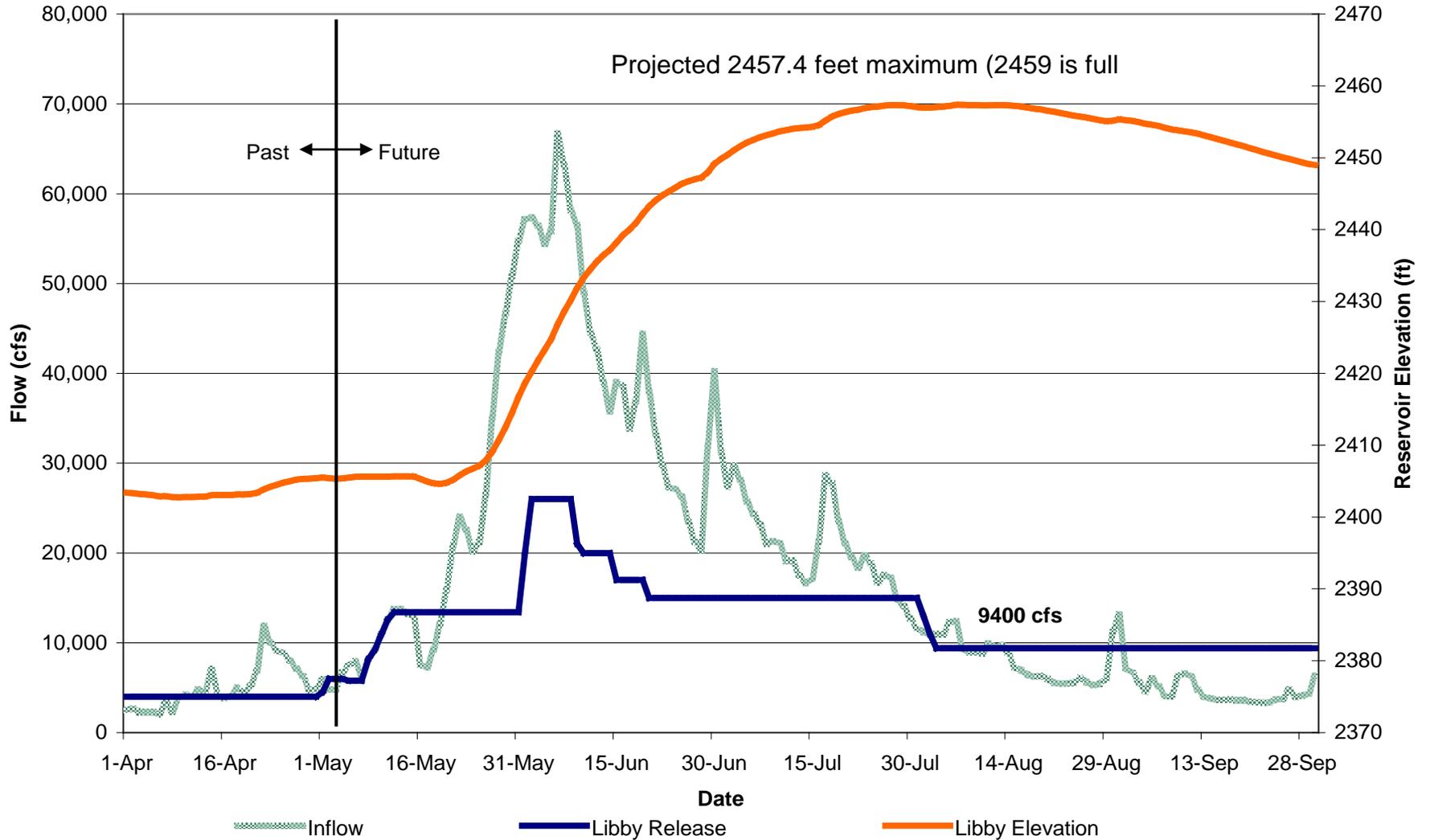
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DRAFT Attachment 2
Transmission Emergency Action Plan
(May 19, 2009)

The following is a list of actions that BPA Transmission Services will pursue to avoid a situation on the transmission system that would result in the interruption or adjustment of protection measures contained in the respective Biological Opinions (BiOps).

When an unplanned transmission outage initiates generator dropping at a federal hydro plant, it could potentially require an interruption of fish protection measures. Notification to the region will be made within 24 hours and the responsible agency will follow the protocols for notification, reporting, and documentation as specified in the *Technical Management Team Emergency Protocols, Appendix 1 – Emergency Protocols of the TMT Water Management Plan*.

Pre-emptive Actions

Whenever possible, BPA Transmission Services will attempt to avoid interruptions to fish protection measures by taking pre-emptive actions.

- Coordinate scheduled transmission maintenance.
- No additional transmission sales on a transmission path experiencing congestion will be allowed to prevent aggravation of the transmission congestion.
- Implement Reliability Redispatch of federal and non-federal generation in the BPA Balancing Authority Area under the Reliability Redispatch Pilot Program when bids are available and effective.
- Coordinate with BPA Power Services Hydro Duty Schedulers to determine if Discretionary Redispatch of federal generation can be done under Attachment M of the OATT.
- Curtail transmission schedules as appropriate to minimize/avoid a transmission system emergency condition.

Emergency Actions

Should the implementation of available resources on the pre-emptive actions list above fail to resolve a situation, or if the situation arises suddenly without warning, BPA Transmission Services shall initiate the process to declare a transmission system emergency. A declaration of a transmission system emergency from BPA Transmission Services will initiate implementation of the Generation Emergency Action Plan - *Attachment 1 of the TMT Emergency Protocols*.

A transmission system emergency will be declared if:

1. a transmission problem requires immediate action to further prevent deterioration of the transmission system or prevent cascading outages; or
2. a transmission problem requires reduction or increase in generation within set time constraints and violating BiOp constraints is the only option that time will permit or it is the only effective option for mitigating the problem.

Implementation of actions from the Emergency Actions List in the Generation Emergency Action Plan will not occur unless a declaration of a transmission system emergency or a NERC Energy Emergency Alert 2 or 3 is requested by BPA.

Attachment 2 – TMT Emergency Protocols

Definitions

Balancing Authority - The responsible entity that integrates resource plans ahead of time, maintains load-interchange-generation balance within a Balancing Authority Area, and supports Interconnection frequency in real time.

Balancing Authority Area - The collection of generation, transmission, and loads within the metered boundaries of the Balancing Authority. The Balancing Authority maintains load resource balance within this area.

Energy Emergency Alerts – Procedures by which a Load Serving Entity can obtain capacity and energy when it has exhausted all other options and can no longer provide its customers' expected energy requirements. An Energy Emergency Alert may be initiated by Reliability Coordinator at 1) the Reliability Coordinator's own request, or 2) upon the request of a Balancing Authority, or 3) upon the request of a Load Serving Entity. 1

Energy Emergency Alert 1 - All available resources in use.

- Balance 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.

Energy Emergency Alert 2 – Load management procedures in effect.

- Balancing Authority, Reserve Sharing Group, or Load Serving Entity is no longer able to provide its customer' 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.

Energy Emergency Alert 3 – Firm load interruption imminent or in progress.

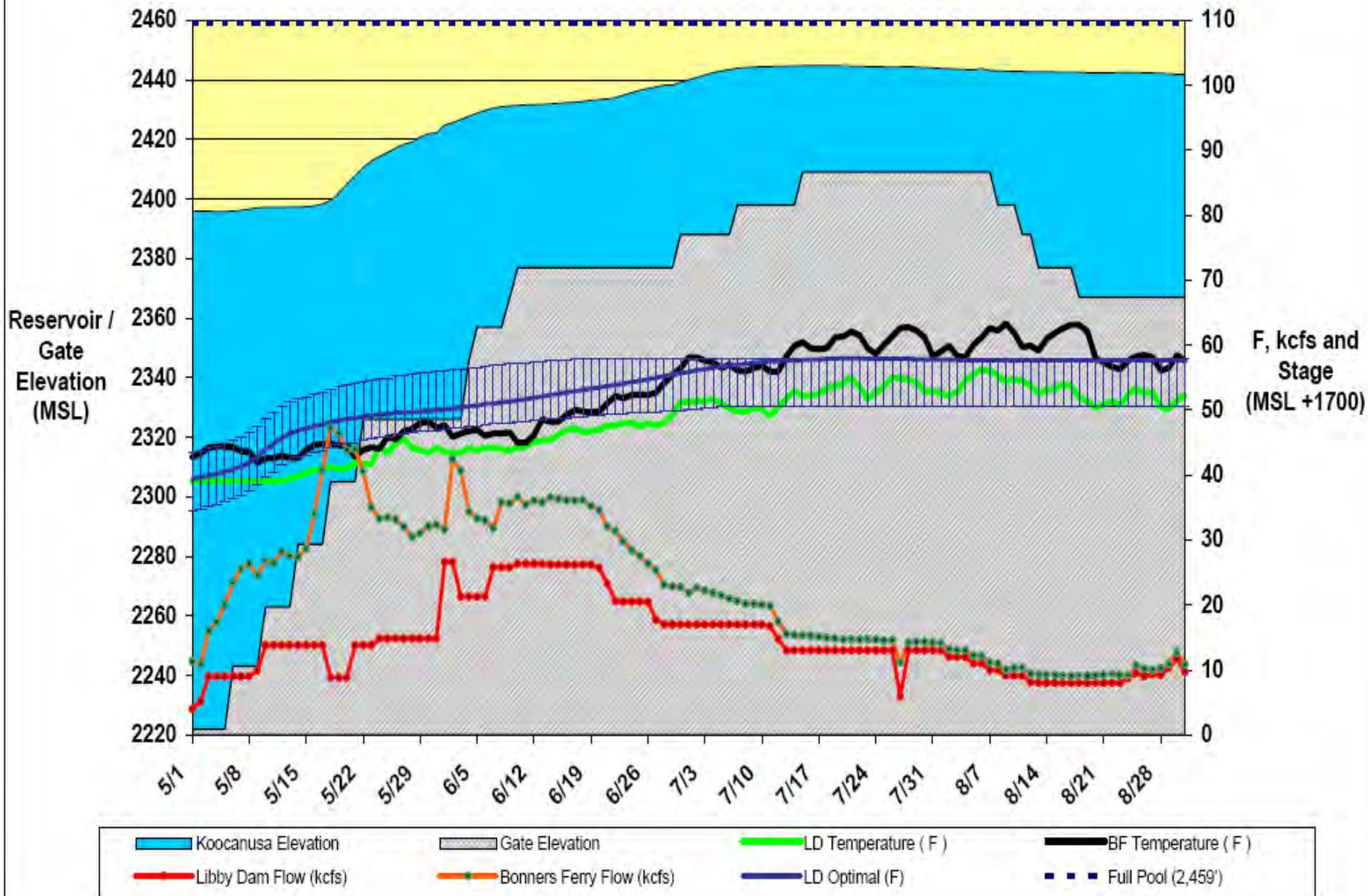
- Balancing Authority or Load Serving Entity foresees or has implemented firm load obligation interruption. The available energy to the Energy Deficient Entity, as determined from Alert 2, is only accessible with actions taken to increase transmission transfer capabilities.

Energy Emergency Alert 0 - Termination

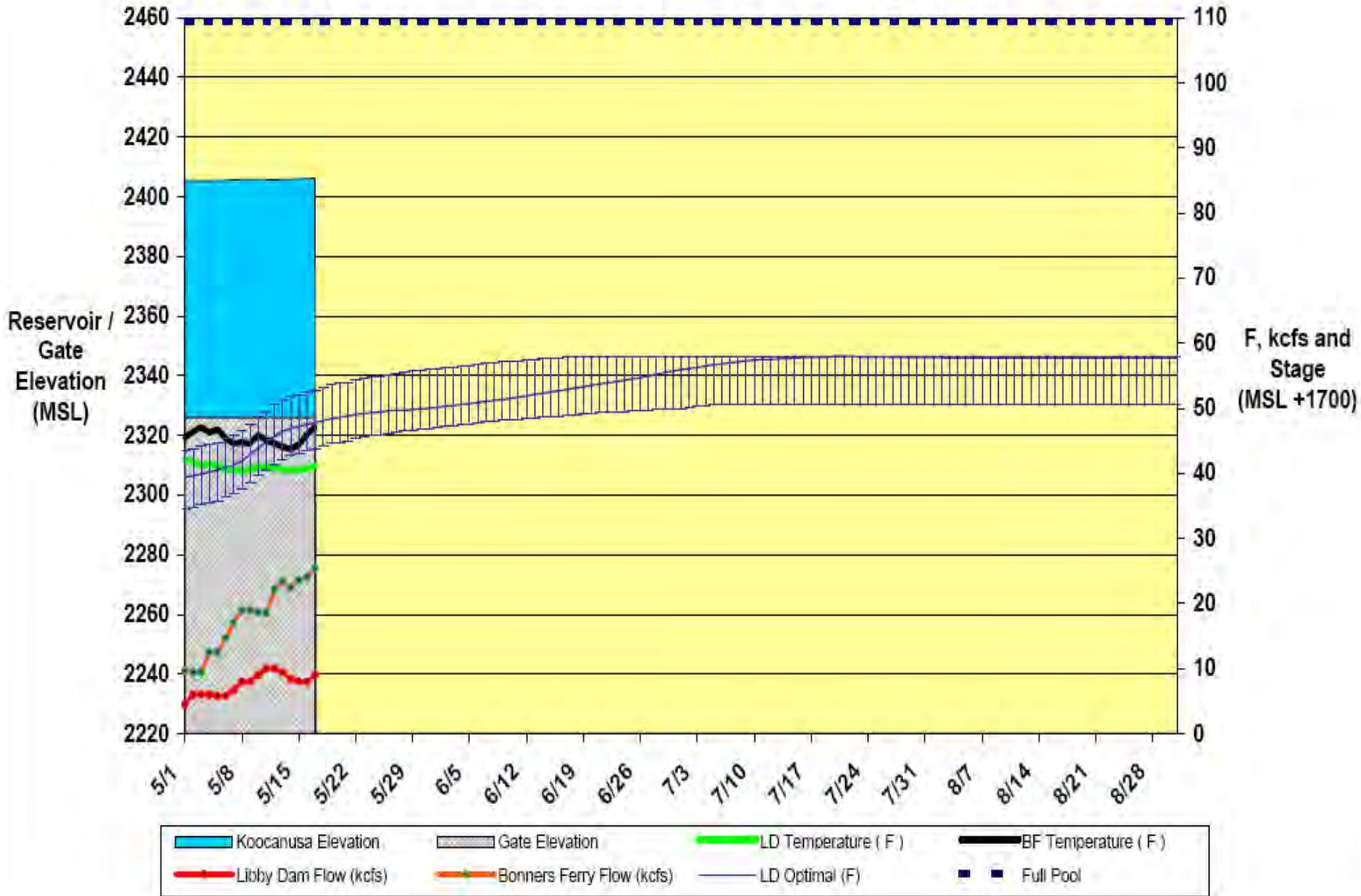
- When the Energy Deficient Entity believes it will be able to supply its customers' energy requirements, it shall request of its Reliability Coordinator that the Energy Emergency be terminated.

Redispatch – The intentional incrementing of location-specific generation and the corresponding decrementing of different location-specific generation to mitigate loading on constrained transmission facilities.

Kootenai River and Kootanusa Reservoir Temperatures 2008 BiOp Fish Operations (1 May - 31 August)



Kootenai River and Koocanusa Reservoir Temperatures 2009 BiOp Fish Operations (1 May - 31 August)



COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

May 20, 2009 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.

Review of Minutes/Agenda

The 4/22, 4/29, 5/6 and 5/13 facilitator notes and official meeting minutes had all been posted to the TMT webpage. Dave Wills, USFWS made the following edit to the 5/6 official minutes:

- Under operations review/reservoirs, clarify language to say "lower ¼ of the 1% operating efficiency range."

With the no other changes mentioned during the meeting, the 4/22, 4/29 and 5/6 Facilitator Notes and Official Meeting Minutes were finalized. TMT will finalize the 5/13 notes at the 5/27 meeting.

Hanford Reach Update

Russell Langshaw, Grant County PUD, referred TMT to a graph posted as a link to the agenda; the daily flow levels have been in the range of 65-167 kcfs, with an average of 126 kcfs. The daily deltas ranged from 9-106, with an average of 32. Langshaw said one exceedance had occurred on April 24, when all mainstem projects were spilling. He also said that operations during May 2-4 raised some communications concerns; since then the PUD has worked closely with BPA to ensure the best possible communication process is in place.

Action/Next Steps: Langshaw noted the construction scheduled for the weekend ahead; he will continue to share updates with TMT as the season progresses and this item will be on the agenda for either the 6/3 or 6/10 TMT meeting.

SOR - FWS #1

Jason Flory, USFWS, referred TMT to SOR FWS #1, posted as a link to the TMT agenda. Flory said that the May final forecast indicated a relatively low sturgeon volume, and as such, the Service has made a request for the sturgeon pulse start date to be pushed back as late as possible. Flory reviewed the proposal's hydrograph shape for the pulse:

- ramp up to full powerhouse for 7 days,
- then 20 kcfs for 7 days;
- then 17 kcfs for 5 days;
- then 15 kcfs for 5 days;
- then return to VARQ flows.

Brian Marotz, MT, added that the proposal for 2009 is similar to those used in 2008, which provided favorable temperature conditions via a gradual warming trend. Marotz recommended a gradual ramp down after the tiered sturgeon flow, with increasingly gradual stage changes as flows approached the stable summer minimum. Greg Hoffman, COE, referred TMT to graphs posted to the agenda that showed thermograph and flow data from 2008, noting that 2009 data has been following as similar pattern to last year. Flory clarified that the SOR was a joint effort by the technical workgroup and the policy team.

Joel Fenolio, COE Seattle District, provided scenarios that used the current Libby volume inflow forecast (5209 KAF) to show potential hydrograph shaping and pool elevations for varying start dates and inflow volumes. Fenolio said that last year's pulse began on June 7th and he estimated that this year's pulse could begin between June 10 – 15th and would pose no threat to flood control operations. TMT members discussed the requested operation, the 2008 operation and the benefits of an operation that would ramp down gradually.

Action/Next Steps: The COE planned to implement the SOR as written and will coordinate closely with the Service and sturgeon technical/policy groups. Scott Bettin, BPA, agreed to forward technical group meeting notes along to Jim Adams at the COE. TMT will discuss the start date for the sturgeon pulse at the 6/3 meeting.

Chief Joseph Spill Test

Amy Reese, Seattle District COE, provided a brief summery of the 4/28-5/1 spill test at Chief Joseph. She thanked everyone who helped coordinate the test and reviewed the following preliminary results:

- Gas abatement was substantial: TDG levels at all fixed gauges were below 120%
- The 120% TDG spill cap is equivalent to 100 kcfs (this has been incorporated into the Spill Priority List)
- A consistent, uniform spill pattern is better than a bulk pattern (hydrologically more stable and yields better gas abatement.)

Action/Next Steps: Reese described the following next steps:

- Clean pipes near the fixed monitoring station to improve monitor equilibration and ability to make real-time adjustments as needed.
- Mike Schneider, COE, will help provide with spill cap estimates for higher levels of spill.
- Construction is planned for joint seal repair, with above water work planned for June-August and in-water work scheduled starting mid July. Spill should still be possible in the bays not being worked on; the COE hopes to minimize spill and impacts to the construction. The COE does not anticipate the construction will impact operations at other projects.
- An update on this item will be on the agenda for a June TMT meeting.

Transmission Emergency Action Plan

Tony Norris, BPA, referred TMT to a draft Transmission Emergency Action Plan posted as a link to the TMT agenda. He noted that this document serves as “Attachment 2” to the TMT Emergency Protocols and asked TMT members to provide comments to him within the next week or two. Norris clarified that if a transmission emergency were to occur in the very near future, the draft would stand as it is currently posted. Norris also reminded TMT members that they may provide comments on the Generation Action Plan as well.

Action/Next Steps: This item will be on the agenda for the 5/27 TMT meeting; Mike Viles, BPA, plans to attend the meeting.

Operations Review

Reservoirs: John Roache reported on BOR projects: Grand Coulee was at elevation 1259.7' and expecting a maximum flood control elevation of 1270' for the end of May. Hungry Horse was at elevation 3522.32', with outflows of 6.2 kcfs and inflows in the range of 18-19 kcfs. Roache clarified the method of calculation for VARQ flows, noting that calculating the initial VARQ outflow begins with the monthly final forecast and that adjustments are made to fine tune the final VARQ outflow. One of the major adjustments takes into account how far above or below flood control the project is on April 30. As the project gets closer to refill, current forecasts and engineering judgment is used to guide discharges.. Jim Adams reported on COE projects: Libby was at elevation 2406.9', with outflows of 13.4 kcfs and inflows picking up to 21.3 kcfs. Albeni Falls was at elevation 2058.2'. Dworshak was at elevation 1551.3' with minimum outflows of 1.7 kcfs. Seven day average inflows were 102.1 kcfs at Lower Granite (Adams noted inflows were at 141 kcfs on 5/19), 248 kcfs at McNary and 260.8 kcfs at Bonneville. Adams added that the impacts of involuntary spill (elevated TDG) were yet to be seen.

Fish: Paul Wagner, NOAA, reported that juveniles were in the 88,000 per day range at Lower Granite after a peak earlier in the season of 160,000 per day. Steelhead numbers were in the 68,000 per day range at Lower Granite. Cindy LeFleur, WA, said that adult passage counts at Bonneville were approaching 93,000 for the season. She noted that June 15 is the cut off date for counting Spring Chinook; total count is tracking to be in the range of 130-150,000 which is significantly lower than the 300,000 prediction. Jacks are on track to reach a new record high, with a total expected to be in the range of 80-90,000.

Power System: Tony Norris, BPA, reported that over 2100 megawatts of wind capacity have been installed.

Water Quality: Paul Wagner reported on Salmon Manager recommendations for a revised Spill Priority List; Jim Adams, COE planned to post the suggested as a link to the agenda following the meeting.

Next TMT Meeting: May 27 Face-to-Face
Agenda items may include:

- Notes Review

- Transmission Emergency Action Plan / Comments
- Upper Snake Augmentation Update
- Spill Priority List
- Summer Operations / Draft Summer Fish Operations Plan
- Operations Review

**Columbia River Regional Forum
Technical Management Team Meeting
May 20, 2009**

1. Introduction

Today's TMT meeting was chaired by Jim Adams (COE) and facilitated by Robin Gumpert (DS Consulting), with representatives of BPA, BOR, Montana, COE, NOAA, Oregon, USFWS, CRITFC, Washington, the Nez Perce Tribe and others participating. 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 for April 22, 29 and May 6, 2009

There were no comments on the April 22 and 29 minutes so they are presumed final. The May 13 minutes will be finalized at the next TMT meeting on May 27. In response to a question from Dave Wills (USFWS), the May 6 official minutes will be revised, under Bonneville Spring Creek Hatchery, to specify that the operation was at the lower quarter of 1% efficiency operating range.

3. Hanford Reach Update

Russell Langshaw (Grant PUD) gave an update on protection flows in Hanford Reach from April 2 to May 17. Flow band constraints ranged from 20-60 kcfs, while mean daily flows ranged from 65-157 kcfs with an average of 126 kcfs. Minimums ranged from 61-141 kcfs, with a mean of 109 kcfs. Maximums ranged from 75-238 kcfs, with a mean of 141 kcfs. Daily deltas were from 9-136 kcfs, with a mean of 32 kcfs.

An exceedance on April 24 occurred mainly as a result of higher inflows than anticipated. All the mid-Columbia reservoirs filled, and the resulting spill sent flows above the Hanford reach protection band for about 4 hours.

An operation on May 2-4 caused some concern, and as a result Grant PUD has been working closely with BPA on coordinating and communicating better to avoid future exceedances. Langshaw will revisit TMT on June 3.

4. Sturgeon Operations at Libby – SOR-FWS#1

The SOR, submitted to the COE on May 15, specifies a sturgeon volume of 0.8 maf is set based on the May final inflow forecast. This is a tier 2 water year, according to the 2006 USFWS BiOp for Libby. Every year, a policy technical team and a technical work group come up with flow management recommendations for sturgeon, which are used to develop the SOR.

This year's operation is planned around encouraging results from last year, which was very similar to 2009 in terms of weather patterns – a cool, late spring and slow warming of river water. The goal of this year's sturgeon operation is to mimic last year's conditions with the limited volume available in 2009. Therefore the SOR has no firm start date; the intent is to start flows as late as possible. Timing will be based primarily on reservoir temperatures and sturgeon spawning behavior. The operation will ramp up from VARQ flows to full powerhouse capacity for 7 days; then to 20 kcfs flows for 5 days; 17 kcfs for 5 days; 15 kcfs for 5 days; and finally back to VARQ flows.

The effort to stage the operation with lower elevation runoff wasn't attempted this year because the goal is to repeat last year's results when temperatures remained cool longer. Temperature is more important than flow, Montana and NOAA agreed.

Greg Hoffman (COE Libby Dam) presented several graphs depicting the requested operation. Despite difficulties in 2008 with selective withdrawal gates at Libby, the sturgeon operation lasted 14 days at full powerhouse. This year, the selective withdrawal gates have been repaired, and one goal of the SOR is to delay peak flows in June. In general, reservoir flows are significantly behind schedule in 2009, as they were in 2008. This will probably be a good year to replicate last year in terms of temperature management and river flow.

Joel Fenolio (COE Seattle) presented graphs of scenarios with different inflow volumes and start dates for the sturgeon pulse. Even the low scenario shows a maximum elevation at Libby Dam of 2,453 feet. In 2009 the maximum elevation will probably happen later in the year than usual.

Brian Marotz (Montana) requested gradual changes in the ramp down to base flows. The COE will implement the SOR as written, in coordination with USFWS. TMT will revisit this issue at its next meeting May 27.

5. Chief Joseph Spill Test

Amy Reese (COE Seattle) summarized the results of spill testing and the post-construction operation at Chief Joseph Dam.

Spill Testing: This took place from April 28-May 1, 2009, scheduled at that time to make use of large volumes that forecasts showed would need to be spilled anyway from Chief Joseph in April for flood control. The spill tests found that newly installed deflectors yield substantial TDG abatement: All tests showed that TDG levels at Chief Joseph remained below 120% with deflectors in place.

The COE will do more long term evaluation of these data to determine the best spill pattern for Chief Joseph. Meanwhile, temporary spill caps are in effect,

based on information from data loggers, probes, and 6 fixed monitoring stations: 20 kcfs for 110% TDG saturation; 40 kcfs for 115% TDG saturation; and 100 kcfs for 120% TDG saturation.

During the tests it was discovered that, compared to data loggers and probes, fixed monitoring stations gave unreliable readings of TDG saturation levels, thus are a poor basis for setting future spill caps. There are 6 of these stations in TDG pipes that are probably clogged with algae. The probes will be moved to locations outside the pipes so they can gather more reliable TDG data.

The TDG abatement achieved by deflectors at Chief Joseph is impressive. The spill cap for 110% TDG in the tailrace was 5 kcfs before deflectors were installed; now it's 20 kcfs. For 115% TDG, the cap was 27 kcfs, now its 40 kcfs. For 120% TDG, the cap was 30 kcfs, now it's 100 kcfs. There was a consistent finding that bulk spill patterns create higher TDG levels than uniform spill.

Summer Construction: Joint seal repair work is underway in response to uplift pressures at Chief Joseph Dam, Reese reported. Two construction projects are in progress. The first involves underwater work sealing the joints in the dam tailwater, scheduled to start the second or third week in July and last through September. The number of cofferdams needed for that work will influence the number of bays available for spill during the work period.

The second project involves repairing joint seals above the tailwater elevation level, lasting from June 10 through September. The COE hopes to minimize spill during the work period. USFWS and NOAA agreed that up to 10 kcfs spill would be considered acceptable. No impacts to other systems or operations are expected. The COE will provide updates on this work as needed.

6. *Transmissions Emergency Action Plan (TEAP)*

The TEAP, attached to today's agenda, is related to the generation emergency action plan BPA approved at TMT last year. The generation emergency action plan describes the steps BPA will take to avoid interrupting fish protection measures, Tony Norris said. The TEAP further describes the role of BPA's Transmission Services in that process. Mike Viles from BPA's transmission business line will give a presentation on the plan at TMT's next meeting May 27. Norris asked TMT to review the TEAP in preparation for Viles' presentation next week.

The plan should cover more than line outages, Jim Litchfield (Montana) said. Transmission can be impacted by a variety of events.

7. Operations Review

a. Reservoirs. Grand Coulee is at elevation 1,259.7 feet and slowly filling, with inflows starting to pick up. The May 31 maximum flood control elevation is 1,270 feet.

Hungry Horse is at elevation 3,522.32 feet, with 6.2 kcfs discharges and inflows of 18-19 kcfs. The reservoir is filling at the rate of 1-1.5 foot per day. Both Libby and Hungry Horse are operating this year under a combined transmission limit of 840 megawatts, which means that Hungry Horse can release no more than about 7 kcfs before they have to spill when Libby is operating at full load, John Roache said. BOR is working with the COE on coordinating flows at Libby under this limitation.

Libby is at elevation 2,406.9 feet, with VARQ flows of 13.4 kcfs starting May 19 at 6 pm. VARQ flows will continue until either the sturgeon pulse starts or updated VARQ information is available. There was mention of the impact full powerhouse flows from Libby will have when the sturgeon pulse begins. Wagner asked what triggered Libby outflows to increase from 6 to 13.4 kcfs. Refill began April 28; at that point inflows were below the VARQ limit, Fenolio said. The project passed inflows over the past 2 weeks until they rose to the VARQ level. The STP forecast shows inflows rising to 17-18 kcfs soon and up to 30 kcfs by May 29, Adams reported.

Albeni Falls is at elevation 2,058.2 feet and slowly filling. The reservoir is anticipated to fill by the end of June.

Dworshak is at elevation 1,551.3 feet, back to minimum flows of 1.7 kcfs after spilling last weekend in response to 160 kcfs inflows.

Seven-day average inflows are 141 kcfs at Lower Granite, 248 kcfs at McNary, and 260.8 kcfs at Bonneville. The Bonneville tailwater has been spilling 111.6 kcfs, with TDG readings just under 120%, mitigated by wind in the forebay. The freshet has clearly arrived. Inflows at Lower Granite were 83 kcfs on May 13, 92 kcfs on May 14, and 97.9 kcfs on May 18.

b. Fish. Juveniles: The combined yearling passage index count was 88,000 fish at Lower Granite on May 19, Paul Wagner reported. The peak migration count was 160,000 within the past week. The 2009 migration is about 60% completed at the lower Columbia River projects. The most recent passage counts were 50,000 at Little Goose; 250,000 at McNary; 30,000 at John Day; and 63,000 at Bonneville, the highest count Bonneville has seen in recent years.

Steelhead passage index counts are 68,000 and peaked at 168,000 fish about a week ago in response to the freshet. Steelhead passage counts at individual projects are 38,000 at McNary and 25,000 at Bonneville.

About 2,000 sockeye per day are passing Lower Granite, which is within the expected timeframe for sockeye passage in late May.

Adults: Approximately 93,000 spring Chinook passed Bonneville, with some 20 days left in the counting period that ends June 15, Cindy LeFleur (Washington) reported. The US v. Oregon technical advisory committee predicted a river mouth run size of 147,000 this year to be revised as new counts come in.

Jack Chinook passage is off the charts in 2009, with a recent count of 80,000-90,000 jacks compared to a previous record of 24,000 jacks in 2000. As a result of this year's bump, the 10 year average for Chinook jacks will rise from 146,000 to 180,000. Researchers are studying this phenomenon and expect to see a strong return of adult Chinook in 2010 as a result.

c. Power System. Installed wind capacity in the region is now 2,105 megawatts, Norris reported.

d. Water Quality. High inflows at Lower Granite have been causing involuntary spill downstream at Bonneville and some of the Snake River projects, Adams reported. On May 19, spill at Lower Granite was 40.7 kcfs, causing spill at Little Goose to exceed its 30 kcfs gas cap. Total dissolved gas levels on the Snake River are 114.4% in the Lower Monumental forebay and 115.8% in the Ice Harbor forebay. The impacts of involuntary spill are still traveling downriver, taking 2-4 days to reach successive projects.

Discussion turned to the spill priority list, part of the spring Water Management Plan. After discussion at yesterday's FPAC meeting the Salmon Managers would like to revise the spill priority list, Wagner said. Their recommendation is to move Bonneville to the top of the list for spills of 125 kcfs or more because that is where most fish in the lower river are passing now. However, Bonneville needs a 120 kcfs daytime cap to protect ascending adults from fallback, and a 150 kcfs nighttime cap. The Salmon Managers' priorities for passing involuntary spill in descending order are:

Ice Harbor – Has up to 30% daytime spill and to the gas cap at night with no transportation, making it a good candidate for high spill.

McNary – Is generally limited by powerhouse capacity, but can spill up to 150 kcfs with only 120% TDG in the tailrace.

Lower Monumental – Transport here is typically not very effective; passage via spill is better. Testing of uniform vs. bulk spill is in progress. Generally it's possible to spill about 10 kcfs more at Lower Monumental with a

uniform than a bulk spill pattern. If the project is using a bulk pattern and more spill is needed, switch to a uniform pattern and increase spill by 10 kcfs.

Little Goose – Can spill up to 125% at night, with a daytime spill cap of 30% for adult passage. Nevertheless, the Salmon Managers reached consensus on spilling a higher percentage at Goose when the powerhouse is fully loaded and all 6 units are running. Spill can increase under such conditions without causing adult passage problems.

Lower Granite and Chief Joseph are next, followed by John Day with its ongoing 30% vs. 40% spill test. The Dalles and Dworshak are last on the list.

This proposal goes against the guidelines COE fish biologists typically use, Laura Hamilton (COE) noted. The usual order is to spill first at Lower Granite, then Lower Monumental, Little Goose and Ice Harbor, moving down the river rather than cherry-picking projects. The Salmon Managers' recommendation is based on current migration and transport benefits at specific locations, Wagner explained. TDG impacts of the proposal could actually lower the amount of spill available, Norris said. One suggestion for the proposal is to split projects into two lists, those that are above and below 125 kcfs, which has worked in the past, Adams and Scott Bettin (BPA) agreed.

Wagner will provide the COE and BPA with the criteria the Salmon Managers used in developing their spill recommendations. TMT will revisit the spill priority list at its next meeting.

9. Next Meeting

The next regular TMT meeting will be on May 27 at the COE Portland office. The transmission emergency action plan, lower Snake River flow augmentation, spill priority list, summer operations, and possibly the FOP will be on the agenda. This summary prepared by consultant and writer Pat Vivian.

| Name | Affiliation |
|-----------------|--------------------|
| Tony Norris | BPA |
| John Roache | BOR |
| Jim Litchfield | Montana |
| Doug Baus | COE |
| Paul Wagner | NOAA |
| Rick Kruger | Oregon |
| Dave Wills | USFWS |
| Jim Adams | COE |
| Tim Heizenrader | Centaurus |
| Erik Volkmann | BPA |
| Kyle Dittmer | CRITFC |
| Joel Fenolio | COE |

| | |
|------------------|---------------------|
| Laura Hamilton | COE |
| <u>Phone:</u> | |
| Brian Marotz | Montana |
| Shane Scott | PPC |
| Jason Flory | USFWS |
| Cindy LeFleur | Washington |
| Amy Reese | COE Seattle |
| Steve Hall | COE Walla Walla |
| Margaret Filardo | FPC |
| Russ Kiefer | Idaho |
| Richelle Beck | DRA |
| Greg Hoffman | COE Libby Dam |
| Russ George | WMC |
| Tom Le | Puget Sound Energy |
| Dave Statler | Nez Perce Tribe |
| John Hart | EWEB |
| Mike Butchko | Powerex |
| Glen Trager | Shell Energy |
| Tom Lorz | CRITFC |
| Rob Diaz | Integral Renewables |
| Scott Bettin | BPA |
| Russell Langshaw | Grant PUD |

TECHNICAL MANAGEMENT TEAM

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

TMT CONFERENCE CALL

Friday May 22, 2009 05:00 - 6:00

CONFERENCE PHONE LINE

Conference call line:888-285-4585; PASS CODE = 601714

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Please e-mail her at rgumpert@cnnv.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and Introductions
2. Lower Granite Transport Facilities - Dan Feil, USACE
3. Other
 - a. Set agenda for next meeting - **May 27, 2009**
[\[Calendar 2009\]](#)

Questions about the meeting may be referred to:

*[Jim Adams](#) at (503) 808-3938, or
[Cathy Hlebechuk](#) at (503) 808-3942, or
[Dan Feil](#) at (503) 808-3945*

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

May 22, 2009 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.

Debris Issue at Lower Granite

Russ Kiefer, ID, referred to an email sent out earlier in the day about regarding debris collecting on the screens at Lower Granite. Kiefer said he appreciated the COE personnel at the project who helped alert the region to this issue and noted that for steelhead, it would be much better to transport than collect. He suggested increased spill would improve passage at Lower Granite and would also move more water to the spillway rather than the powerhouse. Kiefer said that after conferring with his co-managers, the official request from IDFG is to shift spill up to 120%.

Dan Feil, COE, referred TMT to an email sent by John Bailey, Project Operator at Lower Granite, which provided detail on the debris issue at the project. Feil noted that 700 fatalities have been observed today. He also clarified that no PIT tag data will be available during bypass, as the screen that is having debris issues is downstream of the primary bypass. At the time of the call, the project had outflows of 140 kcfs and was spilling 32.5 kcfs. Feil said that a 122% gas cap level is equitable to about 40 kcfs; he clarified that the gas cap is per the new Spill Priority List. Kiefer recalled that two days ago the project spilled at higher level and levels were still were under 110%; he estimated the COE could bring spill up to 50 kcfs and still not go over 120%.

Ritchie Graves, NOAA, asked the COE if they would be amenable to spilling up to 120%. (He also clarified that the current minimum requirement at Lower Granite per the 2008 BiOp is 20 kcfs.) Tom Lorz, CRITFC, acknowledged the difficulty in estimating the level of benefit, but the decision being made today is one that will be based on the best professional judgment of those in the region. Dave Statler, Nez Perce Tribe, acknowledged that two or three days ago the Clearwater had elevated flows but levels have since subsided and the debris will likely subside within the next day or two. The COE answered NOAA's question by stating they were indeed amenable to spilling up to 120%.

Action: The COE planned to implement an operation that would bring spill up to the 120% cap. Feil planned to send this out to TMT in a teletype and will follow up with email updates as the next few days unfold.

- ID suggested the COE review a report that refers to PIT tag data that indicates that spillway passage is better than bypass passage and to be mindful that this is the peak migration of the most endangered fish on the Snake River - the Sockeye.

Feil said the COE will be sure to pass on all data (including effects on lamprey and any effects to passage at downstream projects) gleaned from this unexpected event and stated that the COE will do the best they can to manage this issue.

Next TMT Meeting: May 27th Face to Face

Agenda items include:

- Review Notes
- Follow up on Debris issue at Lower Granite
- Transmission Emergency Action Plan / Comments
- Lower Snake Augmentation Update
- Spill Priority List
- Summer Operations / Draft Summer Fish Operations Plan
- Operations Review

**Columbia River Regional Forum
Technical Management Team Conference Call
May 22, 2009**

1. Introduction

Today's TMT call was chaired by Dan Feil (COE) and facilitated by Robin Gumpert (DS Consulting), with representatives of CRITFC, NOAA, Oregon, COE, Idaho, Nez Perce Tribe, BPA, USFWS, and others participating. 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. Debris in Bypass at Lower Granite Dam

Today's unscheduled call was requested by Russ Kiefer (Idaho) to address problems with debris accumulation at the primary dewaterer of the Lower Granite bypass facility. The first watering screen in the bypass facility has been shut down and the transport operation suspended due to heavy clogging with fine debris, pine needles, etc. While project staff report that it is typical to see large woody debris when flows are 150 kcfs or higher, this type of debris accumulation has not been seen before.

To date, 700 salmonid mortalities have been counted as a result of the debris. Now that the project is in primary bypass mode, the mortalities have generally stopped, Feil assured everyone. However, all were aware that lower adult returns can be expected for fish that are bypassed now instead of being transported at Lower Granite. The source of the debris appears to be the Clearwater River, where there were record-setting flows 2-1/2 to 3 days ago.

Kiefer's initial proposal to spill to the 125% TDG tailrace level met with resistance, so he modified it to 120% to achieve consensus. Noting that transporting fish will result in higher adult returns, especially for Snake River sockeye, and that the current situation precludes sampling to evaluate passage conditions, Kiefer pushed for increased spill at Lower Granite to help flush out the debris and resume transport as soon as possible. According to section 6.2 in Appendix 1 of the Water Management Plan, the situation fits the definition of emergency measures that call for adaptive management.

Rick Kruger (Oregon) asked whether PIT tag data accrues during bypass operation; Feil said no. The screen with the debris problems is downstream of the primary bypass, so fish returning to the river aren't encountering it.

The outcome of today's meeting is that the COE will spill to 120% of the gas cap at Lower Granite as requested, Feil said. There was discussion of what that will mean in terms of actual spill. Currently the project is spilling

approximately 32.5 kcfs, and the 120% gas cap level is approximately 41 kcfs, Feil said. Oregon, Idaho and CRITFC urged the COE to push the gas cap as high as possible under the circumstances. Tom Lorz (CRITFC) urged reliance on empirical data over SYSTDG model runs to set spill caps. Kiefer advocated spilling closer to 50 kcfs and using Lower Granite tailrace TDG readings as a gage of the highest spill level possible. That level of spill would probably not exceed 120% in the tailrace based on empirical data, he said.

Dave Statler (NPT) asked how often TDG levels are monitored. Once daily and the COE sets spill caps not only to manage TDG levels in the Lower Granite tailrace but Little Goose forebay as well, Feil replied. Scott Bettin (BPA) asked about the BiOp spill requirement for Lower Granite, which is 20 kcfs. Statler suggested looking for other sites in the hydrosystem that might be impacted by the debris at Lower Granite. Staff at the four dams downriver will be alerted to check their fish screens for debris, Feil said.

TMT members stated their views.

NOAA – Data strongly indicate that fish at Lower Granite are better off in terms of adult returns if transported rather than bypassed to the river. The sooner transport operations can resume the better.

COE – Willing to spill to 120% TDG until transport can resume. Not willing to recalculate spill caps more than once daily, or alter the process of setting spill caps, which are based on both SYSTDG model runs and empirical data. TDG levels at Little Goose forebay must be taken into account when setting caps.

Nez Perce, CRITFC – Requested that project staff provide counts of lamprey mortalities in all bypass facilities including fish screens, turbine intakes, and the bypass facility. (These will be included in the COE's monthly report to Judge Redden.)

Idaho, Oregon – The situation calls for pushing the envelope on the spill cap in order to aid peak migration of Snake River steelhead, the most endangered fish in the basin. Along with CRITFC, urged reliance on empirical data over SYSTDG model runs for setting spill caps as high as possible without exceeding 120% in the Lower Granite tailrace.

The COE will issue a teletype to the project calling for spill to the gas cap of 41 kcfs, up from the current level of 32.5 kcfs. Project staff will monitor the situation closely over the Memorial Day weekend and will reinstate transport operations as soon as possible. TMT will touch base again on Tuesday, May 26, for a status update on this.

3. Next Meeting

The next regular TMT meeting will be on May 27 at the COE Portland office. This summary prepared by consultant and writer Pat Vivian.

| <i>Name</i> | <i>Affiliation</i> |
|--------------------|---------------------------|
| Dan Feil | COE |
| Shane Scott | PPC |
| Ritchie Graves | NOAA |
| Rick Kruger | Oregon |
| Russ Kiefer | Idaho |
| Dave Statler | Nez Perce Tribe |
| Mike Butchko | Powerex |
| Scott Bettin | BPA |
| Howard Schaller | USFWS |
| Bob Heinith | CRITFC |

TECHNICAL MANAGEMENT TEAM

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

TMT MEETING

Wednesday May 27, 2009 09:00 - 12:00

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

CONFERENCE PHONE LINE

Conference call line:888-285-4585; PASS CODE = 601714

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 or Cathy Hlebechuk (503) 808-3942 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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*All members are encouraged to call Robin Gumpert with any issues or concerns they would like to see addressed.
Please e-mail her at rgumpert@cnnv.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and Introductions
2. Review Meeting Minutes for May 13, 2009 [\[Meeting Minutes\]](#)
3. Transmissions Emergency Action Plan - Tony Norris, BPA
 - a. [TEAP](#)
4. Sturgeon Operations at Libby - Dan Feil, COE RCC
 - a. [SOR-FWS#1](#)- Jason Flory, USFWS
5. Lower Snake Augmentation Update - John Roache, USBR
6. Spill Priority List - Paul Wagner, NOAA-F
 - a. [Fish Managers recommendation for Order of Spill Priority](#)
7. Lower Granite Barge Maneuvering Test- Dan Feil, COE RCC
8. Dworshak Unit 3 Outage - Steve Hall, USACE-NWW
9. Operations Review

- a. Reservoirs
 - b. Fish
 - c. Power System
 - d. Water Quality
10. Other
- a. Set agenda for next meeting - **June 3, 2009 (Conference Call)**
[\[Calendar 2009\]](#)

Questions about the meeting may be referred to:

*[Jim Adams](#) at (503) 808-3938, or
[Cathy Hlebechuk](#) at (503) 808-3942, or
[Dan Feil](#) at (503) 808-3945*

DRAFT Attachment 2
Transmission Emergency Action Plan
(May 26, 2009)

The following is a list of actions that BPA Transmission Services will pursue to avoid a situation on the transmission system that would result in the interruption or adjustment of protection measures contained in the respective Biological Opinions (BiOps).

Pre-emptive Actions

Whenever possible, BPA Transmission Services will attempt to avoid interruptions to fish protection measures by taking pre-emptive actions.

- Coordinate scheduled transmission maintenance.
- No additional transmission sales on a transmission path experiencing congestion will be allowed to prevent aggravation of the transmission congestion.
- Implement Reliability Redispatch of federal and non-federal generation in the BPA Balancing Authority Area under the Reliability Redispatch Pilot Program when bids are available and effective.
- Coordinate with BPA Power Services Hydro Duty Schedulers to determine if Discretionary Redispatch of federal generation can be done under Attachment M of the OATT.
- Curtail transmission schedules as appropriate to minimize/avoid a transmission system emergency condition.

Emergency Actions

Should the implementation of available resources on the pre-emptive actions list above fail to resolve a situation, or if the situation arises suddenly without warning, BPA Transmission Services shall initiate the process to declare a transmission system emergency. A declaration of a transmission system emergency from BPA Transmission Services will initiate implementation of the Generation Emergency Action Plan - *Attachment 1 of the TMT Emergency Protocols*.

A transmission system emergency will be declared if:

1. a transmission problem requires immediate action to further prevent deterioration of the transmission system or prevent cascading outages; or
2. a transmission problem requires reduction or increase in generation within set time constraints and violating BiOp constraints is the only option that time will permit or it is the only effective option for mitigating the problem.

Implementation of actions from the Emergency Actions List in the Generation Emergency Action Plan will not occur unless a declaration of a transmission system emergency or a NERC Energy Emergency Alert 2 or 3 is requested by BPA.

Generator Dropping

When an unplanned transmission outage initiates generator dropping at a federal hydro plant, it could potentially require an interruption of fish protection measures. If fish protection measures are interrupted, notification by the responsible agency will follow the protocols for notification, reporting, and documentation as specified in the *Technical Management Team Emergency Protocols, Appendix 1 – Emergency Protocols of the TMT Water Management Plan*.

Definitions

Balancing Authority - The responsible entity that integrates resource plans ahead of time, maintains load-interchange-generation balance within a Balancing Authority Area, and supports Interconnection frequency in real time.

Balancing Authority Area - The collection of generation, transmission, and loads within the metered boundaries of the Balancing Authority. The Balancing Authority maintains load resource balance within this area.

Energy Emergency Alerts – Procedures by which a Load Serving Entity can obtain capacity and energy when it has exhausted all other options and can no longer provide its customers' expected energy requirements. An Energy Emergency Alert may be initiated by Reliability Coordinator at 1) the Reliability Coordinator's own request, or 2) upon the request of a Balancing Authority, or 3) upon the request of a Load Serving Entity. 1

Energy Emergency Alert 1 - All available resources in use.

- Balance 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.

Energy Emergency Alert 2 – Load management procedures in effect.

- Balancing Authority, Reserve Sharing Group, or Load Serving Entity is no longer able to provide its customer' 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.

Energy Emergency Alert 3 – Firm load interruption imminent or in progress.

- 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.

Energy Emergency Alert 0 - Termination

- When the Energy Deficient Entity believes it will be able to supply its customers' energy requirements, it shall request of its Reliability Coordinator that the Energy Emergency be terminated.

Redispatch – The intentional incrementing of location-specific generation and the corresponding decrementing of different location-specific generation to mitigate loading on constrained transmission facilities.

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

May 27, 2009 Meeting

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.

Review of Minutes/Agenda

The May 13 Facilitator Notes and Official Meeting Minutes were posted and, with no further comments, were considered final. Notes from the May 20, 22 and today's May 27 meeting will be finalized at the next TMT meeting.

Transition Emergency Actions Plan

TMT had received BPA's draft TEAP during the May 20 TMT meeting and had offered a few comments at that time, which BPA incorporated into a revised draft presented today. Mike Viles from the Transmission Business Line discussed in further detail the pre-emptive actions list and talked about the next step Alert 1 actions, all of which would be measures taken prior to impacting fish protection measures. In response to a question about what the COE is doing to reduce bottlenecks in the power system, Mike shared that new lines were being built in busier areas and that BPA had been awarded additional borrowing authority to step up those actions. It was suggested that TMT might take a Fall field trip to look at dispatch and better understand the real-time decisions that are made.

Next Steps: Tony will invite someone from BPA to discuss an annual letter that describes from power services to connect and control groups what their requirements are for declaring emergencies. This presentation will likely happen at a TMT meeting in June, TBD. Any comments on the TEAP should be shared with Tony Norris, BPA.

Sturgeon Pulse Operations

Dan Feil and Joel Fenolio, COE, updated TMT that temperatures were beginning to stratify but were not ready yet to begin the sturgeon pulse at Libby – the current expectation was that the operation will begin on June 8: ramping Libby up to full load for 7 days, per the SOR presented at the May 20 TMT meeting. Joel said the operation would begin no later than June 15 and offered to provide updated information and visuals at the next TMT meeting.

Upper Snake Flow Augmentation Update

John Roache, BOR, shared an update that the BOR still expects to release 487 kaf flow augmentation from the Upper Snake this year, starting on June 1 with a release of water above Milner. Flow augmentation from the Boise will also be released in June. Flow augmentation from the Payette will be released primarily in July and August due to water quality concerns. John offered to share more details with TMT as they are known.

Spill Priority List

As follow up from the May 20 TMT meeting, the COE shared feedback with the salmon managers on their proposed spill priority list. The COE agreed with the rationale for the priorities given the current conditions and operations, with the exception of the 120 kcfs request at Bonneville: given implications to adult fallback, the COE would not spill above 110 kcfs at Bonneville.

Action: Laura Hamilton, COE, will write up a new teletype to reflect the suggested spill priority list and COE response, and share it with TMT when it is released. (**NOTE:** A follow up email was sent on 5/28 from the COE indicating a few minor changes that were made to the list, which was sent out to TMT.)

Lower Granite Barge Maneuvering Test

The COE shared that as part of the fish facility re-design at Lower Granite, there is a need for a test to determine the best location for providing access to loading barges during spill. The COE acknowledged that this issue was being brought to TMT last minute, and this was due to sudden availability of funds to move forward with the work. The test, currently scheduled for June 4, would require 12 hours of flows at 130 kcfs. With the forecast showing the project being around 110-120 kcfs, the COE suggested that the additional water could be made up by increasing storage in the pool, thereby operating outside MOP.

A presentation on this was shared with FPAC on 5/26. FPAC responded that they had hoped for flexibility around the date, and absent that option, provided other options, noting that MOP operations are a court ordered fish protection measure. Options included: Using Dworshak flows to augment (**NOTE:** the Nez Perce Tribe was not at the FPAC meeting so had not weighed in on this or any of the options) or providing spill elsewhere in the system such as nighttime spill at Little Goose, or spill at Lower Monumental or Ice Harbor – this they believe would continue to move the fish while the Lower Granite pool was filling. While the ‘net effect’ for water travel time from a hydrologic standpoint might not be much, the timing of the fish arrival and passage at each of the projects from a biological standpoint was of concern to the salmon managers – factoring in predation and other stresses. Finally, FPAC asked whether Idaho Power had been contacted to explore options for how it might provide support for this operation/test.

The COE suggested that June 4 was chosen specifically because the smallest tugboat and largest barge would both be at the project at that time. In response to a question about the Water Control Manual that guides the COE not to operate outside MOP if Lower Granite flows are above 120 kcfs due to local flooding concerns at Lewiston, the COE suggested that the deviation from MOP would only be needed if flows were below 120 kcfs. Finally, they suggested that actual operations would depend on the natural condition that day; if today’s ESP forecast is accurate, the COE estimated that the operational need would be MOP+1 or MOP+2 for a period of 24 hours or less.

TMT members weighed in on the COE’s proposal to operate outside MOP if necessary to provide 130 kcfs flows at Lower Granite for the test on June 4:

- Oregon: Opposed to operating outside MOP given that it is an important, court ordered fish protection measure. If operating outside MOP, compensate by providing spill elsewhere in the system. Other options suggested were to conduct the test at the flow available in the system on June 4, or conduct it at a later time.
- Idaho: Supports the study and test at 130 kcfs and believe it is possible to do this with compensation through spill at another project. The state of Idaho does not support using Dworshak flows to augment for this operation. No official objection but do feel that deviations from MOP should be of concern to the action agencies.
- Montana: Wants to see more details about the operation; supports the test to find the best fish facility redesign and with this objective met at what conceptually appears to outweigh the short term costs, no objection to the proposed operation.
- NOAA: Support the study at 130 kcfs and believe that providing some spill elsewhere to compensate for the loss at Lower Granite during storage into the pool would help make the fish protection measures whole, even if the difference is small. The benefits of the test in providing the best information for re-design of the fish facility will be important and might outweigh the short term ‘costs’; still, do not take the costs lightly. No objection to the operation.
- BPA: It is important to find the best location for the fish facility. From a hydrologic perspective, there does not appear to be much change in water travel time – want to see the details of the operation. Defer to the COE to make the final decision as there would be no financial impact from any of the options generated today. In this case, adaptive management should be used.
- BOR: Sees the value of the test and 130 kcfs flows would provide optimum conditions to get the best results. Water travel time does not seem to be a problem from a hydrologic perspective but do not know the biological impacts. Defer to the COE to make the final decision.
- CRITFC: Would like to wait to see more details about the proposed operation before weighing in.

ACTION: The COE will run operating scenarios to show at various natural flow levels what would be needed in terms of MOP operations to bring Lower Granite up to 130 kcfs for a 12-hour period. This information will be shared with the region as soon as possible (before June 3) and TMT will discuss this issue again during their meeting on June 3.

Dworshak Unit 3 Outage

Steve Hall, Walla Walla District COE, shared information with TMT about a leak on Dworshak’s unit 3 discovered late Friday afternoon. The unit has since been out of service as it is dewatered for inspection. The cause, exact location and extent of the damage were yet unknown – the COE hoped to have more information in the next one to two weeks. The short term impact to operations was that Dworshak outflows were reduced to 5 kcfs. In response to a question, Steve suggested that this issue had no impact to flood control but that gas cap exceedances were the concern. He also shared that a snow flight was planned for June 11 to verify the percentage of snow covered area which will be important for setting summer operations at this project.

Next Steps: The COE will keep TMT apprised via email as new information is available – this issue will also be revisited at the June 3 TMT meeting. The COE has not looked in any depth at next step operating options given they do not understand the extent of the damage nor how long it will take to repair; however they are considering how to address TDG issues including options for obtaining waivers to go beyond the current TDG limits set by the state of Idaho and Nez Perce Tribe.

Operations Review

Reservoirs: Grand Coulee was at elevation 1265.6’ feet and filling. Hungry Horse was at 3529.1 feet with 6.1 kcfs out and filling with 18-19 kcfs in. Outflows would be reduced to about 5.1 kcfs on 5/28. Libby was at elevation 2410.5 feet with 29.1 kcfs in and 13.4 kcfs out. Albeni Falls was at elevation 2059.5 feet with 74.5 kcfs in and 65.2 kcfs out. Dworshak was at elevation 1568.9 kcfs with 22.5 kcfs in and 5 kcfs out. Lower Granite day average flows were 164 kcfs; McNary day average flows were 331 kcfs; and Bonneville day average flows were 334 kcfs.

Fish: Adults – Cindy LeFleur, Washington, reported that the TAC updated their run size estimates at Bonneville to 160,000 plus or minus 5,000. 105,000 had been counted to date and the spring counts would continue through June 15. A concern with adult travel delays between Lower Monumental and Little Goose, upon closer inspection, revealed that the fish had in fact made it to Lower Granite so there was likely no delay. Counting errors of jacks and adults might have been the cause of the mis-read.

Juveniles – Paul Wagner, NOAA, reported that most of the yearling chinook were in the lower river, with about 70,000 at McNary and 40,000-60,000 at Bonneville. Sub-yearling counts had picked up to 17,000 at Lower Granite and 19,000 at Little Goose. Steelhead counts were around 38,000 at Lower Granite and 46,000 at Little Goose. Sockeye counts were about 4,000 at Little Goose. Adult numbers were tracking above the 10 year average and were later than the 10-year average. Jack numbers were far above the 10-year average. Juvenile timing was tracking well with the 10-year average at Lower Granite. Steelhead were earlier than expected.

Power System: Nothing to report.

Water Quality: Laura Hamilton reported that with the recent involuntary spill on the Snake River, a number of TDG exceedances had occurred, with the most occurrences at Camas/Washougal, Bonneville forebay and Ice Harbor forebay. She noted that exceedances at the Bonneville forebay were unusual and likely had been impacted by spillwall construction work at The Dalles.

Other: The salmon managers provided revisions to BPA’s Emergency Actions list – Tony Norris, BPA, said he would make the changes and send the revised list to TMT and schedulers prior to the June 3 TMT meeting.

TMT Schedule: June 3 Face to Face, June 17 Face to Face/Conference Call (TBD), June 24 Face to Face

June 3 meeting agenda items include:

- Finalize May 20, 22, 27 Facilitator Notes and Official Minutes
- Update on Sturgeon Pulse Operation at Libby
- Lower Granite Barge Maneuvering Test
- Dworshak Unit 3 Outage
- Summer Operations / Draft Summer Fish Operations Plan
- Operations Review

**Columbia River Regional Forum
Technical Management Team Meeting
May 27, 2009**

1. Introduction

Today's TMT meeting was chaired by Dan Feil (COE) and facilitated by Robin Gumpert (DS Consulting), with representatives of Washington, Oregon, Idaho, COE, BPA, BOR, NOAA, CRITFC and others participating. 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 for May 13, 2009

There were no comments on either the May 13 facilitator's notes or official minutes, which were deemed final.

3. Transmission Emergency Action Plan

Tony Norris (BPA) and Mike Viles (BPA TBL) gave a more detailed presentation of the Transmission Emergency Action Plan (TEAP). The TEAP has been revised since the last TMT meeting in response to a comment from Jim Litchfield, MT but it might still need more work, Norris said. The section on generator dropping was moved to the bottom of the emergency actions list because it's a transmission-related emergency action that protects the power system from failing.

Generator dropping is usually a response to the loss of a transmission line, which tends to overload surrounding lines. The automated software for this function maximizes use of the transmission system because it monitors dispatches and precludes the need to limit transmission during a line outage to prevent overload. This in turn allows for generation up to maximum levels to keep TDG levels down during spring runoff. This automated system allows BPA to guarantee stakeholders will be notified within 24 hours if generation drops.

The challenge is that BPA can't guarantee 24-hour notice of all types of generation-related interruptions to fish protection measures. There are two types of actions, automated (instantaneously or within seconds) and coordinated (within 20 minutes). Automated remedial transmission actions offer no opportunity for human intervention. That changes once duty schedulers get involved and can take steps to preserve fish protection measures. Viles asked TMT for suggestions on dealing with this uncertainty.

The preemptive actions list in the TEAP includes transmission actions the dispatcher has up to 20 minutes to coordinate with duty schedulers. Viles described each item on the list.

1. Coordinate scheduled transmission maintenance – Any planned maintenance is coordinated around fish protection measures, including scheduling line outages to avoid fish migration season.

2. No additional transmission sales on a transmission path experiencing congestion will be allowed – If an area is approaching its transmission limit, BPA will stop sales so the transmission system isn't forced over the limit. Typically the dispatcher requests that all sales be stopped under this condition.

3. Implement reliability redispatch of federal and non federal generation in the BPA balancing authority area – Different generators within BPA's balancing authority can decrease or increase power generation, which helps balance the flow of transmission to avoid transmission problems that might impact fish measures. This occurs on an hourly basis. BPA incorporates the cost of the protective measure into its rates.

4. Coordinate with BPA power services hydro duty schedulers to determine whether discretionary redispatch of federal generation can be done under Attachment M of the Open Access Transmission Tariff – This tariff allows transmission and hydro duty schedulers to work together on solving problems that arise so there is minimal or no impact to fish protection measures.

5. Curtail transmission schedules as appropriate to minimize or avoid transmission system emergencies – In this case, the transmission system goes above its operating limit, and BPA curtails the schedule to get it back under the limit. From the moment the system goes above its limit, BPA has 20 minutes to get it below the limit before violating reliability standards.

Items 2 and 3 on the list now allow BPA to issue a merchant alert without first issuing a NERC alert. This is a powerful tool in terms of avoiding transmission impacts to fish protection measures.

To address transmission bottlenecks, BPA has been identifying which parts of the system need reinforcement. The work in part will be funded by BPA's additional borrowing authority under the federal stimulus package. This will provide at least two new transmission lines, one being built now between McNary and John Day dams in response to wind generation development, and another to be built soon from Castle Rock, Washington, to Troutdale, Oregon. More transmission projects will be identified by late fall 2009.

BPA will refine the paragraph in the TEAP on generation dropping and repost the new version to the TMT web page. Next month, BPA will send the connecting control areas in WECC a letter describing the procedure they must follow to request energy from BPA in a generation emergency. That would be a good time for TMT to revisit this topic. In the meantime, any comments on the TEAP should go to Tony Norris.

4. Sturgeon Operations at Libby – SOR-FWS#1

The tentative date for beginning the sturgeon pulse, which was unspecified in this SOR submitted to the COE last week, is June 8, no later than June 15, Joel Fenolio (COE NWS) said. TMT will revisit the sturgeon pulse at its next meeting.

5. Upper Snake Flow Augmentation Update

The BOR's current goal is to provide 487 kaf of flow augmentation this summer from the Upper Snake River, John Roache (BOR) reported. Approximately 200,000 acre feet of this volume will come from above Milner Dam. Flows will ramp up to around 2,200-2,500 cfs around June 1 and remain at that level through about July 15. Flow augmentation in the Boise basin will follow sometime in June after flood control ends.

There will be less of a shift in time for flows in the Payette basin due to water quality issues. These are related to elevation and temperatures of Lake Cascade. BOR is working on moving some of the Payette flow augmentation volume earlier.

6. Spill Priority List

The list, which was discussed last week but not posted online, is linked to today's agenda. The Fish Managers have ranked the projects in the following order: Bonneville; Ice Harbor; McNary; Lower Monumental (change bulk spill pattern to uniform); Little Goose (spill up to 125 kcfs at night and fully load the powerhouse before spilling more than 30% of inflows during daytime); Lower Granite; Chief Joseph; Grand Coulee; The Dalles; and Dworshak.

The COE agrees with the rationale behind this order but is not willing to spill above 120 kcfs at Bonneville, due to strong indications that higher levels of spill create adult fallback problems there this time of year. Spill of 110 kcfs is considered safe.

The Salmon Managers placed Bonneville at the top of the spill priority list because that's where in-river passage is peaking now, making it the most effective location for spill, Paul Wagner (NOAA) said. The upriver projects are in transportation mode, so spill there should be avoided.

The limitation on spill at Bonneville will last only for the next few weeks until the summer operation begins, Feil said. When migration patterns move into summer mode, TMT will revise the spill priority list accordingly.

7. Lower Granite Barge Maneuvering Test

Lynn Reese (COE) gave a presentation on this 12-hour test, which has been scheduled for June 4 on very short notice. The reasons for that are the short-term availability of stimulus funds, the fact that June 4 falls nicely between

spring and summer migration activity, and other navigational concerns such as the availability of the correct tug and barge combination.

As part of redesigning the fish facility at Lower Granite, the COE may move the juvenile loading facility to a location that is safer to navigate to and from during spill and high flows. To help identify an optimal location, the study will use real time interviews with barge captains during the approach and egress plus video surveillance and acoustic surveys to study eddies and spill patterns at current and proposed dock locations. The test includes scrutiny of the best outfall location for returning juveniles to the river. Barge captains have noted that spill of 130 kcfs causes navigation problems at the dock, so flows of at least 130 kcfs are desirable on June 4 to study these problems. Video equipment will be left in place to record what happens during low flows of summer, when eddies make it difficult for fish barges to leave the loading dock.

While flows from Lower Granite are now 150-160 kcfs, based on recent modeling they are expected to be only 112-113 on June 4, Hall said. The COE plans to do the barge test then even if flows aren't 130 kcfs. TMT members agreed that 130 kcfs resulting from inflows at Lower Granite for 12 hours on June 4 would be ideal. However, there was concern about what to do if spill doesn't reach 130 kcfs due to inflows. A COE presentation to FPAC yesterday proposed storing water in the Lower Granite pool for release on June 4 to create 130 kcfs flows. This would simulate the problem the test is addressing, but it would cause the pool to rise above MOP by anywhere from MOP+1 to MOP+2.5 feet.

Its unfortunate there's no flexibility in the test date, Wagner said. The volume of water requested for June 4 is not great, but fish managers are concerned about going outside of MOP because it's part of the court order calling for no impacts on fish protection measures. The purpose of the MOP operation is to increase water velocity and help move fish downstream, so deviating from it could mean slowing the migration to the ocean, Wagner said. Later flows could compensate by speeding migration, but the biological effects of that are unclear, due in part to concerns about the length of the storage period.

The Salmon Managers proposed an alternative to offset the impact of MOP exceedance at other projects, most likely compensatory spill at Lower Monumental or Ice Harbor. Another possibility is spilling at Little Goose above 30% at night. Feil asked whether the effects this could have on transportation were considered; Russ Kiefer (Idaho) said yes. While the impact of going outside MOP at Lower Granite will be small, there's general agreement among the fish managers that slowing migration to the ocean at this time of year will reduce adult return rates, Kiefer said. And migration conditions get progressively worse as time passes, especially for spring migrants, Wagner said. The fish managers' goal is to meet the needs of the test without impacting fish protection measures. One possibility is to ask Idaho Power whether discharges from Brownlee Dam could be scheduled on the day of the test. The COE has not checked into that.

The Nez Perce Tribe wasn't part of yesterday's FPAC call or today's meeting, so they will need to be polled, Wagner and Kiefer said. Historically, the tribe has advocated using flow augmentation from Dworshak when more fall Chinook juveniles are out-migrating in June. Therefore, as a representative of Idaho on TMT, which includes the Nez Perce view, Kiefer didn't support using flow augmentation from Dworshak for the barge test.

Typically the COE cannot use the entire range of MOP to MOP+1, which yields about 8 kcfs of spill, so inflows to the pool could increase by 5 kcfs without violating MOP constraints, Steve Hall (COE) said. If flows are below 120 kcfs on June 4, the COE wants flexibility to fill to MOP+2, which would provide 16 kcfs of added spill, the amount needed to create flows of 130 kcfs.

The COE will provide TMT with scenarios depicting effects of filling the pool above MOP and releasing the water the next day, Feil said. Navigation scheduling precludes finding a window of time to go below MOP. Kiefer requested that the scenarios show what's possible without dropping flows at Lower Granite below 100 kcfs; TMT will work together on that. Members were then polled on their views.

Oregon – Objected to going outside the MOP constraints for any reason. Do the test with whatever flows are available, without impacting fish measures. The Lower Granite fish facility remodel is a long-term project, with no guarantees of funding in 2011 when the 2-year construction project is scheduled to begin. There will be other opportunities to do the test if June 4 doesn't work out. Releasing more water after the test won't offset the MOP violation – it could speed migration for some groups of fish while slowing others down, exposing them to increased predation and stress.

Washington – If the court order says stay at MOP, there should be offsets for deviating from it.

Idaho – Supports conducting the study, and believes it could be done with compensation to keep the fish migration whole. Idaho advocated increasing spill at Lower Monumental and Ice Harbor to offset the MOP violation. They didn't support using flow augmentation from Dworshak for the test. Expressed disappointment at the lack of an offset in the COE's plans, but won't object because the effects will be small and the benefits of the test significant.

Montana – Supports the test and the best redesign of the fish facility possible, and didn't object to the COE's plans for carrying it out. Upgrading the Lower Granite fish facility design will avoid future spill interruptions that harm fish. Impacts of MOP violations appear small, but Montana wants more details in the form of scenarios.

NOAA – Agrees that the impact of the test will be minor; nevertheless, accommodation to keep the migration whole would be preferable. The barge test

is worth the investment. The delay issue isn't to be taken lightly although the impacts will be small.

BPA – Deferred to the COE and the Salmon Managers to work out this issue.

BOR – Also deferred to the COE and Salmon Managers on this issue. The test should be done under flows that will provide the best result.

CRITFC – The decision should be deferred until modeled scenarios are available.

8. Dworshak Unit 3 Outage

On the afternoon of May 22, just before a 3-day holiday weekend, the COE learned of a leak in the turbine pit of the big unit at Dworshak which accounts for over half the powerhouse discharge. The leak is estimated at 250-300 gallons per minute, enough to overwhelm two 4-inch gravity drains, Hall said. The unit is out of service and being dewatered for visual inspection. Pinpointing the leak could take a week or two. Depending on the findings, the outage could last from a month to a year and a half if the unit must be completely disassembled. The problem is exacerbated by of the de-certified cranes onsite needing repair in order to perform the work.

Effects in the near term are that Dworshak can release only 7-8 cfs or about half its normal flows without violating the 110% gas cap. This limit would remain until the unit is repaired because use of the unit before repair could result in a catastrophic failure that could destroy the powerhouse.

Flood control isn't an issue because the project can still release flood flows via the RO gates and the spillway. The project is currently discharging 5 kcfs using 2 small units. Dworshak and Libby don't have backup generators, and the aging equipment is approaching the end of its design life.

Margaret Filardo (FPC) asked whether the COE has requested a waiver of the 110% TDG standard, given the potential for affecting the volume of flow augmentation available in summer. It's too early for that, Feil replied. The COE will keep TMT posted as more information on the leak becomes available.

9. Emergency Actions List

Paul Wagner gave Tony Norris a revised emergency actions list that the Salmon Managers developed in their recent FPAC call. The positions of Ice Harbor and Little Goose have changed, in part to reflect the added spillway weir at Goose in 2009. Norris will revise the list and send it to TMT members.

10. Operations Review

a. Reservoirs. Grand Coulee is at elevation 1,265.6 and filling. The end of May flood control elevation is 1,273.8 feet.

Hungry Horse is at elevation 3,529.1 feet, discharging 6.1 kcfs and filling. Yesterday inflows were 18-19 kcfs, with 25 kcfs forecasted this weekend. Discharges will drop to 5.1 kcfs on the evening of May 28.

Libby is at elevation 2,410.5 feet, with inflows of 29.1 kcfs and outflows of 13.4 kcfs. Albeni Falls is at elevation 2,059.5 feet, with inflows of 74.5 kcfs and outflows of 64.5 kcfs. Dworshak is at elevation 1,568.9 feet with inflows of 22.5 kcfs and outflows of 5 kcfs.

Seven-day average inflows are 164 kcfs at Lower Granite, 331 kcfs at McNary, and 344 kcfs at Bonneville. There has been involuntary spill at Snake River projects for the past several days.

b. Fish. Adults – The technical advisory committee for *US v. Oregon* updated the run size at the Bonneville river mouth to 160,000 plus or minus 5,000 fish, Cindy LeFleur (Washington) reported. The projected final count at Bonneville is 140,000 fish.

In response to concern that adults are being delayed between Lower Monumental and Lower Granite, Kiefer had asked FPC staff to account for average travel time during this period using PIT tagged fish. The response was that once travel time is accounted for, all PIT tagged fish that passed Ice Harbor a week ago have made it to Lower Granite. This is good news, Kiefer said, because it appears that adults are not being delayed at Little Goose. Adult passage is generally above the 10-year average for this date, with 2009 runs being very late, Wagner reported.

Smolts – Spring migration is nearing its conclusion at the upper river projects, but not at Bonneville, Wagner said. Increased flows brought increased passage – when Snake River flows were 130-140 kcfs, the passage index went up to 160,000-180,000, then dropped to zero due to shutdown of the juvenile facility for 3 days. The most recent index count is 10,000 fish. Little Goose index counts are 50,000, and 15,000 at the upper river projects. McNary index counts recently dropped from 250,000 to 70,000. Bonneville index counts are in the 40,000-60,000 range.

Subyearling passage is increasing, Wagner reported. The most recent index count is 15,000 at Lower Granite and 19,000 at Little Goose. Subyearling counts are less in the lower river. Steelhead passage peaked at 150,000 at Lower Granite and is in the range of 38,000 now, with a similar trend at Little Goose. In terms of ESU juvenile passage, Lower Granite is above the 10-year average.

Sockeye PIT tag counts have increased from 20,000 to 60,000 fish, Kiefer said, due to a pilot study of Snake River sockeye in Idaho. Increased counts

mean more PIT tagged fish, not a larger run size. The total smolt release was 170,000-180,000 fish, with 65,000 of them PIT tagged. Wagner showed TMT graphs that indicate these PIT tagged fish made it to the ocean. Smolt passage data showed similar results for spring Chinook and steelhead passage. Sockeye passage looks low in relation to the 10-year average, but Wenatchee sockeye have probably not been accounted for.

c. Power System. There was nothing to report.

d. Water Quality. Involuntary spill began May 20 on the lower Snake River and May 21 for the lower Columbia River, Laura Hamilton (COE) reported. There have been 72 TDG exceedances to date in May, with most occurring at Camas Washougal gage, followed by Bonneville and Ice Harbor forebays. This could be the result of spill wall construction at The Dalles, which requires a bulk spill pattern. John Day is not currently spilling 30-40% inflows, but The Dalles is.

9. Next Meeting

The next TMT meeting will be June 3, possibly in person or a conference call depending on topics to be discussed. The sturgeon pulse, Lower Granite barge test planning, an update on the Dworshak unit outage, review of meeting notes and the operations review will be on the agenda. A TMT conference call is scheduled for June 17, and a meeting in person on June 24. This summary prepared by consultant and writer Pat Vivian.

| Name | Affiliation |
|-----------------|--------------------|
| Dan Feil | COE |
| Cindy LeFleur | Washington |
| Rick Kruger | Oregon |
| Russ Kiefer | Idaho |
| Doug Baus | COE |
| Tony Norris | BPA |
| John Roache | BOR |
| Jim Litchfield | Montana |
| Paul Wagner | NOAA |
| Kyle Dittmer | CRITFC |
| Laura Hamilton | COE |
| Steve Hall | COE Walla Walla |
| Mary Mellema | BOR |
| Ruth Burris | PGE |
| Cathy Hlebechuk | COE |
| Mike Viles | BPA TBL |
| Don Faulkner | COE |

Phone:

| | |
|----------------|--------------|
| Joel Fenolio | COE |
| Glen Trager | Shell Energy |
| Barry Espenson | CBB |

| | |
|------------------|---------------------|
| Margaret Filardo | FPC |
| Shane Scott | PPC |
| Holli Krebs | JP Morgan |
| John Hart | EWEB |
| Russ George | WMC |
| Tim Heizenrader | Centaurus |
| Richelle Beck | DRA |
| Rob Diaz | Integral Renewables |
| Tom Le | Puget Sound Energy |
| Rob Allerman | Deutsche Bank |
| Greg Hoffman | COE Libby Dam |

TECHNICAL MANAGEMENT TEAM

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

TMT CONFERENCE CALL

Wednesday June 3, 2009 09:00 - 12:00

CONFERENCE PHONE LINE

Conference call line:888-285-4585; PASS CODE = 601714

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 rgumpert@cnnw.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and Introductions
2. Review Meeting Minutes for May 20, 22, 27, 2009 [[Meeting Minutes](#)]
3. Libby Sturgeon Pulse Operations Update - Joel Fenolio, COE NWS
 - a. [2009 Libby Projected Operations](#)
 - b. [2009 Koochanusa Reservoir Temperatures](#)
 - c. [2009 Sturgeon Reservoir and River Temperatures](#)
4. Lower Granite Barge Maneuvering Test Update - Jim Adams, COE RCC
5. Dworshak Unit 3 Outage Update - Rudd Turner, COE
6. Summer FOP Update - Rudd Turner, COE
 - a. [2009 Summer Fish Operations Plans](#)
7. Operations Review
 - a. Reservoirs
 - b. Fish
 - c. Power System
 - d. Water Quality
8. Other
 - a. Set agenda for next meeting - **June 17, 2009**
[\[Calendar 2009\]](#)

Questions about the meeting may be referred to:

*[Jim Adams](#) at (503) 808-3938, or
[Cathy Hlebechuk](#) at (503) 808-3942, or
[Dan Feil](#) at (503) 808-3945*

2009 Summer Fish Operations Plan

BACKGROUND

The 2009 Summer Fish Operations Plan (FOP) describes the U.S. Army Corps of Engineers (Corps) planned operations for fish passage at its mainstem Federal Columbia River Power System (FCRPS) dams during the 2009 summer fish migration season. The 2009 Summer FOP is consistent with the adaptive management provisions in the 2008 NOAA Fisheries FCRPS Biological Opinion (2008 BiOp) and the Corps' Record of Consultation and Statement of Decision (ROCASOD) adopting the project operations contained in the 2008 BiOp and the Columbia Basin Fish Accords (Accords).

As in 2008, the 2009 Summer FOP incorporates planned operational adjustments necessary to perform essential research, and to accommodate the adjustment of surface bypass structures or other features for the 2009 summer migration season. The FCRPS water management and project operations not specifically addressed in this 2009 Summer FOP are consistent with the 2008 BiOp and other operative documents including the 2009 Water Management Plan (WMP), seasonal WMP updates, and the 2009 Fish Passage Plan (FPP). As in 2008, operations may be adjusted through coordination with regional sovereigns.

The following sections describe: factors that influence management of fish operations during various runoff conditions, including TDG management, spillway operations, and minimum generation; specific summer operations for fish passage at each mainstem project; the juvenile fish transportation program operations; protocols for emergencies; coordination with the region; and, monthly reporting.

GENERAL CONSIDERATIONS FOR FISH OPERATIONS

For planning purposes, the Corps' 2009 Summer FOP spill levels, summarized in Table A below, assume "average" run-off conditions. However, because actual run-off conditions vary in timing and shape and may be higher or lower than average, adjustments in spill levels (kcfs discharge rates, spill percentages, or spill caps) will be adaptively managed in-season as needed to avoid or minimize poor juvenile or adult fish passage conditions, navigation safety concerns, or to accommodate powerhouse or transmission constraints. Actual spill levels may be adaptively managed from those displayed in the table below for research or other conditions and will be coordinated through the Technical Management Team (TMT) or other appropriate regional forum. Such conditions are discussed in more detail below.

Management of Spill for Fish Passage

The Corps will continue to manage spill for fish passage to avoid exceeding 120% in the project tailrace, and 115% in the forebay of the next project downstream consistent with the current State of Washington total dissolved gas (TDG) saturation upper limits.¹ These levels are referred to as “gas caps.” The project maximum flow rate or spill discharge level that meets but does not exceed the gas caps, is referred to as the “spill cap.” The gas caps are constant, whereas, spill caps may vary daily depending on flow, temperature, and other environmental conditions.

As noted above, the spill rates presented in Table A are the planned summer spill operations and assume average runoff conditions; however, adjustments to these spill rates may be necessary for the following reasons:

1. high runoff conditions where flows exceed the powerhouse hydraulic capacity with the specified spill rates;
2. navigation safety concerns;
3. generation unit outages that reduce powerhouse capacity;
4. power system or other emergencies that reduce powerhouse discharges; and,
5. a lack of power demand resulting in an increase in the rate of spill.

Spill below the specified rates could also occur during low runoff conditions when meeting minimum generation levels at a project requires reducing spill rates. This would most likely occur in July and August. Minimum generation and spill rates are included below in the project specific information.

The Corps’ Reservoir Control Center (RCC) is responsible for daily management of TDG responsive to changing conditions. In order to manage gas cap spill rates consistent with the States’ TDG saturation limits, RCC establishes the spill caps for each project on the lower Columbia and Snake rivers on a daily basis throughout the fish passage season. These spill caps are set so that resultant TDG percent saturation levels are not expected to exceed the 120%/115% TDG limits, measured as the average of the highest 12 hourly readings each day.

Within any given day, some hours of measured TDG levels may be higher or lower than the gas caps due to changing environmental conditions (wind, air temperature, etc.). The process of establishing daily spill caps entails reviewing existing hourly data at each dam (including flow, spill, temperature, and TDG levels) and taking into consideration a number of forecast conditions (including total flow, flow through the powerhouse, wind and temperature forecast, etc.). This information is used as input into the System TDG (SYSTDG) modeling tool. The SYSTDG model estimates TDG levels in the rivers several days into the future, and is a tool integral to daily decision-making when establishing spill caps at individual dams.

¹ In February 2009, the State of Oregon modified its waiver for 2009 to remove the 115% forebay TDG limit. However, the Corps will continue to manage to 120% and 115% limits (the Washington TDG standard) in 2009.

Spill caps set by RCC in daily spill priority requests will be met at the projects by using the spill pattern in the appropriate FPP spill table which most closely corresponds to the requested spill (i.e. may be slightly over or under). During the freshet when flows are often expected to be greater than hydraulic capacity with the specified spill rates at the dams, or if a lack of power load results in an increase in the spill rate, the Corps will attempt to minimize TDG on a system-wide basis. In this case, spill caps are also developed for 125%, 130%, or 135% saturation to minimize TDG throughout the system.

In accordance with the 2009 Spring FOP, spring spill operations commenced on April 3 at 0001 hours for the Corps' lower Snake projects and on April 10 at 0001 hours for the lower Columbia projects. Spill caps have been established at the specified amounts and will continue unless conditions require changing to maintain TDG within the upper limits of 120% in the tailwater of a dam and 115% in the forebay of the next project downstream (and at Camas/Washougal). Spill will transition to summer levels at 2359 hours, or shortly before midnight, at each project just prior to the summer start dates specified.

Operations to manage TDG will continue to be coordinated through the TMT.

Spillway Operations

The Action Agencies will meet the specified spill levels to the extent feasible; however, actual hourly spill quantities at dams will be slightly greater or less than specified in Table A below. Actual spill levels depend on the precision of spill gate settings, flow variations in real time, varying project head (the elevation difference between a project's forebay and tailwater), automatic load following, and other factors.

Operational Considerations:

- **Spill discharge rates:** Due to limits in the precision of spill gates and control devices, short term flow variations, and head changes, it is not possible to discharge exactly the spill rates stated in Table A, or as stated in RCC spill requests (teletypes) to projects that call for specific spill discharges. Therefore, spillway gates are opened to the settings in FPP spill pattern tables, which provide discharges that are the closest to the spill discharge rates. The spill rates in Table A coincide with specific gate settings in the FPP spill tables. Actual spill may be higher or lower than the identified spill rate due to low flow conditions, periods of minimum generation, TDG spill cap limitations on spill amounts, spill curtailment for navigation safety, and other circumstances.
- **Spill percentages:** Spill percentages are considered target spill levels. The project control room operator and BPA duty scheduler calculate spill rates to attempt to be within +/- 1% of the target percentage for the following hour (or +/- 1.5% at Little Goose Dam when flows are less than 30 kcfs). These percentages may not be attained due to low flow conditions, periods of minimum generation, TDG spill cap

limitations on spill amounts, spill curtailment for navigation safety, and other circumstances. Operators and schedulers will review the percentages achieved during the day and adjust spill rates in later hours, with the objective of ending the day with a day average spill that achieves the target.

Minimum Generation

The Corps has identified minimum generation flow values derived from FPP tables which specify turbine operation within the 1% of best efficiency range. These values are approximations and do not account for varying head or other small adjustments that may result in variations in the reported minimum generation flow and spill amount.

Conditions that may result in minor variations include:

1. Varying pool elevation: as reservoirs fluctuate within the operating range, flow rates through the generating unit change.
2. Generating unit governor "dead band": the governor controls the number of megawatts the unit should generate and cannot precisely control a unit; variations can be +/- 1% to 2% of generation.
3. System disturbances: once the generator is online and connected to the grid, it responds to changes in system voltage and frequency. These changes may cause the unit to increase flow and generation slightly within an hour.
4. Individual units may operate slightly differently or have unit specific constraints.
5. Generation control systems regulate megawatts (MW) generation only, and not flow through turbines.

All of the lower Snake River powerhouses may be required to keep one generating unit on line at all times for power system reliability, which may result in a reduction of spill at that project. During low flows, one generator runs at the lower end of the 1% of best efficiency range. All of the Snake River plants have two "families" of turbines with slightly different capacities. In most cases one of the smaller units, with somewhat less generation and flow, will be online during these times. The smaller units are generally numbered 1 – 3 and are the first priority for operation during the fish passage season. An exception to this is at Ice Harbor Dam, where the unit priority list has been modified to accommodate the transformer bank outage at Sacajawea. Also, if smaller units are unavailable, one of the larger units may be used. Further, at Lower Monumental, generating unit 1, which is the first priority unit during fish passage, was damaged, then welded in a fixed blade configuration. Consequently the unit cannot operate at the low end of the design range. In addition, Ice Harbor units cannot be operated at the lower end of the 1% of best efficiency range. These units experience cavitation at a generation level somewhat higher than the lower 1% limit, which damages the turbine and can be detrimental to fish. Therefore, Ice Harbor units will operate at their lower cavitation limits. Minimum generation flows are 50 kcfs at McNary, John Day and The Dalles and 30 kcfs at Bonneville.

Low Flow Operations

Low flow operations at lower Snake River projects are triggered when inflow is not sufficient to provide for both minimum generation and the planned spill levels. In these situations, the projects will operate one unit at minimum generation and spill the remainder of flow coming into the project. As flows transition from higher flows to lower flows, there may be situations when flows recede at a higher rate than forecasted. In addition, inflows provided by nonfederal projects upstream are variable and uncertain. The combination of these factors may result in instances where unanticipated changes to inflow result in forebay elevations dropping to the low end of the Minimum Operating Pool (MOP). Since these projects have limited operating flexibility, maintaining minimum generation and the target spill may not be possible on every hour.

During low flow conditions, when the navigation lock is being emptied, the total spill remains unchanged but the spill stated as a percent of total flow may be temporarily reduced below the target spill percentage. This occurs because the volume of water needed to empty the navigation lock during periods of low flow is a greater percentage of the total flow than when flows are higher.

At Little Goose Dam, when day average flows in the lower Snake River are below about 40 kcfs, achieving 30% spill requires changing turbine operations between 2 units at the low end of the 1% of best efficiency range and one unit at the high end of the 1% range. This operation is incompatible with the more constant discharge upstream at Lower Granite Dam. It is also difficult to meet the constant FOP spill level downstream at Lower Monumental Dam. The unsteady flow at Little Goose also impacts that project's reservoir operation and can cause inadequate navigation depths at the downstream sill of the Lower Granite navigation lock. In 2008, through coordination with TMT during these low flow periods, Little Goose spill changed from the 30% level in the FOP to a flat spill pattern of approximately 11 kcfs to smooth out Little Goose discharges, meet Lower Monumental spill levels, and maintain the MOP operating range at Little Goose. A similar operation, modified as necessary to consider configuration or operational changes such as spillway weir and turbine unit 1 operations, will be implemented in 2009 if needed during low flow periods, in coordination with TMT.

Operations during Rapid Load Changes

Project operations during hours in which load and/or intermittent generation changes rapidly may result in not meeting planned hourly spill level because projects must be available to respond to within-hour load variability to satisfy North American Electric Reliability Council (NERC) reserve requirements ("on response"). This usually occurs at McNary, John Day and The Dalles dams. In addition to within-hour load variability, projects on response must be able to respond to within hour changes that result from intermittent generation (such as wind generation). During periods of rapidly changing loads and intermittent generation, projects on response may have significant changes in turbine discharge within the hour while the spill quantity remains the same within the hour. Under normal conditions, within-hour load changes occur mostly on hours

immediately preceding and after the peak load hours, however, within-hour changes in intermittent generation can occur at any hour of the day. Due to the high variability of within-hour load and intermittent generation, these load swing hours may have a greater instance of reporting actual spill percentages that vary more than the +/- 1% requirement than other hours.

Turbine Unit Testing around Maintenance Outages

Turbine units may be operationally tested for up to 30 minutes by running the unit at speed no load and various loads within the 1% of best efficiency range to allow pre-maintenance measurements and testing and to allow all fish to move through the unit. Units may be operationally tested after maintenance or repair efforts but before a unit comes out of a maintenance or forced outage status. Operational testing may consist of running the unit for up to 30 minutes before it is returned to operational status. Operational testing of a unit under maintenance is in addition to a unit in run status (e.g. minimum generation) required for power plant reliability. Operational testing may deviate from unit operating priorities and may use water that would otherwise be used for spill if the running unit for reliability is at the bottom of the 1% of best efficiency range. Water will be used from the powerhouse allocation if possible, and water diverted from spill for operational testing will be minimized. The Corps will coordinate this testing with the region through the Fish Passage Operations and Maintenance Coordination Team (FPOM).

Navigation Safety

Short-term adjustments in spill may be required for navigation safety, primarily at the lower Snake projects but may also be necessary at the lower Columbia projects. This may include changes in spill patterns, reductions in spill discharge rates, or short-term spill stoppages. In addition, adjustments to pool elevation in the Little Goose pool of up to 1.0 foot above the MOP operating range may be necessary to accommodate safe navigation at Lower Granite Dam during periods of low flow (approximately 40 kcfs or less). These adjustments may be necessary for both commercial tows and fish barges.

2009 SUMMER SPILL OPERATIONS

Lower Snake River Projects

Summer spill will begin on June 21 at Lower Granite, Little Goose, and Ice Harbor dams. However, at Lower Monumental Dam, fish run timing and research schedules may require transitioning to summer spill earlier than June 21. Such changes will be coordinated through TMT. Summer spill will occur through August 31, 2009 at all four lower Snake River projects. Summer spill levels are shown in Table A.

Lower Columbia River Projects

Summer spill will begin July 1 at John Day and The Dalles dams, and will begin June 21 at Bonneville Dam. However, at McNary Dam, fish run timing and research schedules may require transitioning to summer spill earlier than July 1. Such changes will be coordinated through TMT. Summer spill will occur through August 31, 2009 at all four projects. Summer spill levels are shown in Table A.

Table A. Summary of 2009 summer spill levels at lower Snake and Columbia River projects.²

| Project | Planned Operations for Summer 2009 (Day / Night) | Comments |
|------------------|---|-----------------|
| Lower Granite | 18 kcfs / 18 kcfs | Same as 2008 |
| Little Goose | 30% / 30% | Same as 2008 |
| Lower Monumental | 17 kcfs / 17 kcfs | Same as 2008 |
| Ice Harbor | 45 kcfs / gas cap on non-test days; 30% / 30% or 45 kcfs / gas cap on test days | Same as 2008 |
| McNary | 40% / 40% or 60% / 60% | Same as 2008 |
| John Day | 30% / 30% on non-test days; 30% / 30% or 40% / 40% on test days | Same as 2008 |
| The Dalles | 40% / 40% | Same as 2008 |
| Bonneville | 85 or 75 kcfs day / gas cap night (85 kcfs day through July 20, then 75 kcfs day through August 31) | Same as 2008 |

SUMMER FISH OPERATIONS BY PROJECT

The following describes the 2009 summer spill operations for each project. Included in the description are planned research activities identified in the 2008 BiOp. The Corps, regional agencies, and Tribes are interested in the continuation of project research studies under the Corps' Anadromous Fish Evaluation Program (AFEP). The 2009 studies have been through the annual AFEP review process with the regional agencies and Tribes, with the study designs being finalized in an interagency meeting held on January 15, 2009. The studies are intended to provide further information on project survival and

² Table A displays in summary form the planned summer spill operations. More specific detail governing project operations is in the section entitled "Summer Fish Operations By Project."

assist the region in making decisions on future operations and configuration actions to improve fish passage and survival at the lower Snake and Columbia River dams.

Lower Granite

Summer Spill Operations June 21 through August 31, 2009: 18 kcfs (including approximately 6 kcfs from the RSW and 12 kcfs from training spill) 24 hours per day. See Table A for operational spill levels.

Changes in Operations for Research Purposes:

- Summer research operations: Normal summer spill patterns and rates as described in the FPP will be used. An alternate (bulk) spill pattern may be used at Lower Granite in summer, as discussed and recommended at the April 2009 FFDRWG meeting. This pattern was evaluated in 2006 and 2007 and will have the same spill level as the FPP spill pattern. There will be no specific spill level variations for testing.

Operational Considerations:

- Lack of power load or unexpected unit outages could cause involuntary spill at higher total river discharges that could result in exceeding the gas cap limits.
- During high flow periods when involuntary spill occurs, there may be periods where certain spill levels create hydraulic conditions that are unsafe for fish barges crossing the tailrace and/or while moored at fish loading facilities. If such runoff conditions occur, spill may be reduced temporarily when fish transport barges approach or leave the barge dock or are moored at loading facilities. If conditions warrant a spill reduction, the MOP elevation range at Lower Granite will be exceeded temporarily to enable the barge to exit the tailrace safely.
- Minimum spill: During periods of low flow before the spring freshet and during the summer period, there may be periods where spill quantities are limited so that tailrace conditions are not advantageous to fish passage. If such low runoff conditions occur, alternative spill operations at the dam will be coordinated through the TMT.
- Minimum generation: The minimum generation amount represents the operation of one unit at the lower end of its 1% of best efficiency range and is needed for power system reliability. This operation will result in individual turbine flows of approximately 11.3 kcfs – 13.1 kcfs at units 1 – 3 and 13.5 kcfs - 14.5 kcfs at units 4 - 6. There may be slight variations in the generation due to power system fluctuations. Also, the outflow will fluctuate because of changing head at the dam. This condition may occur in early spring before the freshet and during the late summer period with low flow conditions.
- Unit outages will occur for required maintenance activities. The outage schedule for the project is shown in the FPP. Dates are subject to change in coordination with FPOM or TMT.

Little Goose

Summer Spill Operations June 21 – August 31, 2009: 30% spill 24 hours per day. See Table A for operational spill levels.

Changes in Operations for Research Purposes:

- Spill duration for testing: Juvenile passage will be studied throughout the summer spill period.
- Summer research operations: 30% spill 24 hour/day. The spill pattern used in the spring will be continued in the summer. Final test conditions will be coordinated through FPOM and/or Studies Review Work Group (SRWG).
- Objectives of the biological test: The goals of this study include: (1) Determine the timing and route of passage for sub-yearling Chinook salmon relative to spillway weir spill and powerhouse operations; (2) Estimate route-specific and overall concrete survival of sub-yearling Chinook; (3) Determine the effects of spillway weir operation and associated training spill, as well as powerhouse operations, on smolt approach paths in the forebay of Little Goose Dam; (4) Estimate survival (concrete) as the first year to determine if BiOp performance standards are being met with the tested configuration and operation.
- Spill pattern during the biological test: The test spill patterns have been developed through ERDC modeling and in coordination with FPOM and/or SRWG.

Operational Considerations:

- Day average flows in the lower Snake River below about 40 kcfs can result in incompatible operations with Lower Monumental Dam and cause spill quantity fluctuations. Little Goose operations to resolve this issue are described in the Low Flow Operations section above (page 5).
- Unit outages will occur for required maintenance activities. The outage schedule for the project is shown in the FPP. Dates are subject to change in coordination with FPOM or TMT.
- Turbine Unit 1 Operation: For 2009, a new more limited operating range is set within the GDACS program for Little Goose Dam to restrict Turbine Unit 1 operation to approximately the upper 25% of the 1% of best efficiency range (about 16 kcfs). This will ensure a strong flow along the south shore to counter the strong eddy that forms during certain spill conditions. A strong south shore current is important for both adult fish passage and juvenile fish egress. Special turbine operations are expected to continue through the spring and summer spill periods until river flow can support only one operating turbine unit. Once low flow conditions occur, the full 1% of best efficiency range will be restored, to minimize impacts on spill levels.
- Minimum spill: During periods of low flow before the spring freshet and during the late summer period, there may be periods where spill quantities are so low that it creates tailrace conditions not advantageous to fish passage. If such flow conditions occur, alternative operations at the dam will be coordinated through the TMT.

- **Minimum generation:** The minimum generation amount represents the operation of one unit at the lower end of its 1% efficiency range and is needed for power system reliability. This should result in individual turbine flows of 11.3 kcfs – 13.1 kcfs at units 1 – 3 and 11.5 kcfs – 14.5 kcfs at units 4 – 6. There may be slight variations in the generation due to power system fluctuations. Also, the outflow will fluctuate because of changing head at the dam. This situation may occur in early spring before the freshet and during the late summer period with low flow conditions.

Lower Monumental

Summer Spill Operations Approximately June 21 – August 31, 2009: Spill 17 kcfs 24 hours per day (subject to 120%/115% TDG spill cap limits) with the RSW operating. See Table A for operational spill levels.

Changes in Operations for Research Purposes:

- **Spill duration for testing:** Summer testing will begin approximately June 21 or earlier, and lasting until mid-July. The dates of testing will be dependent on the availability of subyearling fall Chinook of sufficient size for tagging. Final dates for testing will be coordinated through FPOM and/or SRWG.
- **Summer research operations:** 17 kcfs 24 hours per day with one spill pattern treatment. The spill pattern will be the pattern used in 2008 and coordinated through FPOM and/or SRWG.
- **Objectives of the biological test:** Estimate passage distribution, survival, forebay retention, tailrace egress, and vertical distribution of fish passing over the RSW for subyearling fall Chinook under one spill pattern. Estimate survival (concrete) to determine if BiOp performance standards are being met with the tested configuration and operation.
- **Spill pattern during the biological test:** The 2008 FPP spill pattern will be used for summer testing.

Operational Considerations:

- Daily average flows near 30 kcfs results in incompatible operations with Little Goose Dam and results in spill quantity fluctuation.
- As in the spring, the amount of water spilled in the summer at Little Goose may affect the Lower Monumental spill volume (due to elevated TDG levels).
- Transit of the juvenile fish barge across the Lower Monumental tailrace, then docking at and disembarking from the fish collection facility, may require the level of spill to be reduced due to safety concerns. The towboat captain may request that spill be reduced or eliminated during transit. During juvenile fish loading operations, spill is typically reduced to 15 kcfs, but can be reduced further if needed for safety reasons. Loading periods can take up to 3.5 hours. Because of the time needed to complete loading at Lower Monumental, the Little Goose Project personnel will notify the Lower Monumental personnel when the fish barge departs from Little Goose. This ensures that BPA scheduling is provided advance notice for spill control at Lower

Monumental Dam. Reducing spill may cause Lower Monumental to briefly operate outside of MOP conditions.

- **Minimum spill:** During periods of low flow before the spring freshet and during the summer period, there may be periods when spill quantities are limited so that tailrace conditions are not advantageous to fish passage. This condition is interpreted to be a minimum spill level provided through the spillway weir only (approximately 6.8 kcfs with the reservoir operating at MOP). If such a low flow condition occurs, alternative operations at the dam will be coordinated through the TMT.
- **Minimum generation:** The minimum generation amount represents the operation of one unit at the lower end of its 1% of best efficiency range and is needed for power system reliability. This will result in individual turbine flows of approximately 11.3 kcfs – 13.1 kcfs for units 2 and 3 and 13.5 kcfs – 14.5 kcfs for units 4 – 6 and 16.5 kcfs – 19.5 kcfs for unit 1. There may be slight variations in the generation due to power system fluctuations. Also, the outflow will fluctuate because of changing head at the dam. This limit may occur in early spring before the freshet and during the late summer period with low flow conditions.
- **Unit outages** will occur for required maintenance activities. The outage schedule for the project is shown in the FPP. Dates are subject to change in coordination with FPOM or TMT.

Ice Harbor

Summer Spill Operations June 21 – August 31, 2009: Spill 30% 24 hours per day or 45 kcfs day / spill cap night; then 45 kcfs day / spill cap night after the end of the test, with the RSW operating. See Table A for operational spill levels.

Changes in Operations for Research Purposes:

- **Summer research operations:** Spill patterns will be verified and coordinated through FPOM and/or SRWG. Radio tagged fish will be monitored for passage route and survival.
- **Objectives of the biological test:** The objectives of the test are to determine passage routes and estimate route-specific and concrete survival under the two spill conditions for subyearling Chinook.
- **Spill pattern during the biological test:** Spill patterns will be verified and coordinated through FPOM and/or SRWG.

Operational Considerations:

- Minimum generation or higher powerhouse operation will occur at all times during the 2009 summer fish spill season, until repairs are complete at BPA's Sacajawea transmission facility near the project. Mobile capacitor groups remain in use at BPA's Franklin transmission facility to partially resolve power system issues. In addition, continuous generation is required at Ice Harbor Dam for power system stability and reliability. Normal unit operating priorities will be re-established when the Sacajawea transformer is returned to service, expected in July 2009.

- **Minimum spill:** During periods of low flow before the spring freshet and during the summer period, there may be periods where spill quantities are limited so that tailrace conditions are not advantageous to fish passage. The minimum spill for Ice Harbor Dam is 15.2 kcfs, which includes providing spill through the RSW and training spill to ensure good tailrace egress conditions. If such a low flow condition occurs, alternative operations at the dam will be coordinated through the TMT.
- **Minimum generation:** The minimum generation amount represents the operation of one unit at the lower cavitation limit. The cavitation limit is within the 1% of best efficiency range. This will result in individual turbine flows of approximately 8.5 kcfs – 11.5 kcfs at units 1 – 3 and 10.8 kcfs – 13.8 kcfs at units 4 – 6. Unit 2 has been modified by fixing the blades in a single position to eliminate an oil leak. As a result, its MW output and kcfs discharge at the low end of 1% will be higher than the other 5 units. There may be slight variations in the generation due to power system fluctuations. Also, the outflow will fluctuate because of changing head at the dam. This limit may occur in early spring before the freshet and during the late summer period with low flow conditions.
- **Unit outages** will occur for required maintenance activities. The outage schedule for the project is shown in the FPP. Dates are subject to change in coordination with FPOM or TMT.

McNary

Summer Spill Operations Approximately July 1 through August 31, 2009: 40% or 60% spill 24 hours per day, in two day blocks throughout the summer spill period. See Table A for operational spill levels.

Changes in Operations for Research Purposes:

- Spill duration for testing: Approximately early June through August 3. The dates of testing will be dependent on the size of fish, fish availability, and the number of treatments needed for testing. Final dates for testing will be coordinated through the SRWG.
- Summer research operations: 40% or 60% spill 24 hours per day. Continue to evaluate spillway weir performance by changing the configuration to optimize the spillway and reduce navigation issues. Each test spill level will occur for two days in a randomized block test design, throughout the period. Two spillway weirs will be in place during the test, located at spill bays 4 and 20.
- Objectives of the biological test:
 - Estimate passage and survival rates of subyearling fall Chinook salmon under two treatments.
 - Characterize subyearling fall Chinook behavior in the forebay of McNary Dam under two treatments.
- Spill pattern during the biological test: Spill patterns have been identified using the general model at ERDC by USACE Walla Walla District staff and representatives of the regional fisheries agencies and tribes. Test spill patterns are modifications of the

2003-2005 flat pattern and the 2008 test pattern to accommodate the new placement of the spillway weirs.

- After the study is complete, about August 3, the spillway weir in spill bay 4 will be removed. The spillway weir in spill bay 20 will remain in place. The project will return to the 2008 summer spill pattern. Spill schedule and configuration will be determined in coordination with FFDRWG and TMT. The spill schedule will consider fish passage, power system needs, and changing flow conditions.

Operational Considerations:

- Spillway weir 1 (relocated from spill bay 19) is located in spill bay 4. Spillway weir 2 remains in spill bay 20.
- During the periods when total river discharge exceeds approximately 320 kcfs, involuntary spill in excess of the States' TDG limits for fish passage may occur.
- In addition, low power demand may also necessitate involuntary spill during any given spill treatment.
- Spill will be curtailed as needed to allow safe operation of fish transportation barges near collection facilities downstream of the project. Spill changes will be minimized in order to reduce effects on spill research. Specifically, the spillway, including spillway weirs in spill bays 4 and 20, will be closed while barges are crossing the tailrace (15 – 30 minutes per crossing). Gate hoists at spill bays 4 and 20 are modified to allow closure with spillway weirs in place.
- Minimum generation: A minimum powerhouse discharge of 50 kcfs is required at all times to meet minimum generation requirements. The lower Columbia River dams provide some of the required generation capacity reserves for the power system. Due to this requirement and the constant fluctuations in power demands throughout the day, the 50 kcfs flow cannot be maintained precisely on an hourly basis. The flow may increase by as much as 10 kcfs for short periods. Therefore, the minimum generation flow should meet or exceed 50 kcfs for all hours.
- If total river discharge drops below about 90 kcfs, 40% spill treatments may be reduced to maintain 50 kcfs powerhouse discharge for minimum generation. Similarly, if total river discharge drops below about 135 kcfs, 60% spill treatments may be reduced to maintain a 50 kcfs powerhouse discharge.
- Minimum spill: During periods of low flow before the spring freshet and during the summer period, there may be periods where spill quantities are limited so that tailrace conditions are not advantageous to fish passage. If such a low flow condition occurs, alternative operations at the dam will be coordinated through the TMT.
- Unit outages will occur for required maintenance activities. The outage schedule for the project is shown in the FPP. Dates are subject to change in coordination with FPOM or TMT.

John Day

Summer Spill Operations July 1 – August 31, 2009: 30% or 40% spill 24 hours per day, then 30% spill 24 hours per day after the summer test. See Table A for operational spill levels.

Changes in Operations for Research Purposes:

- Spill duration for testing: Approximately early June to July 20. The dates of testing will be dependent on the size of fish, fish availability, and the number of treatments needed for testing. Final dates for testing will be coordinated through the SRWG.
- Summer research operations: If planned abatement measures are successful at reducing avian predation in the tailrace of John Day Dam, a repeat of the 2008 spillway weir test will be conducted. Two training spill percentages, 30% and 40% 24 hours per day, will be tested. If avian predation in the tailrace is at an unacceptably high level, to be determined during a May 21 SRWG meeting, spill will revert to the 2008 FPP summer pattern which is 30%, 24 hours per day. The two spillway weirs will be shut off to accommodate this, and a north bulked pattern will use spill bays 1-14.
- Objectives of the biological test: The objectives of the study are to assess passage distribution and efficiency metrics, forebay retention, tailrace egress, and survival for subyearling fall Chinook.
- Spill pattern during the biological test: Spill patterns for 30% and 40% spill have been developed at ERDC in coordination with regional agencies. These patterns are included in the FPP. From approximately early June to July 20, 30% spill versus 40% spill will be evaluated. Pending the outcome of the May 21 SRWG meeting, either spill patterns described in the 2008 FPP or the 30% spillway weir pattern will be used from the conclusion of the spillway weir test to the end of spill (approximately July 20 – August 31).

Operational Considerations:

- Wire lines in the avian wire array across the tailrace need to be replaced. A full spillway outage is required to accomplish the work. The Corps is coordinating with the region to stop spill during daylight hours for one or more days to repair the array. The outage is being considered for early June between spring and summer fish outmigration periods, and prior to the start of the summer spillway weir test.
- Minimum spill: During periods of low flow before the spring freshet and during the summer period, there may be periods where spill quantities are limited so that tailrace conditions are not advantageous to fish passage. If such a low flow condition occurs, alternative operations at the dam will be coordinated through the TMT.
- Minimum generation: A minimum powerhouse discharge of 50 kcfs is required at all times to meet minimum generation requirements. The lower Columbia River dams provide some of the required generation capacity reserves for the power system. Due to this requirement and the constant fluctuations in power demands throughout the day, the 50 kcfs flow cannot be maintained precisely on an hourly basis. The flow may increase by as much as 10 kcfs for short periods. Therefore, the minimum generation flow should meet or exceed 50 kcfs for all hours.
- Unit outages will occur for required maintenance activities. The outage schedule for the project is shown in the FPP. Dates are subject to change in coordination with FPOM or TMT.

- Unit outages and spill outages may be required to repair research equipment. These will be coordinated through FPOM and TMT.
- If river flows drop below about 75 kcfs then spill may need to drop below 30% spill in order to maintain station service and power system needs.

The Dalles

Summer Spill Operations July 1 – August 31, 2009: 40% spill 24 hours per day. See Table A for operational spill levels.

Changes in Operations for Research Purposes:

- Spill pattern during the biological test: No research is planned for 2009. The FPP spill patterns will be used.

Operational Considerations:

- When high river flows are such that available spill bays 1 – 6 cannot maintain 40% spill (when spill exceeds 162 kcfs), FPOM and TMT will discuss the preferred spill pattern and rate. The project may maintain 40% spill of the total river flow and depart from the spill pattern, or spill less than 40% of the total river flow using a pattern other than that shown in the FPP.
- Spill bays 10, 11, 13, 16, 18, and 19 are not operational due to wire rope and structural concerns. Spill bay 23 has undercutting issues but may be used during high flows.
- The spill pattern in the FPP is based on a nominal Bonneville forebay elevation of 74 feet.
- Minimum generation: A minimum powerhouse discharge of 50 kcfs is required at all times to meet minimum generation requirements. The lower Columbia River dams provide some of the required generation capacity reserves for the power system. Due to this requirement and the constant fluctuations in power demands throughout the day, the 50 kcfs flow cannot be maintained precisely on an hourly basis. The flow may increase by as much as 10 kcfs for short periods. Therefore, the minimum generation flow should meet or exceed 50 kcfs for all hours.
- Unit outages will occur for required maintenance activities. The outage schedule for the project is shown in the FPP. Dates are subject to change in coordination with FPOM or TMT.
- If river flows drop below about 90 kcfs then spill may need to drop below 40% spill in order to maintain station service and power system needs.

Bonneville

Summer Spill Operations June 21 through August 31, 2009: Spill 85 kcfs during daytime hours from June 21 through July 20, then spill 75 kcfs during daytime hours from July 21 through August 31. Spill to the 120%/115% TDG spill cap at night. Daytime spill hours change periodically and are defined in FPP Table BON-6. It takes

approximately 10 minutes to change between day and night summer spill levels. See Table A for operational spill levels.

Changes in Operations for Research Purposes:

- Spill duration for testing: No special spill operations are required in 2009. Spill patterns and durations from the FPP will be used.
- Summer research operations: No special spill operations are required for 2009 biological tests.
- Objectives of the biological test: Estimate juvenile subyearling Chinook passage distribution in response to a behavioral guidance structure at Powerhouse 2.
- Spill Patterns for summer operations: Spill patterns in the FPP will be used.

Operational Considerations:

- **Minimum generation**: A minimum powerhouse discharge of 30 kcfs is required at all times to meet minimum generation requirements. The lower Columbia River dams provide some of the required generation capacity reserves for the power system. Due to this requirement and the constant fluctuations in power demands throughout the day, the 30 kcfs flow cannot be maintained precisely on an hourly basis. The flow may increase by as much as 10 kcfs for short periods. Therefore, the minimum generation flow should meet or exceed 30 kcfs for all hours.
- **Unit outages** will occur for required maintenance activities. The outage schedule for the project is shown in the FPP. Dates are subject to change in coordination with FPOM or TMT.
- Turbine unit and corner collector outages may be required to repair hydrophones and other research equipment. These will be coordinated through FPOM.
- Minimum spill discharge level is 50 kcfs. This is to provide acceptable juvenile fish egress conditions in the tailrace.
- Actual spill levels at Bonneville Dam may range from 1 to 3 kcfs lower or higher than specified Table A. A number of factors influence this including hydraulic efficiency, exact gate opening calibration, spillway gate hoist cable stretch due to temperature changes, and forebay elevation (a higher forebay results in a greater volume of spill since more water can pass under the spill gate).
- The second powerhouse corner collector (5 kcfs discharge) will operate until the afternoon of August 31, 2009.
- A mid-season spillway outage will be required to survey the stilling basin for erosion. Pending the outcome of this survey, the 2009 spill operation may be altered to maintain dam safety. Changes to spill operations may include changing the spill pattern to avoid further erosion or discontinuing spill until repairs can be made. The mid-season survey will take approximately ½ day to complete. The Corps will coordinate this work through the Fish Facility Design Review Work Group (FFDRWG), FPOM, and TMT.

JUVENILE FISH TRANSPORTATION PROGRAM OPERATIONS

As noted above, the Corps' planned spill operations assume average runoff conditions. The following explains the juvenile fish transportation program under all runoff conditions and is consistent with the 2008 transport operations. The lower Snake River projects are described first, followed by McNary project operations. Detailed descriptions of project and transport facility operations to implement the program, including the transition from barges to trucks when fish numbers decrease in the summer, and the end dates for transport, are contained in FPP Appendix B.

Lower Snake River Dams - Operation and Timing

The 2009 Spring FOP provides information about the initiation of transport at the lower Snake River collector projects; however, the Snake River projected seasonal average (April 3 – June 20) flows were greater than 70 kcfs and the Corps initiated transportation on a staggered start basis. Dates to begin transport at the lower Snake River collector projects were coordinated through TMT.

The collection of fish for transport began at Lower Granite Dam on May 1 at 0700 hours. It began 4 days later at Little Goose Dam, on May 5 at 0700 hours; and began 3 days after that at Lower Monumental, on May 8 at 0800 hours. Barging of fish began the following day and will continue with collected juvenile fish barged from each facility on a daily or every-other-day basis (depending on the number of fish) throughout the spring and into the summer. Starting on or about August 15, fish will be transported by truck, pending numbers of subyearling Chinook collected. Transport operations will be carried out concurrent with FOP spill operations at each project and in accordance with all relevant FPP operating criteria. Fish transportation operations for the lower Snake River collector projects are described in FPP Appendix B.

Fish transportation operations are expected to continue through approximately October 31 at Lower Granite and Little Goose dams, and through September 30 at Lower Monumental Dam. Transportation operations may be adjusted due to research, conditions at the collection facilities, or through the adaptive management process to better match juvenile outmigration timing or achieve/maintain performance standards.

McNary Dam - Operation and Timing

Juvenile fish collected at McNary between April and the start of transport will be bypassed to the river. The normal operation is to bypass fish through the full flow bypass pipe, which has interrogation capability to monitor for PIT tags. Every other day, however, in order to sample fish for the Smolt Monitoring Program, fish are routed through the separator, interrogated for PIT tags, and then bypassed to the river.

Transportation will be initiated at McNary Dam during July 15 – 30, 2009 as per the 2008 BiOp (RPA 30, Table 4) and in coordination with NOAA Fisheries and TMT. Fish will be transported from McNary Dam by barge through August 16, then transported by

truck every other day. All fish collected will be transported except those marked for in-river studies. Fish are expected to be transported through September 30, 2009. The presence of factors such as excess shad, algae or bryozoans that can clog screens and flumes may result in discontinuing transport operations at McNary Dam before September 30. Detailed criteria for McNary transport are contained in the FPP, Appendix B.

Transportation operations may be adjusted for research purposes, due to conditions at the collection facilities, or as a result of the adaptive management process (to better match juvenile outmigration timing and/or to achieve or maintain performance standards). If new information indicates that modifying (or eliminating) transportation operations at McNary Dam is warranted, adaptive management will be used to make appropriate adjustments through the TMT coordination process.

TRANSPORT, LATENT MORTALITY, AND AVIAN RESEARCH

Spring operations to conduct research on the seasonal effects of transport and latent mortality are described in the 2009 Spring FOP. The avian predation study continues into the summer and is described below.

Avian Predation

A study is being conducted to evaluate the impacts of avian predation on salmonid smolts from the Columbia and Snake rivers. The study will determine how various biotic and abiotic factors are associated with differences in steelhead smolt vulnerability to predation by Crescent Island terns and Foundation Island cormorants. The study requests PIT tagging both hatchery and wild steelhead collected in the smolt monitoring sample at Lower Monumental and Ice Harbor dams, beginning April 1 and continuing through July. The recorded condition of a fish will be attached to a specific tag code and vulnerability to avian predation will be evaluated using PIT tag recovery data collected from the avian bird colonies. The study needs a minimum sample of 100 fish each day that are collected for condition by the smolt monitoring program.

EMERGENCY PROTOCOLS

The Corps and the Bureau of Reclamation will operate the projects in emergency situations in accordance with the WMP Emergency Protocols (WMP Appendix 1). The Protocols define emergency conditions and situations that may arise while operating the FCRPS projects, and the immediate actions that may be taken in the face of the emergency. The most recent version of the Emergency Protocols is located at: <http://www.nwd-wc.usace.army.mil/tmt/documents/wmp/2009/final/emerproto/>

COORDINATION

To make adjustments in response to changes in conditions, the Corps will utilize the existing regional coordination committees. Changes in spill rates when flow conditions are higher or lower than anticipated will be coordinated through the TMT. This could include potential issues and adjustments to the juvenile fish transportation program. Spill patterns and biological testing protocols that have not been coordinated to date will be finalized through the Corps' AFEP subcommittees, which include the SRWG, FPOM, and FFDRWG.

REPORTING

The Corps will provide periodic in-season updates to TMT members on the implementation of 2009 fish passage operations. The updates will include the following information:

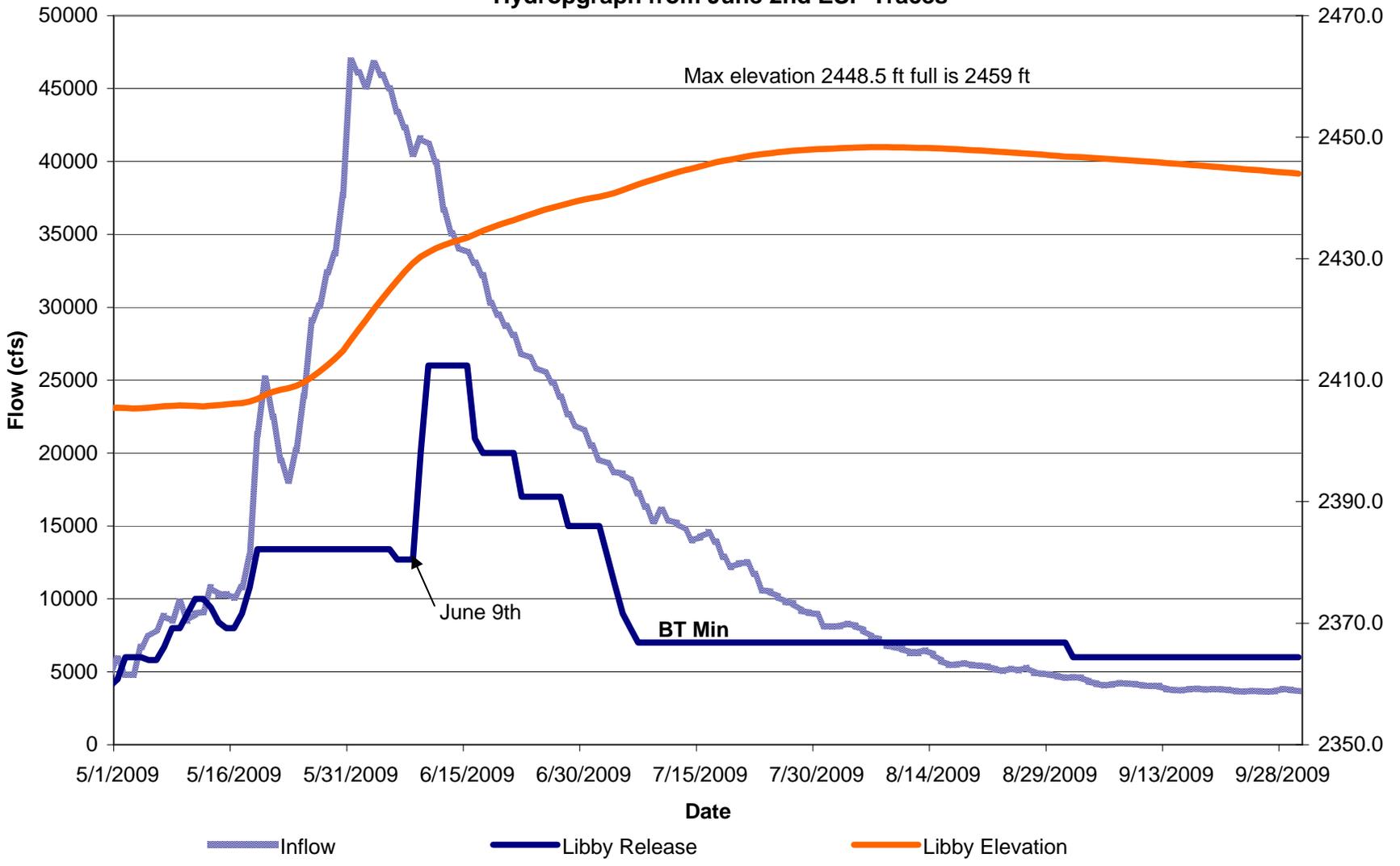
- the hourly flow through the powerhouse;
- the hourly flow over the spillway compared to the spill target for that hour; and,
- the resultant 12-hour average TDG for the tailwater at each project and for the next project's forebay downstream.

The updates will also provide information on substantial issues that arise as a result of the spill program (e.g. Little Goose adult passage issues in 2005 and 2007), and will address any emergency situations that arise.

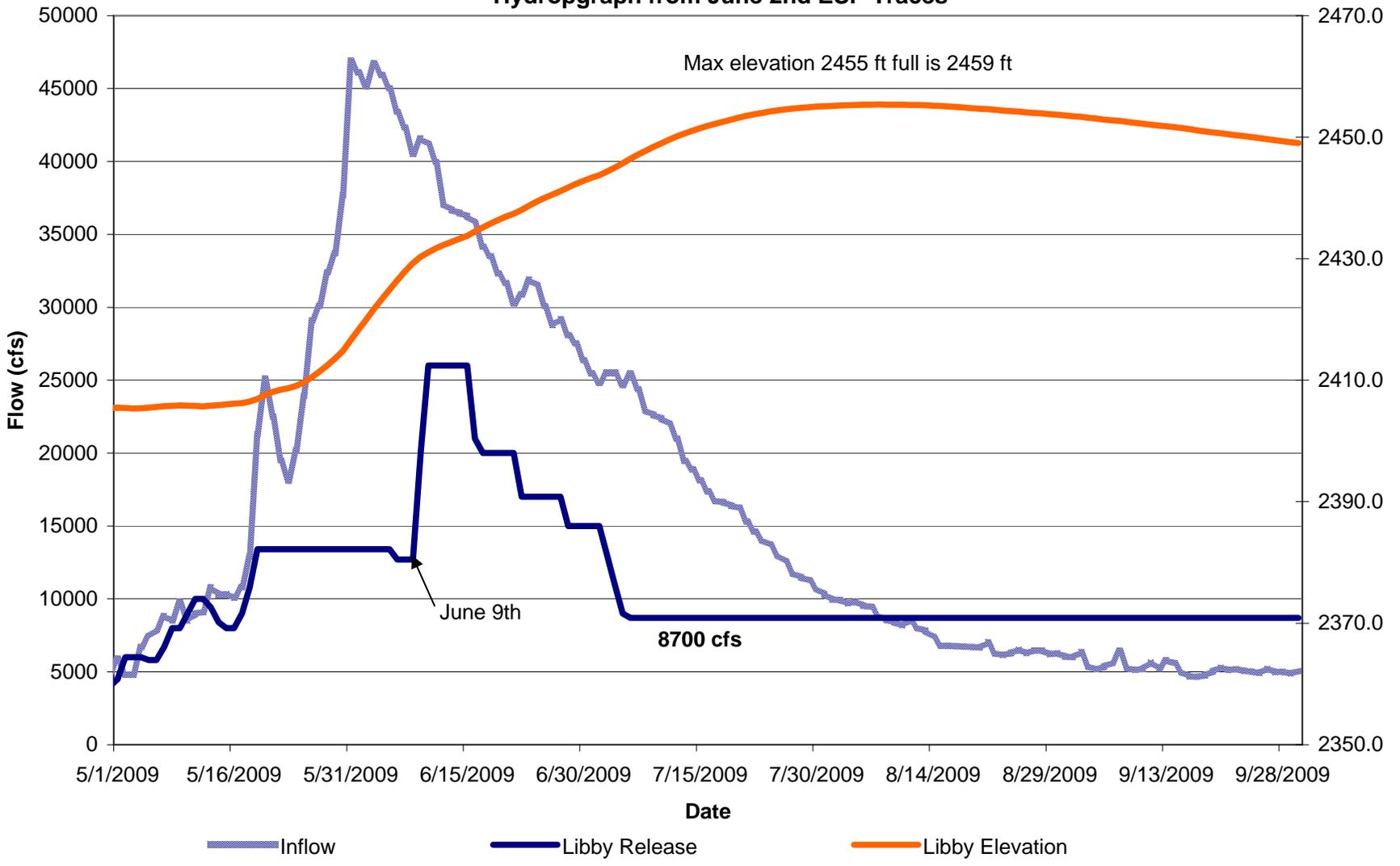
The Corps will continue to provide the following data to the public regarding project flow, spill rate, TDG level, and water temperature.

- Flow and spill quantity data for the lower Snake and Columbia River dams are posted to the following website every hour:
<http://www.nwd-wc.usace.army.mil/report/projdata.htm>
- Water Quality: TDG and water temperature data are posted to the following website every six hours: <http://www.nwd-wc.usace.army.mil/report/total.html> These data are received via satellite from fixed monitoring sites in the Columbia and Snake rivers every six hours, and placed on a Corps public website upon receipt. Using the hourly TDG readings for each station in the lower Snake and Columbia rivers, the Corps will calculate both the highest and highest consecutive 12-hour average TDG levels daily for each station. These averages are reported at:
http://www.nwd-wc.usace.army.mil/ftppub/water_quality/12hr/html/

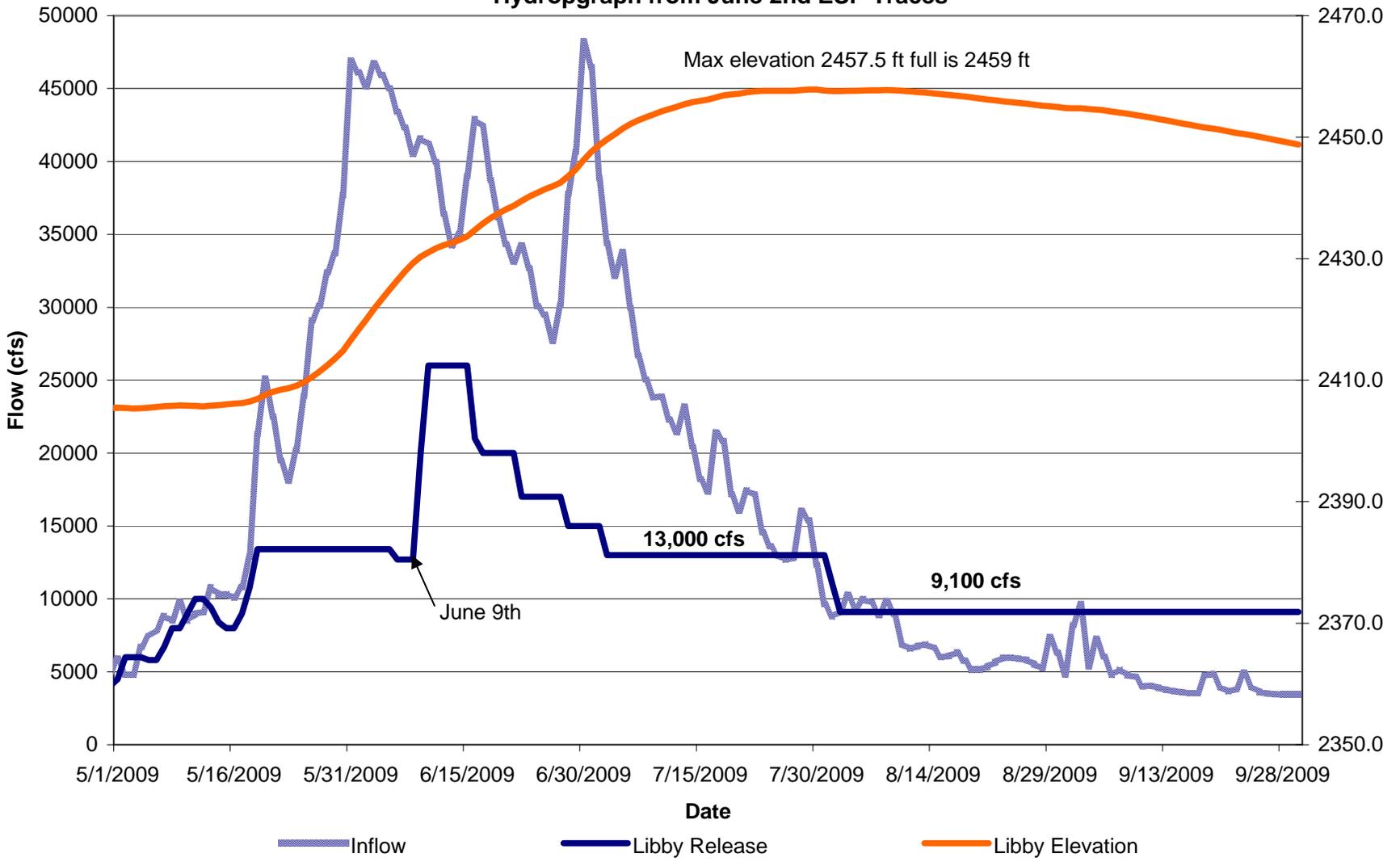
Libby Reservoir May 1 - Sept 30, 2009
Assumed Apr - Aug Inflow Volume of 4600 KAF
End of Sept draft target is 2449 ft
Hydrograph from June 2nd ESP Traces



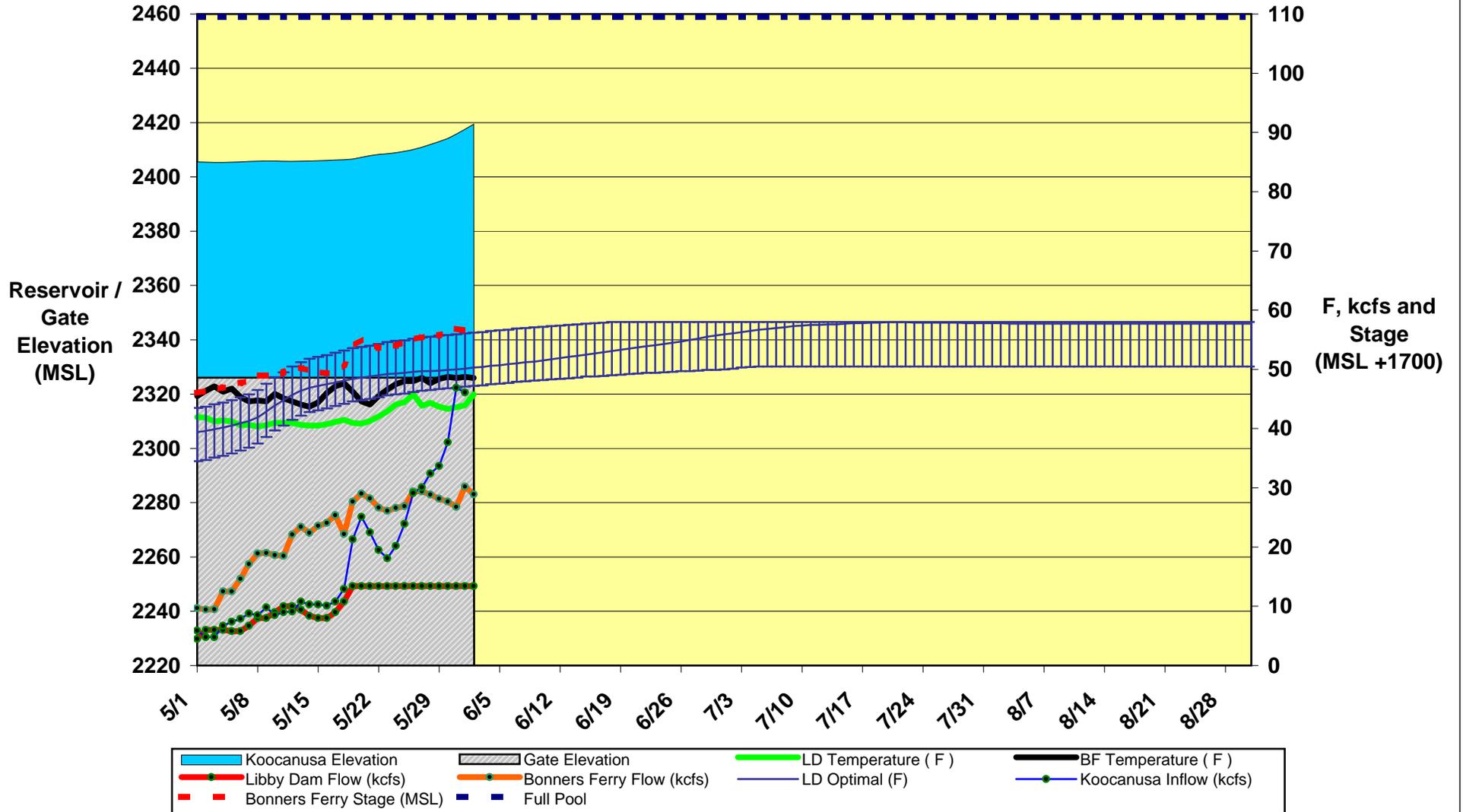
Libby Reservoir May 1 - Sept 30, 2009
Assumed Apr - Aug Inflow Volume of 5000 KAF
End of Sept draft target is 2449 ft
Hydrograph from June 2nd ESP Traces



Libby Reservoir May 1 - Sept 30, 2009
Assumed Apr - Aug Inflow Volume of 5400 KAF
End of Sept draft target is 2449 ft
Hydrograph from June 2nd ESP Traces



Kootenai River and Koocanusa Reservoir Temperatures 2009 BiOp Fish Operations (1 May - 31 August)



COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

June 3, 2009 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 Minutes/Agenda

The facilitator notes and official meeting minutes from the May 20, 22 and 27 meetings had been posted to the web. Kyle Dittmer noted that there were two misspelled names at the end of the May 22 facilitator notes [note: it was later discovered that the misspellings were at the end of the official minutes.] A corrected version will be posted to the web and TMT members will look to finalize the three sets of notes and the notes from today's call at the June 17th TMT meeting.

Libby Sturgeon Pulse Operations Update

Joel Fenolio, COE, reported that the June early bird forecast for the water supply at Libby was for ~ 5000 KAF. He referred TMT to three scenarios linked to the agenda that showed shaping, flow and end of July elevation levels for water supplies of 4600 KAF, 5000 KAF and 5400 KAF. Fenolio said that the sturgeon pulse day had not yet been determined, but that it was likely to be June 9th or later during that week. Greg Hoffman, on behalf of the Sturgeon Flow Planning Group, referred TMT to graphs linked to the agenda that showed current elevation and temperatures in the Koocanusa Reservoir. He noted a general warming trend was expected over the next few days and said that so far in 2009 outflows from Libby have been cooler than observed last year. Hoffman reported that there have been 13 tagged fish observed above Shorty's Island but that so far no spawning has been observed in the area above the bridge. Hoffman said that if flows remain steady over the next two weeks, Hatchery personnel will likely be able to capture some male sturgeon.

Action/Next Steps: The Sturgeon Flow Team had a call planned for 6/5; the COE said they would notify TMT via email when a date was set for the pulse.

Lower Granite Barge Maneuvering Test Update

Jim Adams, COE, reported that flows at Lower Granite had risen naturally to the 150 kcf/s range; the COE planned to proceed with the test planned for 6/4 and clarified that the test would run from 0800 hours to 1900 hours. Karl Kanbergs, COE, added that operations were expected to stay within MOP, with minimal reductions of spill only if necessary to provide consistent conditions throughout the test.

Dworshak Unit 3 Outage

Rudd Turner, COE, said that the COE recognizes the unit 3 outage causes impacts to fish and water quality; he clarified that operations at the project will only use units 1 and 2 for

the near term. He reported that coordination on this issue has been ongoing with many regional partners, including NOAA, USFWS, ID and the Nez Perce Tribe, who will all help the COE determine the best course of action(s) as more becomes known regarding the status of the repair. Paul Wagner, on behalf of the Salmon Managers, said efforts are underway on a draft request for a TDG waiver that would allow operations to go beyond the current TDG limits. Kyle Dittmer, CRITFC, offered to provide assistance with developing scenarios on temperature.

Dave Tucker, Dworshak project staff, reported a brief synopsis of the initial discovery of the leak and clarified that they suspect there may be an issue with an O-ring that was previously repaired in 1986 and/or there may be a head cover issue. Tucker clarified that next steps included physically accessing the leak site, which will require use of the emergency gate, which needs to be certified before it can be used. The COE is pursuing all avenues of securing a mobile crane that will assist with the repair assessment process.

Russ Kiefer, ID, reported that he had been alerted to temperature spiking at the Clearwater Hatchery on 6/2. There was some discussion of what may have caused the sudden increase in water temperature to occur. Steve Hall, COE, and Kiefer said they would make sure that the right people at the project and the hatchery are coordinating clearly and often.

Next Steps: The COE will keep TMT apprised via email as new information is available –they will do their best to expedite a contract for the crane work needed and said that their best guess was that a week will be needed to ascertain and make the repair once the crane is secured.

Summer Fish Operation Plan

Rudd Turner, COE, referred TMT to a draft Summer Fish Operation Plan posted as link to the agenda. He reported that the draft had been submitted to the court on 6/2 and reviewed specific spill operations described in the document. Turner noted that there may be changes to spill operations at John Day to address significant predation issues; this will be coordinated through FDDRWG, TMT and the court. Turner reviewed changes to operations at several projects to accommodate research tests and clarified that the COE plans to evaluate the 40/60% spill at McNary with spill in bays 4 and 20. The COE plans to remove the spillway weir in bay 4 at McNary in early August.

Operations Review

Reservoirs: Grand Coulee was at elevation 1276.8' and filling. Hungry Horse was at 3539.78', with inflows of 15 kcfs and outflows of 4.1 kcfs. Libby was at elevation 2419.7' with outflows of 13.4 kcfs. Albeni Falls was at elevation 2060.8' and slowly filling. Dworshak was at elevation 1584.2', with inflows of 21.4 kcfs and outflows of 6.6 kcfs. Seven day average flows were 161.8 kcfs at Lower Granite, 342.3 kcfs at McNary and 345 kcfs at Bonneville.

Fish: Paul Wagner, NOAA, reported that about 2200 adults were passing Bonneville per day. The two-week index indicated smolts were wrapping up at Lower Granite, nearing the end of yearling passage. Steelhead were surprisingly still in the 20, 000 per day range at Lower Granite and Little Goose, and sub-yearlings were in the 50,000 range at Lower Granite and Little Goose. Wagner asked the COE about a volume difference of about 15

cfs between Little Goose and Lower granite; the COE said a calibration check was underway.

Power System: *nothing to report.*

Water Quality: Jim Adams, COE, reported that there were high levels of TDG due to involuntary spill everywhere but John Day and The Dalles. Russ Kiefer, ID, asked whether the COE planned to reduce spill at Lower Granite; the COE acknowledged that the Lower Granite tailrace was at 23.8 said they did not see justification to adjust levels at this time and would continue to monitor levels closely.

Other: Jim Adams, COE, announced that he has accepted a new position at the COE's Portland District and said that his departure date would likely be July 3. He said that Dan Feil will serve as the TMT Chair for the near term.

TMT Schedule ahead: June 17 Face to Face, June 24 Face to Face

June 17th meeting agenda items include:

- Finalize May 20, 22, 27 and June 3 Facilitator Notes and Official Minutes
- Dworshak Unit 3 Outage / Operations Update
- July 4 Operations
- Operations Review

**Columbia River Regional Forum
Technical Management Team Conference Call
June 3, 2009**

1. Introduction

Today's TMT call was chaired by Jim Adams (COE) and facilitated by Erin Halton (DS Consulting), with representatives of NOAA, COE, BPA, BOR, USFWS, Oregon, Montana, CRITFC, Idaho and others participating. 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 for May 20, 22 and 27, 2009

Review of the recently posted notes for the past three TMT meetings was postponed so people would have more time to review them.

3. Libby Sturgeon Pulse Operations Update

Joel Fenolio (COE) presented three graphs, linked to today's agenda, that depict different inflow volumes to Libby and how that would affect the sturgeon operation.

The COE June water supply forecast will be available June 5. It looks like 5,000 kaf will be the April-August prediction for Libby inflows. That volume would change VARQ flows from 13.4 kcfs to 12.7 kcfs. The second graph attached to today's agenda depicts this scenario, which assumes a June 9 start date for the sturgeon pulse and flat flows, as discussed earlier this week. The scenario shows the sturgeon volume lasting into July. The end of July refill elevation for Libby reservoir is 2,455 feet under this scenario.

The low inflow scenario of 4,600 kaf for April-August is the first graph attached to this item on today's agenda. This outcome would trigger bull trout minimum flows from Libby as soon as the sturgeon pulse ends. Bull trout flows would be 7 kcfs until Aug. 31 and drop to 6 kcfs starting Sept. 1. The end of July refill elevation under this scenario is 2,448.5 feet.

The final graph depicts a high inflow scenario of 5,400 kaf, with a maximum flood control elevation of 2,457.7 feet on Aug. 31. This scenario has the same shape as the others, but doesn't include flat flows as the 5,000 kaf scenario does.

The sturgeon operation will no doubt include reductions in VARQ flows, Greg Hoffman (COE Libby Dam) said. It looks like the reductions will be minor so the team decided not to initiate the sturgeon pulse until next week.

Hoffman reminded everyone that the goal of this year's sturgeon operation is to mimic last year's thermal characteristics as closely as possible. He showed TMT graphs depicting various aspects of the sturgeon operation. The first graph shows current conditions. The selective control gates are at elevation 2,326 feet and releasing water of 43.4 degrees F. Steelhead will have enough warm water by sometime next week to safely provide a full powerhouse operation with cooler water. The reservoir is beginning to stratify, and water temperatures are expected to gradually increase. Overall, flows are expected to decrease slightly, which means VARQ flows will also subside. Temperatures of water coming out of Libby are substantially cooler than in the past, and the operation is on track in terms of replicating last year's thermal characteristics.

The sturgeon operation is dependent on the location of fish on the river, Hoffman said. There are now 10 females in the sturgeon hatchery, but personnel are having difficulty capturing enough males for spawning activity to take place. At present, the sturgeon operation is on hold to allow hatchery personnel time to capture more males. At this point, it looks like the sturgeon operation will begin the middle of next week. The COE will notify TMT members via email when it begins.

4. Lower Granite Barge Maneuvering Test Update

Previous TMT discussion of possible deviation from the MOP-MOP+1 operation at Lower Granite Dam to provide 130 kcfs flows for this test has turned out to be unnecessary, Adams said. Flows are so high that more than enough water will be available to simulate the navigation problems being studied. Flows of 130 kcfs were deemed ideal for the test, and actual flows may turn out to be as high as 150 kcfs. So at this point, it appears the barge test will have no impact on the MOP operation in the forebay.

To the extent possible, the COE will provide flat flows for a consistent operation throughout the barge maneuvering test. There is a possibility that spill might have to drop below 20 kcfs briefly for unanticipated safety reasons, but any disruption to fish operations should be minimal. The test will occur from 8 am to 7 pm tomorrow, June 4.

5. Dworshak Unit 3 Outage Update

There are a number of issues the COE needs to consider in order to determine a course of action to deal with the Dworshak unit 3 outage, Jeremy Giovando (COE) said. Recognizing that the outage will probably impact fish, water quality and power generation, the COE plans to coordinate with TMT throughout the repair process, and will also coordinate with the state of Idaho and the Nez Perce Tribe regarding ESA and CWA reporting requirements. The current focus is on providing as smooth a refill operation as possible in an effort to keep TDG levels below 110% and minimize fish impacts.

Speaking on behalf of FPAC, Wagner advocated applying for a TDG waiver now for what could turn out to be an extended outage. The waiver would be an important tool in terms of the ability to manage flows. FPAC is in the process of drafting a letter to the COE asking them to submit a TDG waiver application as a contingency planning measure. The possibility of getting a waiver will be included in our discussions with Idaho, Rudd Turner replied.

Using a CEQUAL-2 model, the COE will look at scenarios of different operations that could result from the unit outage and their potential effects on TDG levels in the lower Snake River, as well as on reservoir elevations throughout the hydrosystem. The COE is also testing TDG effects at Dworshak. Kyle Dittmer (CRITFC) has been coordinating with Ben Cope (EPA) who is doing similar modeling using the RBM 10 model and plans to give a short presentation on it at the June 24 TMT meeting.

The COE is working now to identify the source of the leak, Dave Tucker (COE Dworshak) reported. Underwater video indicates that it's in the vicinity of the head cover, seams or wicket gates. Maintenance records for unit 3 show that the O-ring for the unit was repaired in 1982 and again in 1985-86. Further investigation of the leak will require sealing off the area to make it safe for human inspection. Lack of a big enough crane could hold up that work. The COE is pursuing parallel paths to getting the emergency gate pulled, either of which might work. The first was using the 50 Ton intake gantry crane and the second was getting a mobile crane on site. The COE might look to the private sector for a usable crane. If the leak is caused by a deteriorated O-ring or related to the previous repairs, the repair efforts could take about a week, Tucker said. Other causes could take up to a year to address. The COE will send TMT substantial relevant information on the unit 3 outage as it becomes available. The COE is currently working on identifying the specific source of the problem and anticipates having a better understanding of the magnitude of the problem by the end of next week.

Yesterday, workers at the Clearwater hatchery reported that the water temperature in the fish marking trailer rose from 51 to 66 degrees F, Russ Kiefer reported. Somehow warm water was released directly into the hatchery intake. The problem highlights that coordination is needed to prevent recurrences, Hall and Kiefer agreed. The COE and Idaho will work together on preventing a recurrence.

6. Summer FOP Update

The Department of Justice submitted the Fish Operations Plan to the court late yesterday, Rudd Turner reported. A table on page 7 of the plan shows that spill levels are in keeping with the approach this year of providing the same spill levels at the projects as last year.

As specified in the summer FOP, Lower Granite outflows will drop from 20 kcfs to 18 kcfs on June 21, and Little Goose will spill 30% of inflows 24 hours a day.

There has been a lot of discussion regarding the McNary summer spill operation. The region coordinated on 50% spill; however, the COE decided to revert back to last year's 60/40% spill at Little Goose for 24 hours a day during the McNary spill test. Wagner asked whether there's a contingency plan for the spillway weirs at McNary. The COE decided to test 40% and 60% spill levels in bays 4 and 20, Turner replied. The plan is to remove the spillway weir from bay 4 once the spill test is completed.

On June 1, Lower Monumental will switch from 24 hours of spilling to the gas cap to 17 kcfs spill. Ice Harbor will continue to spill 30% around the clock on test days, and 45% during daytime and to the gas cap at night on non-test days. That operation will end in mid-July.

John Day will spill 30% or 40% on test days and revert to 30% spill when testing is done. There are significant issues with gull predation in the tailrace at John Day, which FFDRWG plans to discuss with TMT soon. To address predation, the COE might revert to the 2008 summer spill pattern at John Day, which would mean shutting off the spillway weirs and using a bulk spill pattern through bays #1-14.

The Dalles will continue to spill 40% of inflows day and night under the FOP. Bonneville will operate the same as last year, with spill of 75-85 kcfs during the day and to the gas cap at night. This year, the plan is to spill 85 kcfs in the daytime through July 20, then spill to 75 kcfs a day thereafter.

While the 2008 BiOp calls for a potential curtailment of spill at lower Snake River projects if subyearling Chinook counts are low enough, the COE doesn't plan to implement that provision this year. The FOP calls for spill through the end of August at all four lower Snake projects.

Summer transportation operations will begin at McNary between July 15-31, at which point TMT will get involved in the planning. Transportation is already underway on the lower Snake River. Implementation dates for summer spill are June 21 on the lower Snake and July 1 on the lower Columbia. Both dates are somewhat flexible.

7. Operations Review

a. Reservoirs. Grand Coulee is at elevation 1,276.8 feet and filling. The June 15 flood control elevation is 1,285 feet.

Hungry Horse is at elevation 3,539.78 feet. It has been discharging 5.1 kcfs and will drop to 4.1 kcfs tonight. The reservoir has been filling at the rate of about 1-1.5 feet per day.

Libby is at elevation 2,419.7 feet. Inflows peaked at 36.9 kcfs on May 31. Outflows have been holding steady at 13.4 kcfs.

Albeni Falls is at elevation 2,060.8 feet and slowly filling.

Dworshak is at elevation 1,584.2 feet. Inflows were 21.4 kcfs yesterday and are dropping, with a peak of 24.3 kcfs on May 31. Outflows are 6.6 kcfs.

Seven-day average inflows are 161.8 kcfs at Lower Granite, 342.3 kcfs at McNary, and 345.0 kcfs at Bonneville.

b. Fish. Juveniles: Smolt passage is all but finished on Snake River projects, with index counts below 1,000 fish per day at Lower Granite. Passage counts are still in the 20,000 range in the lower Columbia but are reaching the end of the yearling passage season. Subyearlings are where the action is, with counts at Lower Granite in the range of 50,000 fish per day.

Adults: Counts at Bonneville are around 2,200 fish per day. The passage index count for spring Chinook is 118,000 fish, with a prediction of 129,000 fish passing the project by June 15. Daily passage numbers for steelhead are in the 20,000 range for Lower Granite and Little Goose.

Wagner asked about volume discrepancies on the Snake River at this level of flow. It appears there is 10-15 kcfs less spill at Lower Granite than Little Goose, a discrepancy that can't be attributed to tributaries or sinkholes. Is this a calibration issue? Adams said he will investigate and follow up.

c. Power System. There was nothing to report today.

d. Water Quality. High 12-hour TDG levels are being recorded throughout the system, with involuntary spill at all projects except John Day and The Dalles, Adams reported. The COE has decided not to change the gas caps at John Day and The Dalles, which are 90 kcfs and 100 kcfs respectively. The daily average spill at John Day is 26.7% of inflows, less than 30%. On May 2, TDG saturation levels were 117.4% in the John Day forebay, 116% in The Dalles forebay, and 116.7 in the Bonneville forebay. The spill volume at Bonneville is around 150 kcfs, meaning TDG levels are approximately 124% in the tailrace every day. Yesterday on the Snake River, TDG levels at Lower Granite were 124.8 kcfs, the highest reading on the Snake. Forebay levels on the Snake are around 118-119% TDG, with a high reading of 121.7% in the Ice Harbor tailwater.

At Little Goose, spill levels have dropped to 18% of river flow, with TDG readings below 117% in the tailrace, Kiefer said. He expressed concern that spill caps are being set lower than necessary at Little Goose in response to uncontrolled spill a few days ago. The COE plans to leave spill caps where they are until forebay TDG levels come down, Adams said. There was discussion of the degassing effect that has been observed at spill levels around 120 kcfs.

8. Next Meeting

The next regular TMT meetings will be June 17 and June 24 at the COE's Portland office. A Dworshak outage update, summer operations, 4th of July weekend operations, and other topics will be on the June 17 agenda. The June 24 meeting will include a farewell to Jim Adams, who has accepted a new position. Dan Feil will serve as TMT chair after Adams' departure. This summary prepared by consultant and writer Pat Vivian.

| <i>Name</i> | <i>Affiliation</i> |
|--------------------|---------------------------|
| Russ George | WMC |
| Jim Adams | COE |
| Paul Wagner | NOAA |
| Doug Baus | COE |
| Laura Hamilton | COE |
| Steve Hall | COE Walla Walla |
| Tony Norris | BPA |
| Eric Volkman | BPA |
| John Roache | BOR |
| Glen Trager | Shell Energy |
| Rick Kruger | Oregon |
| Tom Le | Puget Sound Energy |
| Brian Marotz | Montana |
| Kyle Dittmer | CRITFC |
| Joel Fenolio | COE Seattle |
| Mark Drobish | Dworshak Hatchery |
| Barry Espenson | CBB |
| Scott Bettin | BPA |
| Jason Flory | USFWS |
| Dave Wills | USFWS |
| Greg Hoffman | COE Libby Dam |
| Karl Kanbergs | COE |
| Margaret Filardo | FPC |
| Mike Butchko | Powerex |
| Rudd Turner | COE |
| Jim Litchfield | Montana |
| Russ Kiefer | Idaho |
| Dave Tucker | COE Dworshak |

TECHNICAL MANAGEMENT TEAM

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

TMT MEETING

Wednesday June 17, 2009 09:00 - 12:00

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

CONFERENCE PHONE LINE

Conference call line:888-285-4585; PASS CODE = 601714

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 or Cathy Hlebechuk (503) 808-3942 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 rgumpert@cnnv.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and Introductions
2. Review Meeting Minutes for May 20, 22, 27, June 3, 2009 [\[Meeting Minutes\]](#)
3. Dworshak Unit 3 Outage - Steve Hall, COE-NWW
4. Dworshak July 4 Operations - Steve Hall, COE-NWW
5. Grand Coulee July 4 Operations - John Roache, USBR
6. McNary Operations - Dan Feil, COE-RCC
7. 2009 Summer Treaty Fishery - Kyle Dittmer, CRITFC
 - a. [SOR 2009-C1](#)
8. Operations Review
 - a. Reservoirs
 - b. Fish
 - c. Power System

- d. Water Quality
- 9. Other
 - a. Set agenda for next meeting - **June 24, 2009**
[\[Calendar 2009\]](#)

Questions about the meeting may be referred to:

*[Jim Adams](#) at (503) 808-3938, or
[Cathy Hlebechuk](#) at (503) 808-3942, or
[Dan Feil](#) at (503) 808-3945*

COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

June 17, 2009 Meeting

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.

Review of Minutes/Agenda

June 3 Official Minutes: Under the Dworshak Unit 3 Outage update, 'gantry crane' was added to specify the crane that would be used to do the inspection.

June 3 Official Minutes: Under discussion of Dworshak operations, RBM 10 Modeling was done by 'Ben Cope, EPA', not Kyle Dittmer, CRITFC.

With the above two changes and no further comments, the May 20, May 22, May 27 and June 3 Official Minutes and Facilitators' Notes were finalized.

Dworshak Unit 3 Outage

Steve Hall, Walla Walla District COE, shared an update with TMT on the investigation of the Unit 3 outage at Dworshak. He began by commending the project staff for their efforts to disassemble and dewater the unit in a timely manner. The inspection occurred on June 11 and a leak was discovered on the head cover seal, an area that had been repaired in the past. Over the weekend, an epoxy sealant was used to seal the leak and a follow up test found no issues. At the time of this report, the unit was being watered back up and would be back in service by 1800 hours on the evening of June 17. Steve noted that the project was operating 7 kcfs outflows (with 2 kcfs spill) and that spill would end when the unit came back on. He added that structural safety was not an issue so the unit would be able to operate through the summer even if the repair is not completely successful. For the long term, the unit will need to be taken out of service for an 'overhaul' that will take about 12-18 months; this overhaul was not yet scheduled.

Next Steps: It was suggested that the salmon managers review all units needing repair, and provide a list of priority units for fish operations. This action will be addressed through FPOM. There was a brief discussion about investigating the possibility of adding a unit at Dworshak, as another potential long term solution for the aging project.

Dworshak July 4 Operations

Steve Hall also reported on the COE's current plan for operating Dworshak through the July 4 weekend. He said that given the current low temperatures in the Lower Snake River, the COE plans to fill the project by next week. The pool will then hold steady through July 4 and July 5, and 'summer operations' will begin on the afternoon of July 6. CEQUAL 2 temperature modeling will inform decisions about the operation, and Steve

said the COE would be able to share preliminary information at the June 24 TMT meeting, with a full analysis by July 1. Inflows over the July 4 weekend based on current forecasted conditions and modeling, were expected to be around 5 kcfs.

The salmon managers responded that they agreed with the proposed operation at this point, and would reserve the right to recommend some draft of the project if temperatures increased drastically between now and July 4. In the meantime, they supported the COE's plan to maintain outflow temperatures of 45-48 degrees.

Kyle Dittmer, CRITFC, will present EPA's RBM10 temperature modeling on July 1 to help inform discussions.

Grand Coulee July 4 Operations

John Roache, BOR, shared the current operating plan for Grand Coulee over the July 4 weekend. To support recreation needs, the project will be around elevation 1287 feet (close to the current elevation, 1286.45 feet) on July 2, then fill through the weekend, targeting 1290 feet by the evening of July 5 or early July 6. The BOR does not intend to negatively impact McNary flows downstream.

McNary Operations

Dan Feil, COE, reported that a change to operations at McNary had been coordinated through technical discussions at SRWG, with an agreement to move the TSW at McNary from bay 4 to bay 19, with 50% spill to begin on June 20 through August 31. This deviation from the FOP would be written up by the Walla Walla District COE and shared with the court. All TMT members present for today's meeting (Washington, Idaho, Montana, USFWS, NOAA, BOR, and BPA) agreed to the change; it was noted that the COE had coordinated with Oregon on this issue as well.

TMT acknowledged the need for a discussion about long term solutions to John Day TSW operations and predation impacts. No near term change was planned for operations at John Day.

SOR 2009 C-1

Kyle Dittmer, CRITFC, shared the tribes' request for operations to support treaty fishing from June 16-19 and June 22-25. The request was to hold, as a hard constraint, Bonneville, The Dalles and John Day each at a 1 foot operating range. He added that the request was intended to minimize pool fluctuations, and was consistent with all signed agreements between the tribes and BPA. The TAC forecasted 65,000 adult summer chinook (18,000 of which would be eligible for tribal take) and 183,800 sockeye (7% of which would be eligible for tribal take).

The COE responded with their planned operations: Bonneville would hold at elevation 75.5-76.5 feet as a soft constraint and 75.0-76.5 feet as a hard constraint except for on June 19 when the project would hold at 72.5-73.5 feet soft constraint to support multiple needs of the river that day. The Dalles would hold at a 1.5 foot operating range soft constraint and 3 foot range hard constraint. John Day would hold at 262.5-264 feet.

(NOTE: Kyle later shared net flight information via email with TMT.)

Operations Review

Reservoirs: Libby was at elevation 2425 feet with 34.1 kcfs in and 27 kcfs out. The sturgeon pulse began on 6/10 with 27 kcfs at 0600 on 6/11. The project will ramp down to 22 kcfs on 6/17; to 20 kcfs on 6/18; to 17 kcfs on 6/23; to 15 kcfs on 6/18 and to VARQ flows (bull trout minimums) around 7/3. The expected Libby summer refill elevation, based on current conditions and forecasts, is 2449-2451 feet. Montana noted its preference for a gradual draft through September, using current information along the way to react to conditions and make adjustments every couple weeks. At the June 24 TMT meeting, TMT will discuss Libby operating scenarios for the COE to run, which the COE will then share at the July 1 TMT meeting. Albeni Falls was at elevation 2061.56 feet. Dworshak was at elevation 1597.6 feet with 11-12 kcfs in and 6.6 kcfs out. Lower Granite inflows have decreased, with a 7-day average of 106.6 kcfs. McNary 7-day average inflows were 266.3 kcfs and, at Bonneville, 271.9 kcfs. Grand Coulee elevation was 1286.45 feet. Hungry Horse was at elevation 3548.97 feet with 2.3 kcfs out and 12-13 kcfs in.

Fish: Juveniles – Yearling passage was nearing the end, with chinook counts less than 1,000/day on the Lower Snake, steelhead counts less than 5,000/day and sockeye numbers also very low. Subyearling passage numbers were around 20,000/day at Lower Granite and about 50,000/day at McNary.

Adults – Summer chinook counts were high, around 2,800/day at Bonneville; jack counts were also high. Final spring counts for chinook were around 170,000 (lower than the forecasted 300,000), about 70% of the 10-year average. Sockeye counts were 183,800 and steelhead adults were just showing up.

Power System: Nothing to report.

Water Quality: No TDG exceedances had been observed for the past three days. Some exceedances had occurred on the Mid-Columbia, from upstream projects.

Other: Jim Adams, COE, announced that he would be taking his new position at the Portland District COE on July 6 so would be chairing TMT for just two more meetings. Dan Feil will take the lead as chair of TMT in the interim. Also, it was announced that Steve Barton from BPA will be the new RCC Chief, and will begin his position at the COE on July 6.

TMT Schedule: June 24 Face to Face, July 1 Face to Face

June 24 meeting agenda items include:

- Finalize June 17 TMT Minutes and Facilitator Notes
- EPA's RBM 10 Temperature Modeling
- Dworshak Operations
- Grand Coulee Operations
- Discussion of Proposed Libby Operations Scenarios
- Operations Review

July 1 meeting agenda items include:

- Libby Operation Scenarios
- Dworshak Operations
 - ★ CEQUAL temperature modeling
- Grand Coulee July 4 Operations Update

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**Columbia River Regional Forum
Technical Management Team Meeting
June 17, 2009**

1. Introduction

Today's TMT meeting was chaired by Jim Adams (COE) and facilitated by Robin Gumpert (DS Consulting), with representatives of USFWS, COE, NOAA, Montana, BOR, BPA, CRITFC, Idaho, Washington, and others participating. 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 for May 20, 22, 27 and June 3, 2009

There were two revisions to the June 3 official minutes: First, under "Dworshak Unit 3 Outage Update," a sentence will be added to clarify that a 50-ton gantry crane was used in the effort to repair unit 3. And Kyle Dittmer (CRITFC) said Ben Cope (EPA) has been doing the RBM-10 temperature modeling. With these two changes, the June 3 notes were deemed final.

There were no comments on other notes for the past four TMT meetings, so these were all deemed final.

3. Dworshak Unit 3 Outage

The staff at Dworshak has been working nights and weekends to get unit 3 back in service, Steve Hall (COE) reported. After dewatering and despite setbacks, the unit was inspected June 11. A leak was found in the head cover seal in an area that had been previously. Project staff injected 6 quarts of epoxy sealant into the joint and expects to have the unit back in service by 6 pm tonight, June 17. Currently Dworshak is discharging about 7 kcfs, of which 2.5 kcfs is spill. Putting unit 3 back in service will cut back on spill and improve TDG conditions. The staff is now certain of the source of the problem, Hall said. Furthermore, they are confident that if the repair is somehow unsuccessful, the unit can still be operated without impacting dam safety.

The last time this leak was repaired was in the early 1990s. A different and probably more effective sealant is available now. The long-term nature of this problem will be addressed whenever the unit is scheduled for a major overhaul. There's no date set for that, but it will be scheduled eventually and typically takes 12-18 months, Adams said.

Lack of a crane could have been a major problem but we got lucky, Tony Norris (BPA) pointed out. He reminded the Salmon Managers that the Action Agencies need a prioritized list of units to be scheduled for repair. Crane repairs or unit outages are typically prioritized based on the likelihood of their going out

of service and causing an unplanned outage. This is an issue for FPOM to address, Norris and Wagner agreed.

All three units at Dworshak probably need an overhaul, Hall said, as it's getting late in their lifespan. Long-term solutions are needed to the problems of aging units at Dworshak. TMT will check in on this issue as the year progresses.

4. Dworshak July 4 Operations

Temperatures have been low this year heading into the July 4 weekend, Hall reported. The COE's current plan is to fill Dworshak reservoir until inflows recede below the ability to discharge water without generating TDG above 110%. That is expected to occur next week. The COE plans to keep the project full through the July 4 weekend, and then begin summer augmentation operations on Monday evening, July 6, after recreational users have gone home. The COE is in the process of running CEQUAL-2 modeling and will provide preliminary information on Dworshak operations at the next TMT meeting June 24. A full analysis will follow at the July 1 meeting.

In terms of temperatures, this year is starting to resemble 2006 and 2007, Adams said. At this time in 2008, the Lower Granite tailwater temperature was 55 degrees F; this year it's 59. Inflows to Dworshak over the 4th of July are projected to be in the 5 kcfs range, Hall said.

The COE and Salmon Managers have agreed on the Dworshak operations plan at this time, per yesterday's FPAC meeting, Wagner reported. If the forecast for the July 4 weekend is hot, drafting will be considered at the July 1 TMT meeting. The fish managers want to reserve drafting as an option if needed to control temperatures. Between now and then, outflow temperatures of 45-48 degrees F are preferred. The COE agreed to this operation. Fully developed scenarios will be available July 1.

5. Grand Coulee July 4 Operations

The planned operation this year is for Grand Coulee to be around elevation 1,287 feet elevation on Thursday, July 2, then fill it to 1,290 feet over the weekend ending July 5 or early on July 6, John Roache (BOR) reported. The BOR intends to perform this operation without significant decreases in flows from McNary, i.e., maintain weekend flows at McNary at a level which is at least 80% of the previous weekday average. The McNary operation probably won't change because it's so heavily regulated, Norris said. The project is essentially full now and passing inflows.

6. McNary Operations

Based on the unanimous recommendations of the regional fisheries managers the COE will be moving the spillway weir from bay 4 to bay 19. The fisheries managers have concern with the potential for high predation rates to

occur with the spillway weir located in bay 4. Once the change occurs the spillway weirs will be located in bay 19 and 20. The move is occurring today. The COE's current plan is to operate the project at 50% spill beginning June 20 and continuing for the rest of the season. This is a departure from the 2009 Summer Fish Operations Plan (FOP). The COE will notify the court of this change to the Summer FOP.

Feil polled TMT members on whether they approve of this change. NOAA, Washington, Idaho, USFWS, Montana, BOR and BPA representatives all expressed support for the 50% operation. Feil reported that Oregon (through a pre-TMT phone conversation), although not represented in today's meeting, has also expressed support.

The conversation then turned to gull predation problems at John Day. The project is currently spilling 30% through bays 2-14, with the spillway weirs in bays 15 and 16 being shut off due to excessive gull predation. Spilling 40% would require spilling through bays beyond bay 16 and likely result in suboptimal tailrace egress conditions, therefore 30% spill will likely continue for the remainder of the year. Feil indicated it might be possible for the project to go back to the 40% spill level when river flows are 170 kcfs or less, however flows in that range are not likely until July 20, which is after the passage and survival test ends.

7. 2009 Summer Treaty Fishery – SOR 2009-C1

Kyle Dittmer presented this SOR for the initial two weeks of this year's tribal fishery. The SOR calls for a 1-foot band as a hard constraint on elevation fluctuations at Bonneville, The Dalles and John Day dams, from the morning of June 16 to the evening of June 19, and the morning of June 22 through the evening of June 29. CRITFC submitted the SOR to the COE on June 10. Additional fisheries requests are planned for late June and throughout July 2009.

CRITFC-sponsored net flights will begin this week and CRITFC will share the data with the COE. Dittmer will present net flight results to TMT before July 4.

The tribes are looking for a stable 1-foot band for this year's fishery, Dittmer emphasized. The 1-foot band is important to tribal fishers because greater fluctuations can cause problems.

1. Increased currents tend to sweep debris into fishnets.
2. Sudden elevation changes can complicate boat access. This has become less of an issue due to platform fishing.
3. Rapid elevation drops within a few hours can cause nets to tangle.
4. Nets can be torn from their anchors. They cost \$500-\$800 apiece, so this has a significant fiscal impact on tribal fisheries.

The latest run forecasts are for 65,000 adult summer Chinook at Bonneville, which is slightly above normal, and 183,800 sockeye at Bonneville,

which is way above normal, Dittmer said. The allowable tribal harvest is approximately 18,000 Chinook and 12,000 sockeye, Cindy LeFleur (Washington) said. Jim Litchfield (Montana) asked whether some of these fish could be spring Chinook. Summer Chinook that spawn above Priest Rapids prior to June 16 are called spring Chinook, LeFleur replied. The cutoff date of June 15 was chosen because most upper Columbia summer Chinook don't cross Bonneville before June 16. Nevertheless, there will always be some spring and summer Chinook crossing Bonneville after June 16, and the magnitude varies from year to year. LeFleur didn't have PIT tag data yet on crossover this year.

The COE plans to operate the three lower river projects as it has for past tribal fisheries, Adams said. For the dates requested in the SOR, Bonneville will operate from 75.5-76.5 feet elevation as a soft constraint, and from 75.0-76.5 feet as a hard constraint. On June 19, there will be a soft constraint of 72.5-73.5 feet for safety reasons. The transition to this operation is planned for June 18. Keeping river elevations stable during nighttime hours is important because the nets are out at night. The Dalles will operate within a 1.5-foot elevation range as a soft constraint and a 3-foot elevation range as a hard constraint. John Day will operate at its normal 1.5-foot elevation range, from 252.5-264 feet.

TMT will revisit treaty fishery operations as the season progresses.

8. Operations Review

a. Reservoirs. Libby is at elevation 2,425.9 feet, with inflows of 34.1 kcfs and outflows of 27 kcfs. The sturgeon pulse began the evening of June 10 with full powerhouse flows and ramped up to 27 kcfs at 6 am on June 11. The plan is to ramp down to 22 kcfs beginning the evening of June 17, to 20 kcfs the morning of June 18, then 17 kcfs the evening of June 23, followed by 15 kcfs the evening of June 28, and back to VARQ flows on July 3. As discussed at a previous TMT meeting, the COE is providing 800 kaf for the 2009 sturgeon operation based on VARQ calculations.

As far as planning Libby summer operations, the STP and ESP forecasts are showing a drop in summer elevations. The COE will prepare detailed modeling scenarios for the July 1 TMT meeting, with preliminary discussion of summer operations at the June 24 meeting. Decisions about summer flows will be made at the July 1 meeting. Montana wants to see stable flows out of Libby this summer, Litchfield said. Brian Marotz has suggested that the COE track this aspect of summer operations closely and revisit it frequently throughout the season. Adams proposed weekly updates, and Litchfield said that wouldn't be necessary as long as the COE consults TMT if any problems arise; Adams agreed. The Libby reservoir elevation could go down by 10 feet into September, but the bull trout minimum could make it a deeper draft, Wagner and Litchfield agreed. TMT will revisit this issue at its next two meetings.

Albeni Falls is at elevation 2,061.56 feet, nearly full and close to passing inflows. (Full is 2,062-2,062.5 feet elevation.)

Dworshak is at elevation 1,597.6 feet with 11-12 kcfs inflows and 6.6 kcfs outflows, and has been running two small units with added spill. Outflow temperatures are between 45-46 degrees F. When unit 3 goes back into service as discussed earlier, the COE will turn off spill and operate the project at 7-7.5 kcfs outflows.

Seven-day average inflows have been declining. They are 106.6 kcfs at Lower Granite, 266.3 kcfs at McNary, and 271.9 kcfs at Bonneville.

Grand Coulee is at elevation 1,286.45 feet, targeting refill over the July 4 weekend as mentioned earlier. Hungry Horse is at elevation 3,548.97 feet with discharges of 2.3 kcfs and inflows of 12-13 kcfs, currently filling about a foot a day.

b. Fish. Juveniles – The 2009 yearling passage is nearing its end, with combined yearling Chinook counts of less than 1,000 fish per day at all Snake River projects, less than 100 fish per day at Lower Monumental, and less than 5,000 fish per day on the lower Columbia. Steelhead yearlings are following the same trend, with less than 5,000 fish per day at Lower Granite and less than 1,000 fish per day at Lower Monumental, bringing yearling migration to a close on the lower Snake and lower Columbia. Sockeye yearling passage is also ending. Subyearling passage is where the action is, with 20,000 fish passing Lower Granite, 10,000 passing Little Goose and 5,000 passing Lower Monumental per day. These numbers reflect improvements in transportation and passage efficiency at the projects, Wagner said.

Adults – Summer Chinook passage is on the rise, with 2,800 fish passing per day and jacks following the same trend. The jacks in the river are primarily Snake River summer Chinook in early June, and will be upper Columbia summer Chinook later in the season. The summer Chinook final run forecast is now 170,000 fish, compared to an earlier 300,000 forecast, LeFleur said. The forecast for upper Columbia summer Chinook is 70,700 fish, and for sockeye, 183,800 fish. The 2009 spring Chinook run is 70% of the 10 year average, but jack counts far exceed the 10 year average, Wagner said. There are several theories to explain such high jack counts. One theory is that two years in a row (2008-09) of good ocean conditions after consecutive years of bad ocean conditions account for the increase. Another is that hatchery practices produced large numbers of jacks, which is easily done by feeding them in a way that accelerates maturity. Adult steelhead passage is just starting. Adult sockeye passage is already off to a good start and could easily exceed the 10 year average, which is low. Passage of yearling smolts is nearly finished, which is consistent with expectations.

c. Power System. There was nothing to report today.

d. Water Quality. For the past 3 days there have been no exceedances at lower Columbia and lower Snake River gauges, Adams reported. Lower Granite is spilling 20 kcfs, Little Goose is spilling 30% of inflows, and the cap at Lower

Monumental is 22 kcfs, set 2 days ago. Ice Harbor is spilling 45 kcfs during daytime and to the gas cap at night. The Dalles is spilling 30% of inflows round the clock. Flows are 100 kcfs at Bonneville and 50% of inflows at McNary, with a 155 kcfs spill cap at McNary. There have been exceedances at the mid Columbia projects, probably the result of gas moving downriver from Canada. Grand Coulee TDG readings are around 115% in the forebay and 113% in the tailwater. The TDG gauge at Boundary (on the Columbia River just below the U.S.-Canadian border) TDG readings have been around 120-122% and TDG levels have dissipated to 110-112% by the time the gas reaches Chief Joseph tailwater.

9. Next Meeting

The next TMT meetings will be June 24 and July 1. On July 6, Jim Adams will report to his new job at the COE Portland district. Dan Feil will serve as TMT chair after July 1. The June 24 agenda will include RBM-10 temperature modeling, preliminary information on scenarios for Dworshak, Libby and Grand Coulee summer operations, CRITFC net flight data, and the usual operations review. The July 1 agenda will include detailed Libby scenarios, CEQUAL-2 temperature modeling, and an update on Grand Coulee operations for the weekend of July 4. This summary prepared by consultant and writer Pat Vivian.

| Name | Affiliation |
|-----------------|---------------------|
| Jim Adams | COE |
| Dave Wills | USFWS |
| Paul Wagner | NOAA |
| Doug Baus | COE |
| Jim Litchfield | Montana |
| John Roache | BOR |
| Tony Norris | BPA |
| Kyle Dittmer | CRITFC |
| Karl Kanbergs | COE |
| Dan Feil | COE |
| Kim Johnson | COE |
| Rob Diaz | Integral Renewables |
| Tim Heizenrader | Centaurus |
| Laura Hamilton | COE |
| Rudd Turner | COE |

Phone:

| | |
|-----------------|--------------------|
| Russ Kiefer | Idaho |
| Cindy LeFleur | Washington |
| Shane Scott | PPC |
| Steve Hall | COE Walla Walla |
| Ruth Burris | PGE |
| Barry Espenson | CBB |
| Russ George | WMC |
| Marvin Shutters | COE |
| Tom Le | Puget Sound Energy |

Richelle Beck

DRA

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TECHNICAL MANAGEMENT TEAM

BOR : John Roache / Mary Mellema / Pat McGrane **BPA** : Robyn MacKay / Tony Norris / Scott Bettin
NOAA-F: Paul Wagner / Richard Dominique **USFWS** : David Wills / Steve Haeseker
OR : Rick Kruger / Ron Boyce **ID** : Russ Kiefer / Pete Hassemer
WDFW : Cindy LeFleur **MT** : Jim Litchfield / Brian Marotz
COE: Jim Adams / Karl Kanbergs / Dan Feil

TMT MEETING

Wednesday June 24, 2009 09:00 - 11:00

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

CONFERENCE PHONE LINE

Conference call line:888-285-4585; PASS CODE = 601714

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 or Karl Kanbergs (503) 808-3941 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 rgumpert@cunnv.net or call her at (503) 248-4703.*

AGENDA

1. Welcome and Introductions
2. Review Meeting Minutes for June 17, 2009 [\[Meeting Minutes\]](#)
3. Merchant Alert Protocol and Power Services Letter to Neighboring Systems - Steve Kerns, BPA
 - a. [Merchant Alert Protocol](#)
 - b. [Letter from Steve Oliver](#)
4. EPA's RBM 10 Temp Modeling - Kyle Dittmer, CRITFC
[Summer 2009 Operations](#)
5. Dworshak Operations Update - Steve Hall, COE-NWW
[2008 Temperature Operations](#)
6. Libby Operations Update - Joel Fenolio, COE-NWS
[Libby Regression Forecast](#)
7. Little Goose Operations Update - Dan Feil, COE-RCC

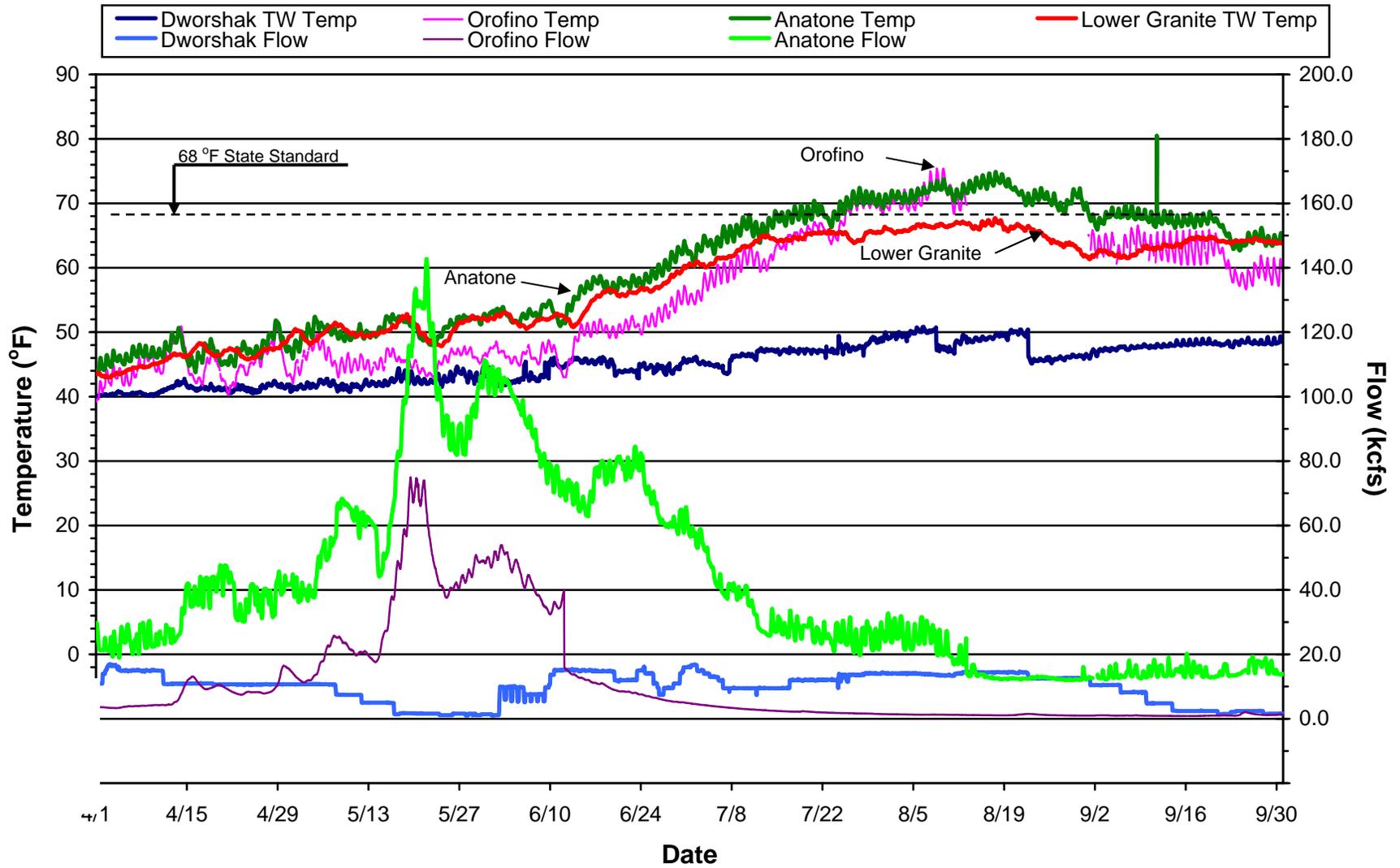
8. McNary Operations Update - *Dan Feil, COE-RCC*
9. John Day Operations Update - *Dan Feil, COE-RCC*
10. Operations Review
 - a. Reservoirs
 - b. Fish
 - c. Power System
 - d. Water Quality
11. Other
 - a. Set agenda for next meeting - **July 1, 2009**
 - b. [\[Calendar 2009\]](#)
 - c. [Jim Adams Farewell Luncheon](#)

Questions about the meeting may be referred to:

*[Jim Adams](#) at (503) 808-3938, or
[Karl Kanbergs](#) at (503) 808-3941, or
[Dan Feil](#) at (503) 808-3945*

Contributing Flows and Temperatures into Lower Granite

April 1 - September 30, 2008



Modeling of Dworshak Summer 2009 Operations



Kyle Dittmer

Hydrologist - Meteorologist

June 24, 2009

TMT Presentation

Columbia River Inter-Tribal Fish Commission

Portland, Oregon

Introduction



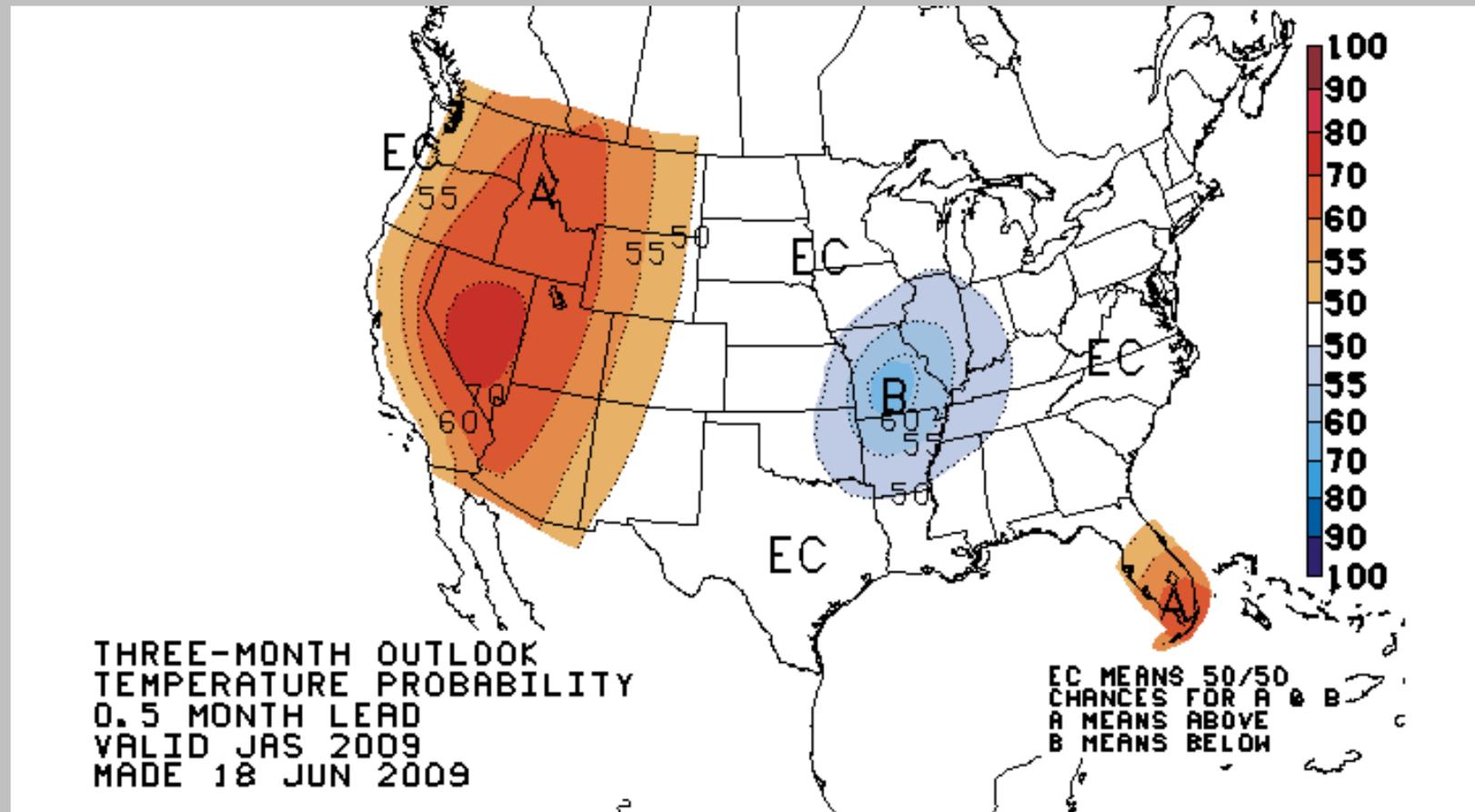
- Goals: (1) Model Dworshak flows and elevations for summer operation scenarios. (2) Evaluate impacts on Dworshak pool elevation and lower Snake water temperature and flow.
- CRITFC's Hydro spreadsheet: modeled outflows and elevations. Inflows provided by NOAA-NWRFC.
- EPA's RBM-10 model: water temperature. Assumes (1) 1976 and 1991 weather years, (2) 1985 tributary inflows, (3) 2000 Dworshak and Brownlee water temperatures, and (3) Dworshak release temperatures are 43 or 47 degF.

Weather Assumptions

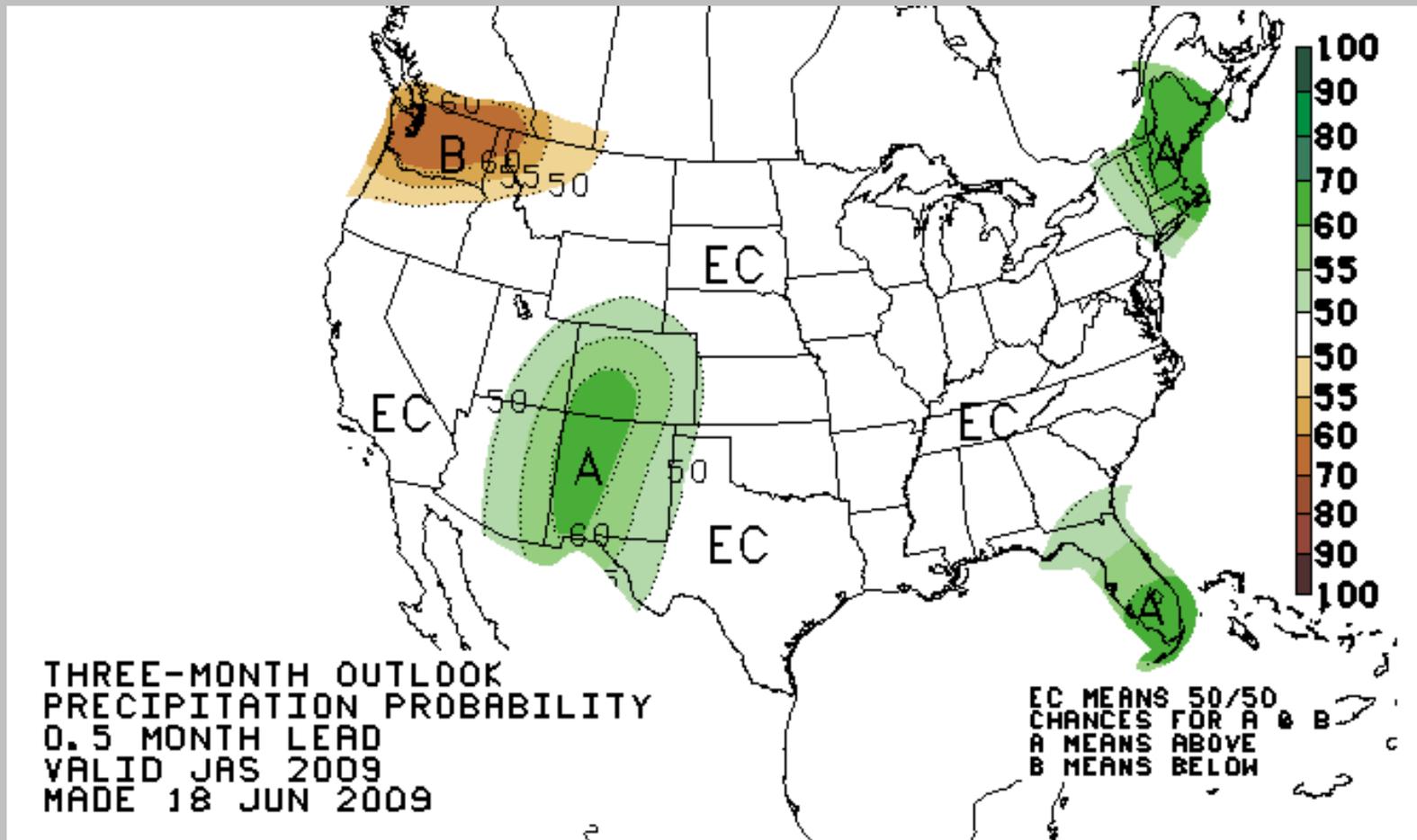


| Lewiston air temperature (degF) | MAY | JUN | JUL | AUG | SEP | Dworshak April-July Inflow (KaF) |
|---|-------------|-------------|------------|------------|------------|-------------------------------------|
| 1976 | 57.79 | 63.6 | 77.74 | 70.39 | 66.15 | 3524 |
| Departure | -0.4 | -2.0 | 4.0 | -1.4 | 2.7 | |
| 1981 | | | | | | 2276 |
| 1991 | 55.85 | 60.28 | 72.27 | 75.08 | 65.53 | 2565 |
| Departure | -2.5 | -5.6 | -1.8 | 2.7 | 1.8 | |
| Average Departure: | -0.9 | -2.6 | 0.7 | 0.4 | 1.5 | 2,788 |
| | MAY | JUN | JUL | AUG | SEP | NWS June WSF (KaF): |
| 2009 departure | 1.8 | 1.8 | | | | 2590 |
| Assumption: "ENSO-neutral and PDO-warm/cool" | | | | | | |
| Oct. 2008 - May 2009: MEI = -0.49 (+/- 0.36) PDO = -1.37 (+/- 0.32) | | | | | | |

NOAA 90-day forecast



NOAA 90-day forecast



Highlights of Scenarios

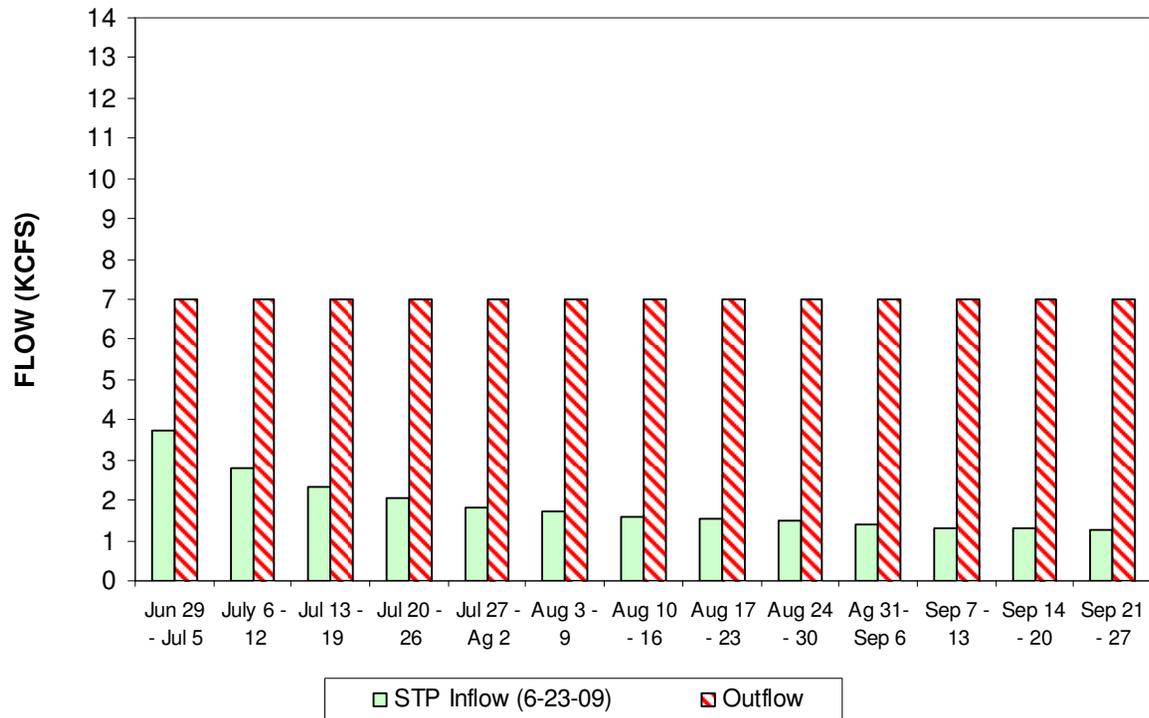


- Flat-7: Outflows are a flat 7 kcfs through Sept.
- Flat-10: Outflows are a flat 10 kcfs through Aug., then 7 kcfs in September to reach 1520 ft target.
- Nez Perce Tribe 2009: draft to 1535 feet by Aug. 31, then 1520 feet by Sept. 30. Shape the July-August outflow to balance NPT concerns with lower Snake needs. Outflows are 7 to 14 kcfs.
- Observed water temperatures: June 14 – June 23.

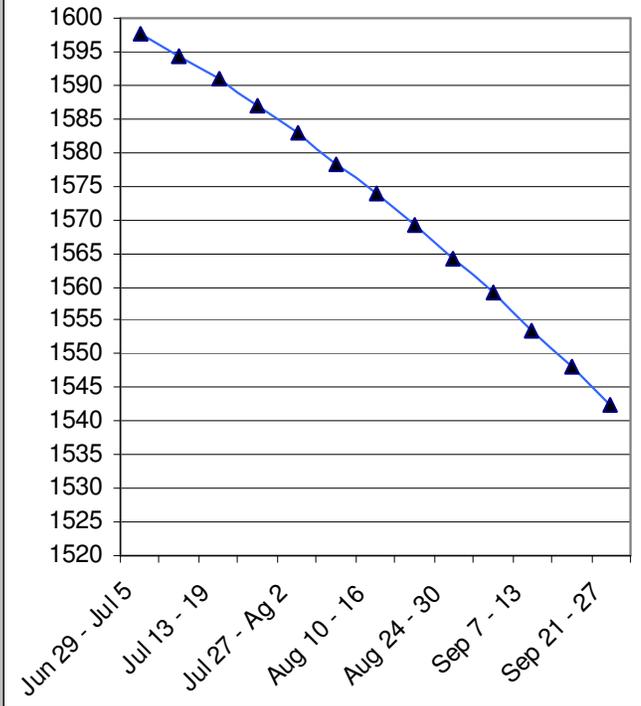
FLAT-7



DWORSHAK SEASONAL FLOWS: Flat-7 Operation



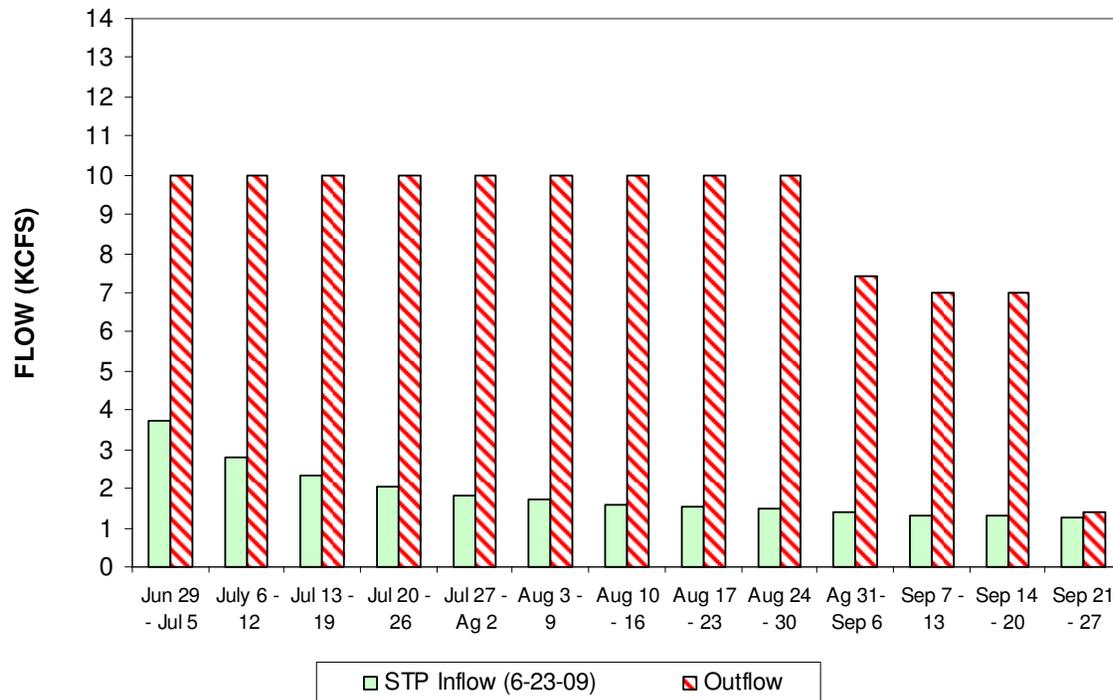
DWORSHAK POOL ELEVATIONS



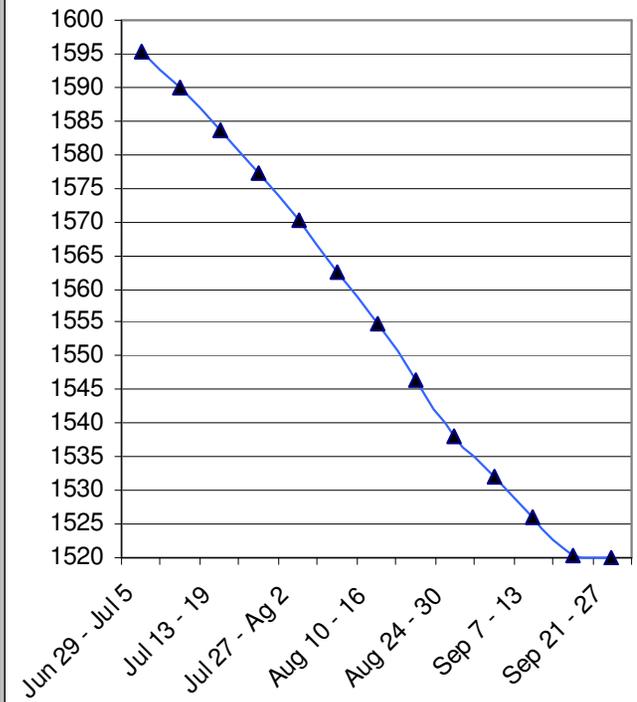
FLAT-10



DWORSHAK SEASONAL FLOWS: Flat-10 Operation



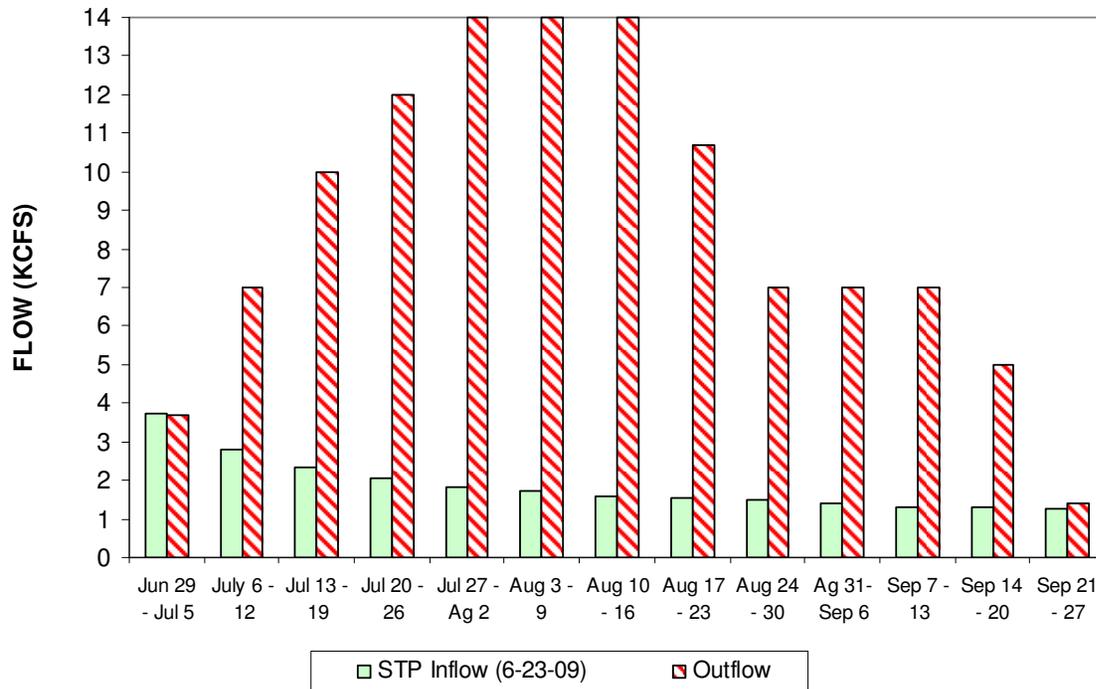
DWORSHAK POOL ELEVATIONS



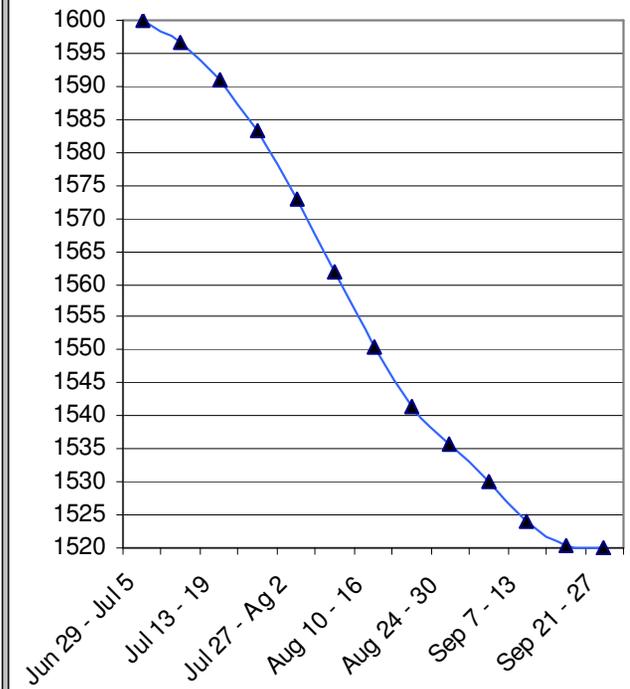
NPT 2009



DWORSHAK SEASONAL FLOWS: NEZ PERCE TRIBE PLAN



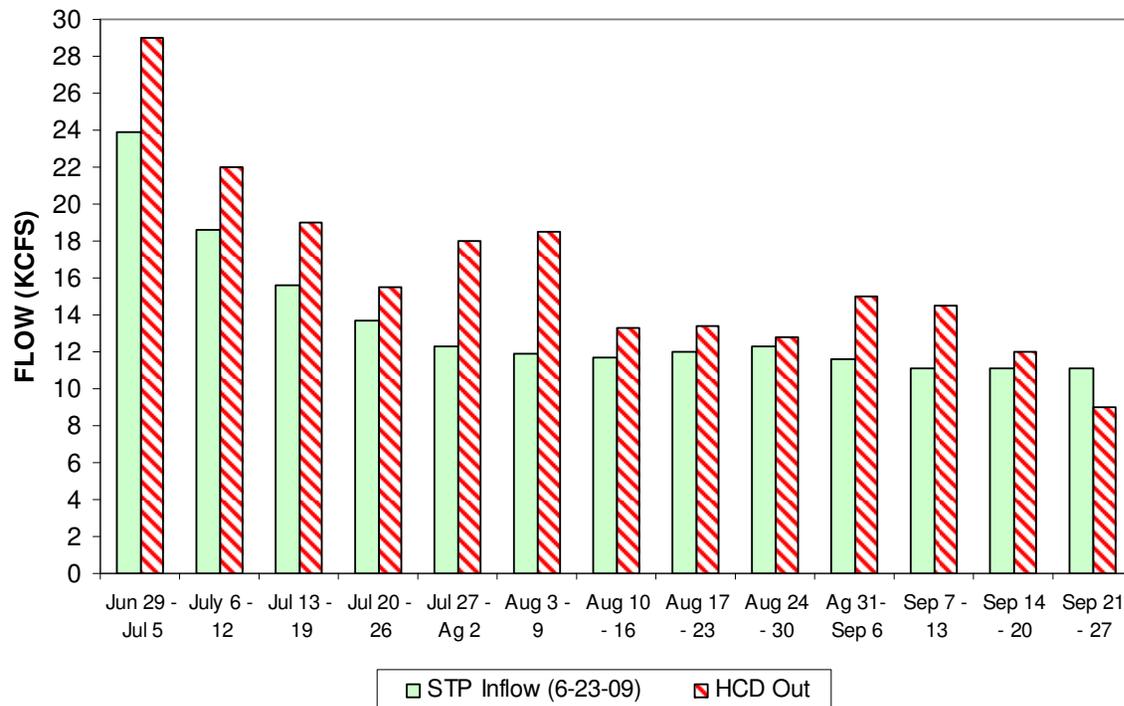
DWORSHAK POOL ELEVATIONS



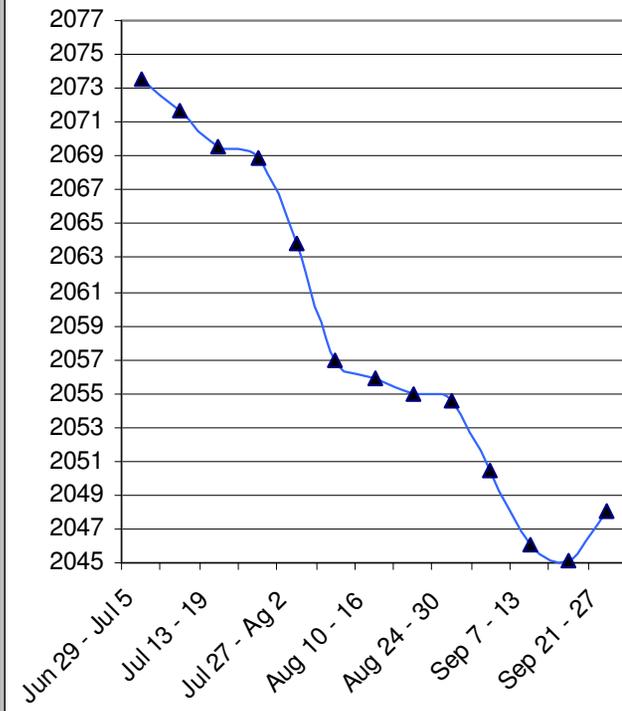
Snake – Hells Canyon



BROWNLEE and HELLS CANYON SEASONAL FLOWS



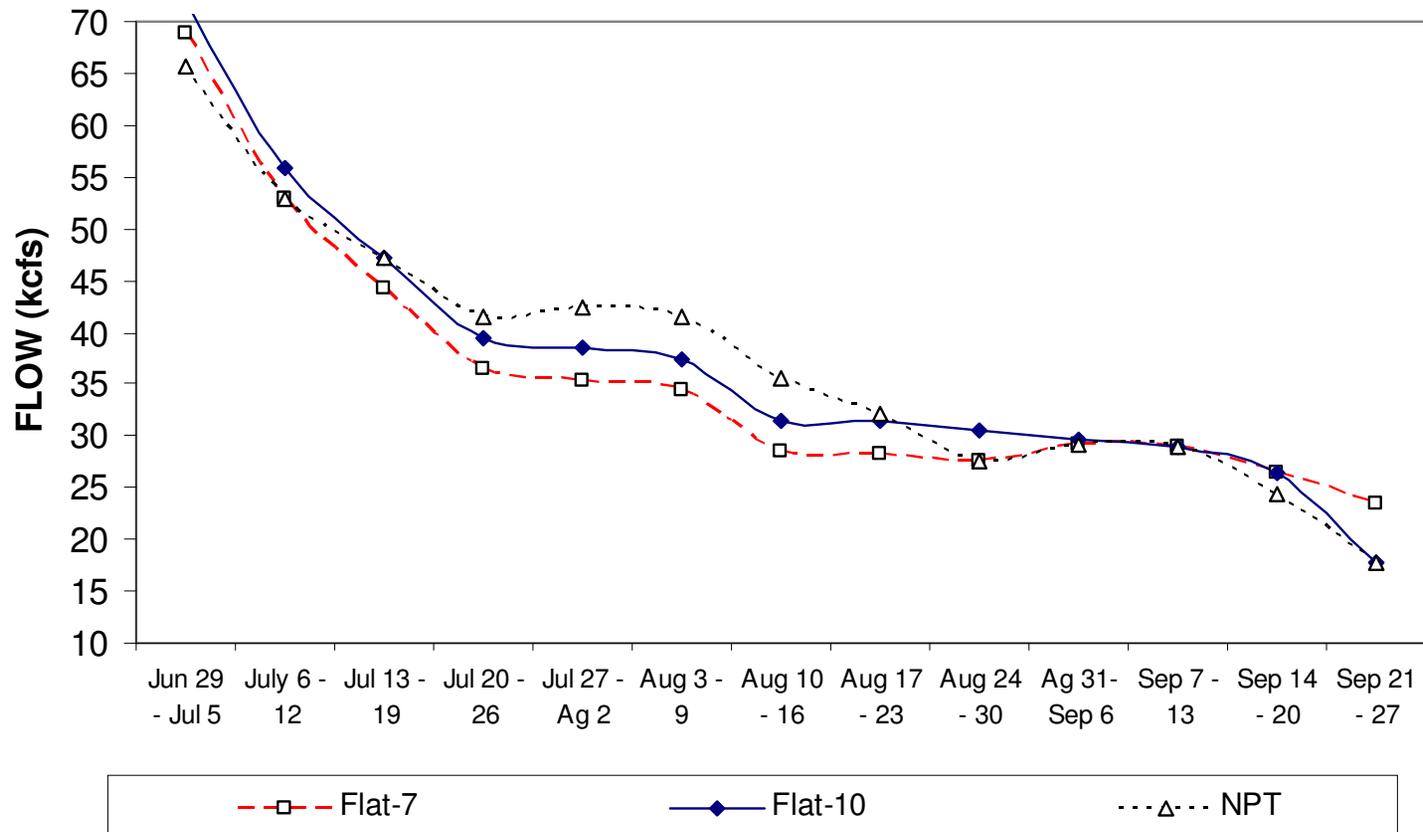
BROWNLEE POOL ELEVATIONS



LOWER SNAKE

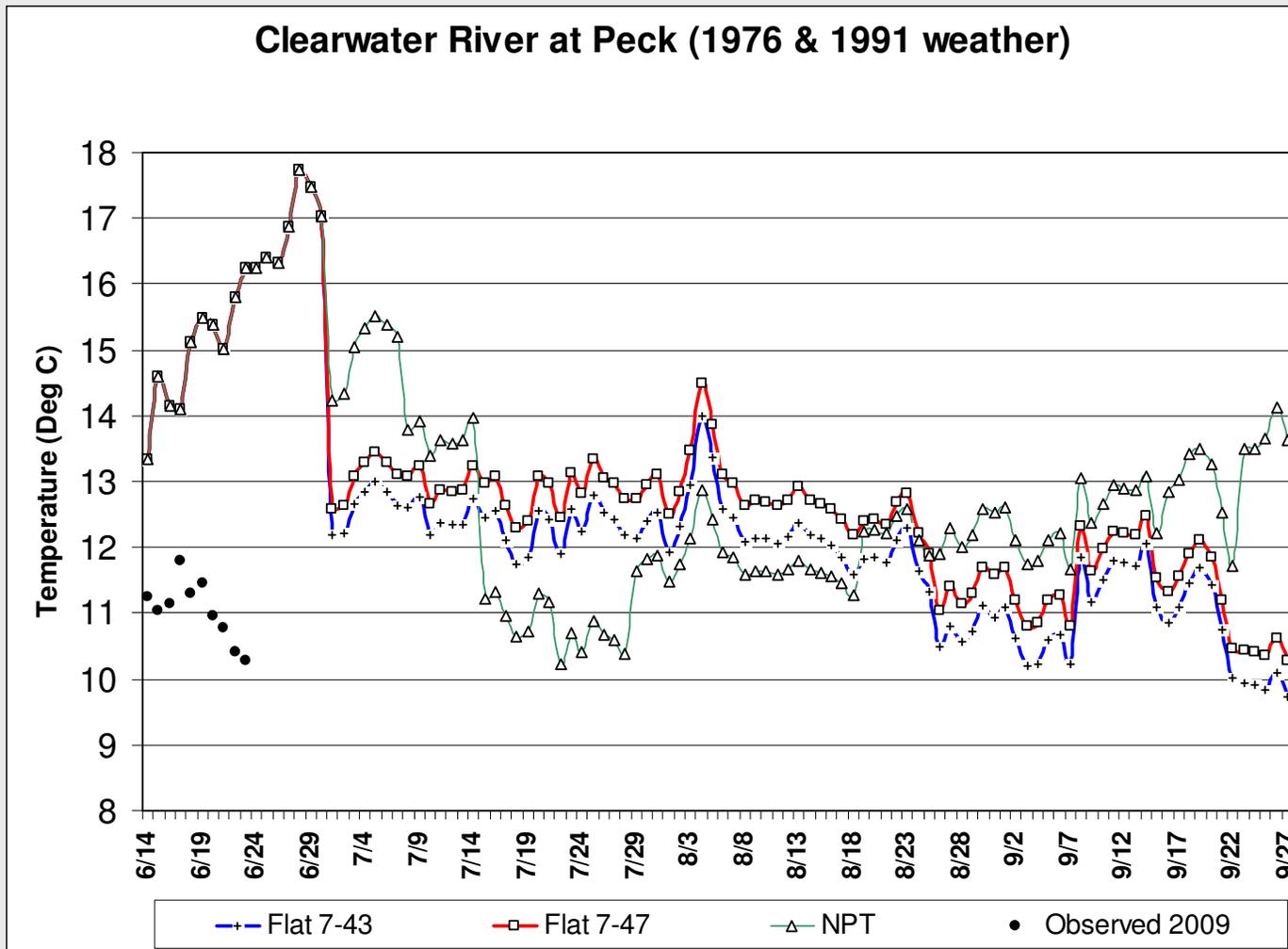


LOWER GRANITE SUMMER FLOWS: Summer 2009



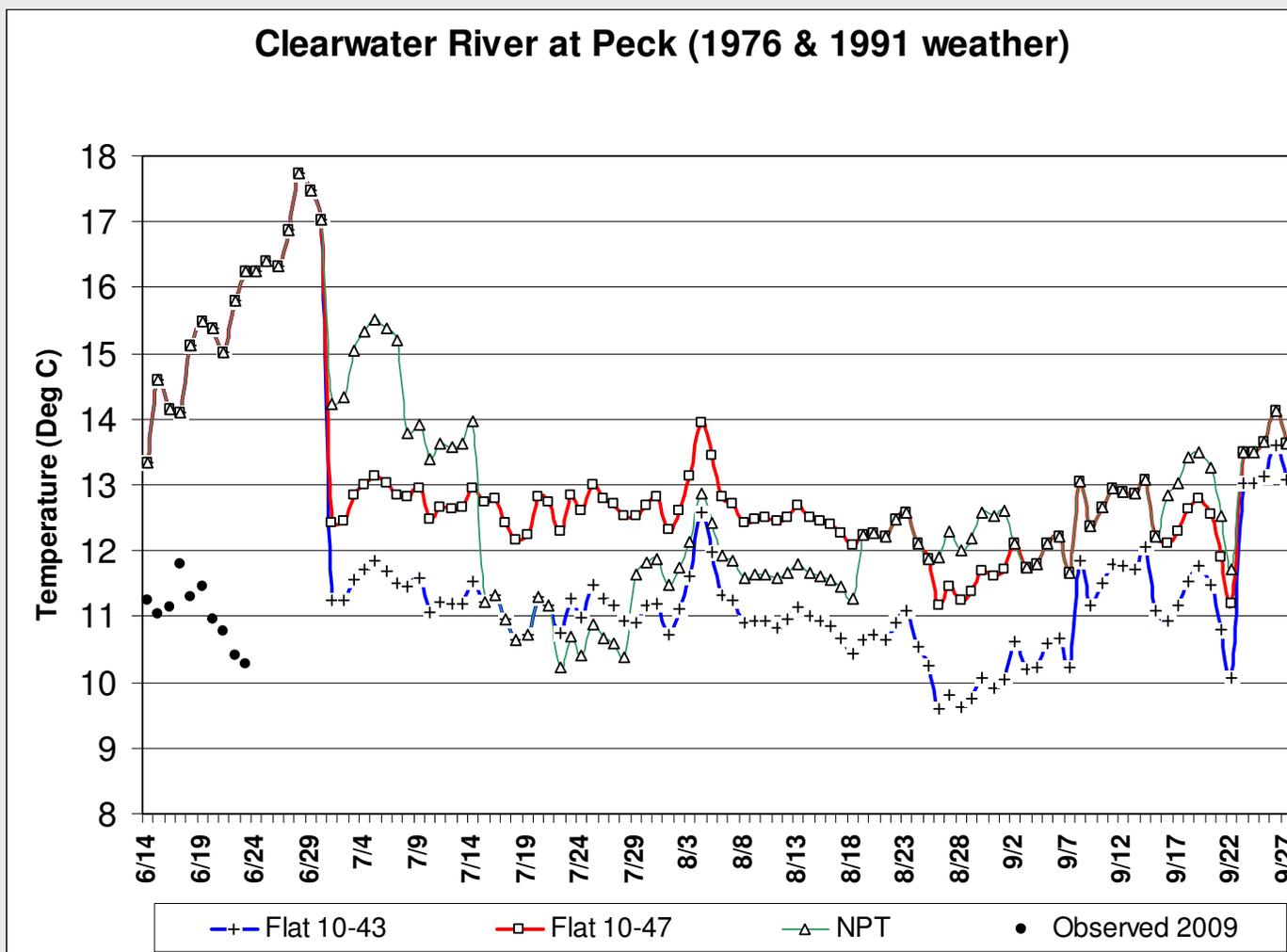
Modeled Water Temperature

(Model data courtesy of Ben Cope, EPA-Seattle)



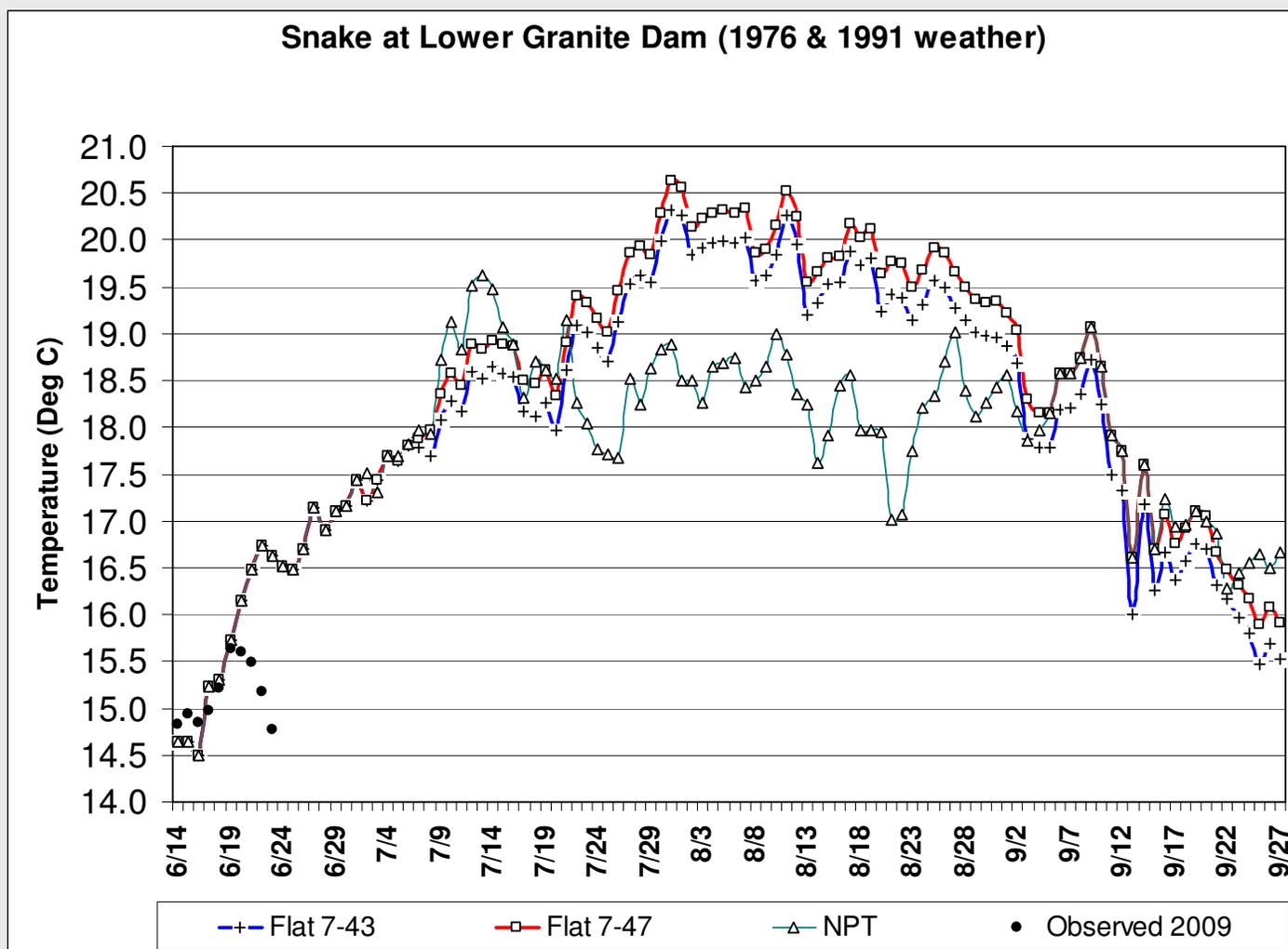
Modeled Water Temperature

(Model data courtesy of Ben Cope, EPA-Seattle)



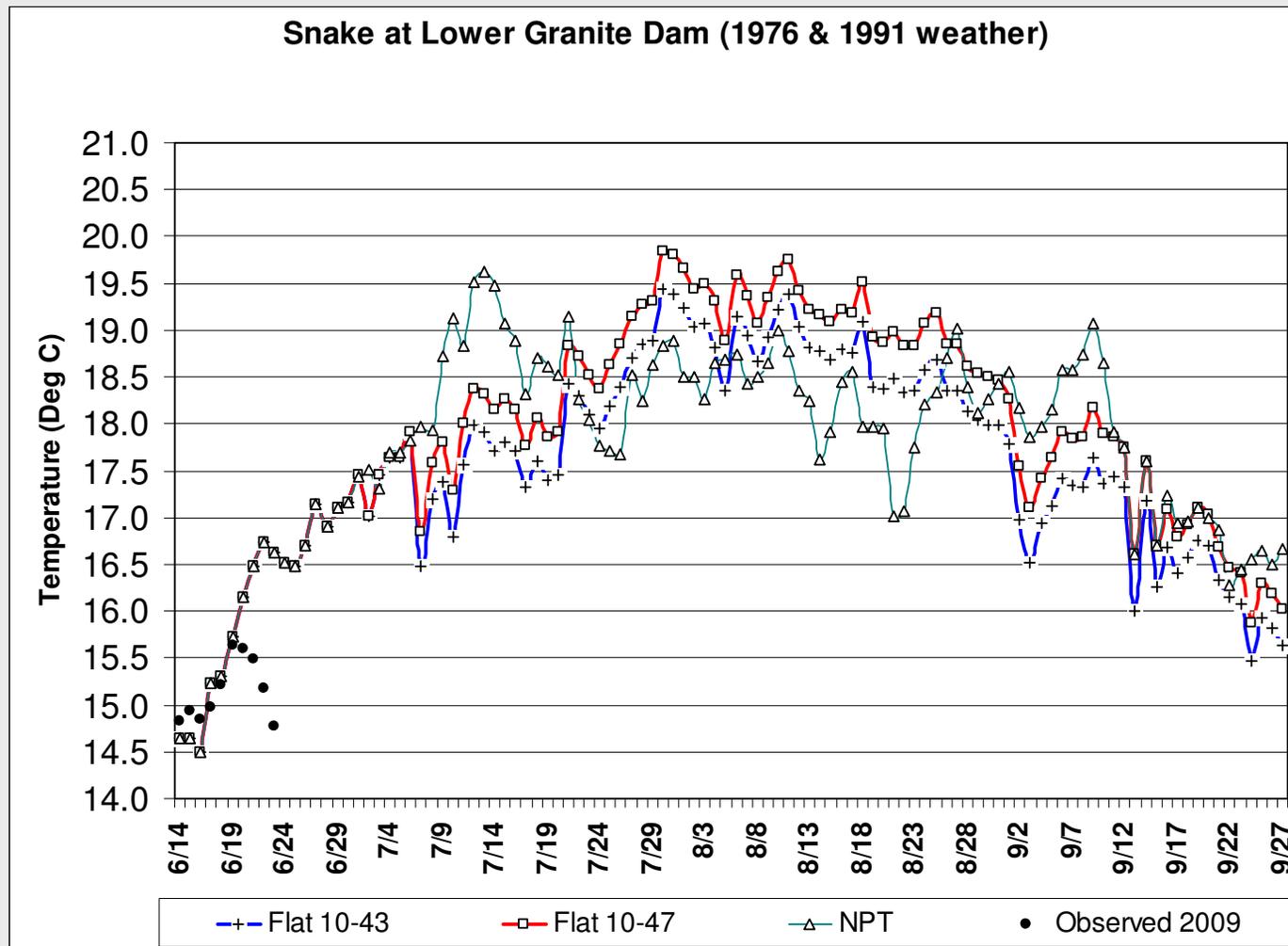
Modeled Water Temperature

(Model data courtesy of Ben Cope, EPA-Seattle)



Modeled Water Temperature

(Model data courtesy of Ben Cope, EPA-Seattle)



Conclusions



- Flat-7: Draft 1263 KAF (July-Sept.). Outflows 7 kcfs. September carryover: ~609 KAF.
- Flat-10: Draft 1566 KAF (July-Sept.). Outflows 7 to 14 kcfs. September carryover: ~235 KAF.
- Nez Perce Tribe 2009: Draft 1794 KAF (July-Sept). Outflows 7 to 14 kcfs. Balanced temperature control is achieved all summer. September carryover: ~200 KAF.
- Water temperature modeling shows that NPT and Flat-10 give a good balance for temperature control (20 degC) during all summer (very important for returning adults and their spawning conditions).

Figure 1. Regression Forecast Apr - Aug 4600 KAF
 Libby Reservoir May 1 - Sept 30, 2009
 End of Sept draft target is 2449 ft

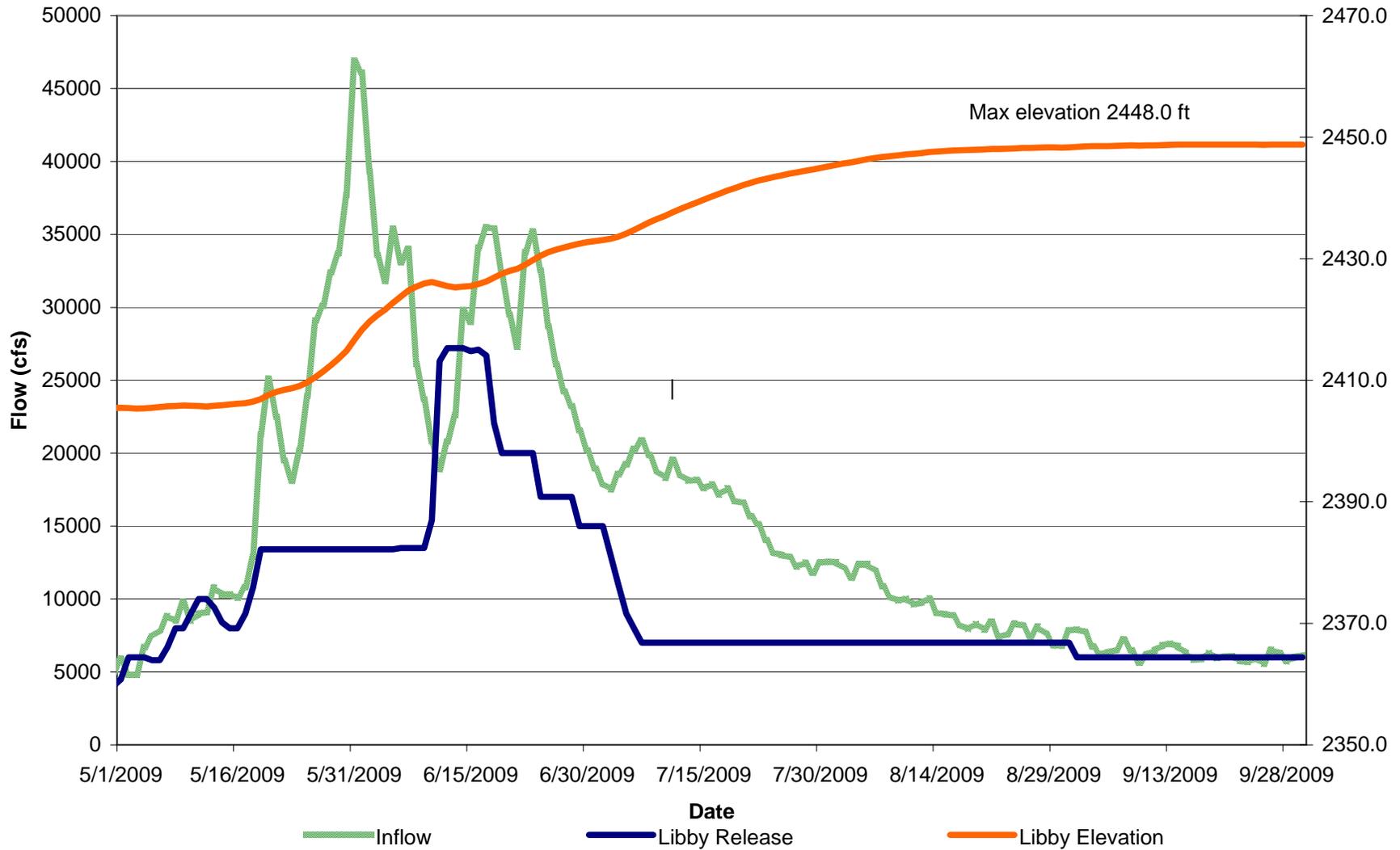


Figure 2.
Modeled Libby Dam Outflows - Flat flow after Sturgeon Pulse
June 23rd ESP Traces

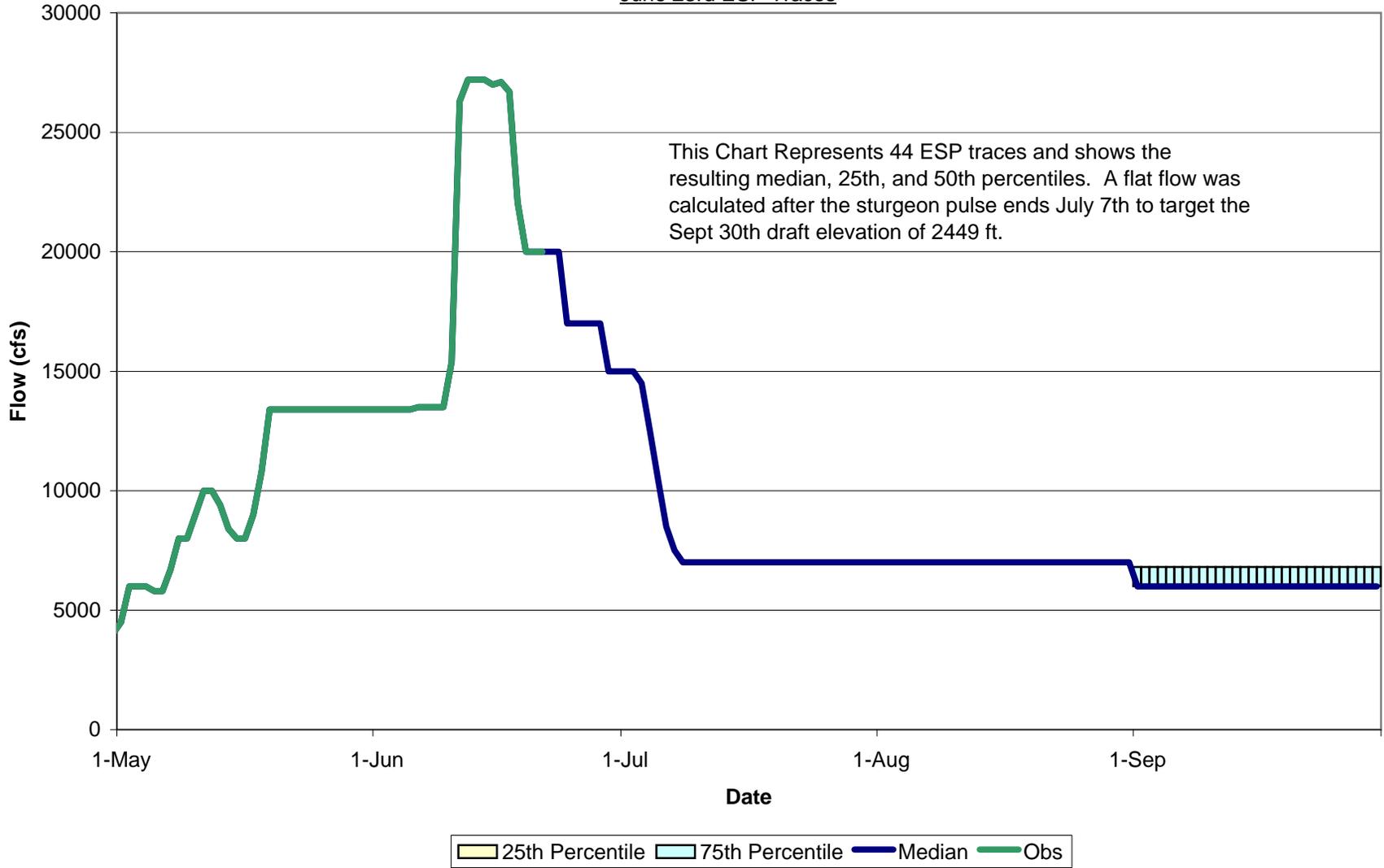
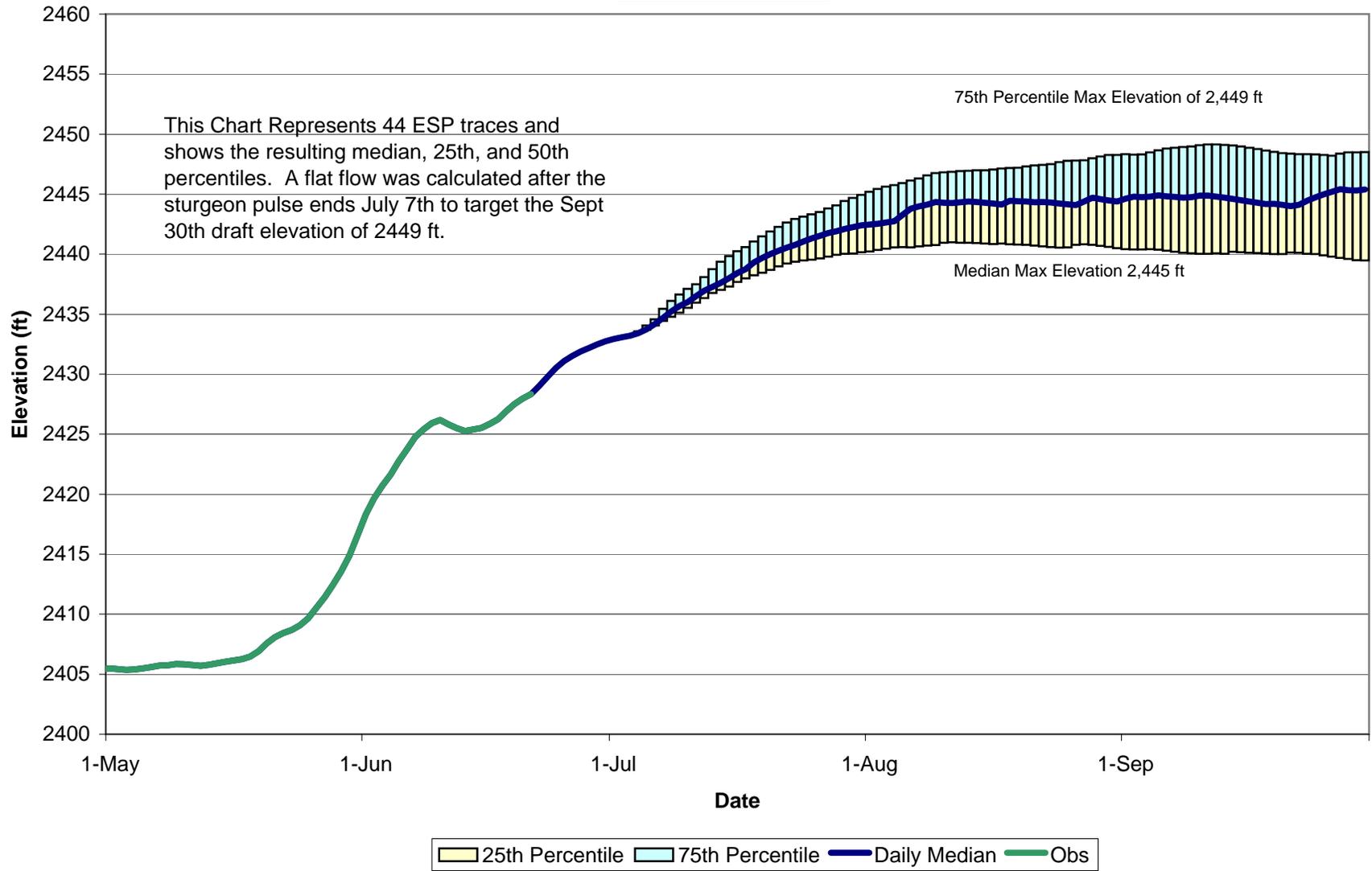


Figure 3.
Modeled Libby Dam Elevation - Flat flow after Sturgeon Pulse
June 23rd ESP Traces



Jim Adams
 Farewell Lunch
 Fong Chong Restaurant
 301 NW 4th
 Dim Sum Party
 Thursday, July 2nd.
 At 11:30



Join Jim and his wife for lunch and try his favorite Chinese cuisine served family style. Its called dim sum and they range in price from 2- 4 dollars each and you can expect to pay around 10-12 dollars per person. Or you can order a more traditional Cantonese style plate from their menu and pay separately.

Please let Dan Feil (3943) or Sonja (3970) know if you would like to attend so we can let the restaurant know how many tables to reserve.

Dim sum (literally meaning "a bit of heart") is the name for a Chinese cuisine which involves a wide range of light dishes served alongside Chinese tea. Dishes come in small portions and may include meat, seafood and vegetables, as well as desserts and fruit. The items are usually served in a small steamer basket or on a small plate.



Merchant Alert Protocol (MAP) TMT Presentation

Steve Kerns

Supervisor, Schedule Planning, BPA

June 24, 2009

Background

July 24, 2006

- Record high temperatures on the West Coast
 - BPA forecasters and planners saw the event coming and prepared by using flexibility that did not effect implementation of the BiOp (moving planned outages, setting up Banks Lake, securing a 2 foot/day draft rate at Grand Coulee, etc...)
- Some Northwest utilities were caught by surprise and four NERC Energy Emergency Alerts (EEA) were issued
 - BPA would not provide power in these circumstances unless an EEA was declared
 - However, there was no way to ensure that any requesting entity had exhausted the market
- Regional Coordination
 - Emergency TMT meeting held
 - DOJ issued a “heads up” letter to US District Court
 - No BiOp deviations occurred

Background

Retrospectively, the Northwest Power Pool (NWPP)/ Pacific Northwest Security Coordinator (PNSC) opinion was that this was a merchant issue

- Should have been sufficient resources generating in the Northwest
- Confusion in the real-time market as to what generation was available
- Merchant/Balancing Authority (BA) communication problems were identified, which led to:
 - difficulties getting EEAs declared
 - different interpretations of available capacity
 - inability of merchants to know where available generation might be

Background

At the October 2006 NWPP Operating Committee meeting, the Merchant Communications Task Force (MCTF) was chartered to address the following:

- The ability for merchants to find a collective solution to deal with emergency communication issues such as sharing information with the reliability entities and communicating with other merchant entities within the region

In November 2007, the MCTF submitted a WECC Business Practice Request which was assigned the Merchant Communications Business Practice (MCBP) drafting team to:

- Develop a formal regional criterion (business practice) or other appropriate method that will provide a process for merchants to broadly communicate with other merchants and reliability entities when they are in need of resources to avoid an energy emergency and believe they have exhausted the local markets

Both of these efforts were led by BPA

BPA Power Emergency Letter

MCBP Guideline

- MCBP drafting team completed work on a Merchant Alert Protocol (MAP) Guideline In February 2009
 - In general, MAP uses existing systems that are widely used by merchants in WECC to quickly communicate a need to acquire resources

- Purposes
 - Prevent the necessity of a merchant declaring an EEA
 - Assist a merchant who has declared an EEA to return to pre-EEA conditions

- Market Issues Subcommittee (MIS) via an e-mail ballot in February 2009 approved 12-1 recommending that the MIC approve the guideline

- MIC formally approved the guideline in March 2009

BPA Power Emergency Letter

Annual BPA Power Emergency letter

- Has been issued the past three years by the BPA Vice President for Generation Asset Management (Steve Oliver)
 - This letter describes the process that BPA will follow if requested to support a neighboring system's load/resource imbalance emergency.
- BPA will consider at least 3 factors to manage power from extraordinary Federal Hydro operations
 - Protecting human health and safety
 - Limiting the potential for reductions in hydro operations mitigation measures enacted under the Endangered Species Act for protected species
 - Honoring regional and public preference.

Use of the Merchant Alert

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 prior to BPA deciding whether to make any extraordinary operations changes to generate additional supplies and/or impacting mitigation measures under the Endangered Species Act

- Issued a Merchant Alert
- Declared a NERC EEA 2 or 3
- Curtailed any sales that do not adversely impact health and human safety
- Increased any possible generation on its own consistent with any emergency provisions governing the operations of those resources, including provisions curtailing fish protections
- Made a public appeal for power conservation (if time permits)

BPA Power Emergency Letter

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

- BPA will follow these same steps in the event that we cannot meet our own firm load obligations
- Coordination with Federal Agencies, TMT stakeholders and the US District Court will occur whenever possible
- This process may be amended or modified at any time by BPA to be consistent with BPA's statutory responsibilities
- Utilities are not to rely on any additional supply from BPA in these conditions as a resource or as a reserve for planning purposes



Department of Energy

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

POWER SERVICES

June, 16th, 2009

In reply refer to: PG-5

Dear Colleagues:

As we prepare to enter the 2009 summer season with the associated potential for significant peaks in electricity demand, Bonneville Power Administration (BPA), is continuing to improve and clarify 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. This process may be amended or modified at any time by BPA to be 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 the Technical Management Team (TMT)¹. If those forums are called, BPA may modify these procedures to fit the specific situation the region is facing.

BPA'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 will consider at least 3 factors to manage power from extraordinary Federal Hydro operations – 1) protecting human health and safety; 2) limiting the potential for reductions in hydro operations mitigation measures enacted under the Endangered Species Act for protected species; and, 3) honoring regional and public preference.

When a utility projects a load/resource imbalance 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.²

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

¹ The group that adaptively manages the Columbia River hydro system in accordance with environmental regulations

² Late schedules or within hour requests also require Balancing Authority (BA) approval. In these cases the utilities should also contact their host BA to identify the appropriate response. The BA will contact BPAT dispatch to coordinate as appropriate. Utilities within the BPA BA will call BPAT Dispatch directly.

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.

1. The Merchant and Balancing Authority functions of a utility have coordinated to issue a Merchant Alert. On March 12, 2009, the WECC Market Interface Committee (MIC) passed the Merchant Alert Protocol guideline, which is intended to provide an efficient communication protocol that can be used when a merchant has a concern that there may not be enough resources available to meet obligations. Utilities are expected to follow the steps outlined in this protocol in order to issue a Merchant Alert as an attempt to fully exhaust efforts to resolve shortages via normal market mechanisms. (See Attachment A for the Merchant Alert Protocol.)
2. After acquiring any resources made available through the Merchant Alert Protocol, the utility should reassess its situation and, if necessary, request that its Balancing Authority issue the appropriate NERC Alert Level. See Attachment B 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
 - b) Increased any possible generation on 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; and,
 - c) Made a public appeal for power conservation if time permits

Once BPA determines that emergencies are being declared, BPA will assess the overall demand for available emergency energy and, when necessary, allocate energy capability based upon the level of the NERC Alert. It is important that utilities not rely on any additional supply from BPA in these conditions as a resource or as a reserve for planning purposes.

If you have any questions regarding this letter please contact either myself, Stephen Oliver, V.P., Generation Asset Management at sroliver@bpa.gov, or Kieran Connolly, Manager, Generation Scheduling at kconnolly@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 Protocol Guideline
- Attachment B – NERC Alert Definitions
- Attachment C – Northwest Power Pool Participating Organizations

Attachment A

**WECC Guideline:
Merchant Alert Protocol Guideline
Date: 2/9/09**

Document Tag Information (required):

| | |
|--|---|
| Guideline Title: | Merchant Alert Protocol Guideline |
| File name: | |
| Category | <input type="checkbox"/> Regional reliability standard <input type="checkbox"/> Regional criteria <input type="checkbox"/> Policy <input checked="" type="checkbox"/> Guideline <input type="checkbox"/> Report or other |
| Document Publication Date: | |
| Adopted/Approved By: | |
| Date Adopted/Approved: | |
| Custodian (entity responsible for maintenance and upkeep): | |
| Stored/Filed: | Physical location: |
| Available From: | Web URL: |
| Previous Name/Number (if any): | |
| Status: | <input type="checkbox"/> in effect <input type="checkbox"/> usable, minor formatting/editing required <input type="checkbox"/> modification needed <input type="checkbox"/> superseded by _____ <input type="checkbox"/> other _____ <input type="checkbox"/> obsolete/archived) |



WECC Guideline: Merchant Alert Protocol Guideline Date: 2/9/09

Introduction

The intent of this Guideline is to provide an efficient communication protocol that Load Serving Entities and Purchasing-Selling Entities ("Merchants") can use when there is a concern that they may not have enough resources to meet their obligations. This is not intended to replace or interfere with the process for declaring capacity and energy emergencies — via Energy Emergency Alert (EEA) — as described in NERC Standard EOP-002-2 – Capacity and Energy Emergencies. Instead, the Merchant Alert Protocol (MAP) can be used prior to declaring an EEA to prevent the necessity of declaring an EEA. In addition, the MAP can be used after an EEA has been declared to assist the merchant in returning to pre-EEA conditions.

While use of the MAP is strongly encouraged, the election to use the MAP is voluntary. However, Merchants who use this protocol are expected to follow this guideline as presented and only for the purpose of finding energy to avoid or remedy an emergency. Merchants should also note that resource owner/operators may require use of the MAP (or some similar communication method) to demonstrate that the market has been exhausted before access to emergency resources can be made available.

Guideline

As with all issues that could potentially affect reliability, clear and frequent communication between Merchants and their host Balancing Authorities (BA) is critical. Prior to the initiation of the MAP, any requesting Merchant is expected to contact their BA(s) to describe the problem and to provide notification that a Merchant Alert will be issued. After this communication occurs, the decision to proceed with the MAP rests solely with the Merchant.

Merchant Alert Process

- ❖ Merchant with access to wesTTrans OASIS bulletin board.
 1. Merchant determines that a Merchant Alert is necessary.
 - Merchant notifies host BA of intent to issue a Merchant Alert before proceeding
 2. Merchant accesses wesTTrans OASIS bulletin board.
 - Selects the Merchant Alert button on the wesTTrans OASIS bulletin board.
 - Merchant enters the following required information into the template:
 - Contact information.
 - POR/POD.
 - Date and start/stop time.
 - Optional comments, if any, but do not include either price or quantity.
 3. Merchant issues the Merchant Alert.
 4. OASIS software issues:
 - A unique visual and audible alarm to all currently logged-in wesTTrans OASIS users.
 - An e-mail with the subject heading "Merchant Alert" to a mailbox that is linked to the WECCNet messaging system. The body of the e-mail will contain all information from the template.
 - Direct e-mails to merchants who have requested to be provided this form of communication.
 5. WECCNet messaging system forwards Merchant Alert e-mail from wesTTrans OASIS to the "ALL WECC" e-mail group
- ❖ Merchant without access to wesTTrans OASIS bulletin board
 1. Merchant determines that a Merchant Alert is necessary.
 2. Merchant contacts its host BA. Merchant requests BA to issue on its behalf a Merchant Alert via the WECCNet messaging system to the "ALL WECC" e-mail group. Merchant provides BA with the information listed below.



- Contact information.
 - POR/POD.
 - Date and start/stop time.
 - Optional comments, if any, but do not include either price or quantity.
3. Final decision on issuing the Merchant Alert in this circumstance rests solely with the BA.
- ❖ A merchant receiving the Merchant Alert who has excess resource capability, and is willing to provide assistance, directly contacts the requesting merchant to negotiate terms.
 - ❖ All information exchanged via this process is stored and retained for at least one year.
- Note: This process will be reviewed at least twice a year by a team assigned by the Market Issues Subcommittee.

Additional Topics

The MAP uses a bulletin board feature in the wesTTrans Open Access Same-time Information System (OASIS) as the primary method for disseminating information. While the initial functionality of the bulletin board was not sufficient for implementation of this protocol, the OASIS vendor — Open Access Technology International, Inc. (OATI) — has agreed to make the necessary changes to support the MAP.

Merchants who have obtained a digital security certificate from OATI access the bulletin board feature to issue a Merchant Alert. The requesting Merchant goes directly to the bulletin board and selects the Merchant Alert button. This constructs a template which requires the following alert information:

- contact information
- point of receipt/point of distribution (POR/POD)
- date and start/stop time
- comments (in field provided)

In order to minimize the risk of market manipulation, price and quantity are not to be included in this template.

Once the completed template has been submitted, a unique visual and audible alarm is issued to all currently active users of the wesTTrans OASIS (the user must be logged in). Concurrently, an e-mail is automatically sent to a mailbox that is linked to the WECCnet messaging system. The e-mail will contain a subject heading of "Merchant Alert" and the body of the e-mail will contain all information from the template. WECCNet will then forward this e-mail on its messaging system to the "ALL WECC" e-mail group. Additionally, merchants who have obtained a digital security certificate may request direct e-mail notifications from OASIS.

Merchants who have not obtained a digital security certificate from OATI can not access the bulletin board feature in wesTTrans OASIS to issue a Merchant Alert. These Merchants may contact their host BA to discuss whether a Merchant Alert will be sent by the BA using the WECCNet messaging system. The final decision on issuing the Merchant Alert in this circumstance rests solely with the BA.

A merchant receiving the Merchant Alert who has excess resource capability and is willing to provide assistance, directly contacts the requesting Merchant to negotiate terms. This communication protocol places no requirement on any entity to contact the requesting Merchant, nor does it place any requirement on entities who do respond to communicate electronically.

The wesTTrans OASIS will store and retain all information exchanged via the Merchant Alert process for later review by WECC. Additionally, after-the-fact spot reviews may occur, so it is recommended that merchants who request the Merchant Alert retain relevant information for a period of one year. This process will be reviewed twice a year by the Market Issues Subcommittee.

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 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:
 - o Public appeals to reduce demand.
 - o Voltage reduction.
 - o Interruption of non-firm end use loads in accordance with applicable contracts¹.
 - o Demand-side management.
 - o 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.

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

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Official File – PG-5 (OP-13-11)

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COLUMBIA RIVER REGIONAL FORUM

TECHNICAL MANAGEMENT TEAM

June 24, 2009 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.

Review of Minutes/Agenda

June 17 facilitator notes/official minutes: TMT members need more time to review. No, so they will look to finalize them during the July 1st conference call.

Merchant Alert Protocol and Power Services Letter to Neighboring Systems

Steve Kearns, BPA, referred TMT to a presentation linked to the agenda. He provided background stemming back to July 24th 2006 (record high temperatures), when some NW utilities could not provide power and an Energy Emergency Alert (EEA) was issued. Kearns reviewed the course of actions taken once the communications problems were identified and noted that one challenge was a difference in interpretation between power and merchant representatives. In October 2006 a merchant communications task force created and then in November 2007 a WECC Business Practice Request was made to draft a formal set of protocols to help facilitate communication between merchants. The Protocols/ Guidelines for purchasing emergency power were completed in February 2009, and they were officially approved in March 2009. Kerns described the 2009 letter from Steve Oliver, BPA, and clarified that “honoring regional and public preferences” means that BPA obligated (contractual and legally) to first save local NW public power needs. Kerns reviewed uses for a merchant alert and BPA’s Power Emergency Letter process; coordination with Federal agencies, TMT stakeholders, and the US District Court will occur whenever possible. Merchants are expected to use existing system to source any available energy sources on their own (before turning to BPA). Kyle Dittmer, CRITFC, asked that the tribes be explicitly spelled out as a regional stakeholder, as they have a government-government relationship with the Federal agencies. Tony Norris, BPA, added that this is one of the ways that BPA is honoring fish protection obligations. TMT members discussed how power emergencies can tangibly affect human health/ safely (i.e. power to hospitals and traffic systems).

Action/Next Steps: TMT members noted that should there be any emergencies this year, it would be appropriate to discuss this item at the TMT year-end review.

EPA's RBM 10 Temp Modeling

Kyle Dittmer, CRIFTC, referred TMT to presentation linked to the agenda. He noted Ben Cope, EPA, was on vacation and so Dittmer presented on Cope’s behalf. Years 1976 and 1991 are years that had similar conditions to this year (2009). He reviewed NOAA’s 90 day forecast data, noting cool temperatures are predicted for the near term but could

take a dramatic turn anytime over of the couple of weeks. He reviewed the expected benefits and anticipated pool elevations for three Libby summer operations scenarios: flat 7 kcfs, flat 10 kcfs (through August 31), and a “Nez Perce Tribe” 2009 scenario, with a gradual ramp up and down July- September. Dittmer showed slides on Lower Snake River/ Brownlee flow data. He showed slides of the three scenarios’ modeled water temperature for 2009 as compared to 1976 and 1991 data. In his conclusions he noted the “Nez Perce” scenario provides most balanced temperature control with a September carry over of approximately 200 KAF.

Russ Kiefer, ID, thanked Kyle for providing this data again this year as it helps TMT consider conditions that may unfold in weeks to come.

Dworshak Operations Update

Steve Hall, COE, referred TMT to a Clearwater River/Lower Snake River temperature reports for June 2009 linked off TMT home page. TMT noted that the COE’s CEQUAL modeling doesn’t get great results when temperatures are below 60 degrees F. Overall, this years water temperatures are somewhat similar to those observed in 2008. He noted there has been 300-400% of normal precipitation on Upper Snake River and high levels of water expected to come down river. Hall reported that Dworshak unit 3 repairs appear to be relatively successful; it is still leaking but within drainage capacity. Unit 3 will be monitored closely. Currently, Dworshak pool is within the top 1 foot of full pool; the project will hold its elevation for the near term and pass inflows as evenly as possible through the July 4th weekend. Hall said that overall the project is in good position to manage actual conditions that may unfold.

Next Steps: This item will be on the agenda for July 1st; COE will present modeling of forecasted temps and a few different operational scenarios for TMT to consider. The COE will also provide data to FPAC or their June 30th meeting. For post July 4th weekend operations, TMT members would like to see scenarios based on actual operations used in ‘07 and ‘08 to see how conditions might play out for 2009. Dave Wills, USFWS, said that the Hatchery would prefer temperatures between 46-49 degrees for optimal fish growth.

Libby Operations Update

Joel Fenolio, COE, referred TMT to slides posted as links to agenda that modeled the regression forecast for April- August 4600 KAF, Libby Dam out flows with flat flow after sturgeon pulse, and modeled Libby Dam elevations with flat flow after sturgeon pulse. Russ Kiefer, ID, asked about justification for increased outflows in early June. A: COE/ BPA said it is due to need to balance flood control risk. TMT members discussed options of going above Bull Trout minimums and Fenolio said the COE could offer an adjustment of extending the sturgeon pulse ramp down over 6 days this year. TMT members present at the meeting provided feedback:

- BOR: no objection.
- BPA: no objection.
- OR: no objection.
- USFWS: no objection.
- NOAA: no objection.
- ID: no objection.

- WA: no objection.
- MT: no objection.
- Also: Kyle Dittmer, CRITFC: no objection.

Next Steps: The COE will provide updates on operations to TMT every two weeks (or more often if requested) as the season progresses.

Little Goose Operations Update

Dan Feil, COE, reported that the spillway weir will shift to the “high crest” (lower flow) position. The transition will take about a day, and Feil clarified that spill levels will not likely be affected.

McNary Operations Update

Dan Feil, COE, reported that hydrophone units went out during bay movement from #16 to #22. Units were shut down- repair/ replaced as needed. Feil clarified that spill will likely stay at 50% during the day. The following TMT members provided input:

- BOR: no objection.
- BPA: no objection.
- OR: no objection.
- USFWS: no objection.
- NOAA: no objection.
- ID: no objection.
- WA: no objection.
- MT: no objection.
- Also: Kyle Dittmer, CRITFC: no objection

John Day Operations Update

The TSW-related bird predation issues observed earlier in the season led to modeling field trip. Group decided 40% spill pattern looked favorable for study conditions. The following TMT members weighed in on the adjustment to 30/40% spill:

- BOR: no objection.
- BPA: no objection.
- OR: no objection.
- USFWS: no objection.
- NOAA: no objection.
- ID: no objection - look forward to seeing study results.
- WA: no objection.
- MT: no objection.
- Also: Kyle Dittmer, CRITFC: no objection

Operations Review

Reservoir: Reservoirs: Grand Coulee was at elevation 1286.8' and filling. Hungry Horse was at 3553.85', with inflows of 8 kcfs and outflows of 2.3 kcfs. Libby was at elevation 2449.4' and Albeni Falls was at elevation 2061.8' and passing inflows. Dworshak was at elevation 1599.8'. Seven day average flows were 98 kcfs at Lower Granite, 259.7 kcfs at McNary and 255 kcfs at Bonneville.

Fish: Paul Wagner referred to FPC website: Summer Chinook 2,000 per day. Sockeye 10,000 per day at Bonneville. Smolt data showed sub yearlings in 13-39,000 per day range, with the recent increase in passage due to hatchery releases. DART data showed sub yearlings tracking above the 10 year average.

Power System: Nothing to report.

Water Quality: TDG low overall. Overall cool temperatures in the lower Columbia River.

Other: The Division COE Team Leader for Regulation Group for the next 120 days will be Karl Kanbergs. Also, Rudd Turner announced his retirement, effective September 3rd-celebration date is TBD. A farewell luncheon for Jim Adams will be held July 2nd Fong Chong 11:30 - Dim Sum Extravaganza!!!

TMT Schedule: Call scheduled July 1 9:00 am (no Face to Face)

July 1st meeting agenda items include:

- Finalize June 24 TMT Minutes and Facilitator Notes
- Continued Temperature Modeling
- Grand Coulee Operations for July 4th
- Operations Review
- SOR Treaty fishing

**Columbia River Regional Forum
Technical Management Team Meeting
June 24, 2009**

1. Introduction

Today's TMT meeting was chaired by Jim Adams (COE) and facilitated by Robin Gumpert (DS Consulting), with representatives of USFWS, COE, Idaho, Oregon, NOAA, Montana, BPA, CRITFC, BOR, Washington, and others participating. 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 for June 17, 2009

There were no comments on these notes because people needed more time for review. They will be finalized at the next TMT meeting July 1.

3. Merchant Alert Protocol Letter

Steve Kerns (BPA) gave TMT a presentation on BPA-led efforts to establish a formal procedure for energy merchants in the region to communicate with each other during impending energy shortages.

The effort began in response to a heat wave on July 24, 2006, when four Energy Emergency Alerts (EEA) were declared in the Northwest. An EEA is a formal announcement to the region that a utility supplying some or all of its generation is unable to meet its load. BPA had previously informed Northwest utilities that there would be no surplus power available that day, and that it would not violate BiOp operations to serve a utility unless an energy alert had been declared. Fortunately, BPA was able to assist utilities that day by selling small amounts of surplus power without violating its BiOp obligations.

The Northwest Power Pool studied the July 24, 2006, situation and found there were actually sufficient resources available in the Northwest at the time to meet the region's loads. However, confusion prevailed in the real-time market regarding the amount of generation available. Most utilities at the time were using serial call lists to contact potential suppliers in the event of a shortage. Communication problems between merchants and balancing authorities also made it difficult to get energy alerts declared. Another lesson learned was that it was possible for a merchant to declare an energy alert without contacting all potential suppliers in the region.

In response to these problems, a task team worked to foster parallel communications using existing technology so merchants could find resources quickly in a crunch. The task team developed a guideline for merchants to use if they wish to broadcast their needs when help is urgently needed. The guideline,

formally approved by WECC in March 2009, is available for use this summer. Utilities now have a mechanism to broadcast their needs to every possible source if they face a shortage in the hot months.

This process dovetails with BPA's annual letter to utilities explaining the procedures BPA will follow in an existing or pending power emergency. Three factors weigh heavily in BPA's decision making during power shortages: (1) protecting human health and safety; (2) maintaining hydro operations for ESA-related purposes; and (3) following BPA's contractual obligations to serve public loads in the Northwest as a priority.

BPA requires Northwest utilities to take a number of steps before it will consider impacting ESA-related operations to meet their load. (1) a merchant alert must be issued. (2) A NERC EEA 2 or 3 must be declared ;(3) Any sales that don't impact human health and safety must be curtailed (e.g. electricity for hospitals and traffic lights); (4) the utility must adjust its ESA operations before asking BPA to do the same; (5) and a public appeal for conservation must be made if time permits.

As always, Kerns emphasized, BPA will coordinate with other federal agencies and TMT stakeholders to the extent possible in power emergencies. BPA's letter to utilities, attached to today's agenda, clarifies that BPA doesn't plan on offering them emergency reserves this summer, thus they need to plan to maintain their own supply.

Evidence has already surfaced that informal merchant alerts can expand the region's power supply in a pending emergency by reaching otherwise unknown sources. Kerns expressed confidence that the new protocol will uncover resources in the Northwest.

Kyle Dittmer (CRITFC) pointed out that Northwest tribes have a governmental relationship with federal agencies, thus they are more than public interest groups. He asked that the second bullet in the BPA merchant alert letter be altered to clarify this relationship.

Karl Kanbergs (COE) wondered whether a similar crisis would likely occur this summer if the weather heats up, given the sour economy. We'd probably be in a similar situation, Kerns replied. This is a low water year, and overall load may be comparable to 2006. The risk is highest at the end of July and in August when flows are low.

4. EPA's RBM 10 Temperature Modeling

Kyle Dittmer (CRITFC) gave a presentation on the RBM 10 modeling work Ben Cope (EPA) does annually on behalf of the Salmon Managers. This spring Cope looked at potential summertime scenarios for Dworshak operations, based on water temperature and flow modeling of previous years with similar conditions. Dittmer and Dave Statler (Nez Perce Tribe) worked with Cope to

develop these scenarios based on weather data from 1976 and 1991 and tributary inflows for 1981.

According to the Weather Service's 90-day forecast, chances of heat spikes in July through September 2009 are above average, Dittmer said. Precipitation has been low in Washington, Oregon and the Idaho panhandle.

The three scenarios, attached to today's agenda, depict:

1. Flat 7 kcfs outflows from July through early September. This scenario was included because of a potential Dworshak unit outage this summer. It would leave a 609 kaf carryover into September.
2. Flat 10 kcfs outflows or full powerhouse through end August, ramping down to 7 kcfs for 3 weeks in September and to minimum flows the last week of September. The end of September elevation target is 1,520 feet. This scenario would leave a 235 kaf carryover into September.
3. The Nez Perce plan: pass inflows for the first week of July, ramp up to 7 kcfs and up to 10 kcfs by the third week in July, to 12 kcfs by the fourth week in July, followed by 3 weeks of 14 kcfs, then ramp down to reach elevation 1,535 feet by end August and 1,520 feet by end September. This leaves a 200 kaf carryover for the tribe to use at the end of September.

Dittmer also showed TMT scenarios of what might happen this summer at Brownlee Dam and Hells Canyon on the Snake River, as well as what flows at Lower Granite Dam might be under the above three scenarios.

Temperatures under the 7 kcfs flat flows scenario range from 43 to 47 degrees. The 10 kcfs scenario shows greater cooling as a result of more water being flushed out of Dworshak. In terms of temperature effects at Lower Granite, the 7 kcfs scenario shows temperature exceedances in late July and the first half of August, while the 10 kcfs and Nez Perce scenarios show temperatures remaining below the standard throughout the hot days. Temperatures in the Snake basin have been cool so far this year but could rise quickly, Dittmer warned. The Salmon Managers have reviewed these scenarios at FPAC and offered them to the COE today to jump-start the discussion of CEQUAL 2 modeling and temperature management. There was discussion of an ENSO-neutral trend in ocean conditions, which could mean for an unpredictable mix of hot and cool days this summer. Discussion of this topic will continue with presentation of the COE's CEQUAL 2 temperature modeling.

5. Dworshak Operations Update

Steve Hall (COE) showed TMT water temperature data by basin, available on the TMT webpage under water quality data. A graph depicting 2008 temperature operations is attached to today's agenda. The Orofino gage on the Clearwater River shows average temperature of 53.6 degrees F, very low for this time of year. Dworshak is releasing 45 degrees F water, while Lower Granite water temperatures remain below an average of 60 degrees F. This is significant

because CEQUAL 2 modeling doesn't produce good results when temperatures are below 60 degrees F. That's why Hall didn't run models to show TMT today.

This year's temperatures are low in relation to historical averages. Last year was cool, with late runoff, while this year's runoff occurred earlier despite low temperatures. Hall expressed confidence that temperatures will remain low over the 4th of July weekend. On July 1, he will present a model run of Dworshak operations for TMT to discuss at its next meeting, cautioning that modeling results will be unreliable if temperatures at Lower Granite remain below 60 degrees F.

Repair of a leak in the Dworshak powerhouse was successfully completed, although the repaired unit is still leaking somewhat. The reservoir refilled within a few hundredths of a foot of its target elevation of 1,600. The COE plans to operate the reservoir within the top foot, with the intent of passing inflows through the 4th of July weekend; CRITFC expressed appreciation for that operation. Although inflows are dropping, there is no storage space available, Hall cautioned, so keeping the reservoir full involves balancing the risk of a rain event.

The COE plans to keep Dworshak operations the same as last week, barring any spikes in temperature. TMT will revisit Dworshak operations on its July 1 conference call and decide then whether to have another meeting the Wednesday following the holiday.

Adams asked the Salmon Managers what information they might need to make recommendations next week regarding 4th of July operations. The COE will present CEQUAL modeling similar to previous years, comparing the likely results of different operational scenarios.

Bring the modeling results to FPAC on Tuesday, Russ Kiefer (Idaho) and Rick Kruger (Oregon) suggested. That gives the Salmon Managers time to digest the information before having to decide on a recommendation at TMT on Wednesday. Paul Wagner (NOAA) and Dittmer requested modeling of previous years as a starting point, particularly of 2007 and 2008.

Dworshak outflow temperatures are 45 degrees F; Adams asked Dave Wills (USFWS) what temperatures are needed for hatchery purposes. A range of 47-49 degrees F is good, Wills replied. The fish will definitely grow faster if water temperature is raised now. Wills requested temperature profiles. Adams showed TMT how to access water temperature data for Dworshak via the TMT page. Doug Baus (COE) will continue to present temperature thermoclines to TMT after Adams' departure as TMT chair early in July.

6. Libby Operations Update

Joel Fenolio (COE) gave a presentation in response to Jim Litchfield's (Montana) proposal last week to drop Libby outflows to bull trout minimums of 7

kcfs after the sturgeon pulse ends. Fenolio showed TMT graphs of what flows might be if the COE has to ramp up outflows after the sturgeon pulse. The 25th and 75th percentile scenarios for Libby show outflows dropping to bull trout minimums of 7 kcfs after the sturgeon pulse ends in order to reach a maximum elevation of 2449 feet by end September.

At this point, the COE plans to set Libby outflows at 7 kcfs after the sturgeon pulse ends, then reevaluate precipitation effects in July, Fenolio said. There was discussion of the fact that VARQ flows for flood control don't include the sturgeon volume as part of the decision process for Libby operations. Brian Marotz (Montana) submitted a proposal to the COE this week that shaves 2 days off the 17 kcfs outflows and 2 days off 15 kcfs outflows at Libby, Fenolio reported. The purpose of the change is to make more water available for a gradual descent in outflows to bull trout minimums.

USFWS, Idaho, Oregon, NOAA, BPA, Washington, BOR, and CRITFC representatives did not object to implementing the Montana proposal. TMT will revisit Libby operations in two weeks with updated scenarios. There was general agreement that Libby scenarios aren't needed more often than biweekly as long as inflows remain low.

7. Little Goose Operations Update

For spring operations, the adjustable spillway weir at Little Goose Dam has been in the low position, discharging flows of about 10 kcfs, Dan Feil (COE) reported. Sometime next week the crest will be moved into the high elevation position for summer operations, discharging flows of 6-7 kcfs. The trigger for switching to the high elevation crest occurs when the daily average flow drops below 75 kcfs, projected to occur on June 30, 2009.

The switch, which takes about a day to complete, involves shutting down the spill bay with the ASW in it, plus the adjacent spill bay. The switch will not affect 30% BiOp spill at Little Goose, which will continue through the remaining bays. There were no objections to this operation.

8. McNary Operations Update

In the process of moving the spillway weir to bay 19, as TMT had discussed previously, several hydrophones used to evaluate fish passage and survival went out of service, Dan Feil (COE) reported. The COE has decided to close down bays 16-22 and repair the hydrophones. Feil said the repair, which takes about an hour, was probably already in progress and would not disrupt the 50% BiOp spill level at McNary. There were no objections but Montana requested prior notification in future.

9. John Day Operations Update

A modeling trip to ERDC last week showed that the 30%/40% spill test can proceed as initially planned, Feil reported. The ERDC modeling dispelled earlier concerns that 30% flat spill might be needed for the rest of the season due to bird predation in the tailrace, a plan that the COE already reported in its monthly letter to the U.S. district court. There is no objection from FFDRWG to 30%/40% alternating spill in 2-day blocks throughout the study, which ends in mid-July, Feil said.

USFWS, Oregon, Washington, BOR and CRITFC all supported the switch back to a 30%/40% spill test.

10. Operations Review

a. Reservoirs. Grand Coulee is at elevation 1,286 feet, on track to refill to 1,290 feet elevation over the 4th of July weekend, John Roache (BOR) reported. Hungry Horse is at elevation 3,553.85 feet, discharging 2.3 kcfs with inflows of 8 kcfs. Kiefer asked whether it's correct to assume that July flows out of the Snake basin will be higher than average this year in response to recent heavy precipitation. Yes, mainly due to flood control and flow augmentation releases, although the details still need to be worked out, Roache replied.

Libby is at elevation 2,429.4 feet. The operation, discussed previously, will drop outflows to 17 kcfs soon, then to 15 kcfs and 10 kcfs, tapering to bull trout minimums of 7 kcfs around July 10.

Albeni Falls is at elevation 2,061.8 feet and passing inflows. Dworshak is at elevation 1,599.8 feet and also passing inflows, as discussed previously.

Seven-day average inflows are 98 kcfs at Lower Granite, 259.7 kcfs at McNary, and 255 kcfs at Bonneville.

b. Fish. Adults – Summer Chinook counts have been 2,000 fish per day at Bonneville and dropped to 1,600 yesterday, Wagner reported. Jack counts have kept pace with adults at the rate of 1 jack for every 2 adults. Sockeye are passing at the rate of 10,000 per day, or 71,000 to date at Bonneville for 2009. This is less than last year, but higher than the 10-year average. Last year's counts were well above the 10-year average at Bonneville, Ice Harbor, and Lower Granite. Kiefer pointed out that the PIT tag counts of sockeye at Ice Harbor this year are indicative of good sockeye returns.

Smolts – Yearling passage is nearly done. Subyearling passage is peaking at 13,000-39,000 fish per day at Lower Granite and Little Goose. Lower Monumental is passing about 10,000 subyearlings per day. There was a bump at McNary, with counts of 277,000 subyearlings on June 18 and 129,000 on June 21. These high counts reflect recent hatchery releases. Subyearling counts are currently 50,000 per day at John Day and 100,000 per day at Bonneville.

c. Power System. There was nothing to report today.

d. Water Quality. TDG levels are below criteria at most locations, Adams reported. The spill cap at Bonneville has been raised to 135 kcfs based on tailwater gage readings. The tailwater gage at Ice Harbor appears to be malfunctioning and will be inspected soon, with gage readings showing exceedances even at a 30% spill level of 90 kcfs. Other than that, all projects are operating in accordance with state water quality standards. River temperatures remain cool, especially on the lower Snake River, with average tailwater gage readings at Lower Granite of 51.8 degrees F, as discussed previously. Temperatures on the Columbia River are 62 degrees F at the McNary tailwater and 62.5 degrees F at Cascade Island.

9. Next Meeting

The next TMT meeting will be a conference call on July 1. The agenda will include review of Dworshak CEQUAL temperature modeling and RBM-10 temperature modeling, a Grand Coulee operations update for the July 4th weekend, discussion of the initial flow augmentation regime at Dworshak, another treaty fishery SOR, and review of the June 17 meeting minutes. This summary prepared by consultant and writer Pat Vivian.

| <i>Name</i> | <i>Affiliation</i> |
|--------------------|---------------------------|
| Jim Adams | COE |
| Russ Kiefer | Idaho |
| Dave Wills | USFWS |
| Rick Kruger | Oregon |
| Doug Baus | COE |
| Paul Wagner | NOAA |
| Jim Litchfield | Montana |
| Tony Norris | BPA |
| Kyle Dittmer | CRITFC |
| Krista Leonard | XX |
| Kim Johnson | COE |
| Rudd Turner | COE |
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