

COLUMBIA RIVER TECHNICAL MANAGEMENT TEAM

February 8, 2017

Facilitator's Summary

Facilitator: Emily Stranz; Notes: Charles Wiggins, DS Consulting

The following Facilitator's Summary is intended to capture basic discussion, decisions and actions, as well as point out future actions or issues that may need further discussion at upcoming meetings. These notes are not intended to be the "record" of the meeting, only a reminder for TMT members. Official minutes can be found on the TMT website: <http://www.nwd-wc.usace.army.mil/tmt/agendas/2017/>

Official Water Supply Forecasts

The U.S. Army Corps of Engineers (Corps) and Bureau of Reclamation (BOR) reported on the official February water supply forecasts. Mary Mellema, BOR, reported on BOR projects:

The volumes for the February final forecast for Hungry Horse inflow are:

- February-July: 88% (of average);
- January-July: 88%;
- April-August: 88%;
- May-September: 88%.

The minimum flows downstream of Hungry Horse based on this forecast are as follows:

- Columbia Falls: 3,460 cfs;
- Hungry Horse: 828 cfs

Doug Baus, Corps, reported on Corps projects:

- The Dalles, April – August: 95% (of average);
- Lower Granite, April-July: 106%;
- Libby, April-August: 95%;
- Dworshak, April - July: 104%.

Grand Coulee Update

Mary noted that BOR has decided to perform drumgate maintenance at Grand Coulee in 2017. This decision was made after considering the official February water supply forecast at The Dalles, which is 95% of average. The maintenance will require the Grand Coulee reservoir to be drafted down to 1,255ft by mid-March, and to stay at that elevation or lower for eight weeks. This decision will not change if weather conditions become dryer, but could change for flood risk management, if necessary.

Dworshak Update

Steve Hall, Corps, provided an update on Dworshak Dam operations. He noted that the forebay is currently at 1,518.35ft; the project is releasing 8 kcfs and inflow is 4kcfs; TDG ranges between 108-109%. The Corps has been operating to stay below 110% TDG, as coordinated at TMT.

Steve reported that the official February water supply forecast for Dworshak is 2.5maf. He presented operational scenarios to the TMT, which considered both a 2.5 and 2.6maf water year. The 2.6maf scenarios were presented due to a forecasted weather system moving through the region this weekend. The scenarios can be found on the TMT website: http://www.nwd-wc.usace.army.mil/tmt/agendas/2017/0208_Agenda.html

It was noted that there was a step down in volume in the STP; however, the STP is tracking the NWRFC forecasts pretty well. Additionally, Dave Swank, USFWS, asked if it is possible for the Corps to deviate

from the April 15th flood control elevation to help alleviate the TDG issues. Steve noted that the Corps cannot deviate from the April 15th target. However, in the past, the Corps has deviated from the end of April target, if the project is close to the refill curve. Steve explained how the Corps calculates the refill curve, which, is based upon a 95% likelihood of refilling.

As requested at the February 1st TMT meeting, Steve presented longer term scenarios, looking out into the refill period (through June). These scenarios, which can be accessed on the TMT website, considered high, medium, and low flow conditions. With both the high and medium flow scenarios, the project would still have to bump up to over 110% TDG for May and June. With the low flow scenario, the refill is shifted earlier and is above minimum discharge during refill. Steve suggested that the low flow scenario is not likely; even if the next two months are very dry, operations will still be above the minimum discharge for refill because there is already more snowpack than in 2015.

Charles Morrill, WA, noted that these scenarios suggest TDG levels of 120% in mid- to late-April given the current volume outlook. Steve affirmed, suggesting that the project continue to operate below 110% TDG barring any significant changes, and continue watching conditions and adjusting as necessary.

The TMT discussed the scenarios, concerns, and suggested considerations moving forward. They provided the following:

- Russ Kiefer, ID, suggested trying to hold the reservoir close to the current elevation, while keeping flows as smooth as possible and TDG levels below 110%. The Colville Tribes, ID, WA, and the Confederated Tribes of Warm Springs were supportive of this suggestion.
- Another option discussed, was to stop spill and run water through units 1 and 2 only. This would decrease the outflow. USFWS was supportive of this suggestion, however, expressed that they are also okay with holding around the current pool elevation.
 - OR was generally supportive of dropping to the two units and stopping spill. Erick Van Dyke, OR, expressed concern with dropping the reservoir too quickly, noting that the pool is nearing the end of April elevation at this point. He noted that the spring freshet is important to move fish out of the system and dropping the pool elevation too soon flattens the freshet.
- BOR, BPA, MT, and NOAA were supportive of maintaining TDG below 110%.
- The Nez Perce were not available to provide input; however, multiple TMT members shared interest in knowing the Nez Perce's preferences.

After hearing the regions' concerns and interests, the Corps confirmed that they will operate Dworshak to meet the April 15th flood control elevation. They will continue the current operation to maintain TDG levels below 110% through next week in order to reduce the probability of higher TDG in April. They will also manage operations to reduce potential impacts to spring flow augmentation flows.

Steve Hall agreed to provide a mid-month water supply forecast and updated long-term scenarios at the February 15th meeting.

- **ACTION:** The Corps will continue to operate DWR to stay below 110% TDG, until further discussion by the TMT on February 15th. They will provide updated forecasts and scenarios for the TMT's consideration as well.

The next TMT meeting will be a face to face meeting on February 15th.

Columbia River Regional Forum
TECHNICAL MANAGEMENT TEAM OFFICIAL MINUTES

February 8, 2017
Minutes: Pat Vivian

1. Introduction

Representatives of Washington, USFWS, BPA, Warm Springs Tribe, Montana, BOR, NOAA, Oregon, Idaho, Colville Tribe and others participated in today's TMT conference call (the Nez Perce Tribe did not attend). Doug Baus, COE, chaired the meeting and Emily Stranz, DS Consulting, facilitated the conversation, which focused mainly on water quality and flood risk management at Dworshak Dam.

2. Official Water Supply Forecast

Mary Mellema, BOR, and Doug Baus, COE, gave the official February forecasts for individual basins:

- Hungry Horse (February-July) – 1,787 kaf, 88% of average
(January-July) – 1,839 kaf, also 88% of average
(April-August) – 1,704 kaf, 88% of average
(May-September) – 1,493 kaf, 88% of average

Minimum flows are 3,460 cfs at Columbia Falls and 828 cfs for Hungry Horse for the remainder of February.

- The Dalles (April-August) – 83 maf, 95% of average
- Lower Granite (April-July) – 21 maf, 106% of average
- Libby (April-August) – 5,583 kaf, 95% of average
- Dworshak (April-July) – 2,541 kaf, 104% of average

3. Grand Coulee Drum Gate Maintenance

Every year the BOR decides whether or not to do drum gate maintenance at Grand Coulee based on the February 1 official River Forecast Center inflow forecast at The Dalles. With an 83 maf, 95% of average, forecast this year, the BOR has decided to proceed with maintenance and notified all TMT members via email on February 3rd, 2017.

In response to queries from Paul Wagner, NOAA, Mary Mellema, BOR, said that once the decision is made, it's practically irreversible because Coulee has to start drafting on February 1 in order to get the reservoir elevation down to 1255 ft by mid-March for drum gate maintenance to begin. The reservoir must remain at 1255 ft or so from mid-March for a period of 8 weeks. It's possible that drum gate maintenance could be canceled due to flood risk conditions, but not if the forecast dries up.

4. Dworshak Update

Steve Hall, COE Walla Walla, presented current data on Dworshak and led a discussion of whether to change the operation that TMT coordinated last week. The current operation has Dworshak releasing sufficient inflows to meet the April 15 flood control target (rather than end of month flood control targets) while keeping total dissolved gas saturation levels close to, but not to exceed, 110% downstream.

4a. Current Operations Data. The reservoir elevation is 1518.5 ft. Dworshak is releasing 8 kcfs with 4 kcfs inflows, 4.7 kcfs in generation, and 3.3 kcfs in spill.

4b. Water Quality Report. Saturation levels of TDG have remained in the range of 108-109% with fluctuations during the day due to temperature changes.

4c. Comparison of 2.5 and 2.6 MAF Scenarios. Hall told TMT a major storm is expected to drive the water supply forecast up on Saturday, dropping about 4 inches of precipitation across the basin. Most of that will fall as snow, which is expected to boost SNOTEL readings at higher elevation stations to normal levels. However, lower elevation stations could see some runoff from rain that hasn't been factored into the water supply forecast.

Hall presented four scenarios to compare potential inflow volumes and operational outcomes at Dworshak Dam:

1. 2.55 MAF Inflows, Low TDG – This scenario is based on STP inflows. A significant inflow event is forecasted for February 11, then inflows decline until April. The April 15 flood control elevation is around 1515 ft. Holding flat discharges would draft the reservoir to an elevation 10-15 ft below its end of February flood control target while keeping TDG levels below 110% into March and April. This is the COE's recommended approach.
2. 2.55 MAF Inflows, Operate to End of Month Flood Control – This scenario would drop DWR operations down to 1 unit releasing just below 3 kcfs through March 1 in order to meet end of month flood control targets. The downside is that releases would increase to 17 kcfs in April for required flood control.
3. 2.6 MAF Inflows, Low TDG – If inflows materialize as forecasted, this scenario places the reservoir at basically the same elevation after the coming storm event. However, with a 2.6 maf forecast, Dworshak is at risk of releasing 8 kcfs through the end of March and 10.5 kcfs in April to meet the April 15 flood control target.
4. 2.6 MAF Inflows, Operate to End of Month Flood Control – Wetter conditions later in the season would require 18 kcfs releases in the first half of April.

Paul Wagner, NOAA, asked if these volumes are consistent with expected inflows. Yes, Hall said, the RFC's ESP traces match the COE's water supply forecast closely, although the STP traces end in March before the April 15 flood control target is attained.

Dave Swank, **USFWS**, said it appears the high TDG levels in these scenarios are driven by the need to meet the April 15 flood control elevation. He asked whether the COE would consider deviating from that requirement, given the limited generation capacity at Dworshak.

Limited capacity is indeed a concern, Hall said. Another concern is deviating from the end of April flood control elevation if the hydrograph is close to intersecting the flood control refill curve (FCRC). The typical deviation the COE allows is to smooth out the transition from late April to early May as the project shifts from flood control to refill operations. The project is required to hold pool until it intersects the FCRC, which generally happens in late April or early May.

4d. Future Operations (Longer Term). Hall explained how the FCRC is calculated and its purpose – to provide 95% confidence of refilling Dworshak reservoir for flow augmentation. He shared three graphics with TMT that extend the DWR modeling period through the end of June when refill starts. The FCRC is a minimum elevation because drafting the reservoir any lower would jeopardize refill.

In response to TMT's interest in visualizing Dworshak operations in a longer term context, Hall presented three scenarios based on historic inflow projections through the start of refill operations:

1. Future Operations Assuming STP and Hydrology Using Inflows from 1997 – This scenario has a 2.9 maf runoff volume, which is the upper bound in the COE water supply forecast for 2017. The runoff of 1997 was strong, but it occurred relatively late in the season and inflows didn't increase significantly until halfway through April. So avoiding high TDG levels through April 15 doesn't necessarily mean there won't be high TDG levels through the rest of April and May under this scenario. It has DWR discharges rising from 8 kcfs through end March to 10, 15, and finally 18 kcfs in order to avoid overfilling the reservoir.
2. Future Operations Assuming STP and Hydrology Using Inflows from 1972 – The year 1972 was chosen for this exercise because it had an April-July DWR runoff volume of 2.5 maf, like the 2017 forecast for DWR. This scenario involves releasing TDG levels well in excess of 110% saturation for most of May and the first part of June. It illustrates past operations that have deviated from the FCRC at the request of the Salmon Managers.
3. Future Operations Assuming STP with April to July Volume 2.1 MAF – This graphic demonstrates that early runoff would mean having to increase DWR releases to approximately 8 kcfs through end February, then even higher when

inflows rise at the beginning of April. If conditions dry up after that, the COE would reduce releases. This shape has strong releases early in the year and shifts the refill curve to the left.

Even if the next couple of months are dry, Hall said DWR will still release more than minimum discharges as the reservoir refills. Snowpack is more robust now than it was at the peak of 2015 snow season. The region has an above average water supply forecast, meaning that large volumes will probably need to be moved during refill to avoid a fill-and-spill situation. Due to the effects of the FCRC, the COE has less operational flexibility when the reservoir is close to being full.

Charles Morrill, Washington, observed that the current volume and timing of inflows implies that releases of 120% TDG will be necessary in mid to late April. Hall agreed. Barring significant changes in the forecast, this is why the COE believes continuing the current operation is the most prudent option.

Paul Wagner, NOAA, reported that some FPAC members preferred a one- or two-turbine operation – but that was before hearing the new information presented today. The Nez Perce Tribe did not participate in yesterday's FPAC call.

TMT members gave their views of Dworshak operations moving forward:

- **NOAA** – With plenty of volume coming according to the official February water supply forecast, the reservoir elevation should hover around 1520 ft. Supports the COE in continuing the current operation, but would consider other options.
- **Idaho** – Recommends keeping the project close to its current reservoir elevation for another week, while smoothing out inflows and releases to the greatest extent possible. Shares NOAA's willingness to consider other options.
- **Washington** – Concurs with Idaho and NOAA on maintaining the current elevation for another week. Wants to avoid a large differential between the FCRC and current reservoir elevation.
- **USFWS** – With the reservoir almost 13 ft below its end of February flood control elevation, USFWS favors using 2 units with no spill, or about 5.5 kcfs out, as proposed last week by CRITFC/Umatilla (not present today). However, USFWS would also support continuing approximately 8.2 kcfs releases, or maintaining the current elevation and releasing volume as necessary in light of the coming storm. Has longer-term concerns about releasing too much water.
- **Oregon** – Not happy that DWR reservoir is nearly down to its April flood control elevation. Expressed concern about having adequate augmentation flows during the freshet for migrating juveniles. Oregon doesn't favor dropping the pool elevation at this point.

- **Montana** – We need to get ahead of the curve and carve out as much reservoir space as possible. Supports continuing the current operation because the forecast doesn't indicate a shortage of water. An operational cushion is needed going into April, when flood control elevations change abruptly.
- **Colville Tribe** – Keep the pool elevation as steady as possible, especially in light of the coming snowstorm.
- **Warm Springs Tribe** – Keep the pool elevation as steady as possible.
- **BPA** – Supports the COE recommendation to continue the current operation.
- **BOR** – Supports the COE recommendation to continue the current operation.

Given the uncertainty of the inflow forecast, Hall said he wasn't sure the pool elevation could be stabilized without jerking flows around. Operating to end of month flood control targets now would clearly result in high TDG levels later that are bad for fish, especially with a storm expected to bring 2-3 inches of precipitation across the basin. If inflows turn out to be less than forecasted, the COE will reduce releases accordingly.

Scott Bettin, BPA, wanted to clarify whether people recommended holding the pool steady or holding discharges steady. **Idaho's** recommendation is to smooth out discharges and keep releases below 110% TDG, while keeping the reservoir close to its current elevation if possible. The **Colville Tribe, Washington** and **Warm Springs Tribe** would support an operation that maintains the current elevation while accommodating power planning needs, increasing discharges if inflows increase.

Given the nuances involved in the decision and in the views TMT members expressed today, the Action Agencies held a brief caucus before deciding how to move forward with Dworshak operations. The decision was to continue releasing close to 110% TDG, targeting the April 15 flood control elevation for another week without committing to a specific elevation. Dworshak will be operated in a way that best addresses the three main priorities TMT identified today – keep TDG levels below 110% for the near future; minimize the probability of high TDG exposures in April; and don't put spring flow augmentation in jeopardy.

5. Next TMT Meeting

When TMT reconvenes in person on February 15 to revisit Dworshak operations, the COE will provide an unofficial mid-month forecast to help in the decision-making.

Name	Affiliation
Charles Morrill	Washington
Dave Swank	USFWS
Scott Bettin	BPA

Jen Graham	Warm Springs
Jim Litchfield	Montana
Mary Mellema	BOR
Paul Wagner	NOAA
Tony Norris	BPA
Aaron Marshall	COE
Doug Baus	COE
Steve Hall	COE
Erick Van Dyke	Oregon
Russ Kiefer	Idaho
Steve Lyman	PGE
Michael Bryant	CBB
Charles Wiggins	DSC
Mike Shafley	Snohomish PUD
Laura Hamilton	COE
Sheri Sears	Colville