COLUMBIA RIVER TECHNICAL MANAGEMENT TEAM
March 13, 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/

Dworshak Update

Current Operations
Steve Hall, Corps, provided an update on Dworshak operations. He noted that the forebay is currently at 1,508.0 ft. The project is releasing 22.5 kcfs, with 5.0 kcfs through the turbines and 17.5 kcfs spill through the regulating outlets (ROs). TDG levels at the Dworshak National Fish Hatchery are 104.7% today. The NW River Forecast Center's forecasted inflow shows a slight decrease, however, the Corps' newly revised inflow trace shows an increase from 10 kcfs to 14 kcfs. Steve noted that the revised early bird water supply forecast is fluctuating, and indicates an April-July runoff volume of around 2.9 or 3.0 MAF. The next snow flight is scheduled for the end of March.

Short Term Scenarios
Steve presented five short-term potential scenarios for Dworshak operations, designed to reach a projected April 15th target flood control elevation. The scenarios are available on the TMT web site. All but the last scenario assume a 2.9 MAF water supply and a 1,471 ft target flood control elevation. The last scenario assumes a 3.0 MAF or greater water supply, and a 1,440 ft flood control elevation. The scenarios illustrate potential outflows, both with and without the 8kcfs drop for the hatchery release.

Dave Swank, USFWS, thought that the second scenario (22.5 kcfs until the two-day drop in flow to 8 kcfs, then 24 kcfs for two days and 21.8 kcfs to April 15th) could work for hatchery operations, but hoped the move to 24 kcfs could be avoided. Julie Ammann, Corps, noted the Corps' concerns with the inflow forecasts. She explained that it will be challenging to reach the end of March and April targets, and the forecasts are very dynamic and unpredictable. Outflows can be held at 22.5 until Wednesday, but with the need to operate to flood control rules, it is likely that an increase to 25 kcfs will be necessary.

Longer Term Scenarios
Steve presented three longer-term scenarios for Dworshak operations through the end of June. Each is based upon a 2.9 MAF water supply. Scenario 1 uses STP traces with "normal" inflow and shape. Scenario 2 uses the 1989 water year, when volume was similar to that projected for this year, but an earlier runoff and more "front loaded" in shape. Scenario 3 uses the 1985 water year, a late runoff year with several peaks. All three scenarios show a need to bump up to 25kcfs and drop down to between 2.9-4.3kcfs for refill.

The date on which discharges to draft will intercept the refill curve will be based upon real time weather conditions. The Corps expects the intercept this year in early April assuming 2.8 MAF and a 1,471 ft FRM target, but notes there have been years when the FRM and refill curves intersect in the end-of-April.

Russ Kiefer, Idaho, noted that the long range scenarios showed it is hard to manage operations to meet the April 15th flood control elevation, but easier after that point. He noted that he is getting a lot of questions from his constituents regarding any flexibility in the April 15th target and asked for clear rationale from the Corps as to why they cannot deviate. Julie Ammann said that the flood risk management protocol is rigid

and designed to prepare for spring runoff. The reduction in reservoir elevation is to protect the lower river as it experiences runoff. Steve Hall added that uncertain weather conditions could add up to a 3.5 to 4 MAF year by the end of April. And at this point the Corps is operating to try and avoid having to go higher than 25kcfs. It was noted that other areas have had real problems this year with atmospheric rivers, both at the local and the system level.

Hatchery Report

Steve Rogers, USFWS, reported that the hatchery fish are doing well at this point. With TDG levels holding at about 104%, and relatively stable conditions. There is now more evidence of gas bubble disease on more parts of examined fish. Spring Chinook were examined on March 10th: 7 of 10 fish showed gas bubbles in the gills, 6 of 10 had bubbles on the lateral line. Only 2 of 10 steelhead had gas in their gills. Steve will compile a spreadsheet of daily fish observations and send the results to Dave Swank for distribution to TMT.

Salmon and hatchery managers are in the process of determining the best approach for their releases. At this point, they are still anticipating a need for a reduced flow operation, but may want to move the date up depending on the smoltification status. This might occur as early as next week. The first fish to be released are Spring Chinook smolt. It might also be better to keep the fish in a low gas situation in the hatchery for a day, and then release them into a low gas river. Managers will try to have a decision by TMT on Wednesday, March 15th.

Action Agencies would need a day to prepare for this reduced flow operation. Depending on the hatcheries' needs, the lowering operation would probably start in the evening or at midnight, with fish release the next morning. There are probably few anglers in the river to be affected by these operations, but the region will be notified.

There is now a semi-permanent TDG monitoring station installed inside the hatchery. The Lewiston TDG station is on line today, and the Peck station will be soon. The Corps will build a page to display all this TDG data in real time.

The next TMT meeting will be an in person meeting at 9:00 AM Wednesday, March 15th

Columbia River Regional Forum
TECHNICAL MANAGEMENT TEAM OFFICIAL MINUTES

March 13, 2017
Minutes: Pat Vivian

1. Introduction

Representatives of BPA, NOAA, the COE, USFWS, CRITFC/Umatilla, Washington, Nez Perce Tribe, Idaho and others participated in today's TMT conference call. Doug Baus, COE, served as chair and Emily Stranz, DS Consulting, facilitated the conversation.

2. Dworshak Update

Steve Hall, COE Walla Walla, walked TMT through several links on today's agenda and led a discussion of current and future Dworshak operations in light of high inflows and an increasing forecast.

2a. Current Operations Data. Current reservoir elevation is 1508 ft with discharges of 22.5 kcfs, 5 kcfs of that through the powerhouse and the rest through the RO gates as spill. Inflows are 14 kcfs.

2b. Total Dissolved Gas Report for Dworshak. Discharges have been generating slightly over 125% TDG saturation levels in the river, while TDG levels in the hatchery collection channel are around 104% which is considered representative of the entire hatchery. The degassing system is apparently working well.

2c. NWRFC Water Supply Forecast. The River Forecast Center's water supply forecast for DWR has been fluctuating, and the COE forecast doesn't always coincide with RFC's.

2d. NWRFC Inflow Forecast. This has just been revised. Flows rose over the weekend from 10 kcfs to 14 kcfs, and the River Forecast Center is predicting a substantial increase in inflows primarily due to rainfall over the next 3 days. Peak inflows of 70 kcfs are predicted on Wednesday, March 15. The COE believes this forecast is a bit high, possibly due to disparities in measuring low elevation snow-water content in the basin. Snowpack is currently ranging from 30-35% density and has to be 45-50% density to produce runoff.

2e. Dworshak Short Term Operations Scenarios. Current project outflows are 22.5 kcfs, based on STP modeling last week. Hall presented five scenarios of operations based on STP inflows through April 15.

- Scenario 1 – This is based on a 2.9 maf Dworshak inflow forecast, managing to an April 15 flood control target. According to this scenario, 22.5 kcfs discharges would continue through end March, then transition to 20 kcfs depending on inflow shape.

- Scenario 2 – This is the same as scenario 1 except it includes a two-day decrease to 8 kcfs for the hatchery release on March 27-28, followed by a short period at 24 kcfs discharges to meet the end of March flood control operation. Starting April 1, Dworshak would need to release 21.8 kcfs in order to reach the April 15 flood control elevation.

- Scenario 3 – This is also a 2.9 maf inflow forecast, operating to an April 15 flood control target but with 25 kcfs discharges in March. Discharges of 17 kcfs would need to start April 1 in order to reach the April 15 flood control target of 1471 ft.

- Scenario 4 – This has the same operating assumptions as scenario 3, with the addition of 2 days of 8 kcfs discharge to accommodate the smolt release.

- Scenario 5 – This shows Dworshak operating to a 3 maf inflow forecast with an April 15 flood control target of 1445 ft (empty). It would require discharges of 25 kcfs and even that might not be enough to reach 1445 ft by April 15.

Dave Swank, USFWS, asked whether the COE believes there will be a 2.9 maf inflow volume forecast as the scenarios show. It could turn out to be a 3 maf year, Hall replied. The 10 day forecast shows a lot of fluctuations in precipitation. The COE will do a mid-month forecast and adjust Dworshak operations accordingly.

Charles Morrill, Washington, asked when the COE will know what the end of April flood control elevation might be; Hall said he would cover that under long term scenarios (see section 2f below). Swank asked whether releases of 24 kcfs are potentially necessary to meet both the end of March flood control target and the April 15 flood control target. The COE is required to operate the project to meet both flood control targets, Hall replied.

Julie Ammann, COE, gave TMT a heads-up that 25 kcfs discharges from Dworshak might be necessary in the near future due to the volatility of the inflow situation. Today's scenarios look good, but actual runoff volume could be a different story.

The COE will hold 22.5 kcfs out of Dworshak Dam until March 15, when TMT meets again. At that point, inflows will determine next steps in the Dworshak operation. A great deal will depend on how much low elevation snowpack melts during the 2-3 inches of precipitation forecasted over the next 72 hours. The next snow flight is scheduled for the end of March.

2f. Dworshak Long Term Scenarios. All three scenarios show 25 kcfs discharges in the last half of March, although they focus mainly on Dworshak operations in April to illustrate the differences in potential operations, Hall said. Most show the transition to the flood control refill curve on April 15, although that intersection would vary under different conditions.

- Scenario 1 – This shows an STP-based operation through June, with a 2.9 maf inflow forecast. Because of relatively high inflows, the transition from flood control to the FCRC on April 15 is abrupt, going from 17 kcfs discharge in the first half of April to 3 kcfs average discharge during refill.

- Scenario 2 – This shows Dworshak operating to a 2.9 maf inflow forecast based on water year 1989 which had early runoff. Discharges of 15.7 kcfs are required to get to the April 15 flood control elevation, followed by flat flows of 3.2 kcfs during refill. In this scenario, intersection with the FCRC would probably occur around April 11-12.

- Scenario 3 – This also shows Dworshak operating to a 2.9 maf inflow forecast, but based on water year 1985, which had late runoff with several peaks along the way. Intersection with the FCRC would probably occur April 10. Discharges are 16.6 kcfs to get to the April 15 flood control elevation and 4.3 kcfs throughout refill.

The actual intersection with the FCRC is impossible to predict because it depends heavily on weather conditions and real time inflows, Hall said. While that is projected to occur in early April this year, in some years it hasn't occurred until end April. Another variable is the jet stream over the Pacific, which could aim an atmospheric river at the Northwest at any time from now through June. Uncertainty about when the FCRC intersection will occur is why the COE operates Dworshak to an end of March flood control elevation as well as an April 15 elevation.

The current April 15 flood control elevation of 1475 ft with 22.5 kcfs discharge is based on a 2.8 maf inflow volume forecast. If the forecast increases, it would be necessary to increase Dworshak discharges to 25 kcfs.

Steve Rogers, Dworshak National Fish Hatchery, reported the fish are doing well under the circumstances. With total dissolved gas of around 104.5% in the hatchery, 7 in 10 spring chinook and 2 in 10 steelhead were found to have a few gas bubbles in the last health exam. Charles Morrill asked whether the fish show any signs of gas bubble disease. To address that question in detail, USFWS will send TMT members a daily spreadsheet documenting hatchery readings of TDG levels in the river and collection channel, correlated to fish health.

Russ Kiefer said he's having difficulty explaining to IDFG fish managers why the COE manages so inflexibly to an April 15 flood control target. Flood risk management is rigid because the system was originally designed to rely on flood risk protocol during the unpredictable runoff period, Ammann said. It's possible the DWR runoff volume forecast could jump to 3.5 or even 4 maf by end April if conditions get any wetter, Hall added. The risk of local or system wide flooding is not reflected in these scenarios – but it's what the flood control rule curves were designed to prevent.

Kiefer said IDFG managers at the Clearwater Hatchery are considering whether they want 2 days of 8 kcfs discharges to release spring chinook smolts. The degassers are helping, but GBT symptoms and smoltification are being closely monitored, and it might make sense to release the fish early. If so, reduced spill would be desired for the release. He asked how much lead time the Action Agencies would need for the sake of power deliveries to schedule two days

of reduced spill, possibly a week earlier than the planned end of March. BPA would need a day's notice under the current forecast, Scott Bettin replied.

The Action Agencies and hatchery managers will work out the details and dates of the reduction in spill if deemed appropriate for the fish release. That request could come as early as next week. It was noted that juvenile chinook migration takes longer than steelhead migration.

Until March 15, two days from today, Dworshak will continue 22.5 kcfs releases, with a strong possibility that will be increased to 25 kcfs in the near future. To measure TDG production from Dworshak spill, the COE has installed a semi-permanent water quality monitoring station in the Dworshak National Fish Hatchery, which will eventually report data to the TMT website. Technical difficulties at the Peck monitoring station should be resolved soon and the station put back into service.

3. Next TMT Meeting

TMT will meet next in person March 15.

Name	***Affiliation***
Tony Norris	BPA
Scott Bettin	BPA
Paul Wagner	NOAA
Doug Baus	COE
Julie Ammann	COE
Dave Swank	USFWS
Tom Lorz	CRITFC/Umatilla
Charles Morrill	Washington
Jay Hesse	Nez Perce Tribe
Steve Hall	COE Walla Walla
John Heitstuman	COE Walla Walla
Wayne Jousma	COE Walla Walla
Andy Goodwin	USFWS
Michael Bryant	CBB
Roger XX	Dworshak
Russ Kiefer	Idaho
Bruce Henriksen	COE Walla Walla
Steve Rogers	Dworshak National Fish Hatchery