COLUMBIA RIVER TECHNICAL MANAGEMENT TEAM

January 18, 2017

Facilitator's Summary

Facilitator: Emily Stranz, Notes: Tory Hines, 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 Water Supply Forecast – January 2017

Doug Baus, COE-NWD, provided an update on the official January water supply forecast, which is posted on the TMT website. Mary Mellema, BOR, noted that the forecasted volumes for the final January forecast for Hungry Horse Dam:

- January-July: 2,266 kaf (108%);
- April-August: 2,091 kaf (108%); and
- May-September: 1828 kaf (108%)

The minimum flows downstream of Hungry Horse are as follows:

- Columbia Falls: 3,500 cfs; and
- Hungry Horse: 900 cfs

Doug noted the final January forecast volumes for the USACE projects:

- The Dalles April-August: 85 maf (97%);
- Lower Granite April-July: 20 maf (99%);
- Libby April-August: 6,861 kaf (117%);
- Dworshak April - July: 3,055 kaf (125%);
- Grand Coulee April-August: 55 maf (97%); and,
- Albeni Falls April-August: 12 maf (97%).

Paul Wagner, NOAA, pointed out that that discharge out of Libby recently decreased and snow fall in that basin is below average, which does not suggest that the water supply is truly 117% of average. Julie Ammann, COE-NWD, noted that the Corps is tracking the inconsistencies between Libby volumes and snow levels on the ground and will continue to keep an eye on it. The Corps is currently targeting an end of January elevation of 2,396ft for flood control. Paul also noted that the water supply forecast for Dworshak shows 125% of average, but snowpack in the basin remains below average, closer to 85-90%. Steve Hall, COE-Walla Walla, noted that the water supply forecast includes a number of indicators, including precipitation from October and November, which is contributing to the 125% forecast. As the season moves forward, the weight of those indicators will decrease and the forecast will adjust accordingly. Steve also added that the first scheduled snow flight will occur at the end of January. Steve added that precipitation

in October was way above normal and while precipitation declined in November, temperatures dropped resulting in increased snowpack. The northern portion of the Columbian Basin was dry, while southern Idaho received average levels of precipitation.

For the climate forecast, Doug noted that official volumes for Lower Granite and The Dalles have changed from the first of the month and are now: The Dalles at 96% of average and Lower Granite at 103% of average.

Doug reported on the 6 to 10-day forecast, noting that it shows below average temperatures throughout the basin with above average precipitation. Looking beyond the 10-day forecast, temperatures continue to be below average and precipitation is expected to fall below average as well.

Chum Operation
Paul reported on the chum operation. He noted that the current operation maintains a 12.5ft minimum tailwater elevation at Bonneville Dam during all hours. This operation has been consistently met the past two weeks and currently tailwater elevation is at 14ft. Charles Morrill, WA, reported that the shallowest redd reported at the last TMT meeting was not an outlier, and is actually a normal occurrence in the Ives complex area. He also added that Todd Hillson is planning to present on the status of chum populations and carcass surveys at the next TMT meeting.

Dworshak Update
Steve Hall provided an update on Dworshak operations. He reported that the Corps is currently operating below 110% TDG (5kcfs), to an end of January flood control elevation of 1,528ft, based off of a January water supply forecast of volume of 3 maf. If the water supply forecast of 3 maf persists through April, the project must draft down to 1,445ft in April. In order obtain 1,445ft, the project would have to release approximately 11kcfs which would equate to TDG levels well above 120%. Steve shared that he does not anticipate that the forecast will remain at 3maf, however, 2.8 maf may be a likely situation (depending on weather). In this case, the project would target 1,520ft by March 1st and would have to draft 10ft across February.

Steve asked for Salmon Managers input as to if it is prudent to draft deeper than the current end of January 1,528ft elevation, which will increase TDG above 110%, but minimize the probability of being above 120% TDG levels in February and March. He continued that Unit 1 is planned to be back in service next week, which will improve the project's ability to move water, increasing to 9kcfs, with 110% TDG.
Steve was confident that the unit would be online next week.

Steve stated that the project is currently drafting to 1,528ft and thinks it would be prudent to increase TDG to 112 (currently at 108%) in attempt to limit higher TDG levels later in the season. Given the current weather modeling, it is possible to increase TDG levels to 112% (5.2-5.4kcfs) and draft down to 1,520ft by the end of January. **Julie summarized that the Corps is asking Salmon Managers to consider drafting deeper than the current 1,528ft end of January elevation target and increasing TDG levels (above 110%) now, to try to avoid significantly higher TDG levels in March and April.** She noted that the Corps will exceed 110% if needed to manage flood risks.

Steve asked that Salmon Managers provide a response as soon as possible, as the Corps will have to coordinate with Idaho and the Nez Perce Tribe to exceed 110% TDG. **He asked that the group also consider ways to shape the water that will have a less negative impact on hatchery and resident fish.** For example, would short periods of high releases followed by a drop in releases help prevent gas bubble disease?

Salmon Managers provided the following initial responses, however, noted that they need to talk both internally at their agencies and at FPAC before providing recommendations:

- Charles notes that TDG is variable depending on the water temperature; cooler water allows for more spill with lower TDG levels.

- Tom Lorz, Umatilla, added that he has been talking to the Nez Perce about when would be best to release the water; however, a recommendation has not been developed as of yet.

- Russ Kiefer, ID, added that generally, higher TDG in April would be better than in February, as both hatchery and wild smolts will be at a life stage that is easier for them to adapt to the higher gas levels.

- Dave Swank, USFWS, stated that going over 120% raises concerns for him and the hatchery. He noted that there is a two week window at hatcheries where there are not many fish in the river and matching up spill releases to this two week period may be challenging, but helpful. He noted that going up to 112% TDG is less of a concern, since degassers are capable of handling levels up to this amount.

Dave Swank agreed to provide TMT with the updated calendar showing migration timings of hatchery and wild fish. Doug added that it is important to hear from the Nez Perce on this issue and noted that he will follow-up with Dave Statler.

→ **ACTION:** The Salmon Managers will consult with their agency partner regarding the increase in TDG and lower end of January elevation. They will continue their discussion at FPAC and bring a recommendation to TMT on Wednesday, January 25th.

→ **ACTION:** Steve Hall will provide (on the TMT website) a few scenarios showing flow ranges with and without pre-draft in January; these will be posted by COB, Thursday, January 19.

→ **ACTION:** Dave Swank will send TMT the wild/hatchery migration calendar.

→ **ACTION:** Doug Baus will connect with Dave Statler to get input from the Nez Perce.

Margaret asked for clarification from the Corps on whether Salmon Managers should be considering TDG levels up to 112% or levels above 130%. Steve stated that modeling for this year is based on a 3 maf year, though the Corps does not believe 3 maf will occur. The modeling based on a 3 maf year shows TDG ranges from 125%-130% before the April 1st draw down. A lot of water will be moved in order to meet flood control and the lower the water supply forecast, the higher the April 1 flood control elevation, which will keep TDG levels lower. The modeling suggests that for the month of March, TDG levels will be in excess of 120%, which is why the Corps is recommending water be moved now. Margaret thought that Steve's modelling would be informative for the FPAC conversation.

Tom Lorz encouraged the Corps to give FPAC a heads-up on these types of issues so that they can discuss them at FPAC and come prepared to TMT, instead of having to wait another 1-2 weeks to make decisions.

Dworshak Unit 3 Outage

Steve also added that the Unit 3 outage will likely extend in to July and early August. He asked Salmon Managers to **provide feedback on the balance between the benefits and impacts of temperature augmentation and TDG during the outage.** Without Unit 3, flows will be constrained and there will be a point in time where decisions will need to be made between TDG levels and temperature augmentation. He asked for Salmon Managers to consider different operations and provide feedback to the Corps. For example, is it prudent not to refill by a certain volume or refill the project and have high flows in August and September. Paul added that this discussion is dependent on the season. Discharging more in June in order to keep temperatures cool is one possibility; flows mid to late June would benefit temperature. He noted that this is a challenging conversation and one that should continued to be discussed as early as possible. Emily offered that a half or full day TMT workshop to discuss options may be helpful. TMT members were receptive to the idea and will explore it more into the future.

With that, Emily thanked the group for joining the call and the meeting was adjourned.

The next TMT meeting will be a face to face on January 25th at 9:00AM

Columbia River Regional Forum
TECHNICAL MANAGEMENT TEAM OFFICIAL MINUTES

January 18, 2017
Minutes: Pat Vivian

1. Introduction

Representatives of BPA, Montana, Washington, BOR, USFWS, CRITFC, Oregon, NOAA, the COE, Idaho and others participated in today's TMT conference call. Doug Baus, COE, chaired the meeting, and Emily Stranz, DS Consulting, facilitated. Review of past meeting minutes and notes will be deferred until TMT meets next in person.

2. Official Water Supply Forecast

TMT reviewed the official water supply forecast information for January, including a summary table of BiOp objectives that relate to the official January forecasts for Hungry Horse, The Dalles, Lower Granite, Libby and Dworshak dams. The NWRFC official water supply forecasts were taken on the third business day of the month.

2a. January 2017 Forecast. Mary Mellema, BOR, and Doug Baus gave official water supply volume forecasts as measured at specific hydropower projects and compared them to average:

- Hungry Horse (January-July) – 2,266 kaf (108% of average)
  (April-August) – 2,091 kaf (108% of average)
  (May-September) –1,828 kaf (108% of average)
- The minimum flow requirement downstream of Hungry Horse Dam is 3,500 cfs at Columbia Falls and 900 cfs at Hungry Horse.
- The Dalles (April-August) – 85 maf (97% of average)
- Lower Granite (April-July) – 20 maf (99% of average)
- Libby (April-August) – 6,861 kaf (117% of average)
- Dworshak (April-July) – 3,055 kaf (125% of average)
- Grand Coulee (April-August) – 55 maf (97% of average)
- Albeni Falls (April-August) – 12 maf (97% of average)

Paul Wagner, NOAA, asked what elevation is required at Libby Dam fors spillway re-commissioning. It's 2,404 ft, at the end of January, Scott Bettin, BPA, said. The end of January flood control elevation for Libby is 2,396 ft this year.

Wagner commented that the amount of snowfall in Libby basin is below average which doesn't suggest water supplies will actually be 117% of average. The COE is keeping an eye on snowpack levels in Libby basin and correlating it to runoff volume, Julie Amman said.

Likewise, Wagner wondered whether Dworshak basin will really receive 125% of average inflows. Water supply forecasts early in the year are based on special indicators such as the SOI to supplement the lack of information available early in the year, Steve Hall, COE Walla Walla, explained. Heavy precipitation in October and November is the reason the forecast is so high at this point. As the year goes on, these two months will have a dwindling influence on the water supply forecast. Actual water supplies in Dworshak basin are projected to be around 97% of normal. Tom Lorz, CRITFC, asked whether the COE is planning to do any snow flights soon; Hall said the first flight will take place in a few weeks.

2b. The Dalles Current Forecast. This is an example of how the forecast in one basin has changed slightly since the official forecast was released. The official April-August forecast for The Dalles was 97%; the latest is 96%.

2c. Lower Granite Current Forecast. The official forecast, 99% of average, has increased to 103% of average.

2e. Water Year Summary. Steve Hall, COE Walla Walla, walked TMT through the summary data posted to today's agenda. In October, precipitation was way above normal throughout the Columbia basin and temperatures were also above normal. By November, temperatures were average but dropped later in the month when precipitation also declined. October-November is the typical time frame for snowpack accumulation. December was colder and drier than usual in northern portions of the basin, while the southern portion in Idaho got heavy precipitation. A recent storm event in the Boise basin raised the water supply forecast from 90% of normal to 110% of normal in just a week.

According to water supply forecast information available on the River Forecast Center web page, Washington, Oregon and Idaho can expect below average temperatures and above average precipitation over the next 6-10 days. Temperatures will probably remain below average for the next 8-14 days, and precipitation is expected to decline.

3. Chum Operation

The current chum incubation operation has been in effect since January 4 and calls for a minimum 12.5 ft elevation in the Bonneville tailwater at all hours for the remainder of chum incubation, Paul Wagner, NOAA, reported. There has been no problem maintaining this operation. Hourly data posted to today's agenda show the tailwater elevation is currently about 14 ft below Bonneville Dam.

Charles Morrill, Washington, commented that shallow redds actually represent chum redd distribution in the Ives Island area; the single shallow redd previously characterized as an outlier is really a more typical elevation. The WDFW is planning provide TMT with a presentation on the latest chum redd survey results and carcass counts at the next TMT meeting.

4. Dworshak Update

4a. Spill Management. The COE's latest water supply forecast calls for a 3 maf year, which makes 1528 ft the end of January flood control elevation at Dworshak, Hall reported. The target elevation is 1528 ft, but the COE thinks it would be prudent to allow TDG levels above 110% and draft the reservoir deeper than that by end January in order to avoid high levels of spill and TDG later in the season.

To date, Dworshak releases of less than 5 kcfs have been producing TDG levels below 110%. While a 3 maf forecast is unlikely, if it does materialize, the end of April flood control elevation would drop to 1445 ft, requiring spill well above the 110% state standard for total dissolved gas. A 3 maf year could produce TDG levels in the 125-130% range, Hall said. Current modeling suggests that outflows during most of March will produce about 120% TDG, which is why the COE wants to take preventive action now. The COE will exceed the 110% TDG standard if needed for flood control purposes, Julie Ammann, COE RCC, noted and will be drafting Dworshak to meet all normal flood control requirements.

The COE doubts this will actually be a 3 maf year, Hall said. An early bird water supply forecast puts it at 2.8 maf, which would require drafting 10 feet out of Dworshak reservoir in February and achieving a 1,520 end of February flood control elevation. The difference between 3 maf and 2.8 maf is 350 kaf to be released, or 3 kcfs a day for 60 days, which adds up to significant additional volume.

In light of the current situation – limitations on Dworshak releases due to the Unit 3 outage extending into summer 2017, and the risk of having to deeply draft for flood control by releasing TDG levels above 120% for long periods in spring – the COE thinks it would be prudent to release more water in February than required and produce TDG levels slightly above 110% early in the year.

Hall asked the Salmon Managers to think about this. Because it is a departure from the norm, the COE will not proceed without full regional support. With TMT's concurrence and based on updated flow information, TDG saturation rates of 112% are requested. The purpose of the operation is to minimize future TDG impacts to fish while preparing for coming flood control requirements. The releases might last throughout February, Ammann said.

Hall had some good news: Dworshak Unit 1 should be back in service by February 1 with a new digital governor in place. He was confident the schedule won't slip. With Unit 1 back on line, Dworshak will be able to increase releases in February and March from 5 kcfs to about 9 kcfs at 110% TDG.

With only two weeks until the end of January, Hall said feedback is needed sooner rather than later to influence the TDG levels required to draft for required flood control elevations. Several questions need to be considered: How should releases be

managed to have the least negative impacts on hatchery and resident fish? Would flat releases ease the impacts of TDG and the incidence of gas bubble trauma given that exposure is cumulative? Will fish recover if TDG levels are temporarily reduced, so should spill be alternated with periods of no spill? Or should very high TDG levels be generated for a short period of time? How do the effects of 115% TDG differ in February and April?

The Salmon Managers present today agreed that before they can state their views on this issue, they need to consult with internal experts and other stakeholders such as the **Nez Perce Tribe**, which was not represented today. Baus and Tom Lorz, CRITFC/Umatilla, both said they will reach out to the tribe, which plays a significant role in the coordination of Dworshak Dam operations.

Charles Morrill, **Washington,** said water temperature is a big variable in TDG levels, and higher levels of spill are generally more acceptable early in the year when temperatures are low.

Russ Kiefer said **Idaho** needs to confer with IDFG, the Nez Perce and Dworshak National Fish Hatchery. Increased spill and gas would probably be better in April than February because it will help hatchery smolts migrate downstream, even though it does involve TDG risks.

Dave Swank said **USFWS** might accept TDG levels of 110-112% for short periods, but levels over 120% would exceed the rates at which hatchery degassers have been tested for safety. He agreed with Kiefer that higher flows in April for out-migrating smolts would allow for better depth compensation. Swank said he will send TMT the latest hatchery reports with wild fish timing added.

Erick Van Dyke said **Oregon** favors drawdown and early releases as water management tools.

The COE needs concurrence from the Salmon Managers, Nez Perce Tribe and Idaho DEQ to move forward with any planned TDG increases, Hall said. Any time spent in decision-making now represents lost opportunity in terms of releasing water when the impacts might be less severe. There are two basic questions to consider:

1. Should Dworshak draft deeper in February based on preliminary inflow information?
2. If not, how should releases be shaped in terms of pushing the gas limit at the least damaging times?

The Salmon Managers will consult with their internal policy experts as well as external stakeholders before answering. The following schedule was devised:

- By close of business **January 19**, the COE will provide TMT with additional modeling scenarios based on STP inflow projections, assuming TDG levels of

around 112% and a lower end of January flood control elevation than required. There are two ways to manage such an operational change: set an increased TDG ceiling or manage flows a certain way and accept the resulting TDG levels. These risk management scenarios will address Dworshak operations between now and the end of April.

- By **January 20**, the Salmon Managers will provide the COE with a preliminary recommendation. Wagner said more detailed information on the flood risk draft for Dworshak would be helpful in making this decision.
- The Salmon Managers will follow up on **January 24** with an FPAC recommendation.
- TMT will meet on **January 25** to make decisions regarding Dworshak operations. In the meantime the COE will contact the Nez Perce Tribe.

Margaret Filardo, FPC, asked for clarification on whether the COE is considering TDG levels of up to 112% or 130% because the difference is vast. Hall said the latest STP traces (based on a 3 maf water volume, which is questionable) show Dworshak releasing in excess of 11 kcfs in February and March in order to reach its April 1 flood control elevation. That level of required releases would produce TDG levels well in excess of 120% saturation.

4b. Impacts of Unit 3 Extended Outage. Because the Unit 3 rehabilitation is likely to extend into summer (possibly not returning to service until late August), Hall asked TMT to start thinking now about how to balance the benefits and impacts of temperature augmentation flows vs. TDG management. If the Unit 3 outage lasts as long as expected, TMT will probably have to decide which has higher priority, TDG management or temperature augmentation? Now is the time to identify any information the COE can provide to help set priorities. Modeling efforts will be more informative if they are done in response to specific questions.

TMT should also start thinking now about how to manage refill given the operational constraints at Dworshak. In brainstorming sessions, people have suggested it might be prudent to sacrifice a certain refill volume if there are difficulties reaching elevations 1535 ft and 1520 ft at Dworshak, Hall said. If there is any flexibility during the refill period, should some of that water be shaped into June by sacrificing refill volume? Refill typically starts in late May or early June, so there is time now to plan for this opportunity to release excess water.

In light of the looming issues this year, Emily Stranz suggested holding a special workshop on Dworshak water management; Steve Hall supported this idea.

5. Next TMT Meeting

TMT will meet in person to revisit Dworshak operations on January 25.

Name	***Affiliation***
Tony Norris	BPA
Jim Litchfield	Montana
Charles Morrill	Washington
Mary Mellema	BOR
Dave Swank	USFWS
Tom Lorz	CRITFC
Charles Wiggins	DSC
Scott Bettin	BPA
Erick Van Dyke	Oregon
Doug Baus	COE
Paul Wagner	NOAA
Steve Hall	COE
Julie Ammann	COE
Tory Hines	DSC
Russ Kiefer	Idaho
Margaret Filardo	FPC