**COLUMBIA RIVER TECHNICAL MANAGEMENT TEAM**
June 6, 2018
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/2018/*

*TMT welcomed back Emily Stranz as Facilitator*

**June Forecasts**
Joel Fenolio, BOR, presented the June forecast for Hungry Horse Dam, which was published June 5. The forecast from June 1 to July 31 predicts a water supply of 880 kaf, or 102% of the 10-year average; May-September is for 2.5 maf, or 150% of average; and January–July is for 3.0 maf, or 150%. May's water runoff into Hungry Horse broke a record set in 1928.

Doug Baus, Corps, presented forecasts for other Columbia Basin facilities. The April-August forecast for The Dalles Dam is for 106 maf, or 121% of average; April-July at Lower Granite Dam is 24 maf, or 120%; April – August Libby Dam is 7,213 kaf, or 123%; April-July at Dworshak Dam is 2,966 kaf, or 122%; April-August at Grand Coulee Dam is 69 maf, or 122%; and Albeni Falls Dam is 18 maf, or 143% of average. Doug also reported that May temperature departures were noteworthy at 3-6 degrees higher than normal throughout the Columbia Basin.

The NWRFC 6-10 day climate forecast predicted below average temperatures, with precipitation below normal in the lower part of the Columbia Basin, normal in the middle, and above normal in the upper part of the Columbia Basin. The 8-14-day, 30-day, and 90-day forecasts all call for above average temperatures and below average precipitation.

The early June forecast for Lower Granite Dam predicts inflows of 110 kcfs, below the 130 kcfs average trace for this year's volume runoff forecast, which will hold until the first week in July. In the lower Columbia River, the extended forecast for The Dalles Dam is for above average inflows, which today are 340 kcfs and forecasted for 350 kcfs next week. After a week, and for the rest of the month, inflows will be below the average trace for this year's volume runoff forecast, at 250 kcfs (50kcfs below average).

**Dworshak Dam Operations**
Steve Hall, Corps, informed TMT of operations at Dworshak Dam. Currently the reservoir elevation is 1,586.5 ft., with 12-13 kcfs inflows and 4.3 kcfs outflows. There is a snow flight scheduled for June 7, with snowpack estimated at 10%. Snow graphs, which are available at the TMT website, show early rapid snowmelt at all stations. If the snowpack estimate proves accurate, the facility can reduce from 2 to 1 unit, with discharge reduced from 4.3 kcfs to about 2.2 kcfs. The project is aiming to refill the reservoir by the 3rd week in June, weather permitting. They would then expect to stay full through the 4th of July holiday weekend (if water temperature remains sufficiently low) before beginning summer draft. Current water temperature is 58 degrees Fahrenheit at the Lower Granite Dam Tailwater. Corps does not expect to need to model temperature augmentation flows until Lower Granite Tailwater temperature is above 60 degrees. Water is being passed as deeply, and as cold, as possible.

Steve updated TMT on the status of Unit 3. The rotor is presently being installed in the turbine pit (a ~200-ton rotor with ¾ inch clearance!). The project is on schedule for a return to service on July 1. Steve will send photos to TMT of the rotor install when available.

**Updated Power System Emergency Plan**
Tony Norris, BPA, informed TMT of the status of the power system emergency plan to be implemented by BPA today. This plan has been developed in coordination with salmon managers. The group reviewed the contingency action list, which prioritizes contingency actions in 3 tiers and are the last options to keep the power system reliable after exhausting preemptive actions, and also intend to minimize impacts on fish.

Tony addressed concerns about the role of MOP in these actions, stating that ideally the operation would not cut into MOP or preemptively fill above MOP. He noted that BPA will continue to coordinate with TMT and that any extended emergency would be discussed with TMT. The contingency actions are intended to be for excursions of short duration – around 2 hours.

Tony reminded the group that the list's order is open to discussion and can be further clarified if necessary (for example to address specific seasonal concerns). However, Tony urged the group to limit the frequency of modifications, as there is a significant amount of internal coordination required.

- ACTION: BPA will implement the Power System Emergency today. Salmon Managers will review the contingency actions and bring any additional suggestions back to TMT.

**Adult PIT-Tag Monitoring Tools**
Paul Wagner, NOAA, updated the group on current data. Both the FPC passage indicator and the DART tool are showing that adult conversion is good in the system, at an 87% rate according to the DART tool. However, several questions remain. However, fallback rates have increased, especially at Lower Monumental Dam. It is unclear why this occurred, and whether it results from several fish falling back once or one fish falling back several times. Tools are being developed to address these and other matters, and salmon managers hope to have a more complete picture by winter.

- ACTION: Salmon Managers will review passage data and bring TMT any conclusions or relevant findings.

**FOP Spring Spill Update**
Dan Turner, Corps, provided an update on ongoing spill operations. He provided a detailed summary of last week's activity and tentative conclusions about the season so far. There are several lessons learned, including:

- There are many, complicated factors that are outside of the Corps' control that impact TDG.
- Spill changes upstream affects TDG levels downstream.
- Changing spill rates frequently has not had the desired effect of stabilizing TDG levels, so gas caps will not be changed as frequently in June. It takes about a week for changes to work through the length of the system.

Dan estimated that if the spill cap at Little Goose Dam remains at 26 kcfs, spill will be below 30% after June 14. Also, if the spill caps at The Dalles Dam and John Day Dam remain at 90 kcfs, spill will remain below 30% until June 15.

Flows are declining in the Snake River, and gas is moving out of the system. At Lower Granite Dam, spill is at 31 kcfs and TDG levels are 114-115% downstream. Little Goose Dam is spilling at the gas cap, and TDG levels are down. It did not exceed the gas cap last week. Operations at Lower Monumental Dam await lower TDG in the Ice Harbor Dam forebay. At Ice Harbor Dam, TDG levels are 119% in the tailrace, with exceedances also found at the McNary Dam forebay, so the spill cap will not be raised. As flows decline, the project should be able to manage TDG of 115% at the downstream forebay.

In the lower Columbia River there has been more involuntary spill, with the expectation that dropping flows soon will lower TDG levels. Dan noted the Cascade Island gauge is still inoperative, with a possible repair in about a week. In the interim, the Warrendale gauge is providing readings. A tailrace gauge malfunction at The Dalles Dam was repaired on June 5. The tailrace gauges at McNary Dam produced different readings, and are under review.

**Summer FOP**
Doug Baus, Corps, informed TMT that the summer FOP is now posted as Appendix E to the 2018 Fish Passage Plan.

**Lower Granite Dam Powerhouse Outage**
Tony Norris, BPA, discussed the powerhouse outage scheduled for June 20 to repair the previously failed disconnect (failed in early May). For repairs, operators propose to limit spill to 50 kcfs for up to 7 hours, and will store water in the Lower Granite pool (not to exceed 737.7 ft. as measured at the Lewiston confluence gauge) for flood control at Lewiston. They will return the system to MOP between 6 PM and 9 AM. This is the same operation that TMT approved at its April 30 meeting, however, there is less water in the system now, so it should be easier to implement. The AAs will provide salmon managers a written operation to discuss at FPAC and FPOM next week.

- ACTION: The AAs will provide a written explanation of the proposed operation for Salmon Managers discussion at FPOM and FPAC.

**The next TMT meeting is a conference call on June 13 at 9:00 AM**
**The next face-to-face TMT meeting will be June 20, with a process meeting to follow.**

**TMT members are encouraged to review all outstanding meeting summaries and minutes, which will be approved at the June 20 meeting.**

**Columbia River Regional Forum**

**TECHNICAL MANAGEMENT TEAM OFFICIAL MINUTES**

**June 6, 2018**

**Minutes: Melissa Haskin, FLUX Resources**

## 1. Introduction

Representatives of BPA, NOAA, USFWS, Corps, Reclamation, ID, WA, OR, MT, Umatilla/CRITFC, Nez Perce Tribe, Colville Tribe, and others participated in today's TMT meeting chaired by Doug Baus, Corps, and facilitated by Emily Stranz, DS Consulting.

## 2. June Forecasts - Joel Fenolio, BOR, and Doug Baus, Corps

### *2a. June Water Supply Forecasts*

Joel Fenolio, Reclamation, and Doug Baus, Corps, presented the official June water supply forecasts. Published June 5, they are as follows:

Hungry Horse: 880 kaf for June-July, which is 102% of average. Fenolio noted that this year's water supply is tracking with last year's. The May-September forecast calls for 2.5 maf (150% of average) with April-August coming in at 2.8 maf, a remarkable 150% of average. This is due to high snow melt in May, beating a record back to 1928. This year, snow melted early, meaning there was a lot of flow earlier in the season than in years past. Minimum flows downstream of Hungry Horse are still 3,500 cfs at Columbia Falls and 900 cfs at Hungry Horse.

The Dalles: 106 maf for April-August, which is 121% of average.

Lower Granite: 24 maf for April-July, which is 120% of average.

Libby: 7,213 kaf, which is 123% of average.

Dworshak: 2,966 kaf for April-July, which is 122% of average.

Grand Coulee: 69 maf for April-August, which is 122% of average.

Albeni Falls: 18 maf for April-August, which is 143% of average.

### *2b. NWRFC Current Month Summary Graphics*

Doug Baus, Corps, reported that temperature departures are well above normal throughout the basin. Early snow melts meant high flows in May. June inflows, however, are forecast to be below average.

### *2c. NWRFC Climate Forecast*

Climate forecasts call for temperatures below average for the next 6-10 days. In the mid-Columbia Basin, temperatures will be near normal, whereas the Southern Tier will be below average. Both Northern Washington and Canada will have above average precipitation.

The 8-14 day and 30-day forecasts indicate temperatures will be above average and precipitation below average.

### *2d. NWRFC Extended Inflow Forecast - Lower Granite Dam*

The extended inflow forecast at Lower Granite is 110 kcfs today, rising up to 130 kcfs, which is 20 kcfs below average. The pattern will hold through June and into the first week or two of July. Inflows on the Lower Snake will be below average.

### *2e. NWRFC Extended Inflow Forecast - The Dalles Dam*

The Dalles Dam inflow is forecasted to be above average. Over the next week, inflows will be about 10 kcfs above average at 350 kcfs. This will hold for a week or two. After this, inflows will drop below average. Towards the end of the month, inflows will drop to 250 kcfs, about 50 kcfs below average.

### 3. Dworshak Operations - Steve Hall, Corps

Steve Hall, Corps, reported that Dworshak is at elevation 1586.5 feet, with inflows of 12-13 kcfs and outflows of 4.3 kcfs. A snow flight is scheduled for June 7 to evaluate snowpack. According to the National Operational Hydrologic Remote Sensing Center (NOHRSC), the snowpack is still at 20%; however the Corps expects it is more around 10%. The reason that is important is because the Corps must maintain space in the reservoir until the snow-covered area is less than 10%.

Hall reported that the snow melt is accelerating rapidly. Crater Meadows is below past years. Hemlock Butte at elevation 5,800 feet had 5 inches of snow water content on June 5 and is expected to melt out by the end of the week. Hoodoo is at 30 inches of snow water content, also below historic years, and is expected to melt early this year. Lolo Pass melted out last week, following the 2012 melt. Lost Lake is at 30 inches of snow water content. Elk Butte at 5,600 feet elevation has completely melted out.

The Dworshak reservoir is expected to be full in the third week of June, depending on weather. The 10-day forecast calls for several days of moderate precipitation, which will affect inflows. The plan is to back off of discharge but the Corps may increase discharge if the reservoir gets close to full again. It should remain full through the weekend after the 4th of July, at which point the Corps will begin the summer draft.

Temperatures in the Lower Granite tailwater are about 58.5 degrees Fahrenheit. As temperatures reach 60 degrees, the Corps will begin weekly modelling. From next week on, there will be temperature models at least once a week.

**Unit 3 Update**: Everything is still on schedule to return Unit 3 to service by July 1.

**4. Updated Power System Emergency Plan - Tony Norris, BPA**

Tony Norris, BPA, reported that the updated Power System Emergency Plan that was coordinated with TMT is now available on the website. Norris shared that the intent is to keep fish safe and is a collaboration between BPA and Salmon Managers. It serves as a last option if the BPA cannot enact any other preventative measures and must take action to keep the power system reliable.

Power system reliability is an "every second of every day" problem and any number of things can result in the need to adjust generation. The April-August timeframe is one of highly constrained actions because of the lack of flexibility in the river. In spring there is a very small window in operations.

Salmon managers raised some concerns and questions about the priority list of the actions. Specifically there was concern about smolts and the issue of descaling and mortality at Bonneville when operating units at the upper end of 1%.

Norris assured TMT that these emergency plans are short-term plans only meant to be enacted for a few hours at most. Operations extending past that timeframe would require coordination from TMT, he shared. In addition, BPA reports to TMT as soon as possible once the emergency protocols are enacted.

Charles Morrill, WA, asked if there was some room in the plan to define a peak passage period for Sockeye and request that to protect them that actions be taken first at Bonneville.

Because Bonneville is closer to Portland and the intertie, this may be difficult. Additionally, it is usually impossible to solve mid-Columbia problems with Bonneville generation. However, Norris noted that BPA could follow some spill priority-like list if the Salmon Managers developed one. He stressed that the list would need to be constant, as any changes must be written into the emergency protocols and significant weekly or daily changes would be nearly impossible due to this.

**Action → BPA will implement the updated Power System Emergency Plan. Salmon managers will bring their suggested priority list and any other changes to TMT when they are ready.**

**5. Adult PIT-Tag Monitoring Tools - Paul Wagner, NOAA Fisheries, and Doug Baus, Corps**

Paul Wagner, NOAA, reported that the FPC passage indicator shows adult passage in the Snake River is tracking within expected rates. The DART tool shows that the most recent fish detected at Lower Monumental have not converted to Little Goose, but the backlog has lessened – a positive sign. Conversion thus far is 87.1%. The fallback rate at Lower Monumental is not currently high but was for a while. Wagner said this is something NOAA will be watching.

**6. FOP Spring Spill Update - Dan Turner, Corps**

Dan Turner, Corps, provided TMT with a spring spill update. Lower Granite has been spilling at the spill cap since June 3. Currently, the spill cap is 31 kcfs and TDG in the downstream forebay is 113 to 114%. Little Goose is spilling at the spill cap, but TDG is coming down. Spill met but did not exceed at the Lower Monumental forebay. Lower Monumental fluctuated in and out of involuntary spill. Over the last few days, Ice Harbor was at the spill cap with TDG in the downstream tailwater at 119% and since the McNary forebay met but did not exceed spill cap levels, the Corps decided it was "not prudent" to raise spill caps.

The Bonneville tailrace gauge at Cascades Island is still out of service due to damage from debris.

Turner presented on lessons learned thus far from Spring Spill (available on the TMT site under agenda item 6e, slide 5:

- Degassing rates from tailrace to the downstream forebay are highly variable.
- TDG in the downstream forebay can be greater to or equal to the tailrace.
- The downstream forebay gauge is usually the most restrictive.
- Factors outside of our control have a major impact on the forebay TDG.
- Changing spill rates cannot effectively keep forebay TDG at 115%.
- Upstream TDG influences downstream TDG.
- At Little Goose, the tailrace TDG will need to be <115% to not exceed 115% in the downstream forebay.

The Corps' strategy in June will be to "spill to the maximum level that meets, but does not exceed, the TDG standards" and be less reactionary to hourly and day-to-day TDG variability and focus more on overall patterns.

Turner noted that in April-May, there was a period where the Corps adjusted spill caps 17 times at Lower Granite. In response, the downstream forebay bounced around from a low of 110% TDG to a high of 121% TDG. During that time, the Corps was not able to "shave off peaks or fill in valleys" at downstream forebays. "We weren't able to nail 115%. There is not such thing as a perfect spill cap to get it to 115% -- there are factors out of the Corps control, influencing TDG." He expressed that frequent incremental changes did not help the Corps meet its goals. Thus, moving forward, the Corps will try to focus on the bigger picture, he said. "I would be surprised if we see 17 spill cap changes between now and the end of the spring spill season."

Turner walked Salmon Managers through data that he used the previous day to set spill caps (see presentation). TDG levels at some gauges (i.e. Lower Granite) Tuesday morning were low because of a wind event but drops in barometric pressure and assumed rises in water temperature were indicating TDG would rise over the next few days. Turner noted that if he didn't see the rises that he as predicting tomorrow, he would reevaluate his spill cap decision and possibly raise spill caps at some projects. He reminded folks that the Corps evaluates the spill caps everyday.

Tom Lorz, Umatilla/CRITFC, asked how the Corps accounts for flows from Pasco since the McNary forebay is only partially influenced by TDG from Ice Harbor.

Turner replied that the Corps uses some rules of thumb depending on the flow distribution between the Mid-Columbia and the Lower Snake. If McNary exceedances were primarily caused by influence from the Pasco gauge, then Ice Harbor wouldn't be backed off to try to offset the high TDG from Pasco. However, if McNary forebay is exceeding, then Ice Harbor should not make it worse and spill may be reduced. The Corps uses their tools and best professional engineering judgement.

Turner noted there has been an 11-hour lag in data uploading between the USGS and Corps databases for the McNary tailrace gauge. He said he believes the values appear to be correct and that the Corps is looking into it.

Erick Van Dyke, OR, asked if Dan Turner had reviewed the SYSTDG model when making his predictions. Turner noted that the Corps had indeed run SYSTDG and was currently running the model for today's spill review. The Corps uses it as a piece of information to evaluate spill caps. "It's a good hypothesis-testing tool," he said. One thing the Corps uses it for is to estimate how long it takes TDG from involuntary spill to exit the system entirely.

Turner also spoke about the challenges of operating to a metric that does not get calculated until the next day and takes into account 12 hours of data prior to that.

**7. Summer FOP - Doug Baus, Corps**

Doug Baus, Corps, reported that the Summer FOP, an appendix to the Fish Passage Plan, has been posted on the TMT website.

**8. Lower Granite Dam Powerhouse Outage - Tony Norris, BPA, and Doug Baus, Corps**

Tony Norris, BPA, informed TMT of a transmission line outage scheduled for June 20 that is the second phase of repair work following the outage on May 2nd. During the May 2 outage, 50 kcfs was spilled and unit 5 was operated for station service. The remainder of inflow was stored in the Lower Granite forebay, then drafted out between the hours of 1800 and 0900. Flows during the June 20 outage will be lower. Salmon managers will discuss and report back to TMT if any changes need to be made to the plan before implementing it on June 20.

**5. Next TMT**

The next TMT meeting is scheduled for June 13. It is a conference call.

**Today's Attendees:**

| Name | Affiliation |
|---|---|
| Charles Morrill | WA |
| Dan Turner | Corps |
| Dave Statler | Nez Perce |
| David Swank | USFWS |
| Doug Baus | Corps |
| Erick Van Dyke | OR |
| Jim Litchfield | Montana |
| Joel Fenolio | Reclamation |
| Julie Ammann | Corps |
| Lisa Wright | Corps |
| Paul Wagner | NOAA |
| Russ Kiefer | ID |
| Scott Bettin | BPA |
| Tom Lorz | Umatilla/CRITFC |
| Tony Norris | BPA |
| Charles Wiggins | DS Consulting |
| Emily Stranz | DS Consulting |
| Melissa Haskin | Flux Resources |
| Paula Calvert | Oregon DEQ |
| Shane Scott | PPC |
| Tom Iverson | Yakama Nation |

| | |
|---|---|
| Steve Hall | Corps |
| Alfredo Rodriguez | Corps |
| Sheri Sears | Colville Tribe |