COLUMBIA RIVER TECHNICAL MANAGEMENT TEAM
June 26, 2019
DRAFT Facilitator's Summary
Facilitator: Emily Stranz; Notes: Colby Mills, 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.nwdwc.usace.army.mil/tmt/agendas/2019/.

Dworshak Operations
Jon Roberts, Corps NWW, reported on current operations at Dworshak Dam. The project is discharging 5 kcfs with a pool elevation of 1,599.59 feet. Inflows have been falling and will continue to drop down to the 2,300 cfs range by the end of the next 10-day period. The project has been operating in the top 1 foot of the reservoir since June 11, and hit 1,600 feet at the reservoir on June 16. The temperature in the Lower Granite tailwater is currently 61 degrees F, and TDG is around 100% at the project and 97.5-98.7% downstream at the hatchery, with those levels expected to continue.

The project will drop to approximately to 2 kcfs discharge this weekend, or a minimum discharge of 1.6 kcfs to top off the reservoir as much as possible to prepare for the transition to flow and temperature augmentation. Jon reviewed an operational scenario using analog year 2017, which reflects a potential start to drafting on July 7, which would provide up to approximately 30 days' worth of 10 kcfs (full powerhouse, 100% TDG) and 10 days of 12 kcfs (limit 110% TDG); allowing the reservoir not to drop below 1,535 feet by the end of August.

The temperature model showed a cool off period at Lower Granite last week, and warmer temperatures are expected to rise around the July 4 holiday weekend. Dworshak Dam operations will be targeted to maintain Lower Granite Dam tailwater temperatures between 66-67 degrees F, to keep a buffer below the 68 degrees F threshold. Jon reminded the group that it takes 3-4 days for releases from Dworshak to affect Lower Granite forebay temperature. As temperatures increase, the project will continue to run models and provide alternatives to the TMT for what releases should be using the least amount of water to conserve for hotter weather.

Idaho recommended prioritizing the water release to keep temperatures under the temperature criteria to support Snake River sockeye returns, which are projected to be poor this year.

Little Goose Dam Operations
Doug Baus, Corps, noted the Little Goose Dam spill operation transitioned from the spring to summer spill operation since our last TMT meeting. The spring spill operations summary document attached to today's agenda summarized the 6 different TMT coordinated spring spill operations from May 21 through June 20. The Little Goose Dam summer spill operation of 30% on all hours began on June 21.

At 0800 hours today the project had a total outflow of 53.7 kcfs. Citing the Little Goose Dam hourly ladder count data for adult Chinook, Doug was encouraged to see adult Chinook not passing the project during the spring gas cap spill operation in the afternoon had resumed afternoon passage since the project began the summer spill operation of 30% on all hours on June 21. Project inflows are forecast to decrease down to 35 kcfs by the end of the next 10-day period.

Paul Wagner, and Claire McGrath, NOAA, reported on fish passage at Little Goose Dam, noting that the disparity between Lower Monumental (YTD 23,652) and Little Goose (YTD 22,947) has largely diminished, although there might be a count disparity at Lower Granite. PIT-Tag data shows the YTD conversion rate between Lower Monumental and Little Goose is still 93.2%, which lags behind the historical year-end average of 98.2% YTD. Claire noted that after June 20, it's taken about 5-10 days for backlogged fish to clear out. She emphasized the

potential disparity in ladder counts between Little Goose and Lower Granite, noting that PIT-Tag data reflects the disparity as a result of fallback and double counting at Little Goose. The actual convergence between Little Goose and Lower Granite YTD is 98.6%, and between Ice Harbor and Lower Granite is 91.1%. The next week will be a waiting period to see if the numbers reach the 98-99% convergence seen in the past. The FPC site also shows the disparity between the ladder counts and the PIT-Tag data, and overall fish have not been converting at the expected rate given the environmental conditions. The TMT spent time looking at and discussing the different tools and data sources used for assessing fish conversion and fallback. NOAA will continue to track the conversion issue and will return with an update at the July 10 meeting.

Operations Review
Reservoirs: Joel Fenolio, BOR, Reported on Bureau of Reclamation projects:

- **Hungry Horse**: releases dropped down to 2,500 cfs yesterday, then will decrease further down to 2,100 cfs which is close to the flow needed to target being 10 feet from full in September. Midnight elevation was 3,556.9 feet (3 feet from full) and the project will probably miss refill by 2 or 3 feet as summer flat flows approach.
- **Grand Coulee**: midnight elevation was 1,287 feet, releasing yesterday about 120,000 cfs with flows of 113,000 cfs.

Doug Baus, Corps, reported on the following Corps projects operations data from June 25:

- **Libby**: midnight elevation was 2426.3 feet, with average inflows of 22.6 kcfs and outflows of 7.9 kcfs;
- **Albeni Falls**: midnight elevation was 2,062.3 feet, with average inflows of 34.1 kcfs and outflows of 31.3 kcfs;
- **Dworshak**: midnight elevation was 1,599.6 feet, with average inflows of 4.1 kcfs and outflows of 5.0 kcfs;
- **Lower Granite**: average outflows were 54.2 kcfs;
- **McNary**: average outflows were 186.1 kcfs; and,
- **Bonneville**: average outflows were 177.1 kcfs.

Water Quality: Alexis Mills, Corps, reported that last Friday began summer spill on the Lower Snake; all projects are now in summer spill and all gages are functioning.

Fish: Paul, NOAA, reported that yearling Chinook are essentially done for the season, with the Snake River winding down with some juveniles continuing to trail through McNary, John Day, and Bonneville. Sub-yearlings have passed their peak in the Snake River, but will continue to pass for the next few months. The prime passage time for sub-yearlings in the Columbia River is approaching, around July 1, and will continue to pass for the next couple of months. Steelhead, Coho, and sockeye are largely done, with some lamprey passing in falling numbers.

At Bonneville, 54,657 adult spring Chinook have passed (37% of the 10-year average), 6,728 jacks (27% of the 10-year average), 28,064 summer Chinook (50% of the 10-year average), 5,008 lamprey (50% of the 10-year average), and 29,039 sockeye (20% of the 10-year average) as the peak of the sockeye season approaches.

At Lower Granite, 19,155 adult spring Chinook have passed (31% of 10-year average), 3,870 jacks (32% of the 10-year average), 1,754 summer Chinook, and no sockeye. 1 sockeye has passed both Little Goose and Lower Monumental, with 3 passing at Ice Harbor.

Tony Norris, BPA, updated the TMT on the recreation operation at Grand Coulee Dam, in preparation for the July 4 holiday weekend, which is planned for no higher than 1,286.5 feet on July 3 and to fill no more than .5 foot per day through the weekend. Then tentatively begin refill the Sunday/Monday following the holiday, to touch full by July 15. Paul noted that as sub-yearling Chinook and adult sockeye are nearing a peak and continue to pass in good numbers, Salmon Managers requested to shape flow on the fish that are nearing the peak and will remain in

larger numbers during that period. Paul asked that 1,288 feet be considered “full”, and the project wouldn’t fill above that unless it can avoid a significant drop in discharge, by July 15 or earlier, putting 2 feet of Grand Coulee storage into July. This is feasible from BPA’s and BOR’s perspective.

Power System: Tony reported varying wind here and there, with sharp spikes on June 25, temperatures have been cool and lows have been fairly low.

The next scheduled TMT meeting is a conference call on Wednesday, July 10, 2019, at 9:00 AM.

This summary is respectfully submitted by the DS Consulting Facilitation Team. Suggested edits are welcome and can be sent to Colby at colby@dsconsult.co.

Columbia River Regional Forum

Technical Management Team OFFICIAL MINUTES
June 26, 2019
Minutes: Melissa Haskin, FLUX Resources

1. Welcome and Introductions

Today's TMT meeting was chaired by Doug Baus, Corps, and facilitated by Emily Stranz, DS Consulting. See the end of these minutes for a list of today's attendees.

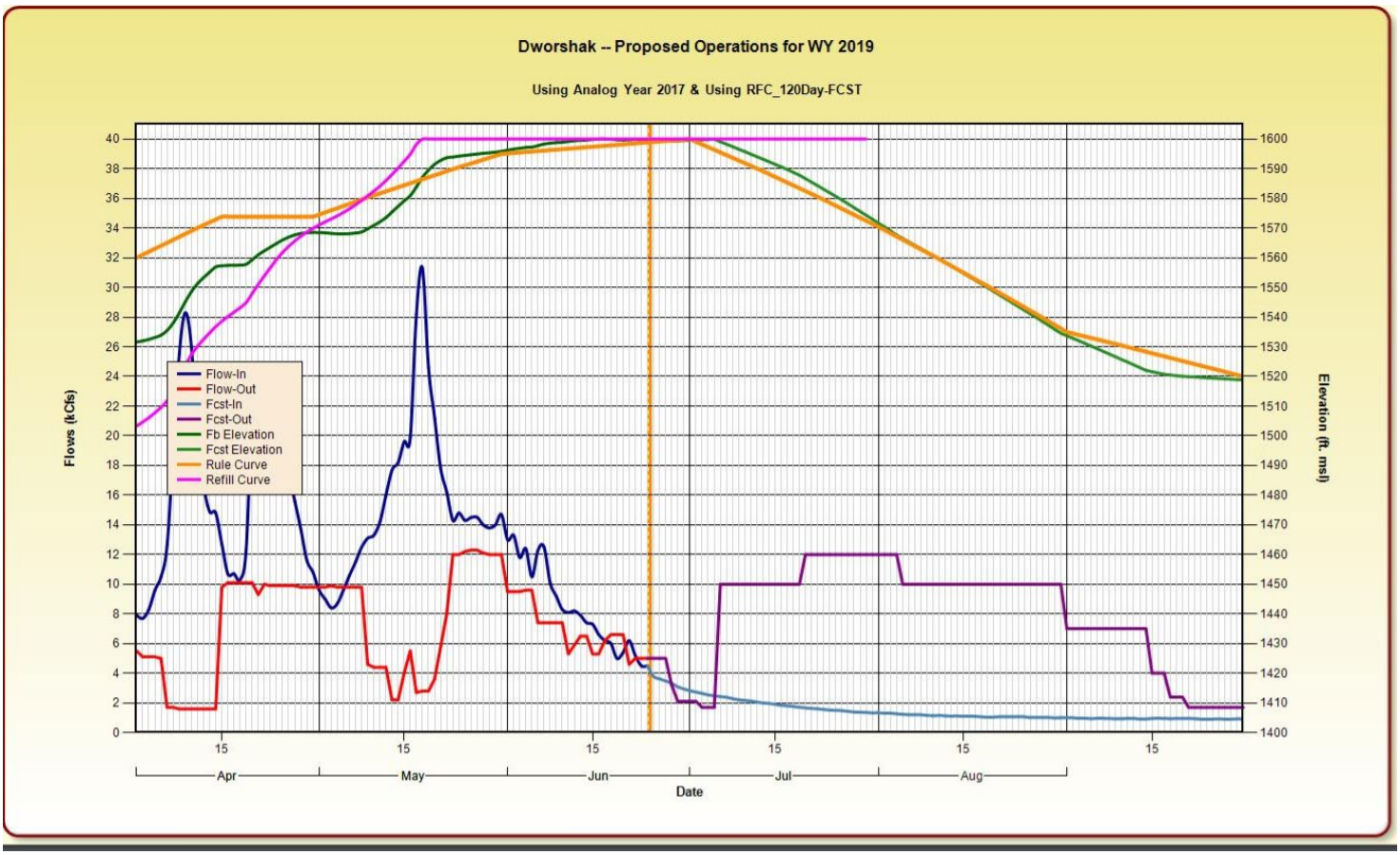
Copies of previous documents discussed and final meeting minutes are available on the TMT website.

2. Dworshak Operations – Jon Roberts, Corps NWW

Jon Roberts, Corps, reported on operations at Dworshak Dam (DWR). The reservoir's current elevation is 1,599.59 ft. Outflows are 5 kcfs. Inflows have been falling and are forecast to drop to 2.3 kcfs by the end of the 10-day period.

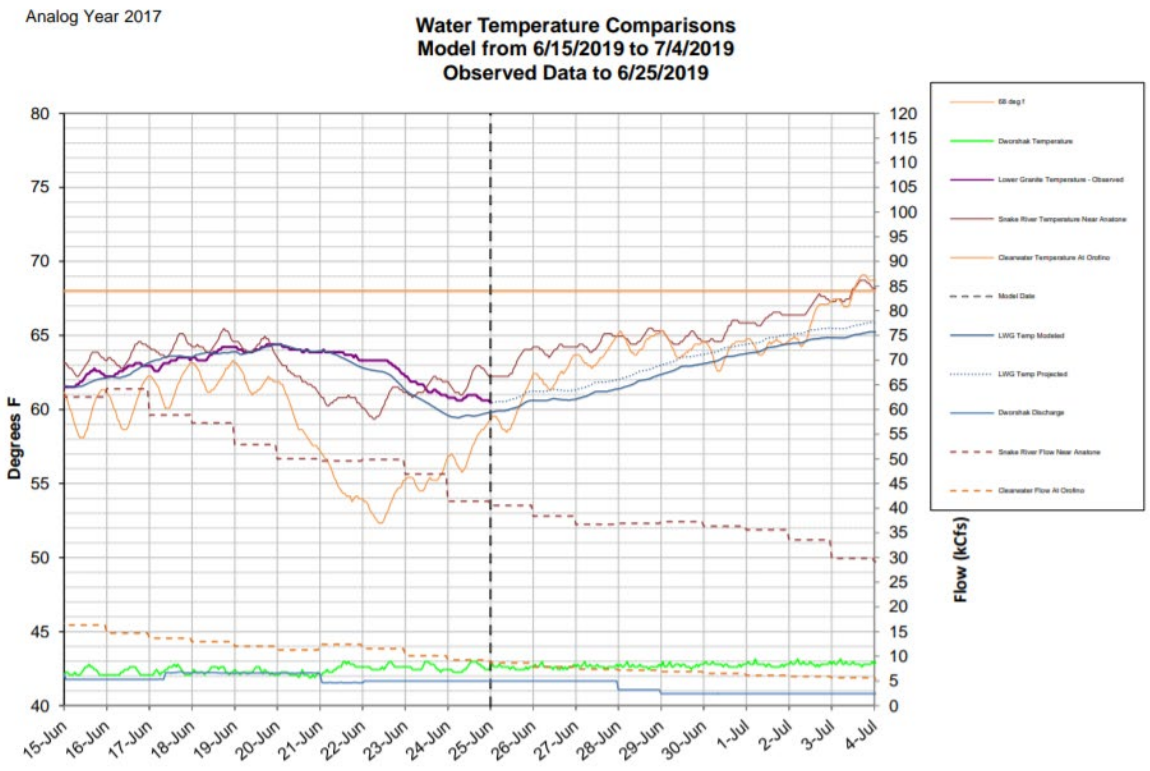
Since June 11, the Corps has been operating in the top foot of the reservoir. Temperature at Lower Granite Dam (LWG) is 61 degrees Fahrenheit (F.). DWR National Fish Hatchery (DHCI) TDG has been 97.5-98.5%. TDG in the DWR tailrace (DWQI) has been around 100%.

Roberts showed the following operational scenario based on historical data using 2017 as the analog year.



The Corps will drop DWR outflows down to 1.6-2 kcfs this weekend. The model above shows that if the Corps had to begin drafting on July 7, there would be up to 30 days' worth of 10 kcfs. TDG would be about 100%. There would also be about 10 days' worth of 12 kcfs (about the limit in the hotter months as TDG approaches 110%). This would allow the reservoir to not drop below 1535 ft. by the end of August.

Roberts showed the following temperature modeling as well.



According to the temperature model above temperatures in the LWG tailwater should climb going into the July 4 weekend. As described in the 2019 Columbia River System BiOp (2019 BiOp) the Corps operates DWR outflows so temperatures do not exceed 68 degrees F. in the LWG tailrace. Specifically, in order to achieve the 2019 BiOp requirement in the LWG tailrace the Corps includes a 1 degree F. buffer when planning DWR outflows to accommodate for unforeseen changes in the forecast/Hells Canyon outflows and due to the significant amount of time (approximately 2-3 days) it takes water leaving DWR to have an effect on temperatures in the LWG tailrace. Therefore when including the buffer in the Corps planned operation the Corps plans DWR operations to target LWG tailwater temperatures in the range of 66 to 67 degrees F. This the same DWR/LWG operation the Corps has implemented in previous years.

Russ Kiefer, ID, recommends if need that water be released prior to the planned date of July 7 in order to keep temperatures below the criteria. This is especially true because it will be a poor sockeye return year.

Jon said if there is a change in the outlook, he will inform TMT.

3. Little Goose Dam Operations - Doug Baus, Corps-NWD; Paul Wagner, NOAA Fisheries, and; Claire McGrath, NOAA

3a. Summary Document – Corps

Doug summarized the 2019 spring and summer spill operations to date at Little Goose Dam (LGS). A complete summary of all 6 TMT coordinated LGS spring spill operations (April 3-June 20) is attached to today's agenda providing additional details on the spill operations. Doug only highlighted the final TMT coordinated LGS spring spill operation (see below - June 13 to June 20) that occurred prior to the commencement of the LGS summer spill operation (30% spill 24 hours per day) that began on June 21.

> Thursday, June 13 – Thursday, June 20: Continued 30% spill for 8 hrs/day (0400-1200) and maintained ASW in high crest all hours. Consensus (no objections) from TMT on Wed 6/12.
>
> a. On Tuesday, 6/18, the Corps and BPA received a consensus recommendation (no objections) from FPAC to modify unit priority to move Unit 6 to last in the order (1, 2, 3, 4, 5, 6) for the remainder of spring spill. Per FPP Table LGS-5, spring unit priority order is: 1, 6, 2, 3, 4, 5. Considering Unit 1 was forced out of service for repairs Mon, 6/17 at 15:00, the intent was prioritize units on the south side of the powerhouse and maintain attraction flow to the adult ladder entrance. When the request was received on 6/18, Unit 6 was already out of service due to a forced outage at 07:00 for an oil leak, so the project was already operating per the request (Units 2, 3, 4). It was anticipated Unit 6 would be out of service through the rest of spring spill; however, it was repaired and returned to service that day at 16:00. RCC issued project guidance to move Unit 6 to last priority on Wed, 6/19 at 10:00 for the remainder of spring spill.

Note the bottom of the LGS spring spill operations document summarizes spring MOP and ASW operations. The number of hours LGS operated above MOP in order to spill 30% to minimize adult delay from June 1 through June 5 was 37 hours.

Summer spill at LGS (30% 24 hours per day) began June 21. Today at 0800 hours total outflow was 53.7 kcfs, generation was 37.2 kcfs, and spill was 16.1 kcfs. Note the significant difference in spring spill percentage on June 20 at 0100 hours when spill was 80% compared to summer spill on June 21 with 30% spill 24 hours per day.

We had not been seeing afternoon passage during the spring spill operation on June 20 and prior dates. Afternoon passage resume on June 21 when spill operations switched to 30% spill 24 hours per day. It is encouraging to see adults now passing during afternoon hours.

LGS inflows are forecasted to decrease to 35 kcfs at the end of the 10 day period.

Regarding the 24 hours report for LGS ladder counts a question was asked if HE01 refers to 0400 to 0500 or 0500 to 0600 hours? The Corps clarified that HE01 is 0500 to 0600 hours and the last hour of counting is 2100 hours.

3b. FOP Fish – Paul Wagner, NOAA, Claire McGrath, NOAA

The disparity between Little Goose and Lower Monumental is largely diminished (there are 23,652 versus 22,947). The gap has closed. However, there is a count disparity of about 2,000 fish between Lower Granite and Lower Monumental Dam.

The DART tool has less "black dots," the dots typically indicate possible delay so less dots means less probability that a delay is occurring. It takes 5-10 days for backlogged fish to clear out. Convergence between Lower Monumental and Little Goose is 92.9%. This is lagging compared to the historical. The ladder count is showing a possible disparity between Little Goose and Lower Granite. However, Claire McGrath, NOAA, said this could be due to fallback and double counting at Little Goose. The average historical conversion is Little Goose and Lower Granite is 98.6%. The rate between Ice Harbor and Lower Granite is 91.1%. The next 5-7 days is a waiting game to see how catch up occurs and conversion for the season ends. There were more delays this year. We will know more after the July 4 holiday, she said.

The FPC website shows the disparity between the ladder count and the pit tag data. The graphic on the website does not account for fallback and double counting. The Ice Harbor to Lower Granite cumulative conversion shows the observed convergence below the expected range. She hopes to see the gap close in the coming week. Next week, we will also be able to look at the final travel times for the fish as well, especially the fish with extreme (20+ days) travel time.

Russ Kiefer noted that using the dam adult window counts for conversion evaluation can result in error. He noted that the DART webpage does have a fallback tracker. This tracker says 11% of fish have fallen back at Little Goose and re-ascended the ladder at Little Goose. Russ took the observed dam counts and adjusted for fallback rates. He came up with similar conversion rates as the pit tag estimates. In the future, he suggests that anyone who uses dam counts as a metric for conversion also get the estimate for fallback rates.

Charles Morrill, WA, noted that fallback data is higher than it has been in the past 10 years.

Dave Swank, USFWS, noted that some of the passage that is high and then low from this season is to be expected as part of the adjustments made. His concern is that passage is still at 93% overall passage. He had hoped that would be higher for now. He is also concerned about the high passage times between Lower Monumental and Little Goose. The 15- 30-day travel-time that some fish have is unusual, he said.

The FPC site will continue to monitor conversion rates through December 31. Thus, even though spring passage is over and daily counts will no longer be updated, the overall counts will be.

4. Operations Update

4a. Reservoirs – Joel Fenolio, Reclamation, and Doug Baus, Corps

Hungry Horse – Hungry Horse is releasing 2,500 cfs as of yesterday and will drop to 2,100 cfs soon to target being 10 feet from full at the end of September. The forebay's midnight elevation was 3,556.9 ft. (3 feet from full).

Grand Coulee – Released 120 cfs yesterday. Inflows have been around 113 cfs; midnight elevation 1,287 ft.

Upper Snake Flow Augmentation: Reclamation started releasing from the Upper Snake at Milner today and plans to hold that release through mid-July. The Boise and Payette are still on the border flood control operations and providing augmentation. There should be more details next week.

Libby – Midnight elevation 2,426.3 ft., yesterday's average inflows were 22.6 kcfs and outflows were 7.9 kcfs.

Albeni Falls – Midnight elevation 2,062.3 ft., yesterday's average inflows were 34.1 kcfs and outflows were 31.3 kcfs.

Dworshak Dam – Midnight elevation 1,599.6 ft., yesterday's average inflows were 4.1 kcfs and outflows were 5 kcfs.

Lower Granite – Yesterday's average outflows were 54.2 kcfs.

McNary Dam – Yesterday's average outflows were 186.1 kcfs.

Bonneville – Yesterday's average outflows were 177.1 kcfs.

4b. Water Quality

Alexis Mills, Corps, reported that summer spill began last Friday for lower Snake projects. All gauges are functioning.

4c. Fish – Paul Wagner, NOAA

Juveniles: Yearling Chinook are mostly done for the season. They will continue to pass and will trail off. Some juveniles are passing Bonneville and John Day, which is normal for this time of year. Subyearlings have probably already peaked on the Snake but will continue to pass over the next few months. On the Columbia, the peak at McNary and the Lower River is typically around July 1-4. On June 22, there were 55,000.

Coho are largely done as are steelhead. Same with sockeye and lamprey. Lamprey are still passing but numbers are falling off.

Adults: Spring Chinook have passed. Adults at Bonneville for the year were 54,057. The 10-year average is 148,623. This means on 37% of average returned. For jacks, the season is over and the YTD on May 31 was 6,728 (27% of the 10-year average). Summer chinook are underway. The YTD is 28,654 (which is 50% of the 10-year average). So far, lamprey are at 5,080 (50% of the 10-year average). They are not lagging but are not quite as strong as this time last year. Sockeye are peaking or the peak is approaching soon. Thus far, there are 29,039 (20% of the 10-year average). At Lower Granite, spring Chinook are at 19,155 (31% of the 10-year average). Jacks are 33,870 (32% of the 10-year average). Summer Chinook are underway at 17,054. Sockeye are 0 thus far. There was 1 at Little Goose, 1 at Lower Monumental, and 33 at Ice Harbor.

Tony Norris, BPA gave an overview of the recreation operation for the July 4th weekend and refill operation at Grand Coulee. The recreation operation will be to have Grand Coulee no higher than elevation 1286.5 feet on July 3rd and to fill no more than 0.5 feet per day across the weekend. Then the reservoir will typically touch full on the Sunday/Monday following the holiday weekend (by July 15). Paul Wagner noted that for fish, the desire for filling the reservoir is to avoid a dramatic drop in flows. Paul asked that elevation 1288 feet be considered full this year unless additional fill can be accomplished without a significant drop in flow at McNary. Tony reported that after the recreation operation Grand Coulee will fill to at least elevation 1288 by July 15th and will fill above 1288 if it can be done without a dramatic drop in flow at McNary.

4d. Power – Tony Norris, BPA

There has been wind on the system. The weather is cool and loads are low.

5. Next TMT

The next meeting will be a conference call on July 10 at 9 a.m.

6. Today's Attendees

Agency	TMT Representative
Army Corps of Engineers	Doug Baus (Chair), Julie Ammann, Lisa Wright
Bonneville Power Administration	Tony Norris
Bureau of Reclamation	Joel Fenolio
NOAA Fisheries	Paul Wagner, Claire McGrath
US Fish & Wildlife Service	Dave Swank
Washington	Charles Morrill
Oregon	Erick Van Dyke
Idaho	Russ Kiefer
Montana	Jim Litchfield
Nez Perce Tribe	Jay Hesse
Umatilla Tribe/CRITFC	Tom Lorz
Colville Tribe	Sheri Sears
Warm Springs Tribe	N/A
Kootenai Tribe	N/A

Agency	TMT Representative
Spokane Tribe	N/A

Other Attendees (non-TMT members):
Army Corps of Engineers – Dan Turner, Steve Hall, Jon Roberts, Alfredo Rodriguez, Eric Chow, Alexis Mills, Will Walker
DS Consulting – Emily Stranz (Facilitator), Colby Mills
FLUX Resources – Melissa Haskin (Note taker)
Clearing Up – K.C. Mehaffey
Columbia Basin Bulletin – Mike O'Bryant
Oregon DEQ – Paula Calvert
PPC – Shane Scott