COLUMBIA RIVER TECHNICAL MANAGEMENT TEAM
May 16, 2018
Facilitator's Summary
Facilitator: Donna Silverberg; 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/

Meeting Notes and Minutes

TMT approved the April 18 and April 25 meeting notes and minutes.

Adult PIT-Tag Monitoring Tools

Susannah Iltis (Columbia Basin Research, University of Washington) presented the tool she and her colleagues prepared to track adult fish movement and possible delay in the Snake River system. The DART tool is available on the TMT web site. Assessing data back to 2014, the analysis focuses on spring and summer Chinook adults returning during the spring spill season that were released above Lower Granite Dam as juveniles. Mini-Jacks and juveniles are excluded. The data for this season show that fish are just beginning to arrive, later than usual, and most are moving quickly, with a two-day travel time from Lower Monumental Dam to Little Goose Dam. So far, 50% of the detected fish are from the Clearwater River. Susannah walked TMT members through the 2017 information to explain what they might see in the future.

Jerry McCann and Dave Benner, Fish Passage Center (FPC), described their adult passage model in detail, saying that the combination of the DART tool and theirs is very complimentary for assessing fish passage. They noted that their fish passage indicator shows predicted and current passage at Lower Granite, Little Goose, Lower Monumental, and Ice Harbor, and cautioned that this season's results are based upon a small sample size because of late fish arrival. Another feature uses PIT-Tag data to predict cumulative conversion rates in the long reach from Ice Harbor to Lower Granite based upon both historic data and actual observation.

Jerry highlighted several findings from their analysis of 2009-2017 data: for spring Chinook, delay in the Snake River system is not necessarily correlated with survival to the basin of origin. Travel time of less than 20 days did not affect survival and, it appears, not all delay is equal. Short delay in the Snake River is not tantamount to mortality. He suggested if TMT observes problems with delay, they might first look at surface spill through the spillway weir as a possible cause. Given the data, he suggested the group consider juvenile survival impacts be weighed/considered when planning responses to observed adult delay. The tool and metadata memo is at http://www.fpc.org/passageindicator_homepage.php.

TMT thanked Susannah, Dave, and Jerry for their presentations and efforts to design and implement these complementary tools that will aid in-season management.

FOP Spring Spill Update

Dan Turner (Corps) updated TMT on spring spill operations. Last week most of the projects on the Columbia and Snake Rivers experienced high flows, with resulting involuntary spill throughout the system. There is in excess of 500 kcfs in the Lower Columbia River. In the Snake, flows have lessened in the last couple of days, allowing Lower Granite Dam to meet the gas cap. Because of a turbine outage, Lower Monumental Dam recorded high TDG levels. Flows in the Columbia River were higher than the Snake, with involuntary spill and high TDG levels, especially at McNary Dam. The Bonneville tailrace gauge at Cascade Island was blown out by debris on May 13, and will remain unusable until flows diminish and repairs are made. In the interim, the Corps is using the Warrendale gauge as a backup. The Dalles Dam tailwater gauge also has some issues that the Corps is investigating.

The NWRFC extended forecast for Lower Granite predicts inflows above 140 kcfs, which if correct, will result in involuntary spill until about May 29. A similar forecast for The Dalles predicts high flows and involuntary spill until mid-June. Dan cautioned against too much reliance on predictions further out in time because the forecasts are based upon single traces. He also noted that the water supply forecasts and STP are complementary tools.

Dan provided three spill and TDG project graphs concerning McNary Dam and The Dalles Dam, which are posted on the TMT web site. Gas bubble trauma has been observed at Bonneville Dam. McNary is not generating to full capacity due to holding reserves, and on May 15 spilled 370 kcfs. TDG would be reduced if contingency reserves could be held above the upper end of 1% because it would allow more flow to pass through the turbines rather than via the spillway that increases TDG. The estimate is that a drop of 25 kcfs in spill at McNary should lead to a 2-3% drop in TDG in the McNary Dam tailrace. BPA estimates that the operating reserves are deployed 5-10% of the days, and typically for up to two hours at most. BPA asked salmon managers whether they thought TDG levels were sufficiently alarming to allow McNary Dam to maintain contingency reserves above the upper end of 1%. Salmon managers caucused to determine support for authorizing using a tool for carrying reserves at McNary above the upper end of 1% in order to lower TDG. Upon further discussion, TMT approved the following action:

- **ACTION**: The Action Agencies may operate McNary turbines above the 1% upper limit if necessary to deploy reserves. Shifting reserves to above the 1% range increases generating capacity at McNary Dam within the full 1% range during normal operations. This operation will commence as soon as possible and continue until May 25. At the next TMT meeting, on May 23, BPA will provide information on the frequency that units were operated above 1% for reserves to inform TMT's recommendation whether to continue or modify this operation.

Doug Baus, TMT Chair, will contact TMT members from the Umatilla and Nez Perce tribes, who were not at the meeting, and will inform TMT if either raises substantial objections.

Dworshak Operations

Amanda Morelos, Walla Walla Corps, reported on operations at Dworshak Dam. The NWRFC inflow forecast predicts a coming peak of around 54 kcfs, which the Corps suggests

may be high. Currently there is 26-27 kcfs inflow, with 2.4 kcfs discharge (one unit) and a reservoir elevation of 1539.8 ft. Estimated water supply forecast for April-July in the Clearwater River basin is 123% of normal.

The project will hold 2.4 kcfs discharge until Saturday when they will bump up to 4.8 kcfs (two units) for one week starting this weekend, then increase to 6 kcfs (two units plus spill) through June, condition dependent. A snow flight around June 10th will verify remaining snowpack conditions.

> ACTION: Per request from TMT members, the Corps will provide SWE comparison graphs for this year compared to 2011, 2014, 2012, and 2008 to TMT next week.

Operations Review

Reservoirs

Joel Fenolio, BOR, reported on Bureau of Reclamation projects:

- Hungry Horse midnight elevation 3,510.5 ft. at the forebay; current discharge 2.9 kcfs and expecting inflows 30 kcfs this weekend. The water year is trending to 2012, with flood control concerns for the system.
- Grand Coulee midnight elevation (5/15) was 1,233 ft.; 240 kcfs discharge, with 40 kcfs spill; TDG now at the mid-130% and declining.

Lisa Wright, Corps, reported on US Army Corps of Engineers projects:

- Libby midnight elevation was 2,397.4 ft.; current inflows were 55.2 kcfs; outflows were 12.4 kcfs.
- Albeni Falls midnight elevation was 2,062.8 ft.; yesterday's average inflow was 114.4 kcfs; outflows were 106.7 kcfs.
- Dworshak midnight elevation 1,538.3 ft.; inflows were 25.8 kcfs; 2.4 kcfs outflow.
- Lower Granite average outflows were 124.4 kcfs.
- McNary average outflows were 490.2 kcfs.
- Bonneville average outflows were 465.7 kcfs

Fish

Paul Wagner, NOAA, reported on fish.

Adults passing Bonneville Dam have picked up, with 51,046 spring Chinook observed, or 40% of the 10-year average, though 150% of this time last year. 2,778 Jacks were observed, at 19% of average, though 120% of last year. Winter steelhead are wrapping up, with 3,140 counted, 80% of average and 10% of last year.

At Lower Granite 1,686 spring Chinook passed, 7% of the 10-year average, though 720% of last year.

Yearling Chinook numbers are probably past their peak: 301,000 at Lower Granite; 156,000 at Little Goose Dam, and 127,000 at Lower Monumental. At McNary, yearling Chinook have peaked at 177,000.

Paul noted that the smolt passage index in the lower Snake River seemed lower, but is probably because so many fish are going through the spillway weirs.

DART data suggest for adults, with double peaks for yearling Chinook and a triple peak for juvenile steelhead. Sockeye and Coho are carrying on at Lower Granite, typical of lower trends in the lower river.

There is still a problem with GBT in the lower river, especially with sockeye at Bonneville. The monitoring criteria call for a reduction in spill when 15% of observed fish are affected by GBT, and the current incidence at Bonneville is 17%. However, because of high flows and involuntary spill, there aren't many options to reduce spill.. The Corps noted that projects do not collect fish for GBT testing in the same way, making comparisons between projects difficult.

Power Supply

Tony Norris, BPA, reported that in the past week, an excess in power produced through the balancing authority was sold by BPA, and marked when it occurs.

The next TMT meeting is a conference call on May 23, at 9:00 AM.

Columbia River Regional Forum

TECHNICAL MANAGEMENT TEAM OFFICIAL MINUTES

May 16, 2018

Minutes: Melissa Haskin

1. Introduction

Representatives of BPA, NOAA, Corps, BOR, Washington, USFWS, Idaho, Oregon, Montana and others participated in today's TMT meeting chaired by Doug Baus, Corps, and facilitated by Donna Silverberg, DS Consulting.

2. Review Meeting Minutes – April 18 and April 25

The April 18 and April 25 facilitator's summary and meeting minutes were approved as final. Approval of the May 2 and May 9 summary and minutes was deferred until the next TMT meeting to allow more time for review.

3. Adult PIT-Tag Monitoring Tools - Susannah Iltis, UW Columbia Basin Research; Dave Benner, Fish Passage Center

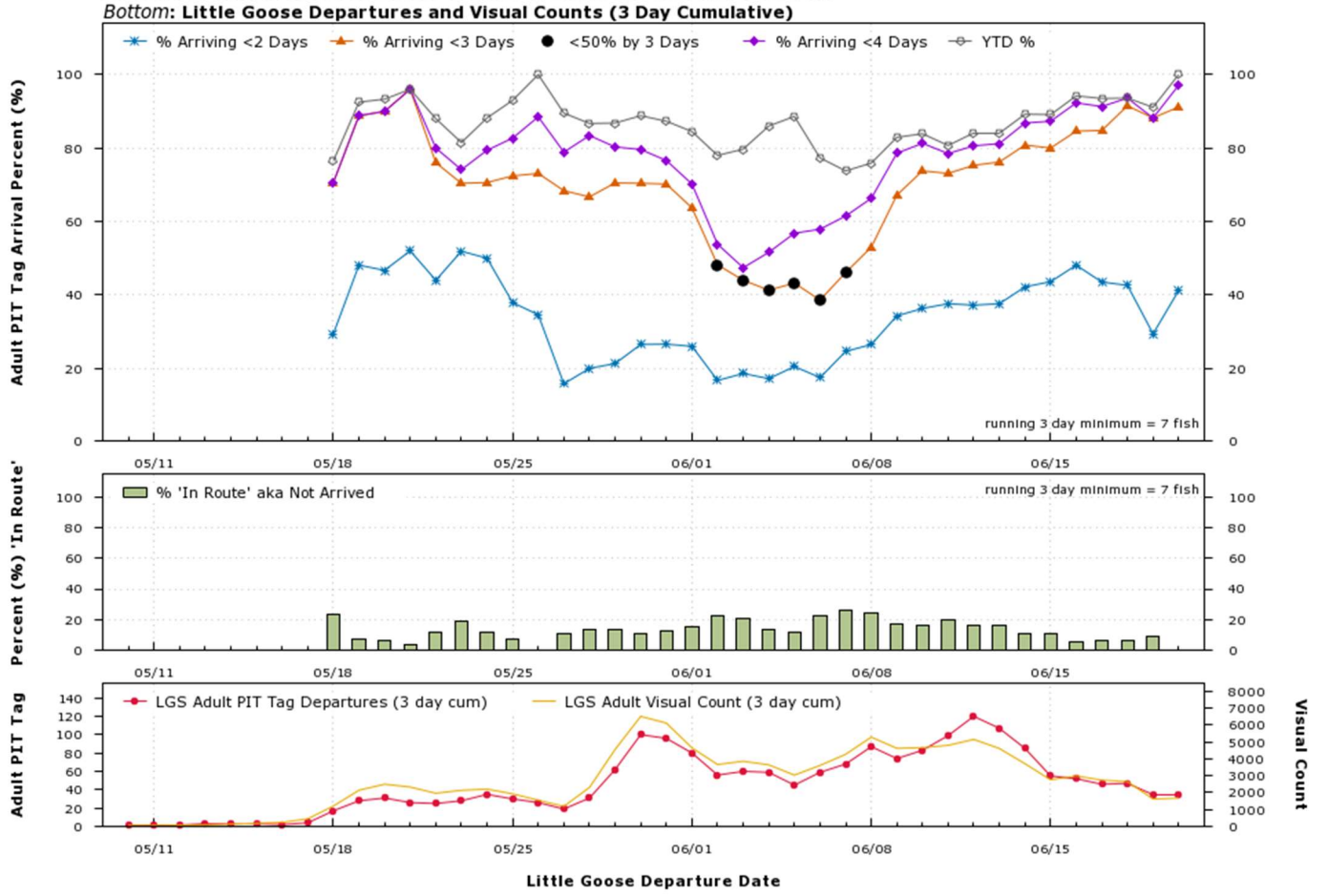
Susannah Iltis, UW Columbia Basin Research, presented a new fish analysis tool to TMT. This tool allows users to track fish movement in the Snake River, and therefore indicates when there is a delay in fish migration. It is available online on the Columbia Basin Research website, http://www.cbr.washington.edu.

The tool, named "DART PIT Tag Adult Reach Distribution and Delay," looks at Spring/Summer Chinook adult PIT tags released at/above Lower Granite. In the analysis, fish detected as juveniles/Mini-jacks are not included.

The tool offers graphs for various data points including cumulative arrival percent by day; percent en route by departure date; and 3-day departure and visual count. Using an example of Little Goose to Lower Granite in 2017, the graphs currently look as follows:

Running 3 Day - Little Goose to Lower Granite Travel Days and Run Size
2017 Adult PIT Tagged All Spring Summer Chinook Released at/above Lower Granite
Unique TagIDs Departing Little Goose (555) through 06/20
YTD Conversion Rate 97.3, YTD Harmonic Mean Travel Time 1.6

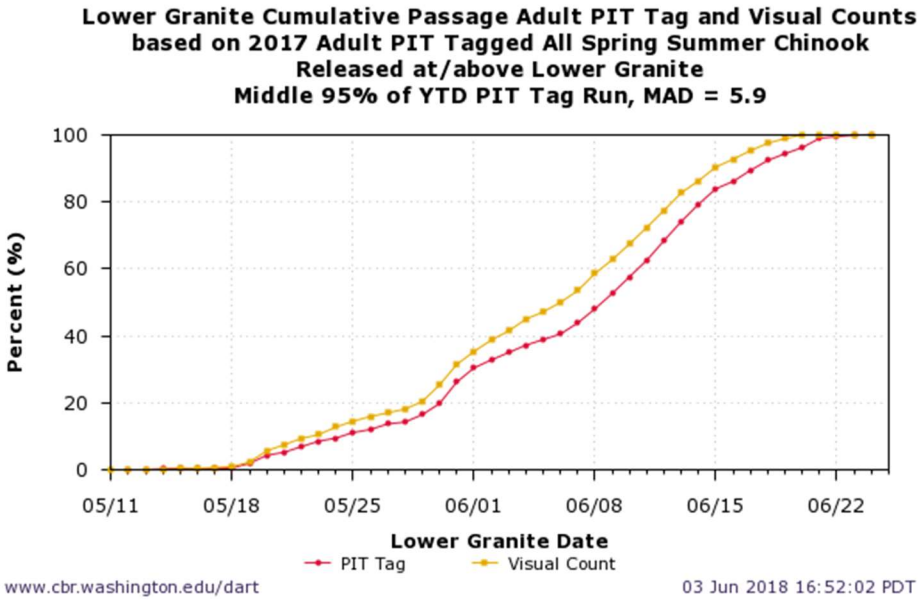
Top: **Cumulative Arrival Percent by Days in Route to Lower Granite by Little Goose Departure Date**
Middle: **Percent in Route to Lower Granite by Little Goose Departure Date**
Bottom: **Little Goose Departures and Visual Counts (3 Day Cumulative)**

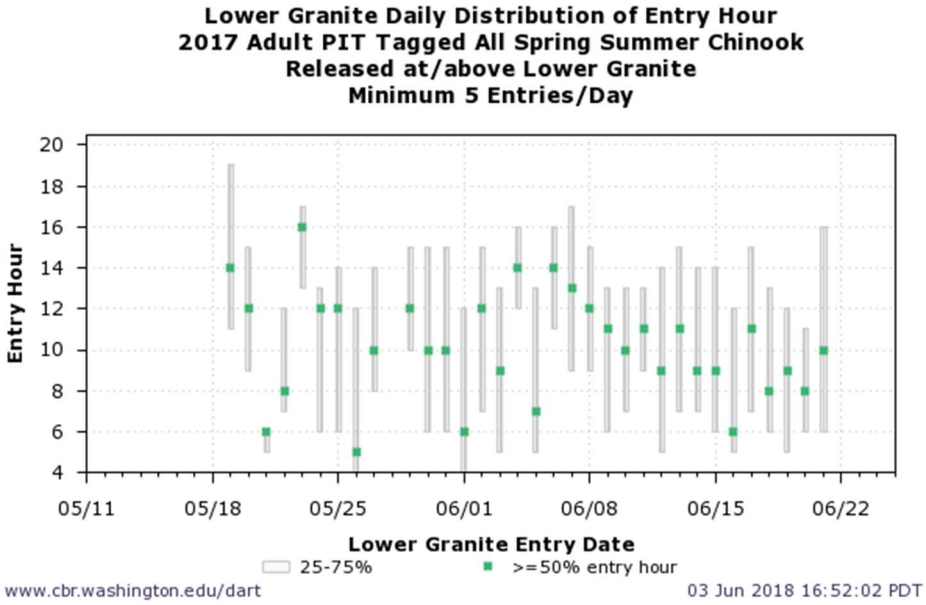


www.cbr.washington.edu/dart

03 Jun 2018 16:52:02 PDT

The tool also provides graphs for daily reach travel time; daily conversion rates; cumulative passage based on PIT-tags and visual counts; daily distribution of entry hours; and, entry hour for fish departing. Here are a few more examples of what available graphs look like currently:





One of the tables has an acronym, MAD, which stands for **M**ean **A**bsolute **D**ifference.

Scott Bettin, BPA, asked Susannah if it would be possible for the tool to provide data on what percent spill fish were experiencing in their blocks. He mentioned his observation that at

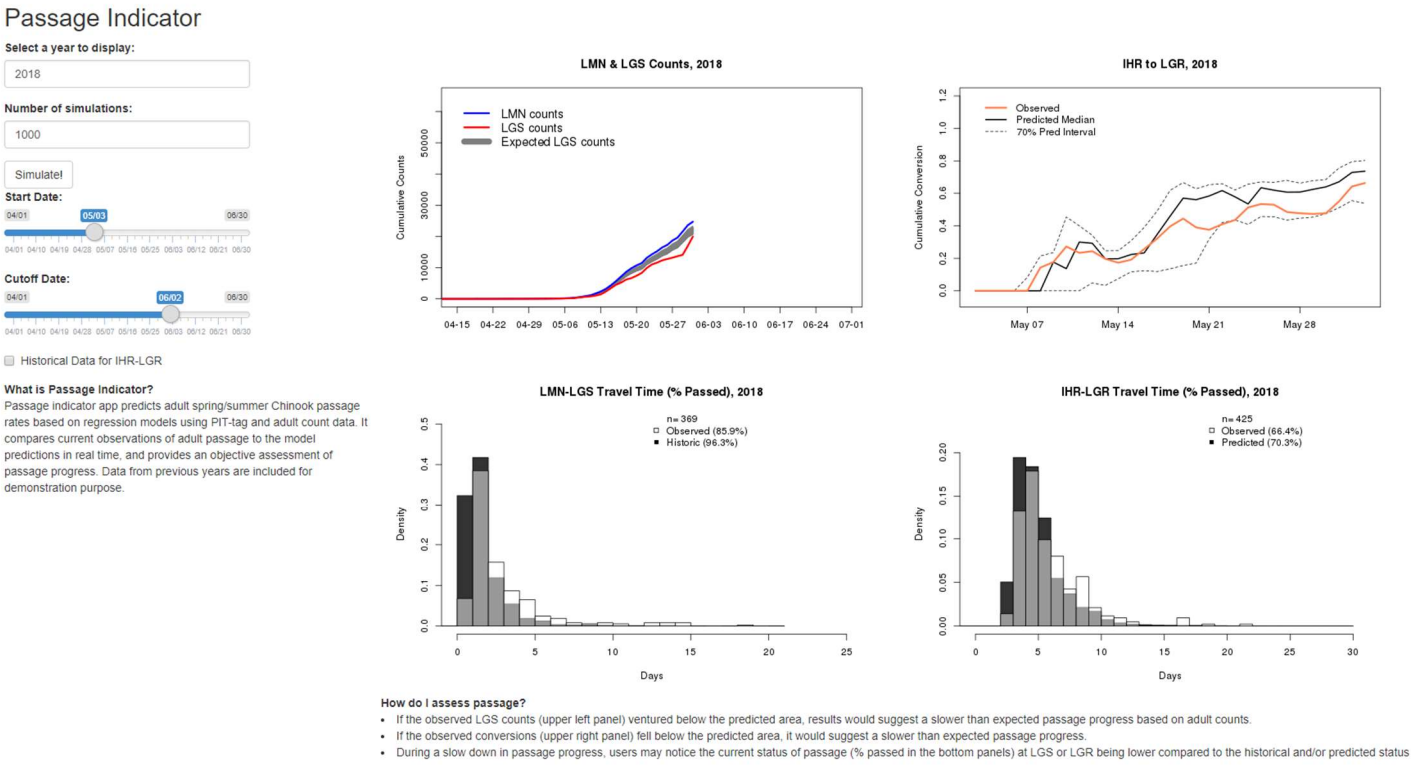
40% spill they seem to slow down and at 30% they seem to speed up. Susannah said she could develop something but mentioned the trouble of it being after-event. She mentioned that with her tool all she knows is that a fish has not arrived yet, not its location at a certain time. After a fish has arrived she can look at the spill it experienced at the time of detection. She mentioned the trouble of pinning down whether the fish was being affected by spill or if it is just a slow fish, as there are some slow fish.

Looking at the data for 2018, the tool shows that fish are later than normal and seems to be projecting a slow-down, however, at the time of presentation, a day of data was missing.

Erick Van Dyke, OR, said he would like to see the tool include data for Ice Harbor.

Dave Benner and Jerry McCann of the Fish Passage Center (FPC) presented as well. They developed a tool that is available on the Fish Passage Center website. This tool currently focuses on Little Goose, though data for Lower Granite and Lower Monumental are available. It specifically focuses on adult Chinook.

The tool offers four graphs, as indicated below:



The above graph offers current data in addition to a prediction of expected counts based on current data and historical PIT-tag data.

One caution McCann had was not to take the shape of predictive curves too seriously until enough data are in. It may be too early in the season with too low of a sample size right now,

he said. He mentioned to use the parts together in identifying issues, saying "one indicator alone is probably not useful by itself to indicate there is a problem with delay."

A key finding of their passage delay analysis was that when they looked at hourly data from 2009-2017 or so, spill in bay 1, where the adjustable spillway weir (ASW) is located, was the most important dam operation variable in fish passage. They also found spill from the other bays was not as linked to passage performance. They suggested TMT look at the ASW when making decisions and reducing flows there as a first step. They also mentioned that not all delay is equal, noting that the data indicate a short delay in the Snake River is not necessarily tantamount to mortality.

A TMT member noted that 2017 is not a good indicative year for those using the tool, as it was not a normal year.

The tool indicated counts lower than historic levels at this time but still good overall, indicating that this year is later than historic years.

Russ Kiefer summarized the two tools. DART's being the tool to initially indicate an issue with passage that may need to be looked into. The FPC tool as being the place for additional data to see future predictions, for instance, whether it is a slow year because of cold temperatures or other slowdowns. The two tools can help TMT in coming up with operations to help in the event of delays.

4. FOP Spring Spill Update - Dan Turner, Corps NWD

4.a. Snake River TDG Overview Table

Dan Turner, Corps NWD, reported. Between the last TMT meeting (May 9, 2018) and the current meeting, many of the projects were in involuntary spill. In the days preceding the May 16 meeting flows decreased, resulting in Lower Granite spilling at the spill cap and TDG reducing to the gas cap on May 15. This reduction is not expected to continue. The involuntary spill from May 9 to May 15 was due to lack of load, which resulted in higher TDG downstream.

At Ice Harbor, TDG in the tailrace exhibited an increasing trend from May 9 to May 15, up to 126%. Exceedances in the McNary forebay were due to high TDG coming in from both the Snake and the Columbia. The Corps strategy as of May 16 was to not cause or contribute to downstream exceedances.

4.b. Columbia River TDG Overview Table

All of the projects in the lower Columbia were in involuntary spill leading to the May 16 TMT meeting. The highest TDG levels were observed at the McNary tailrace where it was 134% on May 15 and the daily average spill was 370 kcfs. On Sunday, the Bonneville tailrace gauge at Cascades Island ceased to report data due to a 30-foot piece of driftwood wrapped around its pipes and ropes. Because flows are high and the tailwater elevation is high, crews cannot safely reach the area to inspect and repair. Crews will have to wait for flows to subside. The Corps will continue to monitor the TDG levels at the Warrendale gauge as an analog.

Also of note is a possible broken pipe at The Dalles tailwater gauge. The gauge is still reporting data and crews will inspect the area as soon as possible.

4.c. NWRFC Extended Inflow Forecast - Lower Granite

The Lower Granite flows are in a little bit of a lull with flows expected to increase to above 140 kcfs on May 16 or 17. At that time, Lower Granite will be in involuntary spill again and is forecasted to remain there until May 29.

4.d. NWRFC Extended Inflow Forecast - The Dalles

The Dalles is experiencing high flows, which are forecasted to continue until mid-June.

4.e. Project Graphs and Discussion of Reserves

During the project graph discussion, Tony Norris, BPA, discussed shifting carrying reserves from the upper end of the 1% range to above 1% as a tool to reduce TDG. This action was discussed at TMT last year but failed to gain enough support. However, TDG levels this year are higher and are likely to increase based on current flow forecasts. The Salmon Managers held a caucus to discuss the operation. After the caucus, Erick Van Dyke, Oregon, expressed concerns about a lack of scope, specifically in terms of how often BPA would operate above 1%. Tony assured Erick that BPA will likely rarely deploy contingency reserves above the 1% at McNary and will report exceedances back to TMT. Salmon Managers were specifically interested in how often turbines will be operated above 1% and how much this operation will reduce TDG.

The Salmon Managers supported or did not object to shifting contingency reserves to above the 1% range at McNary Dam through Friday, May 25, with the expectation that BPA will provide updates at the next TMT meeting on May 23.

There was discussion about extending the operation to other projects that could benefit from TDG reduction, such as John Day. TMT will revisit other options after reviewing the impacts of the operation at McNary.

TMT members present polled on shifting reserves at McNary Dam from the upper end of the 1% range to above the 1% range in order to reduce TDG in the tailrace and downstream of the project, effective immediately through Friday, May 25:

- Paul Wagner (NOAA) – support;
- Joel Fenolio (BOR) – support;
- Doug Baus (Corps) – support;
- Tony Norris (BPA) – support;
- Charles Morrill (WA) – no objection;
- Russ Kiefer (ID) – no objection;
- David Swank (USFWS) – no objection;
- Erick Van Dyke (OR) – no objection.
- Nez Perce and Umatilla were not present. Doug will contact them regarding the operation and if either object, it could re-open the discussion. There was some

concern about making a decision without Nez Perce and Umatilla present; however, Russ and others mentioned that it would not make sense to jeopardize the health of fish because members were unable to make a meeting.

5. Dworshak Dam –Amanda Morelos, Corps-NWW

5.a. NWRFC Inflow Forecast - Dworshak –Amanda Morelos Corps-NWW

Inflows are currently in the range of 26-27 kcfs and are forecasted to increase to peak at 53 kcfs. The Corps is operating one unit at 2.3 kcfs plus 100 cfs for the fish hatchery. Dworshak's current forebay elevation 1539.8 feet.

5.c. Proposed Operations

The snowpack is currently 123% of normal. Outflow is being held at 2.4 kcfs until the end of the week when it will be raised to 4.8 kcfs for a week, then increased to 6 kcfs. This plan will change as needed according to the forecast and observed inflows, Amanda said.

Amanda said the Corps will begin temperature modeling in June and making decisions based on inflows and pool elevations when 10% or less of snow-covered areas remained – around the beginning of July.

The Corps' plan is less aggressive on the incline in order react to flows. Tony Norris, BPA, noted, it would not make sense to fill reservoirs immediately and then have to spill a large amount.

Erick Van Dyke, OR, requested to see additional snowpack data for 2008, 2011, 2012, and 2014. Amanda said the Corps will provide him with the data at the next TMT meeting.

The Corps is planning a flight after June 10 in order to monitor the snowpack.

6. Operations Review

6a. Reservoirs

Joel Fenolio, BOR, and Lisa Wright, Corps reported.

Hungry Horse is at 3,510.5 feet elevation, releasing outflows of 2.9 kcfs. Hungry Horse is releasing at its maximum capacity right now as it is operating on only 1 of its 4 units. Three units are currently out of service.

Once Flathead Lake is at 2,092 feet elevation, the flood stage at Columbia Falls will drop to 13 feet.

Joel said that Hungry Horse will probably be down to 300 cfs over the coming weekend and that the BOR will bring releases up to 8-10 cfs, meaning spill will be about 5-7 cfs. He said this may go higher going into June.

This year is front-loaded as far as volume, similar to 2012, and the BOR will take aggressive action in controlling the refill of the reservoirs over the next few weeks, he said.

Joel reported that by June, 3 of the 4 units should be back online.

Grand Coulee is spilling at 40 kcfs after passing inflow all weekend.

Libby is at 2,397.4 ft elevation with inflows of 55.2 kcfs and outflows of 12.4 kcfs.

Albeni Falls is at 2,062.8 ft elevation with inflows of 114.4 kcfs and outflows of 106.7 kcfs.

Dworshak is at 1,538.3 ft elevation with inflows of 25.8 kcfs and outflows of 2.4 kcfs.

Lower Granite is passing outflows of 124.4 kcfs. McNary is passing outflows of 490.2 kcfs and Bonneville is passing outflows of 465.7 kcfs.

6b. Fish.

Paul Wagner reported.

Adults:

Bonneville: adults picked up with Chinook counts at 51,046, which is 45% of the 10-year average but 150% of last year's count at this time. Jacks are at 2,778, which is 19% of the 10-year average but 120% of last year's counts. As jacks typically tend to follow later in the season, the hope is that they will pick up soon. Steelhead are wrapping up their run with counts of 3,140, which is 80% of the 10-year average.

The DART site indicated a later than average run as indicated by spring Chinook counts at Bonneville, Ice Harbor and Lower Granite.

Juveniles:

Yearling Chinook are likely past their peak, Wagner reported. Compared to last year, it is quite the peak, he said. Counts at Lower Granite peaked at 301,000. Meanwhile the peak for Little Goose was 156,000 and 127,000 for Lower Monumental. Counts are tapering.

Smolts had three peaks this year as opposed to the two normally observed, as with the steelhead at Lower Granite.

6c. Power System – BPA

Tony Norris, BPA, reported. Norris presented a graph to TMT different from weeks past. This graph has a grey line denoting net interchange and was titled "BPA Balancing Authority Load and Total Wind, Hydro, Fossil/Biomass, Nuclear Generation, and Net Interchange, Near-Real-Time."

Norris that we are seeing a lot of wind and a lot of hydropower generation. He noted that this time of year temperatures are usually mild and loads are relatively low.

Participants:

Name	**Affiliation**
Dan Turner	Corps
Lisa Wright	Corps
Joel Fenolio	BOR
Julie Ammann	Corps
Charles Morrill	WA
Paul Wagner	NOAA
Doug Baus	Corps
Jerry McCann	Fish Passage Center
Dave Benner	Fish Passage Center
Erick Van Dyke	OR
David Swank	USFWS
Tony Norris	BPA
Eve James	BPA
Melissa Haskin	Flux Resources (Notetaker)
Charles Wiggins	DS Consulting
Donna Silverberg	DS Consulting
Ruth Burris	Portland General Electric
Bryan Marotz	MT
Logan Osgood-Zimmerman	Corps
Aaron Marshall	Corps

Phone:

Russ Kiefer	ID

Scott Bettin	BPA
Tom Iverson	Yakama Nation
Susannah Iltis	University of Washington, Columbia Basin Research
Shane Scott	PPC
Ruth Burris	PGE
Erin Kovalchuk	Corps
Eric Hockersmith	Corps
Amanda Morelos	Corps
Michael Bryant	Columbia Basin Bulletin
Leah Sullivan	BPA