COLUMBIA RIVER TECHNICAL MANAGEMENT TEAM
May 23, 2018
DRAFT 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/

Dworshak Dam Operations

Steve Hall and Alfredo Rodriguez, Corps, updated TMT members on the week's operations at Dworshak Dam. There has been a substantial difference between the NWRFC inflow forecast and observed river conditions, with Lower Granite Dam closer to the forecast than Dworshak Dam. The RFC forecast of a spike in inflows this past week did not occur, so the Corps is forecasting inflows of about 30 kcfs until the weekend, when a decline is expected.

The powerhouse is currently limited to one available turbine (Unit Two) because of an oil leak in the cooling system of Unit One. Repairs are underway, and the turbine is scheduled to return to service mid-next week. The Corps understands the urgency of keeping this repair on schedule to help reduce TDG. Total outflow is currently 5.0 kcfs that is distributed via the following routes: 1) 2.2 kcfs in generation, 2) 2.7 kcfs in spill, and 3) 0.1 kcfs via the hatchery pipeline. The refill target date is mid-June. Water temperature is very cold, so no temperature modeling is presently occurring, but the Corps is ready to brief TMT when it warms.

Steve also reported the readings from five SNOTEL sites. All sites are presently most closely following the 2012 curve. Crater Meadows should be melted out by mid-June; Hemlock Butte by the beginning of June; Hoodoo Basin by mid-June; and Lolo Pass and Lost Lake by the end of June. A snow flight is scheduled around June 6 to 8 to get a good look at refill progress and remaining water in the basin. TMT Members requested the Corps provide final SNOWTEL graphs after the mid-June melt off.

Unit Three repairs are proceeding on schedule. The Corps is now testing the rotor, which will be installed soon. The turbine is expected to return to service by July 1, and work is unlikely to be completed sooner. Plans to overhaul Units One and Two are not presently scheduled.

Adult PIT-Tag Monitoring Tools

Paul Wagner, NOAA, reported on data generated by the two new tools to track adult delay presented at the May 16 TMT meeting. Both the FPC fish passage indicator and the DART tools are currently showing the potential for an adult fish passage delay from Ice Harbor to Lower Granite and Lower Monumental to Little Goose. There is concern that the fish run is late, snowmelt and runoff is early, they are seeing delays, and the flow forecast is for increases from 150 to 190 kcfs. These conditions concern NOAA.

There is currently a 4,600 fish differential between window counts at Lower Monumental Dam and Little Goose Dam. The DART tool showed several "black dots" which indicate possible

delay. Fish counts have been late to upload due to computer issues recently, but should usually be available before 9 AM on the next day. The current observed fish counts that have been PIT-tagged by PNL at Ice Harbor are 220 at Ice Harbor, while 190 have passed at Little Goose, and 156 have passed at Lower Granite, or a 79% conversion rate. The baseline for conversion is that 50% of the fish will travel between the two dams within two days. The current conversion is lower than that, though the recent trend is toward that expected figure. Due to concerns, the group agreed an end-of-week review seemed advisable.

- **ACTION:** Members agreed to hold an unscheduled TMT meeting at 11:00 on Friday May 25, to review trends and forecasts regarding this matter.

Doug reported the Corps O&M has a scheduled screen cleaning at Little Goose on May 29-30. This will necessitate a two-unit rolling outage, which will increase spill. Depending on what debris is reaching the screens, the work could be completed in one day.

FOP Spring Spill Update

Dan Turner, Corps, described spring spill operations. Snake River projects all had involuntary spill, which resulted in gas cap exceedances. TDG levels were above the criteria at Ice Harbor, Lower Monumental, and Little Goose. TDG at Lower Granite was 114%, within the criteria. Because both the Snake and Columbia Rivers had high flows and high TDG, the McNary Dam forebay is at 124% TDG.

Columbia River projects are also experiencing involuntary spill, with TDG levels higher than those on the Snake River – in the 130% range. The Bonneville tailrace gauge at Cascades Island is still out of service and repairs await lower flows. Until then, the Warrendale gauge is being used. Spill caps remain stable at 121 kcfs. In a rare event, there is some degassing occurring at The Dalles Dam (e.g. 5/19), with 129% TDG in the forebay (TDA) reduced to 126% in the tailwater (TDDO).

The NWRFC extended flow forecast for the Snake River, measured at Lower Granite Dam, is for involuntary spill to continue through June 3. The forecast for the Columbia River is similar, though involuntary spill is predicted to last longer, until June 19.

No changes in the spill caps for the Lower Snake River projects are expected any time soon. For example, the spill cap at Lower Granite Dam will not change because TDG levels at the downstream forebay gauge (LGSA) are currently 114% (5/22), with 113-115% predicted for tomorrow at LGSA. Based on current conditions the spill cap at Lower Granite Dam will remain between 31-33 kcfs. Last week in order to reduce TDG production downstream of McNary Dam the TMT coordinated an operation to hold contingency reserves above 1 percent. When contingency reserves were held above 1 percent generation was increased and spill reduced from 77% to 69%, TDG levels decreased by 2.5%. John Day Dam had steady spill. If BPA was able to hold contingency reserves and John Day Dam and spill could be reduced from the current spill of 57% down to 51%, TDG levels could be expected to drop 4% (current 133% predicted to reduce to 129%). Degassing at The Dalles Dam (5/21) has lowered levels from 129% in The Dalles Dam forebay (TDA) down to 124% in the Bonneville Dam forebay (BON).

McNary Dam Operations

In connection with the above-mentioned TDG reductions, Tony Norris, BPA, reported on operations at McNary Dam and the effect of these operations on downriver projects. At present,

all four lower Columbia River projects are carrying reserves. McNary had no deployment of reserves above the upper end of 1% as was authorized at last week's TMT. This action, which allowed generation up to the high end of the 1% range by decreasing spill and increasing flow through the generators, appears to have had a positive impact on TDG. Because of this, the action agencies wondered about trying a similar action at John Day.

Salmon managers expressed concerns due to descaling, injuries, and mortalities of juveniles at McNary. These might have been a result of the operation (putting more juveniles through the project with high flows), or could have been the result of debris in the system. It was noted that, if the change in spill and patterns were only leading to a 5% benefit, the impact to juveniles did not seem worth the shift. After a private caucus, salmon managers agreed to continue holding contingency reserves above 1% at McNary, and requested adding daily sampling to watch for injuries to juveniles. Salmon managers were not supportive of taking similar action at John Day at this time; instead they support monitoring results on juveniles and TDG at McNary until May 30th and discussing whether similar action at John Day would be warranted at that time. The action agencies expressed their concern about the high levels of gas and the benefit that a reduction in spill might have for the broader system. The group will continue the discussion at the next TMT meeting.

There is an unscheduled TMT meeting on Friday May 25 at 11:00 AM to review adult passage delay issues in the Snake River.

The next scheduled TMT meeting as face-to-face on May 30 at 9:00 AM.

Columbia River Regional Forum

TECHNICAL MANAGEMENT TEAM OFFICIAL MINUTES

May 23, 2018

Minutes: Melissa Haskin, FLUX Resources

1. Introduction

Representatives of BPA, NOAA, Corps, BOR, Oregon, Washington, Idaho, Umatilla (CRITFC), Nez Perce Tribe, and others participated in today's TMT meeting chaired by Doug Baus, Corps, and facilitated by Donna Silverberg, DS Consulting.

2. Dworshak Dam - Alfredo Rodriguez and Steve Hall, Corps NWW

2.a. Inflows

Alfredo Rodriguez and Steve Hall, Corps NWW, updated TMT on Dworshak operations and forecasts. Forecasts from the NWRFC indicate that inflows will hover around 25-35 kcfs. However, the Corps expects this forecast is higher than what will actually occur.

Rodriguez reported the RFC inflow forecasts have been higher than observed, noting that in the week prior forecasts indicated inflows of 48 kcfs; however, observed inflows were 26 kcfs. In light of this, the Corps expects inflows to be more around 30 kcfs for the next few days followed by a decrease.

2.b. Hourly Data

Currently, Dworshak is operating on just one unit (Unit 2). Unit 1 is out of service due to an oil leak in the cooling system. Parts are on order and expected to arrive early next week. Unit 1 should be returned to service mid-week next week. Because of this, outflows are currently 5 kcfs. Once the unit is returned to operation, the Corps will increase outflows to 6 kcfs.

Jay Hesse, Nez Perce, commented on the need for Unit 1 to be returned to service quickly, noting that TDG was at 110%. He stated that putting Unit 1 back online would help reduce TDG at Clearwater.

2.c. Snowpack Update

Crater Meadows: This year's snowpack is most closely following 2012, except in 2012 flows ceased intermittently. Snow should be completely melted by the middle of June.
Hemlock: Snow is expected to melt by the beginning of June.

Hoodoo: Also following 2012. Forecasted to melt by mid-June.
Lolo: Similar to 2012, but will probably more closely resemble 2014.
Lost Lake: On track to run out of snow by June 20.

The Corps has a snow flight scheduled for early June. Water temperatures are still exceptionally cold.

Erick Van Dyke, OR, asked if the Corps could share the same graphs again in mid-June so that he could see a more complete picture.

Steve Hall, Corps NWW, provided an update on Dworshak Unit 3. Currently, teams are painting the rotor, which should be about ready to be re-assembled. There will be additional testing before it is re-assembled and again in the fall after it has been returned to service. Right now, the unit is scheduled to be returned to service July 1, 2018.

Charles Morrill, WA, asked if current work would delay the overhaul of the other units.

Hall replied that overhauling Units 1 and 2 is not currently scheduled. He noted that he is not privy to long-range financial planning, but will try to look into it and report back to TMT.

3. Adult PIT-Tag Monitoring Tools - Paul Wagner - NOAA Fisheries

Paul Wagner, NOAA, reported on Adult PIT-Tag monitoring.

3.a. FPC Passage Indicator

Currently there is about a 4,600 differential between Lower Monumental and Little Goose (Figures 1 and 2). This suggests a delay at Little Goose, however, it could be too early to tell for sure. There was a dip, but in recent days, passage at Little Goose has increased. A catchup still needs to happen. Compared to historical data, the run started later than normal this year. This is coupled with early runoff due to high May temperatures.

3.b. 5/23 Passage Indicator Graphs

Figure 1. FPC Passage Indicator – Cumulative Counts at LMN, LGS.

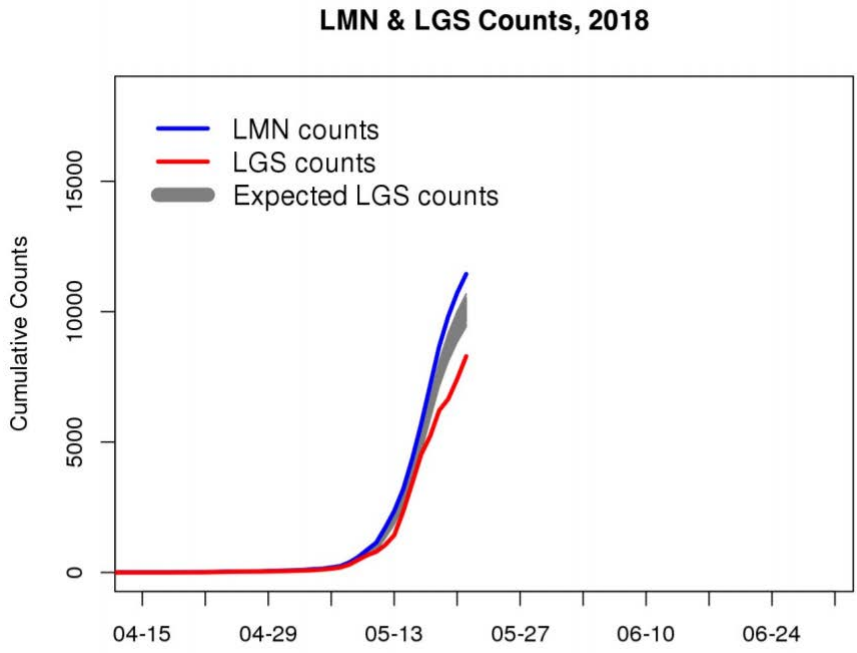
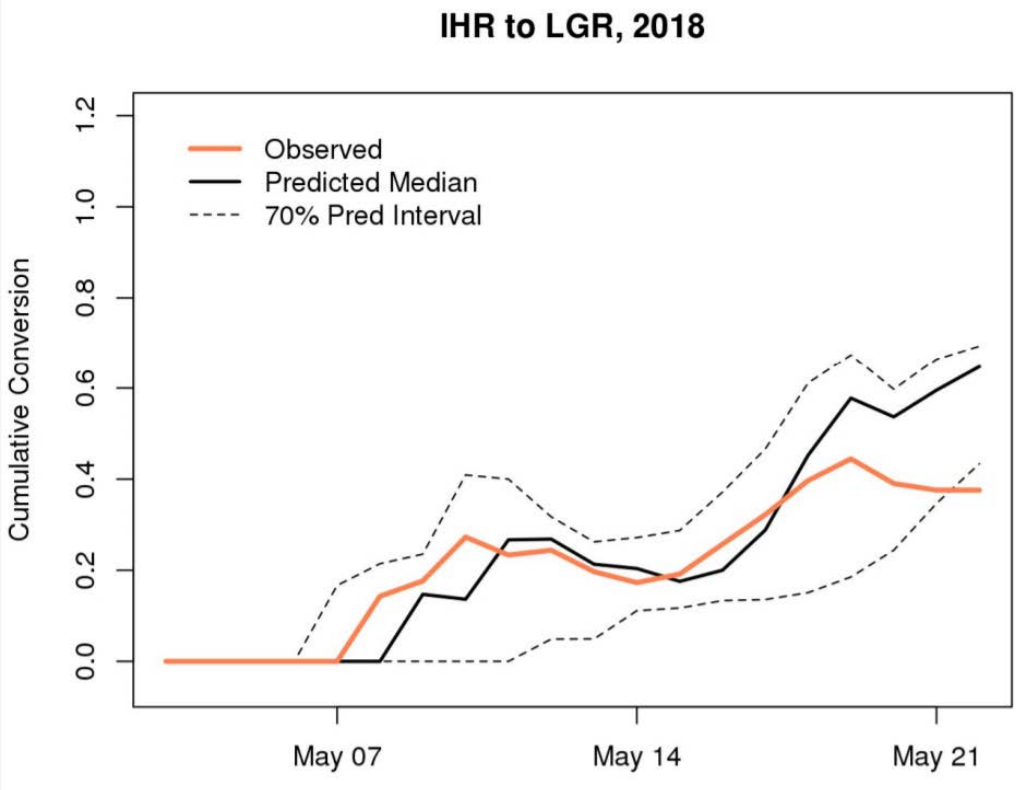


Figure 2. FPC Passage Indicator – Conversion Ice Harbor to Lower Granite.



3.c. DART Adult PIT-Tag Reach Distribution and Delay

The DART tool also suggests there may be a passage delay and that fish are not achieving at least 50% arrival at Little Goose within 2 days of detection at Lower Monumental.

Flows have been increasing, which results in higher involuntary spill. Over the five days preceding the meeting, flows were in the range of 140 kcfs and spill was 37% at Little Goose.

With flows expected to increase from 150 to 190 kcfs, the salmon managers wish to wait until Friday to discuss if a modified spill operation at Little Goose is necessary.

Russ Kiefer, ID, commented that delay is not a good thing; however, because it looks like passage is picking up and that what happened may have just been a temporary dip, waiting a few extra days is warranted. He noted that perhaps issues would sort themselves out on their own without intervention.

Action → TMT will reconvene Friday, May 25, to discuss a modified spill operation at Little Goose to speed up fish passage.

Baus wondered what the best time of day was for checking the DART tool for updated reports. Erin Kovalchuk, Corps NWP, reported that the site tends to update at 7:30 to 8 a.m. Charles Morrill, WA, asked why the Walla Walla data was not online yet, noting that ideally all data would come in at the same time. Chris Peery, Corps NWW, said there is a computer issue at Lower Monumental preventing data from coming in. He said counts were completed by hand. He was hoping to have the problem resolved by Friday. He said yesterday's count was 1,500, up from 800 the day before. He reported Ice Harbor counts at 240 as of the day before the meeting (May 22) and said the Corps was planning to release another 15 tagged fish. He reported counts at Lower Monumental at 227 detected. At Lower Granite the count was 156 and at Little Goose the count was 196. Conversion is approximately 79%.

Doug Baus, Corps, informed TMT that Little Goose will be cleaning screens on May 29-30, which requires a rolling 2-unit outage.

In response to a question about the timing of screen cleaning, Ann Setter, Corps, replied that the outage could possibly be moved later, depending on how much debris has accumulated on the screens. If the debris is similar to what it has been, the cleaning could take as little as one day.

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

4.a. Snake River TDG Overview Table

The Snake has been spilling over the spill cap for the last week at most projects due to high flows and involuntary spill. TDG is over the gas cap at Little Goose, Lower Monumental,

and Ice Harbor. Lower Granite spill is producing 114% in the downstream forebay. Ice Harbor spill is producing 124% in the tailrace and 123% in the McNary forebay.

4.b. Columbia River TDG Overview Table

Many of the projects on the lower Columbia have been in involuntary spill over the last 7 days resulting in TDG above 130%. John Day tailrace is at 134%. The Bonneville tailrace gauge at Cascades Island is still out of service due to damage from debris and will be fixed as soon as flows recede to a safe level for crews to go out (likely mid-June). Some degassing is occurring at The Dalles. For example, on May 20, TDG was 129% in the forebay (TDA) and 126% in the tailrace (TDDO).

4.c NWRFC Extended Inflow Forecast – Lower Granite

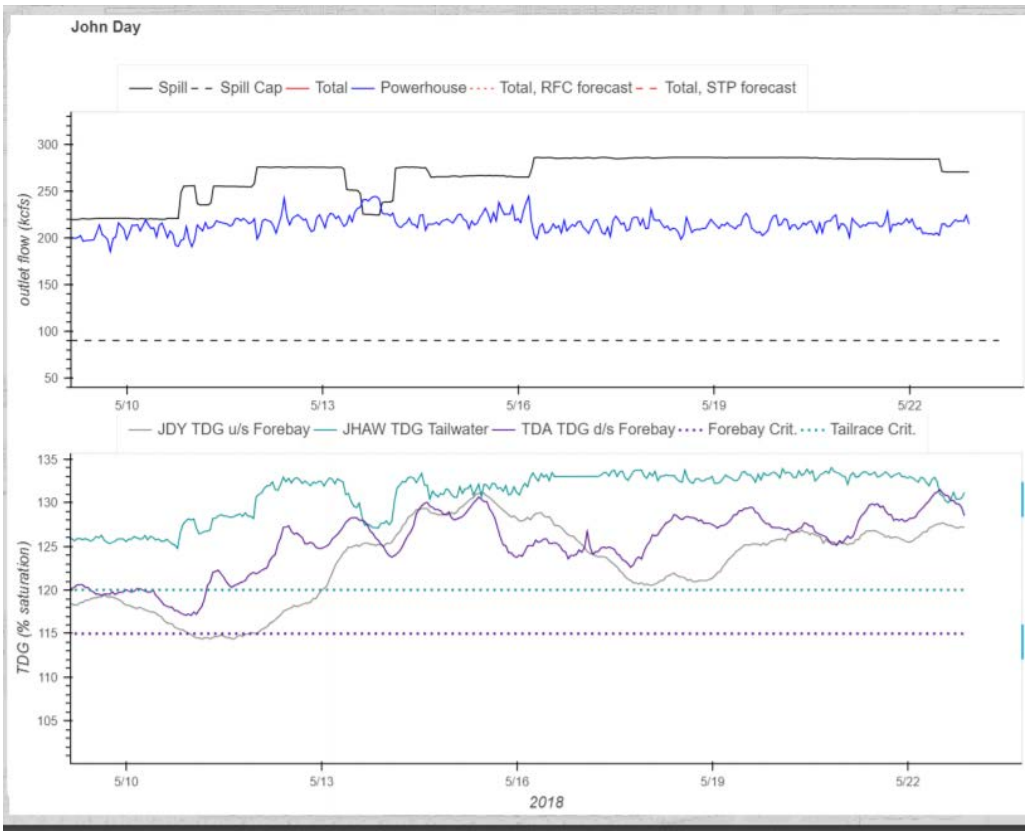
The Columbia is expected to remain in involuntary spill until June 19.

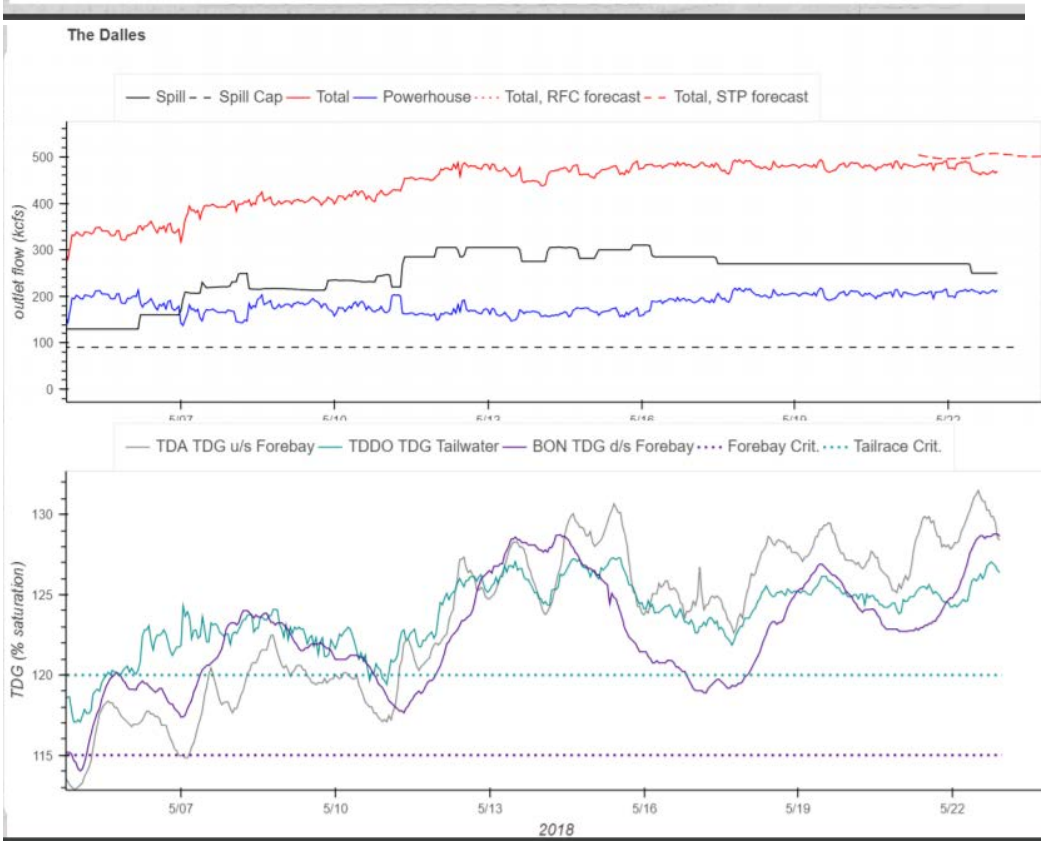
4.d. NWRFC Extended Inflow Forecast - The Dalles

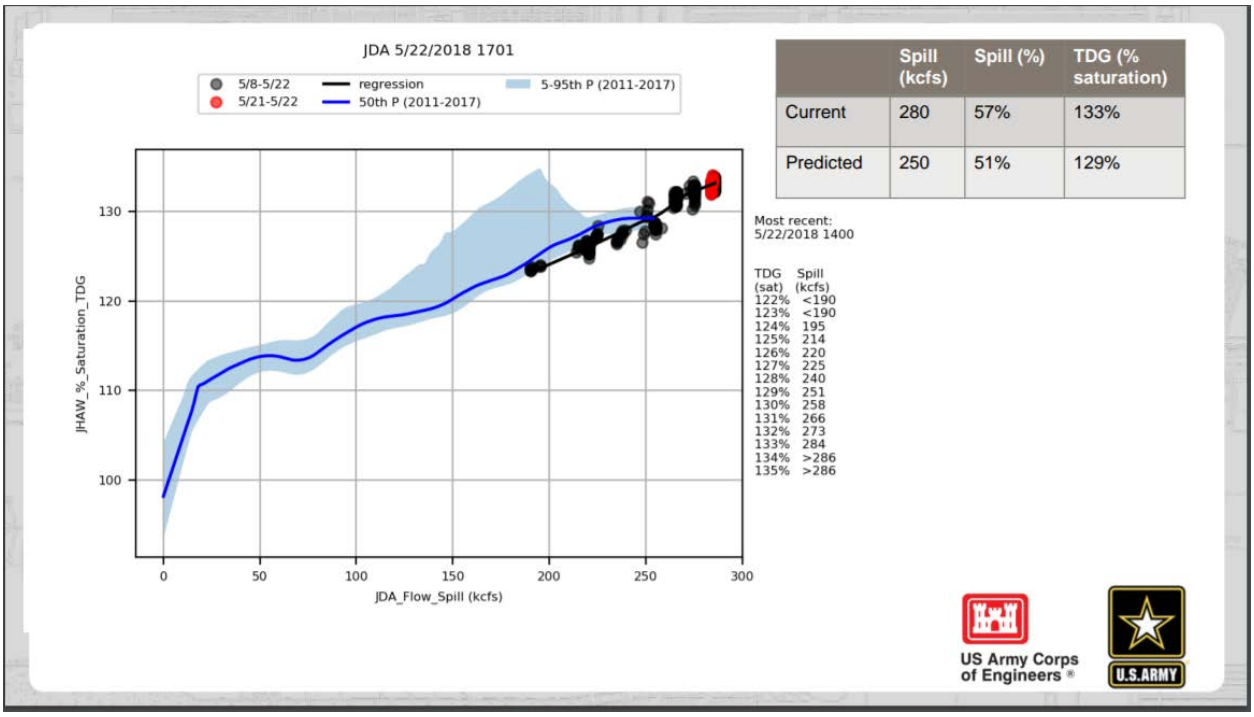
The Snake is expected to remain in involuntary spill until June 3.

4.e. Project Graphs

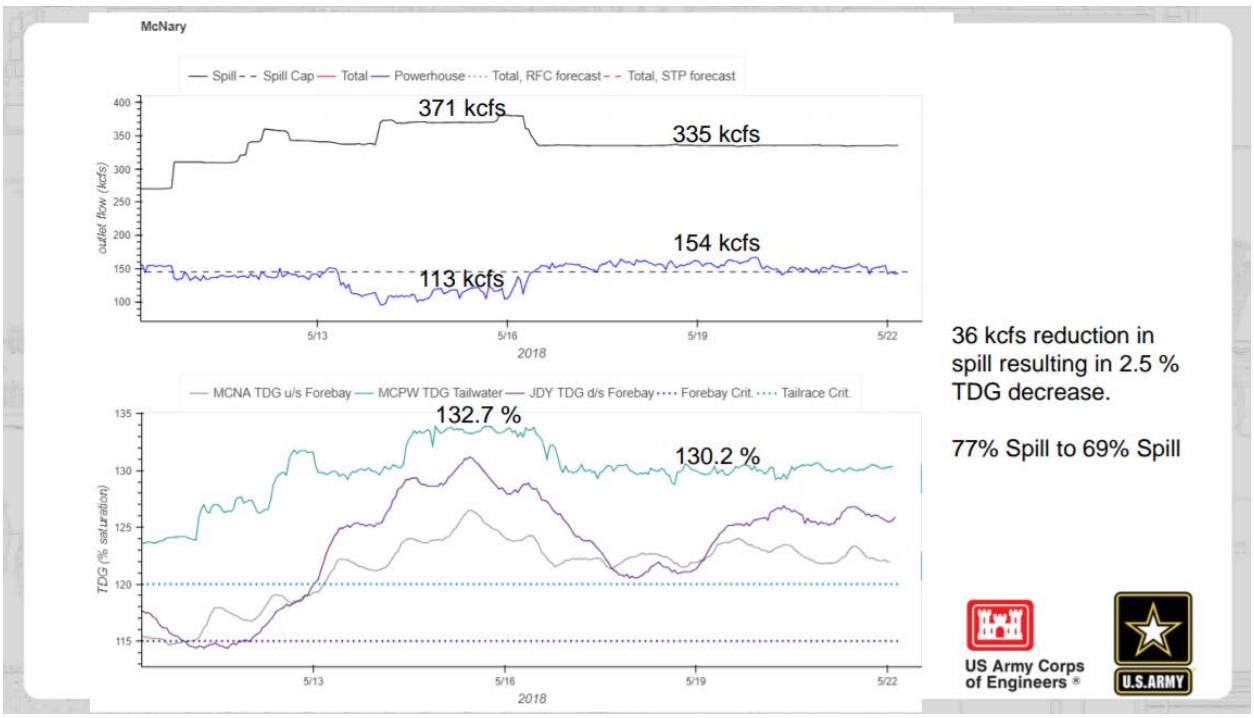
The following graphs were presented:


John Day
Spill
Spill Cap
Total
Powerhouse
Total, RFC forecast
Total, STP forecast
outlet flow (kcfs)
300
250
200
150
100
50
5/10
5/13
5/16
5/19
5/22
JDY TDG u/s Forebay
JHAW TDG Tailwater
TDA TDG d/s Forebay
Forebay Crit.
Tailrace Crit.
TDG (% saturation)
135
130
125
120
115
110
105
5/10
5/13
5/16
5/19
5/22
2018


The Dalles
Spill
Spill Cap
Total
Powerhouse
Total, RFC forecast
Total, STP forecast
outlet flow (kcfs)
500
400
300
200
100
0
TDA TDG u/s Forebay
TDDO TDG Tailwater
BON TDG d/s Forebay
Forebay Crit.
Tailrace Crit.
TDG (% saturation)
130
125
120
115
5/07
5/10
5/13
5/16
5/19
5/22
2018



	Spill (kcfs)	Spill (%)	TDG (% saturation)
Current	280	57%	133%
Predicted	250	51%	129%



36 kcfs reduction in spill resulting in 2.5 % TDG decrease.

77% Spill to 69% Spill

Erick Van Dyke, OR, asked if the Corps was making notes in their data of when the projects are in involuntary spill. Julie Ammann, Corps, replied it shows up in the hourly data when spill is above the spill cap but they do not separate out those data and flag them in the database. Dan Turner, Corps, said they do take into account in their decision making process whether projects are in involuntary spill or not.

Turner noted that TDG increased to 132% in the McNary tailrace, which wasn't anticipated. He said it may be a "blip in the system," or due to a change in spill pattern when spillbay 2 returned to service.

TMT discussed the operation to carry reserves above the 1% range. Tony Norris, BPA, reported that shifting reserves from John Day to above 1% at The Dalles would decrease spill and TDG in the John Day tailrace and downstream, similar to the operation coordinated with TMT for implementation at McNary. He reported that thus far reserves held above 1% at McNary have not been deployed, and McNary was able to operate units within 1%. He asked if the TMT was interested in extending the operation for another week.

The salmon managers mentioned their confusion with the operation, saying they did not realize that to enact the operation, units would be operated at the upper end of 1%. The Corps and BPA felt they had been clear at the previous meeting that this operation would allow units to be operated in the full 1% range, but it appeared there was still confusion.

Norris noted that operating closer to the upper 1% increases turbine flow, resulting in a spill reduction and less TDG, which was the primary objective of the operation.

Wagner and Tom Lorz, Umatilla/CRITFC, asked Norris additional questions about the operation, specifically about units that were offline. Wagner said the way he understood it, before the operation two units were sitting idle waiting to be engaged to provide reserves. He thought the point of the operation was to engage them, but what he was realizing was the result of the operation was units were operating in the mid-to-high 1%. Scott Bettin, BPA, explained that the units were down for an unrelated issue. However, they came back online during the operation, confounding the effects of the operation. Lorz wanted to know how much of the reduction in TDG was related to the additional units and how much was due to the operation.

Turner reported that a 10 kcfs decrease in spill results in approximately a 1% reduction in TDG and that the operation at McNary resulted in an estimated 36 kcfs decrease in spill for a 2.5% TDG reduction.

The salmon managers caucused on the option to shift reserves from John Day to above 1% at The Dalles, and on whether or not to continue carrying reserves above 1% at McNary for another week. Norris reminded TMT that since Grand Coulee is operating under Flood Risk Management requirements, high flows in the Lower Columbia will persist.

After caucusing, Paul Wagner reported that the salmon managers supported continuing the operation at McNary for a week. However, there wasn't unanimous support for the operation at The Dalles. The salmon managers also requested that fish condition sampling at McNary be increased from every other day to every day to monitor the impact of the operation on the fish. Ann Setter, Corps, said she would check with SMP and report back. She believed SMP would be able to accommodate the request. Wagner asked that in the event SMP cannot do daily condition monitoring, she provide an explanation.

Julie Ammann, Corps, reiterated that taking the same action at The Dalles would have a benefit at John Day and downstream, and asked if they were opposed to trying it to see what would happen. The salmon managers stuck with their recommendation. Lorz noted that applying the operation at The Dalles could result in higher injury rates of fish that pass through the turbines.

5. Next TMT

The next TMT meeting is an unscheduled conference call on Friday, May 25, to discuss adult fish passage delay and possible operational interventions.

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
Jay Hesse	Nez Perce
Jim Litchfield	Montana
Joel Fenolio	BOR
Julie Ammann	Corps
Lisa Wright	Corps
Paul Wagner	NOAA
Russ Kiefer	ID
Scott Bettin	BPA
Tom Lorz	Umatilla (CRITFC)
Tony Norris	BPA
Aaron Marshall	Corps
Ann Setter	Corps
Charles Wiggins	DS Consulting
Chris Peery	Corps
Donna Silverberg	DS Consulting
Erin Kovalchuk	Corps

Mike O'Bryant	Columbia Basin Bulletin
Shane Scott	PPC
Steve Hall	Corps
Alfredo Rodriguez	Corps
Amanda Morales	Corps
John Heitstuman	Corps
Ruth Burris	PGE