COLUMBIA RIVER TECHNICAL MANAGEMENT TEAM

July 1, 2015
Facilitator's Summary
Facilitator & Notes, Emily Plummer, 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.

Review of Meeting Minutes
TMT members will review and provide suggested edits to the June 17th, 24th, and 25th Official Minutes and Facilitator's Summary prior to the July 15th TMT meeting.

Dworshak/Lower Granite Water Temperature
Steve Hall, COE-Walla Walla, updated TMT on Dworshak and Lower Granite water temperature. He noted that as of this morning water temperatures in the Lower Granite tailwater were around 65.5 degrees Fahrenheit. This temperature decrease is a result of multiple factors, including a temporary increase in Dworshak's discharge over the weekend to 13.5kcfs, switching from 1 to 2 units at Lower Granite (passing cooler water), increased release of cold (17degrees C) from Idaho Power, a region-wide rain storm and recent cloud cover which has reduced solar radiation. Steve noted that the project team has conducted numerous model runs and that models are suggesting that discharge can be reduced from full powerhouse down to ½ powerhouse through the weekend and still maintain the 1-1.5degree temperature buffer coordinated through TMT. The project plans to reduce discharge to 5.4kcfs tonight and hold this through the weekend; the project will continue to monitor and model temperatures and increase discharge if needed to maintain the buffer, while limiting discharge to only what is needed to maintain the buffer.
It was noted that there has been some delay in adult passage at Little Goose, and that it is easier to keep the water cool for fish than to have to mitigate temperatures after water has warmed. Various TMT members expressed appreciation to Steve Hall and the Walla Walla District for their attention to these issues.

Steve Hall walked TMT though a number of potential scenarios for the remainder of the summer flow season, noting that he would like Salmon Manager's recommendations on how they would like to see the flows shaped through July and August. The various scenarios and forecasts are available on the TMT website (agenda link). Steve noted that he does not expect to be able to operate below full powerhouse capacity and maintain the 1-1.5 degree buffer throughout July. There was inquiry as to how much of an impact the available water is likely to have on water temperatures. Steve noted that management strategies affect temperatures differently, for instance, spilling over the surface weirs will release warm surface water, whereas turbines release deeper, cooler water. Steve postulated that with the amount of water available, the project may be able to reduce temperatures at Lower Granite within a couple of degrees. He also noted that the 1-1.5 degree buffer is necessary in order to allow the project to be responsive

without exceeding 68 degrees. It was noted that TMT will continue to track and manage this operation throughout the season.

Operations Review

Reservoirs: Mary Mellema, BOR, reported on Reclamation projects:

- Grand Coulee elevation was 1,282.9ft and is continuing to fill; the project expects to reach refill by mid-July and then begin summer draft operations.
- Hungry Horse elevation was 3,549.7ft with 2.5kcfs outflow and inflows at 2.4kcfs. The BOR will be shaping more water into July (monthly average of approximately 2.5kcfs), with less in August (monthly average of approximately 2.0kcfs) in order to support Flathead Lake elevations. The project still anticipates the 20ft draft and meeting the Columbia Falls minimums.

Lisa Wright, COE-NWD, reported on Corps projects:

- Libby was at elevation 2,442.8ft, with 12.9kcfs inflow and 9.4kcfs outflow.
- Albeni Falls was at elevation 2062.3ft., with 17.3kcfs inflow and 18.7kcfs outflow.
- Dworshak was at elevation 1,589.5ft with 1.0kcfs inflow and 9.6kcfs outflow.
- Lower Granite average outflow was 30.8kcfs.
- Bonneville average outflow was 150.6kcfs.
- McNary average outflow was 156.3kcfs.

Fish: Paul Wagner, NOAA, reported on fish. Sub-yearling Chinook passage index is around 6,000 at Lower Granite and Little Goose; these numbers are down from around 15,000 earlier this week. Sub-yearling passage at McNary is around 102,000; 70,000 at the John Day; and 15,000 at Bonneville. The sub-yearling passage peak is over in the Snake River, and in the Lower Columbia this is traditionally peak passage time. Sub-yearling mortality is up at the John Day Dam, around 14%, other projects are seeing 1-2% mortality. Paul noted that the mortalities are predominately disease related and are likely impacted by the higher water temperatures, low flow conditions, and/or infected fish from hatchery releases. In order to reduce harm caused to the smolts through handling, the amount sampled will be reduced at JDA, BON and MCN. Juvenile lamprey passage at MCN is looking relatively good, however, BON and JDA juvenile lamprey passage is low.

In regards to adults, Paul noted that the numbers are looking good at Bonneville: summer Chinook are at 170% of the 10-year average with 101,000; Sockeye are at 220% of the 10-year average with 357,000; and Lamprey passage is around 10,500 so far this year. At Lower Granite, adult Chinook passage is 8,975 which is 100% of the 10-year average; Sockeye passage is 75 which is 200% of the 10-year average. The Salmon Managers are keeping an eye on Sockeye conversion between Ice Harbor, Lower Monumental and Little Goose, noting that the passage index is 372, 313, and 250 respectively. It was noted that last weekend (6/27 and 6/28) there were days with no passage over Little Goose, which indicates stalling. This is expected to be due to increased forebay temperatures, which got up to 82 degrees, but since have dropped back down to 72 degrees with passage increasing to 22-25/day. Pete Hassemer, ID, noted that yesterday's Sockeye counts at Bonneville were up and they are expecting that this year's passage index will exceed the pre-season prediction.

Water Quality: Tina Lundell, COE-NWD, reported on water quality. She noted that all of the gauges are operating properly and there are no TDG exceedences to report. The Corps will continue to implement summer flow operations.

Power System: Tony Norris, BPA, shared a letter from BPA to adjacent utilities and balancing authorities which outlines the protocol that those entities need to go through prior to requesting BPA's assistance with power system emergencies. Tony noted that BPA prioritizes their Endangered Species Act requirements, however, in times of low water flow and high temperatures, energy emergencies do happen. He also reminded TMT members that BPA is open to suggested edits on their Power System Emergency Action Plan (available as an appendix to the Appendix to the 2015 Water Management Plan - http://www.nwd-wc.usace.army.mil/tmt/documents/wmp/2015/), specifically regarding any desired TMT protocol for low flow years. FPAC is planning to discuss these protocols at their meeting next week.

- ACTION: FPAC will discuss the Power System Emergency Action Plan list and if necessary provide suggested edits to BPA.

Update: Bill Proctor, COE-NWD, reported that the Corps will be undergoing a server consolidation next week and Corps websites will be down for at least a day. The consolidation is planned for Tuesday, July 7th.

- ACTION: The Corps will email TMT to let them know of the server shut down and any potential implications to next week's TMT call.

The next TMT meeting will be a conference call on July 8th at 9:00am.

Columbia River Regional Forum
TECHNICAL MANAGEMENT TEAM—OFFICIAL MINUTES

July 1, 2015
Minutes: Pat Vivian

1. Introduction

Representatives of the COE, BPA, NOAA, Washington, Idaho, Nez Perce Tribe, Colville and CRITFC/Umatilla tribes, BOR, Oregon, USFWS, Montana and others participated in today's discussion. Doug Baus, COE, chaired the meeting, with facilitation by Emily Plummer, DS Consulting. This summary is an official record of the proceedings, not a verbatim transcript.

2. Review Meeting Minutes – June 17, 24 and 25

Review of these facilitator's notes and official minutes was postponed until the next TMT meeting.

3. Dworshak/Lower Granite Water Temperature

Steve Hall reported. The Lower Granite tailwater temperature is now around 65.5 degrees F after last weekend's high. According to modeling done on Friday, June 26, the COE considered two options (see graphs 3a and 3b linked to today's agenda) for preventing temperature exceedances. The options were (1) raise Dworshak releases to 12.5 kcfs on Saturday, or (2) raise releases to the gas cap of around 13.8 kcfs. Temperatures at Orofino and Anatone were forecasted to soar over the weekend, pushing the Lower Granite tailwater close to 68 degrees F without much buffer. So the COE increased Dworshak releases to 12.5 kcfs on Saturday as a precaution against temperature exceedances at Lower Granite.

Modeling results from June 30 yielded two surprising findings: (1) Temperatures at Anatone didn't increase as predicted, and (2) On June 28, Idaho Power discharges out of Hells Canyon peaked at 18 kcfs with temperatures in the range of 17 degrees C. This was cooler than expected, so temperatures at Anatone rose more slowly than predicted, while temperatures at Orofino did rise. Then June 28 brought a region wide thunderstorm and dramatic cooling.

As a result of these weekend changes, the Action Agencies realized that less cool water was needed than initially thought. After running the model Monday morning, June 29, Dworshak was reduced to full powerhouse. In the interest of conserving cool water, the COE and BPA will further reduce discharges to half powerhouse, or 5.3 kcfs, tonight. Based on model runs to date, it appears that 5.3 kcfs discharges can safely continue through the 4th of July weekend before ramping back up to normal augmentation flows. Moving forward, the COE is making every effort to conserve water, while doing what's necessary to maintain the 1-1.5 degrees F buffer that TMT recommended last week.

Hall apologized that the COE didn't notify TMT of the operational changes this weekend. The possible switch to 12.5 kcfs had been discussed at TMT last week and occurred at midnight on June 26.

The use of different analog years in modeling runs came up. Hall said 2013 matched some trends better over the weekend (attachment 3a to today's agenda), while 2003 was a better match for conditions this week (attachment 3b). Erick Van Dyke, Oregon, asked whether using 2013 as an analog year produced a flatter profile. That is driven more by the National Weather Service's air temperature forecasts than the use of data from analog years, Hall replied. Analog year data are used to cue patterns in the Orofino and Anatone temperature forecasts, but these are shifting to match up with observed flows as well as Brownlee releases. The COE is using analog years to assess shape rather than magnitude this year, which is drier than all water years on record.

Russ Kiefer, Idaho, thanked the COE for keeping temperatures down, given the complexity in these predictions. It appears that warm temperatures have already delayed adults at Little Goose. The intent was to not get "behind the curve" by starting the 4th of July weekend with cooler temperatures, Hall said. He showed TMT a graph of potential operational scenarios for the remainder of the season (attachment 3c), adding that the current inflows shown on the TMT web page might not be accurate. Dworshak inflows were quoted as less than 1 kcfs recently, which is probably not accurate, and the RFC forecast may not be accurate either in relation to recent readings from the Canyon Ranger Station gage upstream. The COE is in the process of addressing these data issues.

A graph of the planned operation based on TMT guidance to date indicates that following the 68 degrees F target closely with a 1.5 degrees F buffer would put Dworshak flows in the 11-12 kcfs range in the weeks following the 4th of July. Then in August, there would be a reduction to 5 kcfs or so until the Nez Perce operation in September.

Other options modeled were:

- Operating to the gas cap for the entire month of July would mean releasing minimum flows for the rest of August once the reservoir elevation hits 1535 ft.

- Outflows of 11.5 kcfs would extend the volume until approximately August 12, when Dworshak reservoir elevation would hit 1535 ft and the project would go to minimum discharges of 1.5 kcfs for the remainder of August.

- Operating to powerhouse flows of approximately 9.6-10.2 kcfs would take the reservoir to elevation 1535 ft around August 19-20, then to minimum discharges for the remainder of August. A variation on that would be operating at full powerhouse flows through July, then releasing a constant discharge of approximately 6.5 kcfs through August.

Dave Statler, Nez Perce Tribe, asked whether TMT will have in-season management opportunities to reserve cooling capability for August by making decisions in July to operate Dworshak at full powerhouse vs. the proposed operation (the dark blue line on graph 3c). The goal would be to conserve water so elevation 1535 ft is not attained until August 31. Yes, Hall replied, the scenarios for powerhouse releases with flat August spill (light blue line) and the powerhouse to 1535 ft elevation release (yellow line) show what the operation would be if the Salmon Managers were willing to relinquish the 68 degrees F objective at Lower Granite tailwater in order to conserve water.

The COE will continue to maintain a 1.5 degrees F buffer below 68 degrees F for the sake of sockeye passage unless the Salmon Managers decide that conserving water for August takes precedence over temperature control downstream in July. The buffer is needed to meet the temperature objective due to uncertainties in modeling and weather forecasting, as well as Hells Canyon releases and other variables. Erick Van Dyke, Oregon, asked whether the buffer could be tightened, but Hall said not without risking temperature exceedances, which the COE will not do absent clear direction from the Salmon Managers. TMT should be prepared to be asked in July and August for decisions about rationing the remaining water at Dworshak.

There was general agreement that the comparative graph (attachment 3c) does a good job of showing how the reservoir might react to various operations, and that maintaining 68 degrees F at Lower Granite tailwater is still a priority. Statler asked how 5-6 kcfs releases in August would affect temperatures at Lower Granite. That would definitely result in temperature exceedances, Hall replied. There would be a difference of about 2.5 degrees F between half powerhouse and full powerhouse releases under some conditions, such as wind mixing or operational factors. For example, if two units at Lower Granite are operating, it tends to cool temperatures downstream, while surface passage or RSW spill releases the warmest water stored in the reservoir.

4. Operations Review

4a. Reservoirs. Grand Coulee is at elevation 1282.9 ft, filling slowly through the July 4 weekend. Refill is expected in mid-July when the summer draft begins for BiOp flow objectives through the end of August. Hungry Horse is at elevation 3549.7 ft, with inflows of 2.4 kcfs and releases of 2.5 kcfs. To support Flathead Lake level elevations in Montana, more water is being shaped into July. A 20 ft summer draft through September is still anticipated with lower releases in August and September, most likely in the 2 kcfs range. These flows should be sufficient to meet Columbia Falls minimums.

Libby is at elevation 2442.8 ft with average inflows of 12.9 kcfs and releases of 9.4 kcfs. Albeni Falls is at elevation 2062.3 ft with inflows of 17.3 kcfs and releases of 18.7 kcfs. Dworshak is at elevation 1589.5 ft with inflows of 1 kcfs and releases of 9.6 kcfs. Lower Granite average outflows are 30.8 kcfs. McNary average outflows are 156.3 kcfs. Bonneville average outflows are 150.6 kcfs.

4b. Fish. Juveniles: Subyearling passage is strong this year and declining at lower Snake projects, Wagner reported. The Lower Granite passage index peaked at 15,000 last week and is down to 6,000 daily passage now. Little Goose is passing similar numbers, with smaller index counts at Lower Monumental. The McNary passage index is 102,000 to date, approaching its traditional peak over the July 4th weekend. Passage at John Day is in the 70,000 range and at Bonneville, 15,000. McNary is passing some lamprey, but John Day and Bonneville very few.

Subyearling mortalities are typically only 1-2% at the lower river dams, but mortalities at John Day are 14% due to a parasitic infection. In an effort to reduce mortalities, sampling there has been reduced to twice weekly. In general, sampling rates at the lower river projects have been cut back to minimize the number of fish subjected to handling when already stressed by low flows and temperatures that already exceed 70 degrees F. Relative to historic trends, subyearling passage at the lower Snake projects is down, while McNary is approaching peak passage. Temperatures at Lower Granite are well above average for this time of year but still below 68 degrees F. Temperatures at Ice Harbor and McNary are well above average at around 70 degrees F, with cooler temperatures farther up the Columbia River at Wells and Priest Rapids dams.

Adults: Returns this year are strong. To date, 101,000 summer chinook adults have returned to Bonneville, 170% of the 10 year average. The sockeye count to date at Bonneville is 357,000, which is 220% of the 10 year average. The lamprey count is 10,500, which is 170% of the 10 year average. At Lower Granite, the summer chinook adult return is 8,975 to date, nearly 100% of the 10 year average. Jack counts are also around 100% of the 10 year average. Sockeye returns at Lower Granite are 75 to date, which is 200% of the 10 year average. Adult sockeye returns are 372 to date at Ice Harbor, 313 at Lower Monumental, and 250 at Little Goose. There was stalling in the Little Goose fish ladder when forebay temperatures rose to 82 degrees F. So far the sockeye count at Goose is ahead of the 10 year average, but temperature issues could be problematic this year, with forebay temperatures at Goose already hovering around 78 degrees F.

Pete Hassemer, IDFG, reported that Snake River adult sockeye returns at Bonneville are increasing daily. The run appears to be early this year, with a hefty pre-season projection of more than 1,800 fish. Although it's too early to tell whether fish passage is already slowing down in the Snake, past observations indicate that passage at the next upstream dam should mirror the previous day's count downstream. So the difference of 150 fish between Lower Monumental and Little Goose raises concerns.

4c. Water Quality. Tina Lundell, COE, reported that all gages are functioning properly and there have been no TDG exceedances.

4d. Power System. Tony Norris, BPA, showed TMT the BPA 2015 Summer Emergency Protocols linked to today's agenda. Every year, BPA sends this letter to

utilities and balancing authorities notifying them of ESA-related protocols they need to follow when requesting emergency energy from BPA. These are the same protocols the Salmon Managers were asked to review a few weeks ago. Wagner said FPAC will discuss the emergency actions in light of current conditions on its next conference call.

4e. TMT Website Access. Bill Proctor, COE, announced that the COE servers will be consolidated on Tuesday, meaning the public server for the TMT web page might be down for a while. Baus will keep TMT apprised via email.

5. Next TMT Meeting

TMT will have a conference call July 8 to discuss Dworshak/Lower Granite temperature operations and sockeye passage.

Name	***Affiliation***
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Michelle Yuen	COE
Karl Kanbergs	COE
Mary Godwin	COE
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Scott Bettin	BPA
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Paula Calvert	ODEQ
Joe Skalicky	USFWS
Tom Lorz	CRITFC
Jim Litchfield	Montana
Erick Van Dyke	Oregon