COLUMBIA RIVER TECHNICAL MANAGEMENT TEAM

June 29, 2016

Facilitator's Summary

Facilitator: Emily Plummer; Notes: Tory Hines 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 Meeting Minutes

The official TMT Minutes and the Facilitator's Summaries for the June 15th and June 22nd meeting were reviewed and approved by TMT members, pending the following:

- In the June 22 Official Minutes, Section 2 "*Termination of Transport*", paragraph one, "...the few fish that show up at Little Goose..." was revised to read "…the few fish that show up at Lower Granite…".
- Charles Morrill, WA, requested additional time to review the minutes. If Charlie provides substantive edits, they will be brought back to the TMT for review.

Dworshak Dam Operations

Steve Hall, COE-NWW, reported on water temperatures in the Snake River and Clearwater River. Currently, Lower Granite (LWG) tailwater is at 66 degrees Fahrenheit. Water temperatures at Anatone and Orofino rose above 70 degrees Fahrenheit as air temperatures steadily climbed throughout the week.

Over the weekend, discharges out of Dworshak were held at 2.4kcfs to conserve water as much as possible and maintain the target of 67 degrees as coordinated at TMT. The reservoir touched full and on the morning of 6/27 discharge was increased to 7kcfs because model results indicated that water temperatures were approaching 67 degrees Fahrenheit within three days.

Between June 27th-28th, Idaho Power discharged an additional 5kcfs of warm water beyond what the model was anticipating. The following model run showed temperature exceedances above 68 degrees Fahrenheit by July 1st, triggering an increase to full powerhouse, 9.4kcfs, on June 28th to keep temperatures below 68 degrees Fahrenheit.

The Corps will continue to run models daily to inform the current operation target of 67 degrees Fahrenheit in the LWG tailwater.

Dave Statler, Nez Perce, asked if discharge requests are based on the target tailwater of 67 degrees Fahrenheit. Steve responded yes, as coordinated at TMT last week, the Corps is operating Dworshak not to exceed 67 degrees Fahrenheit in the LWG tailwater. Charles Morrill noted that he was surprised to see the change in outflow. Steve noted that per TMT direction, the Corps is operating to the 67 degree target, and if temperatures and space in the reservoir allow, discharge will be decreased in an effort to conserve water for later in the season. Charles wondered if outflows were maintained at 3.6kcfs over the weekend, would it mean that full powerhouse would not be necessary now? Steve noted that with increasing air temperatures and warm water coming from Hells Canyon, full powerhouse was necessary to stabilize water temperatures. In addition to solar radiation, the LWG spillway weir is in operation and passing water as warm as 25 degrees Celsius. Erick Van Dyke, OR, asked if there have been any temperature exceedances at LWG tailwater. Steve noted that the current temperature is 66.3 degrees Fahrenheit and there have not been any exceedances due to the operational change made on Monday.

Jim Litchfield, MT, recommended closing the spillway weir to limit warm surface water from moving downstream to help cool the river. Lisa Wright, COE-NWW, stated there are new FPP criteria this year that

would require the RSW to close when flows are below 30kcfs. NOAA proposed to close the RSW at LWG now for the remainder of the season and the Salmon Managers caucused to discuss.

Following their caucus, Salmon Managers reported back with unanimous consensus, of those present (NMFS, USFWS, OR, ID, WA, MT, Nez Perce, and Tom Iverson), to close the RSW at LWG as soon as possible through the remainder of the spill season. They expressed that there are concerns over the effects of the RSW closure on subyearling passage and the inability to monitor the impact on them; however, given the temperature conditions, they felt that closing the RSW was a preemptive measure necessary to manage increasing water temperatures. Steve noted that an updated model showing the RSW closure would be provided tomorrow. Erick Van Dyke asked that the Action Agencies continue to monitor the delta difference between the forebay and tailwater locations.

- **ACTION**: The Corps will take the RSW out of service at LWG and implement the spill pattern for uniform spill with no RSW, as defined in the Fish Passage Plan. The Corps will implement the operation as soon as operationally possible. If the change occurs after June 30th, the Corps will notify TMT members via e-mail.

Little Goose Emergency Pumps Operation
Ann Setter, COE-NWW, reported that the new cooling pumps at Little Goose Dam (LGS) that will provide cool water to the fish ladder will be operable by the end of the day on June 30th. She asked Salmon Managers if they should turn on the pumps at that time. Salmon Managers supported turning on the pumps as soon as possible. Dave Statler asked what temperature of water would be pumped in to the ladder. Ann estimated that water temperatures pumped from 20 meters down would be roughly 63 degrees Fahrenheit and would mix with ladder temperatures of 72 degrees Fahrenheit.

- **ACTION:** The Corps will finish installing and turn on cooling pumps that will provide cool water to the LGS fish ladder by Thursday, June 30th. Ann will provide an update on the operation at the next FPOM meeting.

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

- Hungry Horse midnight elevation was 3,558.4ft, with 3.0kcfs inflow and 2.1kcfs outflow.
- Grand Coulee midnight elevation was 1,286.9ft.

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

- Libby midnight elevation was 2,438.3ft, with 7kcfs outflow and 17kcfs inflow.
- Albeni Falls midnight elevation was 2,062.4ft, with 22.5kcfs inflow and 21.1kcfs outflow.
- Dworshak midnight elevation was 1,599.1ft, with 1.8kcfs inflow and 8.1kcfs outflow.
- Lower Granite average outflow was 43.5kcfs.
- McNary average outflow was 197.6kcfs.
- Bonneville average outflow was 196.1kcfs

Following FPP criteria, the Little Goose spillway weir (SW) will be removed once flows fall below 35kcfs. The current flow forecast indicates that flows will be above the threshold for the next 10 days. The Corps is monitoring the forecast and will remove the SW once flows fall below 35kcfs, unless otherwise coordinated with Salmon Managers.

Fish: Paul Wagner, NOAA, reported on fish. For adults:

- Bonneville: Sockeye counts are 255,000 (155% of the 10-year average); Sockeye conversion from Bonneville to The Dalles is looking promising so far this season. Summer Chinook counts are

71,667 (116% of the 10-year average); Jack counts are 6,220 (47% of the 10-year average); Lamprey counts are 11,145 (well above the 10-year average).

- The Dalles: Sockeye counts are 212,000, counts are lower overall from 2015; Lamprey are showing up as well, however, in smaller quantities.
- McNary: Sockeye counts are 164,799 (225% of the 10-year average); Summer Chinook counts are 39,950 (107% of the 10-year average); Jack counts are similar to Bonneville (45% of the 10-year average); Lamprey counts are low.
- Ice Harbor: Sockeye counts are 200, indicating that Sockeye are converting at Snake River projects.
- Lower Monumental: Sockeye counts are 148.
- Little Goose: Sockeye counts are 60, but that does not include yesterday's count (data still pending).
- Lower Granite: Summer Chinook counts are 4,784 (63% of the 10-year average). Sockeye counts are 27, but that does not include yesterday's count (data still pending). Adult passage will be monitored at LWG to see if the cooling pump installed at Little Goose positively affects conversion rates. Last year, below Little Goose was the location where Sockeye stalled.

Russ Kiefer, ID, stated that sockeye numbers are picking up at LWG. Researches are reviewing PIT-tag data which show 100 Snake River Sockeye have passed Bonneville; expanding that count, they estimate a total of 456 have passed BON so far this season. It is still early in the run and so far 74% of PIT-tagged sockeye have made it from BON to MCN. Total season estimates for Snake River Sockeye are expected to be a third of last year (1,300).

For juveniles, subyearling passage is declining at LWG, 15,000-30,000 passing last week and 5,000 passing this week. LGS peaked with 6,700 subyearlings passing on June 28th and 1,000 passing at LMN. At McNary, 684,000 passed in part due to large hatchery releases last week. Steelhead and sockeye are done for the season. Some lamprey juveniles have passed LGS, LMN, MCN and JDA.

Paul also provided a link to updated hourly ladder temperature data that can be found on the Fish Passage Center webpage (http://www.fpc.org/river/Q_ladderwatertempgraph.php). It provides temperatures throughout the ladder. Data presented are 1 week post actuals, however, may assist with post-season data analysis on ladder performance.

Water Quality: Scott English, COE-RCC, noted that all gauges are operational, functional and transmitting properly. TDG is low and uniform throughout the system.

***Power System*:** Tony Norris, BPA, noted that there is nothing to report.

The next TMT meeting will be conference call on July 6th at 1:00pm.

Columbia River Regional Forum
TECHNICAL MANAGEMENT TEAM OFFICIAL MINUTES

June 29, 2016
Minutes: Pat Vivian

1, Introduction

Representatives of NOAA, USFWS, Montana, BPA, COE, Washington, Oregon, Colville Tribe, BOR, Idaho, Yakama Nation and others participated in today's TMT meeting. Doug Baus, COE, served as chair with Emily Plummer, DS Consulting as facilitator. This summary is an official record, not a verbatim transcript.

2. Review Meeting Minutes – June 15 and June 22

Paul Wagner, NOAA, noted that "fish at Little Goose are often diseased" should read "fish at Lower Granite…" in the second paragraph on the first page of the June 22 official minutes that describes the COE truck transport proposal. With this change, the notes and minutes were deemed final.

3. Dworshak Dam Operations Update

Steve Hall, COE Walla Walla, described current conditions at Lower Granite tailwater shown in link 3a to today's agenda. The tailwater temperature is 66 degrees F and has been steadily rising for most of this week. After leveling off for a few days, temperatures are climbing again. The graph shows that changes made on Monday, June 27, have reached Lewiston but not Lower Granite yet. Temperatures on the Snake River at Anatone are 70 degrees F and rising.

Over the weekend, Dworshak discharges were 2.4 kcfs in accordance with TMT's advice to target 67 degrees F in the Lower Granite tailrace, and Dworshak reservoir touched full. The June 27 model run indicated that Lower Granite tailrace would reach 67 degrees F in three days' time, so that day the COE increased Dworshak discharges to 4.5 kcfs. Concerned it wouldn't be enough, the COE also modeled a step up to 7 kcfs, which was adopted later Monday as a precaution to keep Lower Granite tailrace temperatures below 68 degrees F. The June 27 model indicated that another increase from Dworshak to 8.5 kcfs might be needed starting June 29.

Yesterday's (June 28) model run showed discharges from Idaho Power's Hells Canyon complex were higher than previously assumed. As a result, the model indicated that temperatures at LWG tailrace would exceed 68 degrees F on July 1 without further augmentation. So the COE modeled full powerhouse discharge at DWR and increased to full powerhouse (around 9.5 kcfs) yesterday at 2 pm. The COE will continue to run daily models and make changes as needed.

Charles Morrill, Washington, said he was surprised to see releases drop over the weekend. In backing off releases on June 27 so the reservoir would touch full (1,599 ft elevation is considered full), the COE operated DWR in accordance with TMT's request to manage LWG tailwater temperatures to 67 degrees F. Allowing the reservoir to refill means the project stored half a foot or more of extra water that will be available for release in August and September as needed. Statler asked whether Hells Canyon discharges affected the modeling that called for additional DWR releases. Hall said yes, the Idaho Power releases led to a decision to increase DWR releases to full powerhouse.

Temperature string data from the LWG forebay show the water surface temperature has risen dramatically in the past few days, Hall said, primarily due to solar radiation. The LWG spillway weir (SW) is still operating, passing 25 degrees C water as of yesterday after mixing with cooler water from the powerhouse. The higher temperatures produced by the weir affect LWG tailwater temperatures. Water volumes and temperatures have risen dramatically over the past few days due to solar radiation and warm flows as measured at the Anatone and Orofino gauges. Last week's prediction that augmentation from DWR would be needed by June 27 turned out to be accurate, but the amount of augmentation was increased to full powerhouse.

Jim Litchfield, Montana, asked whether closing the removable spillway weir (RSW) at LWG is expected to cool the river downstream at LGS and LMN; Hall said yes. Litchfield asked about the turbine depth at LWG. Spilling from deep bays at LWG and stopping surface spill through the RSW would alter downstream temperatures by passing cooler water from 30 ft down, Lisa Wright, COE, said. There's a difference of about 4 degrees C between water from the turbines and the RSW, Litchfield added.

The prospect of closing the RSW raises the question of how to weigh juvenile vs. adult effects, Wagner said. Without the changes made on June 27, the tailwater would probably have exceeded 68 degrees F by now, Hall noted. Current LWG tailwater temperature is 66.3 degrees F. In response to questions, Hall said the LWG pool operating range is 733-738 ft and MOP is 733-734 ft. The spillway crest is at 681 ft, and the bottom of the turbine intake is at 599 ft. So when LWG is operating in the MOP 1-ft range of 733-734 ft, the spillway crest is at a depth of 52 ft (approx. 15 meters) and the turbine intakes are at a depth of 134 ft (approx. 40 meters).

Bill Hevlin, NOAA, said the RSW at LWG should be closed and spill distributed through the deeper spillbays for the sake of temperature control in the lower river. The LWG forebay is at 25 degrees C; spill from the RSW is negatively affecting temperatures downstream. It's a different situation than last year now that cool water is available at the ladder exit.

The Salmon Managers caucused in order to decide whether to recommend closing the RSW at LWG. They reached a unanimous decision, given rising temperatures, that the RSW should be closed as a preemptive measure to keep LWG

tailwater from exceeding 68 degrees F. It is not known how subyearlings will react to the RSW closure.

In accordance with the Salmon Managers' request, the COE will take the RSW out of service and implement the non-RSW spill pattern, Baus said. The change will probably occur this afternoon or tomorrow morning, Ann Setter, COE Walla Walla, added. If it takes longer than a day, TMT will be notified via email.

Erick Van Dyke, Oregon, asked how closing the RSW at LWG will impact temperature modeling. The COE will decrease discharges at DWR if tomorrow's modeling indicates that would be advisable, Hall said. If modeled offset temperatures drop below 66 degrees F, the COE will change the operation.

4. Little Goose Dam Operations

Ann Setter, COE Walla Walla, said the COE expects to be ready late Thursday to turn on the rental cooling pumps at the Little Goose ladder exit by the end of the day tomorrow (June 30) and asked if there were any objections to activating the pumps as soon as possible. Further data review and discussion will occur next week at FPOM. Several of the Salmon Managers responded:

- **Idaho** – Supports turning on the pumps.

- **Oregon** – No objection; wants an update and discussion at FPOM.

- **Nez Perce** – No objection, but wondered what temperature water will be pumped in relation to ladder temperatures. On June 28, water of 63 degrees F was pumped from 60 ft deep and mixed with surface water of 72-73 degrees F at the ladder exit, Setter replied.

On June 30 or whenever installation is complete, the COE will turn on the pumps at the ladder exit and provide TMT with an update at its next meeting July 6.

5. Operations Review

5a. Reservoirs. Mary Mellema BOR, and Lisa Wright, COE, reported.

Hungry Horse is at elevation 3558.4 ft with inflows of 3.0 kcfs and discharges of 2.1 kcfs. Grand Coulee is at elevation 1286.9 ft. Libby is at elevation 2438.3 ft with inflows of 17 kcfs, releasing minimum flows of 7 kcfs. Albeni Falls is at elevation 2062.4 ft with inflows of 22.5 kcfs and releases of 21.1 kcfs. Dworshak is at elevation 1599.1 ft with inflows of 1.8 kcfs and releases of 8.1 kcfs. Lower Granite average releases are 43.5 kcfs, McNary average releases are 197.6 kcfs, and Bonneville average releases are 196.1 kcfs.

The COE is keeping an eye on flows at Little Goose and is prepared to remove the SW when flow drops below 35 kcfs per Fish Passage Plan criteria, as discussed at last week's TMT meeting. Flows are forecasted to remain above the 35 kcfs threshold for the next 10 days.

5b. Fish. Paul Wagner reported.

Adults: The adult sockeye count at Bonneville Dam is 265,000 to date, which is 155% of the 10 year average and well above the forecasted return of 100,000. Summer chinook arrivals are 71,667 to date, which is 116% of the 10 year average. The jack count of 6,220 is 47% of the 10 year average. The lamprey return of 11,145 is well above the 10 year average. It's too soon to report on adult steelhead migration.

The Dalles Dam is seeing some adult lamprey and 212,000 sockeye returns, a marked improvement over last year. Sockeye conversion looks good at this point. McNary passed 164,799 sockeye, which is 225% of the 10 year average. Ice Harbor passed 200 sockeye, Lower Monumental 148, Little Goose 60, and Lower Granite 27 sockeye to date. Sockeye appear to be converting; their progress is being closely monitored. Hopefully they won't stall at Little Goose this year with the pumps in place.

Lamprey counts at McNary Dam are low. The McNary summer chinook return of 39,950 is 107% of the 10 year average. The jack return is only 45% of the 10 year average, very similar to Bonneville's return. Spring chinook passage at LWG exceeded the 10 year average.

Kiefer gave IDFG estimates of Snake River sockeye returns. Snake River counts listed on the FPC webpage don't reflect IDFG's sockeye tally from yesterday. The researchers observed 100 PIT tagged Snake River sockeye at BON as of two days ago, with an expanded estimated overall return of 466 adults at BON. An early estimate of conversion success indicates that 74% of PIT tagged Snake River sockeye made it from BON to MCN as of a few days ago. The run appears to be moving upstream successfully.

Van Dyke asked how this compares to last year's run. Approximately twice as many Snake River fish had migrated past BON by this date last year, Kiefer replied. Last year's run estimate was 4,000 fish, while this year's estimate is 1,300 or about a third of last year. It's too early to gauge conversion rates from BON to LWG. Percentage estimates for this year's run vs. last year would be a useful comparison, Morrill noted.

Juveniles: Just recently, subyearlings were still passing Lower Granite at the rate of 15,000-30,000 per day but are down to 5,000 per day as of yesterday. Subyearling passage peaked at Little Goose yesterday with 6,700 and is declining. Passage at Lower Monumental peaked at 1,000 and is likewise declining.

June and early July is prime passage time for juveniles on the lower river. The combined subyearling passage index at McNary is 684,000, which includes fish from

Hanford as well as Priest Rapids and Ringgold hatcheries. Passage numbers are picking up at John Day and Bonneville as well. Juvenile sockeye and steelhead passage is over for the year. Some lamprey juveniles have passed Little Goose, Lower Monumental and McNary dams, but lamprey passage at John Day Dam is lagging.

Hourly temperature data from various locations within the fish ladders at Lower Snake River projects and McNary Dam are now available on the FPC website, Hall said. Data are manually uploaded and posted once per week, so there may be up to a week lag in data availability. Real-time ladder temperature data for Lower Granite are posted on the TMT website. These data give a sense of how river temperatures are reacting to operational decisions and whether temperatures at specific ladders are stable or increasing, or if there are differentials (i.e., thermal blocks) developing. The Little Goose ladder is already showing a differential between the fishway entrance and exit. That is why the cooling pumps were installed. Ladder temperature data will be updated regularly as passage season progresses.

5c. Water Quality. Scott English, COE, reported that all monitoring stations are functioning properly and TDG readings are low system-wide.

5d. Power. There was nothing to report today.

6. Next TMT meeting

TMT will meet next in a conference call at 1 pm on July 6. Topics on the agenda include Dworshak augmentation flows, pump operations at Little Goose and possible discussion of the Little Goose spillway weir.

Name	***Affiliation***
Paul Wagner	NOAA
Dave Swank	USFWS
Jim Litchfield	Montana
Tony Norris	BPA
Doug Baus	COE
Lisa Wright	COE
Julie Ammann	COE
Tory Hines	DSC
Laura Hamilton	COE
Michelle Yuen	COE
Scott English	COE
Bill Hevlin	NOAA

Phone:

Charles Morrill	Washington
Erick Van Dyke	Oregon
Sheri Sears	Colville
Mary Mellema	BOR

Russ Kiefer	Idaho
Steve Hall	COE Walla Walla
Alfredo Rodriguez	COE Walla Walla
Tom Iverson	Yakama
Margaret Filardo	FPC
Michael Bryant	CBB
Laura Berg	Energy News Data
Scott Bettin	BPA
Lynn Polenski	NPCC