COLUMBIA RIVER TECHNICAL MANAGEMENT TEAM

October 21, 2015
Facilitator's Summary
Facilitator: Emily Plummer, DS Consulting; Facilitation Support: Tory Hines, DS Consulting

The following notes are a summary of issues that are intended to 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
Russ Kiefer, ID, suggested NOAA review and clarify the description in the September 16th Facilitator's Summary, regarding the relationship between fish transport numbers, flow, spill percentage and survival.

- **ACTION**: NOAA will review the language from the September 16th TMT meeting and provide revised language accordingly. The summary will be reviewed again at the November 18th TMT meeting.

Draft 2016 Water Management Plan
Doug Baus, COE-NWD, noted that the first round of comments on the 2016 Draft Water Management Plan is due by October 31st, 2015. Jim Litchfield, MT, asked if there were any major changes from the 2015 Water Management Plan. Doug highlighted changes in the Libby and Dworshak operations. Doug also encouraged everyone to use the PDF 'compare' feature which will highlight the changes between the 2015 final and the draft 2016 Water Management Plan. He continued that if there are suggested edits or missing pieces, please bring that to the Action Agency's attention.

- **ACTION:** The first round comments on the Draft 2016 Water Management Plan are due by October 31st, 2015 and second round comments are due on November 17th, 2015. All comments and track changes should be submitted to Doug Baus (COE), Scott Bettin (BPA), Mary Mellema (BOR) and Tony Norris (BPA).

2015 Preliminary Survival Estimates
Paul Wagner, NOAA, presented the 2015 Preliminary Survival Estimates for the passage of spring-migrating juvenile salmonids through the Snake and Columbia River dams and reservoirs (see draft report linked to TMT agenda). Paul noted that the data provided are estimates of survival rates; the final report will be available in February of 2016. He noted that 2015 was a year of low flows, warm temperatures and high spill percentages which all contributed to the low measured survival rates. Paul described Table 3 of the report, which illustrates survival estimates for Snake River yearling Chinook salmon from 1997-2015. It shows that the survival rate from the trap to Lower Granite dam for Chinook was 91%, which is below the 17 year average of 93%. For 2015, the following survival estimates were provided:

- LGR – MCN: 69%, 2004 was the last time rates were in this range.
- MCN-BON: 63%
- LGR-BON: 44%
- Trap-BON: 40%

Jim Litchfield, MT, asked why the confidence interval for chinook increased over the reach from LGR to BON, noting that from the trap to Bonneville the interval decreased, suggesting the estimated survival rates were more accurate for the longer reach. Paul noted it would be a good question for Steve Smith at the NOAA Science Center. Paul continued to Table 5 which illustrates survival estimates for Snake River Steelhead from 1997-2015. For 2015, the following survival estimates were provided:

- Trap-LGR: 87%, in 2014 this number was in excess of 100%.
- LGR-MCN: 62%, slightly lower than 17 year average (64%).

- MCN-BON: 66%
- LGR-BON: 41%, close to the average 17 year average (46%).
- Trap-BON: 36%, considerably lower than the 17 year average (45%).

Russ Kiefer, ID, noted that the low survival estimates from the trap to Lower Granite were possibly due to smolt residualization due to tough migrating conditions. Paul agreed that the fish were reported as being very stressed and evaded the trap, which likely brought numbers down for that reach. Table 6 illustrates survival estimates for yearling Chinook salmon and Steelhead originating in the upper Columbia River. For 2015, the following estimates were provided:

- Yearling Chinook Salmon, Release-MCN: 51%
- Yearling Chinook Salmon, MCN-BON: 87%
- Steelhead, Release-MCN: 35%, within the range of past years.
- Steelhead, MCN-BON: 57%, lower than the 17 year average (75%).

Table 7 illustrates estimates for Sockeye salmon from Lower Granite Dam tailrace to Bonneville Dam tailrace for fish originating in the Snake River, and from Rock Island Dam tailrace to Bonneville Dam tailrace for fish originating in the upper Columbia River, 1996-2015. For 2015,

- Snake River Sockeye, LGR-MCN: 70%, above the 17 year average (63%).
- Snake River Sockeye, MCN-BON: 53%, below 17 year average (58%).
- Snake River Sockeye, LGR-BON: 37%, below 17 year average (42%).
- Upper Columbia Sockeye, RIS-MCN: 76%, above 17 year average (66%).
- Upper Columbia Sockeye, MCN-BON: 44%, below 17 year average (74%).
- Upper Columbia Sockeye, RIS-BON: 34%, below 17 year average (51%).

The Mean Spill graph on page 19 presents spill as a percentage of total project outflow. Paul noted that this year it was considerably higher than the mean. Laura Hamilton, COE, stated that spill at Lower Monumental Dam averaged 49% spill because it has a fixed spill rate. Lower Monumental had the highest proportion of spill compared to 5-10 years back and is a reflection of very low flows.

Paul continued to describe that fish passed as early as April 1, 2015 and travel time was slower in 2015 than in prior years, but not a large difference. The detection probability graph illustrates that with spill being relatively high, less than 20% of yearling Chinook were detected and less than 10% of Steelhead were detected at many of the dams. For wild Chinook salmon, transportation rate was 11.4% and hatchery transport rate was 13.6%. For Steelhead, wild transport rate was at 12.4% and hatchery transport was 13.9%. Charles Morrill, WA, asked the percentage of fish were detected in the trawl that were detected at Bonneville. Paul noted that even with low flows the trawl did well, with detection percentages in the 2-2.5% range. Paul noted that Jim Faulkner of the Northwest Fisheries Science Center indicated that the trend across the season appeared that the fish migrating early had higher survival estimates than those later on in the season.

Operations Review

Reservoirs

Lisa Wright, COE-NWD, reported Reclamation and Corps projects:

- Hungry Horse midnight elevation was at 3,532ft with 2.8kcfs outflows and inflows of .5kcfs.
- Grand Coulee midnight elevation was at 1,284.3ft, with 73.4kcfs outflows and inflows of 77.3kcfs.
- Libby was at elevation 2,440.6ft, with 3.8kcfs inflow and 4kcfs outflow.
- Albeni Falls was at elevation 2,056.1ft, with 8.8kcfs inflow and 22kcfs outflow.
- Dworshak was at elevation 1,515.6ft, with .8kcfs inflow and 1.6kcfs outflow.
- Lower Granite average outflow was 18.3kcfs.
- McNary average outflow was 81.6kcfs
- Bonneville average outflow was 89.7kcfs.

Erick Van Dyke, OR, noted the STP is forecasting an estimate of 117kcfs, he noted it may be a challenge to reach 125kcfs for 11.5ft tail water elevation once chum flow augmentation commences. He asked if the Corps would provide flow for chum at the 125kcfs level or if they will reassess once flows are released. Scott Bettin, BPA, stated that is a better question to ask the Bureau of Reclamation, as the augmented flow will come from Grand Coulee, and noted that the critical part is when you start drafting. Tony Norris, BPA, noted that BPA relies on west side precipitation to provide incremental stream flow to help prop up tail water. He continued that there will be a delayed response as there is a waiting period for reservoirs to fill once rain begins.

- **ACTION:** At this time the tentative plan for chum operation will be the same operation coordinated last year. The operation would begin with a tailwater elevation of 11.5 to 13.0 feet beginning on November 7TMT will revisit the chum operation at the November 4th TMT meeting, unless there is significant rainfall and then an interim meeting will be scheduled.

Fish

Paul Wagner, NOAA, reported on fish. He noted that 2015 was a great year for Fall Chinook at Bonneville, with a total number close to 940,000 (210% of the 10 year average). Jack counts were at 81,000 (106% of the 10 year average). He continued that Fall Chinook counts are looking strong going forward. For Steelhead, the numbers were not as good, an estimated 263,000 for both wild and hatchery combined (75% of the 10 year average). For wild Steelhead alone, the annual estimate was 91,558 (85% 10 year average). For Lower Granite, 57,370 fall Chinook counted (212% 10 year average at LGS). For Jacks, 10,478 thus far into the season (65% 10 year average), a bit lower than what Bonneville indicated. At Bonneville, Steelhead numbers were at 118,500 for wild and hatchery combined (78% 10 year average) and 38,800 for wild Steelhead (84% 10 year average).

For juveniles, the season is virtually over. The only projects still collecting juveniles are at Lower Granite and Little Goose, with a few 100 over the past week. Lower Monumental has shut down collection for the season and Bonneville is collecting a few hundred per day. Juvenile monitoring will shut down on October 31st.

Water Quality

Laura Hamilton, COE, provided an update on water quality. She noted that starting in August, the John Day gauge was drifting and the Corps has been working with USGS to determine the reason an impact to data. Other gauges had experienced the same drifting issues, however, reference gauges were installed and the drift was verified as accurate data. However, the John Day gauge appeared to continue to drift and the Corps is unsure about the validity of the data and is working with USGS to review. Laura noted that some possible causes of why the gauge drifts are: bacterial biofilm, unknown hydraulics, unknown biological processes reducing oxygen in the water and also reducing TDG, algae growths or fouling from dirt and debris. She noted that the gauge drifting appears to be connected with low flow conditions and warmer water temperatures.

Power Systems

Nothing to report.

The next TMT meeting will be a conference call on November 4th at 9:00AM.

Columbia River Regional Forum
TECHNICAL MANAGEMENT TEAM MEETING

October 21, 2015
Minutes: Pat Vivian

1. Introduction and Review of Meeting Minutes

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

Review of the September 16 meeting minutes and facilitator's summary was postponed until the next TMT meeting due to concerns about how the causes of low transport rates in 2015 were characterized. NOAA will supply language to clarify that the low transport rates were the result of early migration before transport started, as well as proportionally high levels of spill.

2. Draft 2016 Water Management Plan

The draft 2016 WMP is posted to the TMT website. Baus invited TMT members to submit comments in track changes by the end of October.

The WMP describes some operations in greater detail and it discusses operations that may modify actions as specifically described in the NOAA Fisheries FCRPS BiOp RPA table. For example, there will be a unit outage at Dworshak that will affect Dworshak operations and at Libby there will be modified operations to facilitate the continued habitat restoration actions. Baus suggested reviewers use the PDF combine feature, which can compare the draft 2016 WMP to the final 2015 WMP and highlight changes.

3. Preliminary Survival Estimates for 2015

The annual NOAA Fisheries preliminary survival memo is out for review, linked to today's agenda. Paul Wagner, NOAA, summarized it for TMT. Final survival data might change when all PIT tag data for the year are available and the final report is released.

The preliminary numbers indicate that low flows and high temperatures in 2015 meant generally below-average survival through most reaches for all listed species. However, the data are not considered as reliable as in previous years. Spill percentages were high, resulting in low rates of transport that left a lot of fish in the river, and low PIT-tag detection rates due to the majority of fish passing via spillways. This created wider confidence intervals for 2015 relative to other years.

Wagner went over the memo's findings by species, noting that wide confidence intervals make it difficult to pinpoint problem locations. Reach survival estimates are more reliable than project survival estimates under these circumstances. Jim Litchfield, Montana, wondered why the confidence intervals tend to be smaller (more reliable) over a longer reach; Wagner said Steve Smith, NOAA, could answer that question.

Charles Morrill, Washington, asked about the effect of spill implementation on survival rates since 2006; Wagner said NOAA hasn't yet looked into this. Erick Van Dyke, Oregon, asked why there were no survival estimates for 2004 and 2005. Maximum transport in both years meant there weren't enough fish in-river below MCN to provide an estimate for those reaches, Wagner replied.

Yearling Chinook: From the Trap to LGR, yearling Chinook survival was 91%, which is lower than the average for all 17 years of survival data (93%), but similar to or better than recent years (84% in 2013 and 92% in 2012). From LGR to MCN, survival was 69%, the lowest since 2004. From MCN to BON, survival was 63%, the lowest since 2008. From LGR to BON, survival was 44%, the lowest since 2004. From the Trap to BON, survival was 39%, which is 10% lower than the 17-year average. Upper-Columbia yearling Chinook didn't fare well in 2015, with 51% survival from release to MCN, which is lower than the 17-year average of 55%. Survival from MCN-BON was 87%, which is above the 17-year average of 81% but below survival estimates in recent years.

Steelhead: From the Trap to LGR, survival was 87%, which is substantially lower than prior years. Russ Kiefer, Idaho, asked whether that was due to low flows and warmer temperatures; Wagner said yes, this year fish were stressed and reluctant to enter the trap. From LGR to MCN, survival was 62%, slightly less than the 17 year average of 64%, and less than the rates of 64% in 2013 and 69% in 2011. Survival from MCN to BON was 66%, lower than in recent years, but not out of line with the past 17 years. From LGR to BON survival was 41%, which was lower than the 17 year average of 46%, and much lower than survival rates in the past 8 years which were higher due to operational changes and structural modifications at the dams. From the Trap to BON, 36% of Snake River steelhead survived, which is considerably less than in the past 17 years and especially in recent years.

Upper Columbia River steelhead survival to MCN was only 35%, which is lower than the 17 year average (42%) but higher than one recent year (28% in 2012). Upper Columbia River steelhead survival from MCN to BON was 57%, which is substantially lower than the 17 year average of 75%.

Sockeye: According to Table 7, estimated survival for Snake River sockeye from LGR to MCN was 70%, which is better than the 17 year average and in line with recent years. However, 45% of Upper Columbia River sockeye survived from MCN to BON (the 17 year average is 74%). From LGR to BON, Snake River sockeye survival was 37% which is 5% less than the 17 year average and considerably lower than the past 7 years. Sockeye did fairly well in the upper Columbia from Rock Island to MCN, but

survival from MCN to BON was only 44% (vs. 74% for the 17 year average). Rock Island to BON saw 34% of sockeye survive. This was an improvement over last year but worse than the 17 year average. Problems at Wanapum Dam could have contributed to low survival rates in 2014.

Confidence intervals and river conditions: Survival data from MCN to JDA has always had wide confidence intervals, Wagner said. Daily flows in 2015 were the lowest in all 17 years of data collection, and temperatures were the highest, as measured at Little Goose. In response to questioning, Wagner will follow up with Montana and Oregon on the confidence intervals, and with the Northwest Fisheries Science Center on whether the 17 years of water quality data are based on forebay or tailrace gauge readings. Mean spill in 2015 was similar to recent years, but this year it was a considerably higher percentage of total project outflow at two of the lower Snake projects, LGR, and LMN.

Passage timing and travel time: Smolt migration began early this year, and a lot of yearling Chinook passed BON before May 1 according to the smolt index. Bettin added that passage bumped on April 3 with the start of spill; fish were present and waiting to move. Wagner noted that juvenile steelhead followed similar migration patterns. As for travel time, fish moved faster this year than in the years before passage modifications and the spill program, but more slowly than recent years. The slowest travel time recorded was in 2001.

Detection probability: Fewer than 20% of PIT tagged yearling Chinook were detected per project as compared to around 30% for most of the past 17 years. For steelhead, detection was in the 10% range at LGR and LGS; even fewer were detected at LMN or IHR. The combination of early fish movement and high spill percentages resulted in record low transport percentages in 2015. Only 11.4% of wild Chinook and 13.6% of hatchery Chinook were transported. Steelhead transport rates were 12.4% for wild fish and 13.9% for hatchery fish.

Charles Morrill, Washington, asked how well the PIT trawl detected fish in the estuary, and Wagner said the range of 2-2.5% was typical; it could turn out to be more than 3% when all the PIT tag data are in. Jim Falkner, who compiled this data had stated there was a general trend of decreasing survival as the year progressed. Russ Kiefer, Idaho, asked whether NOAA has an estimated percentage for sockeye transported. Wagner will check previous years' annual reports for inclusion of that information, as there are no sockeye transport estimates in the preliminary report.

A final report on the survival rates of listed species in 2015 will be published in February 2016. It will contain all PIT tag data collected, broken down into weekly passage survival rates and rates of detection at individual projects. TMT will revisit survival rates of listed species at the TMT year-end review.

5. Operations Review

5a. Reservoirs. Hungry Horse is at elevation 3532 ft with inflows of 0.5 kcfs and releases of 2.8 kcfs. Grand Coulee is at elevation 1284.3 ft with inflows of 77.3 kcfs and releases of 73.4 kcfs.

Libby is at elevation 2440.6 ft with inflows of 3.8 kcfs and releases of 4 kcfs. Albeni Falls is at 2056.1 ft with inflows of 8.8 kcfs and releases of 22 kcfs. Dworshak is at elevation 1515.6 ft with inflows of 0.8 kcfs and releases of 1.6 kcfs.

Lower Granite outflows are 18.3 kcfs, McNary outflows are 81.6 kcfs, and Bonneville outflows are 89.7 kcfs.

Van Dyke noted the STP has BON outflows of 117 kcfs in November which is below 125 kcfs that generally results in a BON tailwater of 11.5 feet. Given this is a dry year, the goal is to start chum flows on November 7 or later, Bettin said. Usually west-side precipitation helps raise the tailwater elevation downstream of BON, but this year the Willamette River system is in deficit, Tony Norris, BPA, reported. This means there will be a delayed reaction to any precipitation in the Cascades in terms of additional flows for chum. Joe Skalicky, USFWS, said he will provide data from past models to help with decision making regarding this year's chum operation.

5b. Fish. Paul Wagner reported. Adults: This was a great year for fall Chinook at BON with a total return of 940,000 adults, which is 210% of the 10 year average. The jack count so far is 81,000, which is 106% of the 10 year average. Steelhead didn't fare as well: the return of 263,000 combined hatchery and wild fish is only 75% of the 10 year average. The wild count alone was 95,558, which is 85% of the 10 year average.

Steelhead passage from BON to LGR followed a similar trend at 57,370 adults, which is 212% of the 10 year average—remarkably close to the record percentage for chinook. However, the jack return of 10,478 was only 65% of the 10 year average. Adult steelhead returns to LGR were 118,504, which is 78% of the 10 year average. The wild count was 38,800, which is 84% of the 10 year average.

Juveniles: Juvenile passage is nearly done for the season; monitoring ended at two projects on September 31. The only projects still collecting fish and monitoring passage are LGR, LGS, and Bonneville. Daily passage at LGR continues to hover around 1,000 fish, but LGS and BON have been passing less than 100 per day and zero some days.

5c. Water Quality. Laura Hamilton, COE, reported. In August and September the COE noticed the JDA gauge readings were drifting down. A test sensor confirmed the gauge was malfunctioning, so on October 1, the COE switched data collection to the reference gauge, which was giving accurate readings. Since then, the gauge had some problems on October 9-14.

A similar pattern of declining TDG readings occurred on the Snake River in August and September, but those readings were accurate. The COE has identified five possible causes of declining TDG: bacterial biofilm, algae growth, unknown hydraulics, accumulation of dirt and debris, and little-understood biological processes that reduce oxygen and TDG levels underwater. On the Snake, there seems to be a strong correlation with warmer than usual temperatures and low flows. Van Dyke asked whether this means the reported values are incorrect. The answer to that question was that the USGS is working on the issue and we don't know yet, Hamilton replied.

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

6. Next TMT Meeting

TMT will meet next in a November 4 conference call. Chum operations is on the agenda.

Name	***Affiliation***
Scott Bettin	BPA
Lisa Wright	COE
Doug Baus	COE
Paul Wagner	NOAA
Mary Mellema	BOR
Erick Van Dyke	Oregon
Tory Hines	DSC
Michelle Yuen	COE
Jim Litchfield	Montana
Laura Hamilton	COE
Charles Morrill	Washington
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Joe Skalicky	USFWS
Sheri Sears	Colville
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Michael Bryant	CBB
Dave Benner	FPC