COLUMBIA RIVER TECHNICAL MANAGEMENT TEAM

May 6, 2015
Facilitation Team's Summary
Facilitator, Emily Plummer; Notes, Tory Hines DS Consulting

The following Facilitation Team'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.

McNary Flow Objectives
Mary Mellema, BOR, discussed the McNary flow objectives, noting that FPAC members were informed and recognized the BOR would reduce weekly average flow target to 165-170kcfs as a target weekly average, in order to address concerns with decreasing pool elevations and achieving refill. Mary continued that they will continue to monitor the operation and make necessary adjustments if needed to prevent the elevation of Lake Roosevelt from dropping below 1,243ft. Request was made to revisit this Wednesday, May 13th TMT.

- **ACTION:** The Action Agencies will operate to a 165-170kcfs weekly average flow target at McNary Dam through Friday, May 15th. TMT will reassess flow objectives at the next TMT meeting.

Update on Kootenai River Habitat Restoration
Sue Ireland, Kootenai Tribe, provided an overview of the Kootenai River Habitat Restoration Program. She described the multiple-phase project being implemented throughout a 55-mile stretch of the Kootenai River. Data collection and modelling for the project began in 2002, and the first phase of on the ground restoration started in 2011. The project has been a collaborative effort aimed at addressing habitat concerns from an ecosystem perspective. Efforts thus far have included bank and side channel restoration through the planting of riparian trees and shrubs, adding large wood structures to improve the cover and complexity of the pool habitat, enhancing instream habitat, and improving hydraulic complexity. Low and stable flow in September and October coordinated through TMT have been vital for the construction phases of the project and have allowed the Tribe to complete work within the in-water work window in a cost-effective and safe manner.

In 2015, the Tribe plans to implement the Bonners Ferry Islands Project, which aims to increase the number of large, deep pools in order to assist sturgeon migration upstream of Bonners Ferry to higher quality spawning habitat. If approved by TMT (SOR2015-02), the lower, stable flow in September-October this year will facilitate excavation of two pools, construction of two islands, bank grading and placement of large wood structures. Sue's presentation, including photos of the project, is available on the TMT website (http://www.nwd-wc.usace.army.mil/tmt/agendas/2015/0506_Agenda.html).

SOR 2015-02 - September/October 2015 Libby Dam Outflow for Kootenai River Habitat Restoration Project
Sue Ireland presented SOR 2015-02- September/October 2015 Libby Dam Outflow for Kootenai

River Habitat Restoration Project. She noted that the SOR requests 6,000cfs or less from Libby Dam during September and October, with a gradual decline to reach the targeted flow (following ramping rate guidelines in the 2006 USFWS BiOp for Bull Trout and White Sturgeon). Sue continued that the low flow is needed to allow the Kootenai Tribe of Idaho's contractor to implement the in-water work associated with the Bonners Ferry Island Project described above. She noted that this project will be require two seasons to be completed, however, another SOR will be presented to TMT in 2016 for the remaining work.

Joel Fenolio, COE-Seattle, explained how the Action Agencies would implement the SOR if approved by TMT. This year Libby Dam will likely be drafted to 2339 feet (20 feet from full), as triggered by the BiOp during years when water supply is forecasted to be in the lowest 20th percentile (defined as a May final forecast of less than 72.2 MAF of April-August runoff volume at The Dalles Dam). The May final forecast will be finalized tomorrow but as of today the forecast is 69.7 MAF and is unlikely to increase above 72.2 MAF. In accordance with the BiOp, the Action Agencies would draft to 2339 feet by end of September based on the current forecast. This year, the Action Agencies will target 2339 feet by end of August in order to provide the low flow as requested in the SOR. Additional information regarding specific project outflow, dates, and forebay elevations, were provided in a presentation attached to today's TMT agenda: http://www.nwd-wc.usace.army.mil/tmt/agendas/2015/0506_LibbyOps_MayPublicMeetings.pdf

Jim Litchfield, MT, noted that if the forecast remains dry and inflow is low it might be appropriate to maintain a cushion above 2,439ft by the end of August. TMT members generally agreed that the target elevation should be revisited in season. Doug Baus, COE-Division, requested that TMT members review the SOR and come prepared to poll on the SOR at the May 13th meeting.

- **ACTION**: TMT will poll on SOR 2015-02 at the May 13th meeting.

SOR - FWS #1 Libby Releases for Sturgeon and Bull Trout

Jason Flory, USFWS, presented SOR-FWS #1 – Libby Release for Sturgeon and Bull Trout. He explained that due to the low flow year there is not enough water for a two sturgeon pulses. This year's operation will instead aim for a single pulse targeting peak runoff from the high elevation tributaries. The single pulse operation maintains the same temperature management approach utilized in the double-pulse operations, which aims to target spawning temperatures towards the end of the operation. The pulse is intended to provide cues to sturgeon to begin upstream migration, then as temperatures warm, to provide cues to migrate further upstream from staging areas to spawn.

The SOR is for full powerhouse for 7 days, followed by gradually receding flow until the sturgeon volume is exhausted; however, flow will not drop below the bull trout minimum (7,000cfs through August 31 in Tier 2 year). It was noted that flood risk reduction operations supersede flow augmentation and project managers will coordinate operations with regional sturgeon managers. Joel Fenolio explained how the Action Agencies would implement the SOR if approved by TMT. He shared that the April-Aug inflow forecast for May is 5.4MAF; however, he expects that the inflow will likely be less, closer to 5MAF. This means that the target Sturgeon volume will be 800KAF and the Bull Trout minimum will be 7kcfs through August 31.

- **ACTION**: TMT will poll on SOR FWS#1 at the May 13th meeting.

Libby Dam VarQ Deviation Request

Joel Fenolio discussed the Libby Dam Var-Q Deviation Request which defines an alternative operation with outflow reduced from 18kcfs to 13kcfs in order to shift water later and increase summer refill elevation and allow for flexibility in summer flow operations. Joel requested feedback from the Salmon Managers, noting that this type of deviation involves water management decisions that would need to be implemented today. Joel continued that if outflow is dropped to 13 kcfs, the resulting maximum reservoir elevation would be approximately 3 feet higher than with the Var-Q operation. He noted that the additional three feet allows for flexibility in how the Corps would be able to shape flow in June, July and August. Tony Norris, BPA, asked if like other Columbia River basins, observed inflow in the Libby basin is coming in below the lowest ESP stream flow forecasts? Joel stated that upper parts of the Kootenai Basin are closer to average, but still below the average for snowpack at this time of year. He continued that with precipitation not landing as snow due to warmer temperatures, inflow was higher than average through March and April, but now May is returning back to average.

Paul Wagner, NOAA, stated that this deviation request was presented at FPAC and the consensus was that during a low flow year like this one, the desire is to move as much water as possible into spring migration, understanding that this will likely have implications to summer flow. Salmon Managers expressed appreciation to the Corps for looking into this operation, noting that in wetter years it would likely be a valuable operation. Joel recognized the Salmon Managers concerns and thanked them for considering the alternatives.

Dworshak Operations

Steve Hall, USACE- Walla Walla, provided an update on Dworshak operations. He noted that the BiOp states that the project is to maintain a 95% probability of refill, unless otherwise coordinated at TMT. He presented two water volume analysis charts illustrating the probabilities of 20, 50, and 80% confidence of refilling if the project moves forward with a 2 or 4 day operation at full powerhouse. These scenarios did not incorporate water used for ramp down operations. The scenarios ranged from 449kaf to -18kaf of potential augmentation volume available after the operations. Steve stressed that he is concerned that the project will likely not be able to refill if the 4 day full powerhouse operation is implemented and that the Salmon Managers need to recognize the risk and likely implications to summer augmentation operations. He reiterated that this operation would most likely exhaust any flexibility for summer operations. Steve strongly recommended that if the Salmon Managers want to continue at full powerhouse, they recognize the need for an immediate ramp down to minimum flow in order to attempt refill by the end of June.

Paul Wagner, NOAA, noted that the April to July water supply forecast is for 1,325ft and April to June is 455kaf which seems adequate. Steve noted that 455kaf was observed for runoff, which is about 69% of the average for the month of April. He continued that there is a decreasing trend in basin; the forecast will likely drop to 45% of normal and possibly continue to decrease. Steve also pointed out that snowpack is very limited and most of the precipitation will be lost to groundwater and not enter the streams. Any rainfall experienced from now through the spring and summer seasons will not be productive as far as aiding streamflow and base flow in the summer.

Following a brief caucus, Salmon Managers (Umatilla, NOAA, WA, ID, OR, Nez Perce, and USFWS) unanimously recommended that DWR continue to operate at full powerhouse until midnight on Friday, May 8th (for a total of 4 days), then ramp down to 5kcfs on Saturday, May 9th, followed by a third ramp down to minimum outflow of 1.6kcfs on Sunday, May 10th. Paul noted that while this is not an ideal operation, as it risks refill and will likely impact summer flow augmentation flexibility, the hope is that the benefits to the spring migrants will outweigh costs to temperature control operations in the summer season. Representatives from NOAA, WA, ID, and Nez Perce all expressed recognition of the risks to refill and appreciation for Steve Hall's professional opinion.

- **ACTION:** Dworshak will operate at full powerhouse through midnight on Friday, May 8th. At 0100 on Saturday, May 9th, the project will ramp down to 5kcfs, and at 0100 on Sunday May 10th, the project will ramp down to minimum flow (1.6kcfs) and hold. ID will update regional fishermen (via email) of the operation change.

Operations Review

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

- Grand Coulee elevation was 1,249.3ft.
- Hungry Horse elevation was 3,539.52ft with 6kcfs outflow; discharge will be increased tomorrow to 7.6kcfs. Inflow is around 9kcfs and likely to increase as temperatures rise.

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

- Libby was at elevation 2,421.8ft , with 14.5 inflow and 12.1kcfs outflow.
- Albeni Falls was at elevation 2,055.8ft, with 30.5kcfs inflow and 27.3kcfs outflow.
- Dworshak was at elevation 1,586.5ft with 6.8kcfs inflow and 9.5kcfs outflow.
- Lower Granite average inflow was 62.8kcfs.
- Bonneville average inflow was 175.2kcfs.
- McNary average inflow was 170.9kcfs.

***Fish*:** Paul Wagner, NOAA, reported on fish. For juveniles, yearling Chinook at Lower Granite peaked early in the season at 152,000 on April 25th. Last week's passage at Lower Granite was between 20,000 and 40,000, with 42,000 passing on May 6th. Little Goose peaked on April 28th with around 100,000 fish; current passage is between 30,000-20,000. Lower Monumental increased to 90,000 on the 5th of May, likely due to the reduced spill, the average is closer to 24,000. McNary numbers also increased, rising up to around 265,000. Bonneville peaked around 100,000. Sub-yearlings at Bonneville experienced a large bump in passage due to the Spring Creek release. For the Columbia River, fish passage is following expectations for yearling Chinook, the Snake River however, is low for this time of year.

Steelhead passage in the Snake River is low, with a peak at 105,000 on April 26th, similar trend to Chinook with numbers continuing to decrease. The most recent numbers for Steelhead at Lower Granite was 36,000 which is a small increase compared to other days, however, not a strong showing for this time of year. The Lewiston trap is collecting a lot of Steelhead, indicating that the fish are in the Lower Granite pool but are not passing the project. Little Goose numbers are

around 13,000; Lower Monumental passage is around 30,000; McNary passage is around 56,000 with an increasing trend that is encouraging compared to other years.

Sockeye are starting to pass Lower Granite, with 295 thus far. The McNary passage index has increased as well. It is still early for lamprey passage; a few have been counted at John Day. Dave Statler, Nez Perce, asked whether Chinook numbers jumped similar to Steelhead. Paul stated that the numbers jumped slightly. Margaret Filardo, FPC, noted that there was a recent increase in Steelhead and Chinook PIT recaptures, suggesting an increase in passage at Lower Granite

Paul also reported on adult passage. For adults, the passage season has been an early one, it is unclear at this point it if will also be a large run. 152,000 Spring Chinook have passed Bonneville, however, recently numbers have decreased from 13,000 to only 3,200 per day. The trend for the past five days shows Jack Chinook decreasing; the overall number count is low for this time of year. It is possible Jack Chinook will run later on in the spring or numbers will be down compared to past years. The trend upriver shows adults arriving at projects in large number for this time of year, with 30,000 at Lower Granite (250% of the 10 year average). It was noted that lamprey are not yet moving much. Dave Statler, noted that lamprey may not be following the early migration like other species. Paul noted that it appears lamprey numbers are similar to past years and their run will likely be closer to July.

Water Quality: Tina Lundell, COE-NWD, reported on water quality, noting that all Corps gauges are operating. The past week included continued exceedances in the Ice Harbor forebay, with yesterday's (high) 12 hour average at 117.9%, but hourly values are currently decreasing with the cooler weather. Ice Harbor forebay temperatures in May were up 3 degrees from last year (51C to 54C). Tom Lorz, CRITFC, asked what the Corps was attributing these TDG exceedances to, Tina responded that it is likely ambient air temperature, (low) wind conditions, and solar radiation. Erick Van Dyke, OR, asked what water temperatures were at for Lower Monumental, Tina noted that these temperatures are also warmer, around 54C. Lower Monumental has not seen TDG exceedances in the tailrace.

Erick Van Dyke followed by asking if TDG had been exceeded in Lower Monumental Dam tailrace or forebay during the period, and Tina responded that Lower Monumental has not seen TDG exceedances for this period.

Power System: Nothing to report.

The next TMT meeting will be a face to face meeting on May 13th at 9:00am.

Columbia River Regional Forum
TECHNICAL MANAGEMENT TEAM—OFFICIAL MINUTES

May 6, 2015
Minutes: Pat Vivian

1. Welcome and Introductions

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

2. Review Meeting Minutes – April 29 and May 4

Review of the facilitator's summary and meeting minutes for April 29 and May 4 was deferred until the next TMT meeting May 13.

3. McNary Flow Objectives

FPAC has discussed a proposed range of 165-170 kcfs as the BiOp flow objective at McNary in light of low water supply forecasts at McNary and throughout the Columbia basin, Paul Wagner, NOAA, reported. That range is considered an acceptable adaptive management strategy to the water shortage.

Mary Mellema, BOR, reminded everyone that over the next week, Lake Roosevelt elevation cannot go below 1243 ft due to irrigation and other obligations. TMT will revisit McNary flow objectives at its next meeting May 13.

4. Libby Operations

TMT discussed several aspects of Libby operations this year – Kootenai Tribe habitat restoration work; Action Agency plans for implementing the Tribe's request for minimum flow out of Libby in September and October; and an update on the SOR presented by the USFWS for sturgeon and bull trout augmentation flow from Libby this year. The COE offered TMT the option of implementing a deviation request from VarQ flood control operations at Libby in light of the steadily dwindling water supply. Finally, the COE presented operational scenarios that tie all of these operations together.

4a. Kootenai River Habitat Restoration Update. Sue Ireland gave a presentation, linked to today's agenda, describing the Tribe's multi-year restoration of habitat in the Kootenai River, the second largest tributary in the basin in terms of runoff volume. The purpose of the presentation was to explain to TMT why the Tribe is requesting that Libby outflow be restricted to the bull trout minimum of 6 kcfs or less through September-October and perhaps into the first week of November 2015.

The Kootenai River Habitat Restoration Program began in 2005 to address the decline in fish and wildlife habitat associated with hydropower and agricultural development. Factors in the decline have included altered thermal regime and flow, sediment transport, and river hydraulics. The Tribe is collaborating with federal and state agencies to improve habitat for sturgeon, burbot(a freshwater member of the cod family) and other important native focal species in the Kootenai River.

The Kootenai River Habitat Restoration Program (KRHRP) has a 12-year timeframe and uses an ecosystem approach that focuses on addressing limiting factors and species in the reach. The KRHRP was part of the settlement agreement that came out of BiOp litigation in 2006.

The current focus is on the Braided Reach above the town of Bonners Ferry, Idaho. Desirable sturgeon spawning habitat occurs upstream of this reach. Major habitat actions include the development of pools and pool forming structures to help pave the way for upstream migrating sturgeon, as well as riparian enhancement, reconnection of side channels and creation of flood plains to support the food web. The ladder of pools is being developed in this reach to encourage migration upstream of Ambush Rock Pool, a desirable white sturgeon spawning location. Other projects include the Upper Meander project in 2012 and the Middle Meander project in 2013. Last year brought improvements to the Myrtle Creek and Shorty's Reach spawning grounds downstream of Bonners Ferry. Work in 2015 will take place close to the town of Bonners Ferry, using the pool ladder concept to enhance habitat, including island construction, excavation of pools, and bank grading/revegetation on the north bank . It will continue in 2016 with two pool-forming structures on the south side. Partners to the Kootenai Tribe include Idaho and Montana, the COE, BPA, USFWS and Canada.

The Tribe is grateful to TMT for its support of minimum flow at Libby in September-October beginning in fall 2011 to accommodate restoration activities—TMT's support has been critical to project success. Furthermore, supporting the Kootenai River Habitat Restoration Program assures Action Agency compliance with the USFWS white sturgeon BiOp.

Brian Marotz, Montana, inquired about the May final water supply forecast at The Dalles that will likely trigger a 20-ft draft at Libby (to elevation 2,339 ft) by the end of September, and how it will impact implementation of this SOR. There was agreement to address this after presentation of the SOR (see below).

4b. SOR September-October 2015 Libby Dam Outflow for Kootenai River Habitat Restoration Project. The Kootenai Tribe is requesting that Libby outflow be held at 6 kcfs or lower during September and October and the first week of November, with a gradual ramp down to flow rates identified in the 2006 USFWS BiOp for sturgeon and bull trout. The flow limitations will allow construction of two islands and excavation of three pools. Four pool forming structures are planned to be completed in 2015-16.

Joel Fenolio, COE Seattle, described how the Action Agencies plan to implement BiOp flow for sturgeon and bull trout in 2015. Based on a likely May final forecast of less than 72.2 MAF at The Dalles, the FCRPS BiOp RPA calls for Libby Dam to be drafted to 2439 feet by the end of September. As in previous years, the Action Agencies will target the BiOp elevation by the end of August in order to maintain minimum flow in September-October for the Kootenai River restoration work.

Jim Litchfield, Montana, suggested this operation be reviewed as the time approaches in order to avoid over-drafting the reservoir in September if inflow is low. Keep in mind the elevation target defined in the BiOp is actually for the end of September, Brian Marotz, Montana, added.

The latest modeling of the sturgeon volume (see section 4c below) shows Libby forebay peaking at elevation 2446 ft on July 23, Fenolio said. The Libby Dam May final water supply forecast of 5.4 MAF is higher than current ESP traces indicate. Releases should be 14 kcfs from late June to end August to reach elevation 2439 ft by August 31, with the latest ESP run targeting a range of 11-17 kcfs. But Libby releases might be as low as 7 kcfs for bull trout minimum flow in August, based on the volume forecast of 5.4 MAF.

Wagner asked about the gap between 7 kcfs bull trout minimum flow and 14 kcfs shown in the modeling. Based on the current Libby water supply forecast, the variable bull trout minimum flow is set at 7 kcfs May through August 31, Fenolio replied. The actual summer flow rate at Libby won't be known until June, but it could be as low as 7 kcfs if inflow and precipitation are below average. On the high end, Libby flow could be 20 kcfs if there's as much precipitation as in June 2012. Charles Morrill, Washington, asked whether there's an analog year for 2015 in the Kootenai basin, and Fenolio said no. So far in 2015, precipitation has been 150% of average but that's not translating into inflow due to cooler temperatures.

TMT will review the Kootenai River Habitat Restoration Program SOR at its next meeting May 13 and make a recommendation. The Kootenai Tribe will submit another SOR in 2016 for actions that will be implemented next year.

4c. 2015 SOR-FWS#1 Libby Releases for Sturgeon and Bull Trout. Jason Flory, USFWS, reported. In 2013 and 2014, Libby flow operations for sturgeon and bull trout consisted of a double pulse, the first coinciding with low elevation runoff to cue sturgeon to migrate upstream to staging areas, and the second with high elevation runoff to cue sturgeon to migrate further upstream and spawn on the descending limb of the hydrograph. The temperature target was 8-10 degrees C on the descending limb of the hydrograph.

This year differs from other years because it's is a Tier 2 year, with not enough water (0.8 MAF) to support a second pulse. The 2015 single pulse operation will start when high-elevation runoff reaches the river; the goal is to release supplemental flow with the natural hydrograph by operating Libby Dam at full powerhouse for 7 days. Then the

operation will recede to summer flow. River temperatures will be managed as they have in previous years.

The justification for this operation is a 2010-12 spill test that found no increase in sturgeon spawning as a result of upstream encouragement. Nevertheless, more tagged females migrated upstream of Bonners Ferry in double-pulse years. This finding is still being investigated. Results should be available this year.

4d. Libby VARQ Deviation Request. The COE follows VARQ flood control procedures for Libby Dam, per the NOAA Fisheries FCRPS BiOp. Nevertheless, due to this year's low water supply forecast and need to operate Libby for multiple objectives (refill, USFWS sturgeon SOR, and Kootenai Tribe SOR)), the Corps developed an alternative operation that would result in a deviation from VARQ. Fenolio presented the request as an option for TMT to consider, with a recommendation needed today so the operation can be set up.

Current VARQ projections call for 18 kcfs releases from Libby. Under the deviation request, Libby flow would be 13 kcfs in May, followed by the sturgeon volume in June and flat summer flow for July-August.

With the 5.4 MAF May final water supply forecast at Libby, 18 kcfs VARQ flow for May and June seems high, Fenolio said. Dropping flow to 13 kcfs would avoid a fill-and-spill operation, as well as potential flooding at Kootenai Lake and Bonners Ferry. The deviation request would increase the summer refill elevation by 3 ft, providing more flexibility to shape flow June-August.

The graph linked to this item on today's agenda gives a perspective of the summer flow needed for Libby to reach elevation 2439 ft by end August. Average flow was 11-16 kcfs in 25-75% of the years modeled. A caveat: the 90% ESP trace puts Libby operations close to the bull trout minimum flow of 7 kcfs. Releasing 13 kcfs instead of VARQ provides a bit more buffer as the reservoir is drafted to 2439 ft.

Without the deviation request, Libby forebay achieves a maximum elevation of 2446.2 ft sometime in late July, then drafts down to 2439 ft at end August, Fenolio said. Under either scenario, Libby releases will be flow neutral from May 1 to the end of August. Full pool elevation at Libby is 2459 ft. If the project doesn't reach full pool, it will have adverse impacts on recreational activities. While both cases (18 kcfs vs. 13 kfs) are flow neutral in terms of reaching elevation 2439 ft, reducing flow from now through mid-May will result in more water this summer.

Tony Norris, BPA, noted that observed inflow are regularly coming at or below the lowest range of the ESP streamflows at multiple locations throughout the basin. Fenolio added that Libby basin is not as dry as other Columbia River locations, having seen 150% of average inflow this winter mainly due to warm temperatures and heavy precipitation.

Wagner presented FPAC's response to the deviation from VARQ at Libby. By recommending that 18 kcfs outflow continue, FPAC's goal is to move as much water as possible for spring migrants, even if it causes problems later this summer. Tom Lorz, CRITFC/Umatilla, said in other years a deviation would be a good idea, but this year, the full 18 kcfs flow is needed in the spring. The Salmon Managers thanked the COE for providing it. The COE will therefore not implement the deviation.

4e. Libby Dam Operational Scenarios. The current forecast for Libby is 5.4 MAF, 92% of average, Fenolio reported. This forecast may be high, driven by precipitation since last October. Current ESP traces imply that 5 MAF is probably more accurate, but the COE is required to use its official forecast to establish sturgeon and bull trout minimum flow. If Libby's water supply volume is less than 4.8 MAF this year, there would be no sturgeon volume, and the bull trout minimum would be 7 kcfs after the sturgeon volume is expended through June 31.

When the sturgeon volume is triggered, outflow from Libby will rise to 20 kcfs or whatever the sturgeon team determines is appropriate at that point. The project will ramp up to 25 kcfs or powerhouse capacity for 7 days, then ramp down to 17 kcfs and then 15 kcfs on descending limb, based on in-season management decisions.

TMT will revisit the two Libby SORs at its next meeting May 13.

5. Dworshak Operations

Steve Hall, COE, presented an augmentation volume graph linked to today's agenda, prepared in response to a request from Wagner at the last TMT meeting. The graph uses 20% and 80% confidence levels instead of the 50% the COE typically uses. July runoff at Dworshak is expected to be 120 KAF, but could be as low as 100 KAF; normal is around 320 KAF. April runoff was 455 KAF. The May-June water supply forecast volume could be anywhere from 967 KAF to 523 KAF, depending on the confidence level of the forecast.

Wagner reminded everyone that the original request was for four days of 10 kcfs, one day of 7.5 kcfs, one at 5 kcfs, and one at 2.5 kcfs, followed by minimum flow of 1.7 kcfs through end May.

Based on expected conditions through May 8, the volume needed to fill Dworshak reservoir by end June would be 238 KAF, minus minimum discharges of 168 KAF and runoff through May 8 of 112 KAF. This leaves a projected augmentation volume of 449-500 KAFas of May 8.

Implementing the Salmon Managers' May 4 request will leave an augmentation volume of between 427 and negative 18 KAF, Hall said. The negative volume means the project would miss refill by approximately 1 ft. The model depicts full powerhouse flow through the end of the day on May 8, based on conditions as of May 3. The graph indicates the difference between the two operations is approximately 23 KAF of volume.

This analysis is based on an assumption the project will fill in June, which Hall reiterated is risky. All indications are the project won't get sufficient inflow to refill in June.

Discussion turned to the Salmon Managers' preference for full powerhouse releases from Dworshak through the end of the week. Hall said the region is running out of assured water, and continued releases will take the project that much farther from assurance of refill. While the FCRC per the BiOp is based on 95% confidence of refill, the graphs are based on 80% confidence at most, which will be further jeopardized by continued releases. Temperature augmentation flow could be needed as soon as June with a hot, dry summer ahead.

In the past month, the water supply forecast at Dworshak has gone from 70% or normal to just 54% of normal for April-July. The April 1 water supply forecast was1709 KAF; now it's 1325 KAF, or 455 KAF less. By contrast, the December water supply forecast was almost 2400 KAF, close to 100% of normal. The decline in the water supply is based on weather projections, with indications that the forecast could be even lower in June. While data records for the analog year 1977 are scant, this year's protracted cool thaw tends to mean that snowpack this year won't translate into runoff as it did in 1977. Because most of the basin has been snow-free for some time, any rain that falls now will probably be lost to groundwater and vegetation. For this reason, the COE does not expect DWR inflow to go up to 9-10 kcfs as shown in the RFC forecast. Dworshak might see 8.5 kcfs inflow at most.

Hall asked FPAC for a recommendation on two issues: (1) Should full powerhouse discharges continue until May 8? and (2) After that, should discharges drop to minimum flow for the rest of May in order to conserve water? The Salmon Managers caucused and gave their recommendation: Maintain full powerhouse flow (9.5 kcfs) from DWR through May 8, then reduce outflow to 5 kcfs or 1.6 kcfs on May 9. The consensus was that water for spring fish outweighs the risk to temperature control later in the season. Wagner said FPAC fully acknowledges the risk to refill in its recommendation. Washington, Idaho and the Nez Perce Tribe stated their agreement with NOAA on the recommendation as well as the risk.

Based on FPAC's unanimous recommendation (NOAA, CRITFC, Nez Perce, Oregon, Washington, USFWS, and Idaho), the Action Agencies will implement the following operation.

1. Tuesday, May 5, through Friday, May 8, outflow of 9.5 kcfs.
2. Saturday, May 9, ramp down to outflow of 5.0 kcfs.
3. Sunday, May 10, ramp down to outflow of 1.6 kcfs.

Hall clarified the difference between 1.6 kcfs and 5 kcfs on May 9 amounts to 6.7 KAFof releases that day. The rampdowns will begin at midnight and take several hours in accordance with ramp rates. . It was noted that fishing at Orofino this weekend will be impacted by this operation. TMT will revisit Dworshak operations at its next meeting on May 13.

6. Operations Review

6a. Reservoirs. Hungry Horse is at elevation 3549.4 ft, releasing 5.6 kcfs to accommodate a two-unit outage that ends May 7. Discharges will then increase to 7.6 kcfs, the VARQ flow for the first part of May, and will continue at that rate for a while. Current inflow of 9 kcfs is expected to pick up when temperatures rise.

Grand Coulee is at elevation 1249.3 ft. Libby is at elevation 2421.8 ft with inflow of 14.5 kcfs and releases of 12.1 kcfs. Libby Dam is at elevation 2421.8, with inflow of 14.5 kcfs and outflow of 12.1 kcfs. Albeni Falls is at elevation 2055.8 ft with inflow of 30.5 kcfs and releases of 27.3 kcfs. Dworshak is at elevation 1586.5 ft with inflow of 6.8 kcfs and releases of 9.5 kcfs.

Lower Granite average outflow is 62.8 kcfs, McNary average outflow is 170.9 kcfs, and Bonneville average outflow is 175.2 kcfs.

6b. Fish. Juveniles: Wagner gave updated FPC yearling spring Chinook passage index numbers for Lower Granite to date, noting that the peak was early this year, 152,000 fish on April 25. For the past week, index counts have been in the 20,000-40,000 range. Today's index count at Granite is 42,000 fish. Passage at Little Goose peaked on April 28. Lower Monumental saw 90,000 fish on May 5. This increase may be explained by the LMN spill cap that was reduced from 26 down to 24 kcfs on May 3 resulting in more juveniles passing via the JBS relative to spill. Passage at McNary picked up to 265,000 recently, and passage at BON is 100,000. While passage on the Columbia is following expectations, passage of Snake River yearling spring Chinook is low for this time of year. Bonneville passage is 100,000 fish, including a big bump of subyearling fall Chinook from the Spring Creek hatchery release.

Steelhead passage on the Snake peaked at 105,000 on April 26, which is similar to spring Chinook, but numbers since then have continued to drop. The recent count of 36,000 steelhead is good, but much higher numbers were expected with increased flow from Dworshak. The appearance of steelhead at the Lewiston trap indicates that they are in the lower pool above Granite, although they are not passing the project. Passage at Little Goose is 13,000; at McNary, 56,000 with 40% spill, a relatively low count compared to the passage index. Snake River sockeye passage is just getting started, with 295 passing Lower Granite Dam. Passage index counts for sockeye are picking up at McNary, as well as the upper Columbia and tributaries.

Lamprey passage is just getting started, with John Day the only project passing lamprey. It appears that snowmelt is beginning to reach the Clearwater, with a gradual increase in natural water discharges from the basin, Dave Statler, Nez Perce Tribe, noted. The RFC hydrograph shows another day or so of increased runoff, Charles Morrill, Washington, added. PIT-tag recaptures at Lower Granite over the past several days have been 600-700 a day until May 5, when the count jumped to 1054 PIT-tagged Chinook.

Adults: Wagner reported that spring Chinook set a record of 157,000 to date at Bonneville, which is 150% of the 10 year average. It is not yet clear whether the run is huge this year or just early. Daily counts earlier this week were in the 13,000 range, but yesterday's count was only 3200. Spring Chinook jack counts at Bonneville are lower than average to date. The run may come later, or there could be a small jack return in 2015. The trend at all projects is similar, with adult spring Chinook counts around 150% of average for this time of year.

Adult lamprey passage generally doesn't start until late May or later, Statler said. Hassemer added that current dam counts are about where they should be to meet the pre-season forecast.

6c. Water Quality. Tina Lundell, COE, reported that all monitoring gauges are functioning well. Exceedances in Ice Harbor forebay have continued over the past week, with a 12-hour average high of 117.9% TDG yesterday. Current TDG is 114.5% so it's dropping. The average water temperature at Ice Harbor this week has been 54 degrees F, which is 3 degrees warmer than this time last year. Temperatures in the Lower Monumental tailrace are warmer as well. There have been no TDG exceedances in the LMN tailrace, but the water isn't de-gassing on its way to Ice Harbor forebay. TDG was actually higher on May 4, with a 12-hour average of 117.3% in the LMN tailwater and 118.1% in the Ice Harbor forebay downstream.

6d. Power. There was nothing to report.

7. Next TMT Meeting

TMT will meet next in person on May 13 to discuss McNary flow, the two Libby SORs and Dworshak operations.

Name	***Affiliation***
Laura Hamilton	COE
Tony Norris	BPA
Doug Baus	COE
Sue Ireland	Kootenai Tribe
Lisa Wright	COE
Tina Lundell	COE
Tory Hines	DSC
Paul Wagner	NOAA
Jim Litchfield	Montana
Dan Feil	COE
Charles Morrill	Washington
Scott Bettin	BPA
Karl Kanbergs	COE
Pete Hassemer	Idaho
Michelle Yuen	COE
Bill Proctor	COE

Phone

Dave Statler	Nez Perce
Eric Rothwell	BOR
Brian Marotz	Montana
Joe Skalicky	USFWS
Erick Van Dyke	Oregon
Tom Lorz	CRITFC/Umatilla
Dave Benner	FPC
Jason Flory	USFWS
Dave Lyman	PGE
Michwal Bryan	CBB
XX	ODEQ
Mike Shafley	Snohomish PUD
Mary Mellema	BOR
Steve Hall	COE
Sheri Sears	Colville