**COLUMBIA RIVER TECHNICAL MANAGEMENT TEAM**
May 17, 2023
Facilitator's Summary
Facilitation Team: Emily Stranz & Colby Mills, 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; it is not intended to be the "record" of the meeting. Official minutes can be found on the TMT website: http://pweb.crohms.org/tmt/agendas/2023/. Suggested edits for the summary are welcome and can be sent to Colby at colby@dsconsult.co.*

**Review Meeting Summaries & Minutes** – TMT Members approved the May 3 official meeting minutes and facilitator's summary. Minutes and summary from May 10 and May 11 will be reviewed at the next TMT meeting.

**TDG Update** – Dan Turner, Corps, reported that gas bubble trauma (GBT) data collected yesterday, downstream of Ice Harbor, were below the threshold level. As a result, the gas cap is returning to 125% TDG for the lower Snake River zone. The Corps will be sending out instructions to the projects for spill cap raises taking effect at 1600 hours today.

Dan provided a summary of the course of events surrounding the GBT exceedance that was detected on Tuesday, May 9, downstream of Ice Harbor Dam, and the resulting actions that were implemented. He noted a request from TMT last week to follow up with the Corps' Policy Team, to ask if the Lower Monumental operation could be adjusted to not include performance standard hours. The response was: operations on the Snake River are 16 hours/day gas cap spill and 8 hours/day performance standard spill; as the only change was the gas cap level, decreasing from 125% to 115%/120%, the Corps Policy Team believes that performance standard hours are still appropriate. Addressing another question from last week, about additional sampling at Lower Monumental and Little Goose, Dan referred to BPA, who coordinates sampling with USGS. Paula Calvert, BPA, reported that this is not yet an action the agency has considered.

Dan noted his initial takeaways:

- Shifting Lower Granite back up to 125% TDG was the right call; a consequence is that a lot of TDG is being generated on the system downstream, which could lead to reductions in spill at those projects to meet the 115% forebay criteria. Consider this in future conversations when managing TDG.
- Forebay criteria is challenging as there are a number of different environmental conditions that contribute to TDG.
- The FOP operation is designed for a large gap between the performance standard and the spill caps; as these started to converge, it was challenging to clearly coordinate with the projects on an hourly basis. The gas cap trumps the performance standard targets.
- There is more evaluation needed and language refinement on the instructions.

*Questions and Comments from TMT Members:*

- Idaho was disappointed to hear the Corps' Policy Team's stance on performance standard spill operations after a GBT exceedance in resident fish; they will likely reach out to Corps Policy on the issue.
- A few TMT members noted it would be helpful to conduct a modeling exercise (out-of-season) to estimate what Snake River project spill caps would be under a 120%/115% scenario at all 4 projects versus the 125% at Lower Granite and 120%/115% at the other three; calculate what the relative PIT-pH estimates would be across all four projects.

- Dan thought that the spill caps were not effective of meeting the TDG targets over the past week; TDG takes time to dissipate through the system, and with higher temperatures and low wind speeds, there were higher TDG forebay values than the gas cap.
- Oregon emphasized that more conversation is needed on this issue in the future.
- Idaho asked, if the exceedance occurs again, what would the AAs do differently?
    - Dan responded that he would try starting with lower spill caps; the lower end of the 2018 spill caps to see how the system reacts at that level. This time around things started out too high, needing a quicker reduction in TDG to meet the gas cap.
    - Clearer instructions to the projects on how to operate for performance standard and spill to the gas cap at the same time.
    - The Corps noted that their efforts remain to comply with state water quality standards.
- Idaho asked, how do we know when criteria no longer apply (i.e., during periods of forced spill)?
    - Dan noted this evaluation will change on an hour-by-hour basis. The asterisk (on the spill/TDG table, on the TMT website) is a good preliminary signal of forced spill. (https://pweb.crohms.org/ftppub/water_quality/12hr/table/tdg_overview.html)
- From Idaho's perspective, maintaining spill in the river is how the AAs should be managing for salmonids. If there is a project within the zone that is under a forced spill scenario, does that negate the criteria across that zone? This will be addressed at TMT Process.
- Nez Perce Tribe noted that conditions this year and the reductions in spill for water quality standards highlight the need to refine those water quality standards, with the engagement of Fish Managers. Language refinement/simplifying should focus on TDG levels exceeding the water quality standards/gas cap thresholds. Apply the caveats currently in the water quality standards to be any time there are TDG levels consistently above 125%, those same exceptions to spill reductions would be applied.

**Questions and Comments from Members of the Public** – David Gruen, ODEQ, asked if TMT Members had thoughts about why there are higher GBT rates at Ice Harbor (non-salmonids) and also recently at Bonneville (salmonids, 13% today). Tom Lorz, Confederated Tribes of the Umatilla Indian Reservation/CRITFC, noted that sculpins with high TDG were observed in one location, which could be a problematic spot. Higher levels at Bonneville are likely a result from The Dalles tailrace TDG, and higher water levels in the river can present higher TDG in localized areas without impacting the whole river. Charles Morrill, WDFW, asked for more clarity regarding the process for setting the state Water Quality Standards (WQS). David explained that WQS are developed by the states and approved by the Federal EPA; under the Clean Water Act (CWA), states are delegated authority to develop water quality standards to protect the whole ecosystem (not just salmonids) and must be approved by EPA.

Tom Iverson, Yakama Nation, noted concern that from his perspective, the Corps is trying to implement these rules, while seeming to be hesitant to revisit the Biological Monitoring Plan (BMP) that is too rigid in the protection of sculpins and removing protections for listed fish. The performance standard spill was a negotiated piece of the flex spill agreement that balanced revenue with benefits to fish. When fish benefits are reduced, it seems reasonable to request that the revenue aspect also be reduced. Yakama Nation encouraged the Corps to engage Washington Department of Ecology (WDOE) to revisit the monitoring plan in a way that optimizes benefits for the listed salmon and steelhead, while protecting sculpins. From Yakama's perspective, it seems to be an overreaction to a non-fatal impact to resident sculpins at the detriment to migrating listed anadromous fish. Julie Ammann, Corps, noted that the Corps is not operating under the flex spill agreement, rather the "stay agreement". Additionally, the Corps is engaging with WDOE and is meeting today to discuss the BMP. The Corps feels that they adaptively managed based on WDOE's feedback last week to modify the Lower Granite operation. The Corps does not decide the States' water quality standard.

**The next scheduled TMT meeting is on May 24, 2023, at 9:00 AM.**

**Columbia River Regional Forum**
**Technical Management Team**
**OFFICIAL MINUTES**
**Wednesday, May 17, 2023**
**Minutes: Andrea Ausmus, BPA (contractor, CorSource Technology Group)**

Today's TMT meeting was held via conference call and webinar, chaired by Doug Baus, Corps, and facilitated by Emily Stranz, DS Consulting. A list of today's attendees is available at the end of these minutes.

1. **Review Summaries and Minutes – May 3**

   - May 3 Summaries and Minutes are approved
   - May 10 and 11 Summaries and Minutes are still pending

2. **TDG Update –** *Dan Turner, Corps*

   a. GBT Update

      - Downstream of Ice Harbor was below threshold level
      - Gas Cap is returning to 125% TDG for the Lower Snake River zone
      - Will send out instructions to the projects for spill cap raises taking effect at 1600 today (May 17)

   b. Review of Last Week and Total Dissolved Gas Overview Tables

      - Last Tuesday (May 9), there was a high GBT detected downstream of Ice Harbor which led to a reduction of the gas cap level in the water quality standard for that Lower Snake River zone.
      - Last Wednesday (May 10), there was communication with Ecology. An SOR was also brought to TMT. These led to more refinement of reductions within the lower Snake River zone.
      - According to Ecology, due to site specific data on non-salmonids at Lower Granite, it was excluded from the Lower Snake River zone and the WQS at Lower Granite went back to 125% TDG.Little Goose, Lower Monumental, and Ice Harbor stayed at the 115/120% TDG gas cap.
      - The gas cap and the performance standard spill rate converged at Lower Monumental due to the high flows.

   c. TMT's request to follow up with Corps Policy

      - If Lower Monumental could be adjusted to target the 115/120% gas cap for 24 hours/day with no performance standard hours.
        - Policy said they view the operation on the Snake River as 16 hours per day gas cap spill and 8 hours/day performance standard spill.

- What changed on the river was the gas cap decreased from 125% TDG to 115/120% TDG.
- Given that view, they think that the performance standard hours are still appropriate to do because all that changed was the gas cap level.

- Additional USGS sampling at Lower Monumental
  - Turner said that BPA coordinates with USGS to do the sampling. They will be in a better position to answer the question.
  - Paula Calvert, BPA, said that it is something that they have not yet considered.

d. Preliminary Takeaways

- Taking Lower Granite up to 125% TDG was the right thing to do, but the consequence of that is you have a lot of TDG being generated at the top of the system. This moves downstream and will possibly lead to reductions in spill to meet the 115% forebay criteria.
- Forebay standard is challenging to meet. It is exposed to different environmental conditions. It is not like the tailwater which has a strong relationship to spill levels.
- FOP operation was designed for a large gap between the performance standard and the spill caps. As they started to converge it was more challenging to operate the system and give clear instructions and then understand what is going on an hour by hour basis. Not that it cannot happen but a reminder that a gas cap trumps the performance standard spill targets.
  - Example: At The Dalles if the spill cap to meet the gas cap is less than 40% then that spill cap is what would be operated to.
  - Makes it challenging, especially on the Snake River where they have to do extra things to try to meet the performance standard hours, like filling the pool or doing different flow operations.
- Turner thinks the need to do more evaluation to look at and some cleaning up of language in instructions.

Jonathan Ebel, ID, said that he is disappointed with what the Corps Policy had to say about the performance spill periods during a period of operations after an exceedance. He thinks they will be hearing from Fish Managers about that.

Ebel asked if Turner could articulate the difference in spill caps on the Lower Snake if Lower Granite was at 125% TDG while the other 3 projects were at 120/115% versus if it was also operating to 120/115%, If you have a lot of TDG at the top of the system the impacts of the operations downstream.

Turner said it is still more of a concept at this point. He said that he can walk through some numbers. When Lower Granite tail race (LGNW) is at 125% TDG is it going to lead to higher values in the Little Goose forebay.

For Example:

On the 15th, Little Goose was 121% TDG.

*That will be passed through the powerhouse and mixed with the TDG generated in the spillway.*

*Criteria is not 115% TDG but passing water down to the downstream forebay that is already above 115%*

*Very little capacity to add TDG to the system.*

Lower Monumental forebay was 119% TDG (above the 115% TDG gas cap at that location)

Turner said that if the system is gassed up already there is a likelihood that they could have reduced spill by quite a bit and not got down to 115% TDG because there so much gas being passed downstream. He did not have a specific level of the consequence. He thinks that would be a modeling exercise. They did have the SYSTDG model up and running last week but it was a takeaway that Turner did not consider when they took Lower Granite up to 125% TDG. Next time he thinks it should be part of the conversation of how to manage TDG during an instance like this.

Ebel said thank you and that it sounds like it would have been hard to hit the 115% TDG even if the gas cap at Lower Granite tail race was 120 % TDG. He hopes that they would not have to go back to this for non-salmonid GBT in the future because the idea is ridiculous.

Jay Hesse, Nez Perce, asked if Turner has estimates of what the spill caps at the four Snake projects would be under 115/120% TDG scenario versus the 125% TDG at Lower Granite and 115/120% at the other three projects. Hesse said with those they could quickly calculate what the relative PIT pH estimates would be across all four projects.

Turner said that he does not have those number calculated yet, he thinks that it would be big range. Turner thinks that it would be a good modeling exercise to do outside of season. He said that it might be interesting but it might be such a big range that it might not be useful. He said that TMT might want to table it and talk about how they would want to approach the problem. He said that it was probably not the answer that Hesse wanted but Turner does not have the numbers to give to him.

Charles Morrill, WA, said that the comment about what the PIT pH was during this operation, although not part of the modeling exercise, is an important thing for them to look at and review of this in potential impact of the change in operation over the course of last week.

Stranz said that we will make note to bring that back up to see if there is some modeling and more conversation when we are not in the thick of it.

Erick Van Dyke, OR, said he was confused because he thought that Lisa Wright, Corps, had brought up a table that had values that showed us what the 115/120% TDG was for the Snake. He asked if this is what Hesse had needed.

Hesse said that it was.

Turner said that the first set of numbers (May 10) were their first estimate of what it would take to meet the gas cap, these were strongly influenced by what happened in

2018. They lowered those on May 15. Turner also pointed out that they still did not get close to meeting the 115% TDG in the forebays the entire last week. These spill caps were not effective of meeting the goal. Turner said that they may have worked eventually as it takes a while to dissipate TDG from the system. Each one of the forebays have a travel time as the TDG goes downstream and it is exposed to different conditions. With the raising temperatures and the moderate to low wind speeds there was not a lot of TDG dissipation in the system and we ended up with higher TDG forebay values than the gas cap. Turner said that these are useful numbers but they are not the numbers that he would pick to be effective under all conditions.

Van Dyke said that the explanation was helpful to understand what is happening. There is some conversation that he thinks needs to occur. He asked if this was the information that was provided to the projects for them to operate to teletypes or how did that get disseminated.

Stranz asked Van Dyke to explain why this is important to him so that TMT understand the train of thought.

Van Dyke said that this has been a long time coming on how to manage the system and because TDG was the estimator used to provide the information to get where they wanted them to operate. It is his assumption from the Corps explanation of things, and that there is an understanding that that may not be pinpoint on the button for providing what we actually see. That information is understood, but in instructing the projects to spend a lot of certain spill levels they have been using the modeling tools to provide that information. They then adaptively tweak things, to his understanding, when it is not meeting what they thought it was going to. So it is all part of the soup, which is why it is important. He asked if that is what the projects were told to turn spill to. He said that he assumed it was because that is how things were working.

Turner said these are the numbers that were sent to the projects.

Van Dyke said that any action that did not meet what was expected would have required them to do something verbally or instruct to do something different. He said that was helpful. Van Dyke said that he does not want to get into too much detail, but they need to talk about this more.

Ebel asked if an exceedance occurs again what would the Action Agencies do differently based on what was learned.

Turner said there would not be the exact same situation but he would probably think from the quick takeaways.

- He would start at lower spill caps
    - If they are going to do spill caps at the lower three projects at 115/120% he'd start at the lower end of 2018 spill caps rather than the higher end of the 2018 spill caps. Then see how the system reacts at that level.
    - He thinks they started out too high and needed a quicker reduction in TDG to meet the gas cap.

- He also recommended clearer instructions to the projects on how to operate for performance standard and gas cap at the same time, and provide that clarification as quickly as possible.

Ebel said what he heard is that Turner would impact salmonids more in the future if he sees an exceedance for sculpin.

Julie Ammann, Corps, said that is not a fair characterization, to put the burden on the Corps who are trying to implement the state water quality standard. That is what they are trying to do. She feels that the statement Ebel made was really unfair to say that they are intentionally trying to impact salmonids in a negative way. What they are trying to do is comply with the state water quality standards.

Ebel said he understands what Ammann is saying, but it is illogical.

Stranz said that TMT members are heading into a hypothetical conversation and she thinks that it would be better suited at the process meeting.

**3. Public Comments:**

David Gruen, ODEQ, asked if anyone has any reasons or thought about why were are seeing higher GBT rates. He gave the examples of the Ice Harbor exceedances of the criteria and recent GBT salmonid data at Bonneville showing close to 13% today. He said that they have seen similar TDG numbers in the river last year and in the past. He said that it seems that the GBT rates in both salmonids and non-salmonids are somewhat higher compared to the past. He mentioned that he is aware that there are other environmental conditions that affect GBT but he was curious about thoughts about why there may be what he perceives as elevated rates in the samples given the corresponding TDG levels on the river.

Lorz said that if he were on the call last week he could have gone through a lengthy discussion they had. All of the sculpin with high GBT were located in the one location. It could have been an issue of them happening to find the one hotspot, very shallow water habitat. Because that was the only area they were able to sample, all the fish were taken from one location, they were not taken from multiple locations or across anywhere else. So it could have been just the fact that one location was a problematic spot.

The reason they are seeing higher levels at Bonneville is in the tailrace there were high TDG levels in the 126 – 128% range below The Dalles, which also led to high forebay above the 125% TDG at Bonneville. That is above what they should be spilling or higher likely leading to issues at Bonneville. It could be why they are seeing more on the sample there. This year with the amount they are spilling they are getting much higher gas across the whole river so there will probably be more levels of impact then they have seen before.

Lorz added that we are basically unmanageable spill right now because once you hit around 400s and with unit outages it is very difficult to manage the TDG. There was a major change last week in spilling and producing and now they are shifting again. These are ongoing real-time issues and it is why we have TMT to sit together and talk about the stories that are coming from management.

Tom Iverson, Yakama Nation Fisheries, commented about the Corps response to Ebel's comment. He agrees. The Corps is trying to implement these rules. What they are not hearing from the Corps is that they are willing to revisit the monitoring plan. He said that it is clearly too rigid in the protection of sculpin and removing protections for fish. He finds it concerning that the PSS was negotiated piece of the Flex Spill Agreement that balanced a revenue pillar with a fish benefits pillar. When the fish benefits pillar goes away or is reduced it seems reasonable that the revenue pillar be compromised as well. And so as the Salmon Manager with Yakama Nation we would hope that the Corps would engage Department of Ecology, revisit the monitoring plan in a way that optimizes benefits for these listed salmon and steelhead while protecting sculpin. What is clear to him is that they are overreacting to a non-fatal impact to resident sculpin at the detriment to migrating listed anadromous fish.

Ammann said that the Corps is not operating under the Flex Spill Agreement which did have the three tiers; now they are operating under the Stay Agreement. It is a little different with the power side, she will let BPA speak to that. She said the Corps is reaching out to the states and they have a meeting today with Ecology to talk about the Biological Monitoring Plan. They did adaptively manage based on their feedback last week to modify Lower Granite and it is not up to the Corps to decide what the state's water quality standard is. If there are issues with what Washington Ecology has put out there, Ammann suggests that it is taken up with them. The Corps are not the one who said that they had to do the non-salmonid monitoring. That was part of the requirement for the state. The Corps are just trying to implement that. Ammann said that it is unfair that the burden is being put on the Corps – implying that they are doing something to intentionally to harm salmonids – when they are trying balance all of the operations as they always do, which includes state water quality standards as well as spill requirements.

Iverson appreciated Ammann's response. He did not know that the conversations were continuing. What he had heard was that the Corps was not going to talk about PSS and that BPA had not investigated expanding the monitoring to other reaches. He had not heard that there were more conversations, he appreciates that update and thanks Ammann for the input.

Baus wanted to follow up with what Lorz said. He appreciated Lorz' responses regarding GBT. He appreciated getting some of the biological feedback that Lorz provided. He wanted to add that it highlights the complexity of what is happening right now. As Lorz alluded to, Baus would concur that flows are different every year and so based on the diversity of flows that we see ranging from normal to well above or below average. It is complicated.

Ebel said that this brought up a question. A lot of the criteria apply in what we call a controlled spill and/or voluntary spill arena. He asked when the river has gone to an uncontrolled state how the criteria is applied. He asked if they no longer apply because they are up in the range of turbine capacities and things like that. Ebel asked where do we draw the line, or how does the Corps draw the line. He said that it is important for interpreting the criteria or whether it applies.

Turner said that it will change on an hour-by-hour basis. He said that he will try not to get into too much hypothetical. The criteria for changing the gas cap based on GBT is clear about not applying it during forced spill.

Norris said that he does not like to call it "lose control of the river" because they do not lose control of the river. They have conditions where they have lack of market spill where they have to reduce generation because there is not enough load to generate and achieve the target spill levels so they have to spill above the gas caps per the Spill Priority List. This is an hour to hour evaluation. They follow those rules as needed and there are some hours of each day can have lack of market conditions where we would spill per the spill priority list. Once they get to Level 2, you can see at The Dalles, for example, is spilling more than 40% spill objective then you can see that we have started spill in Level 2.

Turner said that he is looking at the Daily Spill and TDG link on the TMT page and getting confirmation that the asterisk is a good preliminary evaluation tool for forced spill.

Ebel said that he appreciates that. He said that this needs to be ironed out in case this happens again because from Idaho's perspective maintaining spill in the river is how we should be managing it for salmonids. He asked if there is a project in the zone that is under a forced spill scenario does that negate the criteria across that zone. He asked if that removes the application of the GBT criteria because it is in a forced situation. He said that it is a major question that needs to be ironed out.

Turner does not have an answer at the moment.

Stranz said that they should take it into the process meeting.

Hesse said that he appreciates Gruen being on the call with his question earlier but also listening to this discussion. Hesse said that the conditions we are experiencing this year and the unfortunate reductions in spill because of water quality standards highlight the need to refine those water quality standards. Hesse said that as a Fish Manager, he hopes that they can be part of that refinement process. He thanked Gruen again for being part of the dialogue and said that he hopes that they can engage further.

Hesse said that he believes that the refinement that Ebel and others have talked about can be clarified if the focus of the language is on TDG levels exceeding the gas cap thresholds and we can set aside whether that is controlled-uncontrolled-managed-unmanaged-whatever your terminology is but we focus on the TDG levels exceeding the water quality standards of 125% or whatever the number is. The reason Hesse said he made this suggestion for consideration he said went back to Gruen's question of elevated levels in The Dalles area, and below Bonneville, and how they relate to the symptoms downstream. Hesse said that we are in a managed system right now, and the Corps is making adjustments to integrate the management of John Day and The Dalles but they have been exceeded for several days and we are seeing a rise in symptoms. He said that was a long way around to saying simplifying the language and applying the caveats that are currently in the water quality standards for lack of load spill above powerhouse capacity above water quality standards. Whatever that is the be anytime that there are levels consistently or for a couple of days above 125% TDG then those same exceptions and waivers to spill reductions would be applied. Hesse asked Gruen to consider that and

asked the Corps and BPA to have that be part of the continuing dialogue with the Water Quality Agencies and to look for ways to include the Fish Managers in those dialogues.

Morrill asked Gruen about whether the water quality standards handed down from EPA to Oregon DEQ or Washington DOE is up to the states for implementing them. The water quality standards are federal guidelines issued by the EPA and that both Oregon DEQ and Washington DOE are required to work with EPA to provide those guidelines.

Gruen said not strictly speaking, the water quality standards are developed by the States and approved by the federal EPA.

Morrill said that is the relationship that is what he was seeking clarification on. Both Washington and Oregon develop those water quality standards. They then have to be approved by EPA and in the interest of changing the TDG levels that has to be approved by both the State and by EPA. He asked what the nexus to EPA is in this process.

Gruen said that under the Clean Water Act the States are delegated authority to develop water quality standards, but they do have to be approved by EPA for Clean Water Act purposes.

Morrill said that helps in terms of a Fish Managers perspective when they would like to see different operations that they feel would benefit juvenile fish they can work out their concerns with DOE or DEQ but they would still need to go through the connection with EPA.

Gruen said yes, for Clean Water Act purposes, EPA must approve the States water quality standards. He said there is one thing of note under the Clean Water Act that the States have an obligation to balance in their water quality standards. They need to balance risks or to develop standards that are protective of the broader aquatic community. It is not as specific to ESA-listed species as some of the Salmon Managers' focus is on, it is broader than that. The State Water Quality Agencies are in the position of having to try to develop criteria that balances essentially competing interest on the river, what is best for some species on the river is going to be a trade-off to other species. He thinks that it is a hard question to answer in terms of finding that balance. The State Water Quality Agencies cannot exclusively focus on what would benefit listed salmonid or other species. There has to protections for the broader aquatic community as well.

Morrill told Gruen thank you and that it was a good clarification. He apologized for putting him on the spot but it helped his perspective and understanding.

4. **Set agenda for next meeting – May 24, 2023**

    a. Operations Review

Today's Attendees:

| Agency | TMT Representative(s) |
|---|---|
| Army Corps of Engineers | Doug Baus (chair), Julie Ammann, Lisa Wright |
| Bonneville Power Administration | Tony Norris, Scott Bettin, Ben Hausmann |
| Bureau of Reclamation | Joel Fenolio |

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| NOAA Fisheries | Kelsey Sweica |
| US Fish & Wildlife Service | Dave Swank |
| Washington | Charles Morrill |
| Oregon | Erick Van Dyke |
| Idaho | Jonathan Ebel |
| Montana | Brian Marotz |
| Nez Perce Tribe | Jay Hesse |
| Umatilla Tribe | Tom Lorz (CRITFC) |
| Colville Tribe | Kirk Truscott |
| Warm Springs Tribe | |
| Kootenai Tribe | |
| Spokane Tribe | |

Other Attendees (non-TMT members):

Corps – Aaron Marshall, Dan Turner, Alexis Mills

BPA – Paula Calvert

DS Consulting – Emily Stranz (Facilitator), Colby Mills

BPA – Andrea Ausmus (note taker, Contractor with CorSource Technology Group)

Yakama Nation Fisheries – Tom Iverson

Oregon DEQ – David Gruen

Columbia Basin Bulletin – Mike O'Bryant

Energy Keepers – Eve James

Snohomish PUD – Mike Shapley, Ryan Ziegler

Clearing Up – K.C. Mehaffey

Lewiston Tribune -- Eric Barker