To:	**WEI Technical Working Group members**
From:	Jayson Kurtz, TWG Coordinator, Ecofish
Date:	November 6, 2020
Re:	**Summary of TWG meeting held Wednesday November 4, 2020, 9:00 am to 11:00 am**

Attendees:

- Stephen Dery (UNBC)
- Alec Mercier (Water Resource Engineer Rio Tinto)
- Dan Sneep (DFO)
- Justice Benckhuysen (RT)
- Wayne Salewski – (Nechako Environment and Water Stewardship Society)
- Andrea Byrne – (City of PG)
- Phillip Krauskopf – FLNRORD
- Rahul Ray (EDI)
- Jayson Kurtz (Ecofish Research Ltd.)
- Jennifer Carter (Ecofish Research Ltd.)

Meeting Objective: to brainstorm reservoir fisheries interests. Some interests raised to date include:

Interest	Potential Issue/pathway of effect
Resident fish species (habitat, flows, temperature)	Reservoir operations can affect suitability and availability of fish habitat, which can affect fish survival, growth and population. Specific issues captured in other issues.
Ramping in Cheslatta	Rapid or large flow changes can kill fish through isolation or stranding.
Fish access into tributaries	Need to determine if low reservoir levels are impeding fish access into tributaries.
Fish entrainment	Fish entrainment through Skins Lake Spillways could kill fish, decrease upstream populations, or benefit downstream populations.
Littoral productivity	Are reservoir levels or discharge affecting primary or secondary productivity?

Resident fish habitat	Reservoir operation can alter suitability and availability of habitat (spawning, rearing).
Resident fish habitat	Do reservoir operations affect spawning habitat in Tahtsa narrows?
Fish access into tributaries	Need to determine if changing water levels are impeding fish access into tributaries.
Fish in Cheslatta?	
Habitat restoration in Murray-Cheslatta	Issue needs to be refined: assuming this is related to water release facility.
Habitat restoration in Murray-Cheslatta	Issue needs to be refined: assuming this is given current operations.
Resident fish habitat	Reservoir operation can alter suitability and availability of habitat (spawning, rearing).
Water temperature for fish	Fluctuating water levels and discharge can alter temperature.
Littoral productivity	Are fluctuating water levels affecting primary or secondary productivity?
Resident fish habitat	Do reservoir operations affect spawning habitat in Tahtsa narrows?
Fish entrainment	Fish losses through voluntary or involuntary entrainment through the Kemano Penstock are not significant.
Fisheries (e.g., rainbow trout, burbot)	
Reservoir temperature for fish	Reservoir operation can alter temperature (e.g., disrupt thermocline).
Resident fish species (habitat, flows, temperature)	Reservoir operations can affect suitability and availability of fish habitat, which can affect fish survival, growth and population.
Spawning habitat	

<u>Brief discussion on last meeting</u>

- Overall, really good meeting; good ideas and group discussion.
- Bull Trout overwintering discussion was a good example of examining an individual component of an interest (resident fish). By identifying each components' sensitivity to operations (e.g., flow, temperature) we can consider which components are unique and which ones are common. This will allow us to better understand which objectives and performance measures to advance when developing flow alternatives.

- TWG focus is on science-based conclusions; opinions and perspectives are OK but need to include context and not presented as fact.

Summary of previous action items

- Review and summarize 1985 management plan.
  - Jayson has started, will provide summary at subsequent meeting.
- Summary of City of PG flooding seminar (including ice-jam flooding).
  - Really informative, lots of information, presentation available to share.
  - Provided general thresholds of when ice jam flooding occurs.
  - Jayson and Andrea will work to summarize specific information relevant to a flooding objective and PM.
- Salmon temperature tolerance.
  - Jennifer (Ecofish) doing a literature summary to be completed in the coming weeks.
- Caribou.
  - James and Jayson have reached out to BC Smithers Region; will provide an update when available.
- BC expert support.
  - James brought Ray and Nickolas last meeting and they will be available in future.
  - Other experts will be engaged in future meetings.
- Fish access due to sediment accumulation.
  - Jayson and Wayne briefly discussed, will follow up.
- Reservoir productivity.
  - Jayson reached out to Chris Perrin.
- Entrainment.
  - Ecofish risk assessment at skins lake spillway in progress.
- Ramping rates.
  - Ecofish ramping assessment using RT data in progress.
- Climate change research.
  - Justus has reached out and researchers responded.
  - Jayson will provide a summary.
- Float plane access/river depth.
  - Justus commissioned survey and has current river depths.
  - Ecofish will map results.
  - Additional information on other float plane locations forthcoming.

- Bull trout PM.
    - Jayson reached out to Ray (BC) re objectives and thresholds for lower Nechako overwintering; work ongoing.
    - This prompted discussion about whether the task should be to identify BC fisheries management objectives?
        - Yes, but starting with one objective (BT overwintering) before expanding.
    - There was a question whether BT actually over winter in the Nechako.

Action item: Jayson – follow up on whether BT over winter in the Nechako system

Discussion on reservoir fish issues.

- Province experts (Smithers office) could not attend today so we will have to follow up with those folks.
- Number of interests raised by MT already have action items: ramping, entrainment, productivity.
- Dan provided overview of some issues from BC Hydro WUPs (including tributary access, temperature, productivity, littoral habitat, drawdown "dead zone", spawning habitat) followed by group discussion:
    - Littoral habitat (area with light penetration to lake bottom).
        - Closely tied to some elements of lake productivity.
        - Depends on water quality and bathymetry: changes with reservoir level.
            - Justus: bathymetric map developed from pre-inundation information is posed on "get involved Nechako" website.
        - BC Hydro modeled littoral habitat.
        - Littoral habitat/function may not be issue because of low and stable drawdown (operations could change, likely more important if Tahtsa Narrows project advances).
        - Chris Perrin productivity assessment should consider littoral issues.
    - Drawdown dead zone.
        - Neither terrestrial riparian nor aquatic plants do well in drawdown due to wet-dry cycles.
        - Similar to littoral habitat, likely not very significant due to small elevation changes with current operations.
        - Chris Perrin productivity assessment should consider littoral issues.
    - Water temperature.
        - Often considered a footprint issue (related to water residence time once impounded) with limited operational influence.
        - Temperature usually considered mostly for downstream river conditions (e.g., STMP).
        - Justus: Some information exists; Lawrence (1995) thermocline investigation in Knewstubb basin near Kenney Dam, and a few years of RT data near Skins Lake spillway.
        - Is there an operational link? Can operations affect temperature?

- 16°C thermocline generally 10m deep, drawdown 3.92m, so no effect below thermocline. (Stephen corrected that thermocline appears deeper based on Lawrence study).
- Are there other temperature factors to consider? Have we adequately demonstrated temperature is not an issue just based on intake depth? We need to consider what evidence the MT would want. Temperature should be a simple question for an expert.

▪ Action item: Chris Perrin to answer.

Side Bar: climate change:

The reservoir temperature topic prompted a discussion about climate change that wasn't specific to an RT operation:

- *Is there work on effects on climate change on lake temperature?*
  - *Stephen conformed there is work on river but not sure if there are studies specifically looking at lakes.*
  - *Justus reminded us that the climate change consortium research is a combined study, and includes consideration of how climate change affects river temperature via changes to reservoir temperature.*

***Action Item**: Stephen will reach out to colleagues about projected climate change affects to reservoir thermoclines.*

Discussion on reservoir fish issues cont'd.

- Dead standing timber
  - Wayne prompted good group discussion about habitat and productivity value of the abundant submerged dead standing timber. May also affect osprey nesting (emerged dead standing timber).
  - Not unique to Nechako: Williston and other reservoirs also have submerged timber.
  - Recognition that commercial salvage logging (not within direct purview of WEI), clearing for navigation or LWD management, or natural processes could reduce amount of submerged timber.
  - Dan stated that commercial logging could have a regulatory trigger, including *Fisheries Act*.
  - Jayson not aware of any work here or elsewhere to assess underwater forest habitat and productivity; however, Justice provided research paper on this topic.

▪ Action Item: Jayson to review and determine technical merit, possibly engage Chris Perrin.

- Declining fish populations
  - Wayne provided his observations that reservoir is a good rainbow trout fishery (fish to 10lbs not uncommon), but reduced number of kokanee in rainbow trout stomachs.

- MT members have suggested kokanee populations have declined.
- We need to consider population changes considering local factors, but also in regional context.

▪ Action item: Ask BC about status of fish populations.

- Potential factors for fish populations include entrainment, forest fires (water chemistry, riparian habitat), productivity, others.
    - Wayne provided information of an informative group he is involved with that is investigating loss of riparian habitat from wildfires and the effects on salmon populations; results not expected for 2 or more years.
- Although wildfire not related to operations, high-level understanding may inform whether changes to operations will have any affect, or if wildfire or other effects are controlling limiting factors.

▪ Action Item: ask Chris Perrin if wildfires are likely to limit productivity.

▪ Action item: ask BC if there is any research re wildfires and fish populations.

<u>*Side Bar: end goal of interests and operations:*</u>

The fish population topic prompted a discussion about recognizing the end goals of identifying issues and related operations that wasn't specific to any one reservoir interest or issue:

- *We need to focus on specific objectives and end goals. For example, if we find that fish populations are not limited by productivity then no reason to look further into reservoir productivity unless there are changes proposed to reservoir operations.*
- *We could go down many paths to understand large complex land-based effects, which is important to understand to some extent (i.e., are external factors overriding operational affects), but don't want to get caught up in understanding these issues fully.*
- *We want to focus on issues that are directly related to operations, but consider what other factors will influence the success of operations at meeting objectives.*

<u>*Side Bar: BC and Indigenous fisheries interests:*</u>

- *Are BC WEI fisheries interests represented by existing management objectives, and if those objectives are satisfied, do we need to pursue the interest?*
    - *If BC management objectives are being met this does not mean an issue needs to be ignored. We need to recognize that things may change and need to know if that is relevant to other interests and operations.*

▪ Action Item: Jayson to work with BC to identify fisheries management objectives, if objectives are being met, and if objectives are sensitive to operations.

- *We are specifically asking BC for their interests. Mike R brings Cheslatta interests to the TWG; what about other Indigenous interests?*
    - *RT has invited Indigenous participation; varied success, but coming to the WEI process is a window to raise interests.*

- *RT provides updates to Indigenous groups in various formats.*
- *Indigenous engagement efforts should be a Main Table discussion item, not an effort led by the TWG.*

Discussion on reservoir fish issues cont'd.

- Tahtsa Narrows.
  - Although this isn't a specific issue or a defined project or activity, we recognize that if the project goes ahead it will increase reservoir draw-down which has potential to affect many fisheries issues, even those we consider not sensitive to current operations.
  - Justus outlined the project will get screened by regulators prior to commencement. Dan confirms extensive regulatory review would occur.
  - Nonetheless, we agreed that we should flag to MT the Tahtsa Narrows project as a trigger to re-evaluate WEI issues (part of adaptive management).

▪ Action Item: Flag potential issues of Tahtsa Narrows project

Discussion on other interests and issues:

- We have tackled a subset of interests raised by MT.
- Master list maintained by Ecofish.
  - Includes whether interest has technical merit, is related to operations, is feasible to influence or not (e.g., flushing flows in Nechako River), etc.
  - Needs to clearly establish technical merit of each interest and what action we recommend.
  - Needs endorsement by MT.

▪ Action Item: Jayson to summarize all interests and TWG actions, recommendations etc.

- Agreement that we should establish "facts" to avoid us or MT from going down a rabbit hole on something we have already agreed.

▪ Action Item: Jayson to develop facts list.