



To: WEI Technical Working Group members

From: Jayson Kurtz, TWG Coordinator, Ecofish

Date: January 27, 2021

Re: WEI Technical Working Group meeting: Wednesday, January 27, 2021, 9:00 am to 11:00 am

Attendees:

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

Meeting Objective: Fisheries biologists from province could not make today's meeting so all fish related topics have been deferred to our next meeting. Our objective today will be to cover remaining interests either not yet covered and/or that do not have a clear pathway forward.

Agenda:

- Review last meeting and action tracker.
- Interests, Objectives and PMs.
 - Misc. interests
 - Summary of standing tree studies
 - Overview of tasks currently underway

Some interests raised to date include:



Category	General Location	Interest	Potential Issue/pathway of effect	
RT Operations	Cheslatta Lake	outlet weir	reservoir operation can alter suitability and availability of habitat (spawning, rearing). raise Cheslatta lake level to aid in restoration, supplement Nechako flows.	<ul style="list-style-type: none"> Cheslatta Nation interest – Kenney dam release would drop Cheslatta 12', resulting in a large band of "sterile" riparian habitat, subject to erosion (large drawdown zone). A weir is proposed (as part of Kemano completion project) on east end of Murray Lake to stabilize lake. The weir would also supplement downstream flows if needed. Path forward: this interest is dependent on the Kenney dam water release facility, therefore, this is a potential trigger to consider in the future.
Health of river	General	Non-flow enhancements	Numerous water bodies support the ecological function of the Nechako system, including tributaries, side-channels, off-channel habitat, and riparian areas	<ul style="list-style-type: none"> No further action – will be addressed in fish and wildlife topics as appropriate
flooding	Reservoir and river	flooding in reservoir and river	Does T2 provide flood relief? Can it discharge to the ocean?	<ul style="list-style-type: none"> No changes to flow, provides increased stability No further action is required
flooding	river	flooding in Prince George	Ice jams create overland flooding at Prince George	<ul style="list-style-type: none"> Lyle Larson has provided flow thresholds, which is the best information we have. Path forward: loop back with Lyle to confirm if any modifications are suggested after this winter ice season and have NHC review
flooding	river	flooding in Prince George	flood management and information about flooding risks and magnitude important for	<ul style="list-style-type: none"> NHC is developing ice-jam model for Vanderhoof

			city planning: timing and cost of mitigation, timing of high water, backwater effect from Fraser, can effect flooding of PG trails and parks and bank erosion, capitol work planning, erosion protection design and costs, setback distances, property buy-outs, archaeology sites, aquifer impacts, availability of offsetting areas, opportunities to educate public/developers, etc.	<ul style="list-style-type: none"> • Path forward: review results from NHC model to develop flow thresholds
Flooding	river	Fraser Lake flooding	flood management and information about flooding risks and magnitude important for city planning: timing and cost of mitigation, timing of high water, backwater effect from Fraser, can effect flooding of PG trails and parks and bank erosion, capitol work planning, erosion protection design and costs, setback distances, property buy-outs, archaeology sites, aquifer impacts, availability of offsetting areas, opportunities to educate public/developers, etc.	<ul style="list-style-type: none"> • Additional information is coming from Regional District
drought	general	drought management	drought management, Environmental flow needs, can Nechako flows augment drought conditions?	<ul style="list-style-type: none"> • Dams generally do a good job at mitigation hydrological events (high and low flows). • NWC considered water availability for irrigation and concluded it was not a limiting factor. Specifically, a water use assessment (Vanderhoof area) showed that instantaneous withdraw is < 1cms, and therefore, not an issue • There is a concern if water levels fluctuate too much, irrigation pump locations become ineffective. <ul style="list-style-type: none"> ○ UNBC mapping aquifers to consider alternatives to irrigation.

				<ul style="list-style-type: none"> • No further action is required
Fish	Murray-Cheslatta-Skins	resident fish species (habitat, flows, temperature)	"Reservoir operations can affect suitability and availability of fish habitat, which can affect fish survival, growth and population	<ul style="list-style-type: none"> • Biggest issue for Murray-Cheslatta is erosion and water quality: watershed is essentially an industrial water conduit • Kenney dam water release facility is the best solution. However, in the meantime we would like to develop PMs for this interest • Path forward: evaluate flow alternative (including changes to STMP) that may affect fish and fish habitat in the Cheslatta watershed. <ul style="list-style-type: none"> ○ Brainstorming for this topic will continue over the following meetings where we will discuss STMP flows and fish interests.
Fish	Murray-Cheslatta-Skins	Habitat restoration in Murray-Cheslatta	issue needs to be refined: assuming this is related to water release facility assuming this is given current operations	<ul style="list-style-type: none"> • This interest will be deferred until trade off analysis is complete
Fish	Murray-Cheslatta-Skins	resident fish habitat	Need to determine if changing water levels are impeding fish access into tributaries	<ul style="list-style-type: none"> • Need to obtain information on specific locations to focus our attention. • Brainstorming for this topic will continue over the following meetings where we will discuss fish interests.

Action Item: Jayson to reach out to Mike Robertson to discuss specific locations where fish access to tributaries in Murray-Cheslatta is an issue

Action Item: Follow up with NHC regarding ice jam model

Action Item: Follow up with Lyle after winter ice season to discuss if modifications to flow targets are required.

Summary of standing trees study (Northcote and Atagi 1997):

- The authors draw from a number of case studies in both BC and abroad to illustrate the effects of flooding on aquatic communities, and in particular fish and fish habitat
- Northcote and Asagi state that by leaving trees and vegetation in place many benefits are had:
 - Erosion – the presence of remnant forest in this zone provides some stabilization that prevents the wholesale erosion of sediment. Trees can also break up wave action to further protect the shoreline from erosive forces.
 - Productivity – in reservoirs where organic matter and topsoil are left undisturbed by flooding phytoplankton production can increase. Moreover, trees left in the reservoir can act as complex substrate for periphyton to establish on
 - Aquatic ecology - the presence of trees within a flooded reservoir provide both substrate for inverts and plankton to establish on, but also stabilize sediment which provides nutrients to invertebrates and helps isolate contaminants and prevents leaching (Pardue and Nielsen 1979)
 - Fish and fish habitat – trees can provide complex habitat (i.e., cover and substrate for prey species)
- Northcote and Asagi believe if logging is pursued within the Nechako Reservoir there are several ecological effects that may be expected including increased turbidity due to bottom disturbance, increased sediment erosion, decreased fish and invertebrate habitat, and lowered primary productivity
- They provide the following recommendations that may mitigate effects:
 - Initial logging should take place in small subsets where the effects on productivity, invertebrates, water quality and fish communities can be studied
 - Logging should be focused in the aphotic zone to lessen effect on primary productivity, fish habitat, and invertebrate populations;
 - Logging should take place away from inflow streams, where the effects of sediment stabilization due to trees is the greatest, and similarly logging within the drawdown zone should be avoided;
 - Stumps and debris from tree harvest should be placed strategically in the euphotic zones in areas where they will not be disturbed by wave action, to provide increased habitat complexity;

- They identify little baseline information exists so before timber harvest commences, it would be beneficial to establish a comprehensive GIS catalogue, create a baseline inventory of fish and invertebrate presence and density, and quantify angler effort and catch
 - Select areas of the reservoir have had submerged timber harvested in the past and may act as useful examples for study.
- No further action is needed on this interest.

Tasks currently underway:

- Ramping assessment to estimate current ramping rates and evaluate risk to fish:
 - Calculate ramping rates and compare to provincial standard rates to determine risk to fish
 - Give a professional opinion about how ramping events would attenuate downstream in lakes
- Entrainment assessment on SLS:
 - Using the BC Hydro risk screening approach to evaluate risk to fish
- Natural Hydrograph:
 - Rebuilding Nechako river hydrograph since 1952 assuming no diversion through Kemano.
- Reservoir productivity, water quality, and temperature – approach being developed by Chris Perrin for the following objectives:
 - Evaluate risk of operations effect reservoir productivity and water quality.
 - What are the limiting factors of productivity (i.e., flushing out highly productive water from reservoir, wildfires)?
 - Do operations affect reservoir temperature (e.g., disrupt thermocline)?
 - What are key factors driving reservoir water quality (i.e., soil chemistry, land use practices).
- Reservoir erosion assessment:
 - Objective is to evaluate erodibility, velocity, rate of change. Review and/or modification of land owner best practices.
- River erosion literature review:
 - Objective is to understand causes attributing to erosion (i.e., land use, RT operations, environmental conditions) and understand how flow changes affect erosion (i.e., magnitude and rate of flow changes).
- Preliminary wetland assessment:
 - Desktop review to identify wetlands in that could be affected by operations
- Preliminary wildlife assessment:
 - Desktop review to identify wildlife species in the reservoir and river that could be affected by operations

Other Discussion

- RT Operations:
 - RT will have bi-weekly operations update meeting regardubg reservoir conditions and forecast with Cheslatta, Nechako Nations, DoV, and River Forecast Center
 - Update will be released publicly.

- Currently reservoir is higher than normal but Kemano generating hard and no significant concerns looking forward
- Next TWG meeting
 - Proposed Feb 17th then every 2 weeks thereafter – need to confirm with provincial biologists to confirm date. Will send email to confirm.