Rio Tinto
Water Engagement Initiative
Table Meeting

Meeting 5
Vanderhoof
October 8, 2019

Agenda review

- Welcome and introductions
- Agenda review
- Anticipated outcomes
- Meeting 4 summary review
- Draft meeting ground rules
- Technical Working Group (TWG) update
- Presentation: hydrographs
- Introduction to Structured Decision Making
- Lunch

Agenda review (2)

- Develop objectives for WEI interests
- Confirm next WEI Table meeting dates
- Adjourn

Anticipated outcomes

- Increased understanding of hydrographs and the current Nechako River hydrograph
- Increased understanding of objective development as part of Structured Decision-Making
- Development of draft objectives associated with identified interests

September 11, 2019 Meeting summary

- Distributed to meeting partcipants on Wednesday, September 18
- Suggested revision from Henry about including the information he provided to the Table
- Final version posted on: https://www.getinvolvednechako.ca/wei

Meeting 4 Action items

- **Action item:**
  - Rahul to develop a proposed approach to present the activities of the Table to senior politicians.
- **Update:**
  - FLNRORD and DFO to speak today about their communication structures to share updates about the WEI with senior government and political representatives

Meeting 4 Action item (2)

- **Action item:**
  - Rahul to use input provided by participants and develop a list of potential 30-minute presentations.
- **Update:**
  - Item discussed at the Technical Working Group (TWG) and information forthcoming later in this presentation.

Meeting 4 Action item (3)

- **Action item:**
  - Jayson to collate existing mapping/bathymetric data of the Reservoir through Technical Working Group.
- **Update:**
  - **Update:** Task to be completed through the TWG.

Meeting 4 Action item (4)

- **Action item:**
  - Rahul to initiate Communication Working Group.
- **Update:**
  - **Update:** Held first Communication Working Group meeting on Thursday, October 3.

Meeting 4 Action item (5)

- **Action item:** Jayson to find UNBC webinar and share with the Table.
- **Meeting context:** “discussion focused on how the issues of erosion, siltation, and hydrology are related to the health of the river. It was brought forward that a webinar was developed by UNBC on what happens to a river when it is dammed.

Meeting 4 Action item (5)

- **Update:**
- UNBC Natural Resources and Environmental Studies Institute (NRESI) *Colloquium series*
- Multiple presentation's/month; schedule and webinar live-streaming information here:

  https://www.unbc.ca/nres-institute/colloquium-series
- Archived presentations here:

  https://video.unbc.ca/channel/NRESI/
- Recent presentations on *Nechako Watershed Integrated Research* and *Sturgeon*

Meeting 4 Action item (6)

- **Action item:**
  - Jayson to create presentation on how elevated flood risks can liberate flows.
- **Update:**
  - **Update:** Task to be initiated through the TWG.

Meeting 4 Action item (7)

- **Action item:**
  - Rahul to work with WEI team to ensure a base map is prepared for the next meeting.
- **Update:**
  - **Update:** Initial map on the wall today

Meeting 4 Action item (8)

- **Action item:**
  - Rahul to send out details of the next meetings to the Table.
- **Update:**
  - **Update:** Details included in the Meeting 4 summary. January and February to be discussed today.

Proposed WEI Meeting Ground Rules

- You have already shown their commitment and passion to improve Rio Tinto operations in the Nechako region.
- As you regularly meet to discuss and address issues, it is important that participants adhere to a common set of Meeting Ground Rules to ensure the process is meaningful, efficient, and rewarding.
- Below are proposed Meeting Ground Rules for you to review and revise

Proposed WEI Meeting Ground Rules (2)

1. Be respectful
2. Listen actively and be attentive
3. Try to understand other participant's perspectives, even if you disagree with them
4. Be collaborative
5. Focus on the future
6. Stay on topic and be concise

Proposed WEI Meeting Ground Rules (2)

7. Give others a chance to speak (some participants may be shy—but have valuable things to say)
8. Turn off your electronics (use breaks to respond to emails or make phone calls)
9. Speak about your interests
10. Respect the facilitator's requests

Technical Working Group Update

- **First meeting held Thursday, October 3**
  - Conference call, 9 participants
  - Discussed purpose, objectives, function
  - Discussed initial list of information requests for main table and suggest two presentations for November meeting:
    - Climate change
    - Information bibliography
- **Next meeting: TBD**

Information Presentation: Hydrographs

Structured Decision Making

- Backgrounder document emailed on Thursday, October 3.
- “an organized approach to identifying and evaluating creative options and making choices in complex decision situations”
- Method-based approach to identify objectives and evaluate how well alternative scenarios meet those values
- Avoids “loudest voice wins” solution


1: Clarify the Decision Context
2: Define Objectives & Evaluation Criteria
3: Develop Alternatives
4: Estimate Consequences
5: Evaluate Trade-Offs & Select
6: Implement & Monitor
Iterate

Alternative No. of Interest: 1

Colour key: Better / Equal / Worse

PM#	PM	Alternative name:	1 WL	2 E	3 B	4 C	5 F	6 D	7 G2	8 H	9 I1	10 I2	11 I3	12 J	13 K
1	Flood Free (days <650 m^3/s at Somass)		12,017	12,017	12,017	12,017	12,017	12,017	12,017	12,017	12,008	12,017	12,017	12,016	11,995
2	Reservoir Rec. days >329.5 m 24 May-15 Oct		82	58	56	57	53	79	63	56	0	0	0	35	0
4	Reservoir Fishing days > 329.5 Apr-Jun		91	79	69	71	66	31	91	69	0	5	5	21	0
5	Arch No Unauthorized Collection days >328 m		302	234	217	221	217	262	264	217	0	79	84	146	45
6	Arch Erosion, days avoid 327 m - 328.5 m		347	336	325	325	325	267	337	339	365	347	346	325	353
7	FN Traditional Use & Study - Reservoir Days		0	0	0	0	0	0	0	0	5	4	4	0	6
8	River naturalized hydrograph 1=Yes 0=No		0	0	0	0	0	0	0	0	0	0	0	1	1
11	Reservoir Trout Spawning m^2		0.0	0.0	0.0	0.0	0.0	50.8	0.0	0	12,934	25	25	10	266
12	Reservoir Trout Rearing m		0.0	0.0	4.4	4.4	4.4	8.8	0.0	4	5,348	5,220	4,002	874	5,630
13	Wildlife habitat Drawdown Zone ha		22	48	52	52	50	39	36	52	216	193	167	73	219
15	Elsie. Steelhead Parr Rearing m		0.8	11.9	11.9	11.9	17.0	2.9	0.8	11.9	11.9	11.9	11.9	11.9	11.9
22	Moran. Steelhead Parr Rearing m		6.1	16.7	17.6	16.7	20.2	6.2	6.1	17.7	17.2	17.2	17.0	17.2	16.7
23	Moran. Steelhead Spawning m		16.2	23.9	26.9	26.9	26.9	16.2	16.2	26.9	23.0	26.5	26.5	28.4	27.9
24	Moran. Coho Fry rearing WUW m		2.3	5.6	5.7	5.6	5.9	2.4	2.3	5.7	5.7	5.7	5.7	5.6	5.6
25	Moran. Coho Spawning m		3.2	4.4	5.1	5.0	5.1	2.8	2.8	5.1	14.5	5.1	5.1	7.1	7.2
29	GCL Shoreline incubation M m^3		29.2	32.8	32.8	32.8	32.8	32.8	32.8	32.8	18.1	32.8	32.8	32.8	32.8
30	GCL Stamp R. migration M m^3		65.4	64.4	64.1	64.4	58.2	33.8	65.5	64.1	15.3	15.3	19.8	59.3	13.9
33	$ Value of energy (millions)		9.6	10.3	10.2	10.2	9.9	9.8	10.9	9.6	6.0	8.1	9.1	9.1	7.1

Figure 6-1: Interactive Colour Coded Excel Spreadsheet to Assist In Comparing Ash River Water Use Plan Operating Alternatives

Structured Decision Making: Objectives

Structured Decision Making: Objectives

- Concise statemen of “what matters”
- Typically between 4-8 core things that matter to Table members and decision makers
- With evaluation criteria, form the structure for scenario development, trade-off analysis, and selection

Structured Decision Making: Objectives

- Separate means from ends
  - "Fundamental" or "Ends" objectives: the outcomes you really care about regardless of how they are achieved
  - "Means" objectives: specific methods of meeting the fundamental objectives
- Objectives are not targets

What are good objectives?

- **Complete:** capture all of the things that matter in evaluating proposed alternatives
  - Environmental, social, economic, health, and cultural outcomes that may be affected
- **Concise:** nothing is unnecessary or ambiguous
- **Sensitive:** objectives are influenced by the alternatives under consideration
- **Understandable:** stated in a way that is understandable to everyone
- **Independent:** contribute independently to the overall performance of an alternative

Example fundamental objectives: Duncan Dam Water Use Plan

- **Fish:** Maximize fish abundance and diversity.
- **Flood Management (and Erosion Protection):** Minimize the flood damage to people and property on the lower Duncan River.
- **Power Generation:** Minimize economic impacts to both the Kootenay River and the Columbia River generation system.

Example objectives: Walter Hardman Water Use Plan

- Maximize the population of fish in the reservoir
- Maximize the population of rainbow trout in the river downstream of the dam
- Maximize the power revenues generated by the Walter Hardman Project
- Minimize the impacts on wildlife using the area
- Maximize the recreational quality of the reservoir.

Example objectives: Spillimacheen Water Use Plan

- **Power:** Maximize the financial value of power generation at the Spillimacheen facility by maximizing revenue from energy sales, minimizing operating and maintenance costs, and minimizing negative effects on ancillary services; ensure electrical reliability of the BC Hydro system.
- **Recreation:** Maximize appropriate recreational opportunities.

Example objectives: Spillimacheen Water Use Plan

- **Cultural Use and Heritage Resources:** Maximize abundance and diversity of fish and wildlife populations to support First Nations harvesting and associated activities.
- **Flood and Erosion:** Minimize flooding and erosion impacts.
- **Irrigation:** Minimize irrigation impacts.

Example objectives: Spillimacheen Water Use Plan

- **Fish and Fish Habitat:** Maximize native fish abundance and diversity by minimizing the entrainment of fish, maximizing habitat suitability, minimizing fish stranding, minimizing sediment effects and minimizing impacts associated with maintenance and operational procedures.
- **Wildlife and Wildlife Habitat:** Maximize wildlife habitat quality, quantity and diversity.

Nechako WEI Objectives

Nechako objectives for Table discussion

- Compiled interests heard from the WEI Table

WEI Identified Issues

Issue category	Issue
Chinook salmon	Issues: habitat, water flow, timing and temperature needs
Sockeye salmon	Issues: habitat, water flow, timing and temperature needs
Sturgeon	Issues: habitat, water flow, timing and temperature needs
Resident fish species/aquatic life	Issue: habitat, water flow, timing and temperature needs
Wildlife	Potential concerns: beavers, muskrats, shorebirds, Canada geese, osprey, moose
Reservoir	Bank erosion Log and deadheads Osprey Fisheries (e.g. rainbow trout, burbot) Littoral productivity Spawning habitat Recreation (e.g. canoeing) Wildlife habitat

Issue category	Issue
Archaeological sites	Known archeological sites
Erosion	Sensitive locations, and opportunities
Power production	Rio Tinto power generation
Agriculture	Fencing, erosion
Aquifer	Aquifer location, function, and health
Ice jams	Effects on communities and community infrastructure
Non-flow enhancements	Water bodies that support the ecological function of the Nechako system, including tributaries, side-channels, off-channel habitat, and riparian areas. Understand flo and timiing issues.

Issue category	Issue
Waterfowl	Waterfowl, their habitat, riparian habitat, and potential interaction with flushing flows
Recreation	Recreation needs
Water Quality	Maintain water quality
Health of the river	Interest in improving the health of the river
Flooding	Seasonal flooding
Climate change	Climate change implications

Nechako objectives for Table discussion

- Compiled interests heard from the WEI Table
- Drafted preliminary “straw dog” objectives
- Intent is to advance the discussion today, and for you to review, revise, throw out the possible objectives that follow, and create new ones.
- Please also identify the key considerations which will be use to develop evaluation criteria.

Fish: Nechako River

- **Possible objective:** Maximize fish abundance below the Skins Lake spillway
- **Possible: sub-objectives:**
  - Minimize fish stranding risk
    - *Known sensitive periods? Key triggers?*
  - Minimize temperature effects
    - *Most sensitive times? Species?*
  - Maximize tributary access
    - *Known tributaries of concern? Known sensitive periods?*

Fish: Nechako River

- **Possible objective:** Maximize fish abundance below the Skins Lake spillway
- **Possible: sub-objectives:**
  - Maximize habitat suitability
    - *What are the causes of the reduction in habitat suitability? Are there sensitive periods? If so, when?*
  - Maximize food availability
    - *What are the main causes of reduced food availability?*
  - Minimize fish passage issues in the mainstem
    - *Are there areas of known fish passage concern?*

Fish: Nechako River (2)

- **Possible objective:** Maximize fish abundance in the Nechako River
- **Sub-objectives:**
  - Maximize sturgeon survival
    - *Known threats to survival?*
  - Maximize Chinook abundance and health
    - *Known threats to survival?*
  - Maximize Sockeye abundance and health
    - *Known threats to survival?*
  - Maximize resident species abundance and health
    - *Known threats to survival?*

Fish: Reservoir

- **Possible objective:** Maximize fish abundance in the Nechako Reservoir
- **Sub-objectives:**
  - Maximize littoral productivity
    - *Known causes of littoral productivity decreases?*
  - Maximize pelagic productivity
    - *Known causes of pelagic productivity decreases?*
  - Minimize fish stranding
    - *Are there known areas where fish get stranded?*
  - Minimize entrainment risk
    - *Are there known entrainment issues?*

Fish: Reservoir (2)

- **Possible objective:** Maximize fish abundance in the Nechako Reservoir
- **Sub-objectives:**
  - Maximize kokanee population
    - *Known pressures?*
  - Maximize bull trout populations
    - *Known pressures?*
  - Maximize tributary access to spawning tributaries
    - *Are there known tributary access issues?*
  - Maximize nutrient loading
    - *Are there known nutrient issues?*

Wildlife

- **Possible objective:** Maximize the quality and quantity of available habitat area for wildlife
- **Sub-objective:**
  - *Are there known wildlife concerns related to Rio Tino Nechako operations*

Flooding

- **Possible objective:** Minimize flood damage to people and property on the Nechako River
- **Sub-objectives:**
  - Minimize flooding adjacent to the Nechako River
    - *Where are the major areas of concern?*
  - Minimize the effects of erosion and sediment deposits
    - *Where are the areas of concern?*
  - Maximize flexibility of operations to deal with flooding issues
    - *Are there operational concerns?*

Power Generation

- **Possible objective:** Minimize economic impacts to Rio Tinto operations
- **Sub-objective:**
  - Maximize revenue from energy sales
    - *What are the current business drivers?*
  - Minimize effects to Rio Tinto operations
    - *What are the current power needs? Commitments?*

Archeological sites

- **Possible objective:** Minimize adverse effects on archaeological sites
- **Sub-objectives:**
  - Minimize inundation of Cheslatta site
    - *When is the most sensitive period? What mitigation measures been tried? Is there a flow threshold?*

Recreation

- **Possible objective:** Maximize recreational opportunities
- **Sub-objective:**
  - Maximize recreational opportunities in the Nechako River below the Skins Lake Spillway
    - *Flow needs at specific times?*
  - Maximize recreational opportunities in the Nechako Reservoir
    - *Flow issues?*

Waterfowl

- Minimize inundation of nests during nesting period
  - *Nesting season by species?*

Sample Evaluation Criteria

Objective	Evaluation Criteria
Maximize reservoir fishing experience	Number of days reservoir elevation is above 329.5 m from April 1 to June 30
Minimize the negative impacts of flooding on property	Number of days discharge is less than 650 m3/second over 38 years of simulated operations
Maximize trout spawning habitat in tributaries within drawdown zone	Square metres of trout spawning habitat

WEI Future Meeting Dates

- Wednesday, November 20, 2019: Prince George
- No meeting in December
- Wednesday, January 15?
- Wednesday, February 12?

Thank you!