

Water Engagement Initiative Main Table videoconference Meeting 20

Wednesday, May 19, 2021

9:00 am to 1:00 pm



Agenda

- Agenda and meeting summary comment review
- Action items
- WEI Element Updates
 - Communication improvements
 - Reservoir Working Group (Southside Working Group) update
 - Flow-related activities, including Technical Working Group (TWG) summary
 - Related initiatives: Nechako White Sturgeon Recovery Initiative (NWSRI)
- Process walk through
 - Overview of the process: Ash River Water Use Plan
 - Main Table discussion

Draft Agenda (2)

- WEI Process to date and the path ahead
 - Interests to Objectives
 - Performance Measures
 - Creating alternatives
 - Flow modelling
 - Trade-off analysis
 - Structured Decision Making exercise
- Next meeting dates
- Adjourn

Meeting summary comment review

- Draft WEI Main Table Meeting 19 summary sent to meeting participants for review on Friday, April 30
- Includes use of initials of speakers as discussed at the last Main Table meeting
- No suggested revisions received
- Final meeting summary is posted on Get Involved Nechako website:
<https://www.getinvolvednechako.ca/wei>

Meeting 19 Action Items

- **ACTION ITEM:** Participants who provide input during WEI Main Table meetings will be identified by their initials in the meeting summaries
- **Update:** Main Table meeting summaries, starting with the most recent Main Table 19 Meeting summary included speaker's initials
- Future meeting summaries will also include speaker's initials

Meeting 19 Action items

- **ACTION ITEM:** Turbidity will be added to the list of interests and reviewed by the Technical Working Group
- **Update:** Jayson to provide update

Meeting 19 Action items

- **ACTION ITEM:** WEI Main Table to work through examples of how the process works at the next meeting, including interests, objectives, performance measures, and trade-offs
- **Update:** Main Table to work through the process today

Meeting 19 Action items

- **ACTION ITEM:** JK to reach out to Deborah Jones-Middleton about the backwatering interest
- **Update:** Jayson to provide update

Meeting 19 Action items

- **ACTION ITEM:** JK to follow up with Kevin Moutray to get more information about hiking trails around Vanderhoof and how they are affected by flooding
- **Update:** Jayson to provide update

Meeting 19 Action items

- **ACTION ITEM:** The Technical Working Group will investigate including low water and safety issues in the Human Health related interests
- **Update:** Jayson to provide update

WEI Elements

- Communication improvements (Devrie)
- Reservoir Working Group (Southside Working Group) (Jason)
- Flow-related activities, including TWG summary (Jayson)
- Related initiatives: Nechako White Sturgeon Recovery Initiative (NWSRI) (Trevor Rhodes)

WEI Element Update: Communication improvements

- Devrie to provide update

WEI Element Update: Reservoir (Southside Working Group)

- Jason to provide update

WEI Element Update: Flow-related component update

- Jayson to provide Technical Working Group (TWG) summary

WEI Element Update:

Related initiatives: NWSRI

- Trevor Rhodes, Nechako White Sturgeon Recovery Initiative chair

Process walk through

- As a WEI Table, we have been building on the approaches used in Water Use Planning
- Structured Decision Making (SDM) at an overview level
- In the process of working through the steps (e.g. identify interests, develop objectives, identify performance measures)
- Today, we will walk through a similar effort (Ash River Water Use Plan) to demonstrate how what we have been doing relates to where we are going

Process walk through (2)

- Neither Jayson nor I were involved in the Ash River Water Use Plan
- Intent is to show the entire process flow
- Encourage questions on the process
- Have spoken to some WEI members
- Please ask questions throughout

Ash River Water Use Plan

- Plan completed in 2003, Vancouver Island
- Consultative Committee consisted of 15 representatives
- Representatives included BC Hydro, provincial and federal agencies, First Nations, local stakeholders, and industry
- Built on Water Use Plan Guidelines, as are we
- Held 23 meetings (*in person, no COVID at that time*)
- The Main Table reached consensus on a preferred operating alternative for the Ash River

Ash River Water Use Plan: Interests

- Interests included:
 - Power
 - Fish
 - Wildlife
 - First Nations archaeology and traditional use
 - Recreation
 - Consumptive use and water quality, and
 - Flood control

Ash River Water Use Plan: Objectives

- Main Table developed and agreed to the following objectives for the Ash River Water Use Plan
- First Nations
 - Maximize protection of archaeological resources and opportunities for study and traditional use in Elsie Lake Reservoir drawdown zone
 - Maximize traditional use in the Ash River below the Elsie Dam

Ash River Water Use Plan: Objectives (2)

- Fisheries
 - Maximize the abundance of fish in Elsie Lake Reservoir and in the Ash River below Elsie Dam
- Flood Management
 - Minimize adverse effects of flooding on personal safety and property
- Power
 - Maximize the value of power generation produced at the Ash River hydroelectric facilities

Ash River Water Use Plan: Objectives (3)

- Recreation
 - Maximize recreational opportunities in Elsie Lake Reservoir and in the Ash River below Elsie Dam
- Wildlife
 - Maximize the area of riparian habitat around Elsie Lake Reservoir

Ash River Water Use Plan: Performance Measures

- Performance measures were developed by Ash River Consultative committee
- A sample of the Performance Measures developed in the Ash River Water Use Plan process follow:

Flood Control

Table 4-3: Objectives and Performance Measures - Flood Control

Objectives	Performance Measures	Location	Minimum Significant Incremental Change
Minimize the negative impacts of flooding on property	No. days discharge is less than 650 m ³ /s over 38 years of simulated operations	Somass Water Survey of Canada gauging station	± 1 day

Archeological resources

Objectives	Performance Measures	Location	Minimum Significant Incremental Change
Maximize protection of First Nation archaeological resources in Elsie Lake Reservoir drawdown zone from unauthorized collection	No. days reservoir is above 328 m, year round	Measured at intake to power diversion	± 20 days

Support for migrating steelhead

Objectives	Performance Measures	Location	Minimum Significant Incremental Change
Enable migrating steelhead to pass obstructions.	Provide migration pulse flows of 10 m ³ /s over 48 hours 1 = yes; 0 = no	Measured at Moran Creek gauge	Any difference is significant

Ash River Water Use Plan: Interim summary

- The Consultative Committee developed 28 water use objectives
- Performance measures were identified based on these objectives

Ash River Water Use Plan: Alternatives

- Consultative Committee created and evaluated a range of operating alternatives
- Intent to develop alternatives to address the objectives
- Modelled the alternatives using the BC Hydro simulation model
- Trial alternatives: demonstrated the process of specifying operating alternatives, and interpreting the model outputs and Performance Measures

Ash River Water Use Plan: Alternatives (2)

- Five trial alternatives, maximized for a single water use objective were developed, for example:
 - Maximize power generation (Alternative 3)
 - Specified desired flow for fish (Alternative 4)
- The trial alternatives were not intended to be viable as they excluded other interests
- The trial alternatives were for learning purposes

Table 5-1: Specifications for Five Ash River Water Use Plan Trial Alternatives

Alternative Name	Objective	Reservoir elevations	Fish flows	Modelling priority	Water licence constraint on diversion for generation? ¹
1	Maximize year round reservoir recreation opportunities	329.5 m year round	None specified	Reservoir elevation	None
2	Provide 60 day period for archaeology study in drawdown zone	317.5 m for 60 consecutive days summer/fall	None specified	Reservoir elevation for 60 days	None
3	Maximize power generation	None	None	Power	None
4	Maximize fish habitat ²	None	70% of Mean Annual Discharge or 19.45 m ³ /s year round	Fish flows	None
5	Maximize fish habitat	None	5 m ³ /s year round	Fish flows	None

1. The existing water licence limits diversion volume to 3 926 m³/s-days or 76.5 million m³ per year
2. The Consultative Committee specified 70% of Mean Annual Discharge (MAD=27.8 m³/s) or 19.45 m³/s to be discharged over several days during the fall migration and spawning period. However, the alternative was actually modelled as 70% of the *previous day's inflow*.

Ash River Water Use Plan: Round 2 alternatives

- Consultative Committee developed and evaluated more realistic alternatives in Round 2 to seek a balance between objectives

Ash River Water Use Plan: Round 3 alternatives

- Developed 13 operating alternatives (Table 5-2).
- Each alternative was a combination of one or more constraints on operating the Ash River hydroelectric facility to achieve water use objectives
- Alternatives specified up to four constraints:

Ash River Water Use Plan: Round 3 constraints

- Desired reservoir elevations (Column 4 in Table 2)
- Desired fish flow(s) in the Ash River (Columns 5, 6, 7, or 8)
- Presence of pulse flow to assist fish migration in the Ash River (Column 9)
- Maximum volume of water diverted for power generation (Column 10)

Ash River Water Use Plan: Alternative themes

- Theme: Power generation
- Theme: Provide flows for fish habitat
- Theme: Reservoir recreation
- Theme: Restore vegetation to Elsie Lake reservoir drawdown zone
- Theme: Naturalized flow pattern in Ash River
- Theme: Protect reservoir archaeology resources
- Theme: Fish, wildlife, and traditional use

Table 5-2: Specification of Constraints for Ash River Water Use Plan Round 3 Alternatives

1	2	3	4	5 Possible Fish Flow Regimes					10	11
No.	Alt Name	Objective	Constraint on Reservoir Operation?	0.71 m ³ /s Jun to Aug 0.29 m ³ /s Sept to May	3.5 m ³ /s year round	3.5 m ³ /s May to Sept 5 m ³ /s Oct to Apr	3.5 m ³ /s May to Oct 5 m ³ /s Nov to Apr	5 m ³ /s year round	Fish migration pulse flow? ¹	Constraint on diversion for generation?
1	WL	Current water licence	None	✓						76.5 million m ³
2	G2	Power	None	✓						None
3	E	Fish	None		✓				✓	None
4	B	Fish	None			✓			✓	None
5	C	Fish	None				✓		✓	None
6	F	Fish	None					✓	✓	None
7	D	Reservoir recreation	327 m 15 March to 30 June 329.5 m 1 July to 14 October elevations ± 0.5 m	✓					✓	None
8	I1	Wildlife stable reservoir	Max 320 m year round			✓			✓	None
9	I2	Wildlife stable reservoir	Max 320 m May to October Normal operation November to April			✓			✓	None
10	I3	Wildlife stable reservoir	Similar to I2, adjusted to allow power generation max. 323 m elevation			✓			✓	None

1. Migration pulse flow. Modelled as 10 m³/s discharge from Elsie Dam for 48 hours, once on 15 August and once on 15 September. In practice, would be timed with natural rainfall and natural high inflow and discharge to be measured at Moran Creek gauge.

1	2	3	4	5	6	7	8	9	10	11
				5 Possible Fish Flow Regimes						
No.	Alt Name	Objective	Constraint on Reservoir Operation?	0.71 m ³ /s Jun to Aug 0.29 m ³ /s Sept to May	3.5 m ³ /s year round	3.5 m ³ /s May to Sept 5 m ³ /s Oct to Apr	3.5 m ³ /s May to Oct 5 m ³ /s Nov to Apr	5 m ³ /s year round	Fish migration pulse flow? ¹	Constraint on diversion for generation?
11	J	Naturalized flow pattern - river	None			See Figure 5-1 and Appendix I for flows and timing			✓	None
12	H	Archaeology protection (qualitative assessment)	Minimize time elevation between 327 m and 328.5 m (based on Alternative B)			✓			✓	None
13	K	Fish wildlife traditional use	Max. 320 m April to October Nat hydrograph November to March			See Figure 5-1 and Appendix I for flows and timings			✓	None

2. Migration pulse flow. Modelled as 10 m³/s discharge from Elsie Dam for 48 hours, once on 15 August and once on 15 September. In practice, would be timed with natural rainfall and natural high inflow and discharge to be measured at Moran Creek gauge.

Alternative option analysis

- Model flow curves
- Understand physical limitations (e.g. spillway height, gate height, dam safety)
- Ran each alternative through the flow model
- Ran model via Consultative Committee constraints
- Ran numerous iterations based on 38 years of data

Ash River Water Use Plan: Trade-off analysis

- Sought alternative that best satisfied suite of water use objectives
- Trade-off process involved discussions of the relative value among water use objectives
- Selection of the preferred operating alternatives
- involved 3 Steps:
 - Identify key Performance Measures
 - Assess trade-offs among operating alternatives and narrow down to better performing alternatives
 - Assess degree of Consultative Committee consensus on remaining

Alternative No. of Interest: 1

Colour key	Better
	Equal
	Worse

PM#	PM	Alternative name:	1	2	3	4	5	6	7	8	9	10	11	12	13
			WL	E	B	C	F	D	G2	H	I1	I2	I3	J	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

An example

- Many alternatives performed better than Alternative WL, the existing operation
- Alternatives E and G2 improved rearing for steelhead
- Other Alternatives were better for wildlife habitat, energy production and shoreline incubation
- Poorer for archaeology susceptibility
- Committee discussed options for archaeological facts
- Eliminated Alternative WL
- Worked to find alternative that met as many interests as possible

Table 6-2: Recommended Operating Constraints for the Ash River Hydroelectric Facility

Facility	Operating Variable	Target	When	Comments
Elsie Dam	Minimum discharge into Ash River from Elsie Dam	3.5 m ³ /s	1 May to 31 October	Discharge measured at hollow cone valve and/or sluice gate
		5.0 m ³ /s	1 November to 30 April	
		10 m ³ /s	Two 48 hour periods between 1 August and 30 September ¹	
	Maximum discharge into Ash River	No constraint	Year Round	
	Maximum Ramping Rate	As per BC Hydro Ramping Strategy	Year Round	
Elsie Reservoir	Maximum Reservoir Level	No constraint	Year Round	No constraint on reservoir elevations
	Minimum Reservoir Level	No constraint	Year Round	
Power Intake	Diversion flow	No constraint	Year Round	No constraint on power diversion
	Maximum annual diversion volume	No constraint	Year Round	

1. Migration pulse flows: ramp discharge from Elsie Dam to increase flow in the Ash River up to 10 m³/s, measured at Moran Creek gauge, then back down to 3.5 m³/s over a 48 hour period. Induce two pulses during the summer steelhead migration period (1 August to 30 September) with each pulse coinciding with natural increases inflows from precipitation.

Table 6-3: Expected Consequences of the Ash River Water Use Alternative C relative to Current Water Licence

Water Use Interest	Consequences
Power generation	+ Increased power revenue of +\$600,000 per year on average (approximately 6% increase) over current water licence.
First Nation Archaeology and Heritage	+ Opportunity to address archaeology and heritage issues through the monitoring program
Fish in Elsie Lake Reservoir	+ Increased trout rearing habitat in tributaries to the reservoir
Fish in Ash River	<ul style="list-style-type: none"> + Increased rearing and spawning habitat for fish in the Ash River including a nearly 14-fold increase in steelhead parr rearing habitat just below Elsie Dam relative to flows under the existing water licence.¹ + Increased opportunities for fish to migrate past Lanterman Falls and Dickson Falls + Increased minimum flows in the Ash River
Wildlife	+ Increase in riparian habitat around Elsie Lake Reservoir
Flood control	○ Neutral – No increase in expected number of flooding-days for property along the Somass River compared to expected number of flooding-days under current water licence (i.e., Alternative C does not make flooding worse)
Reservoir recreation	- Potential loss. The recommended operating alternative is expected to hold the reservoir at lower elevations during 24 May to 15 October than under the current water licence. This may change the type of or reduce the quality of the recreation experience at the reservoir.

Ash River Water Use Plan Monitoring Programs

- Recommended six monitoring programs:
 - Archaeological Artifacts in Elsie Lake Reservoir Drawdown Zone Monitoring Program
 - Adult Steelhead Migration Monitoring Program, which shall also assess migration of other species (i.e., coho and chinook).
 - Steelhead Parr Monitoring Program
 - Elsie Lake Reservoir Trout Rearing Habitat Monitoring Program
 - Elsie Lake Reservoir Riparian Wildlife Habitat Monitoring Program
 - Ash River Riparian Wildlife Habitat Monitoring Program

Ash River Water Use Plan

- Questions?
- Previously identified questions
 - Need for effective monitoring
 - Need for adaptive management (needs to change as new information arrives or conditions change)

Our process

- Compiled participant interests
- Based on these interests, TWG developed draft objectives
- Main Table reviewed and revised draft objectives at Main Table meeting 18 and 19 in April, 2021
- Confirmed objectives to advance
- TWG is currently preparing draft Performance Measures. A subset will be reviewed today

Interests to objectives

- Main Table reviewed, revised, and confirmed base objectives
- Forms the basis of our assessment

Draft Performance Measures

- Jayson

Planned Rio Tinto Facebook post

Today we attended the Water Engagement Initiative (WEI) Main Table meeting. Rio Tinto initiated the WEI to collaborate with organizations and individuals with interests in its operations in the Nechako region. The WEI Process is a vehicle to share interests, review information, develop refined operating options, and select a preferred option for Rio Tinto to implement in the Nechako region. Today, participants heard updates from the WEI Technical Working Group, walked through a similar Water Use Planning example, and discussed the WEI road ahead.

If you are interested in learning more about the WEI, please visit our website <https://www.getinvolvednechako.ca/wei>

Next meeting dates

- Main Table meeting: Wednesday, June 16, 2021
- Main Table meeting: Wednesday, July 14, 2021

Adjourn