

TWG Update

- Issues scoping and technical memos
- PM refinement
- Reconnaissance field trips



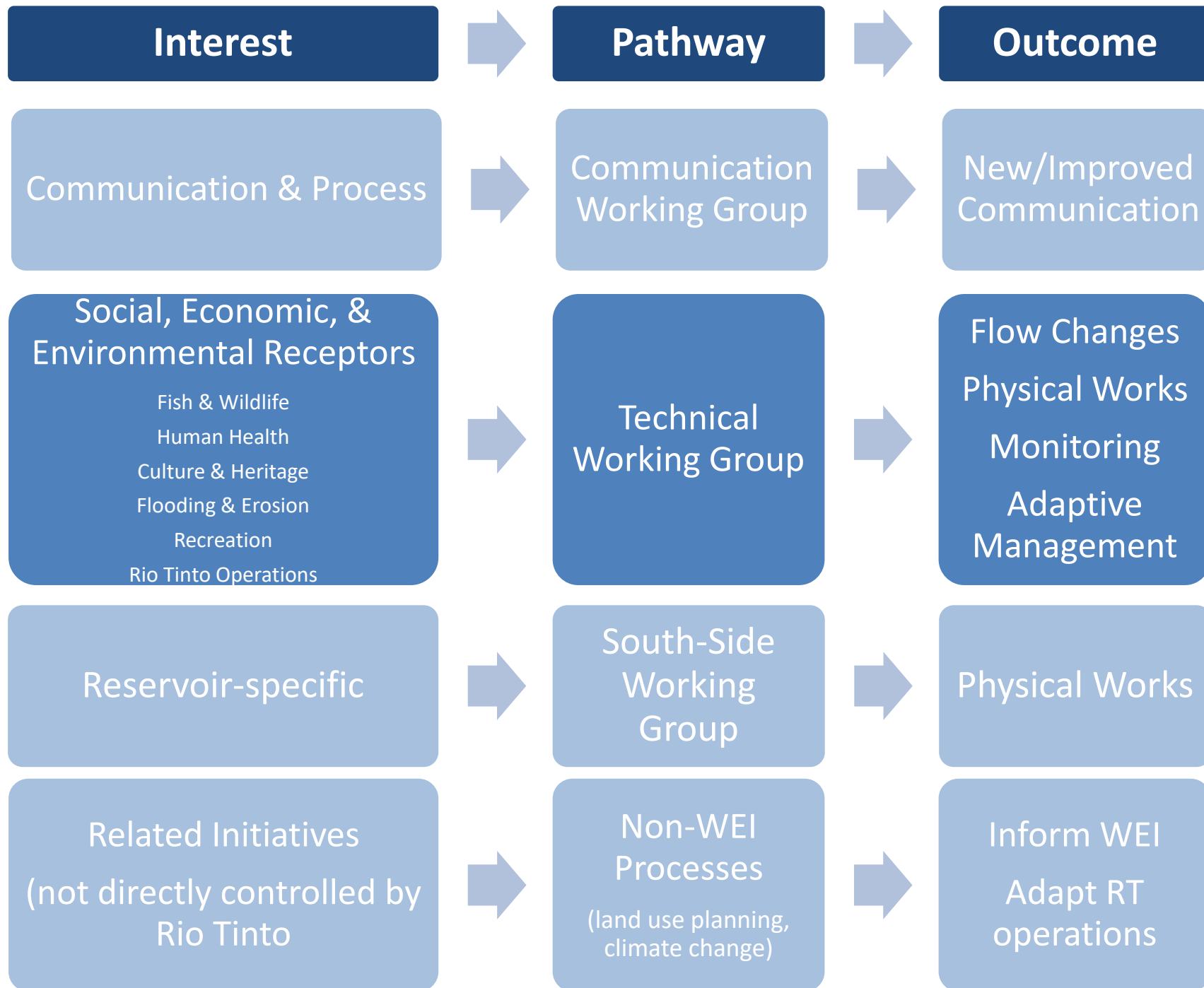
Issue Scoping/ Technical Memos

- Completed by subject matter experts
- Summary of existing information
- Assessment & analysis

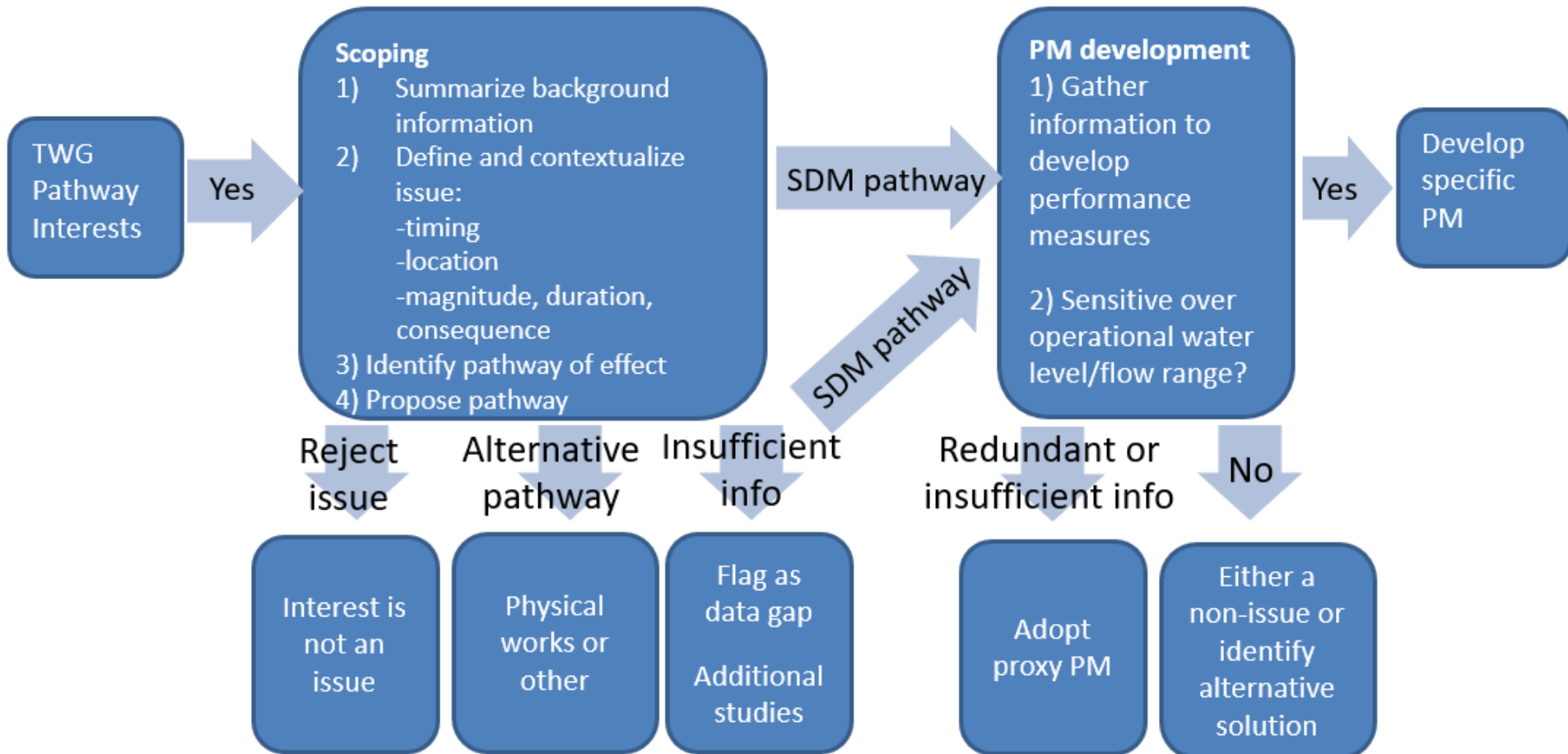


WEI Issues Scoping Refresher





Issues Scoping & Performance Measures



PM Short-List

- 6 - River fish access to side/off channels
- 12 - Reservoir productivity-flushing
- 17 - Cheslatta watershed fish habitat
- 18a - River water temperature and migrating salmon (18C)
- 18c - River water temperature and migrating salmon (20C)
- 21a - River Chinook incubation flow
- 22a - River Chinook rearing habitat
- 25a - Resident fish rearing habitat



PM Short-List

- 32 - Reservoir caribou land links
- 38 - Reservoir osprey nesting habitat
- 41b - Reservoir wetland habitat
- 45b - River bird inundation of nests
- 49b - Cheslatta watershed inundation of archeological sites
- 53 - River open-water flooding
- 65 - Kemano power generation (smelter load)
- 66 - Kemano power exports (Tier 1)
- 67 - Kemano power exports (Tier 2)



GET INVOLVED NECHAKO

Issues and PMs



Issue Scoping Summary

- 67 issues
- 6 issues allocated to SSWG
- 5 issues not related to flow
- 56 issues to develop PMs for



PM Development and Review

- PMs based on:
 - best available science (i.e., technical memos)
 - local knowledge
 - Field observations
 - professional interpretation
- PM “types”
 - Flow curve
 - Threshold
 - Ratio
 - Range
 - Direction
- PMs calculated from RT flow models, temperature model



PM Development and Review

- 56 issues with 76 candidate PMs
- TWG reviewed PMs, winnowed list towards a manageable size
- 4 “categories”
 - 13 review after additional technical work
 - 5 adaptive management
 - 41 drop
 - 17 shortlist

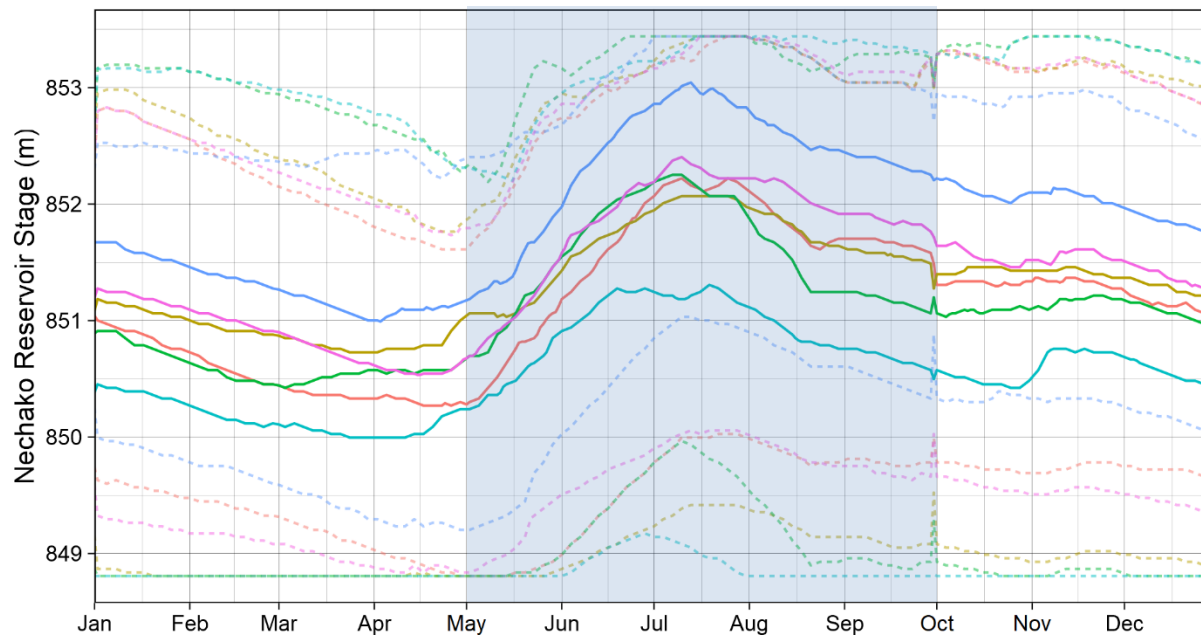


Performance Measure Results

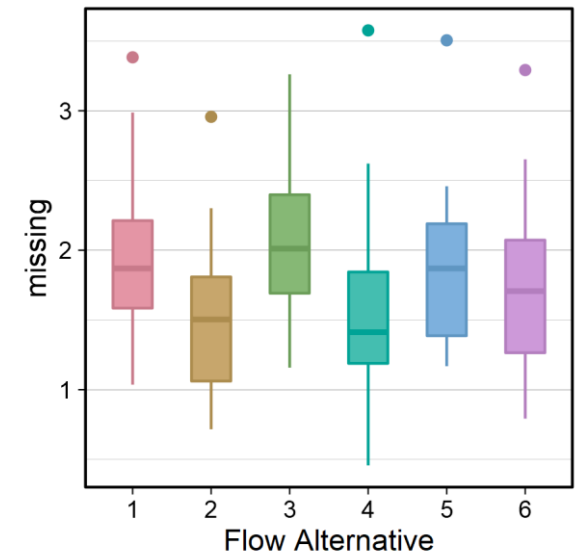


Example PM output

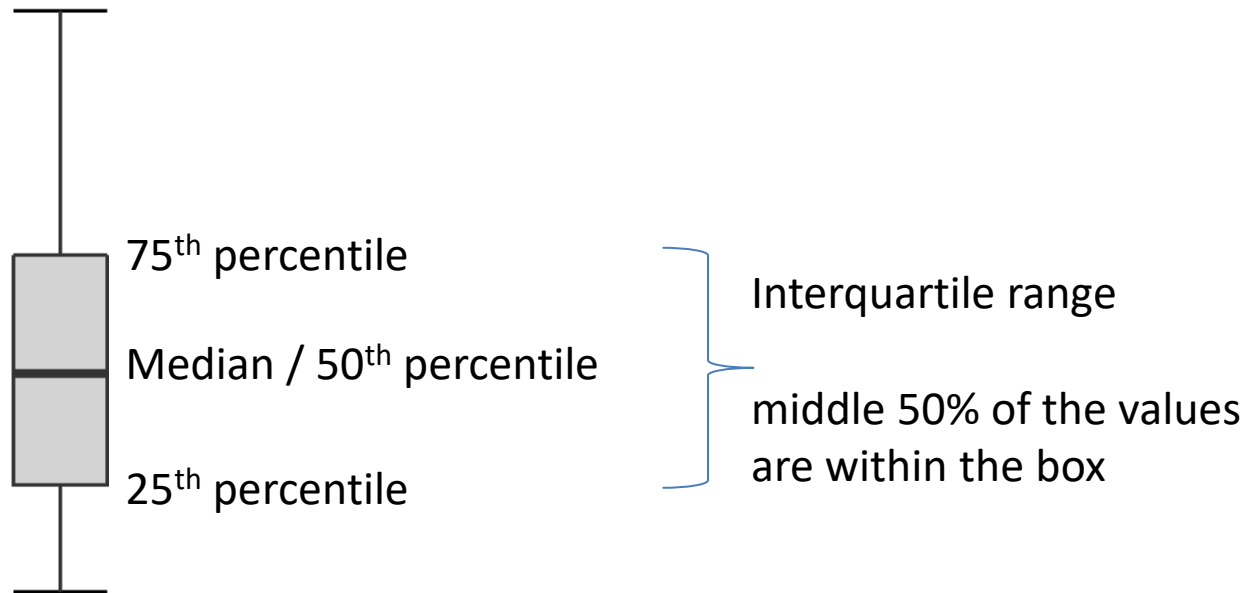
Consolidated Issue Name	PM Number	Location	PM Location	Timing	PM Timing	Performance Measure (for Bookend Alternatives)	PM Unit	MSIC
Reservoir productivity-growth	11	Nechako Reservoir	Nechako Reservoir	Year round (primarily growing season)	May 1 - Sept 30	Reservoir stability (more stable better)	m	1 m



— Median - - - - Min-Max — Alt1 — Alt3 — Alt5
 — Alt2 — Alt4v2 — Alt6



Box Plots

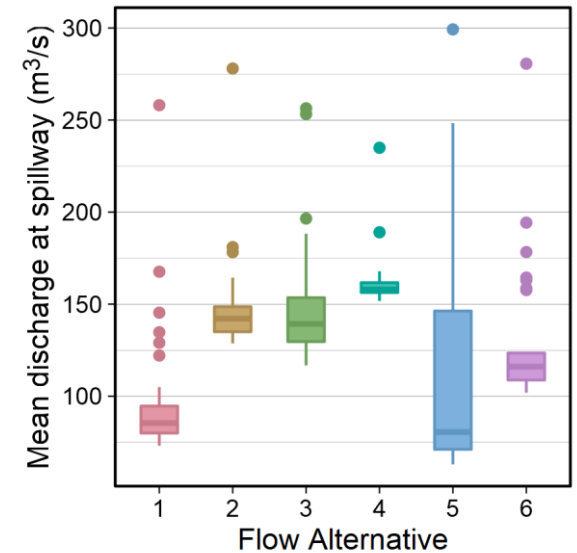
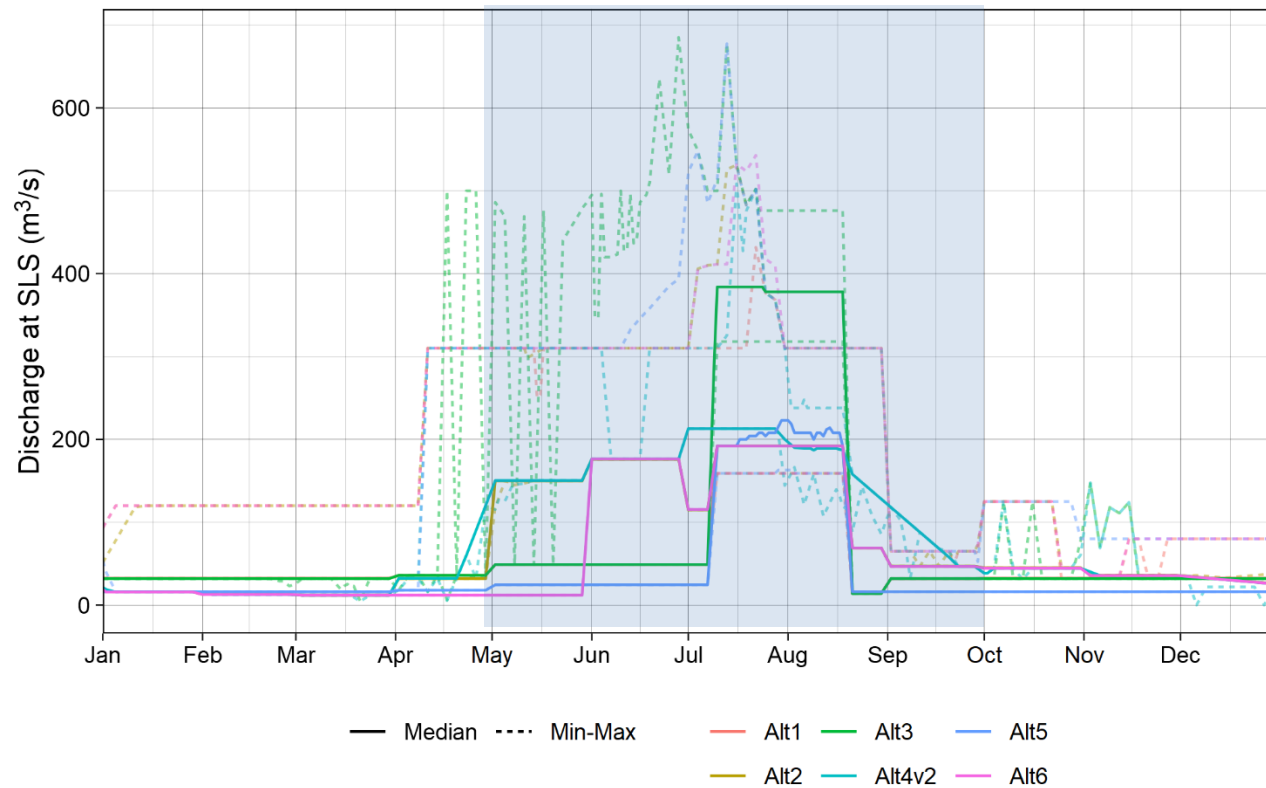


Outlier



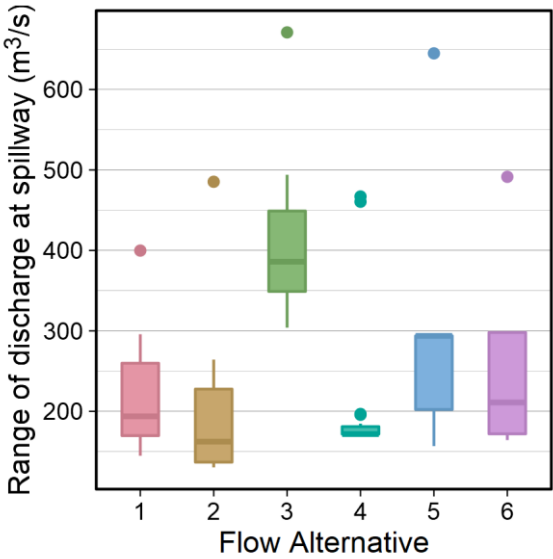
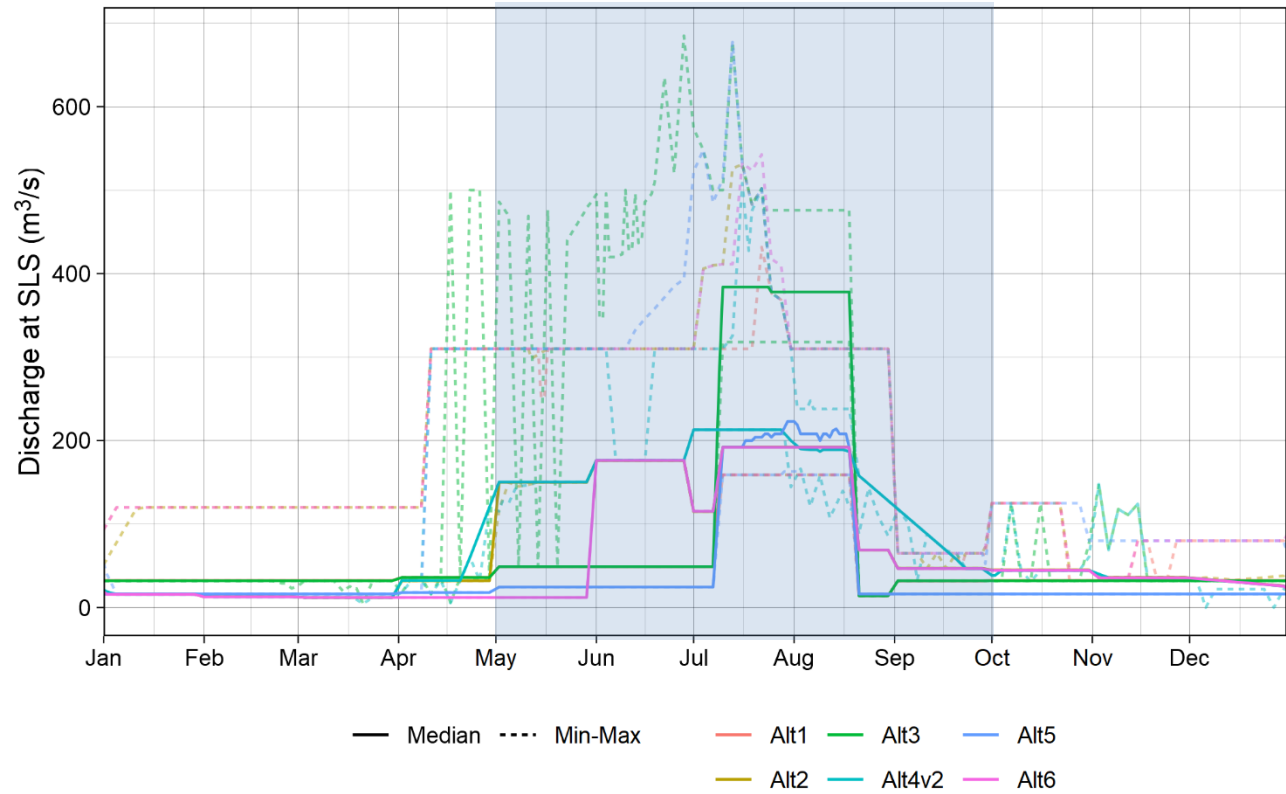
Issue #12: Reservoir productivity-flushing

PM Number	Consolidated Issue Name	Location	PM Location	Timing	PM Timing	Performance Measure (for Bookend Alternatives)	PM Unit	MSIC
12	Reservoir productivity-flushing	Nechako Reservoir	Skins Lake Spillway	Year round, but primarily growing season	May 1 - Sept 30	Range in discharge (less is better)	m ³ /s	20%



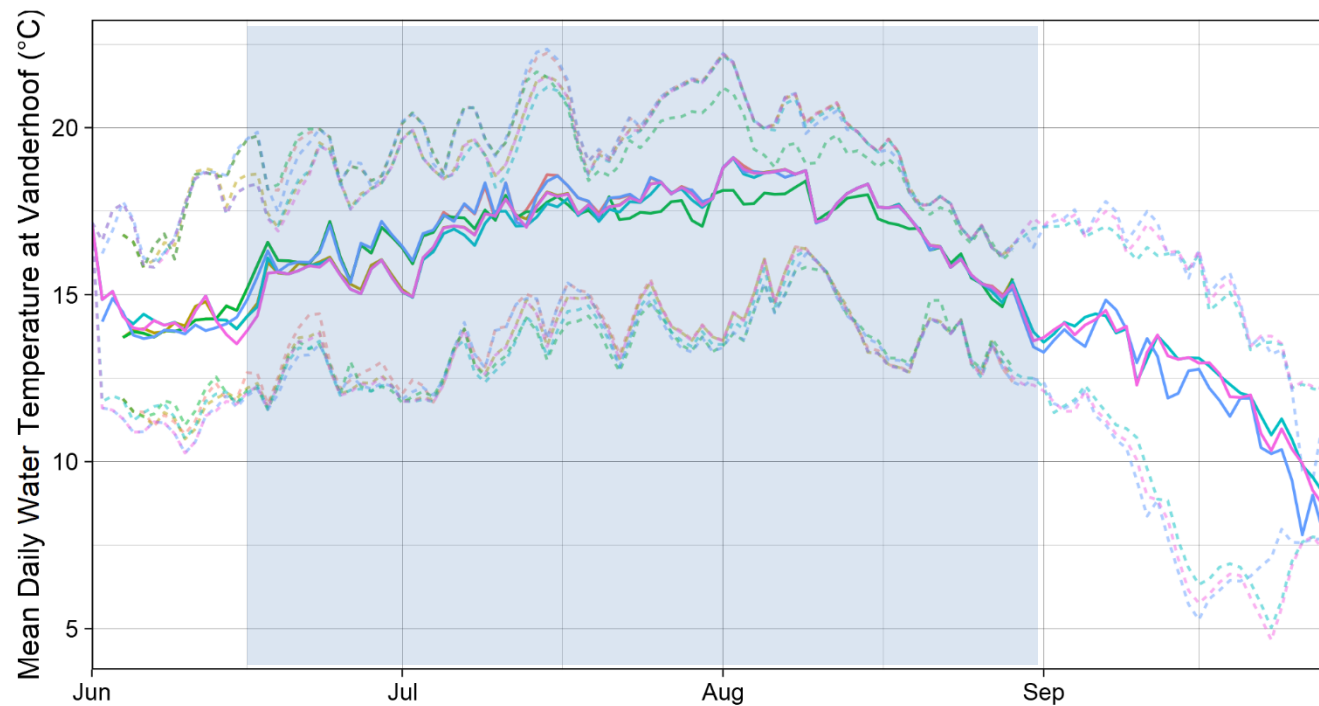
Issue #17: Cheslatta watershed fish habitat

PM Number	Consolidated Issue Name	Location	PM Location	Timing	PM Timing	Performance Measure (for Bookend Alternatives)	PM Unit	MSIC
17	Cheslatta watershed fish habitat	Cheslatta watershed (focus on Cheslatta River)	Skins Lake Spillway	year round, but focus on growing season and STMP period	May 1 - Sept 30	range of flow (less is better)	m ³ /s	20%

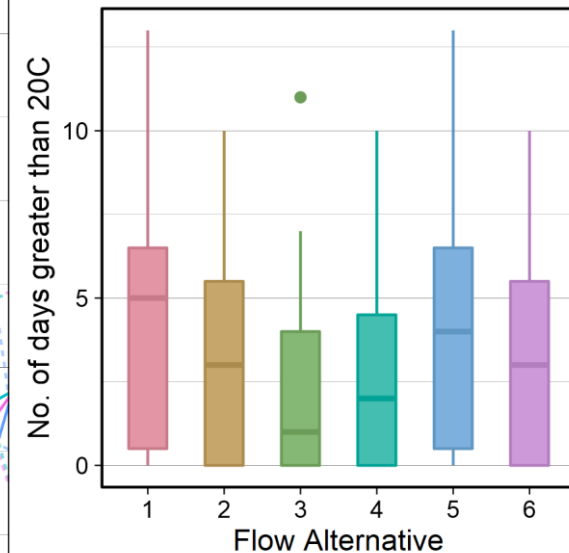


Issue #18c: River water temperature and migrating salmon

Consolidated Issue Name	PM Number	Location	PM Location	Timing	PM Timing	Performance Measure (for Bookend Alternatives)	PM Unit	MSIC
River water temperature and migrating salmon	18c	Chinook: entire Nechako River Sockeye: below confluence with Stuart River	Nechako River at Vanderhoof	Salmon migration period	June 15 - Aug 29	PM3: # of days average daily temp exceeds 20C (fewer is better)	days	20%

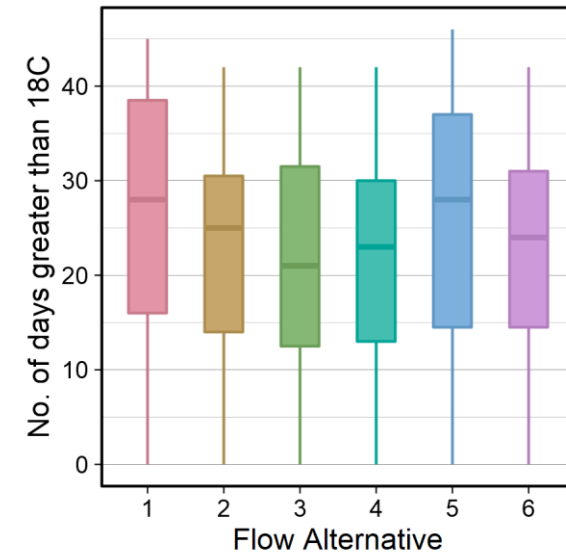


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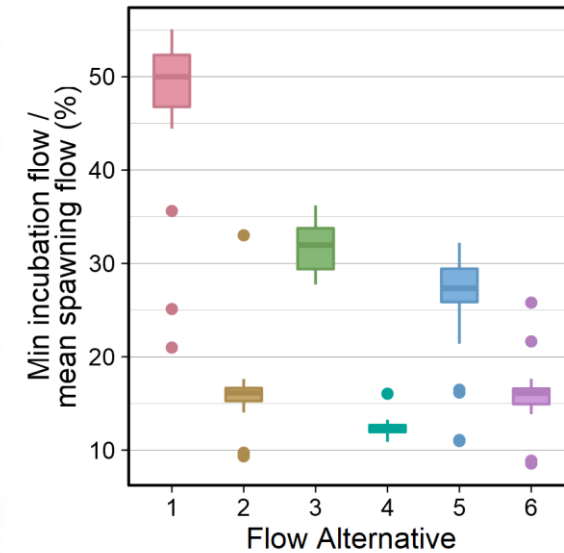
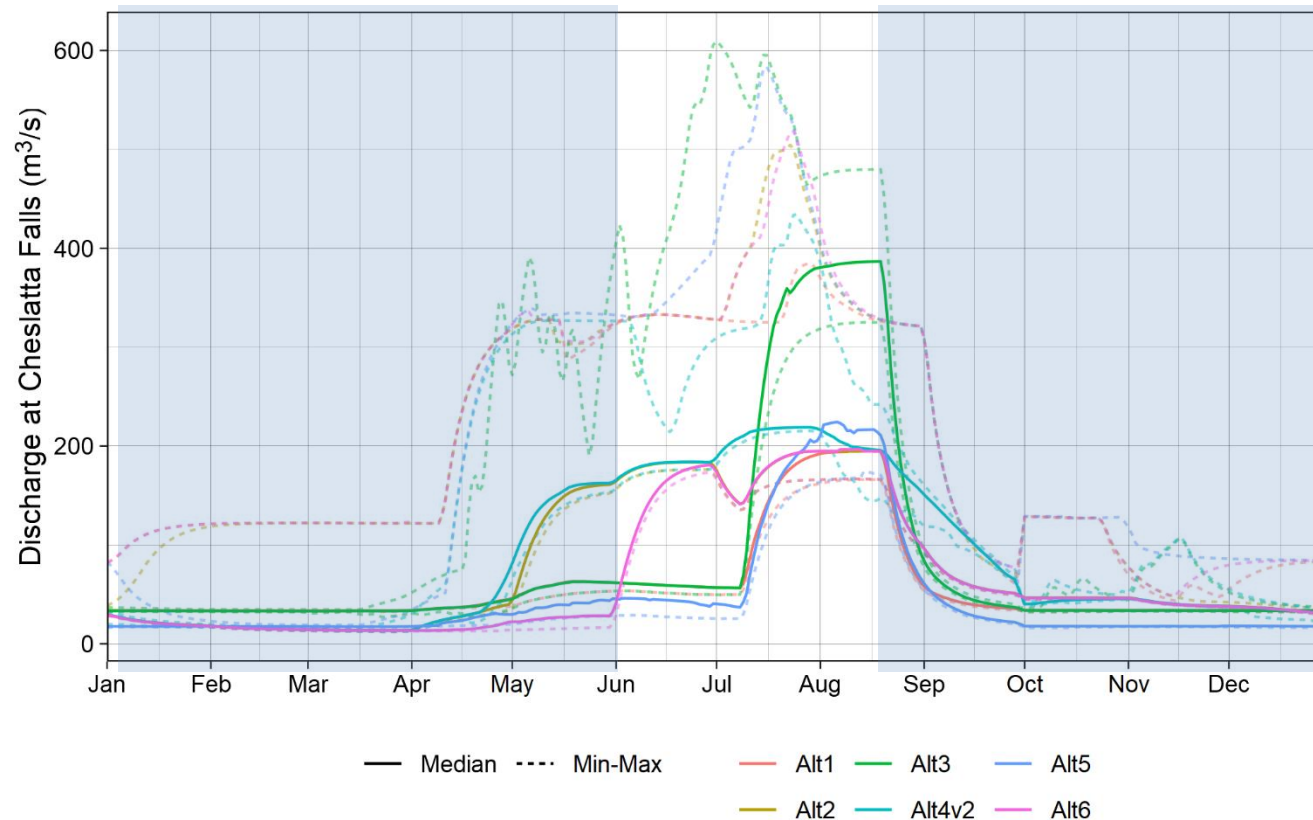
Issue #18a: River water temperature and migrating salmon

Consolidated Issue Name	PM Number	Location	PM Location	Timing	PM Timing	Performance Measure (for Bookend Alternatives)	PM Unit	MSIC
River water temperature and migrating salmon	18a	Chinook: entire Nechako River Sockeye: below confluence with Stuart River	Nechako River at Vanderhoof	Salmon migration period	June 15 - Aug 29	PM1: # of days average daily temp exceeds 18C (fewer is better)	days	20%



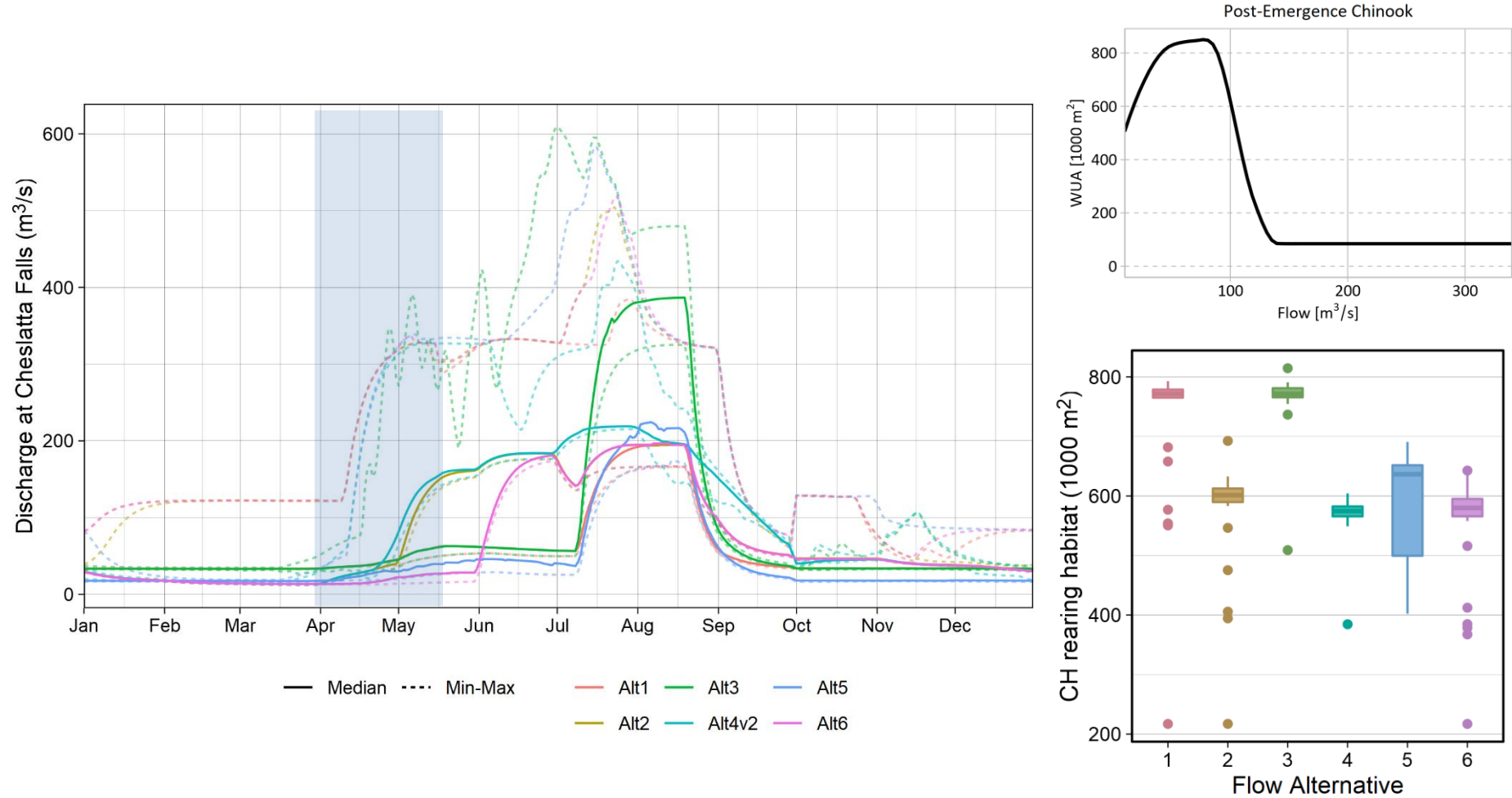
Issue #21a: River CH incubation flow

PM Number	Consolidated Issue Name	Location	PM Location	Timing	PM Timing	Performance Measure (for Bookend Alternatives)	PM Unit	MSIC
21a	River CH incubation flow	Nechako River primarily between Cheslatta Falls and Vanderhoof	Nechako River below Cheslatta Falls	August 15 to May	August 15 to May 15	ratio of minimum incubation flow to average spawning flow (higher is better)	m ³ /s	20%



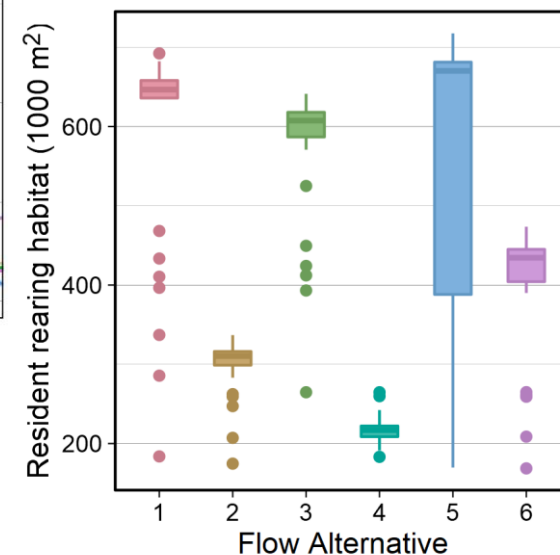
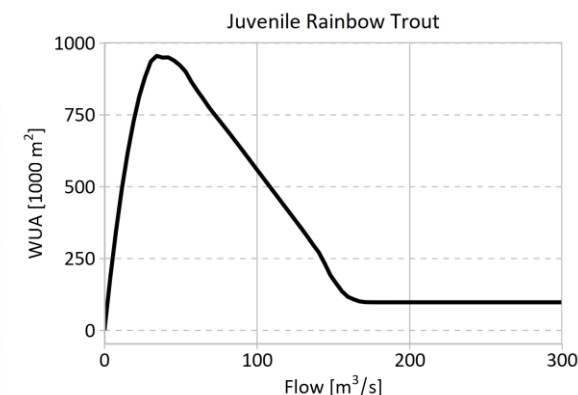
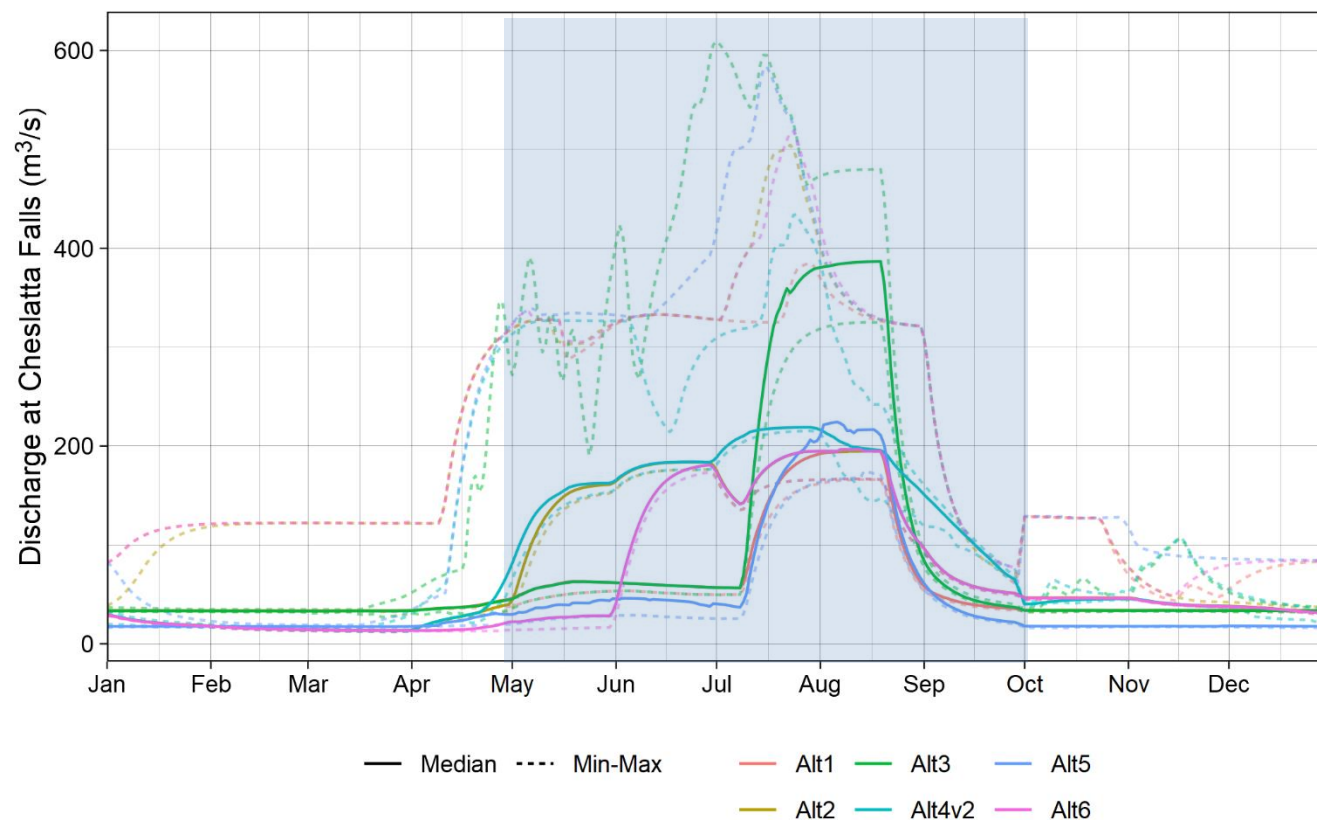
Issue #22a: River CH rearing habitat

Consolidated Issue Name	PM Number	Location	PM Location	Timing	PM Timing	Performance Measure (for Bookend Alternatives)	PM Unit	MSIC
River CH rearing habitat	22a	Nechako River primarily between Cheslatta Falls and Vanderhoof	Nechako River below Cheslatta Falls	April to October	April 1 through May 15	PMA: amount of post-emergent habitat (more is better) (Envirocon curve)	m ²	20%



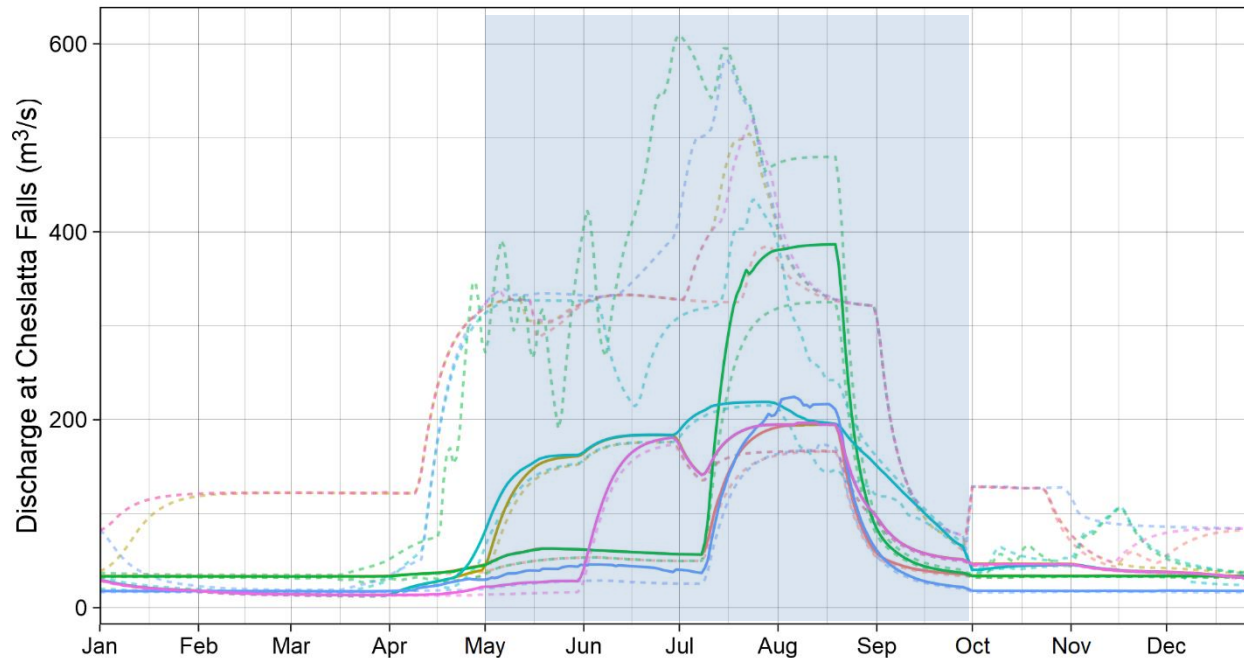
Issue #25a: Resident fish rearing habitat

Consolidated Issue Name	PM Number	Location	PM Location	Timing	PM Timing	Performance Measure (for Bookend Alternatives)	PM Unit	MSIC
Resident fish rearing habitat	25a	Nechako River	Nechako River below Cheslatta Falls	growing season	May 1 to Sept 31	PM1: Average juvenile habitat (more is better)	m ²	20%

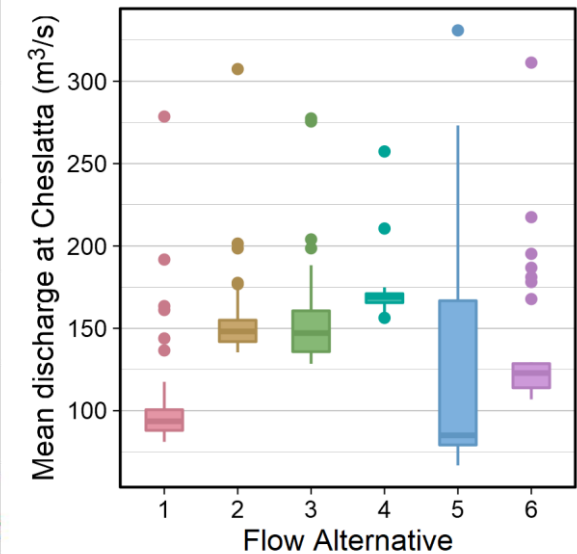


Issue #6: River fish access to side/off channels

PM Number	Consolidated Issue Name	Location	PM Location	Timing	PM Timing	Performance Measure (for Bookend Alternatives)	PM Unit	MSIC
6	River fish access to side/off channels	Nechako River and Cheslatta watershed	Nechako River below Cheslatta falls	year round, but primarily growing season	May 1 - Sept 30	average flow (more is better)	m ³ /s	20%

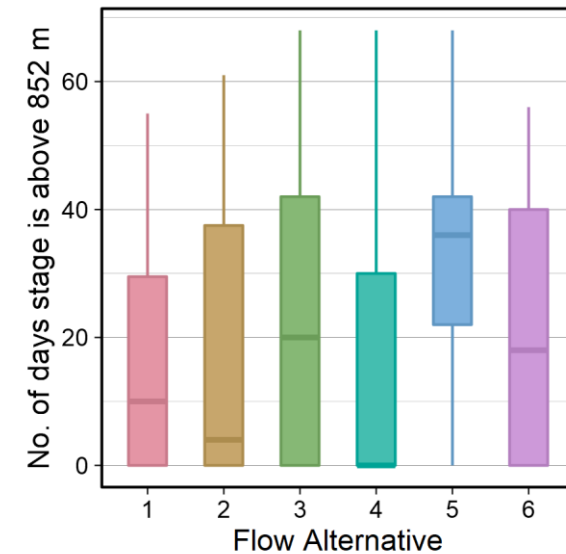
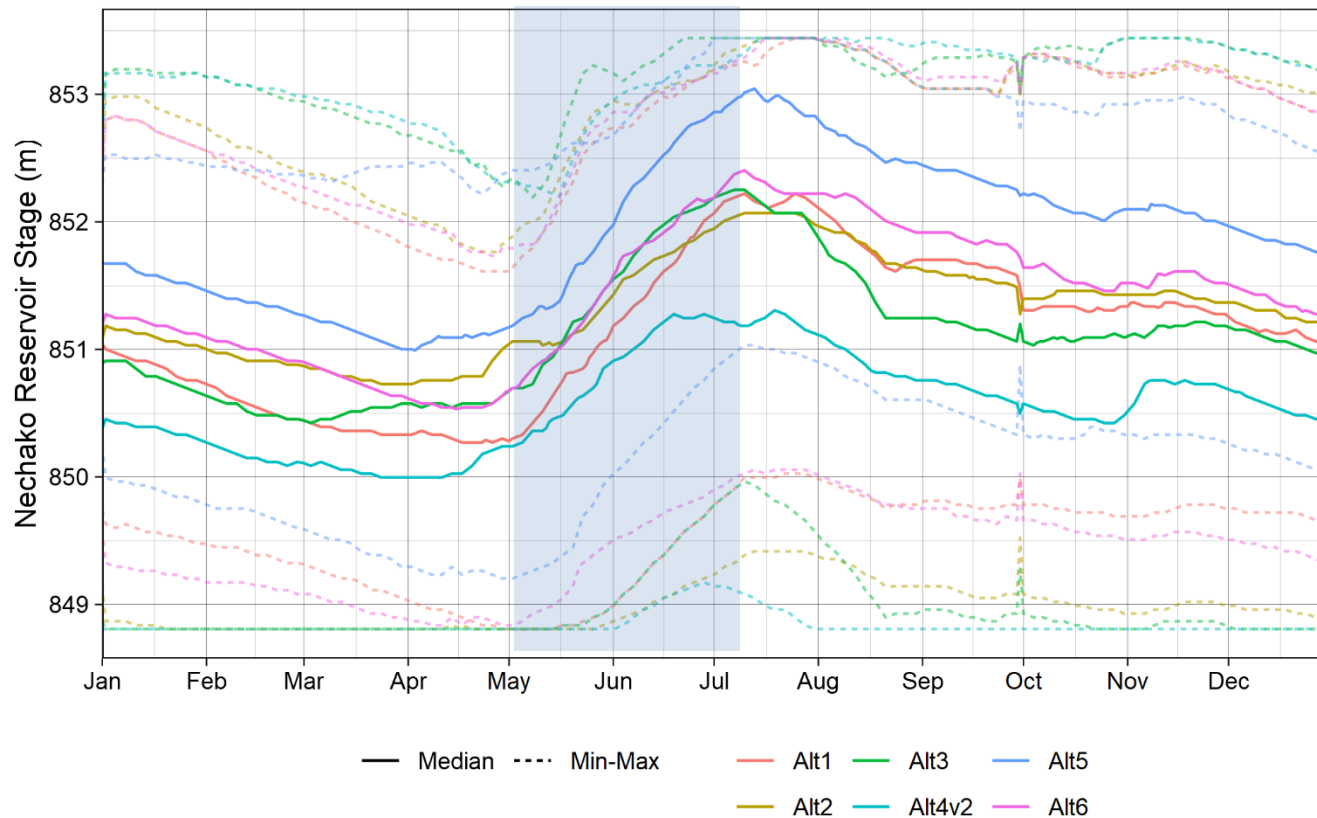


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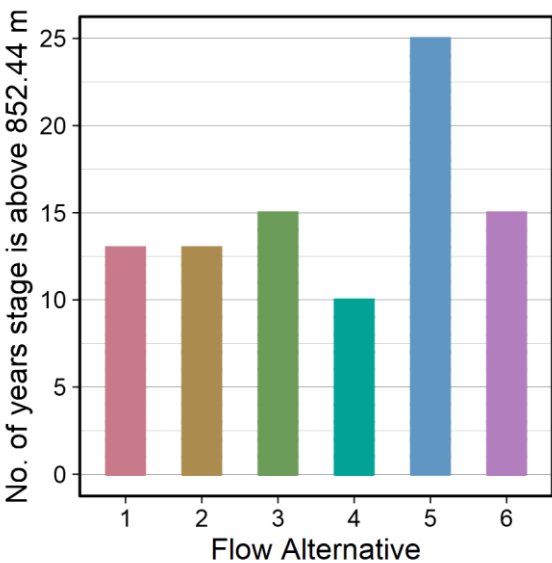
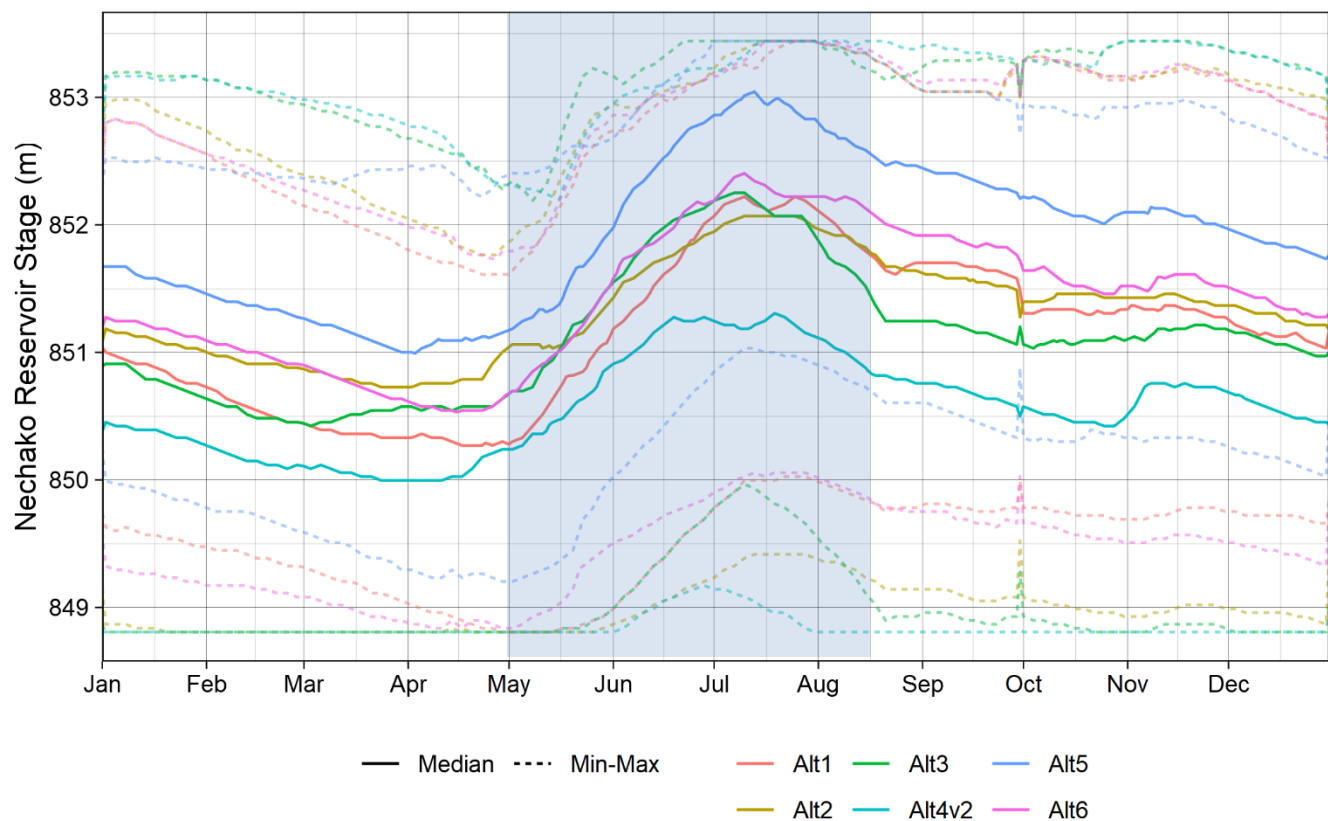
Issue #32: Reservoir caribou land links

Consolidated Issue Name	PM Number	Location	PM Location	Timing	PM Timing	Performance Measure (for Bookend Alternatives)	PM Unit	MSIC
Reservoir caribou land links	32	Nechako Reservoir, Whitesail Reach	Nechako Reservoir	Spring migration and calving period	May 1 to July 7	# of days water elevation is > 852 m (more is better)	days	20%



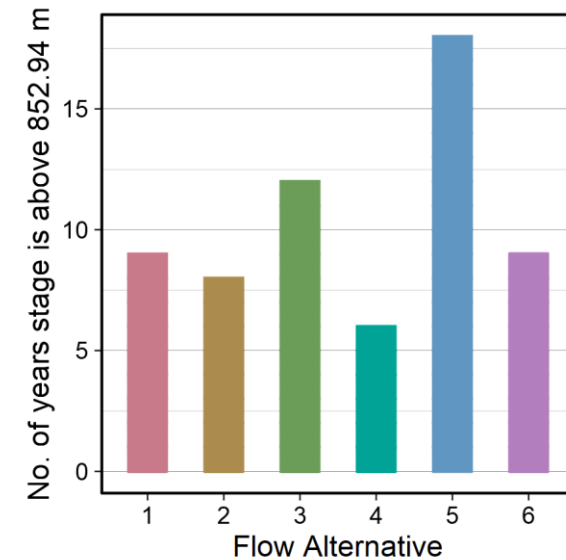
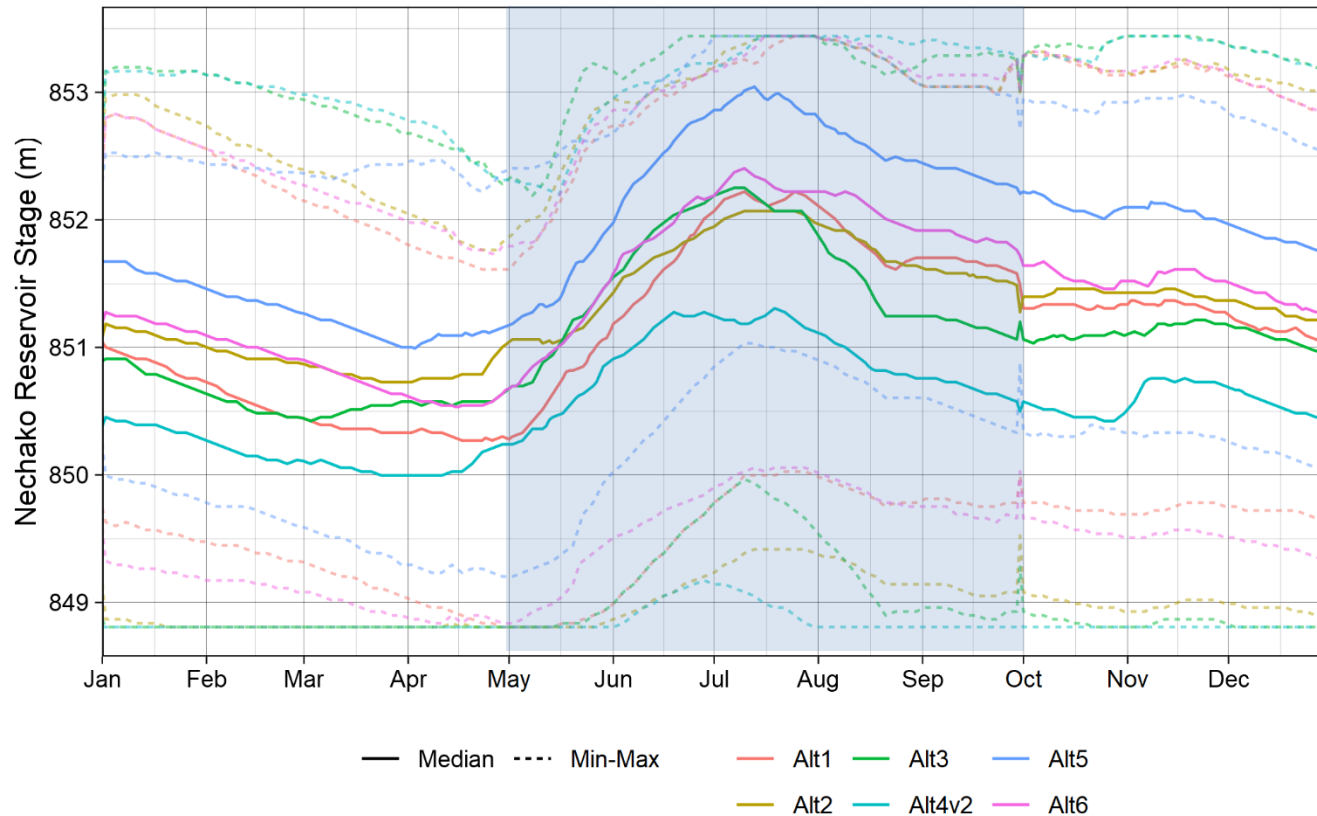
Issue #38: Reservoir osprey nesting habitat

Consolidated Issue Name	PM Number	Location	PM Location	Timing	PM Timing	Performance Measure (for Bookend Alternatives)	PM Unit	MSIC
Reservoir osprey nesting habitat	38	Nechako Reservoir	Nechako Reservoir	spring nesting season (focus on highest intensity nesting period)	May 1 - Aug 15	Number of years where reservoir elevation exceeds 852.44m (fewer is better)	m	20%



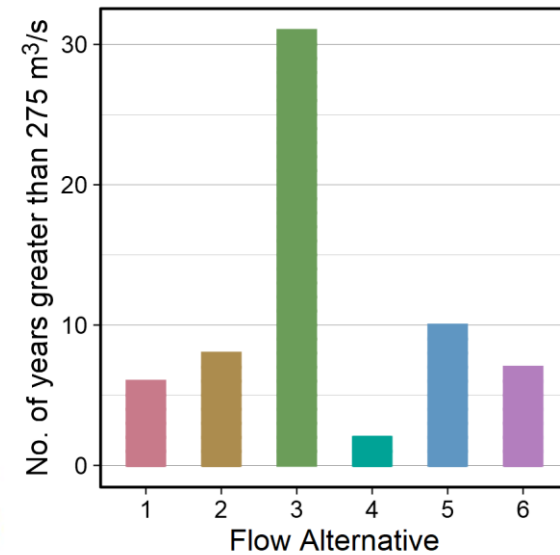
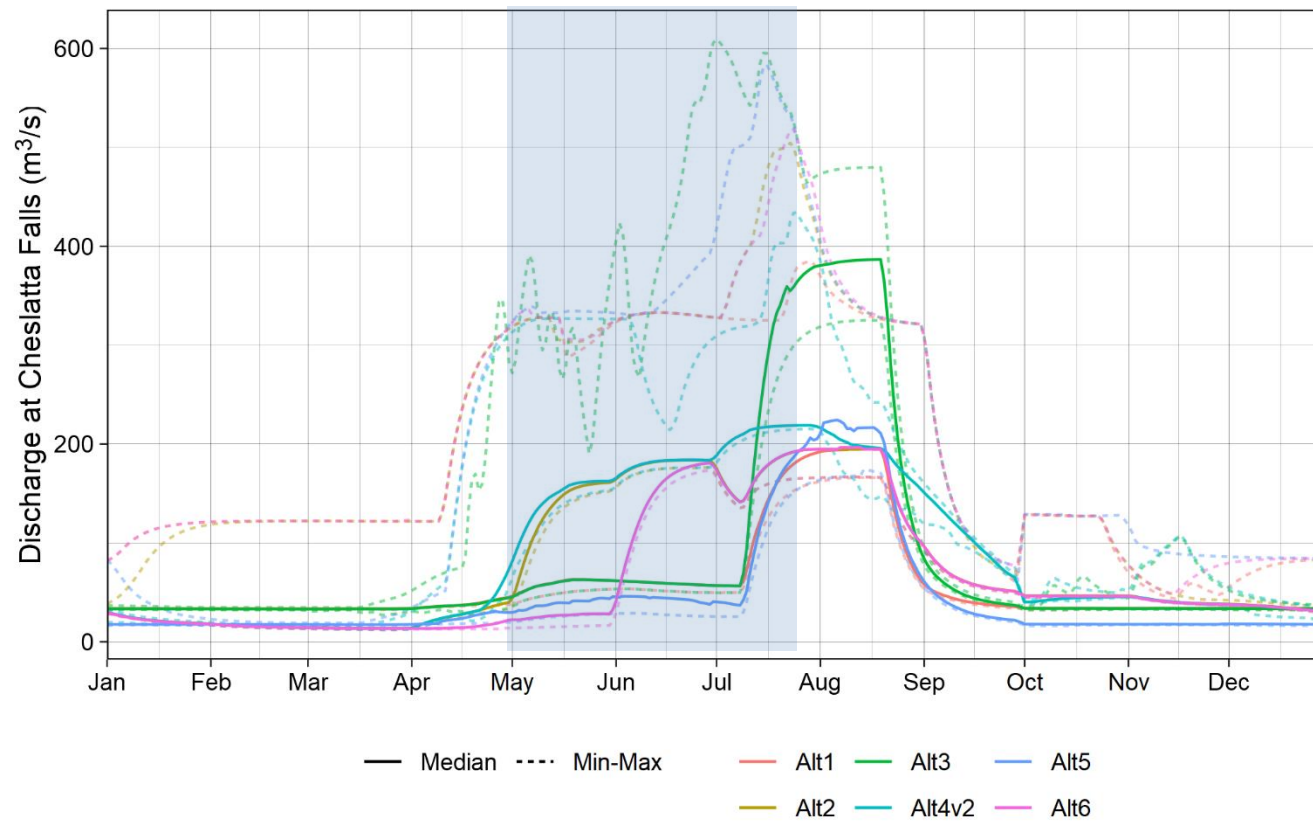
Issue #41b: Reservoir wetland habitat

PM Number	Consolidated Issue Name	Location	PM Location	Timing	PM Timing	Performance Measure (for Bookend Alternatives)	PM Unit	MSIC
41b	Reservoir wetland habitat	Nechako Reservoir	Nechako Reservoir	growing season	May 1 - Sept 30	Number of years where reservoir elevation exceeds 852.94 m (more is better)	years	1 m



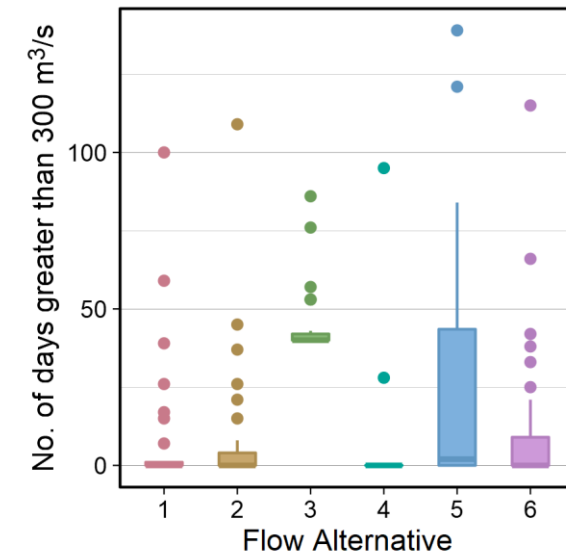
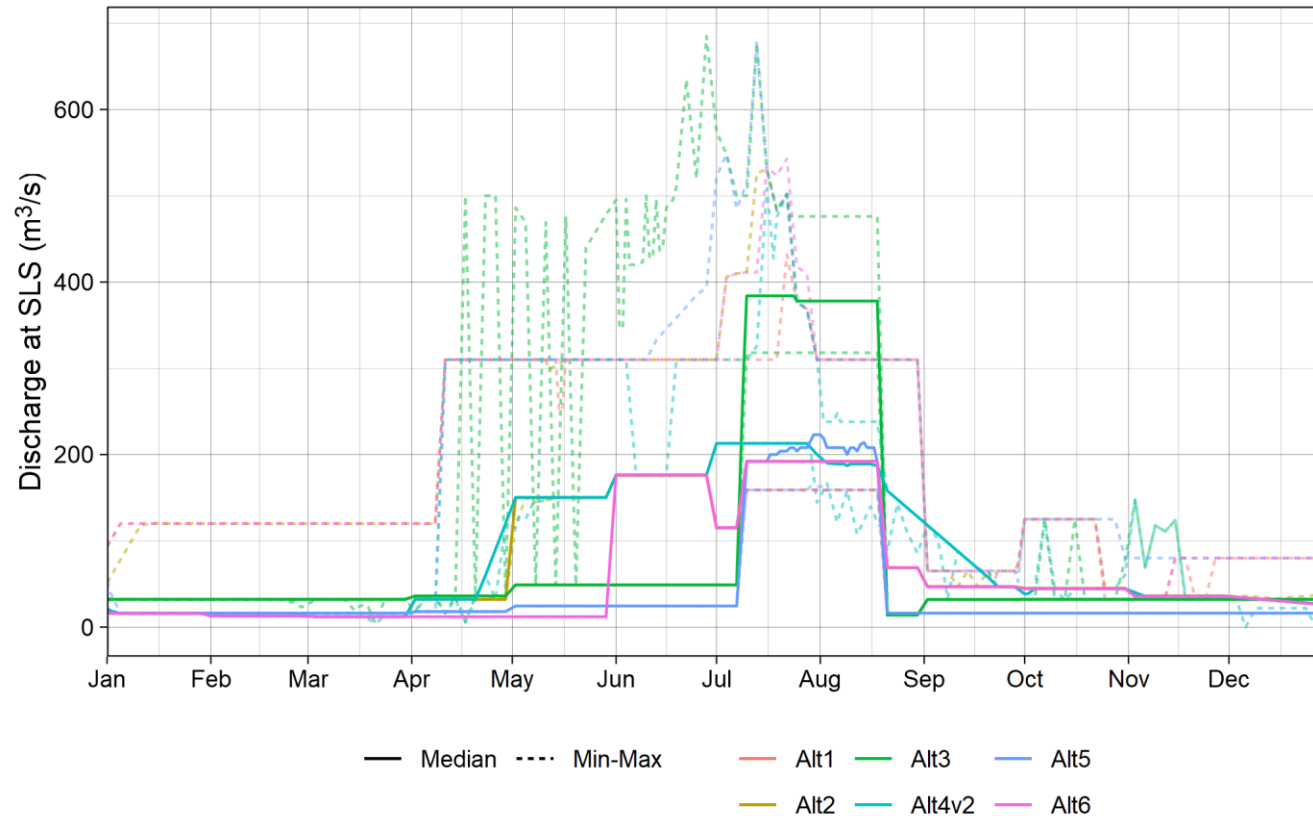
Issue #45b: River bird inundation of nests

PM Number	Consolidated Issue Name	Location	PM Location	Timing	PM Timing	Performance Measure (for Bookend Alternatives)	PM Unit	MSIC
45b	River bird inundation of nests	Entire Nechako River	Nechako River at Cheslatta	spring nesting season (focus on highest intensity nesting period)	May 1 - July 21	Number of years where Cheslatta discharge exceeds 275 cms (fewer is better)	years	20%



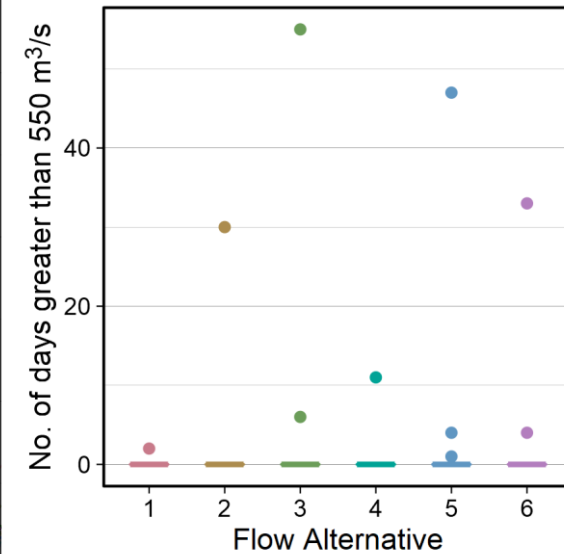
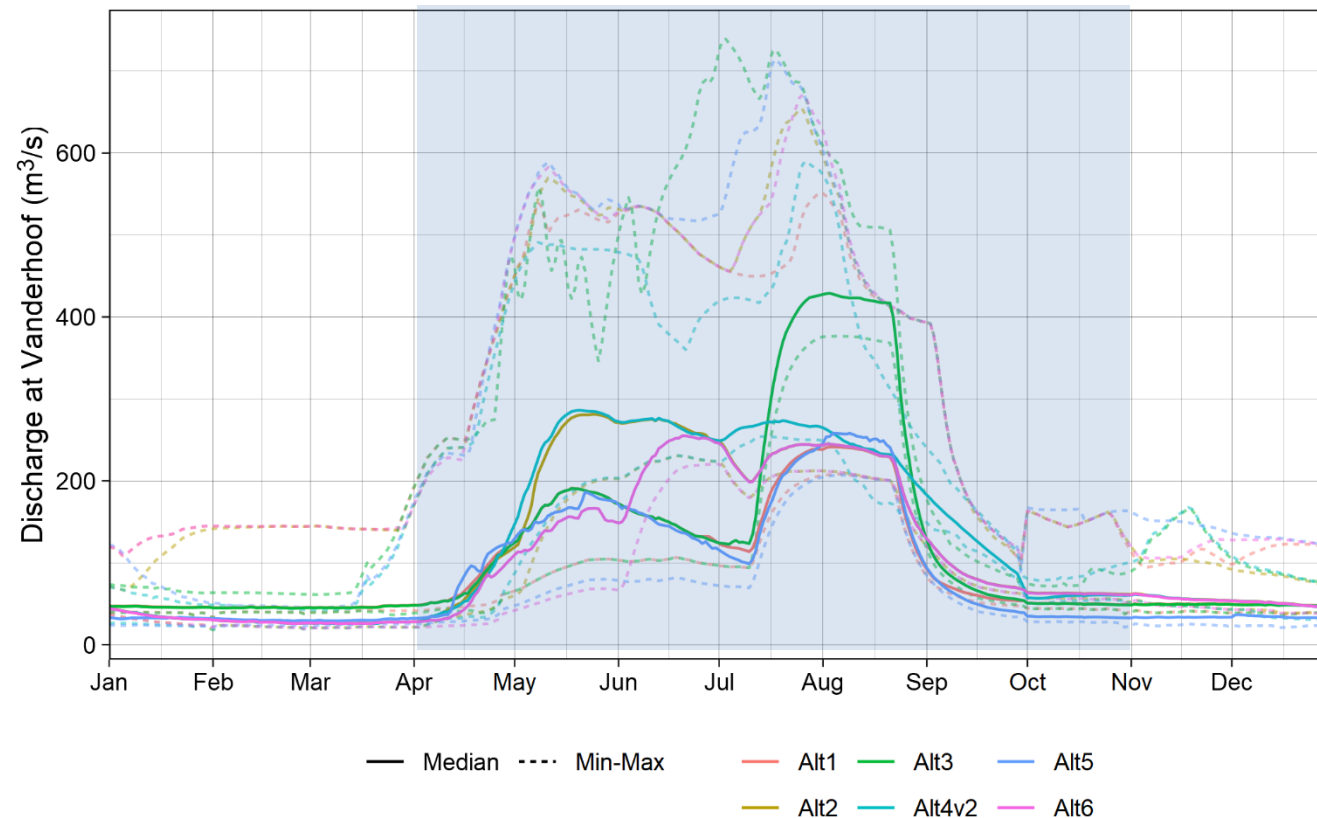
Issue #49b: Cheslatta watershed inundation of archeological sites

Consolidated Issue Name	PM Number	Location	PM Location	Timing	PM Timing	Performance Measure (for Bookend Alternatives)	PM Unit	MSIC
Cheslatta watershed inundation of archeological sites	49b	Cheslatta Lake	Skins Lake Spillway	year-round (most sensitive during STMP)	Jan 1 - Dec 31	PM2: # of days > 300 cms (fewer is better)	days	7 days



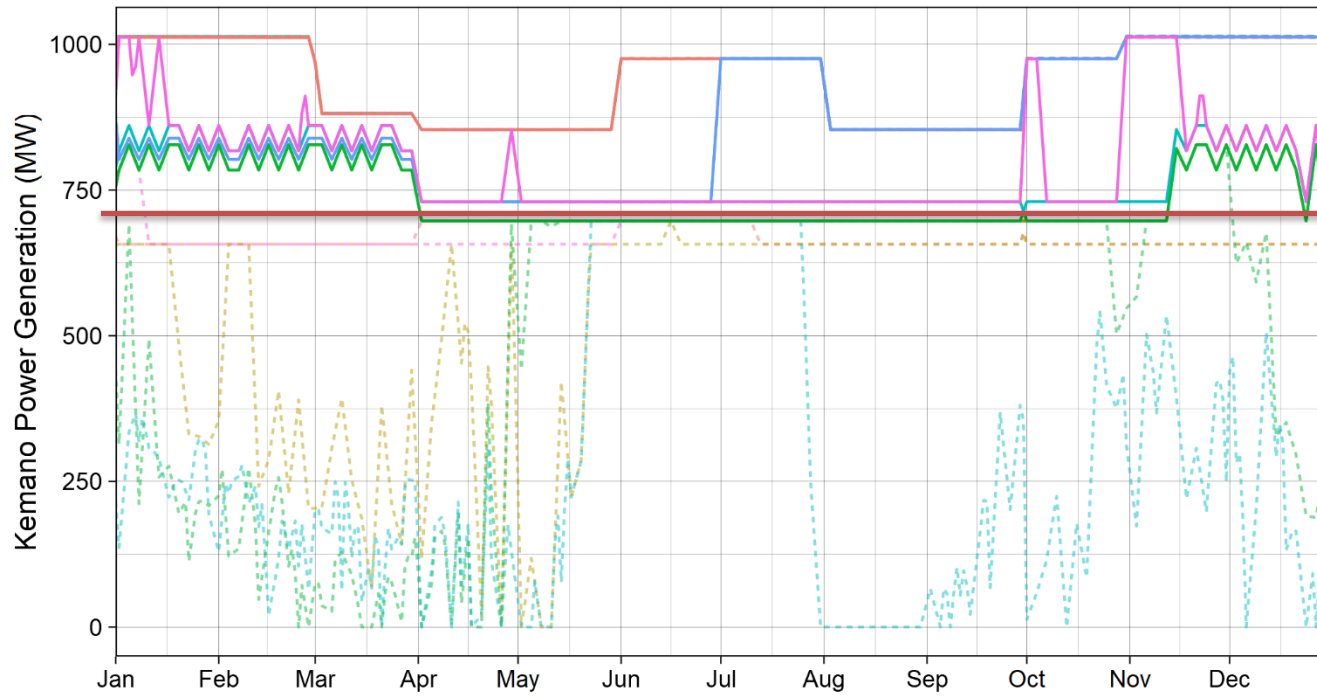
Issue #53: River open-water flooding

PM Number	Consolidated Issue Name	Location	PM Location	Timing	PM Timing	Performance Measure (for Bookend Alternatives)	PM Unit	MSIC
53	River open-water flooding	Entire Nechako River (focus on Vanderhoof reach)	Nechako River at Vanderhoof	Ice-free period	Apr 1 - Oct 31	# of days flow >550 m ³ /s (fewer is better)	days	20%

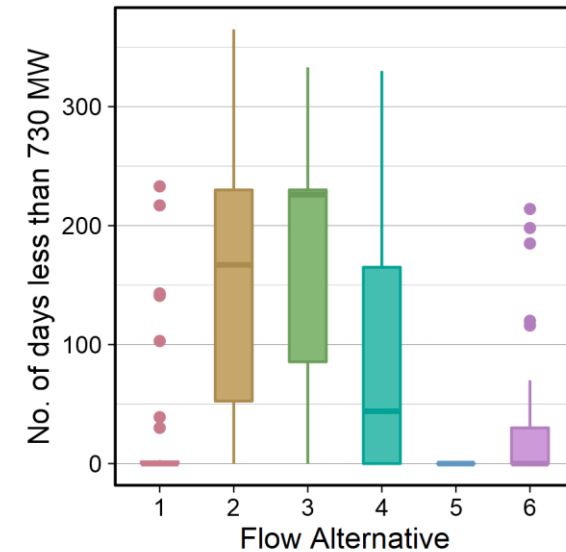


Issue #65b: Kemano power generation

PM Number	Consolidated Issue Name	Location	PM Location	Timing	PM Timing	Performance Measure (for Bookend Alternatives)	PM Unit	MSIC
65b	Kemano power generation	Kemano/Kitimat	n/a	year-round	Jan 1 - Dec 31	# of days smelter load isn't met (fewer is better)	days	

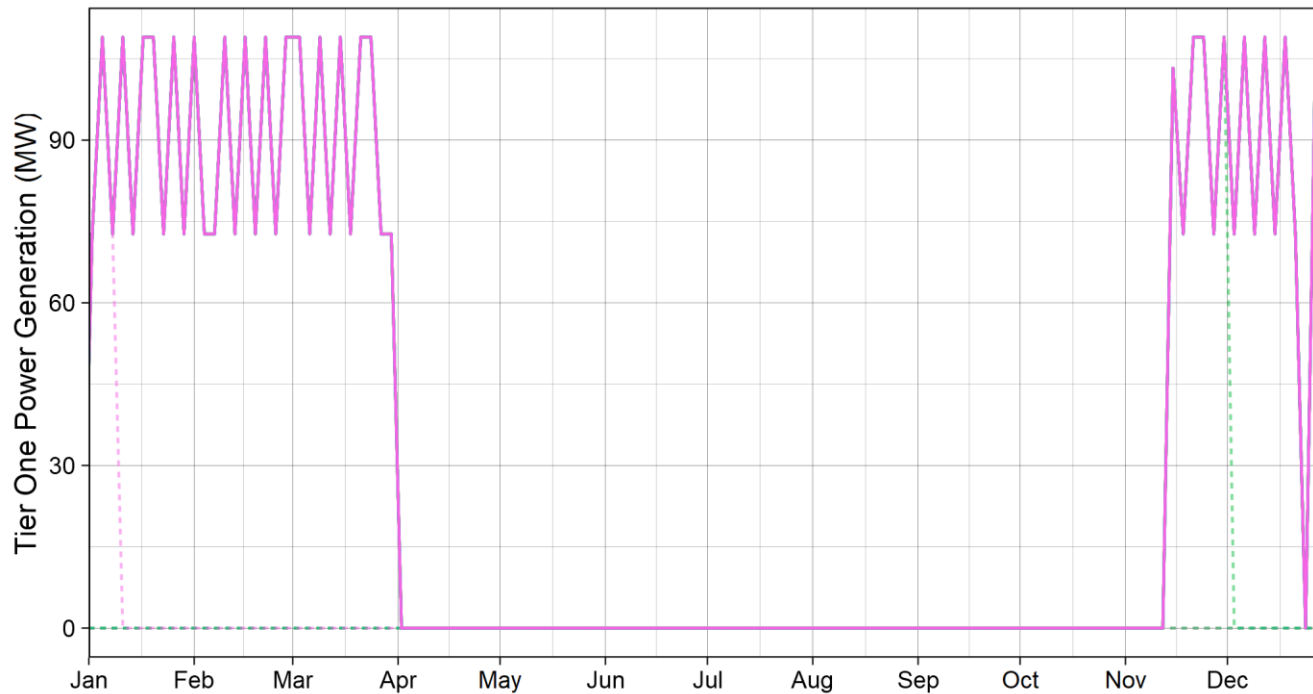


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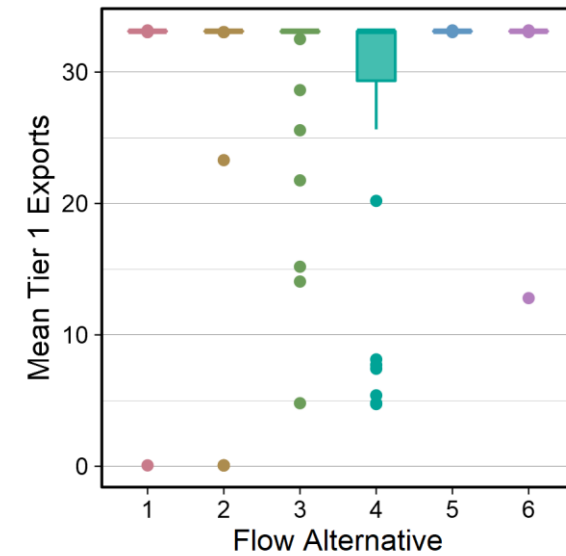
Issue #66: Kemano power exports

Consolidated Issue Name	PM Number	Location	PM Location	Timing	PM Timing	Performance Measure (for Bookend Alternatives)	PM Unit	MSIC
Kemano power exports	66	Kemano/Kitimat	n/a	year-round	Jan 1 - Dec 31	Mean Tier 1 power generation (more is better)	MW	tbd



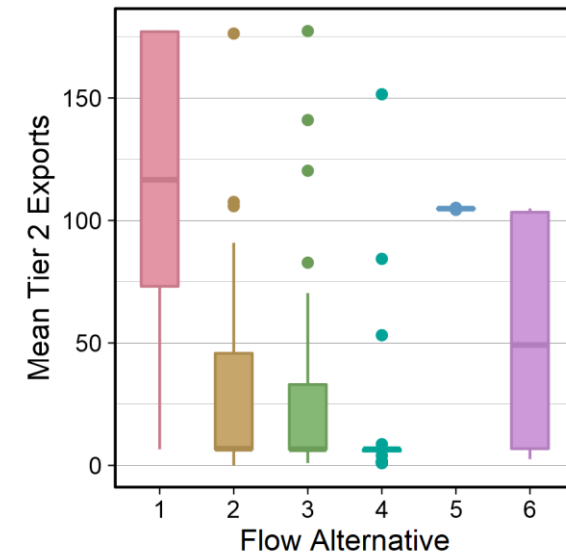
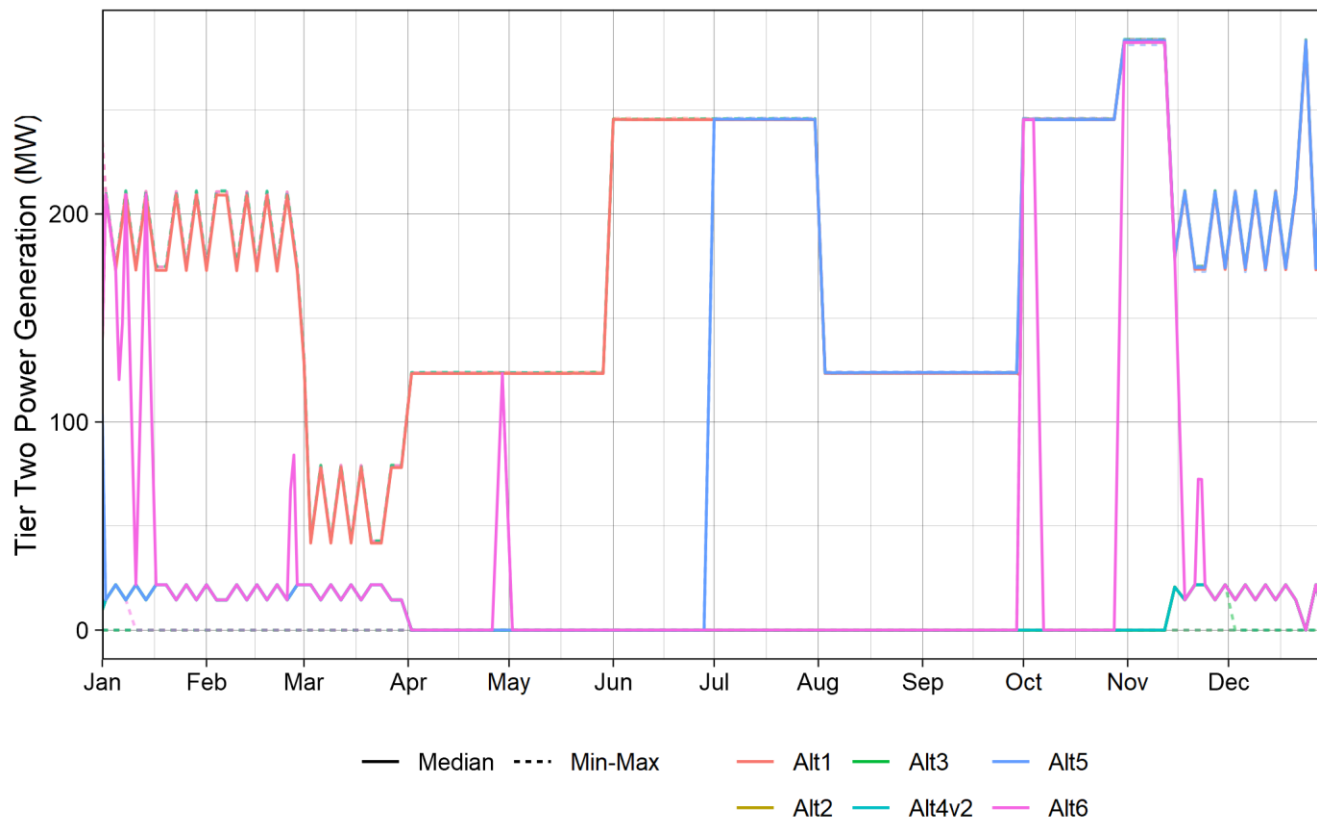
— Median - - - Min-Max

Alt1 Alt3 Alt5
Alt2 Alt4v2 Alt6



Issue #67: Kemano power exports

Consolidated Issue Name	PM Number	Location	PM Location	Timing	PM Timing	Performance Measure (for Bookend Alternatives)	PM Unit	MSIC
Kemano power exports	67	Kemano/Kitimat	n/a	year-round	Jan 1 - Dec 31	Mean Tier 2 power generation (more is better)	MW	tbd



Reconnaissance field trips

- Verify assumptions, learn first-hand
- SSWG:
 - Oct 2021 SSWG reservoir
 - May 2022 SSWG reservoir
- Ecofish/RT
 - June 2022 reservoir (low elevation)
 - July 2022 river/heli flight (high water)
 - July 2022 reservoir (high elevation)
 - **Oct 2022 river (low water) and Cheslatta Lake**

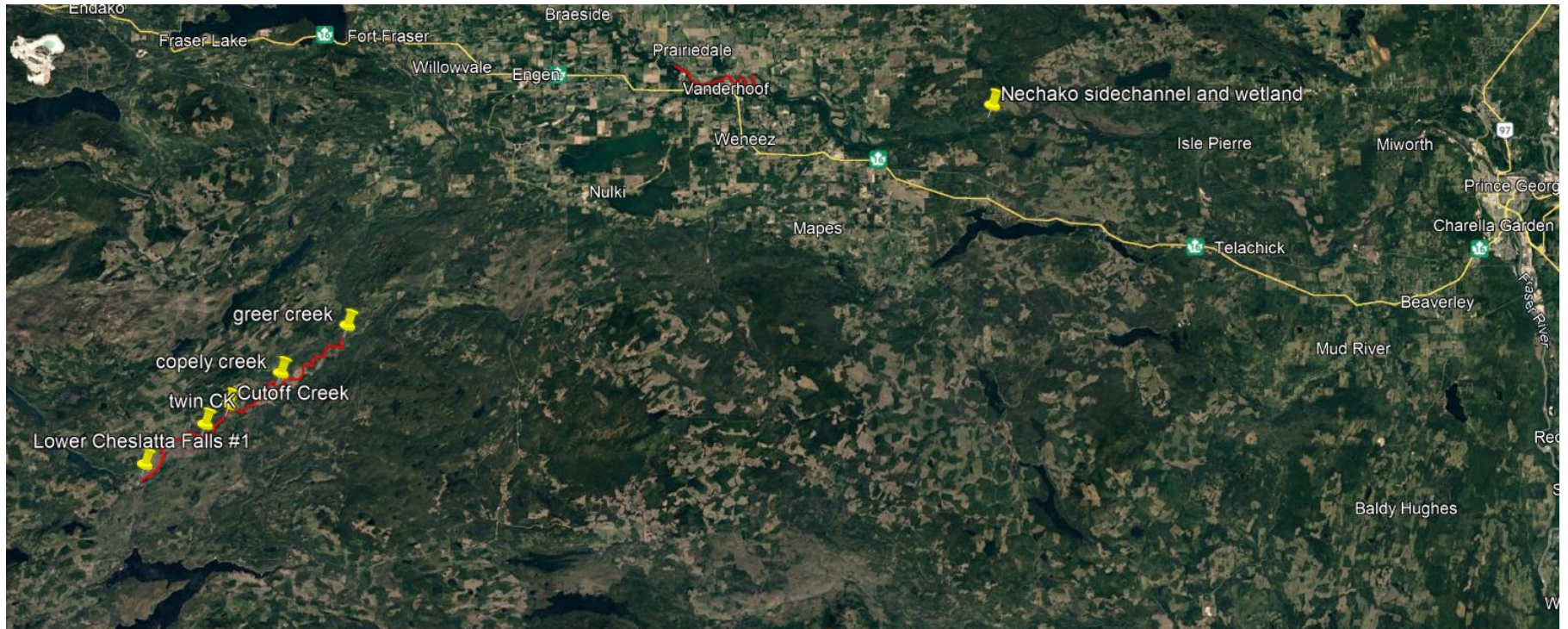
Low-Water Reconnaissance Surveys: Nechako River and Cheslatta Lake



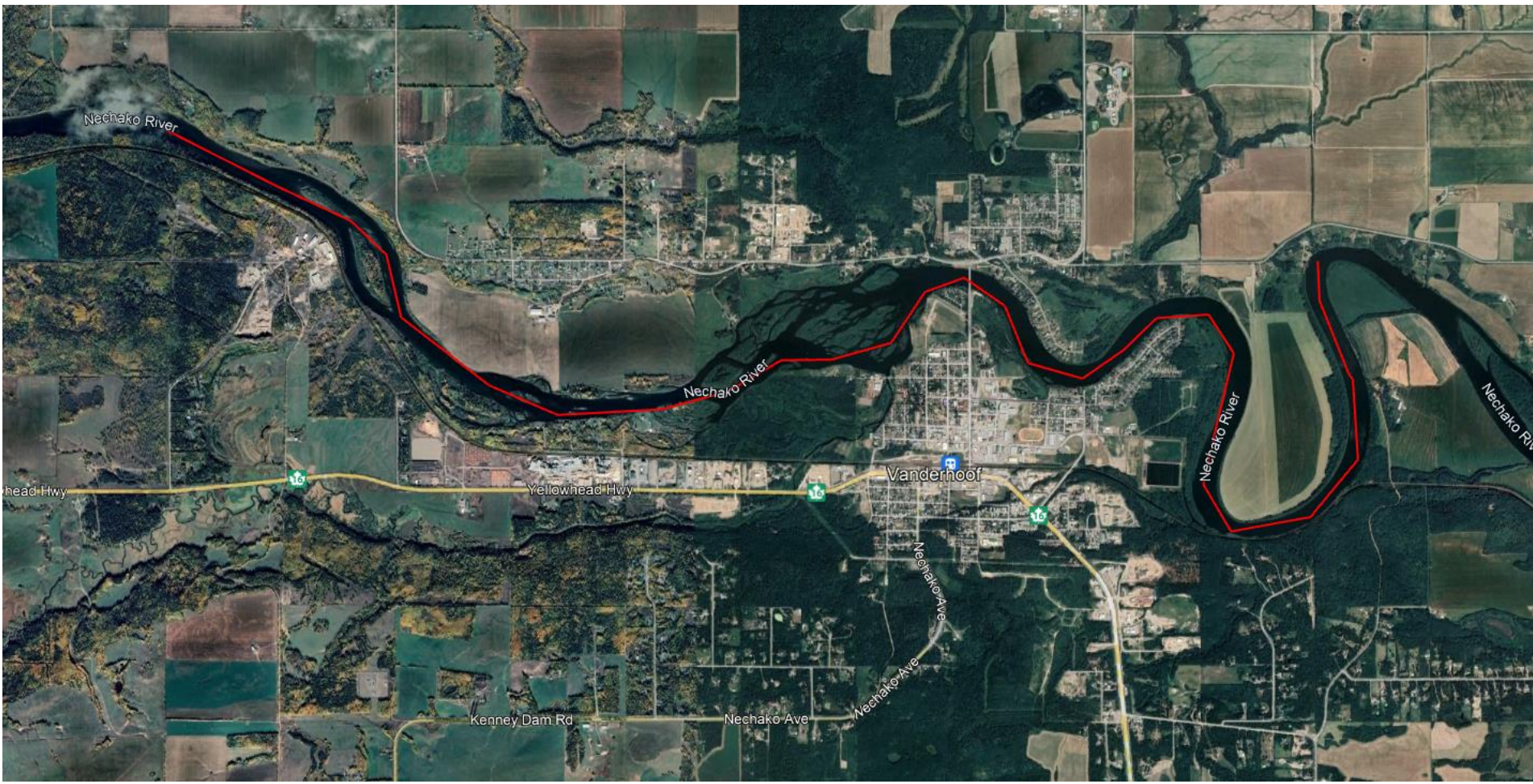
Heidi Regehr, PhD, Wildlife Biologist
Jayson Kurtz, TWG Coordinator

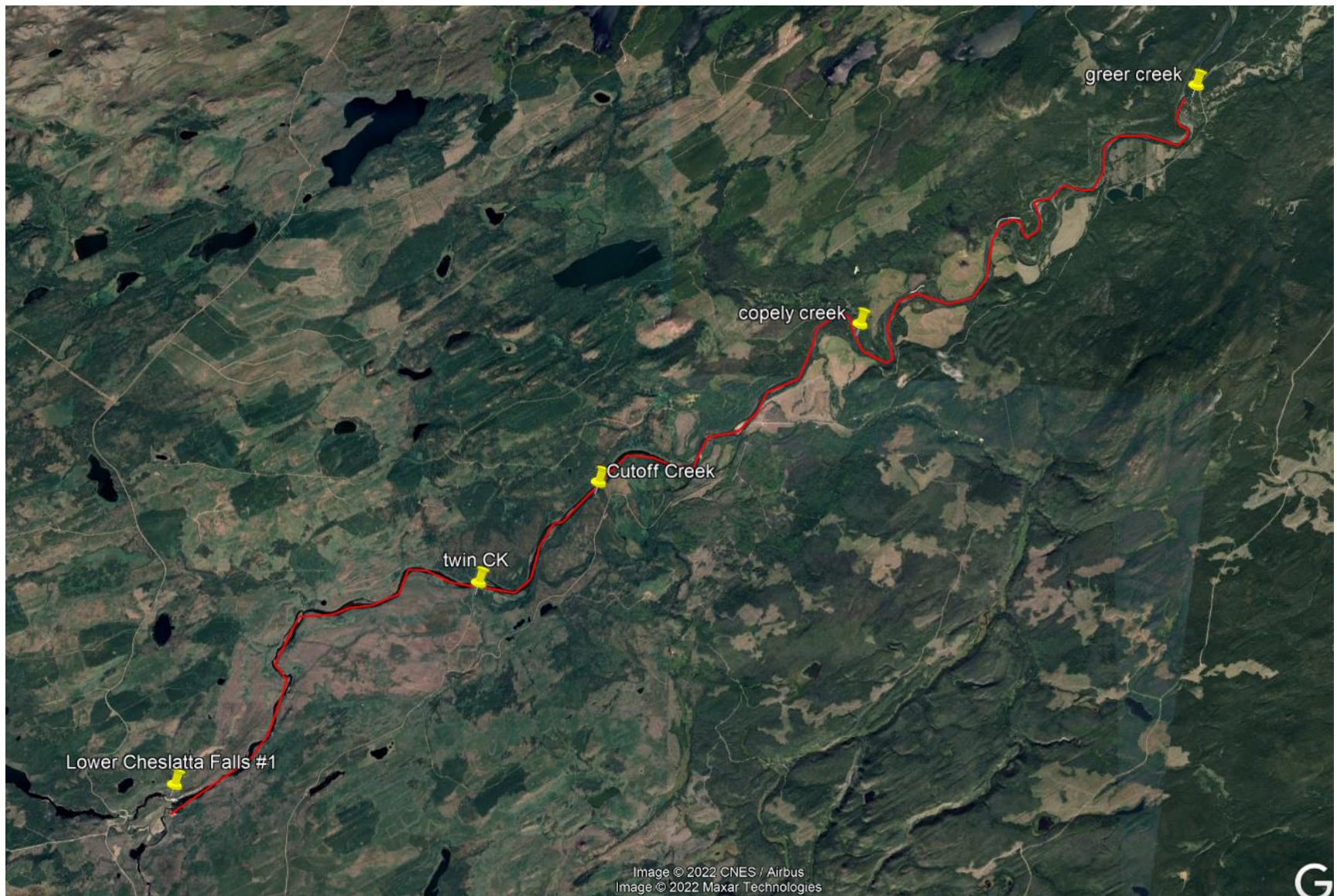
Nechako River - October 3 and 6, 2022

- Jayson, Heidi, Rachel, Brian Aitken









Species Groups/Issues:

- Riparian and Wetlands – wildlife habitat
- Erosion
- Side channels and tributaries – fish access and habitat
- Birds – nest flooding/stranding; island habitat
- Amphibians – inundation/desiccation
- Ungulates – shoreline access; island habitat
- Beavers – flooding/exposure of dens
- Reed canary grass – presence/abundance
- Fish habitat and stranding
- Mussels











Riparian and Wetlands



- Riparian largely intact
- Land development common (agriculture/ranching, housing)

Riparian and Wetlands



Riparian and Wetlands

- Little shoreline riparian habitat at low water (reed canary grass, grazed, set-back from water)
- At high water, shrubs and islands inundated



Riparian and Wetlands

- Little wetland habitat within river channel
- Some wetland areas colonized by reed canary grass



Riparian and Wetlands



Erosion



Erosion



Erosion



Side Channels and Tributaries



Side Channels and Tributaries

- Side channels and tribs dry
- Minimal fish tributary access issues *due to Nechako R. level*



Side Channels and Tributaries



Side Channels and Tributaries



Birds

- Little gravelling habitat in Nechako River Migratory Bird Sanctuary (reed canary grass, mud)
- Riparian nesting habitat at high water



Amphibians

- Little indication of valuable breeding habitat
- One Columbia Spotted Frog in river margin habitat



Ungulates

- Permanent islands not abundant, but likely provide calving and other habitats
- No access issues



American Beaver

- Many dens observed
- Most extensive structures, extending to upper bank

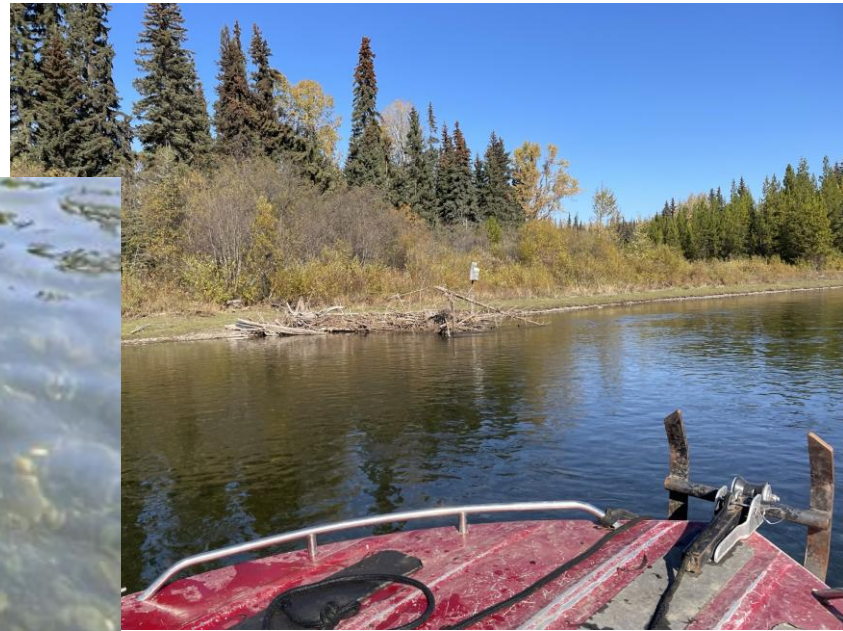


Reed Canary Grass

- Extensive areas colonized
- Heavily grazed along some shorelines



Fish and Fish Habitat



Mussels



- Occasional shells on gravel bars
- Live mussels not observed***

Cheslatta watershed - October 4, 2022

- Jayson, Heidi, Rachel, Cody Reid



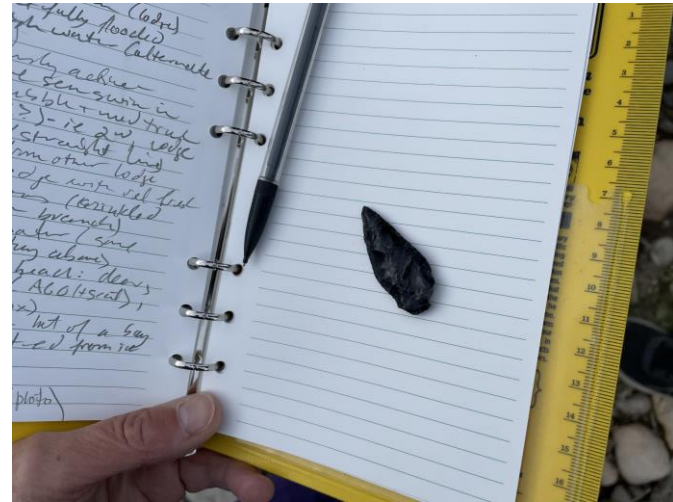
Species Groups/Issues:

- Culture & Heritage
- Wetlands and Riparian – wildlife habitat
- Erosion
- Tributaries – fish habitat and access
- Birds – nest flooding
- Amphibians – inundation/desiccation
- Beavers – flooding/exposure of dens
- Ungulates – shoreline access
- Mussels

Culture & Heritage



Culture & Heritage



Riparian and Wetlands

- Shoreline typically sloped, sandy/rocky
- Generally little riparian vegetation
- Fires extensive
- Some wetlands



Riparian and Wetlands



Riparian and Wetlands



Erosion

- Moderately-sloped, eroding shoreline common



Tributaries

- Some tributaries wetted, some dry
- Minimal fish tributary access issues



Tributaries



Cheslatta River



Birds

- Vegetation nesting in drawdown zone unlikely
- Beach nesting possible
- Waterfowl locally abundant



Amphibians

- Few wetlands, but some potential breeding habitat



American Beaver

- Both lodges and bank dens abundant
- Low and high elevation, often together



Ungulates

- No access concerns evident



Mussels



Fish and Fish Habitat

- Numerous species of aquatic vegetation
- Water quality sampling

