Skeena Salmon: Lake Sockeye
Conservation Unit (CU)
Lakelse

Version 1.1, July 2013

Introduction

This habitat report card is part of a 2013 project by ESSA Technologies that summarizes pressures on the habitat used by Skeena sockeye CUs during their freshwater life history stages (migration, spawning and rearing), as well as their relative vulnerability to those pressures. For an explanation of the indicators shown here, please see the accompanying *Report Card Summaries*. Full methods and results can be found in the main report, *Skeena Lake Sockeye Conservation Units: Habitat Report Cards* (2013). An online interactive version of this information is available at www.skeenasalmonprogram.ca.

Definitions

Conservation Unit (CU): A group of wild salmon sufficiently isolated from other groups that, if extirpated, is very unlikely to re-colonize naturally within an acceptable timeframe.

Pressure indicator: Measurable extent/intensity of natural processes or human activities that can induce changes in habitat condition/state.

Vulnerability indicator: Measures of habitat quantity or quality used to represent the intrinsic habitat vulnerability/sensitivity to watershed disturbances for each life-stage.

Zone of influence (ZOI): Areas adjacent to and upstream/upslope of habitats used by salmon CUs that represent the geographic extent for capture/measurement of pressure and vulnerability indicators.

Status: Condition of habitat relative to a defined indicator benchmark.

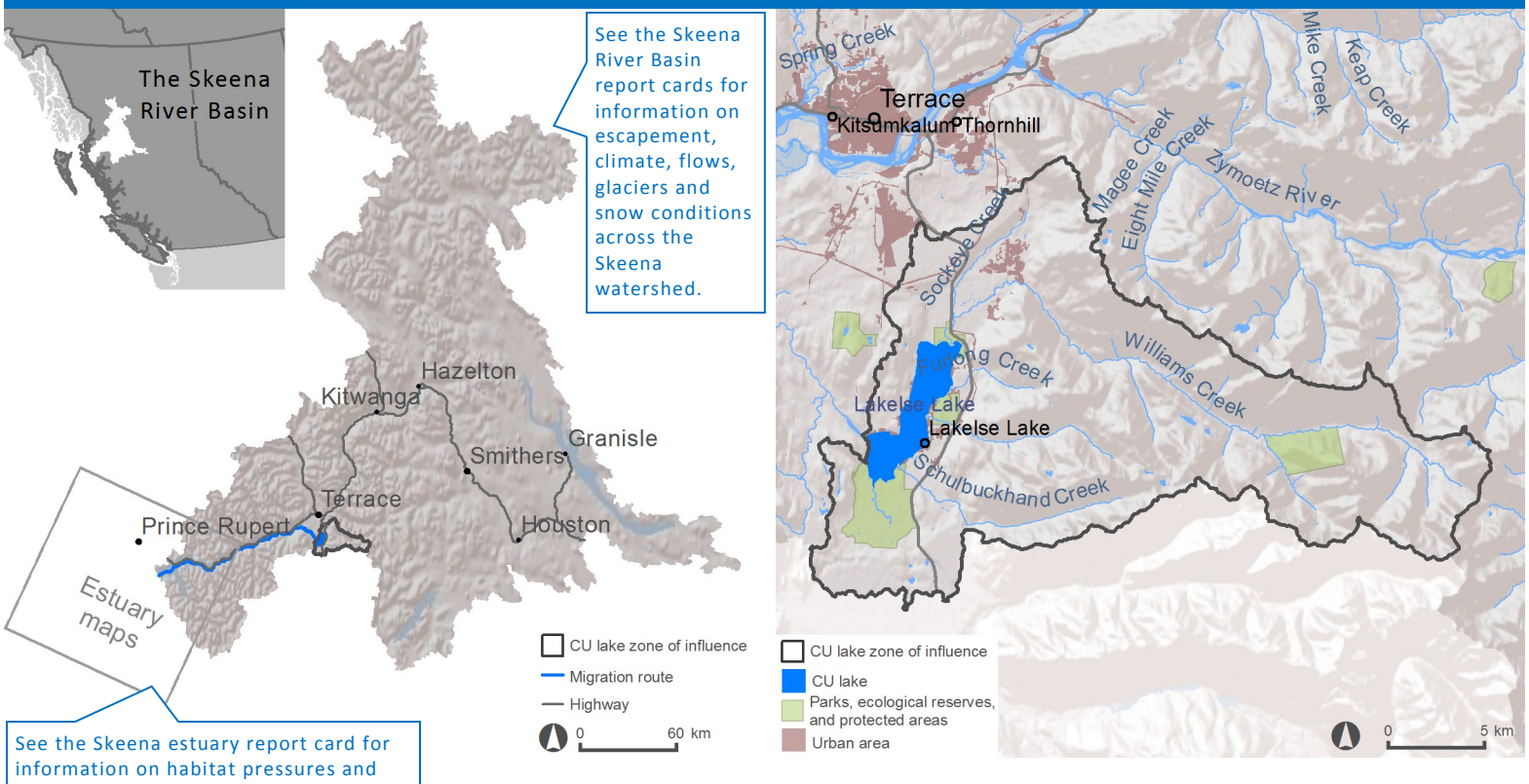
Risk: Risk of adverse effects to salmon habitats within a defined zone of influence. Levels of increasing risk are defined based on the extent/ intensity of impacts relative to defined benchmarks of concern.

Benchmark: A standard (quantified metric) against which habitat condition can be measured or judged, and by which status can be compared over time and space to determine the risk of adverse effects.

Narrative

* No significant lakeshore spawning. Three main sockeye spawning streams: Williams Creek, Hatchery Creek, Schulbuckhand Creek, with one small population of spawners in a series of small groundwater tributaries along 1st Avenue.
* All three main tributary fans that support the majority of spawners have been heavily modified or channelized. Some systems experience sub gravel flows during low flow conditions.
* Increase in sediment production has provided favorable habitat for heavy growth of Pondweed Elodea Canadensis.
* Snowmelt driven hydrological regime with relatively warm lake water, oligotrophic to slightly mesotrophic with a low Nitrogen:Phosphorous ratio.
* Lakelse sockeye exploitation levels have been low to moderate; however, escapements for the last 20 years have been low relative to historic levels.
* Wide variety of habitat rehabilitation activities over the last 10 years.
* Protection and conservation of ecosystem processes and fish habitat are a high priority.
* Cumulative impacts to fisheries resources from forestry, linear, agriculture and residential developments are rated high.
* Majority of spawning stream drainages have been adversely affected by forestry activities. Increased deciduous growth following deforestation has led to extensive beaver activity.
* Formal Lakelse Lake Sockeye Recovery Plan in place with implementation and monitoring underway including annual adult enumeration, sockeye enhancement, habitat restoration and monitoring.
* Hatchery enhancement of 300,000 sockeye fry from 2006 through 2013.
* Large amount of historical data available as watershed was a fisheries research lake in the 1960's and 1970's.
* Historic highs of over 30,000 spawners.

Location



CU overview of habitat vulnerabilities & pressures

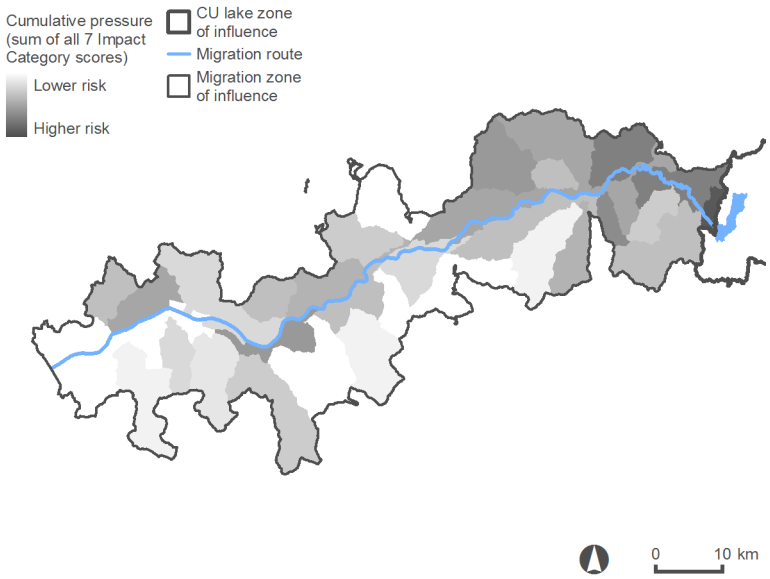
Pressure indicators were grouped into seven relatively independent habitat "impact categories" representing key factors affecting general watershed condition:

- Hydrologic Processes (Forest disturbance; ECA)
- Vegetation Quality (Insect and disease defoliation; Riparian disturbance)
- Surface Erosion (Road development)
- Fish passage/Habitat connectivity (Stream crossing density)
- Water quantity (Water licenses)
- Human development footprint (Total land cover alteration; Impervious surfaces; Linear development; Mining development)
- Water quality (Mining development acid generating; Wastewater discharges)

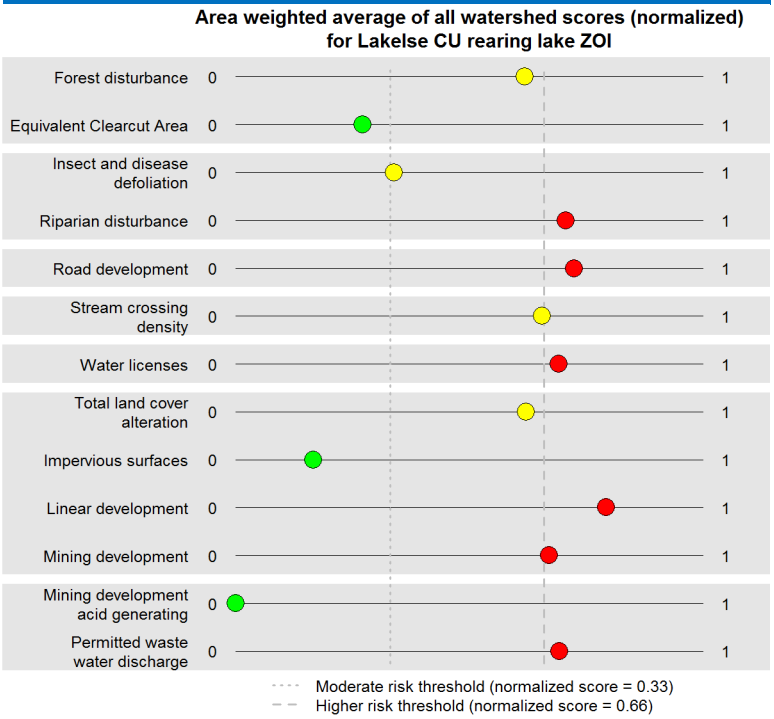
Indicators were also developed reflecting relative vulnerability to habitat pressures within the life stage-specific "zones of influence" defined for each lake sockeye CU:

- Migration (Total migration distance; Length & % of migration route summer flow sensitive)
- Spawning (Total spawning length; Spawning length in tributary, lake or mainstem; Ratio of lake influenced to total spawning length; Length of accessible habitat)
- Rearing (Rearing lake area, Rearing lake productive capacity)

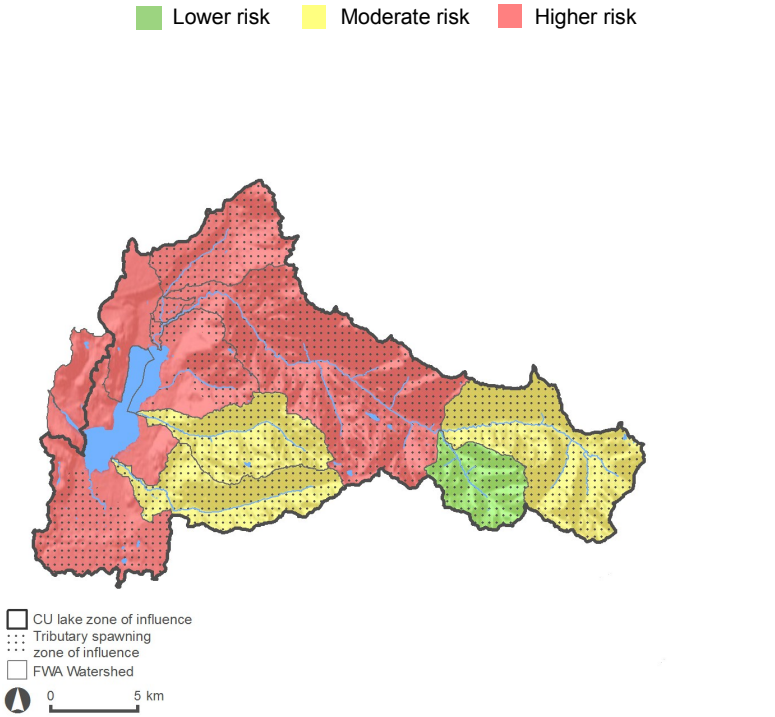
Cumulative pressure—migration



Summary of pressure indicators—rearing

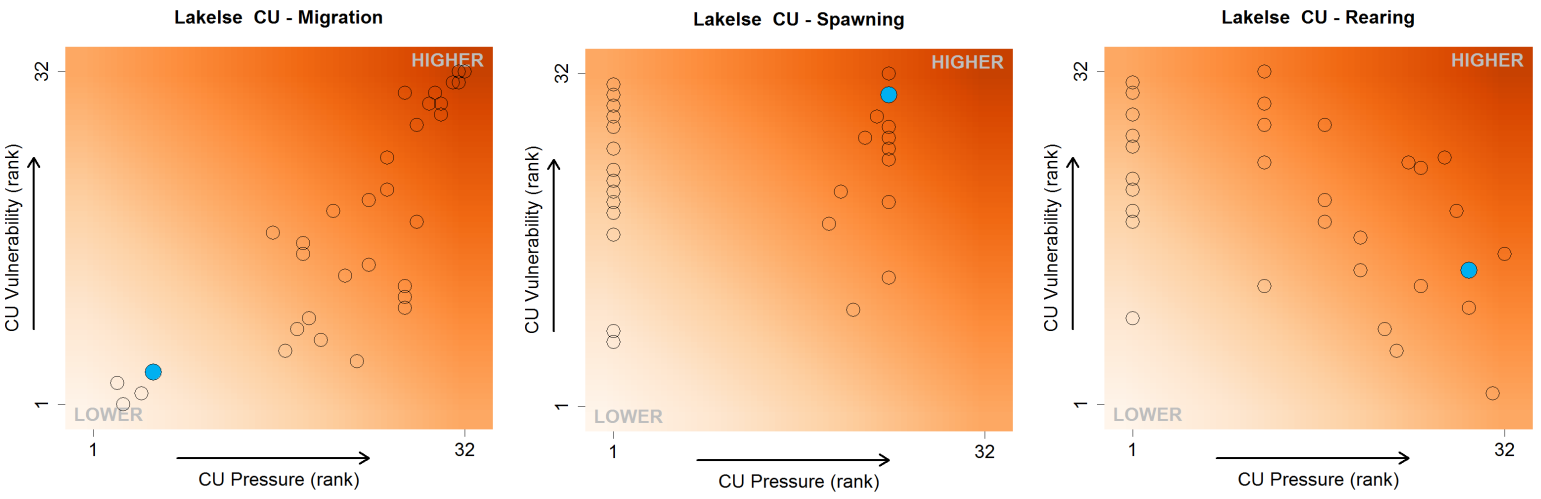


Cumulative pressure—rearing & spawning



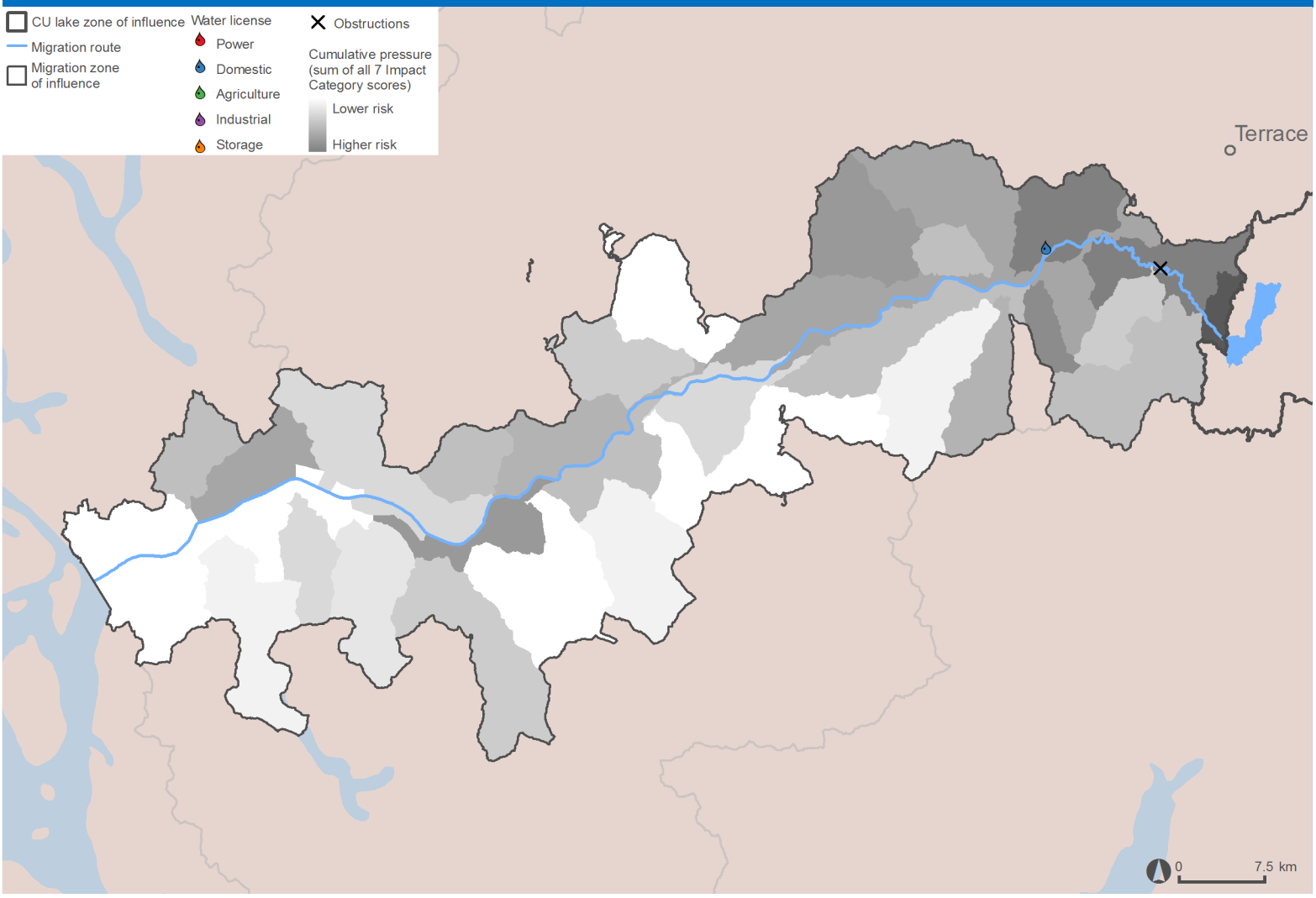
Integrated vulnerability/habitat pressures—migration, spawning, & rearing

● = Lakelse ○ = other Skeena lake sockeye CUs

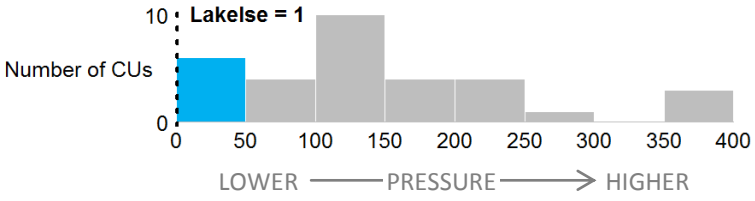


Migration vulnerability & pressure

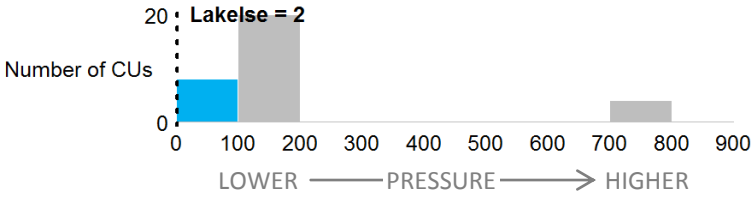
Migration period pressures



Number of obstructions along migration route

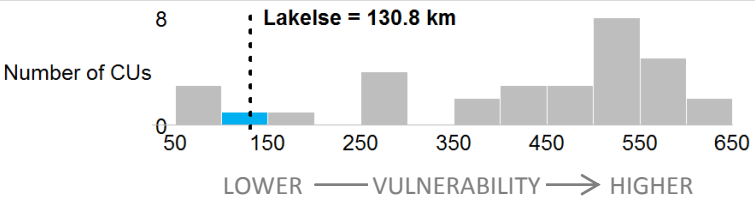


Number of water licenses along migration ZOI

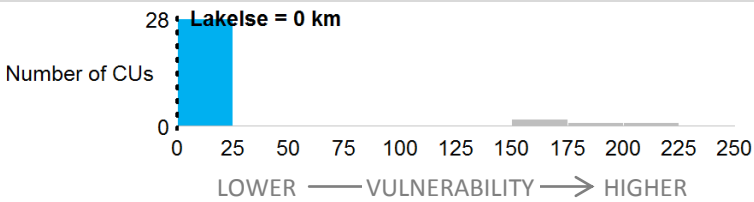


Migration period vulnerability

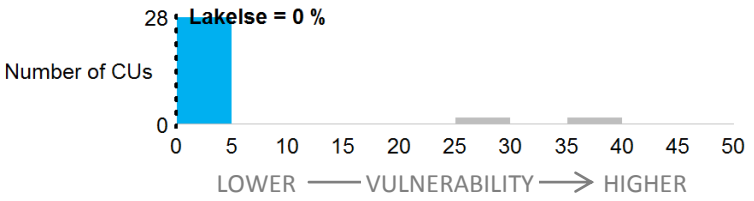
Migration distance (km)



Migration route - summer low flow sensitive (km)



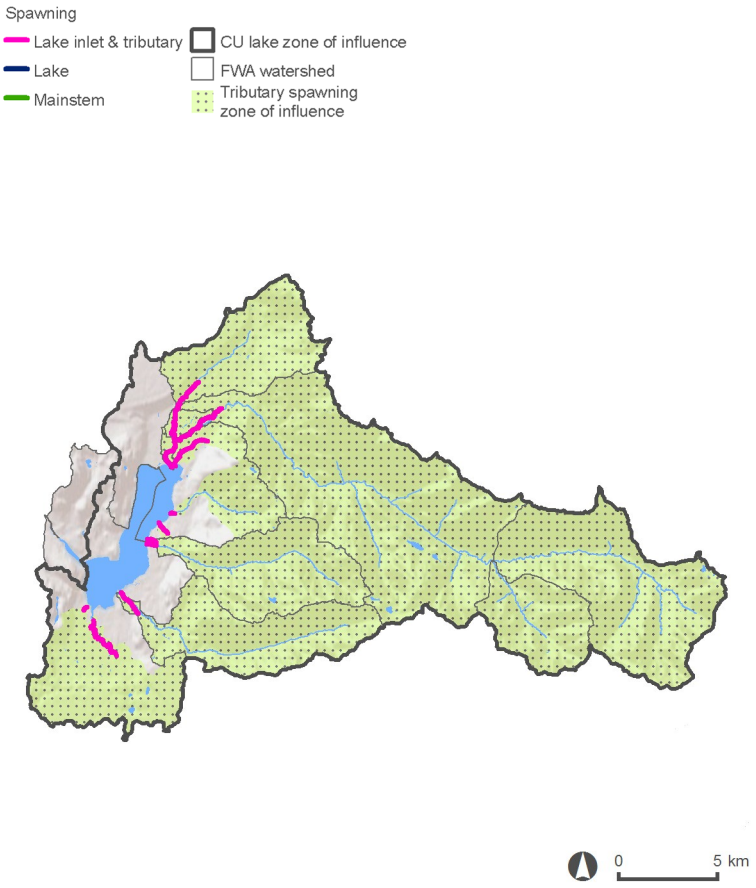
Migration route - summer low flow sensitive (%)



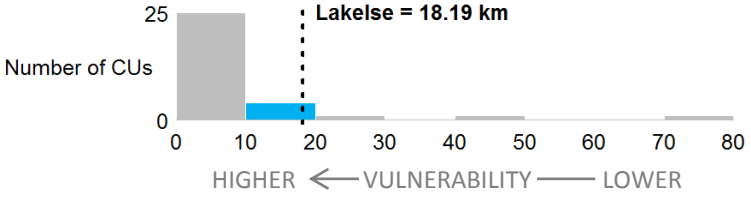
Spawning & rearing vulnerability

Spawning period vulnerability

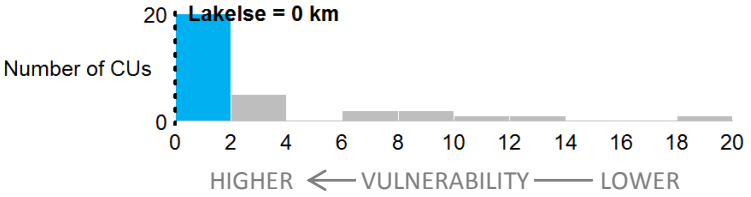
Spawning locations



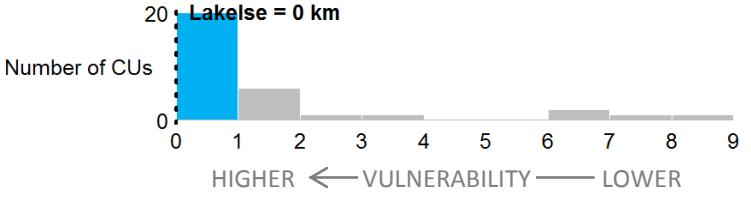
Total (mainstem, trib & lake) spawning length (km)



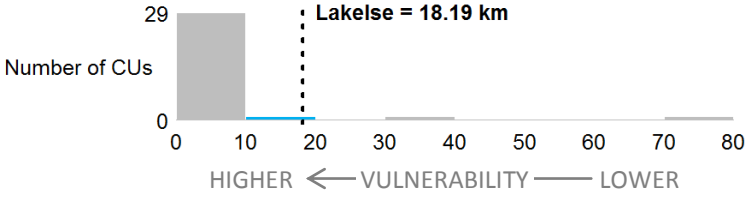
Length of lake shore spawning areas (km)



Mainstem spawning length (km)

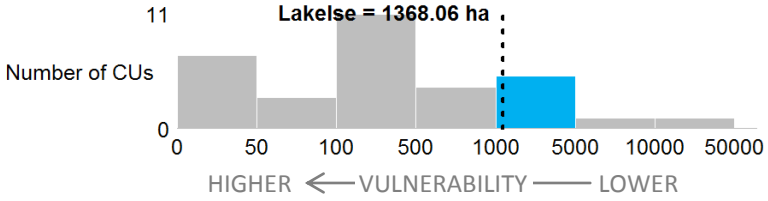


Tributary and lake inlet spawning length (km)

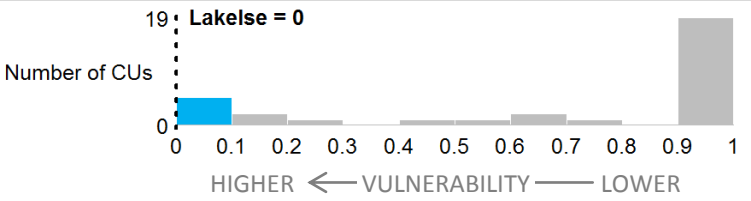


Rearing period vulnerability

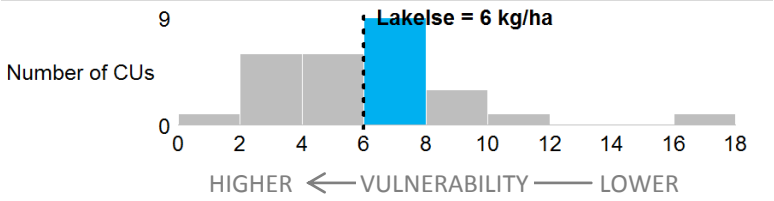
Area of nursery lakes (ha)



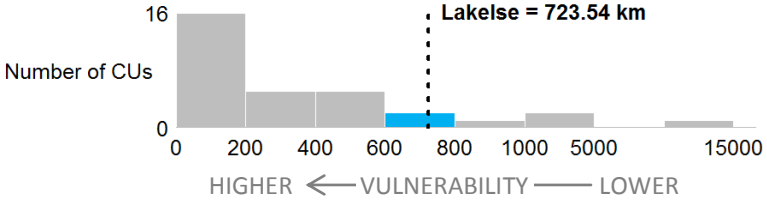
Ratio of lake influenced to total spawning



Nursery lake productive capacity (Rmax est. kg/ha)



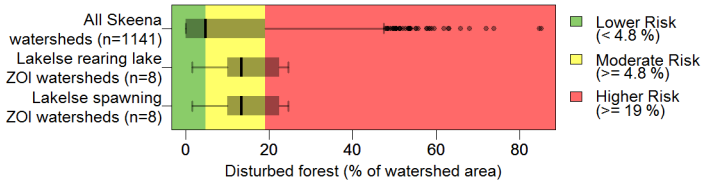
Fish accessible habitat (km)

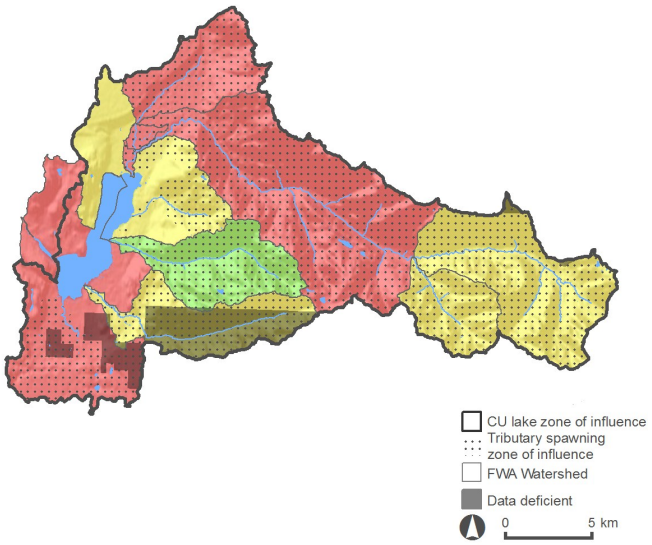


Spawning & rearing pressure

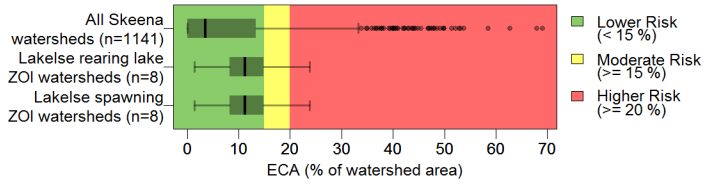
Hydrologic Processes

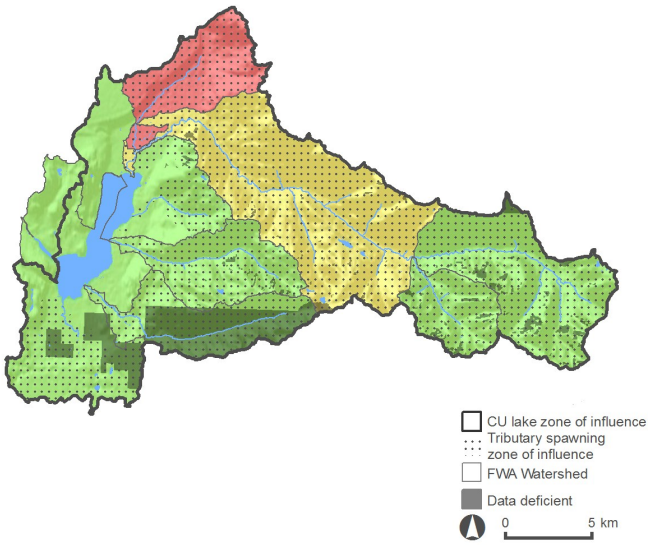
Forest disturbance





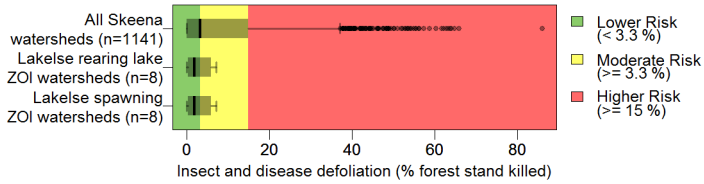
Equivalent Clear-cut Area

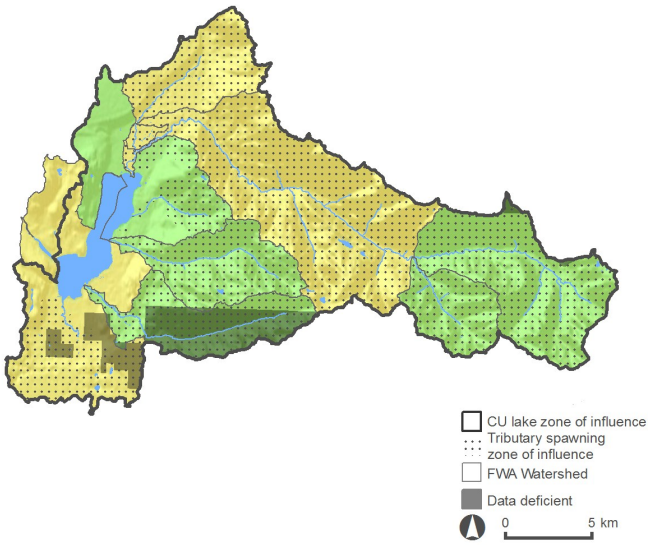




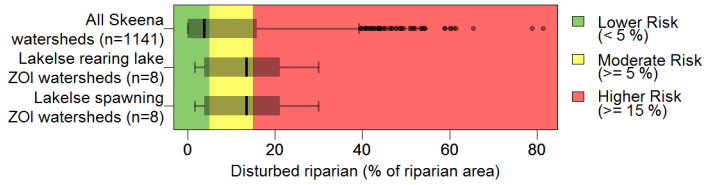
Vegetation Quality

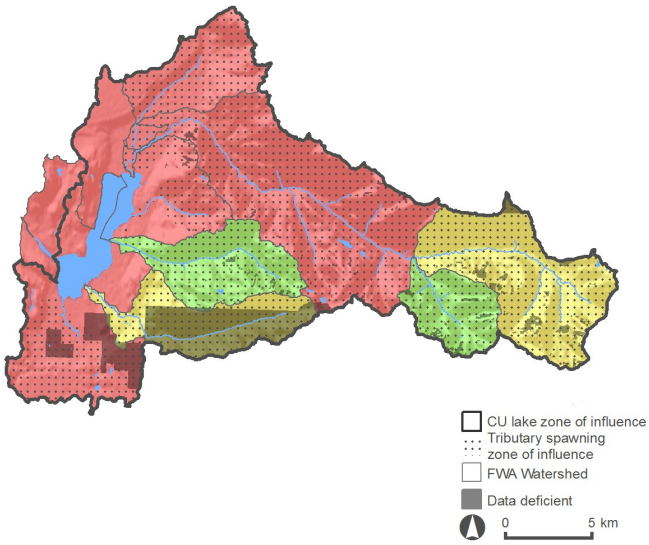
Insect and disease defoliation





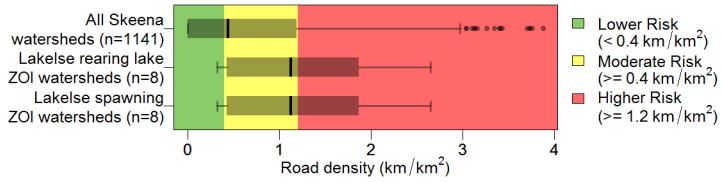
Riparian disturbance

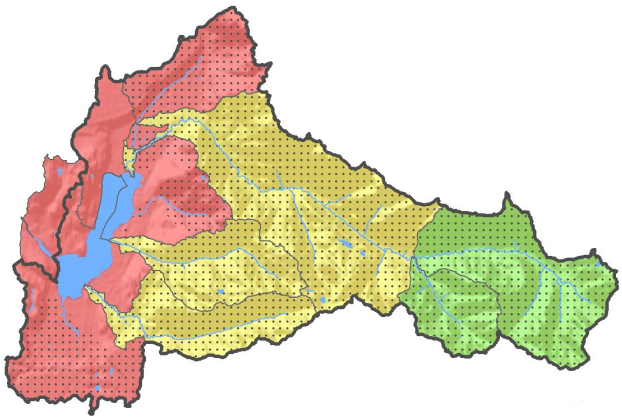




Surface Erosion

Road development

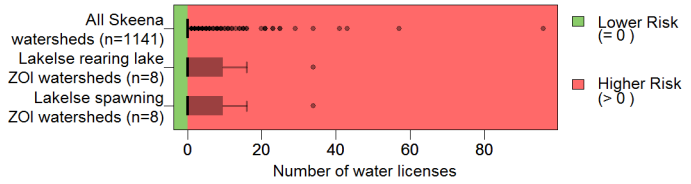


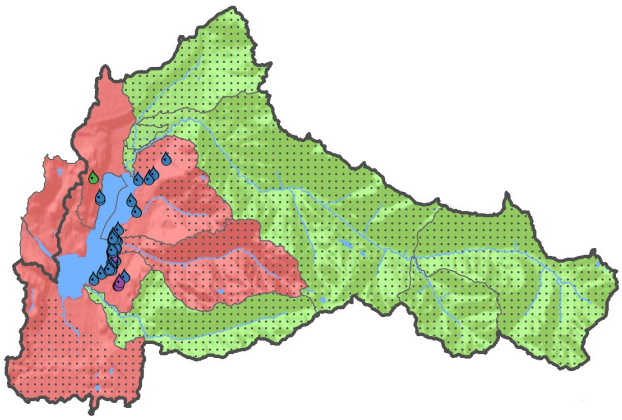


CU lake zone of influence
Tributary spawning zone of influence
FWA Watershed
0 5 km

Water Quantity

Number of water licenses

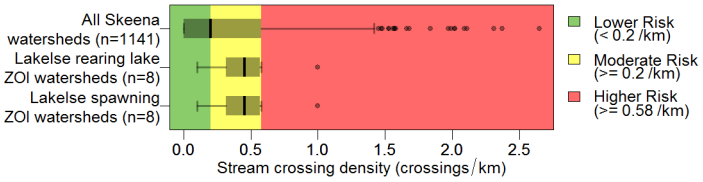


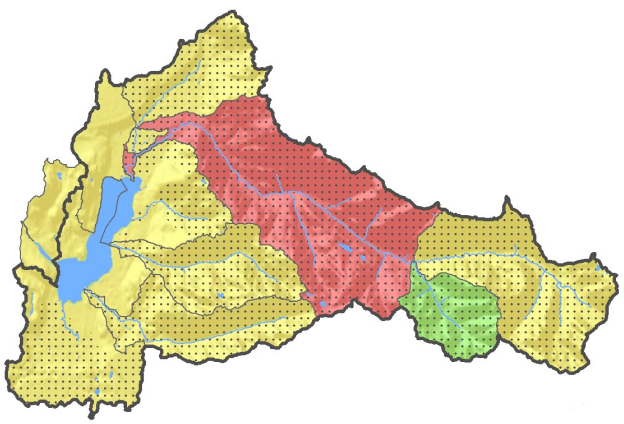


CU lake zone of influence
Tributary spawning zone of influence
FWA Watershed
0 5 km

Fish Passage/Habitat Connectivity

Stream crossing density

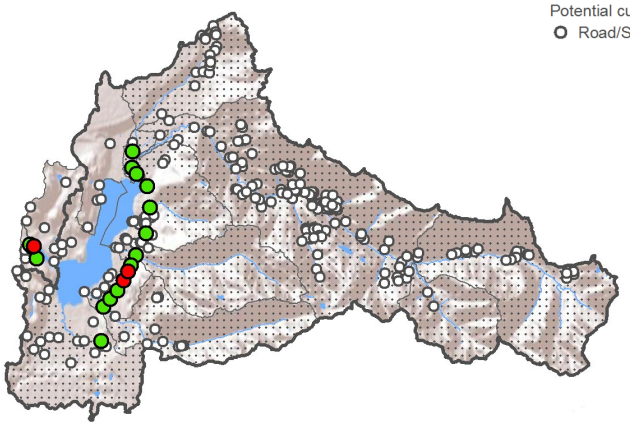




CU lake zone of influence
Tributary spawning zone of influence
FWA Watershed
0 5 km

Culvert passability

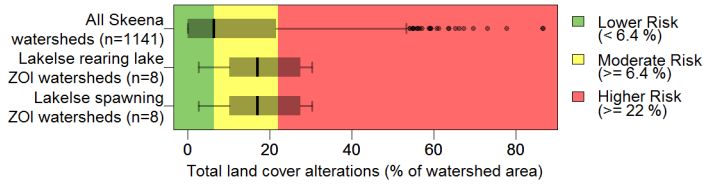
Stream crossings assessed in local Skeena Fish Passage and Culvert Inspection (FPCI) reports.

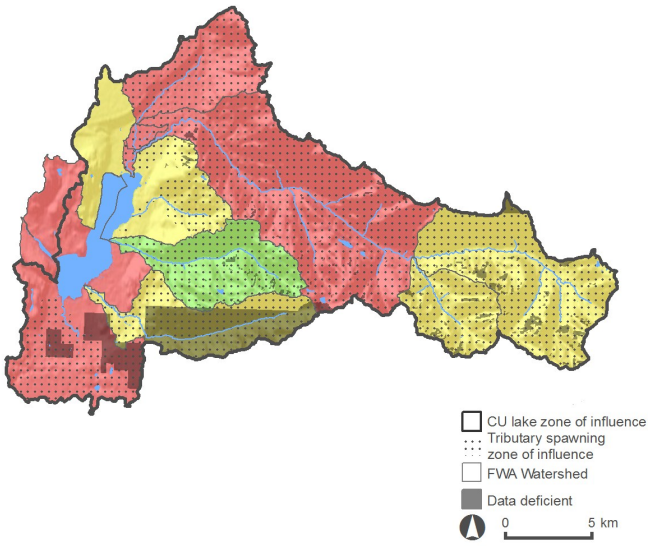


CU lake zone of influence
Tributary spawning zone of influence
FWA Watershed
0 5 km

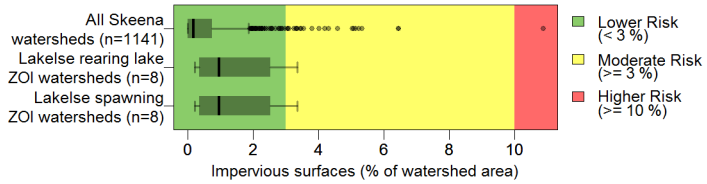
Human Development Footprint

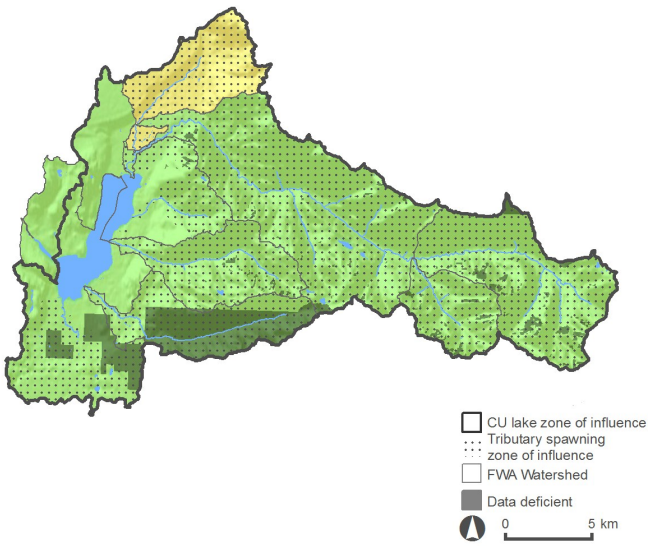
Total land cover alteration



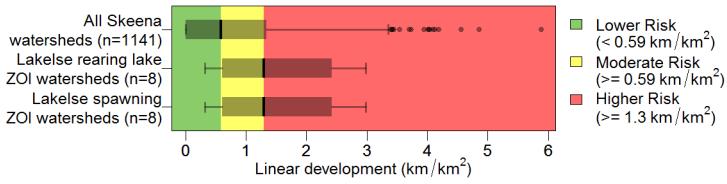


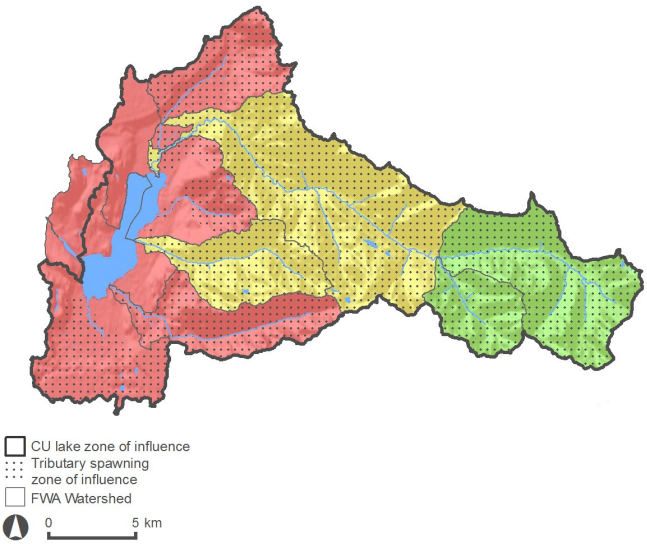
Impervious surfaces



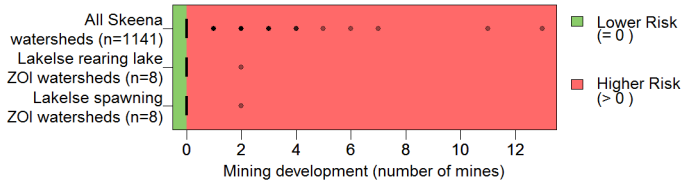


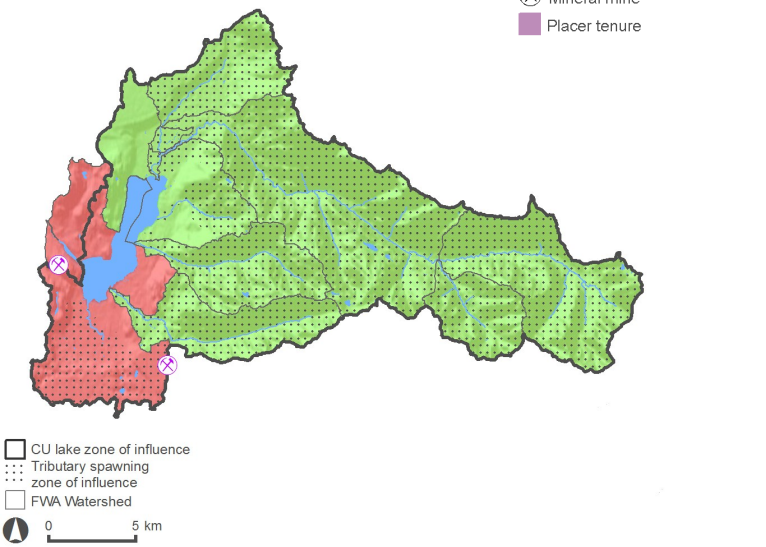
Linear development





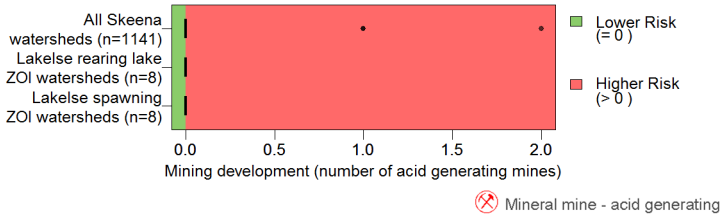
Mining development (total number of mines)

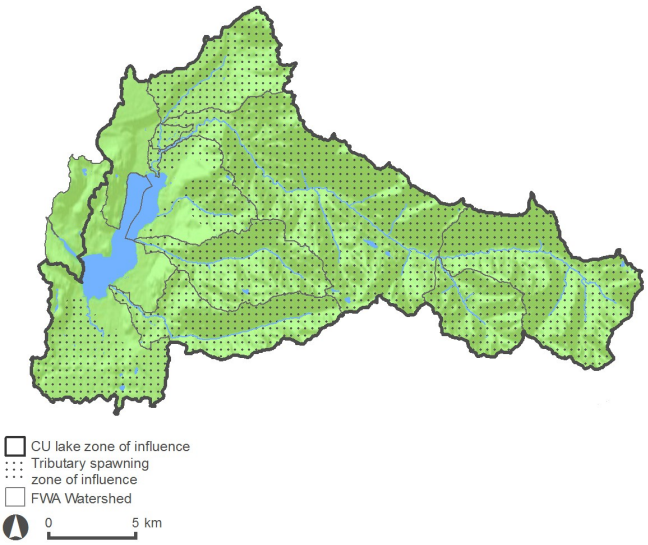




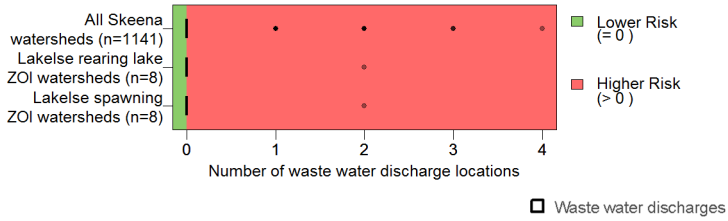
Water Quality

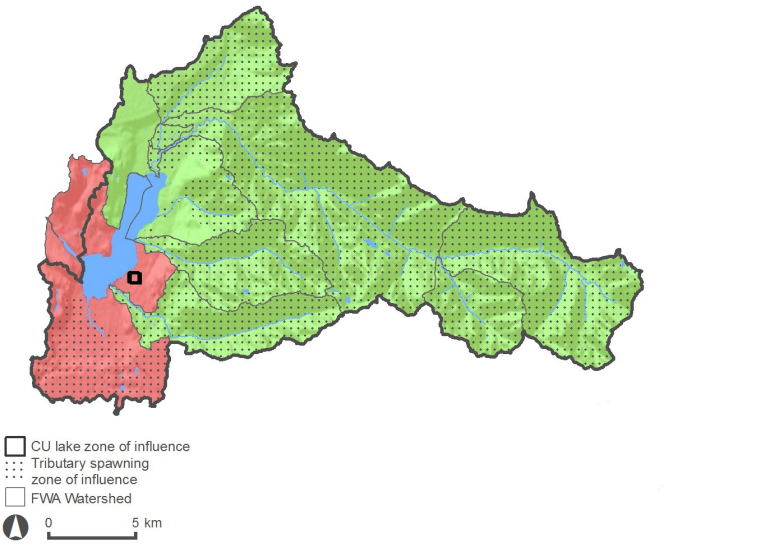
Mining development (acid generating mines)





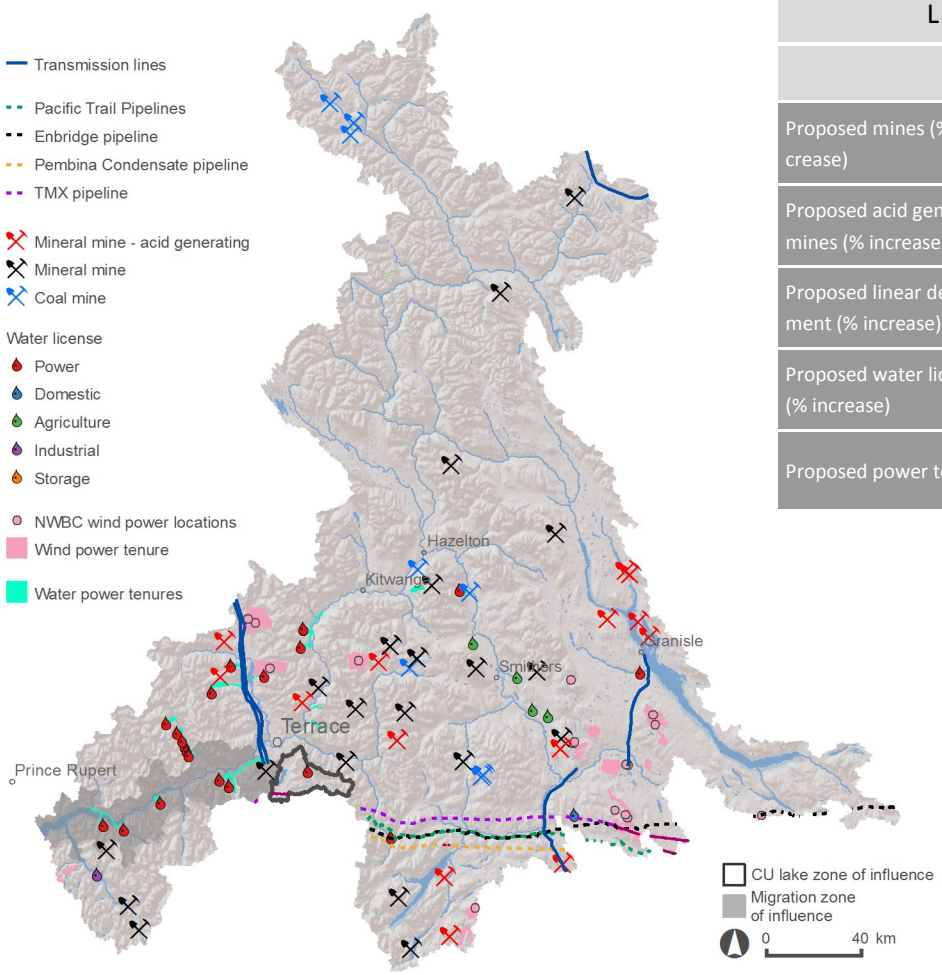
Permitted waste water discharges





Future pressure

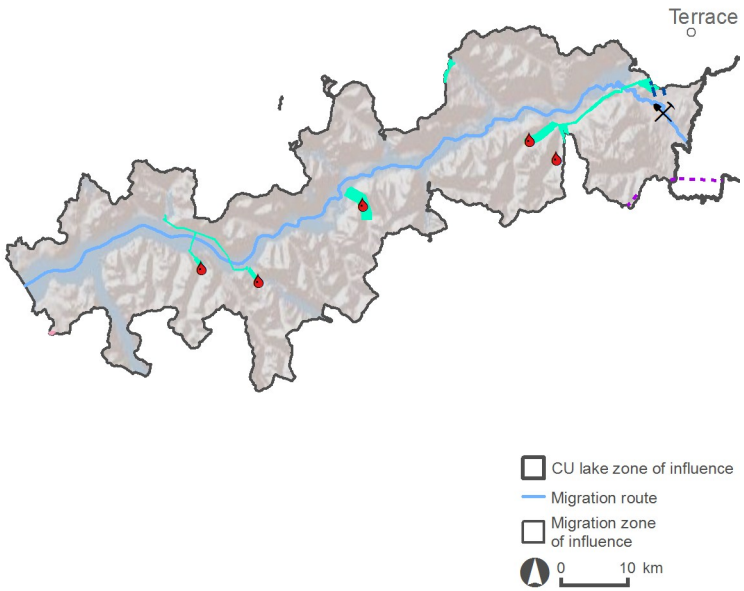
Proposed resource development projects (as of 2010)



Lakelse Lake Sockeye CU summary

	Migration	Spawning	Rearing
Proposed mines (% increase)	1 (10%)	0 (0%)	0 (0%)
Proposed acid generating mines (% increase)	0 (0%)	0 (0%)	0 (0%)
Proposed linear development (% increase)	0.01 km/km^2 (0.6%)	0.02 km/km^2 (1.1%)	0.02 km/km^2 (1.1%)
Proposed water licenses (% increase)	7 (19%)	2 (4%)	2 (4%)
Proposed power tenures	38.25 km^2	0 km^2	0 km^2

Proposed resource development projects in the CU migration ZOI



Proposed resource development projects in the CU spawning and rearing ZOI