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The Pacific salmon explorer: a data driven look at salmon populations and their habitats

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<https://cedar.wwu.edu/ssec/2018ssec/allsessions/516>

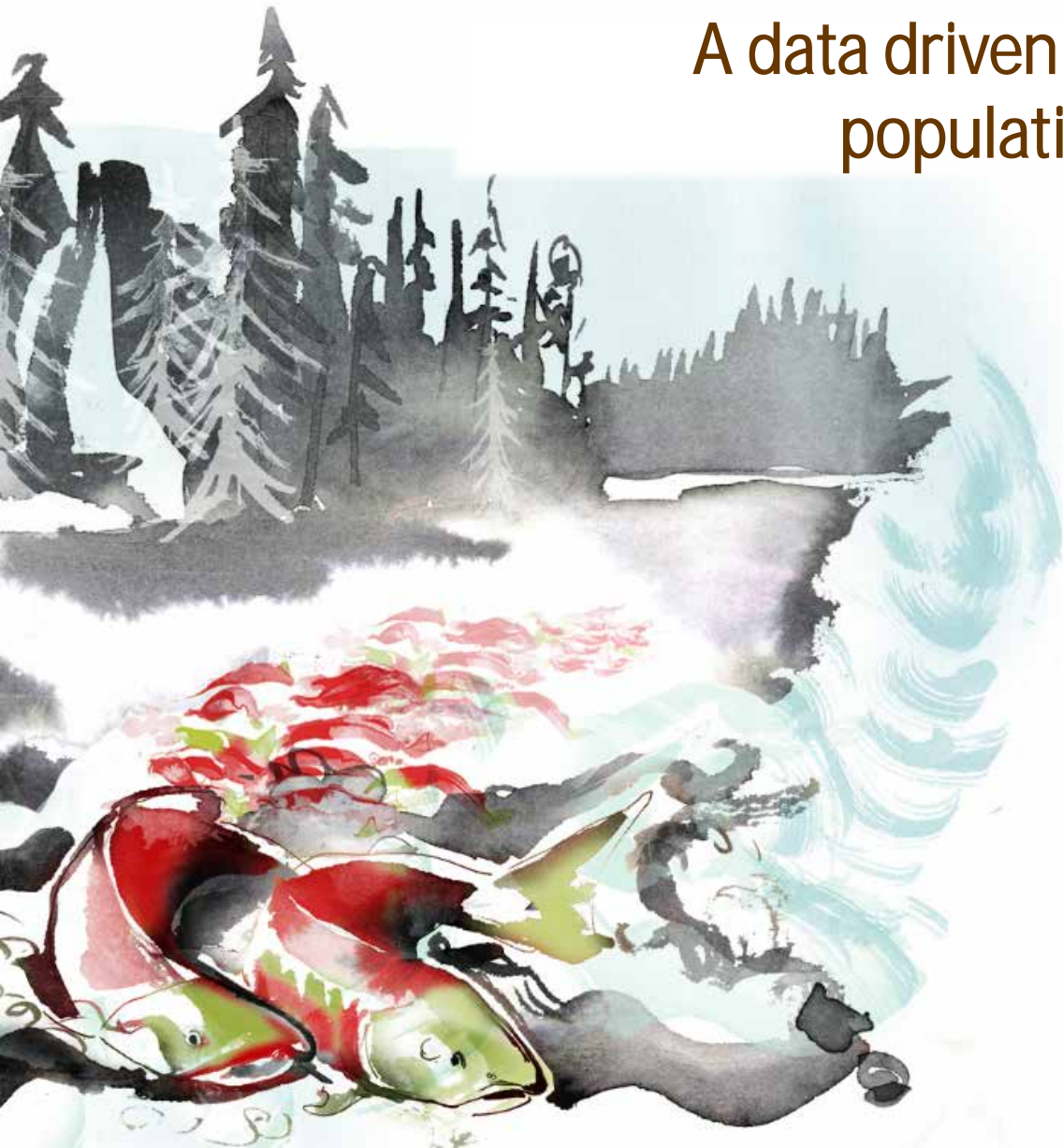
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Speaker

Katrina Connors, Eileen Jones, Leah Honka, Katy Kellock, Eric Hertz, and Brian E. Riddell

The Pacific Salmon Explorer

A data driven look at Pacific salmon populations and their habitats



Katrina Connors, E. Jones,
L. Honka, K. Kellock, E. Hertz
& B. Riddell



SALMON
WATERSHEDS
PROGRAM

Salmon Watersheds Program

1. Synthesize scientific information



2. Assess status of salmon runs and their habitats



3. Make information readily available



192 Salmon Conservation Units (CUs)



Collaborations & Partnerships

1. Collate and expand baseline scientific information

2. Assess status of salmon populations and their habitats

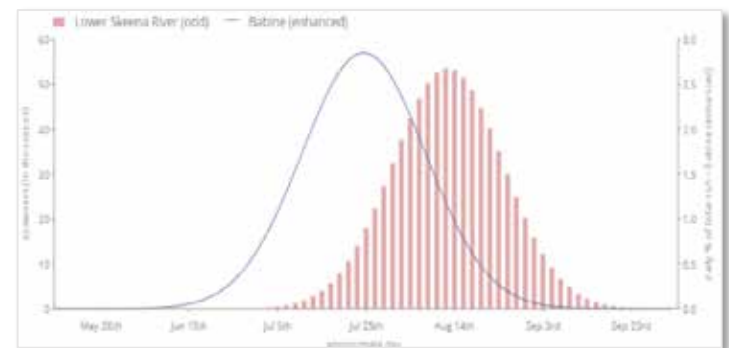
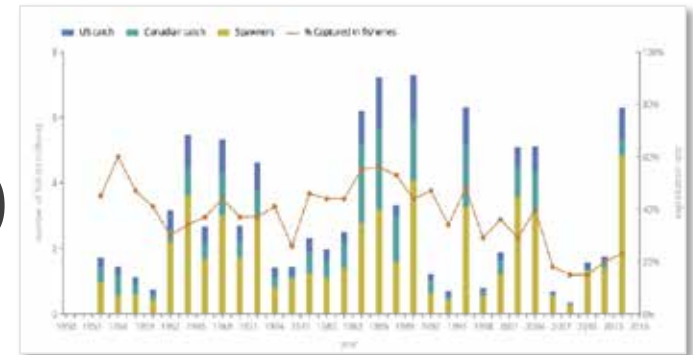
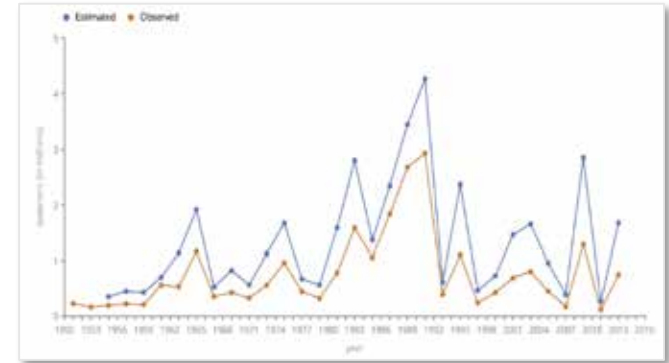
3. Make information broadly available



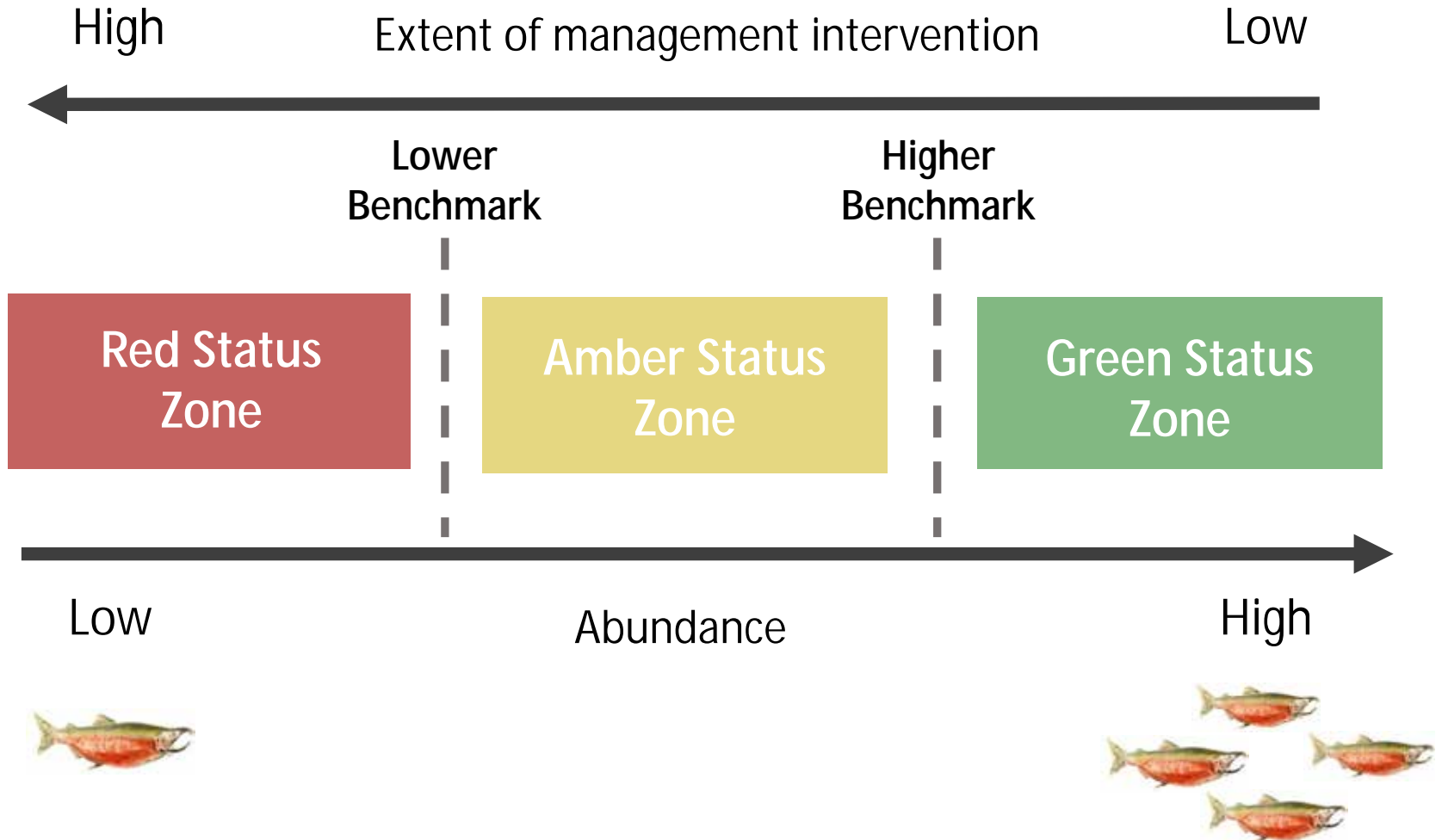
Population Assessments

For each CU within a region:

- number of returning adult salmon
- estimates of freshwater production
- age composition data
- productivity (recruits-per-spawner)
- harvest (in-river and marine)
- run timing

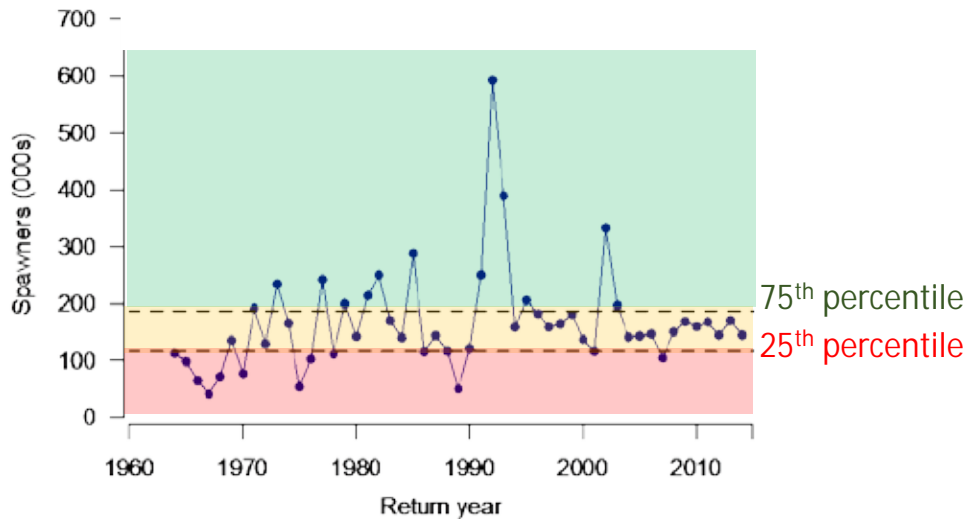


Population Assessments

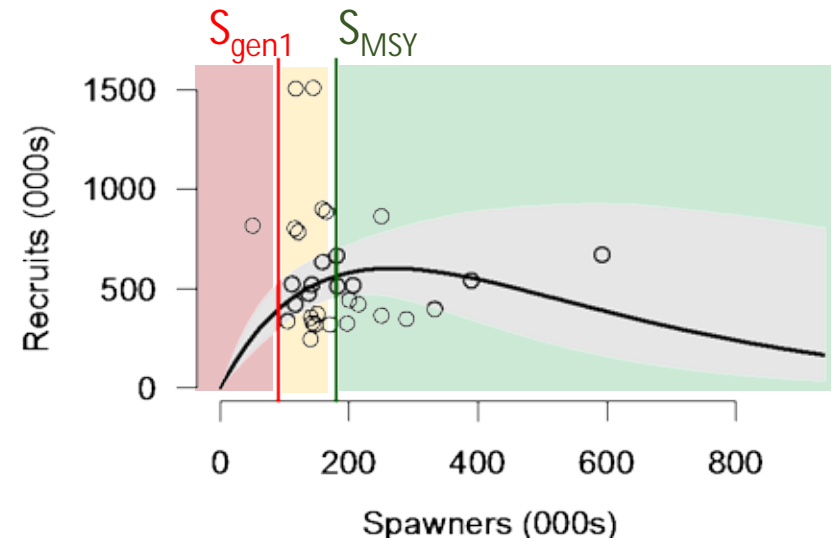


Population Assessments

Historic Spawners

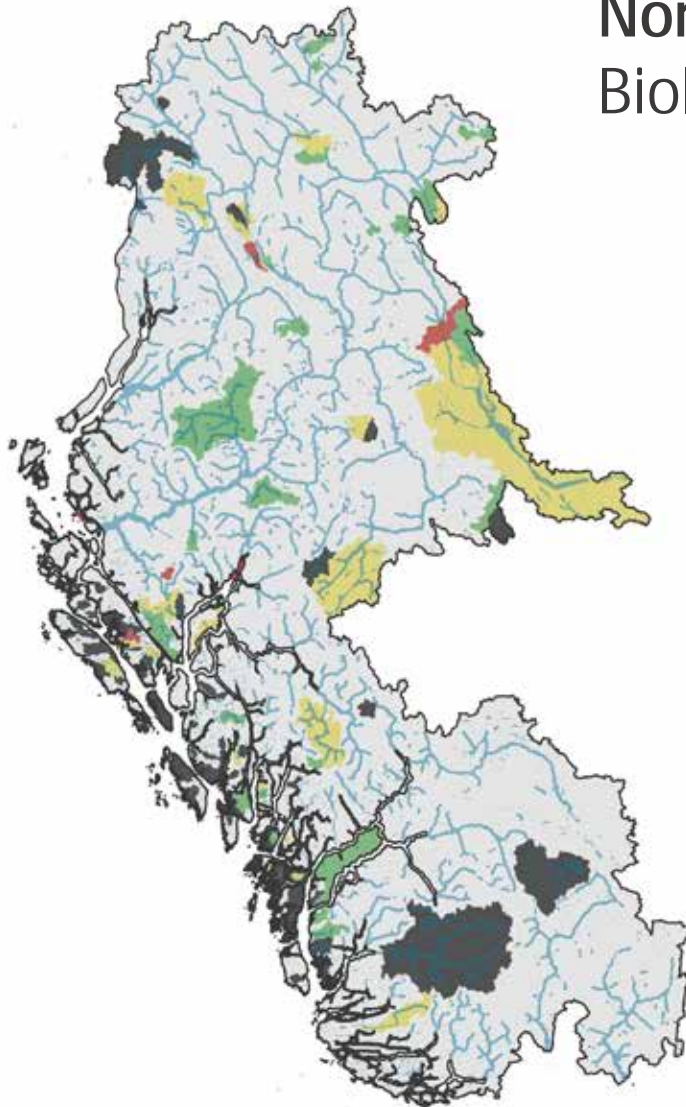


Stock Recruitment



Population Assessments

North and Central Coast - Biological Status



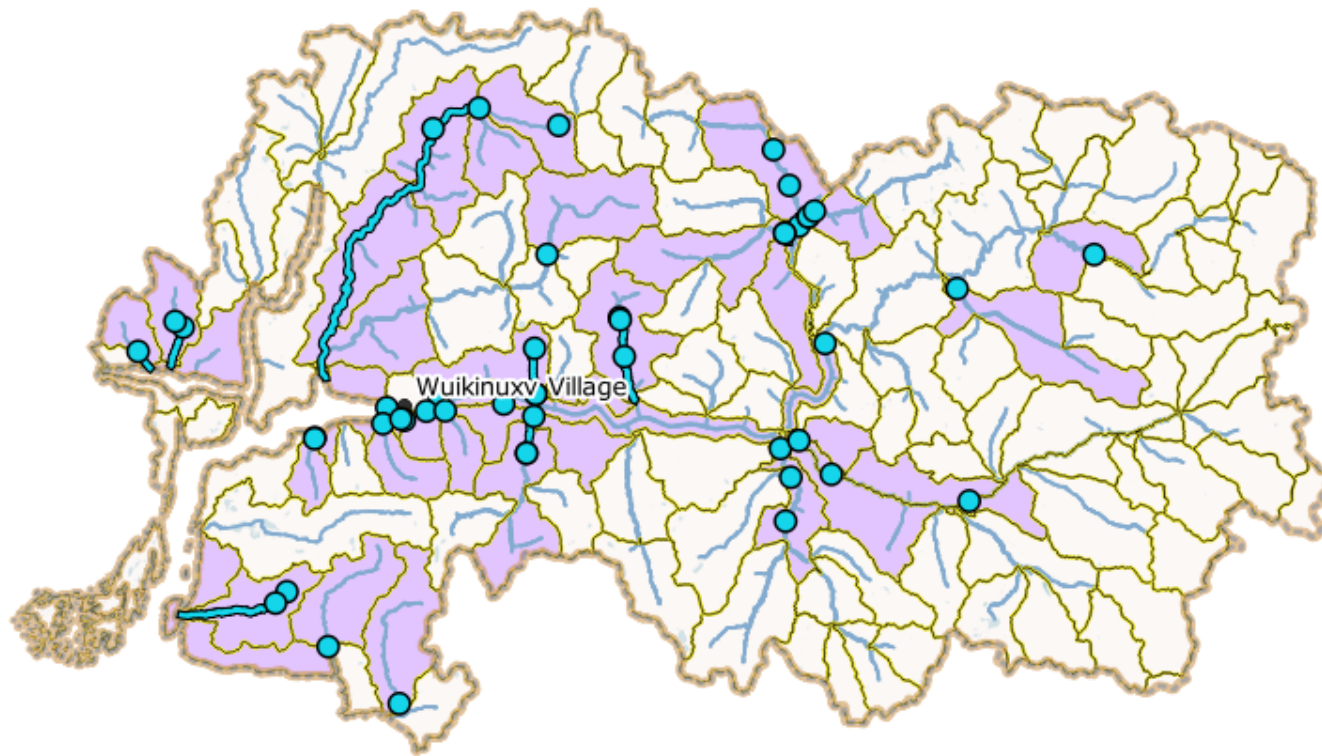
sockeye CUs



Biological Status



Habitat Assessments



- Spawning Sites
- Spawning Zones
- Spawning Zone of Influence
- Coho CU: Rivers Inlet

Habitat Assessments



1. Forest Disturbance



4. Riparian Disturbance



7. Stream Crossing Density



10. Linear Development



2. Road Development



5. Insect & Disease Defoliation



8. Land Cover Alteration



11. Mining Development



3. Water Licenses



6. Equivalent Clearcut Area



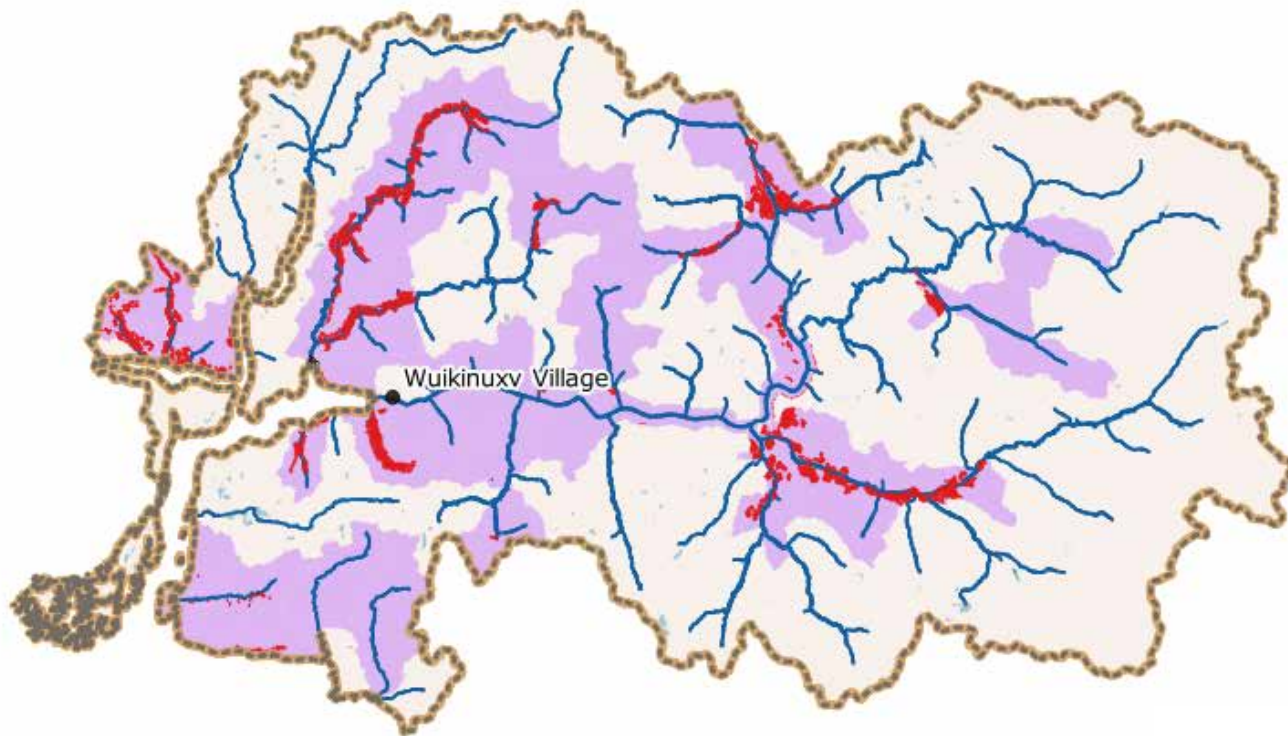
9. Impervious Surfaces





12. Wastewater Discharge

Habitat Assessments

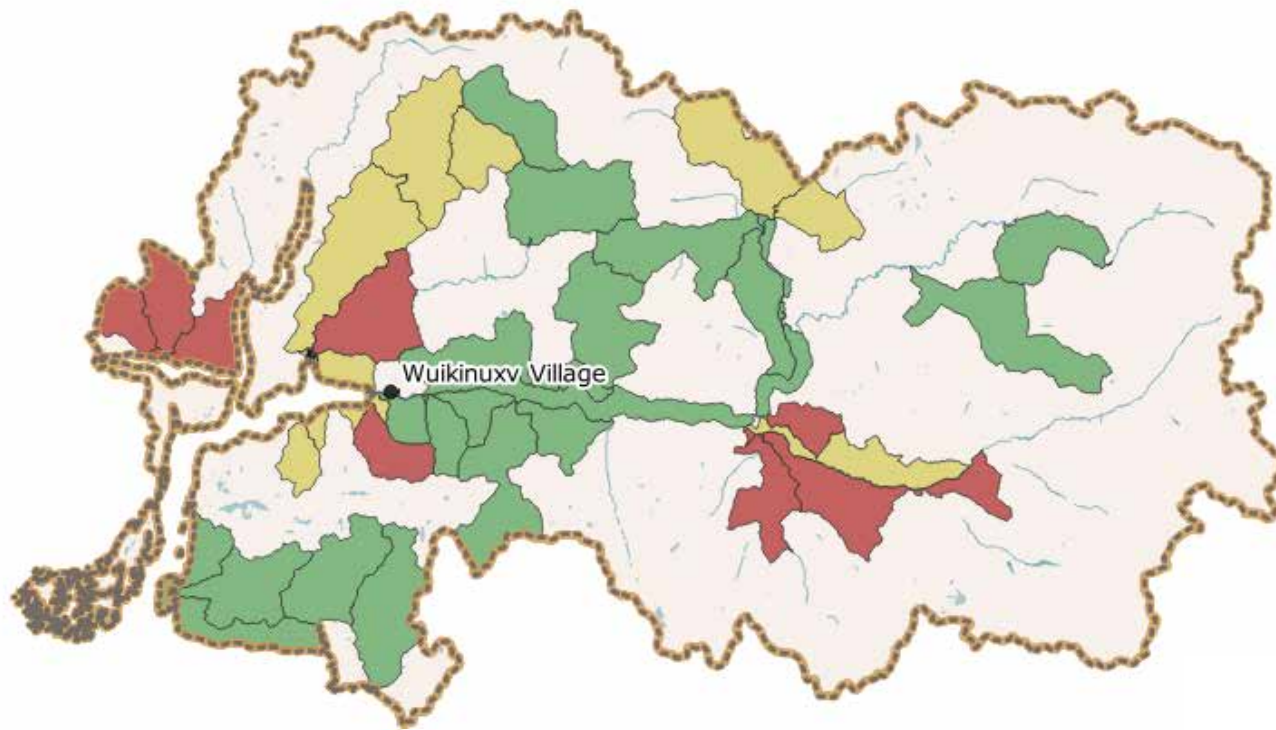
Forest disturbance: % of total watershed that has been clearcut, selectively logged, or recently burned






-  Forest Disturbance
-  Spawning Zone of Influence

Habitat Assessments

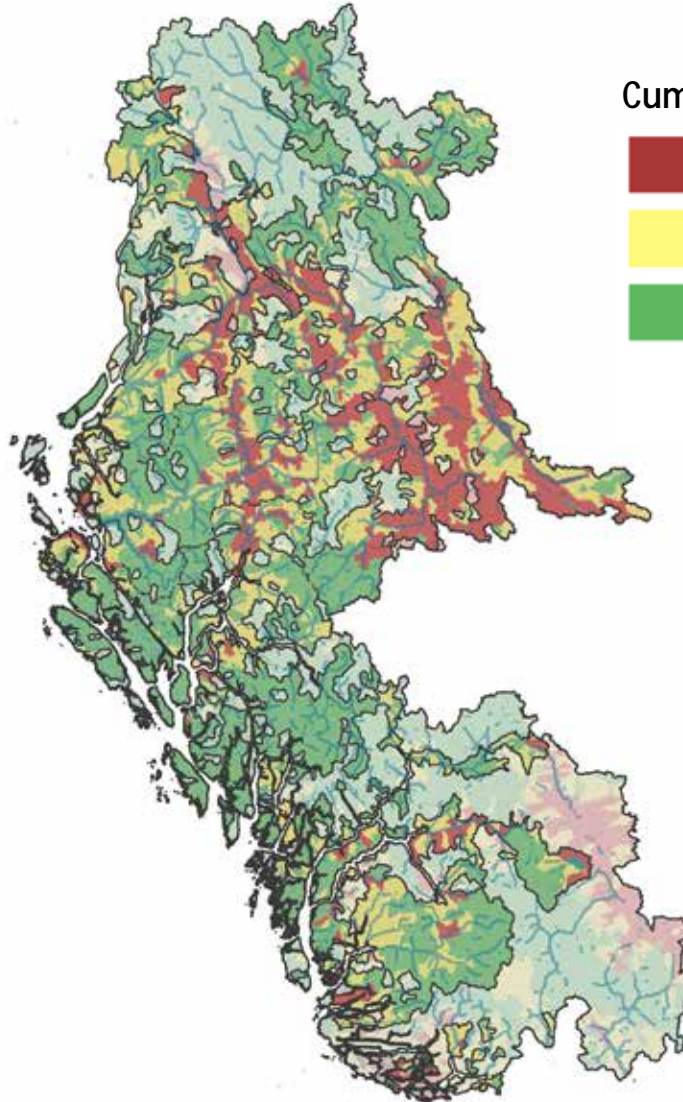
Forest disturbance: % of total watershed that has been clearcut, selectively logged, or recently burned



Forest Disturbance

-  High Risk ($\geq 10\%$)
-  Moderate Risk ($\geq 3\%$)
-  Low Risk ($< 3\%$)

Habitat Assessments

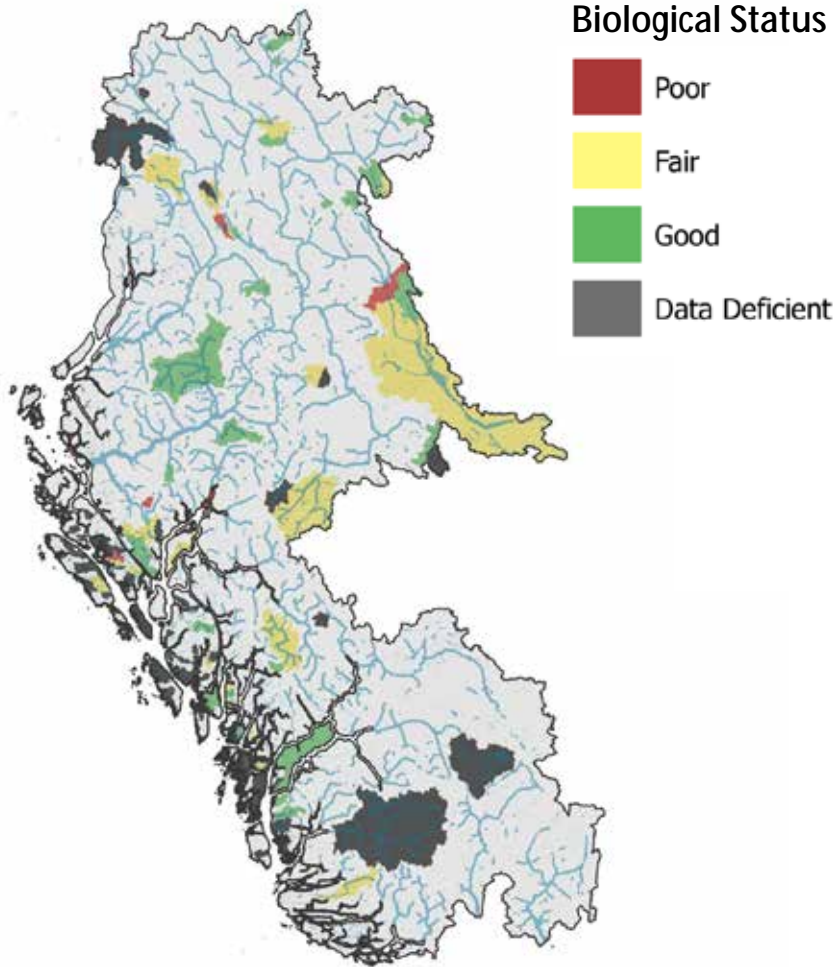


Cumulative Pressures

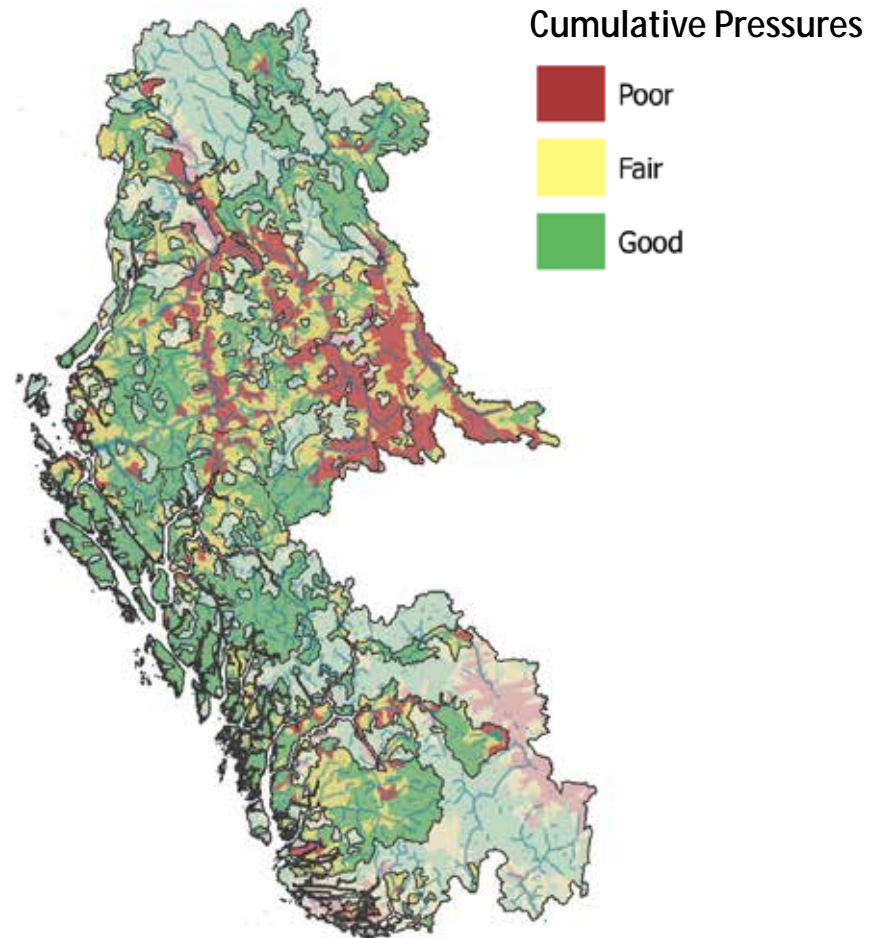


Population & Habitat Assessments

Population Assessments



Habitat Assessments



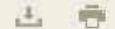
Pacific Salmon Explorer

Pacific Salmon Explorer

A data-driven look at salmon habitat & populations
A project by the Pacific Salmon Foundation's Salmon Watersheds Program



ALL REGIONS ▾ REGION | DATA NEEDS | KEY FINDINGS

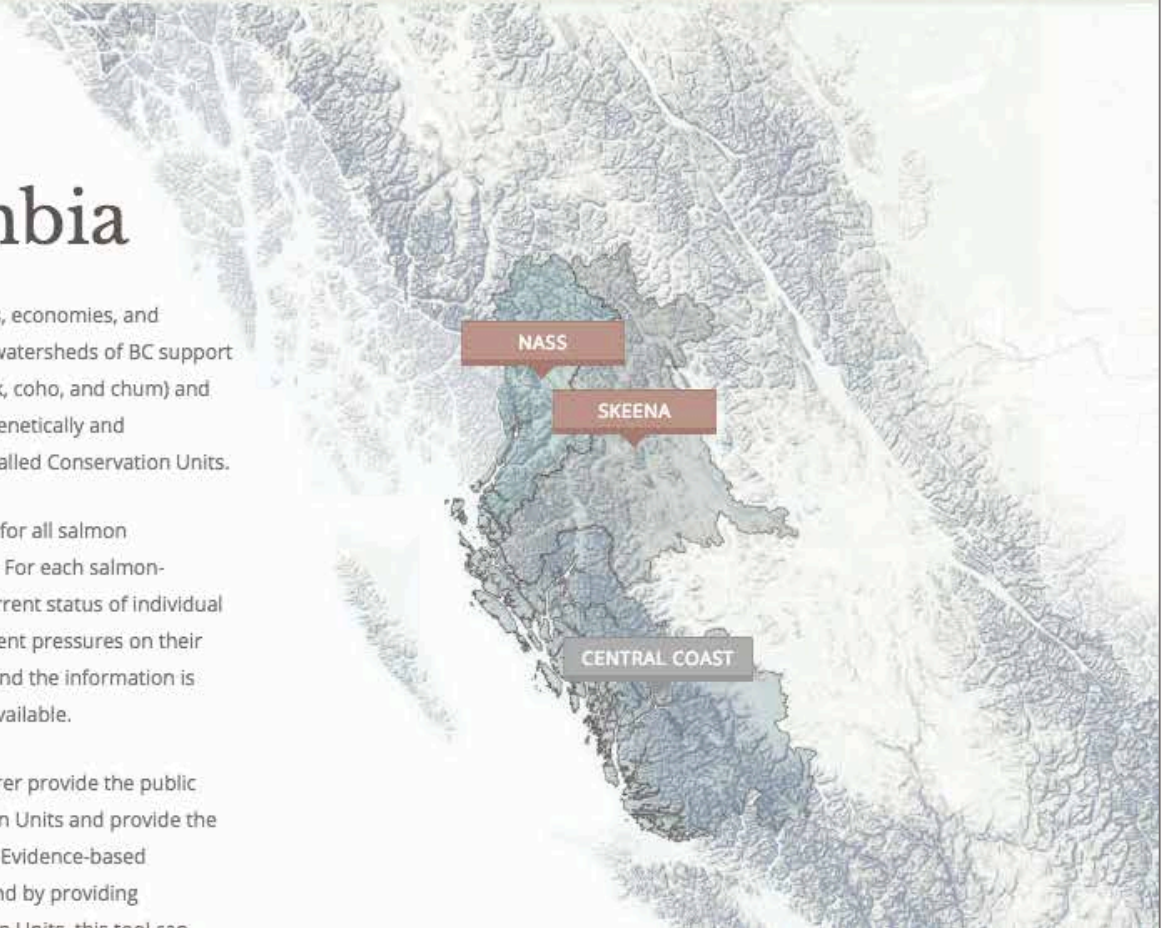


Salmon in British Columbia

Pacific salmon are integral to the coastal ecosystems, economies, and communities of British Columbia (BC), Canada. The watersheds of BC support five species of Pacific salmon (sockeye, pink, Chinook, coho, and chum) and provide spawning and rearing habitat for over 400 genetically and geographically distinct populations of wild salmon, called Conservation Units.

This tool summarizes the best available information for all salmon Conservation Units on BC's North and Central Coast. For each salmon-bearing watershed, we provide a snapshot of the current status of individual salmon Conservation Units and assessments of current pressures on their habitat. The Pacific Salmon Explorer is a living tool, and the information is updated on an ongoing basis as new data become available.

Open-access platforms like the Pacific Salmon Explorer provide the public with timely information on the status of Conservation Units and provide the basis for the monitoring and assessment of salmon. Evidence-based decision-making requires timely and reliable data, and by providing standardized information for all salmon Conservation Units, this tool...

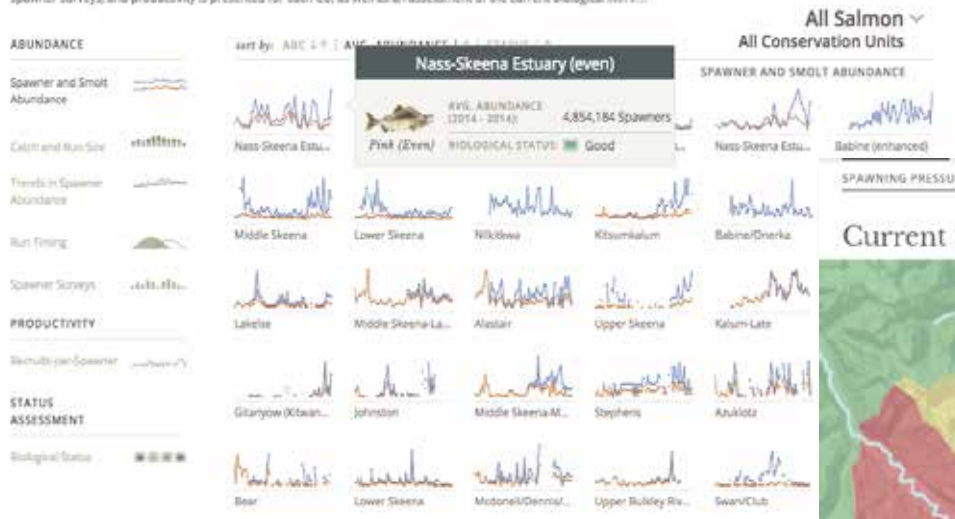


salmonexplorer.ca

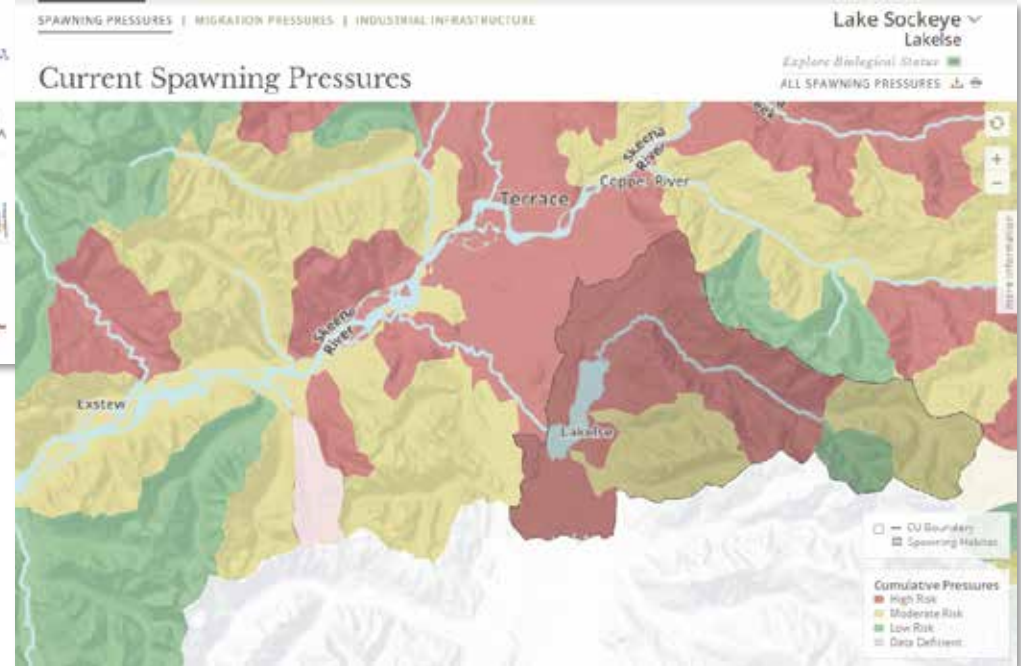
Pacific Salmon Explorer

Salmon Population Status & Assessment

Biological data for all 55 Skeena salmon Conservation Units (CU) is presented for a 60+ year period from ~1950-2014. Information on the number of fish that spawn, changes in spawner abundance over time, fisheries harvest, run timing, spawner surveys, and productivity is presented for each CU, as well as an assessment of the current biological status...



Provides free public access to salmon-related datasets



Pacific Salmon Explorer

Conservation Unit Snapshot: Skeena Watershed Sockeye: Babine (enhanced)



Spawning Phase

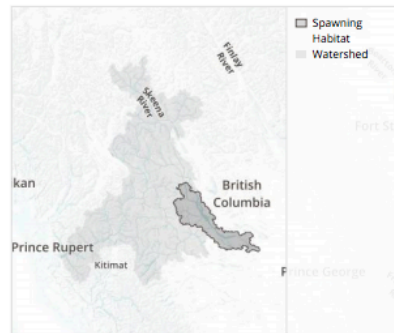


Marine Phase

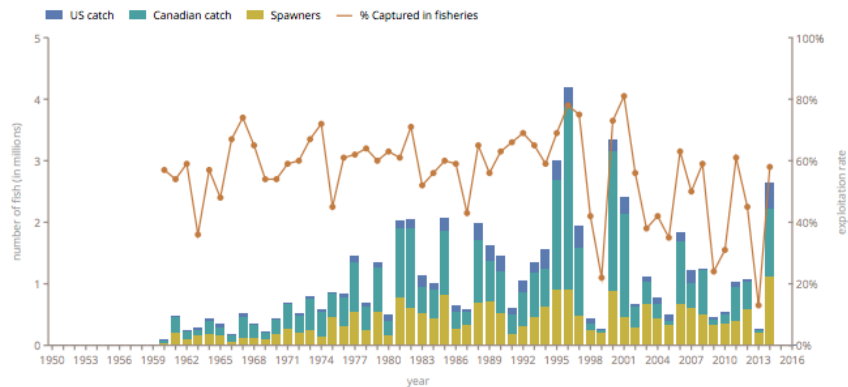
BIOLOGICAL STATUS: ■ Good

With 28 sockeye lake Conservation Units, the Skeena River is the second largest producer of sockeye salmon after the Fraser River. Sockeye weigh an average of 1.5-3.5 kg with most fish maturing at 4 years of age. Juvenile sockeye spend 1-2 years rearing in lakes, and another 2-3 years in the ocean before returning to their natal lakes to spawn. Babine Lake comprises 67% of the total sockeye rearing area and accounts for 75-95% of the total Skeena River sockeye production. Babine Lake was enhanced beginning in the late 1960s with the development of sockeye spawning channels at Pinkut and Fulton Creeks. Sockeye return to the Skeena River from late-June through late August where commercial purse seine, gill net, and troll fisheries primarily target the 'enhanced' Babine sockeye population.

LOCATION



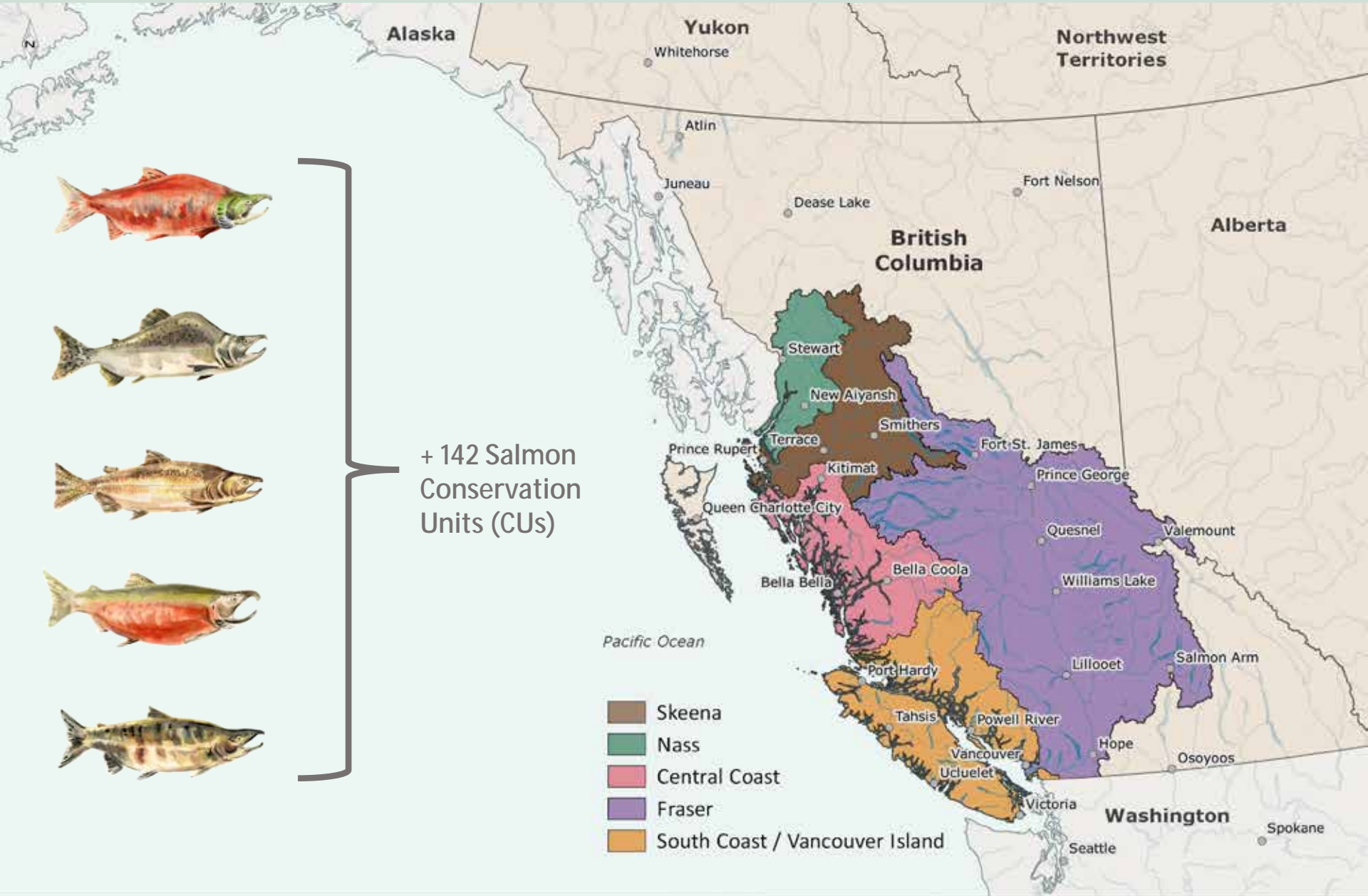
Catch and Run Size



Estimates of the number of salmon captured in US and Canadian fisheries, the corresponding exploitation rate (percent of total run caught in fisheries), and the estimated number of spawners in a given year.

Print summary reports describing the status of each Conservation Unit and key habitat and population information.

Scaling up to the Salish Sea



Take Home Messages

- 1) It's important to know what we don't know
- 2) Evidence-based decision-making requires access to best available information
- 3) Access to timely and relevant information can empower local communities



Acknowledgements



Illustrations
Aimée van Drimmelen

GORDON AND BETTY
MOORE
FOUNDATION



Fisheries and Oceans
Canada

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Canada

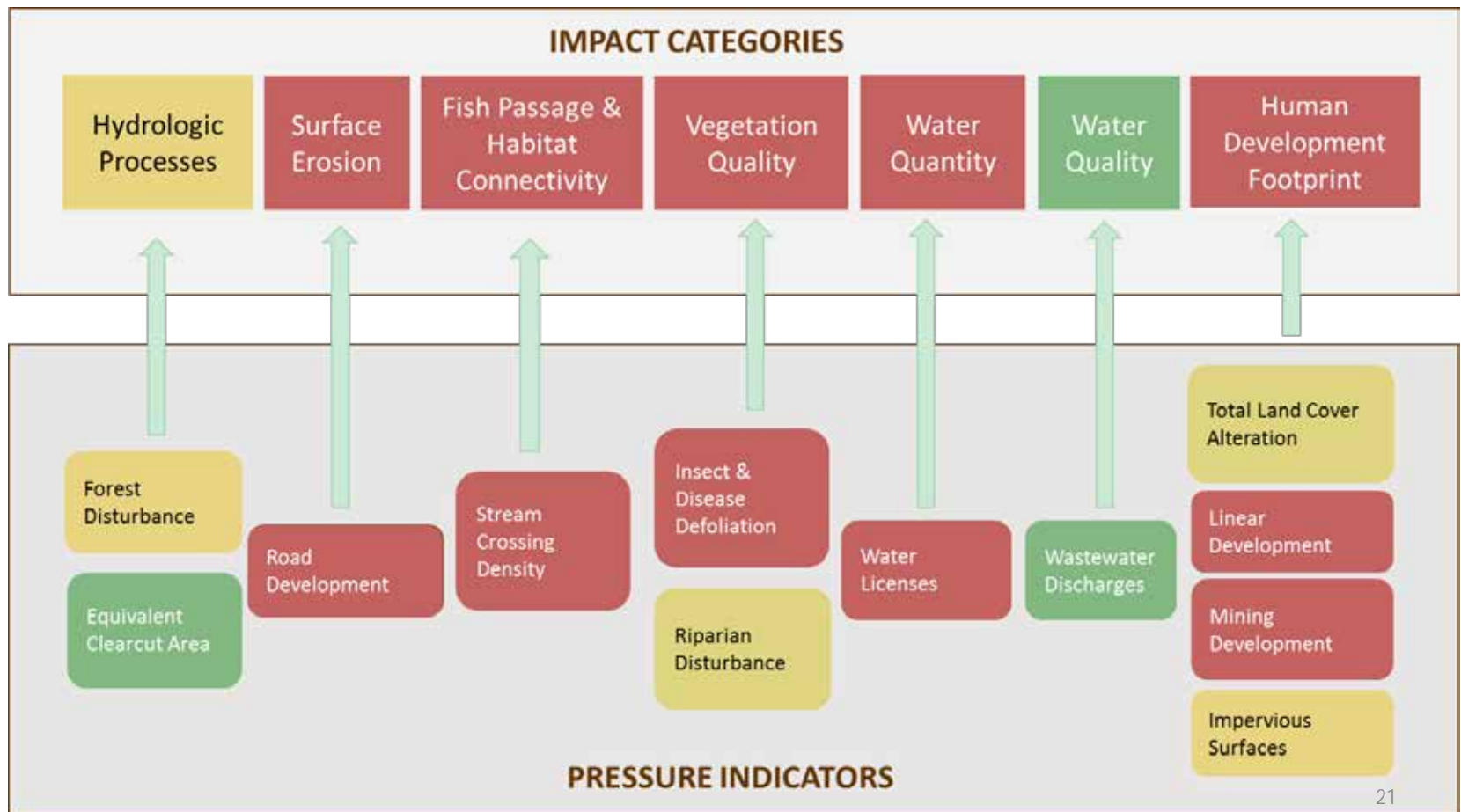


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Cumulative Pressures

Two-Level Roll-Up Rule Set (for individual FWA assessment watersheds)

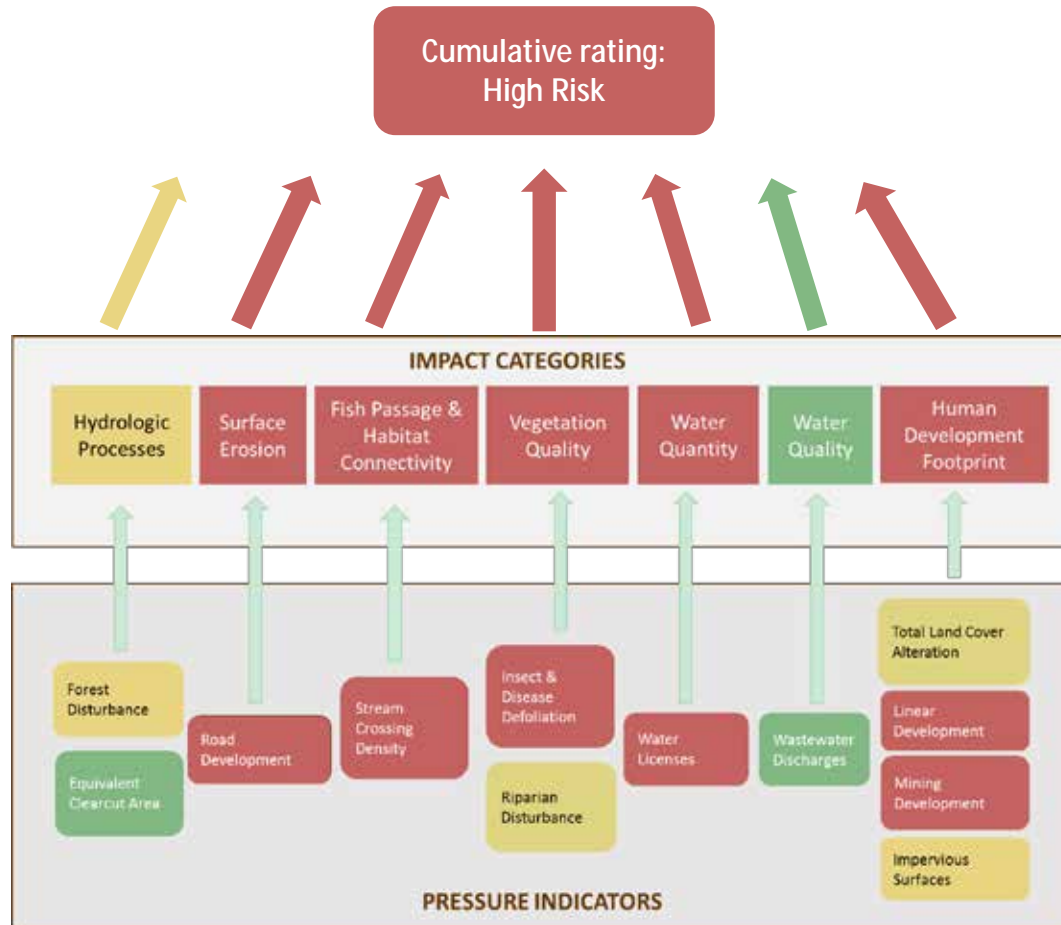
- Level 1: Indicators à Impact Categories



Cumulative Pressures

Two-Level Roll-Up Rule Set (for individual FWA assessment watersheds)

- Level 1: Indicators à Impact Categories
- Level 2: Impact Categories à Final cumulative pressure rating



Biological + Habitat Status

Sockeye

Focus on CUs at
 ... of habitat
 ...
 ... biological

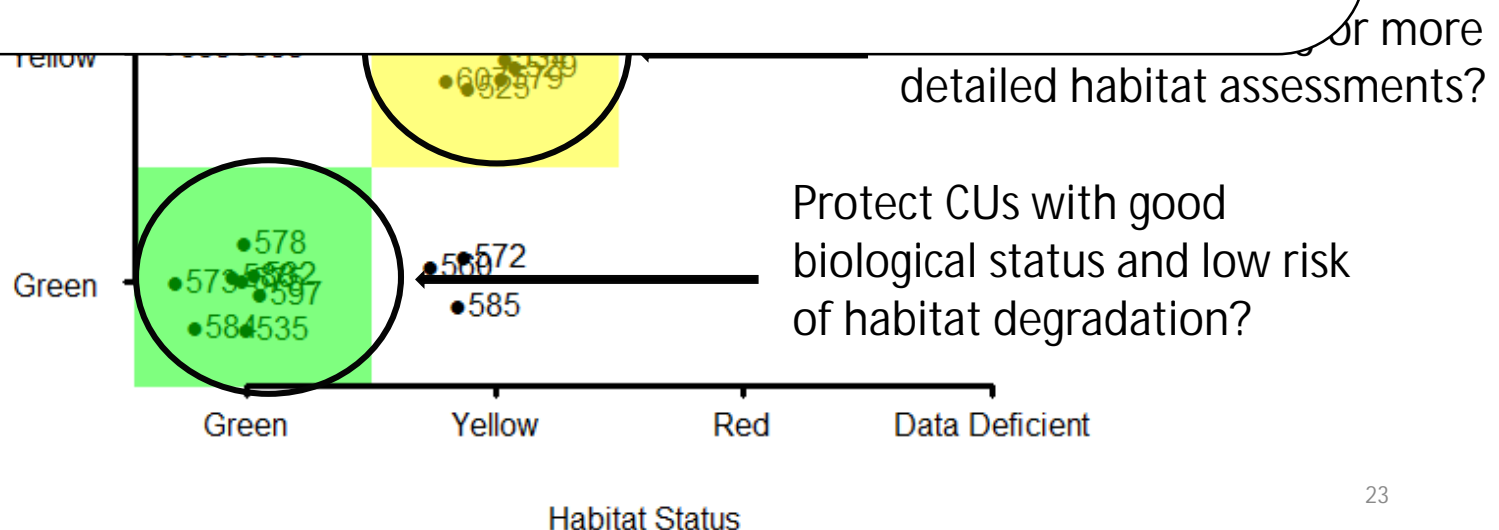
Actions informed by your objectives...

Objective A: maintain biological diversity?

Objective B: maintain abundance of CUs targeted by fisheries?

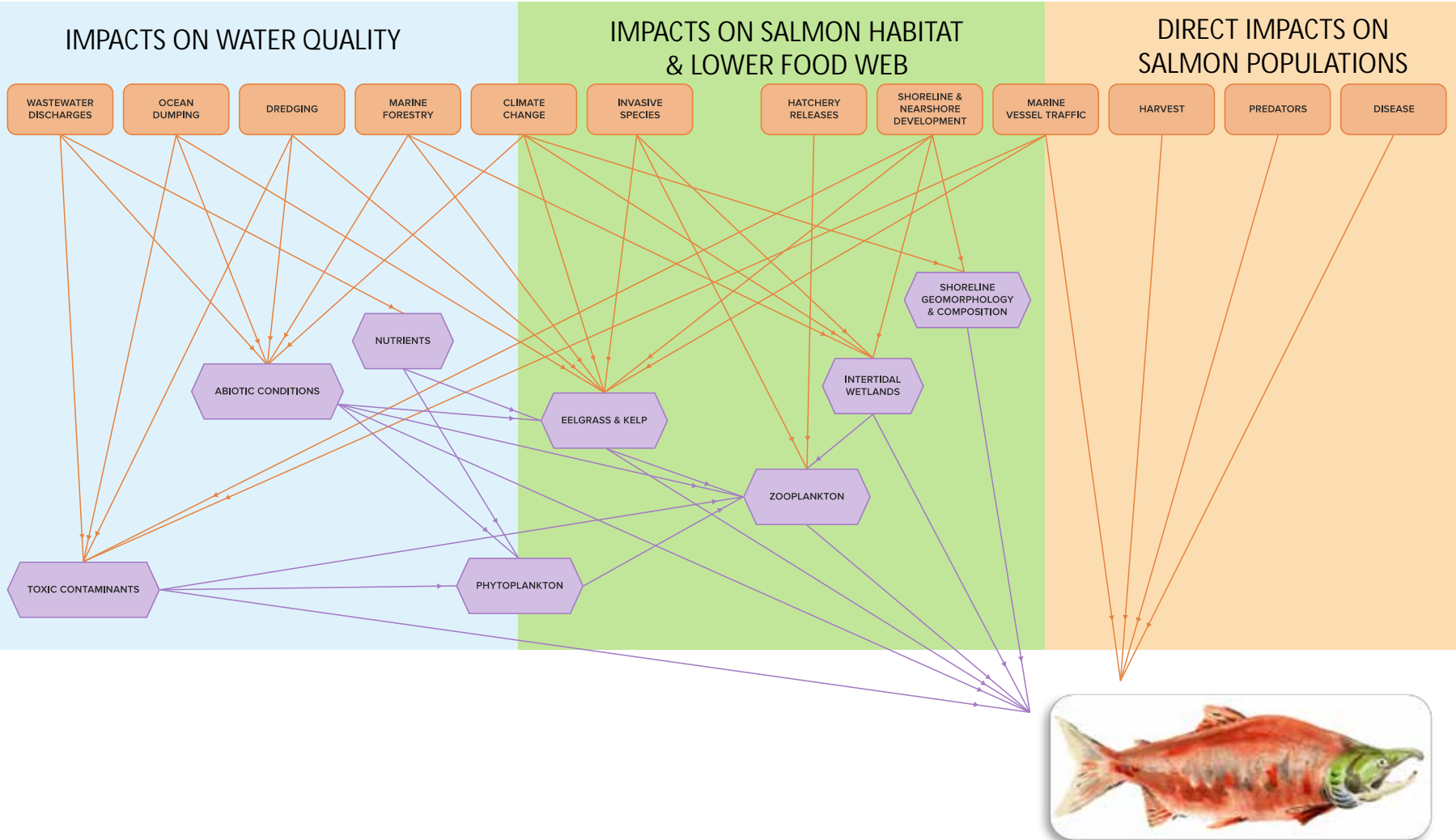
Objective C: maintain abundance of culturally important CUs?

Objective D: focus on recovery of high-risk CUs (red-red)?



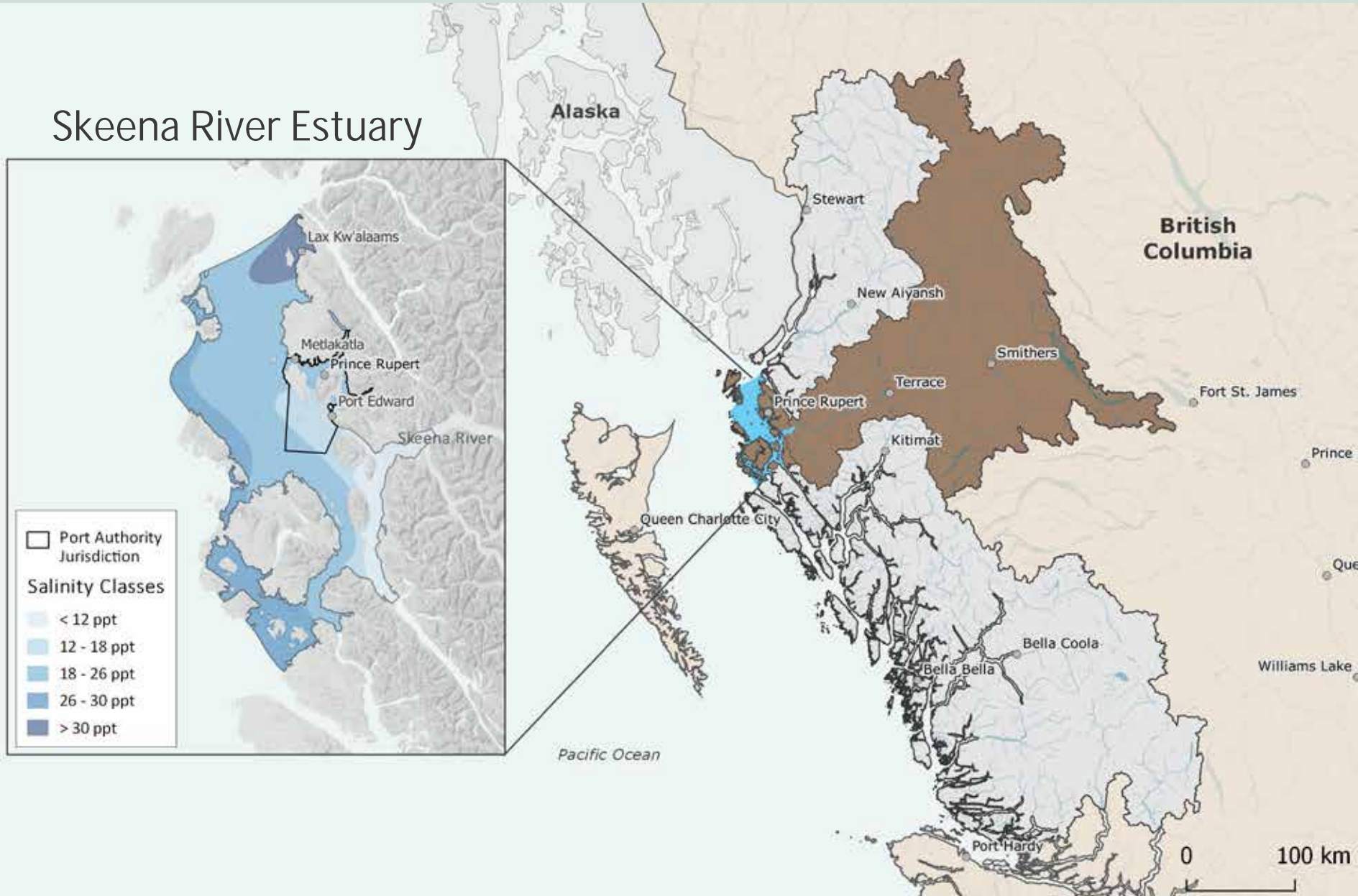
Conceptual Model

■ PRESSURE ■ ECOSYSTEM COMPONENT

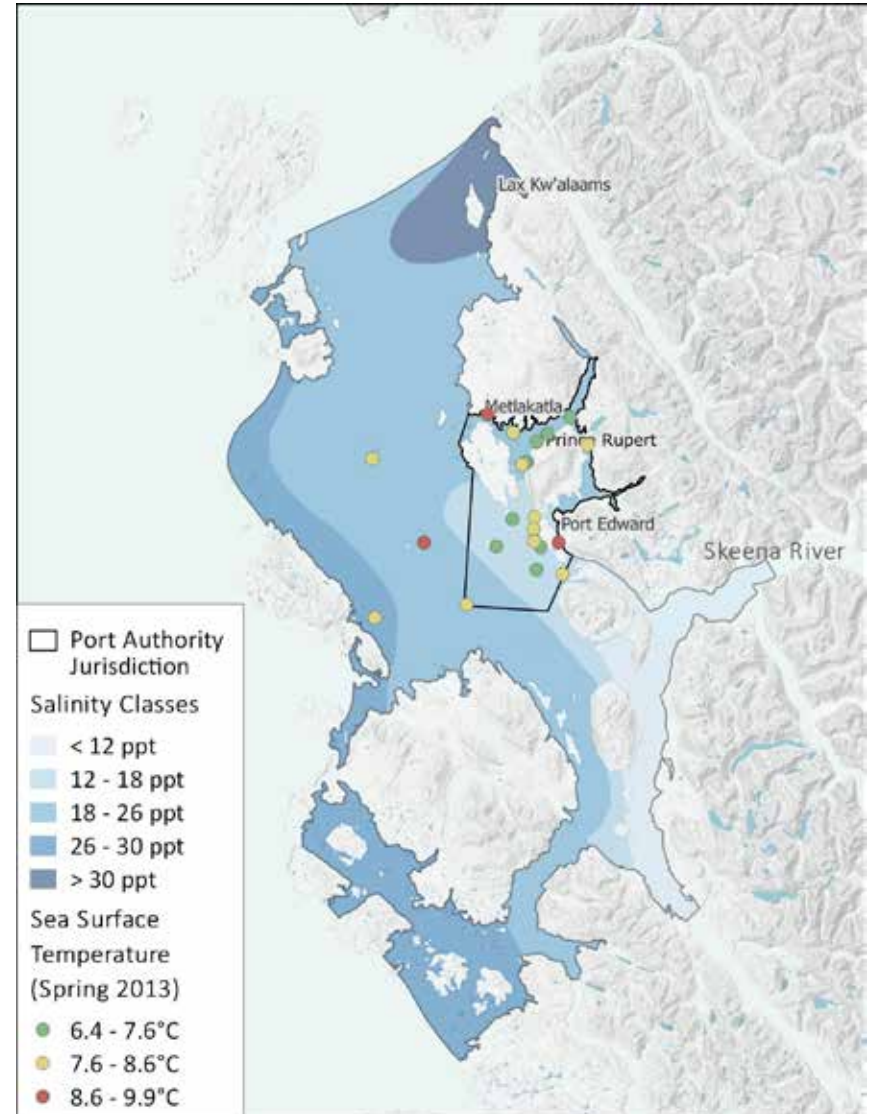
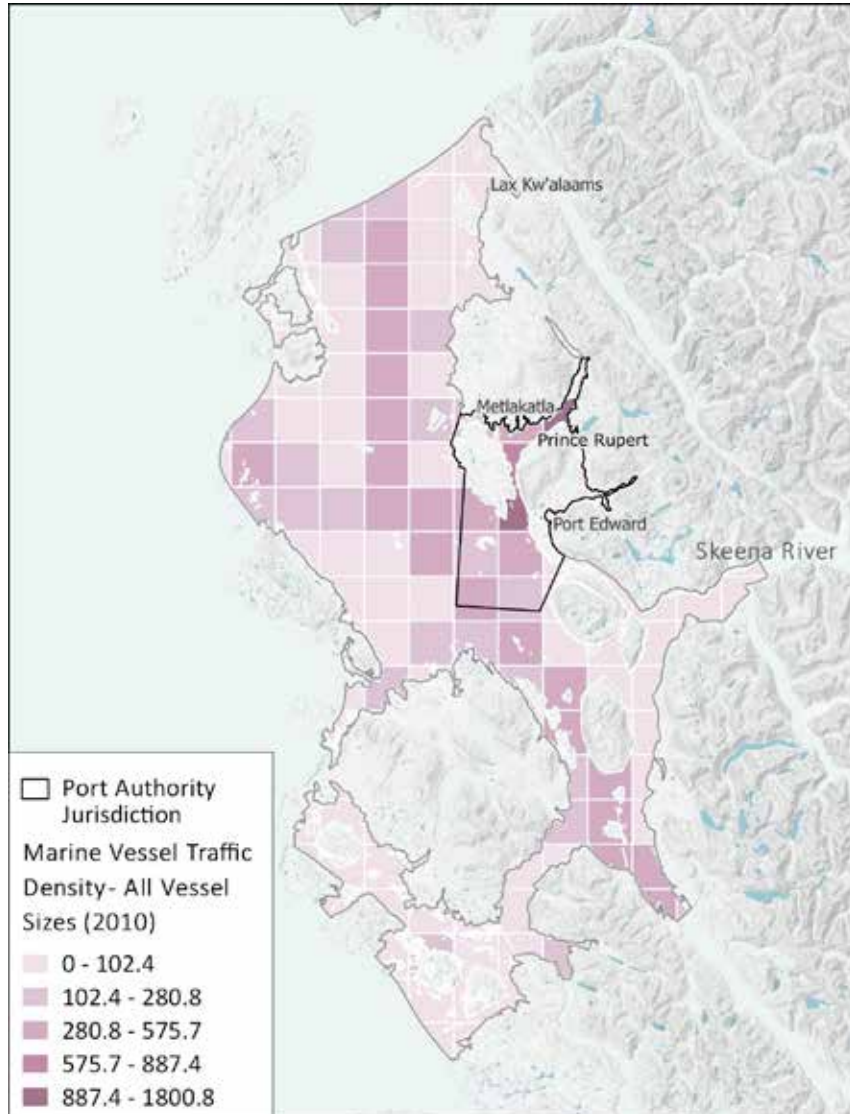


Skeena Estuary Assessment

Skeena River Estuary

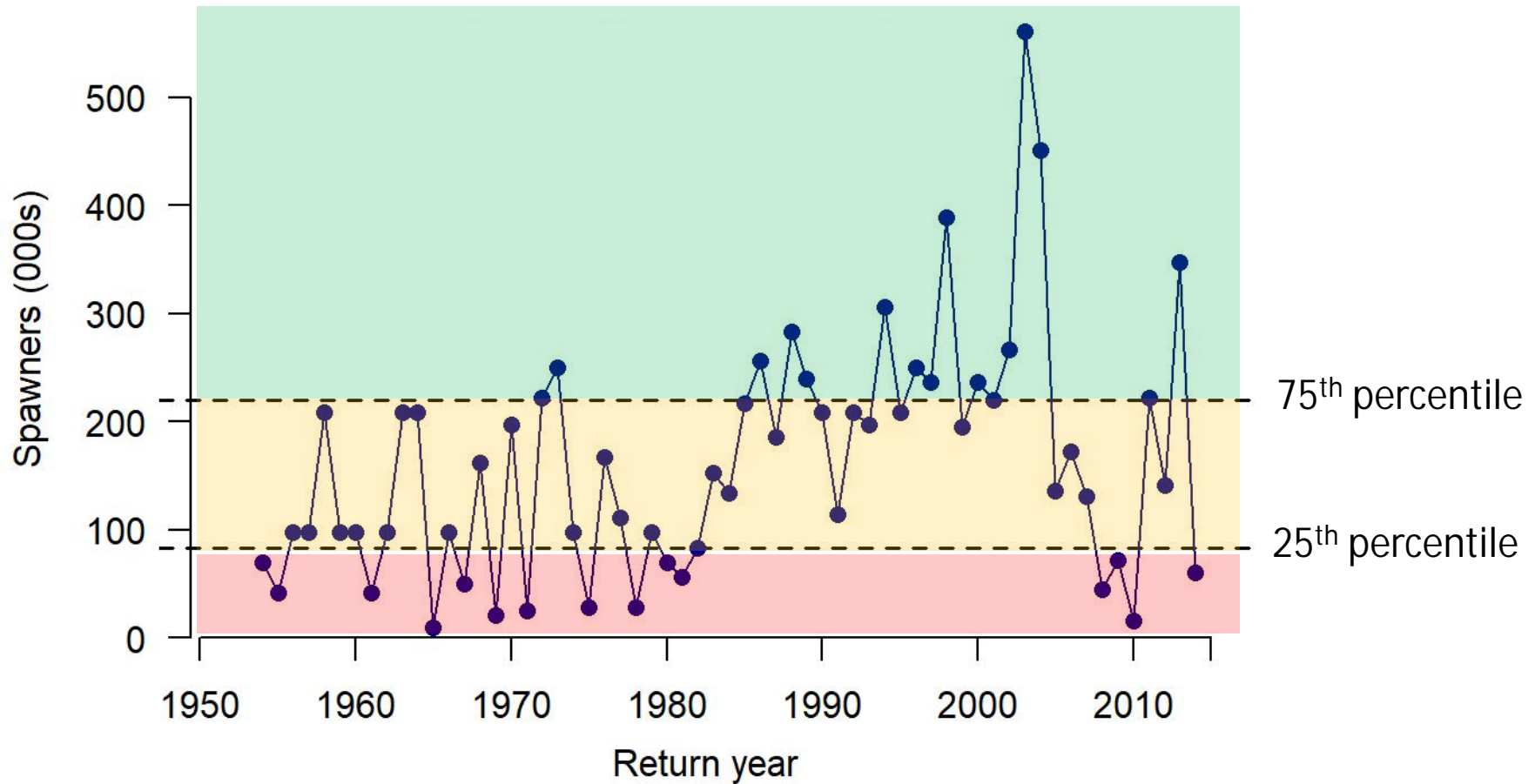


Skeena Estuary Assessment



Population Assessments

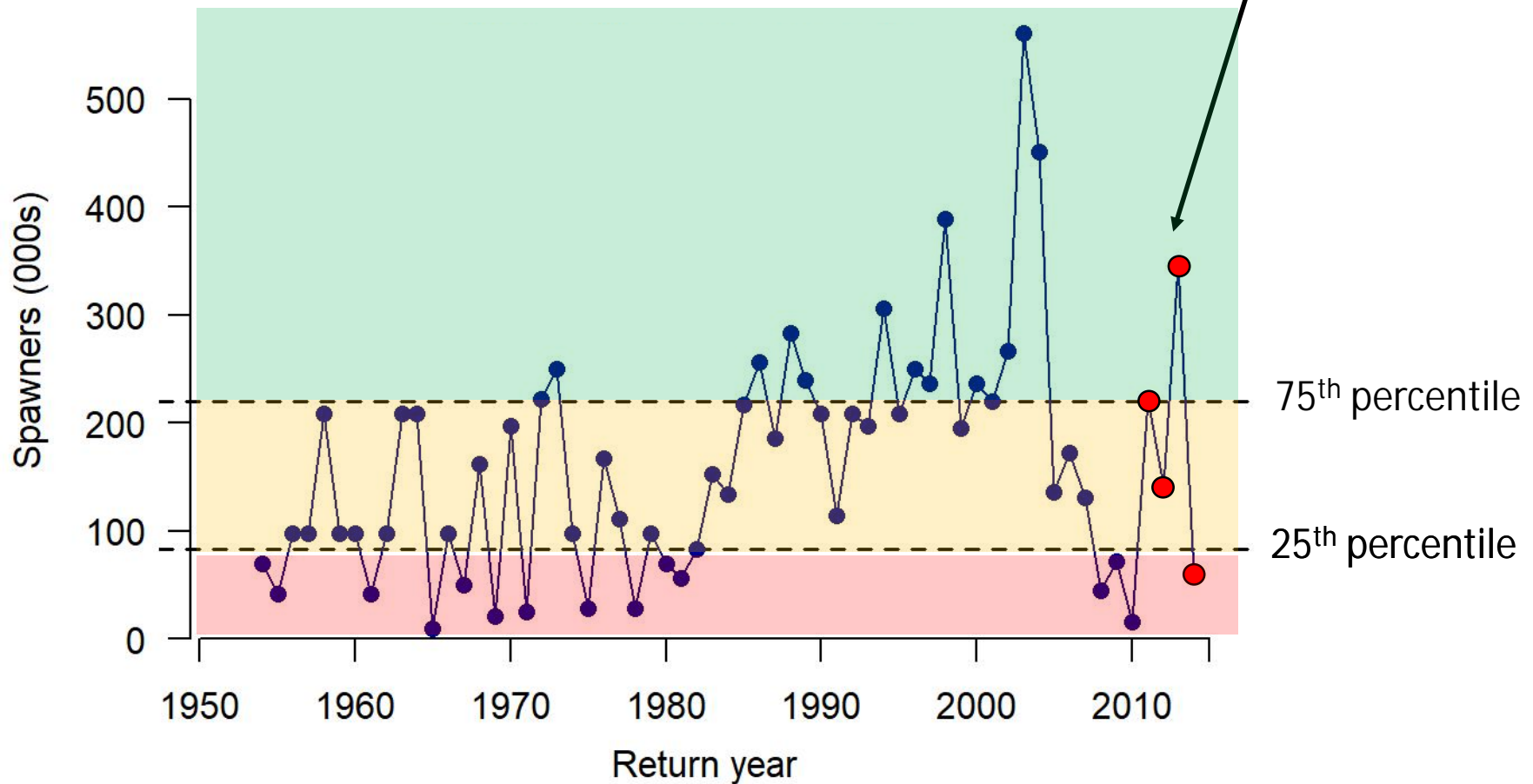
Historic Spawners



Population Assessments

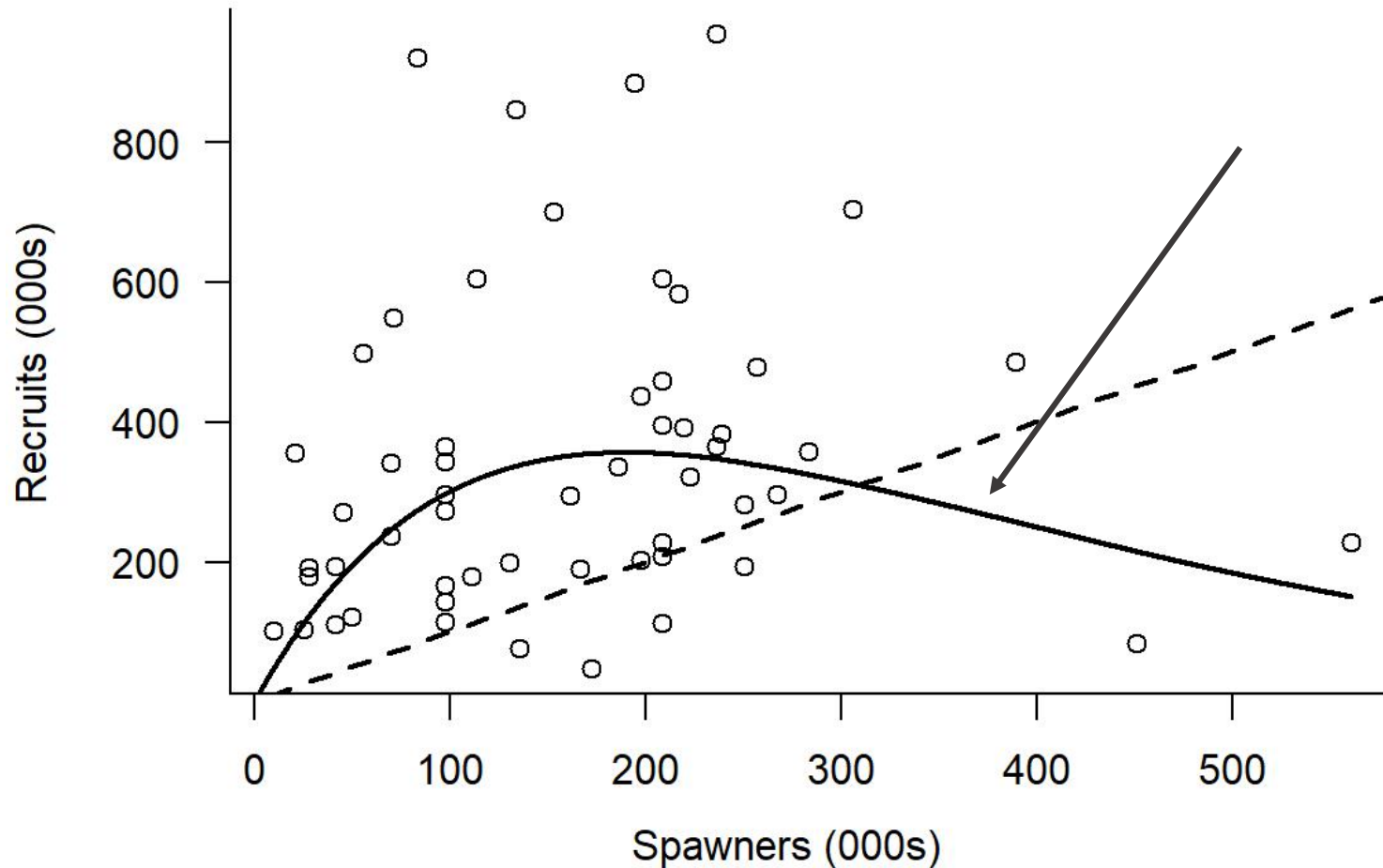
Historic Spawners

Average spawner abundance over most recent generation



Population Assessments

Stock Recruitment

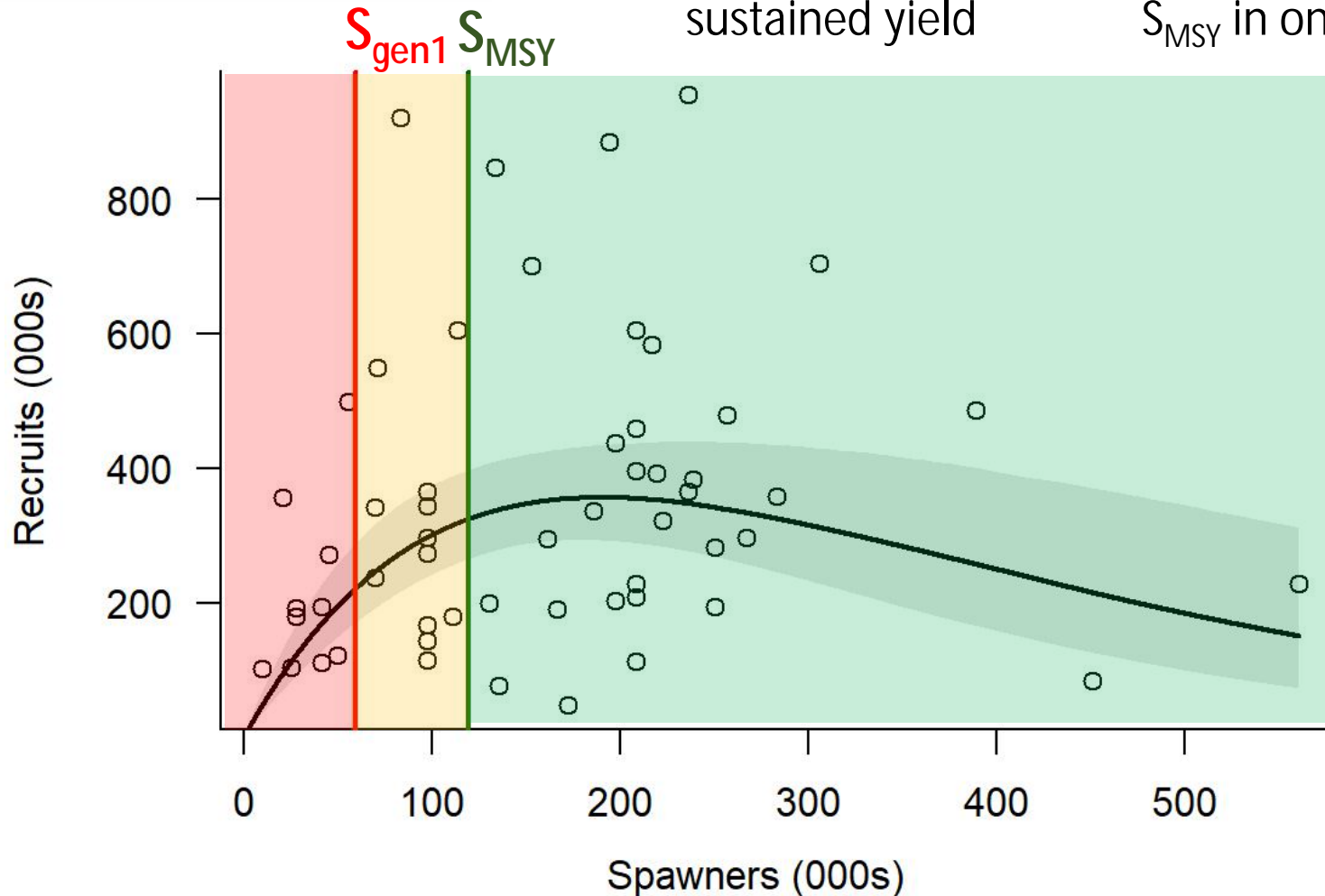


Population Assessments

Stock Recruitment

S_{MSY} – spawner abundance predicted to produce maximum sustained yield

S_{gen1} – spawner abundance that will result in recovery to S_{MSY} in one generation



Population Assessments

Stock Recruitment

Average spawner abundance over most recent generation

