Executive Summary

Fish have significant food, social, and ceremonial value for many First Nations. Fish populations and fish habitat are influenced by human activities, natural disturbances, natural landscape features, and climate. Fish, and specifically pacific salmon (*Oncorhynchus* spp.), are an important source of food for many Nations, have high value for recreational and commercial fisheries, and are an important food source for grizzly bears. Salmon stocks, and particularly sockeye, have seen significant declines over recent decades which has led many Nations to implement voluntary moratoriums on harvest of sockeye. Sockeye hold significant cultural value for many Skeena Sustainability Assessment Forum (SSAF) Nations, so not being able to harvest sockeye has direct and negative impacts on the ability of Nations to practice culture, and to share oral histories which may be communicated alongside certain activities. This SSAF State of the Value Report for Fish and Fish Habitat provides an overview of the current condition of fish and fish habitat in the SSAF study area and describes some of the key drivers behind these results. Salmon stocks in the SSAF study area have been affected by habitat alterations and Nations have seen significant declines in sockeye salmon populations.

This framework includes pressures, watershed sensitivity, and watershed importance indicators, and are displayed as follows:

- Potential **pressures** that may impact fish and fish habitat reflect anthropogenic and natural disturbances that may change the functioning of a river system, and therefore the habitat for fish. This includes four measures of road density, equivalent clearcut area, young second growth forest (<80 years), riparian disturbance, total land disturbance, dams and impoundments, water licenses, groundwater wells, water allocation restrictions, mines, and point source pollution.
- **Watershed sensitivity** indicators are natural features that influence water flow in an assessment unit (AU), and include low flow sensitivity, drainage density ruggedness, and lakes, wetlands, and man-made waterbodies.
- **Watershed importance** indicators refer to specific characteristics of an AU that are important for salmonid species, and include modeled salmonid habitat extent, observed salmon spawning extent, and salmon escapement. It is important to note that observed salmon habitat does not attempt to quantify historic spawning habitat; the STC recognizes that past industrial activity has likely resulted in current levels that are lower than historic levels.

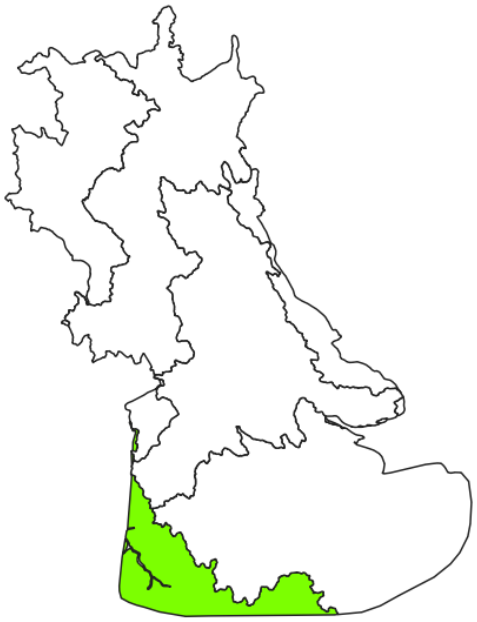
This state of the value report is informed by 20 indicators, and a selection of these indicators has been chosen for presentation here. Results of this study are displayed as a dashboard for 5 major watersheds (Coastal, Nass, Nechako/Fraser, Skeena East, and Skeena West); data are presented as box plots (large vertical line represents the median, whiskers represent the $5^{th}$and 95^{th} percentiles, and dots as outliers). Pressure and watershed sensitivity indicators are displayed across low, medium and high concern rankings. The precautionary principle has been used to identify thresholds that are supported by current knowledge for the values of road density, equivalent clearcut area, and riparian disturbance. The indicators of young second growth forest, point source pollution, total land disturbance, and drainage density ruggedness do not have identified benchmarks, breakpoints were identified to provide a relative ranking within the SSAF area to enable communication of the results.

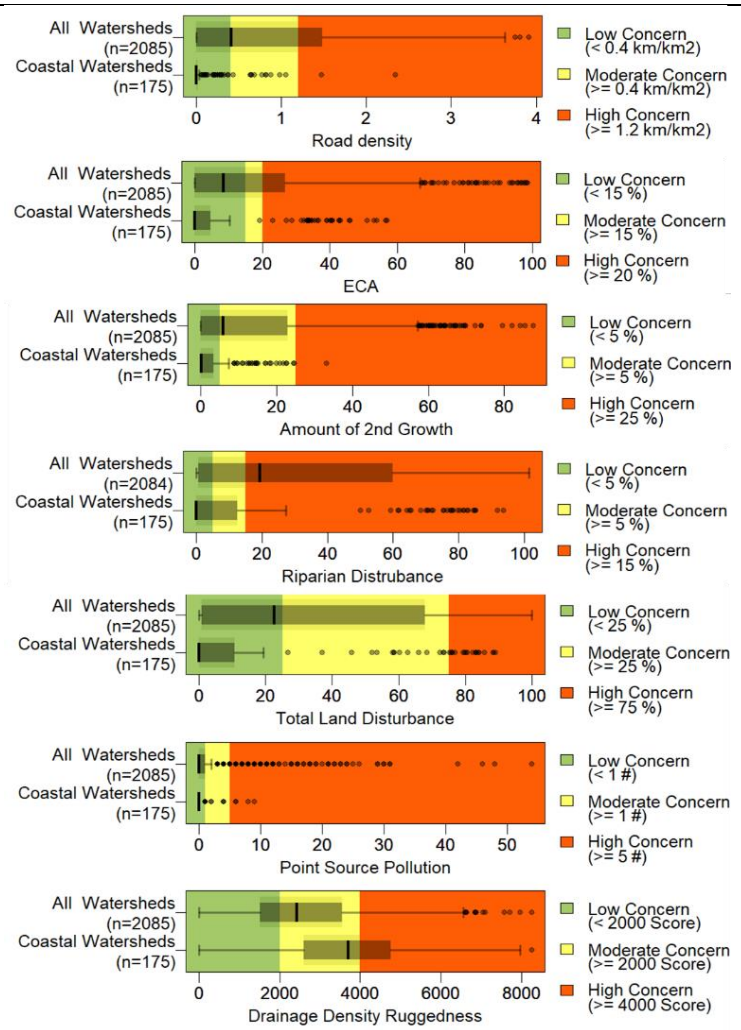
This information is a coarse filter approach at the landscape level, referred to as a Tier 1 approach, that is based on our current knowledge of readily available data (current to 2018) that spans the entire SSAF study area. This report is a single point in time; significant work is being made on updating datasets which will contribute to future versions of this report. This report is one piece of a broader cumulative effects program which is an iterative and multi-scaled approach to cumulative effects assessment in the SSAF area. Complimentary initiatives will enhance our understanding of the state of fish and fish habitat by collecting and analyzing information from direct analysis and observations (Tier 1.5, 2, 3). Tier 1.5 work has not yet started for fish and fish habitat, but will involve watershed monitoring through remote sensing, accompanied by more detailed hydrological characteristics. Tier 2 work involves water and benthic invertebrate sampling from specific streams inside watersheds which have been selected for sampling based on Nation specific metrics (e.g. a Nation may sample a certain stream that has cultural or community importance) and a subset of the Tier 1 assessment data. Tier 3 involves more intensive studies to answer specific management questions or specific research questions, and these learnings will become incorporated into the Tier 1 and 2 assessments over time.

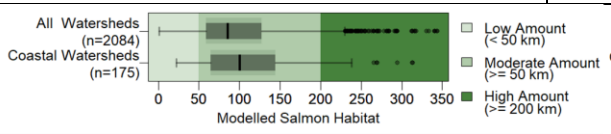
Although this report will not lead to decision making on its own, it can serve as a source of information that can be used to support decision making. Information provided within the report, and the associated database that was developed through the process, can be reframed to support decision makers - contingent on the specified management needs. Sections eight and nine of this document outline future research and monitoring work that can contribute to future analyses and iterations of this report.

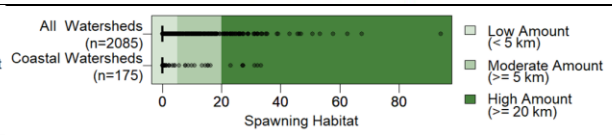
Coastal Unit Summary

The Coastal Unit accounts for the smallest portion of the SSAF Study Area and contains 8.4% of all assessment units (AUs). AUs in the Coastal Unit have relatively less intense pressures and lower watershed sensitivity when compared to the rest of the study area. The watershed pressures of road density, equivalent clearcut area, young second growth forest, riparian disturbance, total land disturbance, and point source pollution all rank as low concern for the Coastal Unit. The Coastal Unit has a higher than average drainage density ruggedness, which can be explained by the steeper topography of the coastal mountains when compared to the inland areas of the SSAF. Drainage density ruggedness is a metric intended to identify how quickly hillslope and stream runoff could be transported downslope or downstream through a watershed, thereby reflecting the potential for flash-floods events. The Coastal Unit has a moderate amount of modelled salmon habitat and low amount of observed spawning habitat, which is comparable to the broader SSAF area. Although the indicators of young second growth forest, point source pollution, total land disturbance, and drainage density ruggedness do not have identified benchmarks, breakpoints were identified to provide a relative ranking within the SSAF area to enable communication of the results.



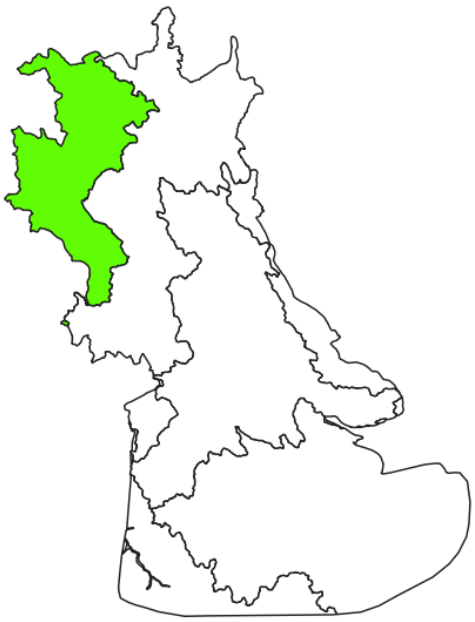


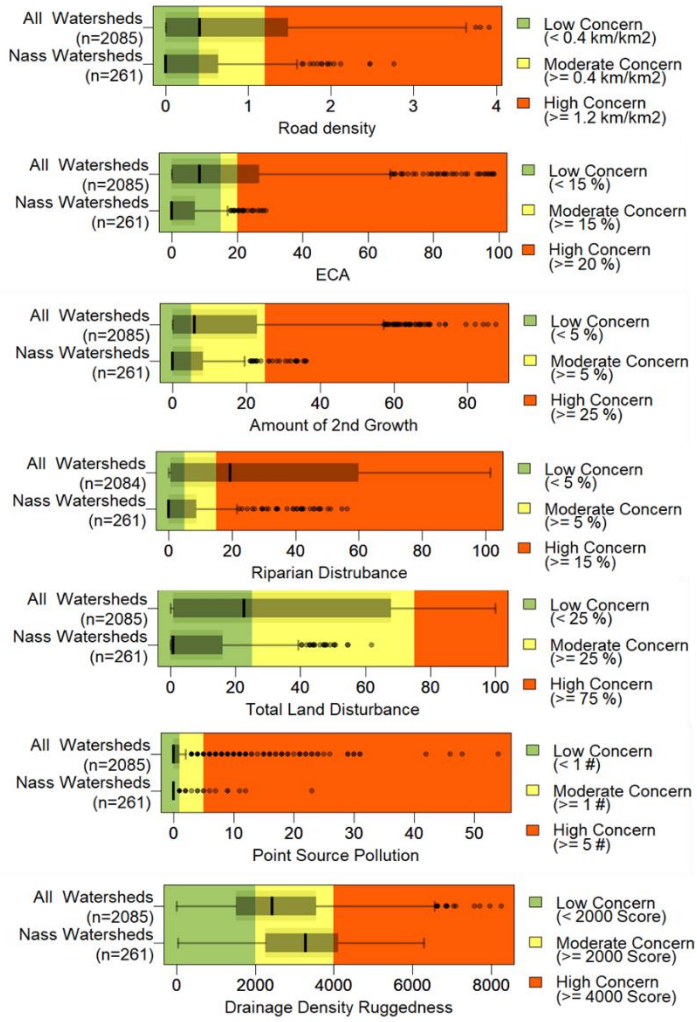


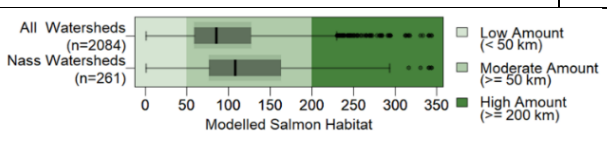


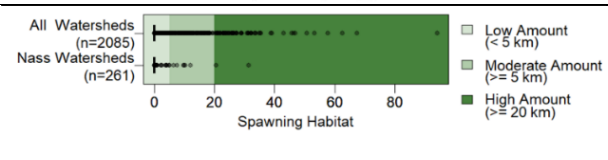
Nass Unit Summary

The Nass Unit accounts for 12.5% of the SSAF Study Area. AUs in the Nass Unit, when compared to the entire area, have relatively less intense pressure and sensitivity indicators. The watershed pressures of road density, equivalent clearcut area, young second growth forest, riparian disturbance, total land disturbance, and point source pollution all rank as low concern for the Nass Unit. The Nass Unit has a higher than average drainage density ruggedness, which can be explained by the steeper topography of the coastal mountains when compared to the inland areas of the SSAF. Drainage density ruggedness is a metric intended to identify how quickly hillslope and stream runoff could be transported downslope or downstream through a watershed, thereby reflecting the potential for flash-floods events. Modelled salmon habitat is moderate overall and is slightly higher when compared to the entire SSAF area. Observed spawning habitat ranks as low yet is comparable to the broader SSAF area. Although the indicators of young second growth forest, point source pollution, total land disturbance, and drainage density ruggedness do not have identified benchmarks, breakpoints were identified to provide a relative ranking within the SSAF area to enable communication of the results.



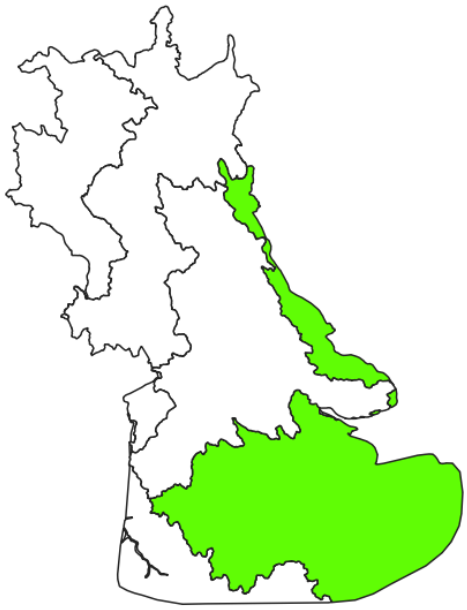


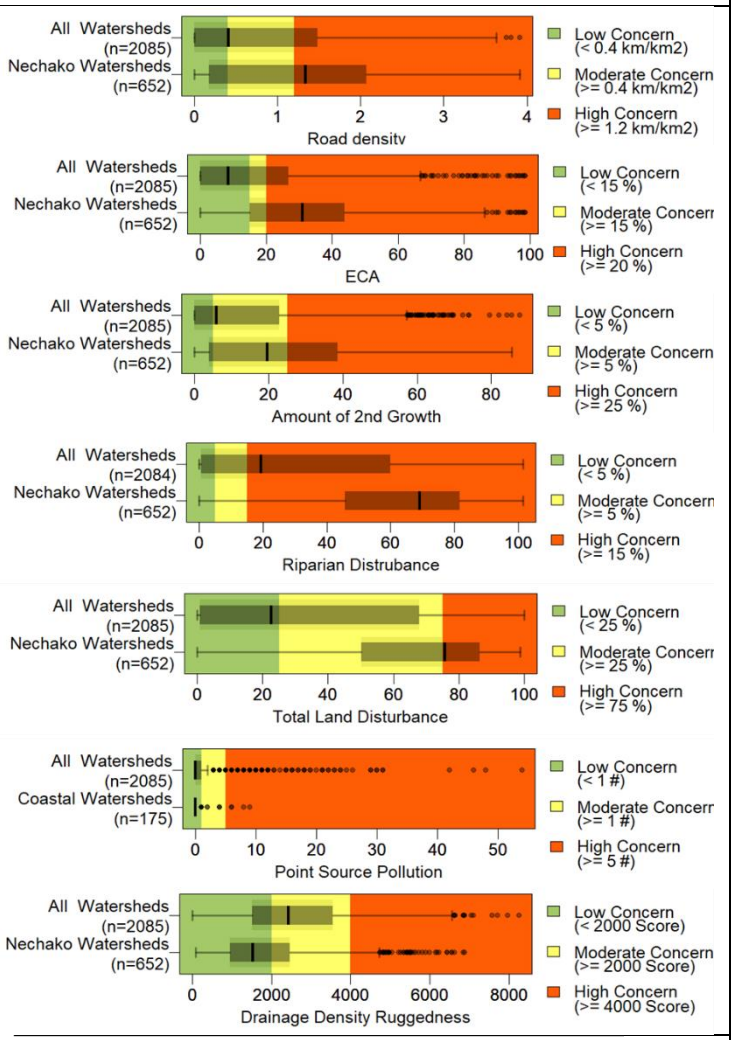


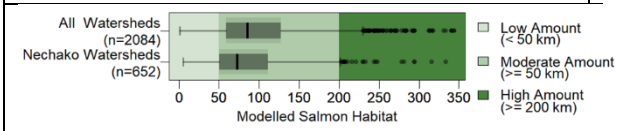


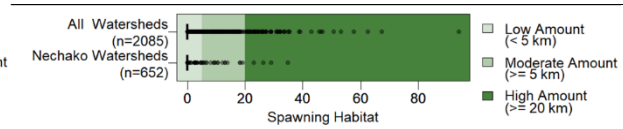
Nechacko/Fraser Unit Summary

The Nechako/Fraser Unit makes up the largest portion of the SSAF area at 31.3% of all AUs. AUs in the Nechako have relatively more pronounced pressures, with high concern rankings for road density, equivalent clearcut area, riparian disturbance, and total land disturbance. These higher risks are related to logging impacts as well as recent and historic fires have which have increased the total land disturbance. The amount of young second growth forest is of moderate concern for this Unit and represents a legacy of past logging in the area. Point source pollution ranks as low concern. Drainage density ruggedness is of low concern in this area and reflects a gentler topography when compared to the western parts of the SSAF. Modelled salmon habitat is moderate overall and is slightly lower when compared to the entire SSAF area. Observed spawning habitat ranks as low yet is comparable to the broader SSAF area. Although the indicators of young second growth forest, point source pollution, total land disturbance, and drainage density ruggedness do not have identified benchmarks, breakpoints were identified to provide a relative ranking within the SSAF area to enable communication of the results.



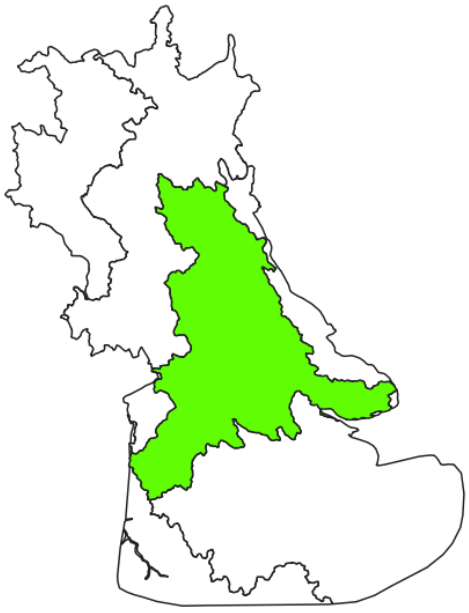


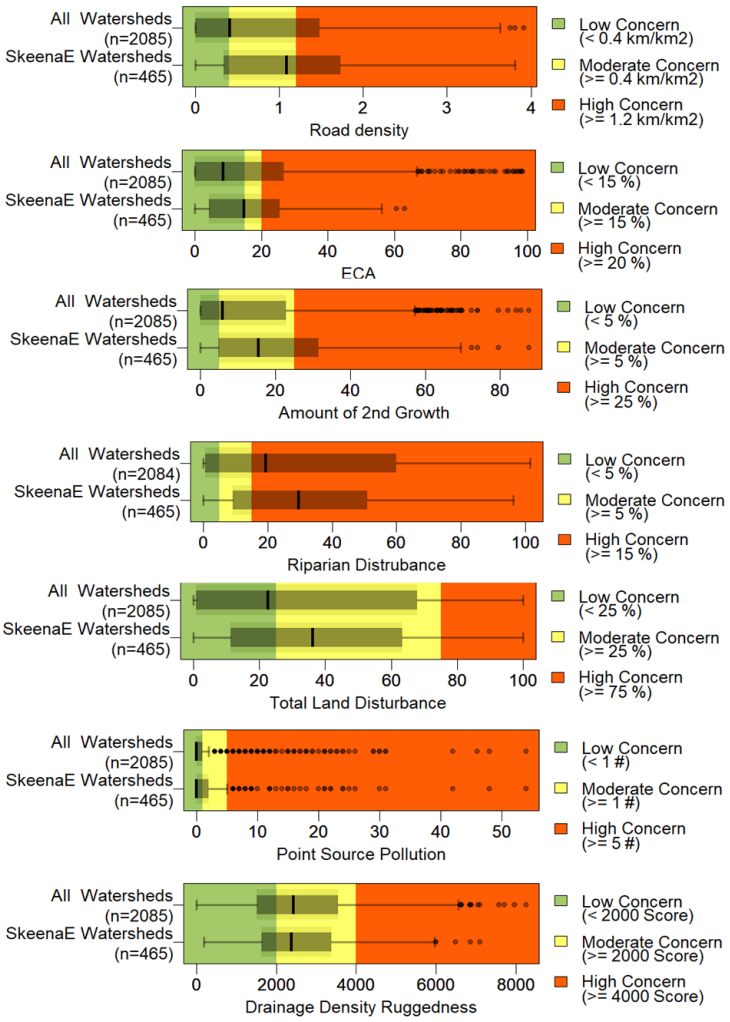


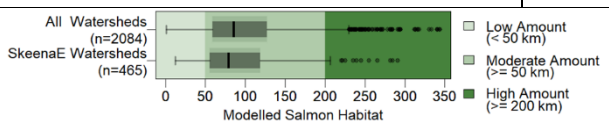


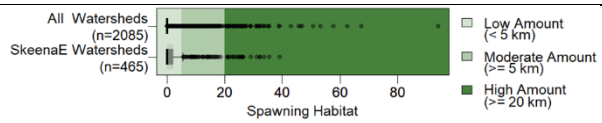
Skeena East Unit Summary

The Skeena East Unit accounts for 22.3% of the SSAF Study Area. AUs in the Skeena East Unit have relatively greater pressures when compared to the larger SSAF area. Riparian disturbance ranks as high concern, with the other pressure indicators of road density, equivalent clearcut area, amount of young second growth, and total land disturbance ranked as being of moderate concern. The moderate concern from the pressure indicators reflects past and current logging, particularly in the central and southern portions of this Unit. The Skeena East Unit has an overall relatively low concern for point source pollution, however there are a number of outlying data points that represent current and historic mines or other industrial sites, and these present a risk to the landbase. Drainage density ruggedness is of moderate concern and reflects the variable terrain seen across this Unit. Modelled salmon habitat is moderate overall and is comparable to the entire SSAF area. Current observed spawning habitat ranks as low yet is comparable to the broader SSAF area. Although the indicators of young second growth forest, point source pollution, total land disturbance, and drainage density ruggedness do not have identified benchmarks, breakpoints were identified to provide a relative ranking within the SSAF area to enable communication of the results.









Skeena West Unit Summary

The Skeena West Unit accounts for 23.4% of the SSAF Study Area. AUs in the Skeena West Unit, when compared to the entire area, have relatively less intense pressure and sensitivity indicators. The watershed pressures of road density, equivalent clearcut area, young second growth forest, riparian disturbance, total land disturbance, and point source pollution all rank as low concern for the Skeena West Unit. Drainage density ruggedness is of moderate concern and reflects the variable terrain seem across this Unit. Modelled salmon habitat is moderate overall and is slightly higher when compared to the entire SSAF area. Observed spawning habitat ranks as low yet is comparable to the broader SSAF area. Although the indicators of young second growth forest, point source pollution, total land disturbance, and drainage density ruggedness do not have identified benchmarks, breakpoints were identified to provide a relative ranking within the SSAF area to enable communication of the results.