Developing a BC Provincial Assessment of Coastal Cutthroat Trout Using a Cumulative Effects and Quantitative Risk Assessment Framework

Sierra Sullivan[12], John Hagen[2], Brendan Anderson[3], Sue Pollard[4], Ron Ptolemy[3], Jordan Rosenfeld[13]

1. UBC Institute for the Oceans and Fisheries, Vancouver BC, V6T 1Z4
2. John Hagen and Associates, Prince George BC, V2M 2E3
3. Ministry of Water, Land and Resource Stewardship, British Columbia Provincial Government, Victoria BC, V8W 9M3
4. Freshwater Fisheries Society of BC, Victoria BC, V9A 7R3

Abstract for in-person presentation for Coastal Cutthroat Trout Symposium 2024

The province of BC encompasses a significant portion of the endemic range of Coastal Cutthroat Trout. Status reports over the decades have consistently highlighted ongoing threats facing this species, drawing attention to population declines and range contractions. Despite these long-term efforts, there are still few regulatory protections for the species, threats to population persistence remain unaddressed, and the status quo state of data deficiency has not changed significantly. In response, the province has commissioned a risk assessment and conservation status review to update information on the species last aggregated in 2008. These undertakings are a primary step towards establishing a higher profile for this species and securing stronger management and regulatory options by which to protect and recover populations in the province.

In this overview, I will outline the progress and future directions of the provincial Coastal Cutthroat Trout risk assessment. As a first step in the risk assessment, we have delineated draft conservation units (CUs) at a spatial scale corresponding to the potential for genetic and demographic interactions. Nested within these are smaller assessment units, which approximate the spatial scale of natal watersheds, where threats to the species are expected to be relatively homogenous.

To assess population status and risk, the Core Area Conservation Status (Fredenberg et al. 2005) or Fisheries Sustainability Assessment (MacPherson et al. 2020) methods are being evaluated as potentials for the overarching framework to categorize and rank populations throughout BC. Within the chosen framework, we will utilize a novel cumulative effects model (CEMPRA – Cumulative Effects Model for Prioritizing Management Actions) to develop semi-quantitative risk scores explicitly linking threats and population responses, and to provide an initial step towards prioritizing threat-based recover actions.

At the core of CEMPRA are a series of stress-response functions that individually link the measured impact of a threat or limiting factor (stressor) to a biological effect (response). These functions enable users to use existing data on stressor impacts and apply them to a common biological response, facilitating comparisons across broad geographic scales, through time, and across alternate management strategies. This approach introduces quantitative data and explicit biological responses to risk assessments, which typically operate on qualitative and ranked

variables, or depend on data-intensive parameterization of bespoke population models. The results from this risk assessment model are threat-impact hypotheses that can be tested through landscape monitoring and adaptive management. This means that the results are most useful when interpreted as interim risk scores and threat prioritizations to be tested and modified as additional data becomes available. Due to its ease of use and flexibility, the initial application of CEMPRA to the Coastal Cutthroat Trout risk assessment is intended to be the first step in an iterative process of data refinement, threat reassessment, reevaluation of management goals, and model validation.

In this presentation, I will review the process of building a CEMPRA model, provide a summary of a recent expert elicitation process on threat identification, and outline future directions for the risk assessment.