Quantifying Yukon Chinook migration mortality and its implications for fisheries management and rebuilding under the Fish Stock Provisions of the Fisheries Act

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Radio antenna installation and aerial view of the Yukon River.

Yukon River Chinook salmon declines have impacted the ability of the United States and Canada to meet escapement goals under the Pacific Salmon Treaty's Yukon River Agreement, and are likely to have resulted in the Stock Management Unit, which is scheduled to be prescribed by regulation under the amended Fisheries Act in 2024/2025, to fall below its Limit Reference Point. In recent years large numbers (33%-52%) of returning Canadian-origin Chinook salmon have gone "missing" between sonar assessments at the mouth of the Yukon River and ~2000 km upriver at the border between Alaska and Canada. A leading hypothesis for these "missing" fish is *en route* mortality due to *Ichthyophonus* infection and heat stress, which has been documented along with opportunistic observation of premature mortalities in Yukon River Chinook Salmon when spawning migration water temperatures exceed 18°C.

This project extends radio-tracking infrastructure (towers and aerial overflights) into Canada to take advantage of an Alaska Department of Fish and Game (ADF&G) project to tag and track up to 600 Chinook salmon in the Alaskan Portion of the Yukon River. Estimates of mortality will be used to evaluate the sustainability of the current aggregate escapement goal for Canadian-origin Yukon Chinook, and rebuilding potential of component Conservation Units to inform analyses to meet the Fish Stock Provisions of the revised Fisheries Act for the Stock Management Unit.

Take-aways

- Yukon River Chinook returns have been declining and an unknown number of returning adults have died during their upstream migration in recent years.
- This transboundary tracking study uses radio- telemetry from towers and aerial surveys to expand Alaska's Chinook tagging efforts and locate the area and cause of the drop in numbers using death rate, migration speed, and timing.

The specific outcomes of this project include:
1) estimates of migration speed, timing, and mortality of Canadian-origin Yukon Chinook, by Conservation Unit and river section, in relation to freshwater environmental conditions; and
2) quantitative evaluation of the consequences of a range of mortality (based on study) for the sustainability of alternative aggregate escapement goals and rebuilding potential.

Timeline

- ✓ Apr-Sep 2024: Construct radio telemetry towers
- 🔄 Jul-Dec 2024: Biosampling
- 🔄 to Mar 2025: Post season analysis and reporting

DFO Science Division
Stock Assessment and Research

DFO Science Section
Yukon/ Transboundary Rivers Area Salmon Stock Assessment

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Location
Yukon River

Collaborations
Alaska Department of Fish and Game
Yukon First Nations

Species
Chinook

Project ID
2402