

Charting a Course for Yukon Chinook

Yukon Chinook Strategic Stock Restoration Initiative



YUKON RIVER
CHINOOK SALMON
STOCK RESTORATION



Chinook Stock Restoration Planning

A Fresh Approach, Big Picture Planning for Yukon River Chinook Stocks

As per Chapter 16 of the Umbrella Final Agreement, the Yukon Salmon Sub-Committee (YSSC) is the voice of salmon management in Yukon. With this mandate in mind, the YSSC set out to work with Yukon's First Nations to develop a framework for restoring the Yukon River Chinook stocks. This report represents Phase 1 in this very important long-term journey that will work towards rebuilding the lifeblood of the Yukon River.

Over the last five years, through the YSSC's many engagement sessions with Yukon First Nations, Renewable Resources Councils, communities and agencies, one constant fear expressed is losing connection to Chinook salmon and fish camp culture. Yukon River Chinook salmon abundance and productivity has been declining for the last twenty years. This is a major cause for concern and one that Yukon First Nations have responded to by foregoing or drastically reducing their subsistence harvest. There is little more that can be done for harvest and, therefore, the YSSC decided it was time to proactively work with Yukon First Nations on the other side of the equation, stock restoration.

Phase 1 of the Stock Restoration Technical Team makes an immediate contribution to a modern and community-based fisheries management process. It identifies a high level framework for stock restoration on the Yukon River that brings together, the knowledge of the technical team, the priorities of Yukon's First Nations, their communities and local and traditional knowledge.

YSSC will continue to work with First Nations groups and stakeholders to develop and implement a 21st-century management system. A plan that addresses and discusses the international and domestic challenges that drive the need for a stock restoration re-building plan that will promote long-term sustainable growth of this precious resource and the critical connection to fish camp culture.

Over the next year, YSSC, Fisheries and Oceans Canada, and the technical team made up of industry experts will collaboratively implement Phase 2 of this Stock Restoration Technical Team in partnership with Yukon's First Nations.. The discussion on stock restoration is long-term and as it continues to evolve, and as Yukon First Nations continue to implement stock restoration initiatives in their own traditional territories, we anticipate that the framework and information provided through this report will have helped guide the way.

The YSSC appreciates the funding from the Yukon River Panel's Restoration and Enhancement Fund and recognizes the need for an internationally consistent approach,. The YSSC will continue to work with the agencies, communities and our management colleagues in Alaska to inform and define a collaborative, long-term plan that will address both the historic decline and future rebuilding of Yukon River Chinook together.



A stylized, handwritten signature in black ink, which appears to read "Pauline Frost".

Pauline Frost
YSSC Chair

Chinook salmon are a cultural icon for First Nations communities in the Yukon. Declines in Yukon Chinook have led to severe harvest restrictions and sacrifices on the part of First Nations in the Yukon, some of which have not harvested Chinook in over a decade. While harvest restrictions are necessary in order to try and get sufficient numbers of salmon to the spawning grounds, there is not much more the communities can do to fish less. This has led to considerable interest in stock restoration - taking action to reverse declines and recover populations - and in doing so restoring the

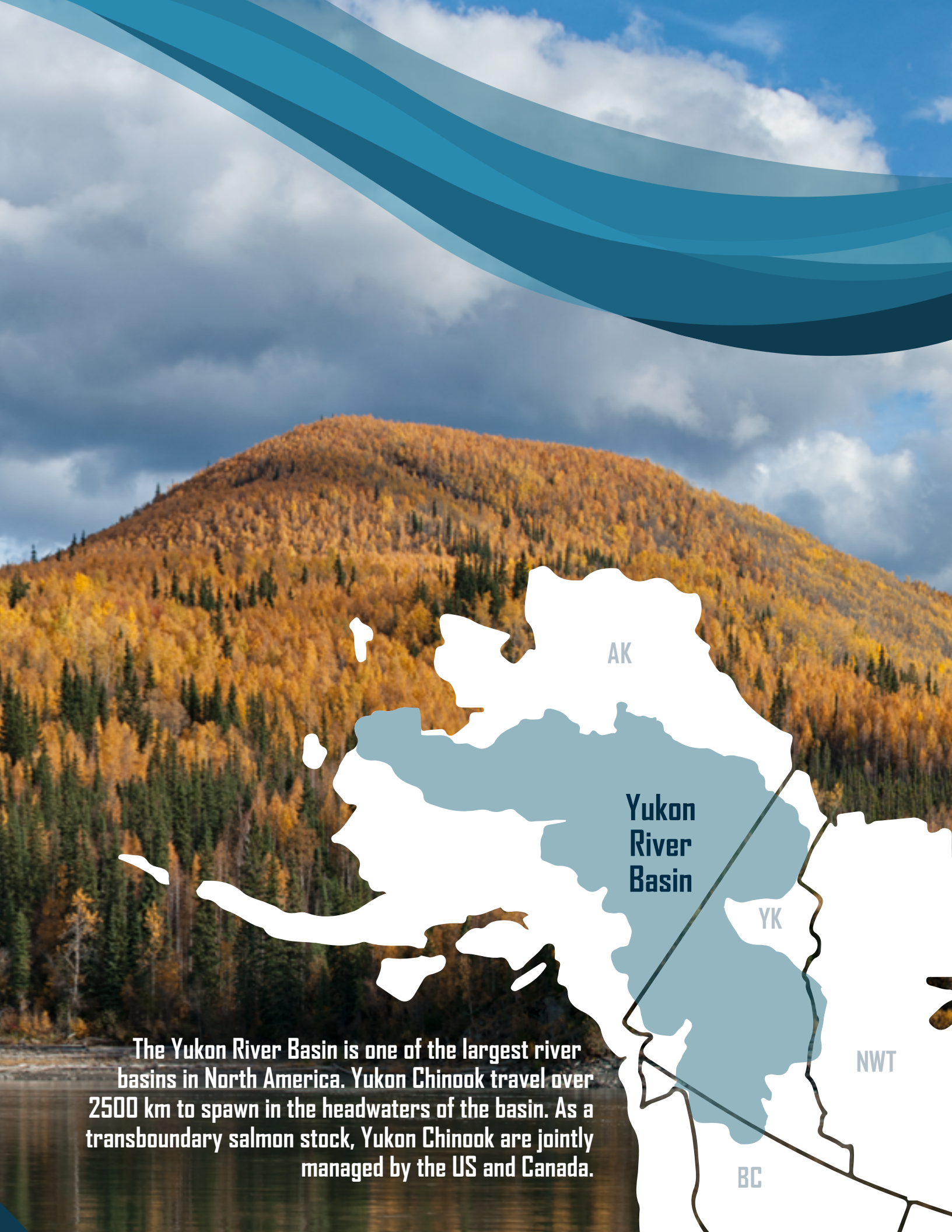
important role of these Chinook salmon stocks to Yukon First Nations communities and culture.

Recognizing that much could be learned from stock restoration elsewhere in the Pacific Northwest, but also that any stock restoration taking place in the Yukon needs to be community driven and reflect the priorities of local user groups, the Yukon Salmon Sub-Committee (YSSC) secured funding in the Spring of 2015 to support the development of a Yukon Chinook Strategic Stock Restoration Initiative (SSRI) and technical team.

The two overarching goals of the initiative and technical team are to:

- 1 Support the development of a stock restoration framework based on community values, which can be used to help develop, evaluate and prioritize Chinook stock restoration initiatives in the Canadian portion of the Yukon River.**
- 2 Provide technical support and capacity building at the First Nations and community level for stock restoration activities.**

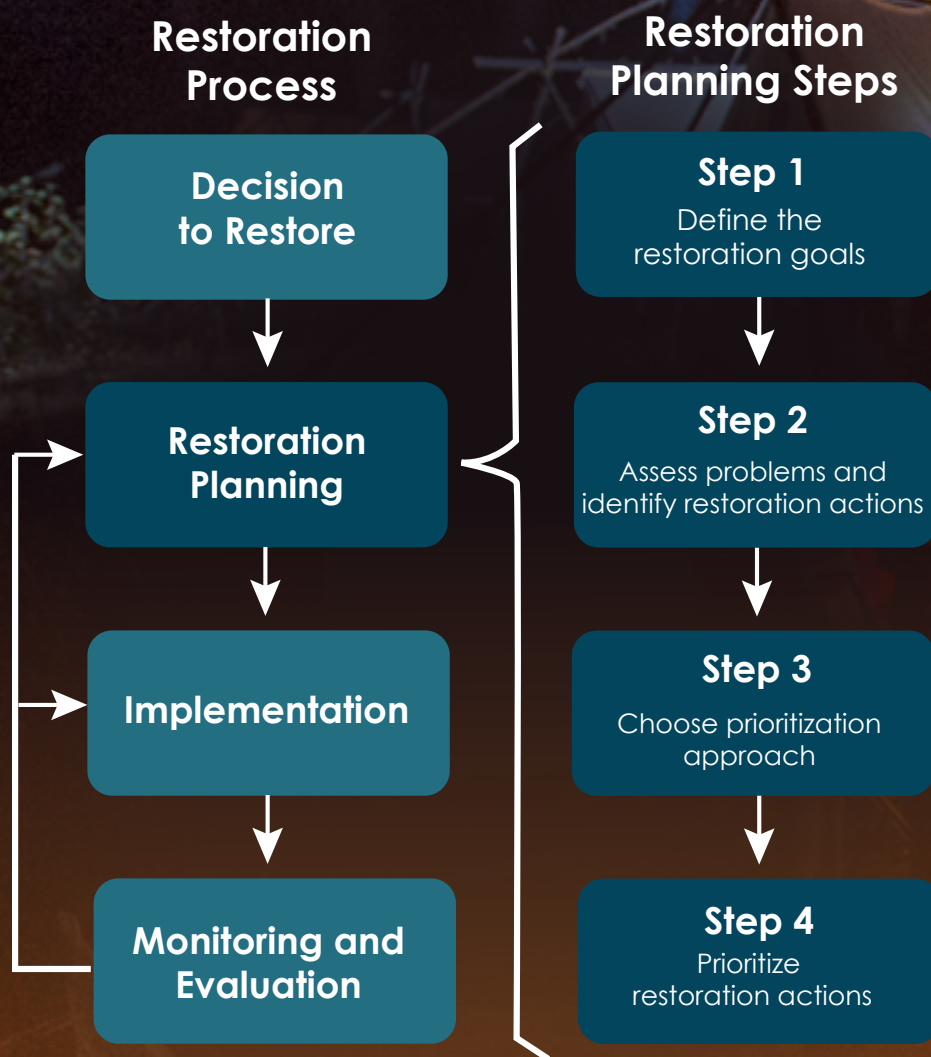




The Yukon River Basin is one of the largest river basins in North America. Yukon Chinook travel over 2500 km to spawn in the headwaters of the basin. As a transboundary salmon stock, Yukon Chinook are jointly managed by the US and Canada.

The Yukon Chinook SSRI is intended to be carried out over three years. The first year focused on restoration planning, specifically: cataloguing community values, objectives and restoration opportunities; reviewing population status and potential limiting factors; forming a technical team to help guide the planning process and provide support to community-led restoration activities

in the Yukon; developing a prioritization framework that matches the quantity and quality of information available in the Yukon; and then applying it. Years two and three will focus on supporting further planning, implementation, monitoring and evaluation of a subset of restoration actions evaluated in year one.

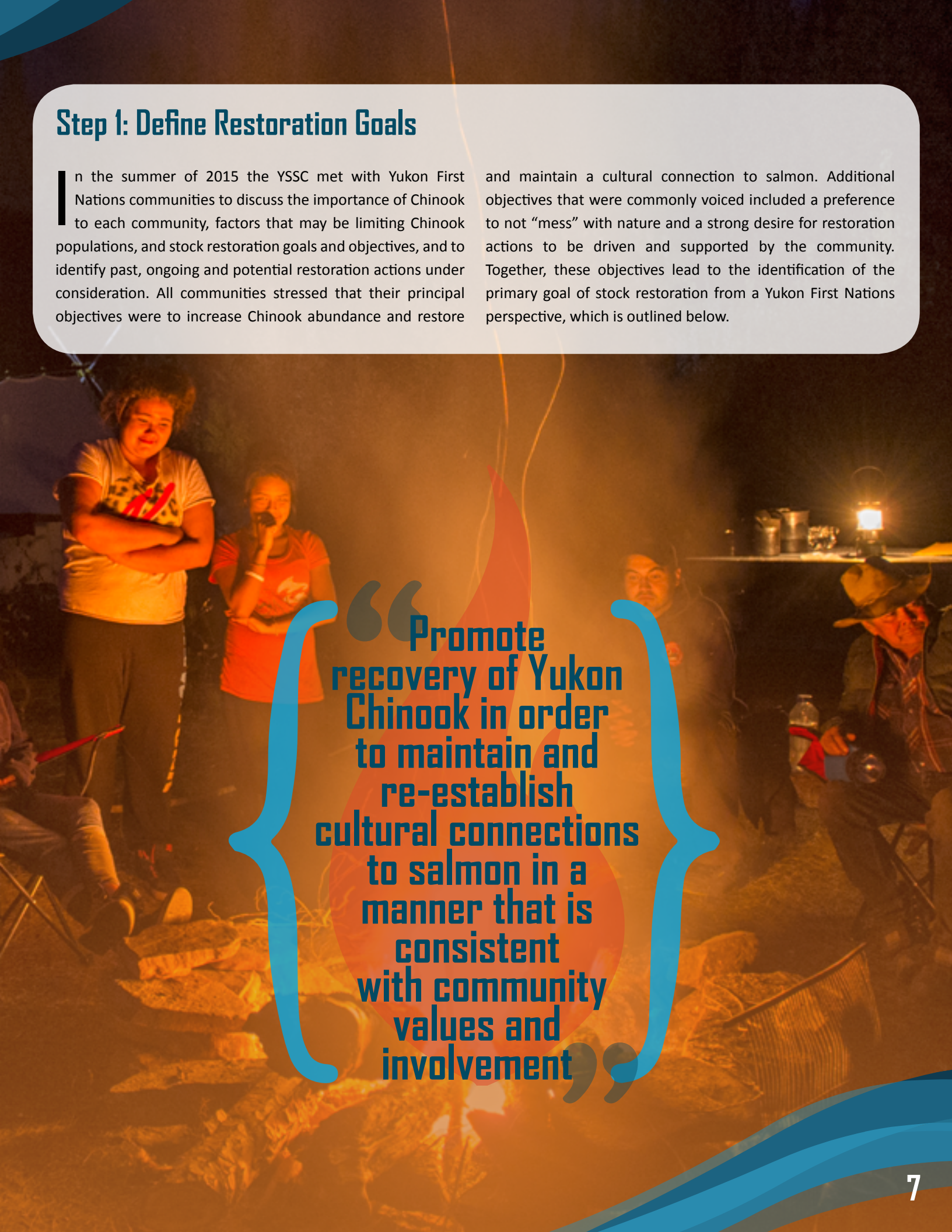


Schematic of the stock restoration process and the four steps for identifying and prioritizing restoration actions nested within this broader process. Year one of the SSRI was focused on the planning process while years two and three are focused on the implementation and monitoring and evaluation stages.

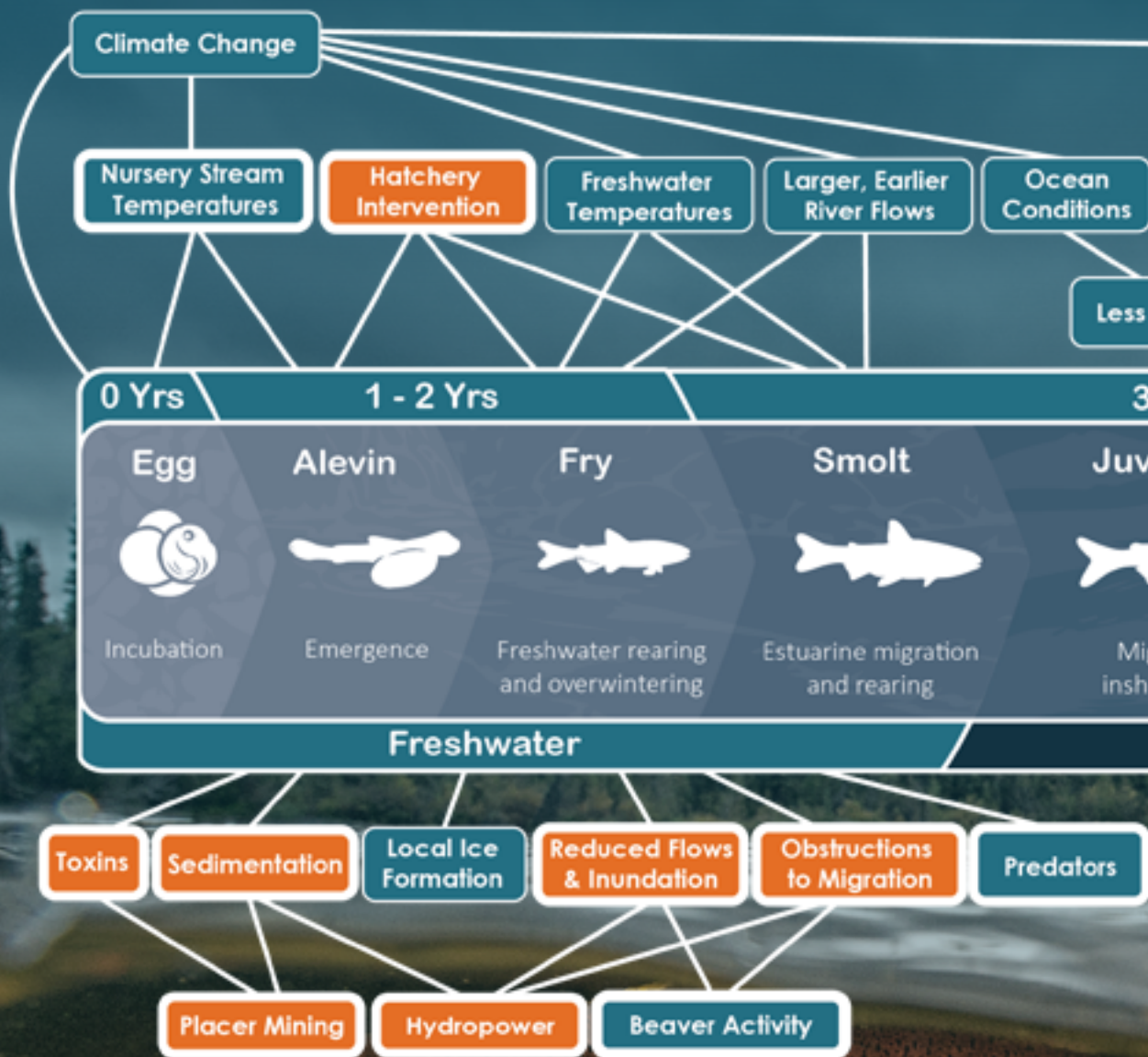
Step 1: Define Restoration Goals

In the summer of 2015 the YSSC met with Yukon First Nations communities to discuss the importance of Chinook to each community, factors that may be limiting Chinook populations, and stock restoration goals and objectives, and to identify past, ongoing and potential restoration actions under consideration. All communities stressed that their principal objectives were to increase Chinook abundance and restore

and maintain a cultural connection to salmon. Additional objectives that were commonly voiced included a preference to not “mess” with nature and a strong desire for restoration actions to be driven and supported by the community. Together, these objectives lead to the identification of the primary goal of stock restoration from a Yukon First Nations perspective, which is outlined below.



“Promote recovery of Yukon Chinook in order to maintain and re-establish cultural connections to salmon in a manner that is consistent with community values and involvement”

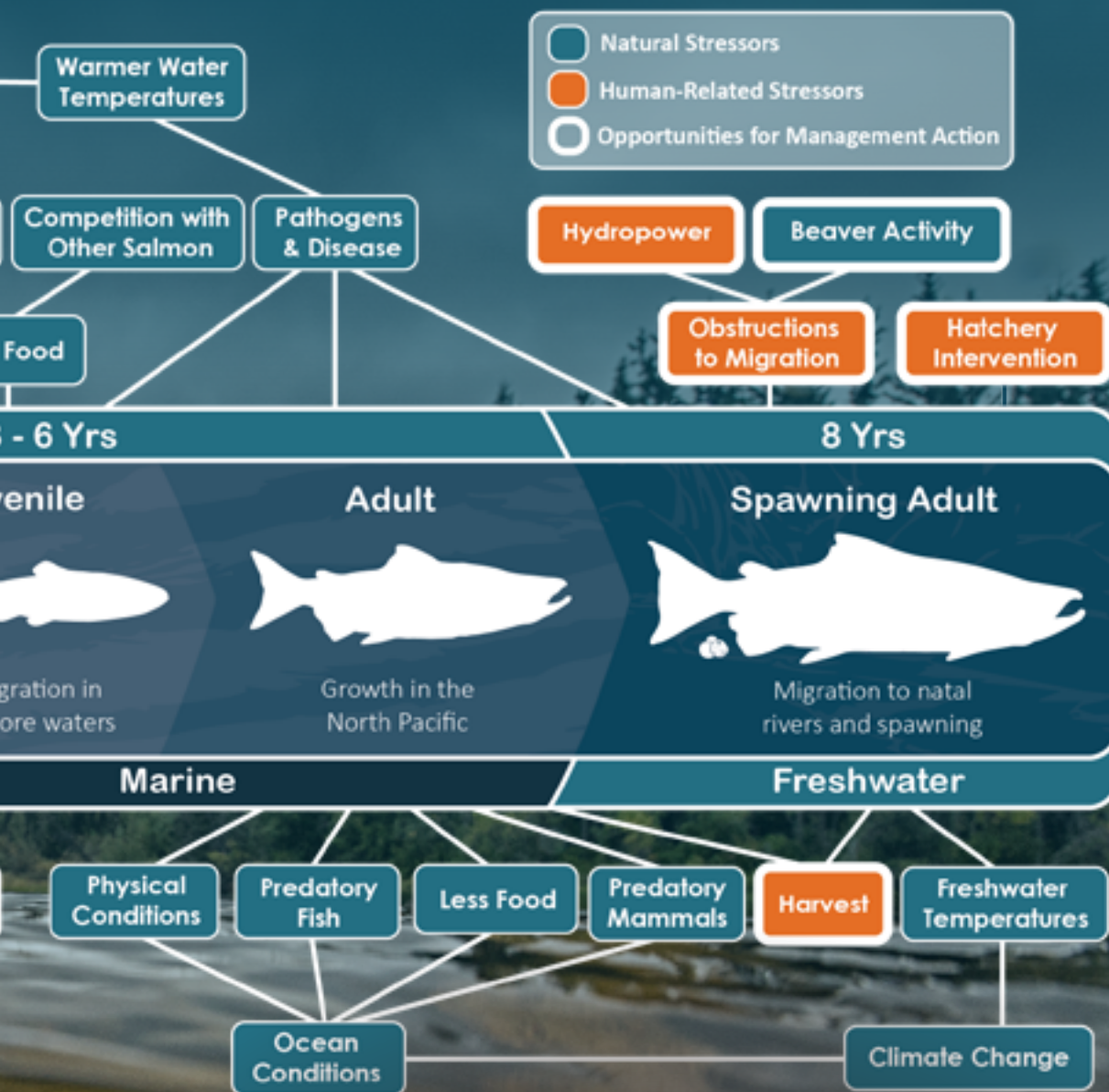


Step 2a: Assess Problems

Limiting factors are the biological and physical conditions that limit a population's viability (e.g., high water temperature). The extent to which factors that are currently limiting Yukon Chinook populations are addressed is an important determinant of the success of restoration actions. There is not a lot of information upon which to definitively identify limiting factors for Yukon Chinook. Examples in freshwater include anthropogenic and natural barriers to spawning and rearing habitat; climatic and hydrologic variation leading to displacement of juveniles, changes in groundwater discharge and degradation of rearing and spawning habitat; disease in returning adults; and sedimentation and toxins from mining

activity. In the marine environment, potential limiting factors include broad-scale changes in oceanographic conditions across the Bering Sea and Gulf of Alaska and increased abundances of Chinook predators and competitors.

Declines in Chinook abundance and survival are not unique to the Yukon and instead are shared across much of central and western Alaska. This suggests the factors responsible for the currently depressed abundance of Yukon Chinook are, at least in part, driven by processes outside of the Yukon Basin. This highlights the importance of recognizing that recovery of the Chinook in the Yukon appears to depend, at least in part, on improvements in marine conditions.



This diagram is a conceptual model of the life history of Yukon Chinook and potential stressors affecting each life stage. The life history processes and developmental stages are shown in the center. Processes and stressors that are typically naturally occurring are highlighted in blue while those that arise from human activities are highlighted in orange. Those processes and stressors that have the potential to be directly altered by human activities within the Canadian portion of the Yukon River, and hence could be the focus of restoration actions, are outlined in bold.

Step 2b: Identify Restoration Actions

To identify potential restoration actions to consider, an inventory of restoration actions was generated based on the opportunities identified through the community visits, past restoration activities and discussion with parties involved in salmon management and conservation in the Yukon. From this inventory, six broad classes of restoration actions emerged.



Existing and potential Chinook restoration opportunities in the Yukon



The approximate locations and types of existing and potential Chinook stock restoration actions within the 8 major sub-watersheds of the Canadian portion of the Yukon River. Actions were identified in consultation with First Nations communities, past restoration activities supported by the Yukon River panel R&E fund and discussion with other parties involved in salmon management and conservation in the Yukon.

Step 3: Choose Prioritization Approach

A simple framework was developed to qualitatively evaluate the ability of these alternative restoration actions to meet the three primary objectives that make up the overarching goal of the YSSC SSRI:

Objective 1: increase likelihood of recovery of Yukon Chinook populations

Objective 2: re-establish cultural connections to salmon

Objective 3: ensure action is consistent with community values, involvement and capacity

For each of the three objectives, performance measures were identified that could be used to qualitatively evaluate and report how well an action contributes to meeting an objective.

Objective	Performance Measure (PM)	Classification		
		Low	Medium	High
1	PM-1: Biological response	Habitat and population enhancement (incl. artificial propagation)	Restore watershed processes	Maintain access, or remove barriers, to (highest quality) habitat
	PM-2: Population status	Low degree of conservation concern and need for management intervention	Moderate degree of conservation concern and need for management intervention	High degree of conservation concern and need for management intervention (incl. extirpated populations)
2	PM-3: Cultural connection	Low likelihood of increasing cultural connection to Chinook salmon via harvest opportunities	Moderate likelihood of increasing cultural connection to Chinook salmon via harvest opportunities	High likelihood of increasing cultural connection to Chinook salmon via harvest opportunities
3	PM-4: Community capacity	Insufficient staff, equipment and / or training to support restoration action	Some staff, equipment and/or training to support restoration action but need for more	Adequate staff, equipment and training to support restoration action
	PM-5: Community support	No support in community for the restoration action	Some degree of support in community for the restoration action	High degree of support in community for the restoration action
	PM-6: Funding	Low likelihood of funding available to support restoration action	Moderate likelihood of funding available to support restoration action	High likelihood of funding available to support restoration action



This table summarizes the classification scheme used to evaluate the ability of alternative restoration actions to meet the objectives of the YSSC SSRI. Each objective is broken down into individual performance measures (rows) that are the criteria used to classify actions. A brief description of the attributes of restoration actions that would result in a score of “high”, “medium” or “low” is provided for each performance measure (columns).

Looking Ahead

Applying the framework allowed us to qualitatively evaluate the ability of alternative restoration actions to meet the YSSC SSRI objectives and arrive at a preliminary classification of alternative actions. Not surprisingly, no single action or set of actions scored high against all performance measures. Instead, there are tradeoffs where, for example, an action may score high on biological response but low on cultural connection, or vice versa.

Year two of the SSRI should focus on those actions that: strike a balance between increasing the likelihood of recovery of targeted Chinook populations; re-establishing cultural connections to salmon; ensuring actions are consistent with community values; and ensuring there are adequate resources to support them. For example, two restoration activities that appear to meet these criteria and which received some technical team support in year one include the Fox Creek stock restoration initiative led by the Ta'an Kwäch'än Council and the Deadman Creek re-introduction efforts led by the Teslin-Tlingt Council. Year two should focus on continued identification of opportunities to support community-led stock restoration efforts and move from the planning stages to the implementation, monitoring and evaluation stages. However, it is important to recognize that progress made towards implementation, monitoring and evaluation will vary among First Nations and communities. They all will be at different stages in

the restoration planning and implementation process.

As communities move from the “planning” to the “doing” of individual restoration actions, careful consideration should be given to the design, implementation, monitoring and assessment of actions. This can be accomplished by considering stock restoration activities through an Adaptive Management lens (see schematic at right below). This approach will help to ensure that individual projects are well designed; enable rigorous evaluation of the ability to achieve the intended results; and allow adjustment to restoration actions based on lessons learned throughout the process.

**The six stages
of the Adaptive
Management
cycle can be
adapted for
stock restoration
activities.**

**Assess problem and identify limits
Define restoration goals
Identify critical uncertainties
Identify alternative restoration actions**

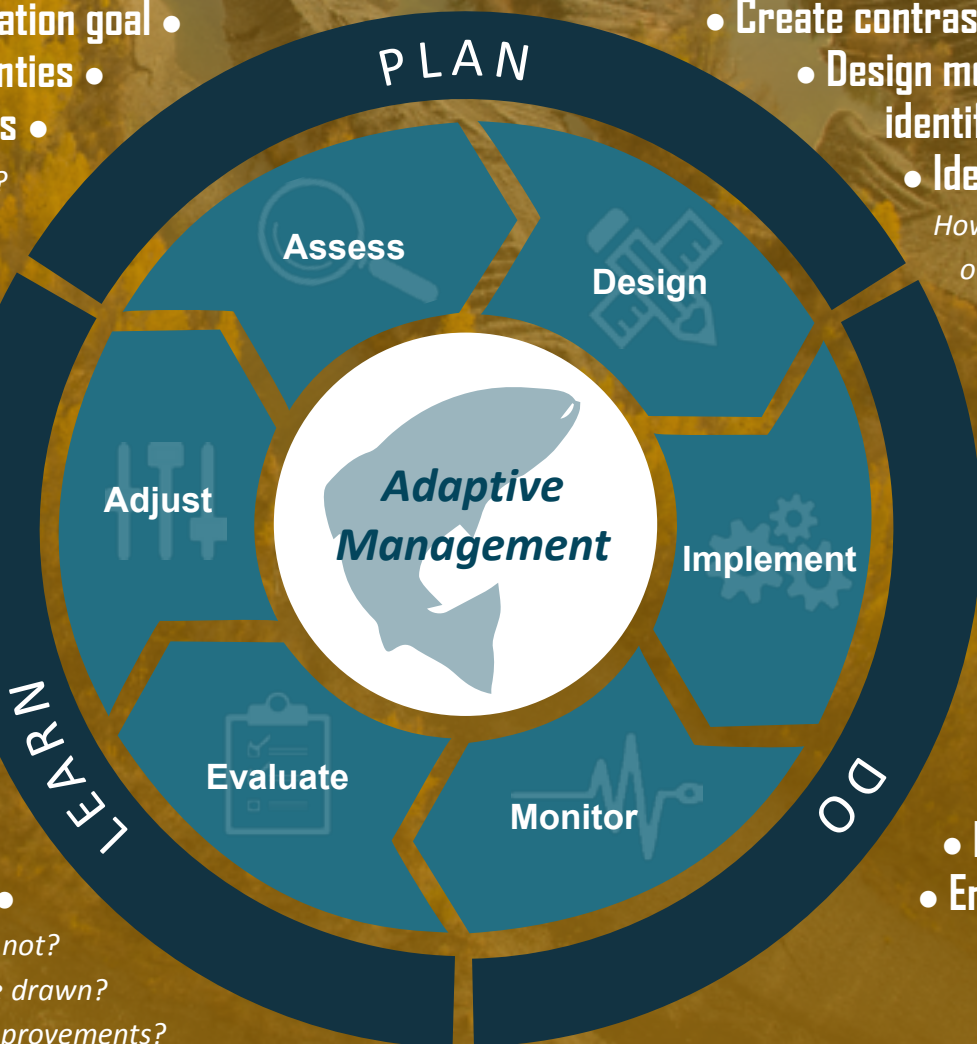
*What is limiting population?
Which actions are most likely to promote recovery?*

**Adjust actions, hypotheses,
or monitoring based on learning •**

**Compare monitoring results with predictions •
Rapid translations of data into insights •
Share learning widely •**

*Were the results expected? If not, why?
What did we learn? What conclusions can be drawn?
Does monitoring approach need improvement?*

• Limits to production
 • Evaluation goal
 • Constraints
 • Success
 • Performance



- Prioritize actions, design management experiments
- Create contrast (“Go big or go home”)
- Design monitoring and evaluation approach, identify key indicators
- Identify expected outcomes, responses

How do we expect key indicators to respond to our management experiments and how will we monitor them?

- Follow implementation plan
- Document deviations
- Present interim results

- Monitor key indicators
- Ensure good data management

• not?
 • drawn?
 improvements?



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Acknowledgements

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For more information about this project please see the full technical report:
Connors, B.M., A von Finster, J. Gustafson, M. Bradford, J. Trerice, D. Zimmerman, H. Wright, and N. Tamburello. 2016. Yukon Chinook Stock Restoration Initiative: Technical Team Year 1 Final Report. 136 pp.