Arctic Rivers Summit Action Plan:

State of Salmon

December 2022

Action Plan: State of Salmon

1.0 Introduction

The Arctic Rivers Summit was a gathering that brought together nearly 100 people to discuss the current and potential future states of Alaskan and Yukon rivers and fish and how we can adapt. The summit was held in Anchorage, Alaska from December 6-8, 2022. People who attended included Tribal and First Nation leaders, community members, managers, and knowledge holders, western scientists, federal, state, and provincial agency representatives, academic partners, non-governmental organizations and others. The Summit was held as part of a five-year Arctic Rivers Project funded by the National Science Foundation's Navigating the New Arctic Program. The Arctic Rivers Project was co-led by the University of Colorado-Boulder and the National Center for Atmospheric Research, and both the project, and the Summit were guided by an Indigenous Advisory Council. Additional Summit partners included the Institute for Tribal Environmental Professionals, the Yukon River Inter-Tribal Watershed Council, the U.S. Geological Survey, the University of Saskatchewan, and the University of Waterloo.

One of the key goals of the summit was to develop action plans centered around four topics:

(1) State of Salmon
(2) State of Rivers
(3) Weaving Together Traditional Knowledge and Western Science for Management
(4) Youth and Elders: Building a Bridge of Traditional Knowledge

This action plan focuses on the State of Salmon. Salmon are a relative, a teacher, and a lifeline integral to Indigenous peoples' cultures and food systems. Although this plan is presented separately from the other three plans, interconnections exist among all of them, with rivers and water flowing throughout the plans and the entire summit. To develop the State of Salmon Action Plan, two small group activities/ discussions were held.

2.0 Process for developing the *State of Salmon* action plan

The process for developing the State of Salmon action plan consisted of three steps completed during two in-person meetings during the Summit. The steps consisted of:

1) Developing a collective vision of a desired future for the State of Salmon in Alaska and the Yukon
2) Engaging in a Strengths, Weaknesses, Opportunities, Threats (SWOT) activity that took into account the desired future
3) Identifying potential actions to work towards the desired future based on the SWOT activity

2.1 Collective vision

During the first gathering, group members first developed a collective vision for a hoped-for future for the state of salmon in Alaska and the Arctic. When creating this vision, group members were encouraged to consider different points of view, for example, how might *communities who live along rivers* answer a question about a desired future state for salmon. How might *salmon* answer this question, or *ancestors*, or *future generations*? For the *State of Salmon Action Plan*, the group developed a vision describing different elements to support healthy salmon. This is described below.

2.2 Strengths, Weaknesses, Opportunities, and Threats (SWOT)

The hopes/desires identified while developing a collective vision for the future laid the foundation for the next activity, a strengths, weaknesses, opportunities, and threats exercise that also took place during the first gathering. Strengths and opportunities were considered to be factors helpful in reaching the collective vision. Weaknesses and threats were factors presenting challenges to reaching the desired future. In general, strengths and weaknesses were described as happening during the current time while opportunities and threats were described as potentially or likely to happen in the future, however, in practice, overlap among the various categories occurred.

To promote brainstorming, group members were encouraged to consider the LESTER categories, which include **L**aws and policies, **E**nvironmental and biological factors, **S**ocial factors and Indigenous Knowledge, **T**echnology and infrastructure, **E**conomic factors, and **R**esearch and monitoring. These categories overlap with one another and were not intended to limit in any way the strengths, weaknesses, opportunities, and threats identified.

For the SWOT activity, the group focused on a single category at a time (ex. strengths were discussed first). Each group member individually filled out sticky notes and then added them to the collective board. Once all group members had a chance to contribute their thoughts, the group discussed the overlap and connections between all the ideas on the board. This process was repeated for all four categories of the SWOT. During both the Gathering 1 discussion and later by facilitators, similar factors (sticky notes) were grouped into themes.

2.3 Identifying Potential Actions

During the second gathering, group members reviewed the themes and, in some cases, the individual strengths, weaknesses, opportunities, and threats characterized and were then asked to identify key potential actions. These actions could build on strengths, address weaknesses, take advantage of opportunities, and mitigate threats.

The results for all three steps are described in Sections 3 through 5 below.

3.0 Collective Vision

During the first gathering, the State of Salmon working group had many ideas regarding their vision for the future of salmon. Key components of this vision included:

- Continuing a cultural way of life
- Clean, "clear, free-flowing, cold streams with plenty of food and complex habitats for rearing and spawning salmon"
- Healthy oceans that support salmon
- Salmon returning to regenerate communities and ecosystems
- A coordinated effort for conservation,
- Managing fisheries for a balanced ecosystem and putting salmon rather than profits first
- Global action on climate change

Some of these components are discussed in more detail below.

Continuing a cultural way of life

A main element of the State of Salmon vision is continuing a cultural way of life in which salmon are a livelihood and one of the main food groups for Indigenous peoples. This way of life includes stories, songs, language, dry fish skin and scale art, fish camps, potlach, and ceremony. Values like "*never taking more than we need*" are key. Salmon heads, salmon skins, and smoked salmon were all brought up specifically as was the importance of the oil and calcium in salmon bones. Returning equity to allocation by supporting subsistence fishing and ensuring that Native people have the first priority for traditional harvests was also noted as part of this vision.

We are a salmon people

Healthy rivers and oceans

Salmon migration between rivers and oceans means that both healthy rivers and healthy oceans are important for salmon. In addition to free-flowing, cold rivers with quality habitats free from toxins and other pollutants, group members also noted decreasing harmful algal blooms in oceans and protecting corals as a primary, basis of the food web as important for salmon and ecosystem well-being.

Salmon returning to regenerate communities and ecosystems

Salmon surviving river and ocean stages of life and returning to spawning grounds, was another key component of the State of Salmon vision. Elements noted as part of this included big, healthy adult females migrating and successfully spawning, successful egg hatching and juvenile rearing, and limited predation by invasives. Salmon returns were described as important not only for supporting people and communities but also as a

foundational species regenerating ecosystems, "*feeding the birds and bears and vegetation and eagles and trout.*"

Fisheries management

The group's vision related to management included putting salmon first and managing more holistically for a balanced ecosystem rather than for just one species. Putting salmon first means managing to make sure that salmon are returning to spawn rather than to maximize yields or profit. It also includes limiting catches by commercial interests and better regulating federal and international waters. Other management components noted by group members included protecting spawning and other important fish habitats, maintaining habitat connectivity, managing invasive species, and conserving genetic diversity. Reducing salmon bycatch from trawling and decreasing farmed salmon in order to reduce diseases, declines in genetic diversity, and competition with wild salmon for food was also brought up. Finally, the group's management vision also included Tribal management of both rivers and oceans and gathering more robust data on salmon juveniles and smolts.

4.0 Strengths, Weaknesses Opportunities, Threats

During the first gathering, working group members also identified and discussed strengths, weaknesses, opportunities, and threats that could further or hinder their desired vision for the State of Salmon.

4.1 Strengths

For the strength category of the SWOT activity, several themes emerged. The top themes revolved around:

1) People care about salmon,
2) Salmon are adaptive and resilient,
3) Deep Indigenous Knowledge and salmon as teachers,
4) Ability to study and understand salmon, and
5) Increasing opportunities to create laws and policies with Indigenous views/perspectives.

These strengths are discussed in more detail below.

People care about salmon

One of the main strengths noted by the working group was the fact that "a lot of different types of people across many user groups and backgrounds care about salmon." Salmon bring people together. "People have an incredible relationship with salmon and desire to see them thrive." The people at the Arctic Rivers Summit demonstrated this commitment to sustaining salmon.

Salmon are adaptive and resilient
Salmon have adaptation inherent in their beings. The group noted that they have great genetic diversity with many population and species-level differences that may strengthen overall biodiversity. They inhabit so many tributaries, “like a tree of life.” There is also diversity in the timing of salmon runs. Salmon were once abundant and much of their river habitat is still healthy or is not as degraded as other ecosystems. Salmon are a cultural and ecological keystone species, and they are not past the point of no return. Salmon are resilient (if left alone) as are the communities who rely on them.

Deep Indigenous Knowledge and salmon as teachers
Elders and youth and the intergenerational transmission of Indigenous Knowledge between them are a great strength. This can include creation stories, values, and practices. Important values noted by the working group entail “helping one another with food gathering and not taking too much, only what is needed.” Examples of sustained stewardship practices includes “removing debris or creating debris spaces so salmon can take breaks” and the ceremony of first fish for youth. Culture camps were noted as a resource for maintaining cultural practices. The group also brought up the importance of salmon as teachers. They teach us to be adaptable, about the circular nature of life, and they “teach us to remember returning home.”

Salmon teach us to remember returning home

Ability to study and understand salmon
The working group brought up a number of strengths related to the ability to study and understand salmon. Interdisciplinary and knowledge co-production methods are improving “that allow us to combine many types of data and information.” Technology is also constantly improving allowing us to learn more about salmon biology and salmon in the context of their ecosystems. In addition to Indigenous Knowledge, we now also have some historical data available. The possibility of community engagement in research was also brought up as a strength with the benefits it brings in terms of both local knowledge and communities shaping the research that takes place.

Opportunities to create laws and policies with Indigenous views and perspectives
Finally, the group brought up as a strength, opportunities to create laws and policies with Indigenous views and perspectives and promoting Indigenous rights. The group noted Canada’s Truth and Reconciliation Commission, the United Nations Declaration on the Rights of Indigenous Peoples, the Bi-Partisan Infrastructure Law, and the Justice 40 Initiative as examples.

4.2 Weaknesses

For the weaknesses category of the SWOT activity, some of the main weaknesses that emerged were related to:

1) Management, and
2) Limited/lack of data.

Other weaknesses identified included:

3) Environmental and biological factors,
4) Development-related pressures,
5) Connection between people and salmon is being lost,
6) Climate change leading to warming rivers and oceans,
7) Lack of action to address climate change and the need for action at a global scale
8) Achievability of ideas brought up

Some of these weaknesses are discussed in more detail below.

Management

A variety of weaknesses were raised around management. These include lack of coordination in management research, difficulty identifying management options that protect salmon in the ocean, overharvesting, climate change not being included as a consideration in management plans, localized rather than regional river conservation efforts, managing for yield and greed rather than managing holistically, needing to manage for increased genetic diversity, and not taking advantage of the common interest that both commercial and subsistence fishers have in rebuilding salmon stocks. Additional weaknesses identified included funding inequities, funding being tied to dams, laws that favor commercial fishing and not subsistence, weak laws restricting bycatch, weak international laws protecting salmon, Indigenous values not having a strong enough role in regulatory processes, lack of listening, or listening but with limited accountability to consider Indigenous perspectives in management processes. The “communication breakdown between paycheck people and subsistence people” was also described as a challenge as was the advancement of fishing technology “to a point where it maximizes yields and damages ecosystems.”

Limited/lack of data

Another major theme that emerged as a weakness was the lack of and/or siloing of data. Data gaps noted included little information on temperature and discharge; lack of data on juveniles and smolts habitat, spawning locations, and overwintering habitats; little data on factors important to juvenile salmon, limited data on why crashes are happening in some areas and booms in others, and an overall lack of monitoring. Additional challenges with monitoring include the sheer size of the Yukon River and concerns that tagging salmon might be cruel for salmon, that research is often done without local knowledge or

permission, and that because data collection is conducted through a mainly western lens, relevant data and wisdom from Indigenous Knowledge may be missing because of this.

Environmental and biological factors
In addition to salmon strengths identified in Section 4.1, the action plan group also noted that salmon have some characteristics that can make them more vulnerable to climatic and other pressures. These include salmon favoring cold water environments and having limited thermal thresholds for chronic temperature increases, their long migration routes, which may increase salmon exposure to various threats, unsuitable habitat conditions (ex., poor prey, warm water, competition, disease), and decreases in plankton and shrimp food sources that get caught under the ice given that there is less ice. Difficulty drying

Development-related pressures
Industrial activity (ex., mining, hydroelectric dams) and continuous human development were noted as threatening habitats (ex., spawning) and introducing pollutants and garbage into rivers and the ocean. Another pressure on salmon that was brought up was that from sound pollution including vibrations.

Achievability of ideas in this plan
One participant brought up the question of whether the ideas and actions brought up as part of the action plan process are actually achievable given that they may be vague and somewhat ambiguous.

4.3 Opportunities

A variety of opportunities were identified during the SWOT activity. Some of the principal opportunities identified related to:

1) Partnerships and convenings,
2) Fisheries management,
3) Youth engagement,
4) Traditional knowledge and values, and
5) Research and monitoring

Additional opportunities included:

6) New Congressional representation (ex., Mary Peltola, first Alaska Native Congressional representative) and continuing to elect better leaders could lead to changes in laws and more equitable funding
7) Funding for communities to restore damage from climate change and colonial impacts.
8) Transitioning to a fossil fuel free society.

Some of these opportunities are discussed in more detail below.

Partnerships and convenings

A main theme discussed by the action plan group were opportunities presented by partnerships and convenings including finding support and spaces to connect, learn, and communicate with one another about "what works, what didn't work, and [how to] modify working together to help Mother Earth." Other goals for collaborations that were proposed included to "study, implement habitat restoration programs, and create policy that prioritizes the needs of people and the environment." Groups noted in the context of developing partnerships were the Bering Sea Elders Group, the North Pacific Fisheries Management Council, the Alaska chapter of the American Fisheries Society, and also scientists and industry. Building relationships to bring the Yukon and Alaska closer together to share in initiatives was another collaboration mentioned. Convenings discussed included group meetings, webinars, and an Arctic Rivers Summit 2. Media coverage of convenings such as the Arctic Rivers Summit was also noted as an opportunity.

Fisheries management

The group noted several opportunities related to management of fisheries and management of lands and waters overall. These included "global community acknowledgement of Indigenous sovereignty and returning land and water for Indigenous management across the globe," "state recognition of Tribes," and "federal agencies revising policies on tribal consultation and co-management (hopefully to improve them)" to provide a stronger role for Tribal voices and Indigenous Knowledge. Environmental protection was also mentioned both generally, "protect and safe our earth and each other," and more specifically in terms of protecting salmon habitat from development. The potential role of technology was also brought up including using "technology to manage for diversity and manage holistically," improving the selectivity of fishing gear to reduce bycatch, and using technology to connect remote communities.

Youth engagement

The importance of engaging the next generation in "taking action, getting education, and involving them in management," fisheries meetings, and data collection was emphasized. Youth groups mentioned included Earth Guardians and the Alaska Native Science and Engineering Program. Another opportunity brought up was that of passing a Youth Act to encourage youth involvement.

Traditional knowledge and values

Traditional knowledge and values were also brought up as an opportunity including the recording of traditional knowledge with free, prior, and informed consent. Values mentioned included sharing so that many people could be fed and being kind, having respect, and being nice, getting along better and working together.

Research and monitoring
Finally, the working group noted several opportunities related to research and monitoring. These included creating a centralized data repository and exchange to facilitate greater information sharing and address challenges related to not being able to find and/or access data. The group also brought up growing both scientific and traditional knowledge, knowledge co-production, and identifying and funding Tribal research priorities.

4.4 Threats

One of the main threats to salmon identified was:

1) Climate change,

Additional threats identified were:

2) Development-related pressures,
3) Loss of culture and community,
4) Federal and state government changes leading to a regulatory environment antagonistic to the environment, climate change, and Indigenous rights.
5) Apathy
6) Volcanic activity

Some of these threats are discussed in more detail below.

Climate change
Climate change affects river and ocean habitats and salmon in a variety of ways. Some of those noted by the group included changing precipitation; "loss of river, sea ice, and glaciers resulting in warmer waters and reduced habitat from senescent [aging] rivers;" increasing erosional processes from permafrost slumping, flooding, glacial retreat, and sea level rise; decreased/lack of sea and river ice; changes in river and ocean habitat including less suitable stream habitat for rearing/egg incubation and loss of habitat due to sea level rise; changes in timing including those related to adult/juvenile migration and juvenile emergence and rearing; changes in the ranges of different fish species including the expansion of salmon into the Arctic (where they are not native); decreased food and increased competition for more scarce resources; shifts in biodiversity and disease, reduced salmon survival in the ocean leading to limited adult returns, and changing salinity levels in the Yukon River Delta due to sea level rise. Invasive species were also brought up as a threat to salmon and can be attributed to both climatic and non-climatic factors. Resulting declines in salmon returns from these threats may contribute to the loss of genetic diversity and of future generations of salmon leading to food insecurity for communities and, in turn, in some cases, losses of those communities.

Development-related pressures
In addition to climate change, group members noted additional development-related threats to salmon including mining (Donlin Gold Mine, the Nyac Mining District, Pebble Mine),

increased mining due to metals needed for renewable energy production, dams, new roads/highways, barge traffic, acid rain, and development overall. Development may impact river connectivity and water quality and lead to de-watering and overall habitat degradation. Future population and industrial growth would also contribute to increased greenhouse gases and thus climate change,

Loss of culture and community
Climate change and other factors contributing to decreases in or loss of fisheries has the potential to lead to a cascade of consequences related to culture and community. These include the loss of culture, language, ceremony, and family time spent together during fishing activities. They also include outmigration from communities and less incentive to conserve. Kids liking McDonalds was also brought up as a challenge to cultural sustainability as was "continued graying of the fleet." The latter refers to fact that fishing permits in Alaska are held by an increasingly older population. This can mean fewer opportunities for youth to have exposure to fishing and the important cultural experiences such activity brings.

5.0 Actions

During the second gathering for this working group, people discussed actions to support the collective vision for healthy, sustainable salmon. As described in section 2.3, these actions can build on strengths, address weaknesses, take advantage of opportunities, and mitigate threats.

In addition to identifying actions during the second gathering, in some cases, group members identified actions during the Strength, Weaknesses, Opportunities, and Threats activity that took place during the first gathering. Actions identified during both gatherings are listed in Table 1 below.

Four overarching action themes emerged, including actions related to:

- *Cultural resiliency and ceremony*
- *Management*
- *Partnerships and convenings*
- *Research and monitoring*
- *Youth engagement*

Table 1. State of Salmon Actions to Pursue

Category	Examples
Cultural resiliency and ceremony	• Have a potlach for salmon, celebrate her name • Fund dormant fish camps to teach skills
Management	• Manage for a balanced ecosystem rather than for single species • Manage salmon to ensure that they are returning to spawn rather than for yield or profit • Protect important fish habitats from development or pollution • Maintain habitat connectivity • Manage invasive species • Conserve genetic diversity • Reduce salmon bycatch from trawling • Decrease farmed salmon
Partnerships and convenings	• Arctic Rivers Summit 2
Research and monitoring	• Increase community engagement in research ○ "Supports local economies" ○ "Brings work and food home" ○ "Creates space for appropriate research (i.e., wanted by locals, has local involvement)" • Create a centralized data repository and exchange to facilitate greater information sharing and address challenges related to not being able to find and/or access data. • Identify salmon families and the routes they travel. • Need to find out why crashes are happening in some areas and booms in other areas.
Youth engagement	• Pass a youth Act to encourage youth involvement in management, fishing activities, fisheries meetings, and data collection.

5.0 Conclusion

The Arctic Rivers Summit brought together a diverse array of people, both Indigenous and non-Indigenous, to share knowledge about salmon in Alaska and the Yukon and to brainstorm options for supporting salmon and communities in adapting to a transforming world. The group of people who gathered were driven by concern about the future of salmon and by the energy to shape what lies ahead.

It is our vision and intention that the discussions and ideas presented in this plan will motivate conversations and inspire actions to sustain salmon, cultures, and communities for the generations to come.

For questions

Please contact Karen Cozzetto, Institute for Tribal Environmental Professionals (ITEP) Tribal Wellbeing for Seven Generations Program Co-Manager and Nikki Cooley, ITEP Co-Director, with any questions or comments about this plan.

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