



Management
Conservation
Traditional Laws
Trust
Way of Life
Stewardship
Knowledge
Place
Communication
Values
Culture
Protection
Connections
Systems
Generations
Respect
Holistic
Language
Resources
Identity

FISHERIES INDIGENOUS KNOWLEDGE

Forum Proceedings and Discussion Paper

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We would like to thank the following speakers for sharing their knowledge and expertise with us at the Fisheries Indigenous Knowledge Forum:

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Saul Milne, Cheam First Nation

Megan Moody, Nuxalk First Nation

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Cover photo: Raising of the Sputc (Eulachon) Welcome Pole by the Nuxalk Nation, March 2014. Photo by the First Nations Fisheries Council.



First Nations Fisheries Council (FNFC). Fisheries Indigenous Knowledge: Forum Proceedings and Discussion Paper. Vancouver, BC: FNFC, October 2019.

Executive Summary

Hundreds of generations of First Nations people living in what is now British Columbia have regarded aquatic animals and ecosystems as integral to their identities, cultures, languages, communities, economies and knowledge systems. Today, fish stocks and habitats face many pressures from the commercial and recreational fishing sectors, as well as from the cumulative impacts of habitat degradation and loss, industrial development, extractive resource activities and climate change, all of which encroach on First Nations inherent rights to access and manage land and water resources.

The Government of Canada has committed to achieving reconciliation with Indigenous peoples through a renewed government-to-government relationship based on recognition of rights, respect, co-operation and partnership as the foundation for transformative change. In 2019, the federal *Fisheries Act* was amended to restore lost protections and incorporate modern safeguards to help protect fish and fish habitat. In addition, the Act strengthened the role of First Nations in reviewing and monitoring projects and in developing policy. A key requirement of the new *Fisheries Act* is that Fisheries and Oceans Canada must consider Indigenous Knowledge that has been provided when making decisions about fish habitat, and all Indigenous Knowledge must be protected if it has been provided in confidence.

In an effort to assist both First Nations communities as they navigate how and when to document and share their Indigenous Knowledge and federal government employees as they request and consider Indigenous Knowledge, the First Nations Fisheries Council of British Columbia (FNFC) hosted a Fisheries Indigenous Knowledge Forum in Vancouver, British Columbia, in October 2019. The forum initiated a dialogue to help build an understanding of Indigenous Knowledge systems and how Indigenous Knowledge about fisheries and aquatic environments can lead to improved outcomes for fish and fish habitat and for First Nations communities. The agenda was designed for First Nations to share their approaches to community-based engagement and research and to discuss how they've addressed issues and challenges related to sharing and integrating Indigenous and Western Knowledge systems.

The approximately 100 attendees heard nine presentations over the 1.5-day forum and had opportunities to discuss the approaches and issues raised. Following a broad look at Indigenous Knowledge systems, presented by Dr. Jeannette Armstrong, Syilx Nation and Associate Professor of Indigenous Studies at UBC-Okanagan, five speakers provided case studies from individual Nations with experience at gathering, interpreting and sharing their Indigenous Knowledge within the context of specific projects. Two presentations discussed considerations for Indigenous Knowledge sharing and use, specifically relating to how Indigenous and Western science can be woven together and to intellectual property issues. Fisheries and Oceans Canada also presented information on the *Fisheries Act* amendments as related to considering Indigenous Knowledge in regulatory approvals.

Ten key learnings and common themes emerged from the presentations and discussions at the forum:

1. Indigenous Knowledge has a holistic, connected nature. Connections and interactions weave throughout ecosystems, so when Indigenous Knowledge holders relate information, they speak about whole systems.

2. Both past and present Indigenous Knowledge have value. While there is much valuable Indigenous Knowledge about historical conditions and practices, people active today in any aspect of using or managing fisheries and aquatic ecosystems also have information to contribute as they witness current conditions and changes first-hand.

3. Open communication and consent are critical. Knowledge holders want to pass information to the next generation, and communities want to share their knowledge to help recover species, but in both cases, they need to be assured that their Indigenous Knowledge will be valued, respected and protected.

4. Indigenous Knowledge gathering and sharing involves communities and community infrastructure. No single person holds all the information; instead, each piece of information from different people and different groups contributes to making a whole picture. Some of the considerations for gathering Indigenous Knowledge include how to avoid participant fatigue and how to engage youth.

5. Cultural differences exist in conservation practices. Culture and traditional practices play a significant role in how ecosystem conservation and species stewardship are practiced. Cultural differences can create misunderstandings and rifts between First Nations and government, highlighting the need for improved understanding and recognition of different practices.

6. Place-based differences occur in approaches to Indigenous Knowledge. In the context of the Fisheries Act requirement to consider Indigenous Knowledge, each Nation will have to decide and communicate its Indigenous Knowledge-sharing protocol. Government staff need to appreciate and respect the differences between communities when soliciting Indigenous Knowledge for decision-making processes.

7. Indigenous Knowledge must be interpreted by the knowledge holders. A piece of information on its own has little value without interpretation by the people within the community, and it is inappropriate for others to interpret a community's IK. First Nations need to be part of decision-making processes in order to be able to provide appropriately analyzed and interpreted IK.

8. Gathering, interpreting and sharing Indigenous Knowledge takes time and resources. Government requests to First Nations for IK are generally made within a prescribed consultation or regulatory process with a government-specified timeline that may not provide adequate time or resources for First Nation communities to consider and respond to the request.

9. Success hinges on building a joint process and developing trust. The only way to successfully attain effective and responsible management of fisheries and aquatic ecosystems is for all parties to work together in an atmosphere of trust. From the outset, there needs to be a jointly agreed process—agreed

between First Nations and government—for contributing IK to federal government processes in a manner that respects all the information brought to the table.

10. Indigenous Knowledge has inherent value for answering research questions. It is important to avoid the trap of providing IK solely in response to government consultation and regulatory process. First Nations should be helping to identify research questions, plan and conduct the research, and analyze and interpret the data, as well as be acknowledged as writers of and contributors to published research.

Given the diversity of cultural practices and traditions among the First Nations in present-day British Columbia, there is no one way in which Indigenous Knowledge can or should be accessed and incorporated into government or any other decisions. There are nuances that must be considered on a community level, and there are trust issues that must be addressed broadly across many, if not all, communities. The goal should be a truly collaborative process between First Nations and government agencies that recognizes and aligns with each party's priorities, rights and responsibilities and that allows for joint decision-making. Collaborative relationships will take significant investments of time, energy and open-mindedness on all sides.

To build the necessary relationships and further the sharing and use of Indigenous Knowledge in decisions related to fisheries and aquatic ecosystems in British Columbia, there is work to do, including:

- Taking time to build common understanding and trust
- Discussing how Indigenous Knowledge will be integrated in government decisions
- Involving First Nations in a meaningful way, while recognizing the different comfort levels in different Nations
- Being accountable for how Indigenous Knowledge is stored and used; accountability needs to operate in both directions between First Nations and government
- Identifying how the intellectual property rights of Indigenous Knowledge holders and communities will be recognized and protected

First Nations and government appear to have the common goal of achieving success at preserving ecosystems and species and at restoring those that are already endangered. This goal can only be achieved by everyone bringing knowledge and information to the table as equals and working together in an atmosphere of trust and respect.

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1. Introduction and Context

The First Nations in present-day British Columbia (BC) have lived along the coast and near major rivers and large lakes for thousands of years. During this time, hundreds of generations of First Nations people have been observing and analyzing habitat characteristics, animal behaviours, species distribution and population changes so that their communities could rely on fish and other aquatic resources for food, social, economic and cultural purposes. Fisheries and the presence of fish in the local environment became cornerstones of First Nations health and well-being, allowing communities to forge intimate connections with the land, water and natural resources. Fish and other aquatic resources underlie their identities, cultures, languages, communities, economies and knowledge systems. Consequently, as their ancestors did before them, First Nations in BC regard aquatic animals and ecosystems as integral to their Indigenous laws and governance structures, and they embrace the responsibility of protecting the natural environment for future generations.

Sharing Indigenous Knowledge (IK) among generations strengthens family and community relationships and ensures continuity of understanding about fish species and populations, ecosystem dynamics and methods used for fishing and preparing and preserving food. Today, fish stocks and habitats face many pressures from the commercial and recreational fishing sectors, as well as from the cumulative impacts of industrial development, extractive resource activities and climate change. All of these activities have encroached on First Nations inherent rights to access and manage land and water resources. As a result, First Nations access to and participation in aquatic resource management and fisheries have been marginalized over time.

Prime Minister Justin Trudeau has committed the Government of Canada to achieving reconciliation with Indigenous peoples through a renewed government-to-government relationship based on recognition of rights, respect, co-operation and partnership as the foundation for transformative change. In addition, both provincial and federal governments have recently committed to implementing the United Nations Declaration on the Rights of Indigenous Peoples. With these positive changes in legislation and policy, First Nations in BC are optimistic that meaningful progress can be made toward reconciliation in fisheries. The process of reconciliation and the fundamental shift in fisheries governance approach will be challenging for all parties and will require ongoing commitment from all involved to improve relationships in ways that lead to improved outcomes for Indigenous peoples.

In 2019, the federal Fisheries Act was amended to restore lost protections and incorporate modern safeguards to help protect fish and fish habitat. In addition, the Act strengthened the role of First Nations in reviewing and monitoring projects and in developing policy. A key requirement of the new Fisheries Act is that Fisheries and Oceans Canada (DFO) must consider IK that has been provided when making decisions about fish habitat. In all other decisions made under the Fisheries Act, IK that has been provided may be considered. Furthermore, this IK must be protected if it has been provided in confidence. With these new obligations to consider IK that has been provided, federal staff who are tasked with making decisions under the Fisheries Act are grappling with how to proceed. Meanwhile, First Nations are uncertain and, in some instances, concerned about requests for their IK and how it will be used and stored.

In an effort to assist both First Nations communities and federal government employees, the First Nations Fisheries Council of British Columbia (FNFC) hosted an Indigenous Knowledge Forum on October 29 and 30, 2019. Held at the SFU Morris J. Wosk Centre for Dialogue in Vancouver, BC, the forum initiated a dialogue to help build an understanding of IK systems and how IK about fisheries and aquatic environments can lead to improved outcomes for First Nations communities. The agenda was designed for First Nations to share their approaches to community-based engagement and research and to discuss how they've addressed issues and challenges related to sharing and integrating Indigenous and Western Knowledge systems.

2. Aims of this Discussion Paper

This paper summarizes the information shared during the 1.5-day forum and identifies key learnings and common themes from the case studies presented. The paper is intended firstly as a resource for First Nations interested in gathering, documenting and sharing their IK, and secondly as a reference guide for both First Nations and government on what must be considered when requesting, sharing and/or using IK.

The forum was a first step in bringing together both parties to build a common understanding of IK systems. While the ultimate goal is for IK to be integrated in a meaningful and respectful way into management decisions about fisheries and aquatic ecosystems in BC, this paper is only the beginning of the discussion on how to achieve this goal, not a prescription for how to achieve it.

The specific aims of this paper are to:

- discuss broad elements within IK systems
- document the case studies described at the forum
- identify key learnings and common themes from the case studies
- provide a resource for First Nations interested in gathering, documenting and sharing their IK
- guide both First Nations and government on considerations for IK sharing and use
- suggest next steps

3. Overview of the Forum

The Indigenous Knowledge Forum drew approximately 100 attendees from throughout British Columbia. Many attendees were Indigenous, including elected or hereditary leaders, Elders, knowledge holders, natural resource managers and technicians, and community members. Representatives from Fisheries and Oceans Canada, provincial government agencies, and academic institutions also attended, as did several FNFC staff and contractors.

The forum opened with words of welcome and a song by Alec Dan, Musqueam First Nation. Deana Machin, Syilx Nation and FNFC Strategic Development Manager, then welcomed attendees and set the context for the meeting. Saul Milne, Cheam First Nation and facilitator for the forum, reviewed the agenda and then invited the first speakers to address the gathering.

Attendees heard seven presentations on the first day and two on the second day. Dr. Jeannette Armstrong, Syilx Nation and Associate Professor of Indigenous Studies at UBC-Okanagan, gave a broad look at Indigenous Knowledge systems. This presentation, which is summarized in section 5, set the stage for better understanding the five presentations that provided case studies from individual Nations with experience at gathering, interpreting and sharing their IK within the context of specific projects. These case studies are summarized in section 6, and key learnings and common themes that emerge from them are discussed in section 7. Two presentations provided considerations for Indigenous Knowledge sharing and use, specifically relating to how Indigenous and Western science can be woven together and to intellectual property issues. These considerations are discussed in section 8. Fisheries and Oceans Canada also presented information on the *Fisheries Act* amendments as related to considering IK in regulatory approvals.

4. Indigenous Knowledge Systems

The En'owkin Centre in Penticton, BC, has been involved since 1979 in helping First Nations gather and use their IK in their communities. As a Syilx member, Dr. Jeannette Armstrong has been part of this process, and as a Canada Research Chair, she has had the opportunity to collect and characterize Syilx stories—*captikw*—to examine how they were used to govern food systems and other aspects of life. Her presentation to the forum centred on her learnings from these experiences.

Knowledge comes directly to First Nations people from the land and the water, and they then use that IK to understand and make decisions about ecosystems. For the Syilx and many other Nations, IK is built over thousands of years and is passed orally from generation to generation. This oral history contains accounts of history, science and philosophy. IK has many elements: it is based on long-term relationships to protect the regeneration of place, and it describes a whole-systems world view. IK can be considered as descriptive data based in real-life practices and observations from people active on the land and in the home.

First Nations must create their own academic knowledge and assert their authority through their IK. It's critical that IK not be labelled or set aside as “folklore” or “historical knowledge.” On the contrary, IK is a wisdom based on the ethical reasons for making a decision, and it emphasizes caring for the whole system over a long period of time. The basis of this wisdom can be described by four Rs:

1. *Relationship*—developing a relationship that is genuine and in-depth.
2. *Respect*—having sensitivity for cultural protocols and requirements.
3. *Responsibility*—looking after and sharing knowledge in a responsible way.
4. *Reciprocity*—giving back to the land (for example, with ceremonies).

The primary code is to take only as much as needed and always to allow enough to remain in the ecosystems for regeneration. For this to work, IK can't simply be a way of knowing; rather, it's the long-term cultural relationship necessary to understand and consider the whole system over time. This view differs markedly from the settler management philosophy of identifying for-profit interests in individual species over short timelines (the time a politician is in office, or the time designated for a project to run).

Ecological IK (also called Traditional Ecological Knowledge, or TEK) includes a host of descriptive data that has been passed down through oral communication over many generations. It can include population-level information such as species occurrence, distribution, habitat requirements, population size, movement patterns, migration routes, changes over time and environmental threats. On a species level, IK can include information about body condition, health indicators, disease cycles, species interactions, predators and symbiotic hosts, among other data. These types of information are of interest to Western scientists, but a critical component needs to be considered: the cultural aspect and how First Nations view the system as a whole.

For example, First Nations consider that all organisms have knowledge, not just people, and all organisms use their knowledge to live sustainably on the land. This way of thinking differs from Western science, in which organisms are viewed as "objects." For First Nations, therefore, organisms are symbols that can tell a story about the ecosystems they live within. In Syilx territory, four main characters or chiefs represent the whole system. They are:

1. *the chinook salmon*, which teaches about water and the need to protect and take care of lakes, rivers and wetlands;
2. *the black bear*, which informs about mountain systems and the need to protect and take care of land;
3. *the saskatoon berry*, which imparts knowledge of food gathering; and
4. *the bitterroot*, which blooms briefly and then hibernates as a root below ground and instills the need to care for the ground.

Of these four chiefs, the salmon and bear are represented by the male protocols in fishing and hunting, while the berry and bitterroot are represented by the female protocols for food preservation and harvesting. Therefore, women's knowledge differs from men's knowledge. Neither is more important than the other.

Knowledge resides not only in Elders but in young people too. IK is based in both traditions and active use, so the young people who are out on the land hunting, fishing and gathering have knowledge that is equally valuable as the knowledge contributed by Elders. The people processing food also have valuable knowledge about how quality or size of a resource may be changing. There must be active use of a resource to adequately build and pass on IK, which emphasizes the need to teach children and youth about practices on the land and water. For example, without active salmon fishing, the knowledge of sockeye salmon was being lost in the Okanagan because these fish were unable to return to the lake and river system. With knowledge contributed by Elders who recalled this resource and the learnings from generations past, the Okanagan people worked to restore the sockeye salmon population to the

Okanagan system. Now with active use of this resource again possible, the youth can be involved and learn, and the IK will continue.

Sources of ecological IK include oral narratives from Elders and specialist knowledge holders, contemporary Indigenous harvesters and food processors, resource and ecosystem managers and technicians, published historical materials, management data reports, Indigenous food maps that include story mapping as well as place names, and other environmental assessments.

5. Community Experiences with Indigenous Knowledge: Five Case Studies

The following case studies were presented at the forum.

5.1 Tla-o-qui-aht knowledge systems

Saul Milne, Cheam Nation, and Terry Dorward, Tla-o-qui-aht Nation, spoke about the importance of the Tla-o-qui-aht Nation Traditional Resource Committee for doing Indigenous research.

The Tla-o-qui-aht Nation currently occupies the villages of Esowista, Ty Histanis and Opitsaht on the west coast of Vancouver Island. In former days, the chief would form a committee of advisors with skills in particular areas when a decision needed to be made. This format sought knowledge and wisdom from others in the community so the chief could make a sound decision. To fulfil this function today, Tla-o-qui-aht's *hawit* and elected Chief and Council passed a Band Council Resolution in May 2015 to support the creation of a Traditional Resource Committee (TRC).

The TRC comprises Elders, students, fishers, fisheries workers, tribal parks guardians and others to participate in and guide knowledge production. The TRC always meets over a meal in one of the Tla-o-qui-aht villages. The committee's purpose is to:

- help develop research project accountabilities,
- participate in priority setting,
- build awareness in the community, and
- provide guidance, feedback and advice to researchers on analysis and interpretation.

Indigenous research methodologies have three layers:

1. *First-person reflexivity*, which means the researcher “talking” to themselves to understand their own power and privilege.
2. *Inter-personal reflexivity*, which is the interaction of one person with another.
3. *Collective reflexivity*, which is making sense as a group.

It is with the third of these layers that the TRC is working to keep individuals accountable as the committee members collectively create a research protocol for transferring knowledge. Next steps will

involve digitizing and centralizing Tla-o-qui-aht research and knowledge and then evaluating it to ensure accuracy, since some historical accounts are inaccurate. Finally, the TRC will assist with developing a community research plan to move toward the larger commitment of community-based knowledge production.

An important aspect for the Tla-o-qui-aht Nation is to have their knowledge brought to the PhD level and be part of the research dialogue in order to tackle large issues like climate change and contribute solutions found in IK. To this end, the Tla-o-qui-aht Nation is involved through the TRC in two multidisciplinary projects:

1. Fish WIKS, which aims to identify the commonalities and differences in IK systems across the Pacific, Arctic, Inland and Atlantic regions of Canada. The project is interested in how knowledge is generated, transmitted and effectively used, as well as the “rules” related to valuing, owning and controlling knowledge.
2. EPIC4 (Enhancing Production in Coho: Culture, Community, Catch), which is developing and using genomics tools to address challenges surrounding coho salmon. The Tla-o-qui-aht Nation is involved specifically in exploring the social-ecological values of community, society and cultural groups as they relate to coho salmon aquaculture and protection of wild coho populations.

5.2 Bella Coola River eulachon

Megan Moody, Nuxalk Nation, spoke about Nuxalk Knowledge and *sputc* (eulachon) in the Bella Coola River. In the past, *sputc* were a significant resource for the Nuxalk people, who had four main village sites, all with eulachon runs. With the arrival of smallpox and subsequent devastation, the four villages came together at Bella Coola. There, they continued to fish the eulachon when they returned to rivers in the early spring. This small silvery fish was a nutritious food source, and its grease was used both as food and medicine. *Sputc* were also traded with neighbouring communities of Indigenous peoples.

The abundance of *sputc* in the Bella Coola River declined for several decades and then fell precipitously after a shrimp trawl fishery expanded into the offshore areas of the Central Coast, Queen Charlotte Sound, from 1995 to 1998. In 1999, the Bella Coola River’s *sputc* population collapsed. Since 2001, the Nuxalk Fisheries Department has conducted annual plankton surveys and found that some fish still exist in the river but at very low numbers. There hasn’t been a *sputc* fishery on the Bella Coola River since the population’s collapse, and as a result, a whole generation of Nuxalk people has lost the connection to this fish; some children have never seen or eaten *sputc*.

Megan completed a Master of Science in Resource Management and Environmental Studies at UBC in 2008, and her thesis was titled *Eulachon Past and Present*. Megan identified that, in addition to scientific research, the cultural and spiritual aspects of eulachon guardianship needed to be upheld. As a result, several events and projects were initiated. In 2014, the whole community came together to raise a *sputc* pole and bring back a *sputc* welcoming ceremony. The pole, which represents Raven holding a male and a female *sputc*, was raised by the river bank in the community. It is a reminder of the importance of

honouring *sputc* and taking care of the environment for continued healthy food resources. The *sputc* ceremony has now become an annual community event, resurrecting an offering to the *sputc* that hadn't been conducted for more than 100 years.

Simultaneously in 2014, the Nuxalk stewardship office began a project to collect Nuxalk knowledge from a wide variety of sources and to produce a book of *sputc* for the community. The book includes stories about *sputc* and quotes from many community members, historical photos, Nuxalk language (including a glossary), artwork, maps and diagrams. The Nuxalk knowledge captured in the book encompasses local science, family rules, ancestral laws, and fishing and grease-making practices. The project leaders began this IK project by visiting the Hereditary Chiefs. The raising of the pole and *sputc* ceremony were an important initiation to the project, because they provided background and momentum for the community to become involved in the *sputc* book project. As the process of collecting IK got underway, the people conducting interviews found that their methods needed to change: interviews weren't an adequate or appropriate way to consolidate this knowledge. They needed to have conversations with many people who came forward with stories and information to contribute outside of a formal interview setting. When the final product was ready in 2017, the project leaders again visited the Hereditary Chiefs for sign-off on the completed book.

The lessons learned during this knowledge-gathering project were many. Knowledge is complex, so gathering and documenting IK required broad engagement with community members. It was critical to follow cultural protocols, respect Indigenous governance and decision-making processes, value local experts and relationships, and incorporate ceremony and cultural practice. As the project unfolded, it was clear that IK had to be learned and interpreted in place by members of the community, not by outsiders. The research component of the project also took significant time, human resources and financial resources. Lessons related to IK and to the *sputc* project process more generally are documented in a PhD thesis written by Rachelle Beveridge (also present at the forum) and related academic papers co-authored with Megan Moody.

The project and its final product—*Alhqulh Ti Sputc, The Sputc Book*—have served to rekindle a sense of pride and identity within the Nuxalk community. The book provides a tangible example of how an Indigenous research process can play out, and it can now be used for knowledge sharing among generations within the community. With a common vision of the community's shared responsibility for *sputc* and the legitimacy of local management, there is a renewed sense of purpose and hope that the IK can now be applied to guide *sputc* management.

5.3 Thompson River steelhead

Michelle Walsh, Nadleh Whut'en, works for the Secwepemc Fisheries Commission and is mainly involved in the Thompson-Shuswap portion of Secwepemc traditional territory, but also on occasion in the mid-Fraser and Columbia portions.

The Secwepemc Nation were invited to provide their IK to the COSEWIC process for assessing Thompson River steelhead. The Secwepemc viewed this request as an opportunity to have their voice heard and to

add to the science and recovery efforts for steelhead. However, the Secwepemc Fisheries Commission also recognized that many people had questions and concerns about providing information and how it would be used. The Secwepemc Fisheries Commission therefore decided to develop a more formal framework for providing IK and also for protecting it.

The intent of this project was to create a living document and template to guide Secwepemc communities as they assess the benefits and risks of providing IK and as they determine when, what and how to share their information. The project identified four steps in planning for IK engagement:

1. Research the processes that require IK

The project leaders researched the requirements and needs of the SARA and COSEWIC processes and developed a background document for Secwepemc communities to better understand these processes and where requests for IK originate.

2. Survey communities to identify their research capacity

The project leaders gathered information from Secwepemc communities about their staff and data-gathering systems, their financial resources, their project coordination methods including involvement of Elders and fisheries committees, and their needs with respect to project management and funding.

3. Develop IK tools specific to fisheries

Working with Dr. Marianne Ignace, professor in the Department of First Nations Studies at Simon Fraser University, the project leaders developed a research methodology and information-sharing protocol. These were published in October 2019 as a document titled *A Planning Framework for Accessing and Using Aboriginal Traditional Knowledge for Secwepemc Community Fisheries*.

4. Test the IK tools

The project leaders used Thompson steelhead as a real-life example to test the IK tools and to then provide Secwepemc IK to the COSEWIC status assessment for this fish population. As part of the IK tool testing, the project leaders reviewed published and unpublished literature, including past interviews. They also held both group and individual interviews, conducted community workshops and focus groups, and solicited input to create maps of steelhead streams. During this testing phase, the project leaders identified two essential components to requesting and collecting IK: first, obtain approval to go ahead from Chief and Council, and second, prepare interviewees. Prior to conducting the interviews, participants received background information about the project, including the purpose and use of the IK that was being collected. This information was provided by telephone or email or in person. Taking this step helped the interviewers make the most of the time during the interviews, because participants understood and were able to engage in the process.

Next steps in this project are now to work with communities to add IK to their own databases so they are ready for future opportunities to apply the IK tools when requests come in. In addition, a standardized interview template is being developed.

5.4 Upper Fraser white sturgeon

Darren Haskell, Tl'azt'en Nation, spoke about Nechako River white sturgeon, which range through the Nechako and Stuart Rivers and spawn on the Nechako near Vanderhoof. This sturgeon population is struggling; the population has declined during the past 50 years from more than 5,000 individuals to about 644. A significant issue for the population is the recruitment of juvenile fish; in other words, young fish are not surviving to reach their active breeding age, which begins at approximately 25 years old.

The Tl'azt'en Nation Fisheries Department initiated an IK project to raise awareness among Tl'azt'en community members about conservation issues related to Nechako white sturgeon and to gather IK about this fish population. The goals were then to summarize the information collected, identify potential projects from the IK gathered, and also create a framework to assist future IK gathering. Before moving ahead, the project concept was presented to Chief and Council.

In implementing this project, the project leaders encountered several challenges during the interview stage. First, trust was an issue. People were very hesitant to describe encounters they had had with sturgeon because of concerns about being fined or having their nets confiscated. There was also concern about how IK would be handled and stored if it were provided to a government department. The project leaders addressed trust-related concerns by establishing a sharing agreement with the First Nations–led UFFCA (Upper Fraser Fisheries Conservation Alliance). In this way, information was being shared with a First Nations organization, not directly with the government. Interviewees signed consent forms before giving interviews. The IK shared during interviews is owned by the Nation and cannot be released without consent. The final project report was reviewed by the Nation before being submitted elsewhere.

A second challenge was with language barriers. Some of the Elders were confused by biology terms used during the interviews, so a fluent Carrier language speaker was hired to ask the interview questions in Carrier. Being well known in the community, this translator made the interviewees feel more comfortable with the process as well. Once the knowledge holders understood the questions, they often spoke at length as they related stories of sturgeon.

A third challenge was how to develop a questionnaire that was sufficiently clear and concise to be able to gather relevant information. Initially the questionnaire had open-ended questions, but this allowed for too wide a range of commentary. The questions were made more specific to hone in on specific information about the sturgeon population. The project leaders held mock interviews to test the fluidity of the questionnaire.

While holding interviews out on the land or water rather than in a room can solicit more information or more accurate information, getting out can be difficult physically for many of the Elders. Therefore, during each interview, a map was used to help identify locations on the land. This, too, proved to be hard for some Elders who weren't used to reading maps. In these instances, the Carrier language translator was especially valuable for providing place names to prompt Elders' memories.

The 28 interviews conducted over a two-year period were transcribed and maps were made of locations identified during the interviews. A final report and the maps will assist in further investigative work in identifying additional habitat for Nechako white sturgeon. In addition, some of the areas noted by interviewees will be investigated to learn more about habitat conditions and sturgeon activity.

5.5 Okanagan River chinook

Dr. Jeannette Armstrong, Syilx Nation, gave a second presentation during the forum to present a successful IK gathering project with Okanagan River chinook salmon. The Okanagan Nation Alliance began its chinook project in 2005 when Elders indicated that the chinook were in trouble, in part due to downstream dams and in part due to the 1974 Boldt decision in the United States. This decision meant that 50 percent of salmon could be taken by the Columbia tribes along the river before the fish ever reached the Okanagan River system.

The Syilx Chiefs put forward a proposal to assess Okanagan chinook as a separate population or designated unit (DU), and a report including both IK and Western science was prepared. As a result, the Okanagan chinook population was assessed by COSEWIC as endangered. However, in 2006 the status was lowered, for political reasons, to threatened. A review in 2016 returned Okanagan chinook to an endangered status.

Jeannette was a member of the Aboriginal Traditional Knowledge (ATK) subcommittee that meets as a part of the COSEWIC process. The ATK subcommittee has two co-chairs and ten members: two nominated by Inuit Tapiriit Kanatami, two by the Métis National Council, two by the Native Women's Association of Canada, two by the Assembly of First Nations and two by the Congress of Aboriginal Peoples.

The committee's role is to assemble the best possible Indigenous Knowledge to both confirm and contest the science being put forward for each species assessment. The committee goes through four steps in its work:

1. Is there likely to be ATK available for the species in question? (ATK Prioritization Report)
2. Is there any published ATK? (ATK Source Report)
3. Is the ATK in published reports suitable for status listing purposes (ATK Assessment Report)
4. Is there a way to gather available ATK that hasn't been documented? (ATK Gathering Report)

When it came to the COSEWIC review of Okanagan chinook in 2016, Jeannette was able to use her skill as a fluent Syilx speaker to help with gathering ATK from Syilx community members. It was important to start with a collective gathering, not with individual interviews. The group decided that they wanted to proceed only with a group interview, not individually. Interview sessions were then conducted using traditional En'owkin dialogue protocol, which helped to build trust among the participants.

6. Considerations for Indigenous Knowledge Sharing and Use

6.1 Weaving ATK and Western science

Kii'iljuus Barbara Wilson, Haida Nation, and Dr. Anne Salomon, a professor at Simon Fraser University, talked in tandem about weaving ancient knowledge and Western science to support resilience in aquatic ecosystems. In their work, they have tried to bring together these different knowledge systems, which at times don't mesh well. They described three case studies in which knowledge systems were successfully integrated:

1. Sea otters and kelp forests

The Coastal Voices project is addressing the social, cultural and ecological challenges from sea otters returning to the west coast. For example, one of the areas being discussed by Coastal Voices is how to find a balance between otters and people both seeking food (sea urchins) to which they have a right. The research is being done under the free, prior and informed consent of the Nuuchahnulth Council of Ha'wiih, the Haida Hereditary Chiefs table and the Heiltsuk Hereditary Hemas. Project team members went first to each Hereditary Chiefs council with the research idea and then followed the protocols of these Hereditary Chiefs tables, which voted in favour of co-developing and guiding the research. A steering committee was assembled with hereditary leaders, cultural advisors and research team members to collect and share information about coastal ecosystems and communities. Everyone involved in the project works together using the traditional principles of *Xaayda Kil Yahdas* and *Gvi'ilas* (Laws of the Ancestors), *Yahguudang dlljuu* (Respectful Acts) and *Tll yahda* (To Make Things Right).

The project's goal is to provide resources to help communities and policy makers decide how to manage different situations as sea otter populations recover along the west coast. Their work has included community exchanges to share information, quantitative surveys, examinations of shell layers at midden sites, comparisons of shellfish sizes between sites and between modern and ancient times, and interviews to learn about ancient management of kelp forest systems. One of the project's outputs has been a digital learning platform with videos and oral histories, which can be accessed at www.coastalvoices.net.

2. Ancient clam gardens

The Clam Garden Network is a community of First Nations, academics and resource managers who are working along the west coast to better understand and reinvigorate clam gardens and traditional clam management. The clam garden restoration project is being led by Parks Canada and is combining Indigenous Knowledge and scientific studies to restore ancient clam gardens, some of which are at least 3,000 years old. More information is online at clamgarden.com.

3. Pacific herring dynamics

Clear declines in herring populations over the past 10 years have prompted conflict and questions about why this is happening, historic population sizes and range, and issues of allocations and rights. In a series of workshops and individual interviews, Indigenous Knowledge was gathered to identify herring spawn locations on maps and to extend the historical record farther back in time. Other IK

was also collected and is being integrated with Western science. For example, the traditional practice of placing kelp seeded with herring eggs into the water can be used to gather data about the number of herring eggs lost from suspended kelp fronds. The project leaders have regular meetings with the Heiltsuk Integrated Resource Management Department's director and aquatics manager to review data and other information, and they co-publish reports and articles with Heiltsuk knowledge holders.

These three case studies show how successfully Indigenous Knowledge and Western science can complement each other for a common purpose.

6.2 Indigenous Knowledge, the law and intellectual property Issues

Merle Alexander, Kitasoo Xai'xais First Nation, spoke about Indigenous Knowledge and the law. He referenced the importance of knowledge not being just an input to processes but being something that informs decision-making. Merle spoke about differences between Indigenous law and common law in the Canadian legal system and that work is underway to harmonize and treat them as equals, a goal that he suggested is necessary for achieving true reconciliation.

A key issue for Indigenous communities as they contemplate the ramifications of sharing their knowledge is the question of intellectual property and how their IK assets will be protected. Intellectual property is defined as the work of a person's mind, which includes Indigenous Knowledge. However, Merle noted that Indigenous people in Canada have no jurisdiction over intellectual property rights. Canada's intellectual property laws focus on conventional properties like patents; they don't capture traditional forms of IK. In some cases, current intellectual property laws relegate IK to the public domain because the knowledge is considered to be too old for protection.

However, during her presentation about Indigenous Knowledge systems, Jeannette Armstrong noted that protection of IK must be considered since there are inherent risks with sharing such information. Whether the knowledge resides with an individual, knowledge specialist, family, clan, medicine society, community, or Nation or language group, there may be unintended consequences of sharing the information. Therefore, protection filters should be applied to avoid the risk of knowledge being inappropriately disseminated as public information, and to avoid the risk of sacred or culturally sensitive information being released in unintended ways. There may also be legally sensitive situations where certain IK should be withheld or protected. Ultimately, the sharing of IK and its analysis and interpretation must be done in ways and with protections in place that ensure the information is applied only for the desired purpose.

These types of issues about IK sharing and intellectual property protection extend beyond Canadian borders and are being examined internationally. For example, the Nagoya Protocol was adopted in 2010 and came into effect in 2014 as a supplementary agreement to the United Nations' Convention on Biological Diversity. The protocol focusses on the fair and equitable sharing of benefits that come from genetic resources (often termed as "access and benefit sharing"), and it includes traditional knowledge

related to uncovering those resources. The Nagoya Protocol is a legally-binding international agreement that has been ratified by 124 parties, but Canada is not among them.

While there are many unknowns and uncertainties with protection of IK as intellectual property, there has been some analysis done by the World Intellectual Property Organization (WIPO) specific to Indigenous Knowledge. In 2017, WIPO published a report titled *Documenting Traditional Knowledge—A Toolkit*. This report describes ways to document Traditional Knowledge, which includes both Indigenous Knowledge and Community Knowledge, and discusses legal protection and intellectual property issues, including rights to the knowledge itself and rights to the documentation process. A key issue is that documenting knowledge in print, audio, video, database or other ways could result in the knowledge holder(s) losing control of the information, its interpretation and its application. Therefore, protecting the knowledge is a key aspect of ensuring that it is not used inappropriately or without consent. The report briefly discusses two forms of intellectual property protection: (i) positive protection gives knowledge holders the right to use the knowledge for their own purposes, and (ii) defensive protection gives knowledge holders the right to prevent people not from their community from gaining rights to the knowledge.

The WIPO report stresses that knowledge holders must think carefully about a request to share their knowledge and should consider whether the benefits of sharing their information outweigh the risks. If the decision is to go ahead with sharing knowledge, then the project to gather and document the knowledge needs careful planning. Project methods must be clear so that participants can provide prior informed consent, and specific objectives must identify how the knowledge will be interpreted and applied and by whom. In addition, the project planning should identify potential risks and how they will be minimized.

In addition to discussing the above in more detail, the WIPO report includes a series of worksheets and checklists to help project leaders and knowledge holders identify reasons for a knowledge documentation project, objectives for the project, the people who would be involved in the project, the users and uses of the information gathered during the project, and applicable intellectual property and other legal aspects. In an appendix to the report, a hypothetical knowledge documentation project is described with a discussion of considerations before, during and after documentation. Another appendix provides examples of Traditional Knowledge registers and databases from countries around the world.

For more information, consult WIPO's Traditional Knowledge page (www.wipo.int/tk/en/) and Indigenous Peoples and Local Communities Portal (www.wipo.int/tk/en/indigenous/).

To read the WIPO report and use its toolkit component, go to www.wipo.int/edocs/pubdocs/en/wipo_pub_1049.pdf.

7. Key Learnings and Common Themes from the Forum

The case studies highlighted different situations and the ways in which diverse communities approached one or several aspects of gathering, interpreting, applying and sharing their Indigenous Knowledge. Each case study is unique in its specifics, yet they contain overarching similarities and common themes. The case studies and other presentations given at the forum provide ten key learnings.

7.1 Indigenous Knowledge has a holistic, connected nature

The speakers emphasized again and again that nothing exists in isolation. For example, to understand the health of fish, it's important to know the health of the surrounding forests. Connections and interactions weave throughout ecosystems. In her second presentation, Jeannette Armstrong mentioned the narrow focus of the *Species at Risk Act* by considering individual species rather than assessing biodiversity at a broader scale to understand the health of habitats and whole systems. When IK holders relate information, they speak about whole systems.

7.2 Both past and present Indigenous Knowledge have value

We frequently think of IK having a historical element, in that the information relates to past circumstances. While there is much valuable IK about historical conditions and in some cases an urgency in gathering and documenting this IK before it is lost, there is also value in present-day IK. The people who are involved currently in harvesting, gathering and preparing resources have information to contribute, as do people in the community who work as resource managers, technicians and guardians. All of these people are out on the land in some capacity, and therefore, they witness current conditions and changes first-hand.

7.3 Open communication and consent are critical

Open communication and consent are critical elements on several levels. Within a Nation, knowledge holders must be made fully aware of the ways in which their IK will be documented and potentially shared so that they can give their informed consent to providing their IK. Likewise, each Nation solicited for IK by the government needs to understand how their information will be incorporated into decisions.

Knowledge holders want to pass information to the next generation, and communities want to share their knowledge to help recover species, but in both cases, they need to be assured that their IK will be valued and respected. Part of this respect involves allowing adequate time for knowledge transfer. Requests for information should be initiated early in a decision-making process to allow adequate time for a Nation to consider and discuss the request before providing their information.

Also of concern is how IK will be protected once a Nation has released it. The issue of intellectual property was discussed in section 7.2 and remains an unresolved element of the IK discussion.

7.4 Indigenous Knowledge gathering and sharing involves communities and community infrastructure

All of the case studies presented at the forum touched on the community aspect to gathering and sharing IK. In the same way that ecosystems function as interwoven connections, so does IK. No single person holds all the information; instead, each piece of information contributes to making a whole picture. For example, each member of a family might hold a piece of a story, or different groups within a community, such as women, harvesters, processors, etc., may each have knowledge that, once combined, tells a complete story. Therefore, it can be important to interview people in family groups and to interview members of the community who have different roles or positions. There is also a need for efficiency at gathering information, because with multiple requests coming in, Elders and other knowledge holders become fatigued.

In terms of community infrastructure, there are practical considerations for gathering IK. Appropriate venues are needed to bring people together, and support is required to help knowledge holders, especially those who are elderly, get to meetings to provide their information.

Another element to the knowledge gathering and transfer process is how to engage youth. They are the next generation and need to understand and have a vested interest in the natural resources. Without their understanding and involvement, the long-term outlook for species and habitats will be grim. Youth need to not only grow into being knowledge gatherers and holders themselves, but also to become advocates for the resources and for the appropriate application of IK to sustain those resources.

7.5 Cultural differences exist in conservation practices

Cultural and traditional practices play a significant role in how ecosystem conservation and species stewardship are practiced. Darren Haskell related a story during his presentation that explains this perfectly: A few years ago, a First Nations person found a dead white sturgeon in the Nechako River. The community's cultural practice dictated that all parts of a fish should be used, not wasted, so the person took the fish and distributed meat to family and other community members. By contrast, the *Species at Risk Act* dictates that an endangered species such as white sturgeon cannot be killed or harmed; a dead fish must be left in the river. The situation led to conflict between the First Nations person and a DFO enforcement officer.

On the other hand, First Nations do not understand the purpose of and rationale for the catch-and-release fisheries authorized by federal or provincial agencies. This practice of catching fish that are not intended as food or for ceremonial purposes is considered disrespectful and harmful to the resource.

These kinds of cultural differences can create serious misunderstandings and rifts between First Nations and government. There needs to be improved understanding and recognition of different cultural practices.

7.6 Place-based differences occur in approaches to Indigenous Knowledge

Since each First Nation has distinct traditions and protocols, each Nation will approach the gathering, documenting and sharing of their IK in a different way. No one way is correct. In the context of the *Fisheries Act* requirement to consider IK, each Nation will have to decide and communicate its IK sharing protocol. Government staff will have to appreciate and respect the differences between communities when soliciting IK for decision-making processes.

7.7 Indigenous Knowledge must be interpreted by the knowledge holders

Several presenters noted that IK can't simply be extracted from a community. A piece of information on its own has little value without interpretation by the people within the community, and it is inappropriate for others to interpret a community's IK. Placing IK into context within the broader community relates again to the holistic nature of IK and is integral to the information providing true value and meaning.

Therefore, First Nations need to be part of decision-making processes from the outset of a project in order to be able to provide appropriately analyzed and interpreted IK.

7.8 Gathering, interpreting and sharing Indigenous Knowledge takes time and resources

Government requests to First Nations for IK are generally made within a prescribed consultation or regulatory process, such as seeking input to a COSEWIC listing or requesting IK for a fish habitat decision under the *Fisheries Act*. These types of processes come with a government-specified timeline that may not provide adequate time or resources for First Nation communities to consider and respond to the request.

IK is not “shelf ready”—communities cannot simply consult reference books. Rather, when a request comes in, most First Nations will go through a series of steps to consider the necessary protocols for sharing their IK; decide how to undertake community-based research; go through the process of gathering, analyzing and interpreting the IK; and decide both how to communicate the IK and how to protect their intellectual property in the IK. Only then can the First Nation respond to the request that prompted this work.

7.9 Success hinges on building a joint process and developing trust

The only way to successfully attain effective and responsible management of fisheries and aquatic ecosystems is for all parties to work together in an atmosphere of trust. Megan Moody specifically noted the frustration experienced by the Nuxalk Nation during COSEWIC and SARA processes. She reported that they contributed knowledge but felt it was then altered and that inaccurate interpretations were made. They felt sidelined and were frustrated by the lack of follow-up after contributing their IK. Megan emphasized that the Nuxalk aren't interested in simply providing information into a pre-determined structure; they want to be part of the process, as well as part of the

interpretation of the science and the knowledge. Although Megan spoke only for the Nuxalk, other Nations likely feel the same way.

Therefore, from the outset, there needs to be a jointly agreed process—agreed between First Nations and government—for contributing IK to federal government processes in a manner that respects all the information brought to the table.

7.10 Indigenous Knowledge has inherent value for answering research questions

IK has tremendous value in and of itself. Therefore, it is important to avoid the trap of providing IK solely in response to government consultation and regulatory process. The presentation by Barbara Wilson and Anne Salomon demonstrated, and Megan Moody also pointed out, that IK should be integrated with basic scientific research and with partners across the board (Crown agencies, academic institutions, nongovernmental organizations). First Nations should be helping to identify research questions, plan and conduct the research, and analyze and interpret the data. Furthermore, First Nations should be acknowledged as writers of and contributors to published research. In this way, IK will be integrated throughout the research process, not just slotted in at a convenient later stage.

The most productive way forward will be for all parties to work together to identify science gaps, research questions and management issues. The goal should be a truly collaborative process that recognizes and aligns with each party's priorities, rights and responsibilities and that allows for joint decision-making from beginning to end.

8. Conclusion and Next Steps

The 1.5-day Indigenous Knowledge Forum was a stimulating and encouraging gathering where participants gained a deeper understanding of the complexities with identifying, gathering, documenting, sharing, interpreting and applying Indigenous Knowledge. IK is not one thing for First Nations communities and peoples; IK integrates language, ceremony, culture, traditional practices, laws and governance, food and medicine, and each community has its own intricacies. IK as a collective brings together not only knowledge but the experiences people have had over time and the relationships people have with the environment. IK resides not just in the past but also in the present, and it relates to and can be held by any member of the community—men, women, Elders and youth.

The holistic nature of IK is a vital concept for First Nations; separating out specific pieces of information for individual species won't necessarily be possible in the context of IK and its all-encompassing nature. This in part indicates why it is so critical for First Nations and government to work together on fisheries and aquatic ecosystem projects and decisions. First Nations must be the ones to translate, interpret and help analyze the IK that comes from their communities and that they choose to share more broadly for benefit to all. Only then can the IK be understood in its right context and truly contribute to successful resource stewardship.

Given the diversity of cultural practices and traditions among the First Nations in present-day British Columbia, there is no one way in which IK can or should be accessed and incorporated into decisions. There are nuances that must be considered on a community level and there are trust issues that must be addressed broadly across many, if not all, communities. The need for collaboration is paramount, with First Nations and government coming together on equal footing to identify research questions and develop management plans. These collaborative relationships will take significant investments of time, energy and open-mindedness on all sides.

To build the necessary relationships and further the sharing and use of Indigenous Knowledge in decisions related to fisheries and aquatic ecosystems in BC, there is work to do, including:

- Taking time to build common understanding and trust
- Discussing how IK will be integrated in government decisions
- Involving First Nations in a meaningful way, while recognizing the different comfort levels in different Nations
- Being accountable for how information is stored and used; accountability needs to operate in both directions between First Nations and government
- Identifying how the intellectual property rights of knowledge holders and communities will be recognized and protected

First Nations and government appear to have the common goal of achieving success at preserving ecosystems and species and at restoring those that are already endangered. This goal can only be achieved by everyone bringing knowledge and information to the table as equals and working together in an atmosphere of trust and respect.