FISH AND FISH HABITAT PROTECTION PROGRAM (FFHPP)
Fish Habitat Restoration Priorities
In-depth interviews

Fish Habitat Restoration Priorities In-depth Interviews | Fish and Fish Habitat Program (FFHP)

Summary Report | Final

Based on its commitment to Indigenous engagement related to the [Fish and Fish Habitat Protection Program](#) (FFHPP), NWAC invited Indigenous, women, girls, and gender-diverse people to contribute to the **Fish Habitat Restoration Priorities** in-depth one-on-one interviews.

The interviews were held as a follow-up to three Fish and Fish Habitat Restoration Priorities roundtable online discussions that occurred on **July 18, 21 and 25 2022.** The interviews included several participants from the roundtables. Interviewing the roundtable and other participants allowed for a deeper dive into some of the concerns raised during the roundtable discussions. The duration of the one-on-one interviews was approximately one hour.

During the interviews, NWAC sought the perspectives of Indigenous women, girls, and gender-diverse people to identify objectives and opportunities related to fish habitat restoration.

The one-on-one interviews relate to the work of Fisheries and Oceans Canada (DFO) in Developing a Framework to identify Fish Habitat Restoration priorities. Contributions will be used to propose improvements to the framework.

The interview questions were framed around four themes:

A. Preserving the values Indigenous women, girls, and gender-diverse people derive from fish and fish habitats
B. Identifying climate and non-climate impact on the values Indigenous women, girls, and gender-diverse people derive from fish and fish habitats
C. Fish habitat restoration priorities and land use change across landscape scales
D. Fish habitat restoration priorities and Indigenous treaty rights

About the research

The Fish Habitat Restoration Priorities Interviews consisted of 18 one-on-one interviews led by the Native Women's Association of Canada between August 15th and September 1st, 2022. Participants were recruited using an open online call.

Participants were limited to Indigenous women, girls, two-spirit and gender-diverse people from across Canada with extensive local and or professional knowledge and or lived experiences in:
- Recreational and or commercial fishing
- Fish and fish habitat conservation and
- Fish habitat restoration

The thematic areas and questions were selected based on a list of considerations and conditions for selecting restoration priorities:

Considerations for selecting restoration priorities	List of conditions
Ecological conditions	• Improve conditions for aquatic species • Address threats related to invasive aquatic species • Mitigate impacts against climate change • Leads to improvement in landscape connectivity • Considers improvement to the size of the area restored • Considers habitat improvement that benefits multiple species • Considers improvement to habitat buffers around unique, sensitive, or protected areas
Socioeconomic consideration	• "Improves habitat in areas that are economically valuable or recreational fisheries"
Cultural considerations	• Address restoration priorities that have been identified by Indigenous people

The interview questions were framed using the considerations for selecting restoration priorities in the table above and three broad guiding questions namely:

1. How does the degradation of fish and fish habitats and measures that respond to degradation affect Indigenous values?
2. How can Indigenous knowledge about the preservation of Indigenous values and the protection of Indigenous treaty rights contribute to the identification of **opportunities** and the development of **objectives** related to fish and fish habitat restoration?
3. How could Indigenous knowledge and the preservation of Indigenous values contribute to the **identification of priority** actions for fish habitat restoration?

The interviews also utilized a values-driven, gender-based approach that:

1. Gives a gendered voice to Indigenous ideas and ideals, by including and mainstreaming gender and Indigenous values as a central feature in policy-making related to fish and fish habitat protection
2. Frames fish as fish habitats as **social-ecological systems** that are closely connected to life and livelihoods in Indigenous communities
3. Acknowledges that Indigenous life and livelihoods are affected by the **cumulative effects** from both **climate and non-climate impacts** on fish and fish habitats
4. Includes gender identities as important elements of decision-making processes related to the governance of fish and fish habitats
5. Recognizes **fragmentation** (disconnection and conflicts) as natural features of decision-making processes related to fish and fish habitat management
6. Acknowledges the protection of treaty rights as a central feature of fish and fish habitat governance
7. Acknowledges the value of **two-eye seeing** in **knowledge production** and **social learning processes** related to fish and fish habitat protection

NWAC conducted one-on-one interviews between August 15th and September 1st, 2022.

Methodology

Executive summary – key interview results

A **Food support is seen as the main benefit of fish & fish habitats for Indigenous women, girls, and gender-diverse people, as well as for the broader community**

Interview participants most often mentioned food support as the benefit they think Indigenous women, girls, and gender-diverse people receive from fish and fish habitats. They also mentioned food support as the top benefit that the broader community receives from fish and fish habitats. Participants mentioned that food support is also the most important benefit for them personally. They also said that it is important to protect the benefits Indigenous women, girls, and gender-diverse people derive from fish and fish habitats because it is linked to their culture and traditions.

B **Water quality, fish health and population size are the main changes observed in and around fish habitats, human activity and climate change are seen as mainly responsible for these changes**

Participants said they have observed changes like a decrease in water quality in and around fish habitats or other sources of water in their community. They also mentioned changes in fish size and health and reported noticing smaller fish populations than in the past. When asked what they think is responsible for those changes, participants said they believed it is mainly human activity in and around fish and fish habitats like fishing for instance, but also climate change. They indicated that, in response to these changes, they have started fish population protection and restoration activities like banning fishing at certain times of year in some locations, creating hatcheries, as well as educating the people that live around fish habitats.

When asked specifically about the role that climate change plays in the changes in and around fish habitats in the communities, nearly all participants believed that climate change is at least partly responsible for these changes. They say they have noticed increasingly extreme changes in seasons and weather events. This has, in turn, forced them to change their approaches when it comes to fishing because fish are moving to different locations compared to the past (mainly further North to cooler waters).

Executive summary – key interview results (cont'd)

C **Impacts of land use changes in urban areas or inland watersheds on fish and fish habitats**

Sixteen out of eighteen participants were able to think of at least one type of land-use change occurring in or near their community with logging being the most frequently mentioned activity. Participants believe that fish and fish habitats have been affected by pollution (waste, noise and light pollution) as well as landslides due to root systems being destroyed.

Participants mentioned that education and raising awareness about the effects of land use change on fish and fish habitats, as well as habitat restoration activities like planting trees should be done to reduce the negative impacts of land use change in urban areas or inland watersheds on fish habitats

D **Most of the participants do not believe measures to restore fish habitats could interfere with their rights, if done in consultation with them**

Some participants (seven out of eighteen) mentioned that they have been prevented from fishing or using fish habitat resources, due to policies or rules that prevent fishing during certain times of the year or at certain locations. Eleven participants did not mention anything when asked how measures to restore fish habitats could interfere with the rights of Indigenous women, girls and gender-diverse people to access fish or to access other benefits from habitat resources. The remaining participants said if Indigenous women, girls and gender diverse people are included in conversations around restoration efforts, there should be no interference with their rights. Similarly, participants indicated that engagement with, and inclusion of Indigenous women, girls and gender-diverse people is the main action that can be taken to prevent fish habitat restoration measures from interfering with their rights.

THEME A:

Preserving the value Indigenous women, girls, and gender diverse people derive from fish and fish habitats

QUESTION:

A. How do you benefit from fish and fish habitats within your community? E.g., food support, recreation opportunities, spiritual and cultural fulfillment, economic empowerment, and environmental protection.

B. Why do you think it is important to protect the benefits Indigenous women, girls, and gender-diverse people derive from fish and fish habitats

Benefits and importance of preserving fish and fish habitat to the community

Food support, cultural and spiritual fulfilment

- Food support, spiritual and cultural fulfilment as well as environmental protection are seen as important benefits that should be preserved

Preservation of culture and tradition

- It is very important to protect culture and traditions.

Preserving nature for future generations

- It is also important to preserve the balance of nature for future generations

"

Definitely food for my family; that is our main goal of going out and catching salmon. We share with our parents, other families, and friends.

As an Indigenous woman, self-identified and naturally born, I benefit from healthy fish and fish habitat because not only does it offer extra sustenance to my family (cost of living in the north is extremely high and we are already low on resources and relocating is not something I want to do because I want to heal my family culture and bring traditions back) but also spiritually so that I can connect with my culture.

Carries on tradition - cultural tradition - that was somewhat lost. You feel like by keeping on preserving salmon, canning, it allows you to still have a connection to the past. And also have a really true source of food for our family that is so healthy - not processed.

We have to show the little ones how to do this - how to live and self-sustain yourself if you have to. It is part of our culture. It is what we do. We rely on that food source and we pass the knowledge down to the next generation. Without that fish source we cannot teach our young how to harvest those fish - whether it be dip netting or spearing - and it is very important that we pass those traditions down

"

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QUESTION:

A. How do you think the broader community benefits from fish and fish habitats?

B. Of the benefits you just mentioned, which would you say are very important - or most important - to you? Why?

Benefits and importance of fish and fish habitats to the community

Food support and community connection
- Food support and bringing the communities together are seen as important benefits derived from fish and fish habitats, especially for elders or the disabled.

Food support and environmental protection
- Environmental protection is also seen as an important benefit

"
In the last 10 years things have changed. We were a fishing village in the past and we were really small […]. Our fleet is small and we have to go to a dock off reserve, but our band has a boat to do community fishing. Seeing people on that boat from all different cultures attempting to learn to fish; there was something that put it in their instinct to go and try. People from surrounding communities come to a dinner and there is fish there but they do not always know where it comes from.

If we did not have fish and good fish habitat a lot of people' livelihoods would be gone. I have seen that with the cod moratorium. It brings families together, and those who do not have access to a boat or cannot get fish themselves, such as elders, benefit as the community is like a family, everyone shares food from the land/sea, people will not go without food.

#1 is environmental protection. We need to protect it in order for everything else to be there. I teach my children about why, when DFO closes the river down, we should not go out poaching. There is the food aspect, and we need to eat but we do not depend on the fish all year round to survive (there is a grocery store) and it is also our cultural right to make sure there is salmon here for our great grandchildren.
"

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THEME B:

Identifying climate and non-climate impact on the value Indigenous women, girls, and gender diverse people derive from fish and fish habitats

QUESTION:

A. What changes have you observed in and around fish habitats or other sources of water in your community? (E.g., changes in fish size, emergence of invasive fish or plant species, reduction in fish catch or changes in water quality, fish kills, or other changes)

B. What effects, if any, do you think these changes in and around fish habitats have had on the benefits Indigenous women, girls, and gender-diverse people derive from fish and fish habitats? **(see follow-up question in slide # 11)**

Changes and effects in and around fish habitats or other sources of water

Decline in water quality

- Deterioration of water quality in fish habitats is seen as discoloration, the presence of algae, and invasive plants.

Decline in fish health

- Changes are seen in the health of the fish, including deformed fish, and changes in the size of the fish compared to what it used to be.

- The population size of the fish, and the size of the catch is not only smaller than what they used to be a few years before but there are also fewer species.

Impacts on benefits: loss of connection to culture and declines in fish population

- There are fewer fish which means that there will be a **loss of connection to Indigenous culture** since many traditions and experiences are linked to fish and fish habitats.

> "
>
> *Water quality: The water in my community is very eutrophic - very nutrient rich with an orange tint. This is an indication that there is not a balance in the water*
>
> *Change in water quality. Tumors on the fish. Declining fish populations of certain kinds of fish (e.g., pickerel). See invasive species (Goby, Asian carp, rainbow smelts) coming through and knocking out native fish and their habitat/food chain.*
>
> *We have had to change locations and not fish in certain areas anymore.*
>
> *Cultural gathering: Whenever we used to set nets before we would all get together for a fish fry. We do not have very many fish fry any more - used to have them every weekend or at least once a month and now maybe once a year.*
>
> *Decreases in fish have had a significant impact on the cultural gathering of the Temagami people, their **cultural practices,** their ceremonies, and their economy. […] That abundance that we once had just does not happen anymore*
>
> "

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QUESTION: What do you think is responsible for the changes in and around fish habitats? **(see follow-up question in slide # 12)**

Reasons for the changes in and around fish habitats

Overfishing

- Overfishing is responsible for the changes in and around fish habitats. These activities are undertaken by people who might not know how to sustainably harvest from a lake.

Industrial activities

- Changes to fish habitats are also attributed to human activities, e.g., cruise ships, fracking and oil extraction activities.

Invasive species

- The introduction of new species has also resulted in competition or wiping out the existing ones.

Climate change

- Another main factor mentioned by participants was climate change. Some mentioned that changes in the weather like hotter days and shorter winters affect the ecosystems through higher water temperatures that throw off a delicate balance that result in longer dry seasons and that cause lower water levels.

"

Lake trout population decline: Think the reduction is possibly due to climate change or maybe people taking more than their share / overfishing / not understanding how to sustainably harvest from a lake. Lake trout have a very specific kind of habitat to spawn.

Declining fish population could be because people are taking too much or due to the lack of fish habitat. Change in water quality may be due to growth of population, pressures on waterfronts, [...]. Invasive species may be a result of people releasing pet fish (e.g., Goldfish). Lower water levels are environmental. Have not had a lot of rain during the summer. Also, climate warming.

Reduction in catch is related to overfishing and climate change (increases in ocean temperatures). Would guess climate change is responsible for new species. Climate change and warming ocean temperatures responsible for change in timing of fish runs.

"

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QUESTION: How has your community responded, or how do you think your community should respond to these changes/impacts in and around fish and fish habitats?

Response to the changes in and around fish habitats

Restriction of fishing in some areas

- Banning the harvesting of certain fish for everyone including Indigenous people, or banning fishing at certain locations, or even at certain times of the year.

Creation of fish hatcheries

- Fish hatcheries have been created on various reserves to help re-populate waters with fish that have been affected by changes to fish habitats.

Public education on sustainable practices

- Education can help to create awareness of the impacts that human actions have on fish and fish habitats.

- There should be involvement of the people that live around these habitats. This will cause them to be more conscious of actions to avoid the destruction of these habitats.

"

*We have our own **fish hatchery** on the reserve and we re-populate a majority of the lakes around us and in our reserve because we notice a lot of fish coming out but fewer going in. If we don't start taking initiative on our own then there will not be any fish in the lakes, which would also impact the broader ecosystem.*

I respond because I am an activist. Started a YouTube channel where I go out on the land and show people the changes I see. Important for people to see how it impacts real people and real animals.

A lot of people are complacent. They notice the change and complain about it but what can you do? You can voice your opinions to people but who will listen.

"

QUESTION:

A. Do you think climate change is responsible for any of the changes in and around fish and fish habitats in your community?

B. Have you observed any changes in seasonal weather in your community? E.g., colder winters, and flooding during the spring.

C. Do you think seasonal changes in weather patterns have affected fish and fish habitats in your community?

Climate and weather-related reasons for changes in and around fish habitats

Climate change and changing weather patterns

- Climate change is at the very least partly responsible for the changes observed in and around fish and fish habitats in their community.

Colder winters and hotter summers

- The weather is increasingly extreme in the winter and much warmer in the summer compared to the past. This was confirmed through conversations with elders.

- Other observations include more frequent, and intense floods, very hot and dry seasons and differences in precipitation.

Warmer waters cause fish migration and invasive species

- Changes in seasonal weather force some fish to go further North in search of cooler waters. This means that communities must fish further North than they are used to.

- Warmer waters also lead to invasive species.

> *Climate change has had an impact on everything. We now have species migrating north that we have not seen before.*
>
> *Yes, and this is evident with the increased range of striped bass, a species that was never found in Labrador waters.*
>
> *From speaking with Elders and watching over the last couple of years, there has been such an increase in moisture and more heavy snowfalls.*
>
> *Winters are long and cold, sometimes so much snow that is changing what the water systems are. More flooding has caused erosion due to high water levels.*

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QUESTION:

A. What effects, if any, do you think seasonal changes in weather have had on the benefits Indigenous women, girls, and gender-diverse people derive from fish and fish habitats?

B. What do you think should be the response to the impacts and effects of climate change and/or seasonal weather patterns on fish and fish habitats?

C. What actions would you recommend to protect the benefits Indigenous women, girls, and gender-diverse people receive from fish and fish habitats?

Effects of seasonal changes in weather on the benefits received from fish and fish habitats

Limited access to fish

- Seasonal changes in weather have forced Indigenous women, girls, and gender-diverse people to change their usual approach to fishing because fish are moving to different locations compared to the past

- This movement affects the already limited access to fish, as well as the ability to enjoy fish and fish habitats.

Community awareness and habitat protection

- Regarding the response to the impacts and effects that climate change and/or seasonal weather patterns have had on fish and fish habitats, there is only so much the government can do.

- Action is required from the entire community to better protect fish and fish habitats, e.g., conserving energy, cleaning up, etc.

- Education of the members of their community is also required to raise awareness about fish habitat degradation.

" *We have our areas where we know the fish should be because they have been there forever, we know where to set our nets and where to go to set out lines, we know the seasons and patterns of the fish. But with climate change that is all changing because fish are moving to different spots. It hinders us in our ability to harvest traditionally in the areas that we know.*

Need education. Community needs to know what was there before to know what is missing. People who enjoy salmon need to know what needs to happen to ensure that it is available in the future. People say that I have the right to eat fish, but there are other animals that also need to eat. We have the grocery story but without fish these animals may not survive which would cause a chain reaction. The river is connected to everything.

We are all responsible. Think it comes from my Indigenous worldview that we have a responsibility to our ancestors, to the people we are alive with right now (human beings and non-human beings) and to future generations. "

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QUESTION:

A. Do you know of any projects [e.g., dams, seawalls and jetties or other infrastructure works] in or near water in your community or other communities?

B. How do you think these projects affect fish and fish habitats?

C. What impacts have the effect of projects had on the benefits Indigenous women, girls and gender-diverse people derive from fish and fish habitat?

Effects of projects in or near water on fish and fish habitats

Project destabilizes fish and local ecosystems

- Projects in or near water in their community or other communities, e.g., dams have affected fish and fish habitats.
- Because of the massive disruption of watercourses projects such as dams destabilize fish habitats and the local ecosystems.

Water pollution

- Projects pollute fish and fish habitats not only though waste but also through noise and light pollution, all of which cause fish to migrate.

" *Top of the Coquitlam River is the Coquitlam dam. For every dam that they put up there is salmon lost.*

We had to build some infrastructure and because of that infrastructure we lost some fish habitat. […]. We had to compensate for that lost territory and build fish habitat in another spot on the reserve.

Anticipate there will be a negative effect. Look at the past, there used to be a pulp mill in Prince Rupert and still the effect of the pollution and effluents that were dumped into the ocean basically. There will be an increase in traffic, noise, light (coming from the facilities 24 hours), there will be a draw in energy, and an increased number of people traveling along the highway to Kitimat and Prince Rupert - all near big rivers that go through. "

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QUESTION:

A. What actions should be taken to reduce the impacts of existing or future projects in or near water on fish and fish habitats?

B. Why do you think these actions are important?

Important actions to reduce the impacts of projects in or near water on fish and fish habitats

Consultations as notification

- Currently, consultations follow a notification process where communities are informed of upcoming projects rather than truly consulted so that their input could be a determining factor of whether a project in or near water goes ahead.

- If Indigenous women, girls, two-spirit and gender-diverse people are included in the early stages then they can bring a different perspective to the projects, especially where projects could be harmful to fish and fish habitats.

Effective consultations

- Consultations are important because the involvement of Indigenous women, girls, and two-spirit and gender-diverse people ensures that Indigenous fish and fish habitats are protected but also that Indigenous cultures, traditions and ways of life are protected since so much Indigenous life revolves around fish.

"

Would be nice if the MNR would do something beyond sending a "notification" on what they are doing in area X. Notification is not an effective consultation process. Consultation is saying you are Indigenous people, you have lived here, you have cultural practices, you have land use that you have been doing for centuries. I want to value that and know what you are doing. How do we support you to keep doing what you have been doing and how are we negatively impacting you to stop you from doing what you have been doing. It is about acknowledging that Indigenous voice, that Indigenous history, that Indigenous cultural practice.

Need to be included and respected when we bring our voice to the table because we are looking to the future. We come from a different perspective - caretakers of the land, passing down information. Until there is a process that is inclusive of Indigenous women it is not a fair process.

Without incorporating or taking into account the concerns of Indigenous women/girls/gender-diverse people, about the impacts of projects on or near water/fish habitats, cultural practices can be lost, this affects a way of life.

"

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THEME C:

Fish habitat restoration priorities and land use change across landscape scales

QUESTION:

A. Has there been or is there currently - land use change activities going on in or near your community [e.g., residential, or commercial development, mining, or logging]?

B. In what ways do you think fish habitats are affected by land use change in urban areas, or inland watersheds/forested areas?

Land use change activities occurring in or near communities and the effect on fish habitats

Residential and commercial development and logging

- Land use change activities occurring in or near communities include residential, and/or commercial development as well as mining.

Habitat loss caused by contaminants, e.g., oil spills and soil erosion

- There is a loss of habitat due to pollution from oil spills, chemicals sprayed in the areas, debris and other items that fall off trucks, and salt from newly constructed roads that drain into water courses.

- The logging activities lead to landslides and sedimentation of water courses during heavy rainfall.

> " *Mining and exploration is our thing. Faro mine was abandoned and all the toxic waste was left behind, sunk into the ground and poisoned all the water there*
>
> *With erosion and clearcutting and not leaving native plants alongside the water to hold the dirt you get silt and dirt leaching into water which covers spawning best.*
>
> *Logging has had an impact on our creeks. Has also ruined a lot of roads to our lakes and we are unable to fish there, unable to monitor how the fish are doing*
>
> *There will be a lot of construction, widening of the road (knocking down some trees and filling some spaces in with dirt). In order to keep the road maintained in the winter it will need to be salted and that additional salinity will be bad for the riparian zones.* "

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QUESTION:

A. What actions do you think should be taken to reduce the negative impacts of land use change in urban areas or inland watersheds on fish habitats?

B. Why do you think these actions are important?

Important actions to reduce the impacts of land use change in urban areas and inland watersheds on fish habitats

Public awareness

- There should be more effective education to inform people of the consequences of the impacts of land use change in urban areas

- Private property owners need to know the full breadth of the impact land use change activities have not only on the fish and habitats but also on the ways of life of Indigenous people who live in those communities.

Habitat offsetting by developers

- Companies should be made to plant trees to replace the ones they remove to so that the soil is less susceptible to erosion.

- Companies should also be required to clean up development sites to make sure the water quality of fish habitats is not contaminated.

- Some of the revenue from development activities should go towards financing habitat restoration efforts.

"

Planting more trees as opposed to clearing and leaving things a little more natural. Fight to stop the logging - and old growth logging - on Quadra.

Re-establishing the root system: Adding a buffer would decrease or slow down changes in water quality in the water body - whether that be sedimentation or runoff or change in salinity. It also adds a bit of aesthetic purposes too (it will look prettier)

Needs to come from multiple angles: from community engagement and education (events that help raise awareness and help people understand their impact on the watershed and the importance of our watersheds) to regulatory processes (i.e., making sure there is not just policies but enforcement). We advocate that for any around stream work, we would request that the company or agency hire environmental monitors or have representation from the Nation to be there while the work is being done. This will not prevent things from happening, but it helps as it allows us to say that we were there and saw what happened.

"

THEME D:
Fish habitat restoration priorities and Indigenous treaty rights

QUESTION:

A. Have you or anyone you know ever been prevented from fishing or from using fish habitat resources?

B. Do you think measures to restore fish habitats could interfere with the rights of Indigenous women, girls and gender-diverse people to access fish or to access other benefits from habitat   resources?

C. How do you think these rights might be interfered with?

Interference of rights of Indigenous women, girls and gender-diverse people and access to fish or to access other benefits from habitat resources

Exclusion of indigenous perspectives in restoration measures

- Measures to restore fish habitats could interfere with the rights of Indigenous women, girls and gender-diverse people to access fish or to access other benefits from habitat resources.

- Indigenous women, girls and gender-diverse people should be included in restoration efforts so that they can bring and show their unique perspective on the matter. If their perspectives are recognized and accepted, then there shouldn't be any interference.

" *Told my grandfather, uncles and brother still have fishing rights on Lake Winnipegosis but the government has regulated that so that out of every five years they can only fish two years - the other three are for commercial use. (Believe the restrictions were put into place because over the years the fish got less and less, smaller and smaller, and harder to fish).*

We look at our harvesting agreement on an annual or bi-annual basis to look at different areas of concern (e.g., low stock in a species) and how we have to adapt our management plan in consideration of this new information. That does have an impact on our treaty rights as we have a right to harvest freely on the land. It is not right, but it is necessary in respect of mother nature and our earth. "

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QUESTION:

A. What actions would you recommend to prevent fish habitat restoration measures from interfering with the rights Indigenous women, girls and gender-diverse people have to fish or to have access to fish habitat resources?

B. Why do you think these actions are important?

Actions to prevent fish habitat restoration measures from interfering with the rights of Indigenous women, girls and gender-diverse people

Inclusion of Indigenous perspectives

- Indigenous women, girls and gender-diverse people should be included when these restoration measures are put in place.

Meaningful collaboration

- There should be collaboration with Indigenous women, girls and gender-diverse people who live in those communities, by hiring them in efforts to restore fish habitats or through meaningful consultations with them that consider the big picture

- It is important to create awareness of the importance of fish habitat restoration actions for protecting the culture and spirituality of Indigenous women, girls and gender-diverse people.

"*Would really like to see the spawning beds monitored by Pikwaknagan First Nation members, along with all the spawning sites, improvement sites, testing sites. Throughout our territory. Want to see a meaningful partnership come forth where we get to sit at the table and provide input as one collective body.*

Early consultation before anything happens on the ground. A lot of things happen on the ground and then they consult. But no matter how many times people say early consultation it does not happen.

Listen to Indigenous women. With fish and fish habitat, within a lot of traditional cultures the fish habitat is related to the stewardship of plants that are nearby and so much of that knowledge is held by women within our societies. In these projects we have blinders on, and we only think about the fish; there is a lot of benefit that can be derived from thinking more holistically about the whole habitat."

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Notes from the interviews

A - Frequency

- The frequency output is a simple way of calculating which words were used the most often. The ouput displays the words in order of decreasing frequency, as well as their number of utterences.

B - Topics

- The topics are inferred by using proprietary machine learning algorithms. Nanos Research uses the Latent Dirilecht Allocation modelling method for natural language processing, which is an efficient way of providing an unbiased and quantitative approach to the sorting of datasets (words) into groups (topics). In essence, our use of LDA modelling is based on the notion that a collection of linguistic responses can be broken down into a series of topics which can be further divided into a collection of words. The output presented is the top 6 words associated within a set of topics, with each column being a distinct topic. These columns can be used to infer the tone and meaning of respondents while minimizing subjective bias. The words are placed in each column based on the relative amount of times they are mentioned together and are displayed with their likelihood of falling into that topic.

C - Observations based on Nanos Machine Learning Algortihms

- The output is a summary of the findings.

*Note on MLA

- Machine Learning Algorithms were run on a selection of questions that had enough reponses for the MLA to be effective (questions 1c, 1d, 2a, 2b, 2c, 3a, 3b, 3c, 3d, 3e, 3f, 3i, 3k, 4a, 4c, and 5d.

Question 1c - What activities do you engage in, in or near the water in your community?

A – Frequency

Fish	51
Water	23
River	20
Lake	13
Live	11
Lot	11
nation	11
Around	10
Year	10
Families	8

B – Topics

	Topic 1 words	Topic 1 probabilities	Topic 2 words	Topic 2 probabilities	Topic 3 words	Topic 3 probabilities	Topic 4 words	Topic 4 probabilities
1	Water	0.25	Lake	0.221429	River	0.264286	Fish	0.264286
2	Live	0.223214	Around	0.258929	Lot	0.223214	Nation	0.294643
3	Families	0.245455	First	0.263636	Recreation	0.245455	Year	0.245455
4	Active	0.235849	Work	0.235849	Swim	0.273585	Get	0.254717
5	Everything	0.257813	Boat	0.242188	Grow	0.242188	Thing	0.257813
6	Important	0.293103	Time	0.235632	Really	0.235632	Take	0.235632

Topic 1: We live by the water, do everything, it's very important to our family.

Topic 2: We go on a boat in lakes and work.

Topic 3: We use it a lot for recreation, swimming in rivers.

Topic 4: We fish on First Nation territory, have been doing so for many years.

C – Observations based on Nanos Machine Learning Algorithms

Words most frequently used in discussion: Fish, water, river, lake, live, lot, nation, around, year, families.
The LDA model output generated 4 topics and an analyst identified the four topics based on the qualitative notes taken during each session and the quantitative analysis from the LDA model.

For topic 1, the probability that each of the 6 words are associated with the topic range from 22.3% to 29.3%.
For topic 2, the probability that each of the 6 words are associated with the topic range from 22.1% to 26.4%.
For topic 3, the probability that each of the 6 words are associated with the topic range from 22.3% to 27.4%.
For topic 4, the probability that each of the 6 words are associated with the topic range from 23.6% to 29.5%.

Question 1d - Do you know of anyone who fishes within your community?

A – Frequency

Fish	49
Families	12
Lot	8
People	8
Also	6
Women	6

B – Topics

	Topic 1 words	Topic 1 probabilities	Topic 2 words	Topic 2 probabilities	Topic 3 words	Topic 3 probabilities	Topic 4 words	Topic 4 probabilities
1	Lot	0.241071	Families	0.258929	Fish	0.241071	Allow	0.258929
2	Women	0.201613	Involved	0.346774	Boat	0.25	Mother	0.201613
3	People	0.25	Young	0.25	Time	0.231481	Went	0.268519
4	Know	0.245098	Also	0.264706	Work	0.245098	people	0.245098
5	Use	0.219697	Yes	0.25	One	0.25	Year	0.280303
6	also	0.265152	Lake	0.234848	Come	0.25	Big	0.25

Topic 1: A lot of people I know, women also.

Topic 2: Families involving younger people also.

Topic 3: Some fish using boats for work.

Topic 4: Mother and family on my mother's side.

C – Observations based on Nanos Machine Learning Algorithms

Words most frequently used in discussion: Fish, families, a lot, people, also, women.
The LDA model output generated 4 topics and an analyst identified the four topics based on the qualitative notes taken during each session and the quantitative analysis from the LDA model.

For topic 1, the probability that each of the 6 words are associated with the topic range from 22.0% to 26.5%.
For topic 2, the probability that each of the 6 words are associated with the topic range from 23.5% to 35.7%.
For topic 3, the probability that each of the 6 words are associated with the topic range from 22.3% to 27.4%.
For topic 4, the probability that each of the 6 words are associated with the topic range from 20.2% to 28.0%.

Question 2a - How do you benefit from fish and fish habitats within your community?

A – Frequency

Fish	75
Water	23
Food	21
Culture	18
Families	18
Get	17
Use	15
Can	14
River	13

B – Topics

	Topic 1 words	Topic 1 probabilities	Topic 2 words	Topic 2 probabilities	Topic 3 words	Topic 3 probabilities	Topic 4 words	Topic 4 probabilities	Topic 5 words	Topic 5 probabilities
1	Water	0.213675	Get	0.247863	Families	0.205128	Use	0.153846	Fish	0.179487
2	Culture	0.192982	Connect	0.22807	Really	0.210526	Spiritual	0.175439	Food	0.192982
3	Lot	0.180328	Support	0.196721	Can	0.245902	Know	0.180328	Communities	0.196721
4	Also	0.183333	People	0.216667	Feel	0.2	Try	0.216667	Economy	0.183333
5	Important	0.35	River	0.183333	Life	0.166667	Elder	0.133333	One	0.166667
6	Lake	0.188406	Spirit	0.15942	Want	0.246377	Scale	0.173913	Able	0.231884

Topic 1: Water and lakes are important in our culture.

Topic 2: Connection to spirits and support for people along the river.

Topic 3: Families to live the life they really want.

Topic 4: Elders use fish for spiritual reasons and I also use the fish scales for art.

Topic 5: It contributes to our economy, we are able to fish for food in our community.

C – Observations based on Nanos Machine Learning Algorithms

Words most frequently used in discussion: Fish, water, food, culture, families, get, use, can, river.
The LDA model output generated 5 topics and an analyst identified the five topics based on the qualitative notes taken during each session and the quantitative analysis from the LDA model.

For topic 1, the probability that each of the 6 words are associated with the topic range from 18.3% to 35.0%.
For topic 2, the probability that each of the 6 words are associated with the topic range from 15.9% to 24.8%.
For topic 3, the probability that each of the 6 words are associated with the topic range from 16.7% to 24.6%.
For topic 4, the probability that each of the 6 words are associated with the topic range from 15.4% to 21.7%.
For topic 5, the probability that each of the 6 words are associated with the topic range from 16.7% to 23.2%.

Question 2b - Why do you think it is important to protect the benefits Indigenous women, girls, and gender-diverse peoples derive from fish and fish habitats?

A – Frequency

Fish	24
Important	14
Culture	11
Women	11
Part	9
Thing	9
Need	8
Generation	8
Protect	8

B – Topics

	Topic 1 words	Topic 1 probabilities	Topic 2 words	Topic 2 probabilities	Topic 3 words	Topic 3 probabilities	Topic 4 words	Topic 4 probabilities	Topic 5 words	Topic 5 probabilities
1	Need	0.183099	Fish	0.183099	Want	0.28169	Important	0.15493	Culture	0.197183
2	Water	0.21519	People	0.21519	Connection	0.139241	Protect	0.240506	Women	0.189873
3	Think	0.189189	Tradition	0.256757	Take	0.202703	Keep	0.148649	Thing	0.202703
4	Feed	0.2	Families	0.2	Really	0.2	Future	0.2	part	0.2
5	Food	0.234375	Source	0.203125	One	0.15625	Way	0.171875	Communities	0.234375
6	Live	0.166667	Something	0.181818	knowledge	0.257576	Generation	0.181818	generation	0.212121

Topic 1: I think we need water to live, for food and to feed ourselves.

Topic 2: Fishing is a source of tradition for families.

Topic 3: It serves as a connection to our knowledge.

Topic 4: It's important to protect and keep our way of life for future generations.

Topic 5: It is a big part of our culture and important for the women and the community.

C – Observations based on Nanos Machine Learning Algorithms

Words most frequently used in discussion: Fish, important, culture, women, part, thing, need, generation, protect.
The LDA model output generated 5 topics and an analyst identified the five topics based on the qualitative notes taken during each session and the quantitative analysis from the LDA model.

For topic 1, the probability that each of the 6 words are associated with the topic range from 16.7% to 23.4%.
For topic 2, the probability that each of the 6 words are associated with the topic range from 18.2% to 25.7%.
For topic 3, the probability that each of the 6 words are associated with the topic range from 13.9% to 28.2%.
For topic 4, the probability that each of the 6 words are associated with the topic range from 15.5% to 24.1%.
For topic 5, the probability that each of the 6 words are associated with the topic range from 19.0% to 23.4%.

Question 2c - How do you think the broader community benefits from fish and fish habitats?

A – Frequency

Fish	35
Communities	20
People	18
Benefit	10
Able	8
Lot	8
Come	8
Reserve	8
Food	7
Harvest	7

B – Topics

	Topic 1 words	Topic 1 probabilities	Topic 2 words	Topic 2 probabilities	Topic 3 words	Topic 3 probabilities	Topic 4 words	Topic 4 probabilities	Topic 5 words	Topic 5 probabilities
1	People	0.233333	Fish	0.216667	Local	0.183333	Communities	0.2	Come	0.166667
2	Reserve	0.133333	benefit	0.152381	Boat	0.333333	lot	0.180952	Harvest	0.2
3	Culture	0.164179	Able	0.253731	Thing	0.164179	Start	0.19403	Now	0.223881
4	Elder	0.203704	Food	0.203704	Access	0.203704	Support	0.185185	Families	0.203704
5	Way	0.2	Bring	0.2	Last	0.2	Use	0.181818	Recreation	0.218182
6	Get	0.252747	Need	0.186813	Salmon	0.197802	Lake	0.175824	May	0.186813

Topic 1: Important for our culture for the people on the reserve and Elders.

Topic 2: We benefit from the fish as we are able to bring food and not needing to depend on supermarkets.

Topic 3: Locally we can access fish as boats are selling fish off the docks.

Topic 4: There is community support as not everyone can go fishing.

Topic 5: Families benefit as they can harvest and use it for recreation.

C – Observations based on Nanos Machine Learning Algorithms

Words most frequently used in discussion: Fish, communities, people, benefit, able, lot, come, reserve, food, harvest.
The LDA model output generated 5 topics and an analyst identified the five topics based on the qualitative notes taken during each session and the quantitative analysis from the LDA model.

For topic 1, the probability that each of the 6 words are associated with the topic range from 13.3% to 25.3%.
For topic 2, the probability that each of the 6 words are associated with the topic range from 15.2% to 25.4%.
For topic 3, the probability that each of the 6 words are associated with the topic range from 16.4% to 33.3%.
For topic 4, the probability that each of the 6 words are associated with the topic range from 17.6% to 19.4%.
For topic 5, the probability that each of the 6 words are associated with the topic range from 16.7% to 22.4%.

Question 3a - What changes have you observed in and around fish habitats or other sources of water in your community?

A – Frequency

Fish	65
Water	42
Lake	40
Year	33
River	21
Lot	20
Salmon	18
Get	18
See	16

B – Topics

	Topic 1 words	Topic 1 probabilities	Topic 2 words	Topic 2 probabilities	Topic 3 words	Topic 3 probabilities	Topic 4 words	Topic 4 probabilities	Topic 5 words	Topic 5 probabilities
1	Water	0.1875	Fish	0.203125	Salmon	0.234375	See	0.15625	Lot	0.21875
2	Lake	0.217391	Catch	0.246377	Many	0.188406	Change	0.188406	Get	0.15942
3	Year	0.208791	Now	0.197802	Use	0.197802	People	0.175824	River	0.21978
4	Species	0.196429	Can	0.196429	Smelt	0.196429	Size	0.214286	Come	0.196429
5	Level	0.241935	Little	0.177419	Ago	0.193548	Nation	0.209677	Know	0.177419
6	Spawn	0.189873	Just	0.202532	Also	0.164557	Good	0.240506	Back	0.202532

Topic 1: The water level changes over the years are affecting the species that spawn.

Topic 2: The fish we catch now are little.

Topic 3: There aren't as many salmon and smelt as there use to be years ago.

Topic 4: In our First Nation reserve, people see a change in the size of fish.

Topic 5: When we come back, it is different than back when we were kids/years ago. We used to get a lot of fish and now not as much.

C – Observations based on Nanos Machine Learning Algorithms

Words most frequently used in discussion: Fish, water, lake, year, river, lot, salmon, get, see.
The LDA model output generated 5 topics and an analyst identified the five topics based on the qualitative notes taken during each session and the quantitative analysis from the LDA model.

For topic 1, the probability that each of the 6 words are associated with the topic range from 18.8% to 24.2%.
For topic 2, the probability that each of the 6 words are associated with the topic range from 17.7% to 24.6%.
For topic 3, the probability that each of the 6 words are associated with the topic range from 16.5% to 23.4%.
For topic 4, the probability that each of the 6 words are associated with the topic range from 15.6% to 24.1%.
For topic 5, the probability that each of the 6 words are associated with the topic range from 17.7% to 22.0%.

Question 3b - What effects, if any, do you think these changes in and around fish habitats have had on the benefits Indigenous women, girls, and gender-diverse peoples derive from fish and fish habitats?

A – Frequency

Fish	39
Change	10
Get	9
Will	9
Food	9
Can	8
Way	8
Women	8

B – Topics

	Topic 1 words	Topic 1 probabilities	Topic 2 words	Topic 2 probabilities	Topic 3 words	Topic 3 probabilities
1	Get	0.36036	Change	0.31982	Fish	0.31982
2	Can	0.468864	Way	0.227106	Food	0.304029
3	Culture	0.29798	Women	0.328283	Use	0.373737
4	Learn	0.322404	Families	0.289617	Will	0.387978
5	Anymore	0.347418	Source	0.262911	Thing	0.389671
6	Indigenous	0.305164	Longer	0.333333	Eat	0.361502

Topic 1: Less of a connection to Indigenous culture and cultural events. Newer generations won't learn because of that.

Topic 2: It's changed the way women can provide for their families. Sources are no longer available.

Topic 3: It's changed the food we eat as we cannot do the things we use to do.

C – Observations based on Nanos Machine Learning Algorithms

Words most frequently used in discussion: Fish, change, get, will, food, can, way, women.
The LDA model output generated 3 topics and an analyst identified the three topics based on the qualitative notes taken during each session and the quantitative analysis from the LDA model.

For topic 1, the probability that each of the 6 words are associated with the topic range from 29.8% to 46.9%.
For topic 2, the probability that each of the 6 words are associated with the topic range from 22.7% to 33.3%.
For topic 3, the probability that each of the 6 words are associated with the topic range from 30.4% to 39.0%.

Question 3c - What do you think is responsible for the changes in and around fish habitats?

A – Frequency

Fish	21
Water	21
Lake	20
Change	13
People	10
Climate	7
River	6
Population	6

B – Topics

	Topic 1 words	Topic 1 probabilities	Topic 2 words	Topic 2 probabilities	Topic 3 words	Topic 3 probabilities	Topic 4 words	Topic 4 probabilities
1	Fish	0.214286	Water	0.293651	Lake	0.277778	Change	0.214286
2	People	0.234848	Level	0.219697	Come	0.25	Climate	0.295455
3	River	0.261905	Lot	0.293651	Water	0.214286	Population	0.230159
4	Take	0.26	Use	0.246667	Species	0.233333	Just	0.26
5	Decline	0.259615	Salmon	0.240385	Reduction	0.259615	Year	0.240385
6	Dump	0.235577	Spawn	0.274038	Lower	0.216346	Temperature	0.274038

Topic 1: There has been a decline in the number of fish caused by people dumping garbage and raw sewage in the river.

Topic 2: The changes in water levels affects the spawning of salmon.

Topic 3: Introduction of new species into lakes reduces the indigenous population of fish.

Topic 4: Climate change and increase in temperature over the years.

C – Observations based on Nanos Machine Learning Algorithms

Words most frequently used in discussion: Fish, water, lake, change, people, climate, river, population.
The LDA model output generated 4 topics and an analyst identified the four topics based on the qualitative notes taken during each session and the quantitative analysis from the LDA model.

For topic 1, the probability that each of the 6 words are associated with the topic range from 21.4% to 26.2%.
For topic 2, the probability that each of the 6 words are associated with the topic range from 22.0% to 29.4%.
For topic 3, the probability that each of the 6 words are associated with the topic range from 21.4% to 27.8%.
For topic 4, the probability that each of the 6 words are associated with the topic range from 21.4% to 29.5%.

Question 3d - How has your community responded, or how do you think your community should respond to these changes / impacts in and around fish and fish habitats?

A – Frequency

Fish	22
Lot	16
Work	15
Project	15
Nation	14
People	13
Can	12

B – Topics

	Topic 1 words	Topic 1 probabilities	Topic 2 words	Topic 2 probabilities	Topic 3 words	Topic 3 probabilities	Topic 4 words	Topic 4 probabilities	Topic 5 words	Topic 5 probabilities
1	Community	0.177215	Fish	0.21519	Lot	0.21519	Area	0.177215	Work	0.21519
2	First	0.22973	Can	0.243243	Restore	0.202703	Year	0.148649	Nation	0.175676
3	Habitat	0.205882	Salmon	0.191176	Back	0.205882	Project	0.25	Get	0.147059
4	People	0.259259	Lake	0.209877	People	0.185185	Look	0.17284	Try	0.17284
5	Future	0.179104	School	0.223881	Informed	0.208955	Make	0.19403	Land	0.19403
6	Monitor	0.235294	Come	0.147059	Need	0.176471	Change	0.264706	Project	0.176471

Topic 1: The community works together, First Nation and other people, to monitor the situation.

Topic 2: We work with schools to get involved learning about salmon life and visiting fish hatchery.

Topic 3: People need to be informed to hope to restore the fish population.

Topic 4: In our area we have projects and we monitor every year to see change.

Topic 5: Projects and work that is run by First Nations on their land.

C – Observations based on Nanos Machine Learning Algorithms

Words most frequently used in discussion: Fish, lot, work, project, nation, people, can
The LDA model output generated 5 topics and an analyst identified the five topics based on the qualitative notes taken during each session and the quantitative analysis from the LDA model.

For topic 1, the probability that each of the 6 words are associated with the topic range from 17.7% to 25.9%.
For topic 2, the probability that each of the 6 words are associated with the topic range from 14.7% to 24.3%.
For topic 3, the probability that each of the 6 words are associated with the topic range from 17.6% to 21.5%.
For topic 4, the probability that each of the 6 words are associated with the topic range from 14.9% to 26.5%.
For topic 5, the probability that each of the 6 words are associated with the topic range from 14.7% to 21.5%.

Question 3e - Do you think climate change is responsible for any of the changes in and around fish and fish habitats in your community?

A – Frequency

Water	17
Change	16
Climate	13
Impact	11
Fish	9
Will	8
Affect	7
Everything	6
Thing	6
New	6

B – Topics

	Topic 1 words	Topic 1 probabilities	Topic 2 words	Topic 2 probabilities	Topic 3 words	Topic 3 probabilities
1	Fish	0.29798	Water	0.313131	Climate	0.388889
2	Affect	0.328042	Change	0.359788	Impact	0.312169
3	Thing	0.328042	Everything	0.343915	Lot	0.328042
4	New	0.306011	North	0.371585	Temperature	0.322404
5	Will	0.348039	Increase	0.289216	Seen	0.362745
6	Eat	0.302222	Get	0.302222	Different	0.395556

Topic 1: We are seeing new bugs and parasites that will affect the fish we eat.

Topic 2: Climate change affects everything, the water levels in the North have increased.

Topic 3: Climate change has had an impact on temperature and many different things.

C – Observations based on Nanos Machine Learning Algorithms

Words most frequently used in discussion: Water, change, climate, impact, fish, will, affect, everything, thing, new.
The LDA model output generated 3 topics and an analyst identified the three topics based on the qualitative notes taken during each session and the quantitative analysis from the LDA model.

For topic 1, the probability that each of the 6 words are associated with the topic range from 29.8% to 34.8%.
For topic 2, the probability that each of the 6 words are associated with the topic range from 28.9% to 37.2%.
For topic 3, the probability that each of the 6 words are associated with the topic range from 31.2% to 39.6%.

Question 3f - Have you observed any changes in seasonal weather in your community? E.g., colder winters, flooding during the spring.

A – Frequency

Flood	22
Year	19
Water	19
Last	12
Winter	11
Change	10
River	10
Get	10
Lot	10

B – Topics

	Topic 1 words	Topic 1 probabilities	Topic 2 words	Topic 2 probabilities	Topic 3 words	Topic 3 probabilities	Topic 4 words	Topic 4 probabilities
1	Winter	0.25	Water	0.237805	Year	0.262195	Flood	0.25
2	Change	0.303571	River	0.196429	Last	0.291667	Temperature	0.208333
3	Get	0.274648	Summer	0.274648	Fire	0.246479	Lake	0.204225
4	Lot	0.258929	Rain	0.276786	Will	0.241071	Now	0.223214
5	Snow	0.284483	System	0.232759	Level	0.215517	Think	0.267241
6	Fish	0.413043	Make	0.23913	Notice	0.204348	Hot	0.143478

Topic 1: In the winter we get a lot more snow.

Topic 2: Rivers get more water as more rain makes it into the system in the summer.

Topic 3: Last year there was a fire. We also notice water levels are different.

Topic 4: Temperatures are hotter now and there's floods.

C – Observations based on Nanos Machine Learning Algorithms

Words most frequently used in discussion: Flood, year, water, last, winter, change, river, get, lot..
The LDA model output generated 4 topics and an analyst identified the four topics based on the qualitative notes taken during each session and the quantitative analysis from the LDA model.

For topic 1, the probability that each of the 6 words are associated with the topic range from 25.0% to 41.3%.
For topic 2, the probability that each of the 6 words are associated with the topic range from 19.6% to 27.7%.
For topic 3, the probability that each of the 6 words are associated with the topic range from 20.4% to 29.2%.
For topic 4, the probability that each of the 6 words are associated with the topic range from 14.3% to 26.7%.

Question 3i - What do you think should be the response to the impacts and effects of climate change and/or seasonal weather patterns on fish and fish habitats?

A – Frequency

People	28
Need	25
Indigenous	16
Water	14
Thing	13
Know	11
Communities	11

B – Topics

	Topic 1 words	Topic 1 probabilities	Topic 2 words	Topic 2 probabilities	Topic 3 words	Topic 3 probabilities	Topic 4 words	Topic 4 probabilities	Topic 5 words	Topic 5 probabilities
1	People	0.183099	Know	0.183099	Indigenous	0.197183	Thing	0.253521	Need	0.183099
2	Water	0.26087	Fish	0.246377	May	0.188406	Change	0.15942	Communities	0.144928
3	Think	0.343284	Response	0.238806	Lot	0.141791	See	0.134328	Land	0.141791
4	Important	0.185185	Need	0.203704	Restore	0.185185	Done	0.185185	First	0.240741
5	Really	0.168539	Nation	0.191011	Say	0.202247	Local	0.146067	Dfo	0.292135
6	Knowledge	0.186441	Also	0.20339	Protect	0.186441	Like	0.186441	Make	0.237288

Topic 1: I think it's really important that people keep and share their knowledge and protect waterways.

Topic 2: The response should come from the First Nations who also know fish.

Topic 3: Indigenous People need to say more to restore and protect.

Topic 4: I would like to see change done at the local level.

Topic 5: DFO needs to work with First Nation communities on the land before they make changes.

C – Observations based on Nanos Machine Learning Algorithms

Words most frequently used in discussion: People, need, Indigenous, water, thing, know, communities.
The LDA model output generated 5 topics and an analyst identified the five topics based on the qualitative notes taken during each session and the quantitative analysis from the LDA model.

For topic 1, the probability that each of the 6 words are associated with the topic range from 16.9% to 34.3%.
For topic 2, the probability that each of the 6 words are associated with the topic range from 18.3% to 24.6%.
For topic 3, the probability that each of the 6 words are associated with the topic range from 20.2% to 14.2%.
For topic 4, the probability that each of the 6 words are associated with the topic range from 13.4% to 25.4%.
For topic 5, the probability that each of the 6 words are associated with the topic range from 14.2% to 29.2%.

Question 3k - Do you know of any projects [e.g., dams, seawalls and jetties or other infrastructure works] in or near water in your community or other communities?

A – Frequency

Dam	16
Water	10
Project	7
Fish	6
Impact	6
Now	5
Communities	5

B – Topics

	Topic 1 words	Topic 1 probabilities	Topic 2 words	Topic 2 probabilities	Topic 3 words	Topic 3 probabilities	Topic 4 words	Topic 4 probabilities
1	Communities	0.232759	Dam	0.25	Impact	0.25	Project	0.267241
2	First	0.25	Water	0.268519	Lake	0.231481	Now	0.25
3	Flood	0.245098	Fish	0.245098	Major	0.245098	Area	0.264706
4	Bridge	0.281818	Run	0.227273	Want	0.227273	Fix	0.263636
5	Highway	0.264706	Know	0.245098	Swim	0.245098	Old	0.245098
6	One	0.237179	Open	0.352564	Increase	0.237179	Year	0.173077

Topic 1: Highways and bridges built near or in our First Nations community, some have been flooded.

Topic 2: A lot of dams, sometimes they open them. They affect the fish.

Topic 3: Major impact on the lake, we couldn't go swimming anymore.

Topic 4: There are projects fixing old infrastructure in my area.

C – Observations based on Nanos Machine Learning Algorithms

Words most frequently used in discussion: Dam, water, project, fish, impact, now, communities.
The LDA model output generated 4 topics and an analyst identified the four topics based on the qualitative notes taken during each session and the quantitative analysis from the LDA model.

For topic 1, the probability that each of the 6 words are associated with the topic range from 23.3% to 28.2%.
For topic 2, the probability that each of the 6 words are associated with the topic range from 22.7% to 35.3%.
For topic 3, the probability that each of the 6 words are associated with the topic range from 23.1% to 25.0%.
For topic 4, the probability that each of the 6 words are associated with the topic range from 17.3% to 26.7%.

Question 4a - Has there been - or is there currently - land use change activities going on in or near your community [e.g., residential, or commercial development, mining, or logging]?

A – Frequency

River	19
Lot	18
Lake	15
Fish	14
Area	13
People	12
Around	11
Mine	10
Log	10

B – Topics

	Topic 1 words	Topic 1 probabilities	Topic 2 words	Topic 2 probabilities	Topic 3 words	Topic 3 probabilities	Topic 4 words	Topic 4 probabilities	Topic 5 words	Topic 5 probabilities
1	Around	0.234375	River	0.234375	Impact	0.15625	Lot	0.1875	Lake	0.1875
2	Log	0.162162	Mine	0.171171	Change	0.198198	Fish	0.18018	People	0.288288
3	Will	0.329268	Waterway	0.134146	See	0.170732	Area	0.170732	Important	0.195122
4	Habitat	0.189655	Get	0.189655	Land	0.189655	Know	0.172414	North	0.258621
5	Water	0.181818	Along	0.19697	Back	0.166667	Project	0.212121	Grow	0.242424
6	Salmon	0.190476	Can	0.321429	Year	0.142857	Thing	0.178571	One	0.166667

Topic 1: Logging around water habitats will affect salmon.

Topic 2: Mining can affect the environment along the rivers and waterways.

Topic 3: We see the impact on the land when we come back years after.

Topic 4: A lot of projects in my area are affecting fish and many other things.

Topic 5: In the North, they cut down old growth forest which is really important to the people.

C – Observations based on Nanos Machine Learning Algorithms

Words most frequently used in discussion: River, lot, lake, fish, area, people, around, mine, log.
The LDA model output generated 5 topics and an analyst identified the five topics based on the qualitative notes taken during each session and the quantitative analysis from the LDA model.

For topic 1, the probability that each of the 6 words are associated with the topic range from 16.2% to 32.9%.
For topic 2, the probability that each of the 6 words are associated with the topic range from 13.4% to 32.2%.
For topic 3, the probability that each of the 6 words are associated with the topic range from 14.3% to 19.8%.
For topic 4, the probability that each of the 6 words are associated with the topic range from 17.1% to 21.2%.
For topic 5, the probability that each of the 6 words are associated with the topic range from 16.7% to 28.8%.

Question 4c - What actions do you think should be taken to reduce the negative impacts of land use change in urban areas or inland watersheds on fish habitats?

A – Frequency

People	13
Need	10
Land	8
Make	7
Fish	6
Habitat	6
Want	6
Area	6
Can	6

B – Topics

	Topic 1 words	Topic 1 probabilities	Topic 2 words	Topic 2 probabilities	Topic 3 words	Topic 3 probabilities	Topic 4 words	Topic 4 probabilities	Topic 5 words	Topic 5 probabilities	Topic 6 words	Topic 6 probabilities
1	Develop	0.094563	Want	0.165485	Fish	0.243499	Need	0.179669	Area	0.130024	People	0.186761
2	Water	0.199005	Project	0.139303	Land	0.169154	Habitat	0.139303	Help	0.21393	Make	0.139303
3	Important	0.189744	Monitor	0.174359	Action	0.14359	Different	0.174359	System	0.174359	Can	0.14359
4	Tree	0.220721	Acknowledge	0.18018	Come	0.193694	Thing	0.153153	Take	0.112613	Indigenous	0.13964
5	Impact	0.141914	Perspective	0.151815	Companies	0.181518	Lake	0.112211	Work	0.270627	Aware	0.141914
6	Understand	0.191358	Nature	0.154321	Effect	0.154321	Environment	0.17284	Log	0.17284	Know	0.154321

Topic 1: It's important to understand the impact developments have. Planting more trees.

Topic 2: Monitoring of projects and acknowledging the Indigenous perspective.

Topic 3: Take action against companies that have an effect on land and fish.

Topic 4: Need to understand the needs of different animals in different environments, lakes and habitats.

Topic 5: Helping the areas that are impacted by the work of logging companies.

Topic 6: Make people aware and include Indigenous groups.

C – Observations based on Nanos Machine Learning Algorithms

Words most frequently used in discussion: People, need, land, make, fish, habitat, want, area, can.
The LDA model output generated 6 topics and an analyst identified the six topics based on the qualitative notes taken during each session and the quantitative analysis from the LDA model.

For topic 1, the probability that each of the 6 words are associated with the topic range from 9.4% to 22.1%.
For topic 2, the probability that each of the 6 words are associated with the topic range from 13.9% to 18.0%.
For topic 3, the probability that each of the 6 words are associated with the topic range from 14.4% to 24.3%.
For topic 4, the probability that each of the 6 words are associated with the topic range from 11.2% to 18.0%.
For topic 5, the probability that each of the 6 words are associated with the topic range from 11.3% to 21.4%.
For topic 6, the probability that each of the 6 words are associated with the topic range from 13.9% to 18.7%.

Question 5d - What actions would you recommend to prevent fish habitat restoration measures from interfering with the rights indigenous women, girls and gender-diverse people have to fish or to have access to fish habitat resources?

A – Frequency

People	11
Fish	10
First	8
Women	8
Nation	7
Come	7
Habitat	7
DFO	7
Get	7
Like	7

B – Topics

	Topic 1 words	Topic 1 probabilities	Topic 2 words	Topic 2 probabilities	Topic 3 words	Topic 3 probabilities
1	People	0.372549	Fish	0.360784	Come	0.266667
2	First	0.320513	Women	0.320513	Like	0.358974
3	Nation	0.319249	Know	0.347418	DFO	0.333333
4	Habitat	0.36643	Involve	0.238771	Important	0.394799
5	Can	0.312169	Indigenous	0.328042	See	0.359788
6	Get	0.341564	Access	0.304527	Want	0.353909

Topic 1: Include First Nation people when it comes to fish habitat.

Topic 2: Involve Indigenous Women and those who may not have access to fish.

Topic 3: Important for DFO to come and see what is important to us and ask what we want.

C – Observations based on Nanos Machine Learning Algorithms

Words most frequently used in discussion: People, fish, first, women, national, come, habitat, DFO, get, like.
The LDA model output generated 3 topics and an analyst identified the three topics based on the qualitative notes taken during each session and the quantitative analysis from the LDA model.

For topic 1, the probability that each of the 6 words are associated with the topic range from 31.2% to 37.3%.
For topic 2, the probability that each of the 6 words are associated with the topic range from 23.9% to 36.1%.
For topic 3, the probability that each of the 6 words are associated with the topic range from 26.7% to 39.5%.