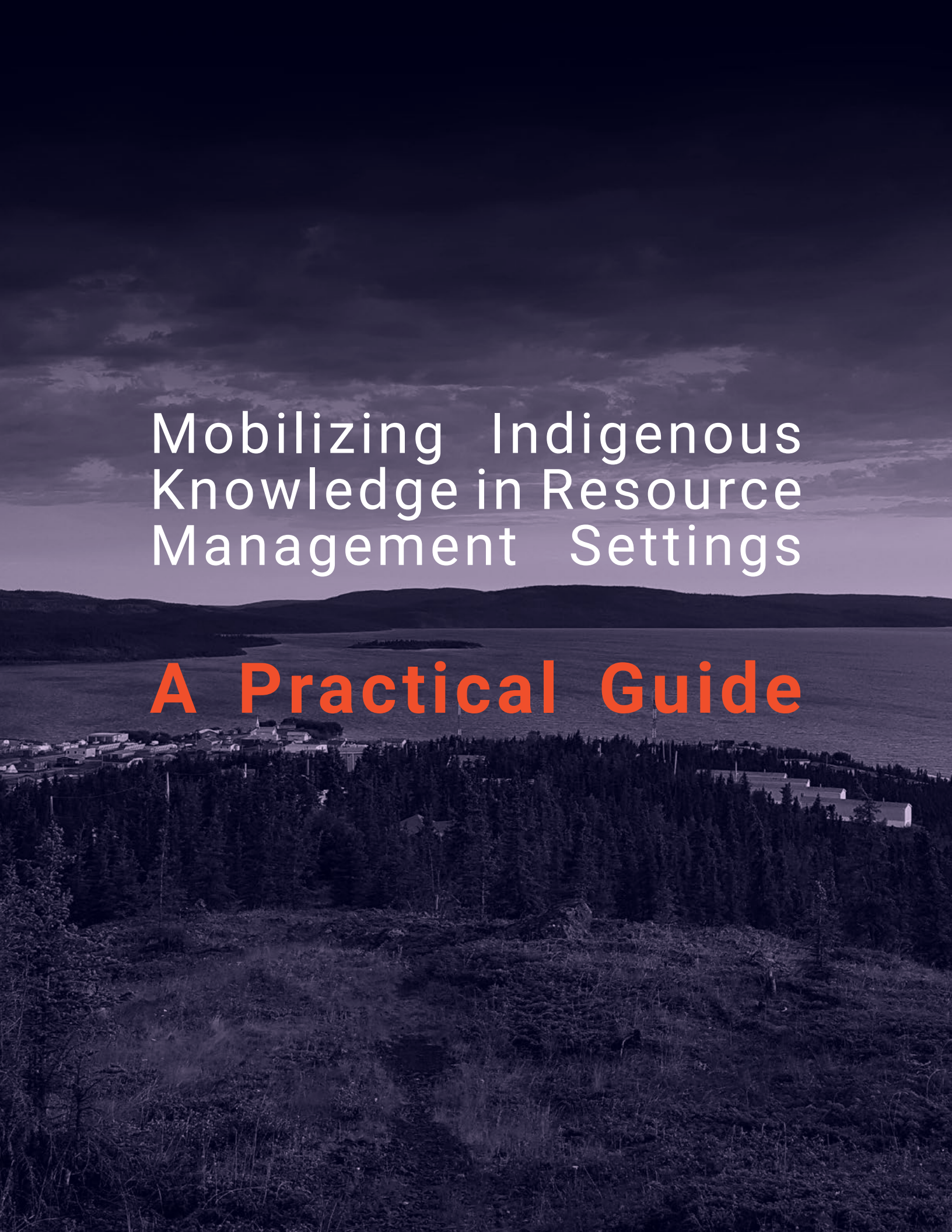

Mobilizing Indigenous Knowledge in Resource Management Settings

A Practical Guide

Mobilizing Indigenous Knowledge in Resource Management Settings: a Practical Guide.
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Trailmark

NWT CIMP
Northwest Territories Cumulative Impact Monitoring Program

Mitacs

About

A practical guide for indigenous communities and government agencies to mobilize indigenous knowledge.

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0.0

Introduction

Introduction

What's the purpose of this guide?

This guide provides resources and curriculum on how to mobilize Indigenous knowledge for better resource management. Our goal is to provide practical advice and recommendations for tools and approaches that support the consideration of Indigenous knowledge in resource management and decision-making.

It aims to assist Indigenous wildlife and lands departments, resource managers, rights holders, and regulatory specialists interested in gathering local Indigenous knowledge and land use information. It intends to assist practitioners on all sides of the resource management equation to allow this knowledge to inform resource management processes and decisions.

Who is this guide for?

This guide is for Canadian Indigenous communities and their staff, partners, and consultants, who wish to:

- Implement processes for gathering local knowledge;
- Use this knowledge to inform community and regulatory decisions about the environment; and
- Apply this information in regulatory, research, or co-management settings.

Aspects of it are also suitable for individuals involved in consultation, engagement, and resource decision-making from Industry, Resource Co-management bodies, or regulatory and enforcement agencies who wish to:

- Improve understanding of social science & indigenous research methods for gathering local Indigenous Knowledge
- Improve the integration or inclusion of provided qualitative Indigenous Knowledge into resource management decisions

What's inside?

Chapter 1.0 Foundations

Foundations begins with an overview of foundational principles and historical context for including Indigenous Knowledge in Canadian resource management contexts. It includes a brief outline of relevant case law and resource management Acts and policies, as well as an overview of terms used in these settings, specifically Indigenous Traditional Knowledge. It includes a discussion of ethical considerations for community-based research from indigenous methodologies.

Chapter 2.0 Community-Based Methods for Resource Management

Community-Based Research Methods for Resource Management provides an overview of the kinds of information needed and relevant for applied resource management, as well as methods and tools to ensure Indigenous Knowledge is gathered in a way that respects Indigenous Knowledge holders, intellectual property, protects confidentiality, and preserves community access and control, while ensuring its relevance to applied resource management endpoints. It breaks the process of developing and implementing a community-based research program into the following five steps:

1. Define Purpose
2. Information Gathering
3. Analysis and Interpretation
4. Verification and Reporting Back
5. Using the Information

Step One discusses techniques to define the research purpose and information gathering plan, which forms the backbone of any research Program. Step Two, information gathering, involves using the appropriate methods and tools to conduct monitoring activities. The analysis and interpretation conducted in Step Three may lead to the production of maps, reports, summaries, etc. that present the findings drawn from the information gathered. These results are validated by monitors and knowledge-holders in Step Four, verification and reporting back. Finally, in Step Five, outputs are produced to make results usable and useful to the community and decision-makers.

The guide is organized around these steps. It provides an overview of potential tasks, methods and tools associated with each step, and discusses relevant considerations for developing and implementing a successful program at each stage.

The process outlined in this guide is intended to support the design, implementation of programs to gather valid, relevant information that can improve and diversify the knowledge base for resource management decisions.

Chapter 3 Data Sovereignty and Sharing

Data Sovereignty and Sharing outlines the principles of data governance and sovereignty, and why it is a vital component of any Indigenous-led research or research partnership with Indigenous communities.

Chapter 4 Conclusion

A brief conclusion of the previous chapters is provided that recaps how community-based research can be designed to facilitate the flow of knowledge and information from community members to program and local leaders, and beyond for decision-making processes.

Chapter 5 Resources

Finally, in the last section of this guide, we provide templates and materials to facilitate knowledge mobility and protection within the research process. It includes the following templates:

Data Management and Sharing

5.A Data sharing plan
for Nations to use as an internal guide for their data governance process.

5.B Informed Consent template
for Nations to use with research participants to ensure they are informed and consent to sharing information.

5.C Data sharing Agreement
for Nations and third parties to outline what is to be shared, how it will be used, and terms of use

5.D Data request form
Nations may respond to data requests by third parties by asking them to fill out this form to clearly outline their request for consideration by the Nation.

5.E Research Agreement template
This could be used with researchers who are working with the community to outline the type of research they are doing, how they will manage the information they collect, etc.

Internal Communications

5.F Briefing Note:
Information sheet on how to create a briefing note for Chief and Council, as well as a Briefing Note template.

Conducting Traditional Land Use Interviews

5.G Interview Best Practices:
Tips for best practices for conducting an interview on Traditional land use and knowledge. We have also included two different examples of interview guides for impact assessment or land use planning that could be followed or modified.

This guide and resource materials are intended to support the design, implementation of programs to gather valid, relevant information that can improve and diversify the knowledge base for resource management decisions.

How was this guide produced?

This guide is built from recommendations stemming from an earlier research project, in which we sought to understand the key challenges related to the inclusion of information from Indigenous communities in impact assessment and land and resource decisions. This earlier research involved

Interviews with:

- Regulatory agencies/co-management boards involved in regulatory decisions and environmental assessments; and
- Indigenous land managers, monitoring program managers, Indigenous monitors, and consultants working with Indigenous knowledge research.

We also reviewed:

- Environmental Assessment Reasons for Decisions to see how Indigenous knowledge was defined, framed and referenced as part of these decisions, focusing on the Northwest Territories Mackenzie Valley Environmental Impact Review Board Decisions as a case study;
- Literature on the history and development of research on Indigenous land use and knowledge, the inclusion and consideration of Indigenous knowledge in science, and community-based monitoring; and
- The history of the development of methodologies for documenting Indigenous knowledge and land use for environmental decisions.

Throughout this previous work, we found that there is a need for tools to help decision-makers, from either Indigenous communities or territorial governments, to gather and represent social and cultural information for the evaluation and management of environmental impacts. Results also indicated a need for support and tools to help communities and researchers to identify and use methods that will elicit and document the best available knowledge from local people

To read more about the findings of this research and related publications, please see the companion reports to this guide:

- Community-based monitoring, Traditional Knowledge, and Resource Management [1]
- An early edition of this Guide, a community-based monitoring toolkit developed with the Lutsel K'e Dene First Nation entitled "Guide for Watching the Land: Yatıé Theʔą́ Nuwé nën Haíd̨ı Xa" (2019).
- Beth Keats' thesis "Exploration of Indigenous Knowledge in Community-Based Monitoring Initiatives: Challenges and Recommendations" [2].

Senior LKDFN Monitor Joseph Catholique

1.0

Foundations

The Duty to Consult & Traditional Knowledge in Regulatory Settings

What are Aboriginal rights and Treaty rights?

Both Aboriginal and Treaty Rights stem from Indigenous peoples' longstanding occupancy and use of the land, including their management of it in accordance with their own values and laws. How Aboriginal Rights are defined in Canada is a culmination of generations of cooperation and conflict, and decades of case law. Aboriginal Rights are generally understood as the right to any practices, traditions, and/or customs that were practiced before European contact. These rights include (but are not limited to): the right to use and live in traditional territories, the right to self-government, the right to Aboriginal title, and social and cultural rights.

Treaty Rights, on the other hand, are rights set out in historic (before 1975) or modern (after 1975) treaty agreements between Canada and some Indigenous groups. Indigenous peoples with Treaty Rights also hold Aboriginal Rights. The contents of treaties vary and may also include Aboriginal Rights, according to the time and circumstances upon which they were negotiated.

Both Aboriginal and treaty rights are protected by Section 35 of the Constitution Act, 1982.

What is the Duty to Consult?

The Duty to Consult is a constitutional obligation that "arises when the Crown has knowledge, real or constructive, of the potential existence of the Aboriginal Right or Title and contemplates conduct that might adversely affect it." [3] The Duty to Consult also applies to honoring Treaty Rights.[4] The Duty to Consult means the Crown, whether the federal, provincial, or territorial governments and their agencies, is required to engage with Indigenous groups for their guidance, leadership and approval and, where appropriate, accommodate potential adverse (negative) effects on Aboriginal or Treaty Rights. Types of activities that trigger the Duty to Consult include proposed industrial development and activities, such as mining, remediation, or hydro projects, operational decisions, and policy development, among others. The scope of the Duty to Consult is present even when the right in question has not yet been proven.

The goals of the Duty to Consult (reconciliation) and impact assessment (sustainable development) are different. In some circumstances, this difference often leads Indigenous nations to assert their right to consultation with the Crown outside/in parallel within the context of an environmental assessment. To varying degrees, however, consultation is integrated into the environmental assessment process, with certain procedural aspects of the Duty to Consult delegated to Industrial proponents or co-management agencies.[5] While the Crown is ultimately responsible for the Duty to Consult, as an organization it must rely on proponents of development and the environmental assessment process to act as an important source of information about proposed development projects and their potential impacts. Development proponents should possess the most knowledge about their project and its potential impacts.

What is Traditional Knowledge, and how is it linked to Aboriginal rights?

Definitions of Indigenous Knowledge and Traditional Knowledge (TK) can vary, and this creates issues for its consideration and inclusion within a regulatory setting. For this reason, defining these terms should be part of research program development and regulatory engagements to ensure all parties are aware of what information is considered Indigenous and/or Traditional Knowledge. For this guide, we use the term Indigenous Knowledge and Traditional Knowledge interchangeably.

Indigenous Knowledge refers to unique knowledge systems specific to Indigenous communities. It represents both the knowledge these systems contain, and the ways of knowing—managing information and validating knowledge—they comprise. The term is used, as it is across the literature and in practice, interchangeably with the term Traditional Knowledge to denote: “an entire epistemology... a unified world-view incorporating all aspects of Aboriginal society, spirituality, economy, and culture.”[6]

Indigenous Knowledge can provide a window into the past, but it is neither historical nor backward-looking. It is in fact fundamentally concerned with the present and with carrying forward knowledge, observations, values and practices that have been tested and proven to be of ongoing usefulness. Although it is generally conceived of as “handed down” from one generation to the next, it is not static either, but “cumulative over generations, [and] empirical in that it must continuously face the test of experience” and remain relevant. It is dynamic and “changes in response to socioeconomic, technological, physical or other changes.” [7]

The term Indigenous knowledge then describes dynamic, empirical knowledge, uniquely rooted in the environment where it developed, and proven relevant repeatedly over an expansive time frame. The term also indicates that this knowledge is underpinned by a unique place- and culture-specific system for producing, evaluating, governing and transmitting knowledge.

In other words, like science, Indigenous Knowledge is a unique type of knowledge resulting from a specific knowledge-generating system. However, because of its link to Indigenous people, it is inseparable from Indigenous values, customs, and, in particular, rights.

For example, when interviewed, Łutsel K’e First Nation members described challenges with Traditional Knowledge terminology and its representation in the regulatory setting. They expressed that over the years, it has become a “catch-all” term, with a lack of clarity on what it is and how it is used, especially for on-the-land monitoring programs. They are concerned that information provided by communities for regulatory purposes may be labelled as “TK” regardless of whether this information sufficiently represents knowledge about the world and ways of knowing. In other words, Indigenous people may share information that does not necessarily qualify as Indigenous or Traditional Knowledge. For this reason, it is important for Indigenous peoples, development proponents, or regulatory boards to establish a definition of Traditional Knowledge within the context of its use.

Knowledge vs. Information/Data

This guide defines *information* as data (e.g., observations) that are gathered from a source (forms, surveys, GPS sites & tracks, recordings, transcripts, etc) and organized according to its relationship to a problem or a question. Knowledge is defined as the critical application of consideration to arrive at an understanding.[8] Knowledge requires a knower, and incorporates "experiences, skills, and techniques, remembered and accumulated."[9] Information can become disembodied, quantified, mapped, and archived; knowledge is the culmination of effort to solve a problem, involves critical thinking, and is culturally bound.

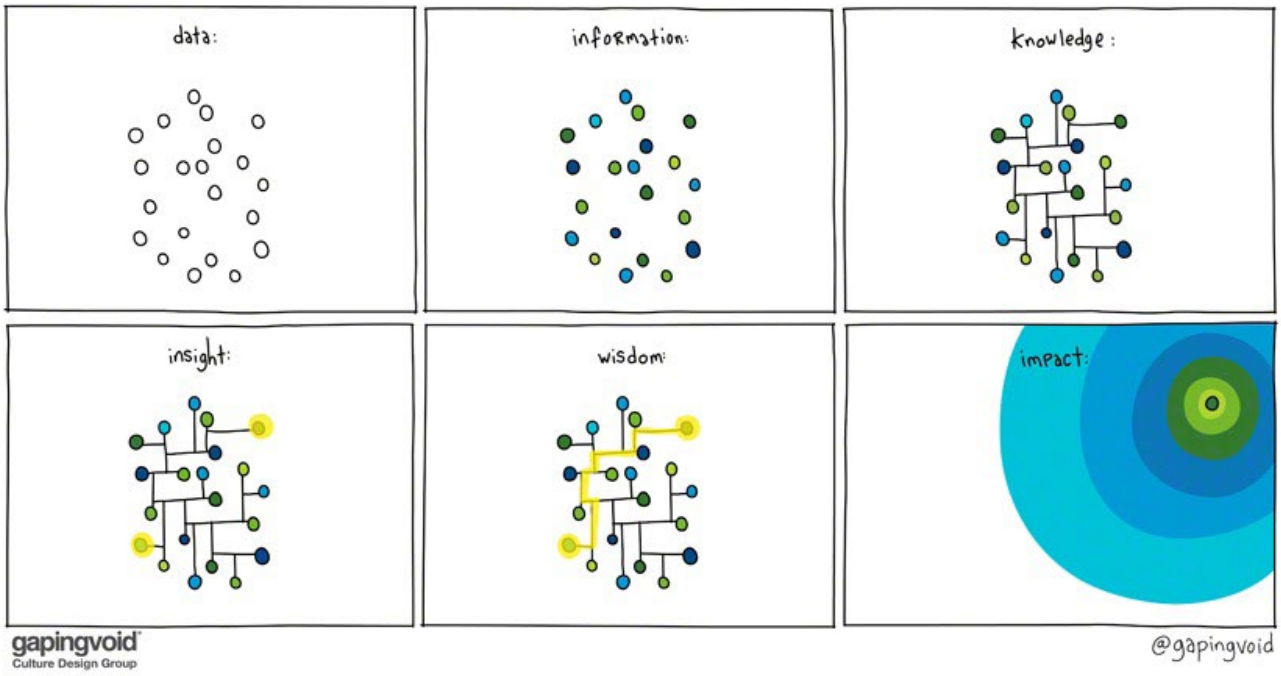


Figure 1 *Visualizing differences between data, information, knowledge, insight, wisdom and impact.*

This guide approaches community-based research design with the understanding that knowledge needs "to flow not in just one direction, but in a circle, so that it is generated, acknowledged, tested, refined, rethought, and ultimately diffused as wisdom." [10] It examines tools to produce and move knowledge across boundaries, between researchers and communities, communities and decision-makers, and decision-makers and regulatory policy.

What are decision-making processes?

A decision-making process and outcome for environmental assessment or management is shaped by information or evidence, different perspectives, argument, debate, and possibly even different knowledge systems (eg. Indigenous knowledge and science). Decision-making is also empowered to arrive at influential recommendations or decisions on a particular subject. This guide focuses on decision-making processes that happen within the territorial and federal regulatory frameworks of Canada. In the Northwest Territories (NWT), the Mackenzie Land and Water Board, the Mackenzie Valley Environmental Impact Review Board, the renewable resource boards, and the land use planning boards are all agencies engaged in decision-making processes.

Despite the best intentions and many years of supporting policies and efforts, blending Indigenous Knowledge into these processes remains difficult.

Why should decision-making processes include Indigenous knowledge and land use information?

First of all, because they must. The Duty to Consult requires federal, provincial, and territorial governments to consider evidence provided by Indigenous communities for how a proposed development project or resource management decision may negatively impact asserted Aboriginal and/or Treaty Rights. Regulatory policies and *Acts* contain requirements to consider and incorporate Indigenous Knowledge within resource management assessment processes. In the NWT, co-management boards, the GNWT, and Canada consider this evidence by looking for the ways it describes what specific rights may be impacted, what the impact to those rights may be, and if there are any ways that a project can reduce or avoid those impacts.

Shaped by case law on the Duty to Consult and Indigenous Rights over the last 30 years, and Indigenous peoples' activism, and land claim agreements, federal, provincial, and territorial regulatory agencies have developed requirements to consider Indigenous land use and knowledge in reviewing major development projects.[11] These policies developed against a backdrop of political, legal, and social change related to Indigenous / non-Indigenous relations, and have been accompanied by, among others, the recommendations of the Truth and Reconciliation Commission, and, at the international law level, of the newly adopted principles of the *United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP)*. Most recently, the Impact Assessment Act (2019) includes new terms and guidance for the inclusion of Indigenous knowledge into fisheries management, impact assessment, and navigation.

Second, the value and importance of including multiple ways of knowing (eg. Science and Indigenous Knowledge) into sustainable and socially acceptable resource decisions is well established. Local and Indigenous Knowledge provide "valuable ecological information based on long-term observations of and interactions with natural resources for which there may be no other long-term [scientific] data sets."[12] The UNDRIP recognizes "that respect for Indigenous knowledge, cultures and traditional practices contributes to sustainable and equitable development and proper management of the environment."[13] The UNDRIP was developed in response to concerns about sustainable development and updated case law on Indigenous Rights, recognizing that knowledge held by Indigenous people about the natural world has sustained their life-ways and is critical to cultural identity and wellbeing.[14]

Despite obligations to assess potential impacts to Indigenous land use and rights and include Indigenous Knowledge in decision-making, challenges in practice persist. Risk and environmental impact assessments have been criticized for failing to account for the spiritual, physical, and ecological relationships Indigenous people have with their environment that form the basis of health and wellbeing.[15]

Methodologies for transparent, constructive, and validated ways of identifying synergies across knowledge systems are required.[16] Including Indigenous Knowledge in decision-making processes may be a unique challenge, yet "imperfect knowledge and uncertainties characterize and challenge environmental decision-making and governance at all levels."[17] In other words, there are challenges associated with synthesizing many different forms of information, even when involving similar systems of knowledge. In addressing urgent environmental and social issues, maximizing strength in research to create knowledge, and creating pathways for knowledge to benefit society and the environment remain the most elusive in terms of approach. The problem is not the lack of information, but the ability to make and move knowledge across disciplinary, institutional, and cultural boundaries. Throughout history, societies that manage to create mechanisms to successfully transmit knowledge do not repeat destructive behaviours.[18] Creating these mechanisms requires designing research capable of understanding the complex interconnectedness of humans, knowledge production, and the natural and social systems we inhabit.[19]

This curriculum aims to provide tools and techniques to facilitate knowledge flow in a way that benefits communities and the environment in land, resource, and wildlife decision-making processes.

What Kinds of Community-sourced Information Matter for Environmental Impact Assessments?

There is no simple “one size fits all” kind of community-based research for environmental impact assessments, as information needs will depend on specific community histories, contexts, concerns, needs, and capacities, as well as the nature of the development or decision being proposed. However, there is very clear guidance on what should be considered as part of an assessment on impacts to Aboriginal Rights, and this guide offers an overview of methods and tools to document evidence for use by Indigenous communities in assessments and resource management decisions processes.

Regulators and resource managers are typically tasked with identifying and using information that can support an assessment of impacts to the natural environment and living systems (including humans). Proponents should provide explicit information on how projects may affect Indigenous peoples, including both adverse and positive effects to their use of land and resources for traditional purposes, physical and cultural heritage, and environmental, health, social and economic conditions. Under the *Impact Assessment Act*, proponents are required to demonstrate they have included community and Indigenous knowledge in collecting baseline data about the proposed project.

Indigenous communities potentially impacted by a proposed development participate in an environmental assessment by 1) becoming informed about the proposed project, then, 2) conducting research and gathering information to identify how the community is using the area, both historically and currently to exercise Aboriginal rights and/or title. This evidence will then support an assessment, either led by the community or the regulator, or both, on the potential ways the proposed project may affect a community’s rights and title throughout the proposed project’s life-cycle (pre-construction, construction, operation, decommissioning and abandonment). Consultations and discussions between the Indigenous community, the proponent or the Crown will be supported by this research and help to ensure that the project and its effects will be considered, mitigated, or accommodated.

Identifying information from communities that is most relevant to environmental assessment and wildlife management decisions is an important way to ensure that time, efforts, and resources are not wasted, and that a community’s concerns and rights are represented.

The following comprehensive list of information needs can inform the design of community-based research and engagement and provide a means to measure if and how this was done. As such it is a significant resource to assess how current research methods, like traditional use studies, or CBM, could be designed to produce results for a regulatory decision-making process.

Exemplary information needs can be found in the *Practitioner's Guide to Federal Impact Assessments Under the Impact Assessment Act* [20] published by the new *Impact Assessment Act of Canada* (2019), and in less detail, within the *Northwest Territories Mackenzie Valley Resource Management Act (S.C. 1998, c. 25)* [21] and *Guidelines for the inclusion of Traditional Knowledge in Impact Assessment* (2005).[22]

The guidelines produced by the IAA are an outgrowth of the need to restore faith in impact assessment to adequately consider impacts to Indigenous life-ways and their relevant knowledge. The absence of such a directive for the NWT has implications on the development of information provided to the co-management boards for decision-making and leaves the co-management boards with few means to gauge how the information is relevant to the project in assessment.[23]

Canada's practitioner's guide under the Impact Assessment Act provides a long list of information requirements to describe "the nature and extent of the exercise of rights of Indigenous peoples, potentially impacted by the project" (Government of Canada, 2019), which may include, but are not limited to:

Traditional Land Use and Knowledge

- general information of the Section 35 rights exercised in the area of the project, including historic, regional, and community context;
- the quality and quantity of resources that are available to exercise the right (e.g. preferred species);
- current and future availability and quality of traditional foods;
- access to the resources required to exercise rights (e.g. physical access to culturally important places, timing, seasonality, distance from community);
- the experience of being on the land, and how the project may interfere with this experience (e.g. changes in air quality, noise exposure, vibrations from blasting or other activities);
- specific areas of cultural importance where rights are exercised, including the use of travel ways, navigable waterways and water bodies;
- landscape conditions that support the Indigenous group's exercise of rights (e.g. large, intact and diverse landscapes, areas of solitude; connection to landscape);
- where possible, information about members within an Indigenous group, and their role in the exercise of rights (e.g. women, men, elders, youth, people with disabilities);
- how the Indigenous group's cultural traditions, laws, and governance systems inform the manner in which they exercise the rights (the who, what, when, how, where, and why);

From the IAA Guidelines

Economic Interests

- commercial and non-commercial fishing, hunting, trapping and gathering and cultural or ceremonial activities and practices;
- commercial, non-commercial and trade economies;

Heritage Resources

- cultural heritage, and structures, sites, or things of historical, archaeological, paleontological, or architectural significance to groups, including, but not limited to:
  - the loss or destruction of physical and cultural heritage;
  - changes to access to physical and cultural heritage;
  - changes to the cultural value, spirituality, or importance associated with physical and cultural heritage;
  - changes to sacred, ceremonial, or culturally important places, objects, or things, including languages, stories, and traditions; and
  - changes to visual aesthetics over the life of the project and post-project abandonment or decommissioning."

Cumulative Impacts:

- where they exist, identification of thresholds identified by the community that, if exceeded, may impair the ability to meaningfully exercise of rights;
- how the project may contribute to pre-existing impacts and cumulative effects that are already interfering with the ability to exercise rights or to pass along Indigenous cultures and cultural practices (e.g. language, ceremonies, Indigenous knowledge)" [24]

Significance and Severity of Impacts

With any information gathered about the topics above, communities can work independently or with proponents and the Crown to identify how the project may interfere, and if so how significantly. This is a key component for project decision-makers

What Kinds of Community-sourced Information Matter for Wildlife Management?

As with regulators in the context of environmental impact assessments, regulators in wildlife management should be consulted for what kinds of information would be considered reliable, necessary, and informative, especially regulators who represent and/or manage wildlife for their communities. Wildlife managers who represent communities play the unique role of knowing what kinds of information are demanded of them, and the contexts from which community-based information may be brought forward. Researchers, advisors, consultants, and/or other parties who have been hired by communities to gather this data should adopt a service-based approach: understanding information that is desired from a community for their own internal—or to participate in external—decision-making processes and designing research programs that aim to gather that information. In these contexts, information is usually sought to not only monitor wildlife but, more importantly, the Indigenous right to access, harvest and use them.

Indigenous Knowledge holders could share information on specific indicators of wildlife population status. We list off potential themes that a community-based research project could explore. Indigenous Knowledge is more than ecological information, and often includes values and principles that guide human relationships to each other and the world around them. The following list encompasses more than ecological information and includes wildlife management itself. Most of these “measurements” may be categorical, versus discrete and quantitative.

- Hunting experience and methods;
- Views on, experience with, and impacts of hunting rules and regulations;
- Uses of species;
- Economic value;
- Names for and differences in sex and age groupings;
- Health and body condition;
- Reproductive behaviour and seasons;
- Diet and feeding behaviour;
- Interactions with predators and sympatric species;
- General behaviour;
- Timing of observations;
- Where animals can be encountered;
- Trends in population abundance, including timelines and reasons for them;
- Preferred abundance;
- Timing of habitat changes (e.g., ice formation);
- Factors affecting habitat changes;
- Views on and experience with human interactions;
- Preferred (ethical) human interactions for mitigation (e.g., deterrence);
- Views on harvest levels;
- Views on priorities of wildlife managers;
- Perspectives on wildlife assessments;
- Concerns and reasons for them;
- Confidence and trust in wildlife management;
- Views on, experience with, and recommendations for engagement with government partners; and / or
- Preferred sources of information.

Community-based research can allow systematic documentation of Indigenous Knowledge about land use, values, cultural survival, and self-determination, which can then be used to assess how a proposed development or resource/wildlife management decision may impact those things. Community-based research can also facilitate the flow of knowledge and information from community members (Indigenous monitors, Elders, youth, land users) to program and local leaders, as well as external parties required to consider this information in decision-making processes. Through sound methods, design, and planning, community-based research programs can harness powerful local knowledge.[25] However, efforts are wasted if the knowledge is not shared with and understood by decision- and policy-makers, and regulatory analysts, as well as local people.

In Chapter 3 we discuss methods and tools for community-based research to use to gather information on these subjects in a culturally sensitive and practical way.

Facilitator's Notes

Chapter recap and discussion

Exercise
What is Traditional Knowledge/Indigenous Knowledge?

This exercise can be facilitated to a small group, or can be completed solo after reading through the chapter.

Facilitated Sharing Circle

The group is presented with a review of the material covered in Chapter 2. The following question is then posed to the group:

> *"After reflecting on this Chapter, how do you personally define Indigenous Traditional Knowledge?"*

Each participant is encouraged to share their own definition of Indigenous Knowledge. Each definition is written on a whiteboard or on a shared screen so that everyone can view together. After all definitions are added, participants are asked to arrange each definition according to their similarities, and noting differences.

Then, participants are asked:

> *"Please share with the group an example or a reflection you might have from your own experiences with Indigenous Knowledge, such as situations intended to document, include, or considering this knowledge in regulatory settings."*

Additional Prompts can include questions such as:

- What was the purpose of this work?
- What was the outcome?
- How did the results of this work inform the decision or process?
- What challenges did you encounter along the way?

After everyone has shared, the facilitator provides 2 examples to build on the discussion:

Example 1: An EA that clearly included and considered Indigenous Knowledge

Example 2: An EA that is controversial because of its lack of inclusion of Indigenous Knowledge.

The facilitator then asks the group:

- Based on this information, what are the factors that went right with Example 1?
- What went wrong with Example 2?

Wrap up

Facilitator reviews key points, both in the presentation and shared by the group, and closes the exercise.

2.0

Community-Based Research Methods for Resource Management

2.1

Indigenous Ethics as Methodology

This chapter outlines how to plan for and conduct community-based research for different resource management scenarios. It focuses on research for use by Indigenous communities to lead or participate in decisions over their land, waters and territories, such as environmental impact assessment, wildlife management process, or land and water permitting assessments. It is also for individuals involved in consultation, engagement, and resource decision-making from industry, resource co-management bodies, and regulatory agencies who wish to use and include this research.

A conceptual framework is the underlying knowledge system that governs research. This guide promotes research that follows the conceptual framework (or epistemological or theoretical framework) of Indigenous methodologies championed by Indigenous scholars and experienced practitioners in this field.[26]

First, Indigenous research methodologies and research settings are based on the principles of the Four R's:[27]

- Respect - valuing diverse knowledges
- Relevance - involving communities in research, linking community concerns and information needs
- Reciprocity - shared benefits and knowledge is a two way process
- Responsibility - researchers are accountable to all partners

This conceptual framework serves to guide researchers to see and write knowledge differently and follow ethical ways to record, store, and share this knowledge. Putting these principles into practice asking important questions, including:

Whose research is it?

Is this research for use by the community, or another party working with the community?

Who owns it?

Will the products that are produced by the research be owned by the community? How will ownership of the products of research be managed?

Whose interests does it serve?

Will the results be used to serve the interests of the community or another party, or both?

Who will benefit from it?

Will the results benefit the participants? The Indigenous organization? The co-management board? The proponent or the Crown? The academic institution?

Answering these questions is a means of maintaining the principles of respect, relevance, reciprocity, and responsibility by establishing clarity around the research itself and the reasons why it is being done. Transparency is an essential part of building trust in a research partnership and establishing certainty for participants around how the information should be shared, referenced, and used.

Who has designed the questions and framed its scope?

Who will carry it out?

Who will write it up?

How will results and benefits be shared?

Additional Considerations

There are challenges common to all community-based research approaches that must be considered when you are planning yours. Regardless of the approach or approaches chosen, program designers and administrators will need to consider how to:

- Engage and motivate community members to participate;
- Access, aggregate, verify and validate information and data collected;
- Combine information/data drawn from Indigenous knowledge and science; and
- Produce or translate data capable of satisfying diverse requirements.[28]

Community participation in research programs can be affected by a variety of factors, which program designs may need to address. In addition to requirements for training, access to technology, and other capacity issues, perceptions of the decision-making processes a research program may be designed to support may also affect community members' willingness to participate. The belief that decision-making and regulatory processes are not capable of incorporating, or, worse yet, are designed to disregard and ignore, Indigenous knowledge and perspectives is one of the greatest barriers to including either in resource management decisions.

Motivated and collaborative engagement comes from the belief that the energy invested in gathering and sharing observations, knowledge, and concerns, will lead to their fair consideration. Faith in the process can be a prerequisite to participation. Therefore, participants should be helped to understand precisely how the information they share will be used, what role it will play, and how much weight it will be given in the decision-making process. Regardless of the outcome, and perhaps especially when decisions do not favour the knowledge and information shared, participants should receive an explanation of how their contributions are reflected in the decision

An additional resource to assist with establishing an equitably beneficial research process for land stewardship is found in a guide produced by the Kitasoo/Xai'xais First Nation (2021) "Informing First Nations Stewardship with Applied Research: key questions to inform an equitably beneficial and engaged research process".[29]

2.2

Steps to Designing Community-Based Research for Resource Management

This chapter focuses on how knowledge is recorded within a community-based research program, how this information becomes data, and how that data is accessed, analysed, interpreted, and transmitted for use in resource management decisions. We walk through this using the following five steps:

1. Define Purpose
2. Information Gathering
3. Analysis and Interpretation
4. Verification and Reporting Back
5. Using the Information

Step one discusses techniques to define the research purpose and information gathering plan, which forms the backbone of the research project. Step two, information gathering, involves using the appropriate methods and tools to gather information. The analysis and interpretation conducted in step three may lead to the production of maps, reports, summaries, etc. that present the findings drawn from the information gathered. In step four, verification and reporting back, these results are validated by participants. Finally, in step five, outputs are produced to make results useful to and usable by the community and decision-makers.

It provides an overview of potential tasks, methods, and tools associated with each step, and discusses relevant considerations for developing and implementing a successful program at each stage.

2.3

Defining Research Purpose

Determining what the purpose of a research program is and how the information gathered will be used is an obvious, and yet often overlooked, step in planning what to focus research on and how.

Information needs of the community and decision-making processes should guide the program so that it is relevant. Knowing how data will be used (e.g., formats that are considered relevant, reliable, and/or usable) can ensure that data will actually be used to affect changes for the community, and aid participation in resource management settings. This ensures that the program not only produces results, but that the results are truly meaningful and useful.

Determining uses for the data and information produced by research at the outset can inform the development of approaches and technical tools, as well as workflows, staffing requirements, and potential candidates for participation. Identifying the "end uses" and/or utility of the program can also increase the program's attractiveness to funders, especially when they are in alignment with funding mandates.

How the research outputs might be used should be determined through a knowledge-sharing agreement created in discussion with potential recipients of this information such as industry proponents, co-management boards, and/or government resource managers (fisheries, forestry, wildlife). (See Chapter 3 for more on data sovereignty and Section 5.3 to access a template/example of a data sharing agreement).

2.3.1 Identifying What to Collect Information About

Community-based research and monitoring programs should always be designed to increase understanding about or monitor things that matter to the involved community. **Chapter 2 Foundations** provides a discussion and summary of information that could be gathered to support an Indigenous community's participation in an environmental assessment or wildlife management decision. **An overarching theme of these information needs is that they should align or be led by issues and concerns that members of the Indigenous community have about the things they care about most, and that these things can be linked with the information needs for assessment of impact to Aboriginal rights and title, or other regional environmental/wildlife management initiatives**.

SCENARIO: Traditional Land and Knowledge Study for Environmental Assessment

A Traditional Knowledge and Land Use Study (sometimes called a Traditional Use Study or Traditional Knowledge Study, or Traditional Land Use and Occupancy Study) is a widely used mechanism for researchers to assess the potential impacts of a proposed industrial project on Indigenous communities.[30] While variation exists within this method, the "map biography" or "land use and occupancy" approaches are the most prominent. This approach to traditional land-use research typically involves survey-style interviews with Indigenous Elders and individuals who participate in the subsistence economy within the community. Information about the use and knowledge of the land is recorded, including seasonal patterns of activities, and ecological knowledge and concerns.[31] Site-specific information, such as hunting, fishing, trapping, or plant gathering areas, as well as trails, cabins, spiritual sites, and habitats are annotated on maps. A profile of the community's land use patterns and subsistence needs is then created by aggregating each participant's information. These results partially illustrate the extent of land traveled for subsistence needs and the location of activities mentioned. The density of areas mapped also are considered to imply a crude estimate of land use intensity. [32] The study may result in a written report of what is shared in interviews, and aggregated category maps depicting the subsistence activities described. These studies are also considered to constitute documentation of Traditional Knowledge capable of bringing forward valuable local insights to meet resource management endpoints [33] or for use in assessing potential overlapping impacts of land uses on Aboriginal Rights.[34]

SCENARIO: Community-Based Monitoring for Culturally Situated, Environmental and Wildlife Information

Monitoring is the act of "maintaining regular surveillance" or, basically, checking on something regularly. In the case of environmental monitoring, the thing being monitored is the environment. This involves gathering information about the environment using monitors, or people and technology "used for observing, checking, or keeping a continuous record of a process or quantity." [35]

Although some prefer to describe environmental monitoring as neutral observation, in general, it is understood to be observing with purpose, responsibility and/or authority. For example, Indigenous communities across Canada are establishing environmental monitoring programs to help protect and exercise their inherent rights and authority on their traditional lands.

The Łutsel K'e Dene First Nation, define monitoring, or Ni Hat'ni, as "watching the land". The goal of such monitoring is not simply passive observation; it is to "keep tabs" on the environment within Łutsel K'e Dene territory in order to support the Nation's knowledge, understanding and use of its traditional lands.

Identifying forms of Indigenous monitoring that already and has always occurred within the community creates an important foundation to plan for information gathering. This includes, for example, monitoring things that communities already look out for when they go and make decisions around fishing, hunting or other forms of harvesting. The challenge lies in translating how they talk about these things to a format or communication that decision-makers consider real "data."[36] This process may involve semantics, redefining terminology, and, most importantly, protecting the integrity of community-based information structures and narratives. Formal "monitoring programs" may mirror and/or adopt informal, flexible, and culturally-situated structures that are already in place, or more simply describe and report on them.

The Community-Based Monitoring Network and Kitikmeot Caribou Inuit Qaujimajatuqangit Monitoring Program, run by the Nunavut Wildlife Management Board and Kitikmeot Regional Wildlife Board, respectively, in Nunavut are examples of monitoring programs that were developed according to the animals, weather, and travel conditions that people are already observing when they travel. Inuit hunters already track changes in wildlife as well as their environment to make decisions around safe and respectful hunting and traveling. In particular, the Kitikmeot Caribou Inuit Qaujimajatuqangit Monitoring Program was developed using monitoring "questions" advised by Elders during interviews before monitoring began, based on what hunters look out for and felt were important to continue to track, to make inferences on how their environment (beyond caribou) is changing. Not surprisingly, monitoring includes questions on other wildlife (predators, competitor species) to capture how Inuit view the land as a whole. Hunters are trained to use an app that runs on a mobile device to record the things they find relevant, interesting, and important for the wildlife managers representing their community.

2.3.2 Defining Research Topics and Questions

A research topic should be developed first in order to guide what will be asked of participants and otherwise documented. Questions could then be developed on the topic and answered through the course of the program. Research questions serve as important guideposts for keeping research programs on track, and can ensure programs are linked to the research topic. For example, a research topic for an environmental assessment could be hunting effort, activities, and species availability, developed based on a community's need to know the status of wildlife and their ability to access it.

Corresponding research questions might include:

- What areas and habitats are important for animals?
- How much effort is required to harvest animals? How does this compare with 10, 20, 30, and 40 years ago?
- What concerns do hunters have?
- What changes do hunters observe in animals and/or hunting practices?

Research questions could be species-specific, or broad for an ecosystem approach. Topics and questions should also be specific enough to produce useful findings for the community, but broad enough to allow for unanticipated results and data sharing for applications outside community contexts (if communities want to share their data).[37]

Research topics and questions should also be driven by the program's purpose and consideration of how the information gathered can be applied in decision-making, co-management and consultation settings. In our example, the purpose of community-based monitoring may be to allow communities to record and share the information they already know but have not yet recorded, and use that data to support their approach to or position on wildlife management. A monitoring program could produce information that describes current hunting practices and observed stressors and concerns. If the program employs hunters as field-based monitors, they could record their tracks and activities in a way that enable researchers to see where hunters are going, how they are hunting, how far they must travel to encounter or harvest food, observations of animal health, unusual animal behaviour, and any/or other concerns they have while on the land.

Species health and access to hunting/gathering is usually a topic of interest to communities, especially if those species are politicized, economically valued outside of communities, perceived to be out of balance by communities, and/or are listed under species-at-risk legislation (e.g., have been or are being assessed by the Committee on the Status of Endangered Wildlife in Canada). Species that are affected by the outcomes of environmental assessments that also potentially impact Section 35 Aboriginal rights are also usually of interest. However, communities are likely more receptive to topics where communities are at their core (e.g., topics are not independent of human relationships or impacts to community members) and how research outcomes potentially affect communities (or their hunting/gathering/Aboriginal rights) are clear.

Example from Field Monitoring: Connecting What to Monitor with the Monitors

When the purpose of an Indigenous monitoring program is tied to harvesting practices and/or reasons for being out on the land, monitors are likely more motivated to participate. This tie also makes it easier for them to envision how they can participate with their existing capacities. Unfortunately, some communities struggle with having access to hunting and/or traveling equipment, despite wanting to participate in monitoring. Some community members may also prefer to participate in monitoring while accompanying hunters on the land to avoid balancing efforts between hunting (e.g., actively looking for and pursuing animals) and recording data in the field. The better monitors understand the purpose of monitoring (research topic) and the value and benefits of the information being gathered, the easier it is for them to determine what and when they should record.

A monitor might question the relevance of documenting weather, snow, and ice conditions. As a hunter, he already made these observations using his own instrumentation (e.g., mind) and knowledge to make decisions about safe travel. However, recording this data systematically for a monitoring program may interrupt his normal behaviour out on the land. For example, he would have to spend more time recording his observations when he would otherwise spend that time searching for food. When explaining that the purpose and end-use of this monitoring data is to sustain and improve safe travel on the land for others, they might be more willing to spend time recording observations that are usually only informally shared, for the benefit of the community. In this manner, ensuring monitoring programs align with community values and needs at the outset is of utmost importance to encourage monitor participation.

Communicating the purpose and intended outcomes for monitoring is an essential element of the monitor recruitment/hiring and training process. Involving monitors in defining the purpose and identifying potential end-uses for the information being gathered mutually benefits the monitors' understanding and program designers. For monitors, the purpose of their recordings should be as meaningful to them as to those who are interested in their data, since they need to independently decide when and how to report their observations.

In the words of an Łutsel K'e Dene First Nation Monitoring participant:

> Monitor: *A recording is good to have a good report. Because it's just you like that. -- you do your reporting yourself, what you see out there. And if every each monitor has a recorder, and [knows] how you want to report. If I'm out in the tundra there, I'll look at a caribou I'll just explain what its reaction is. Why is it bedded and the other ones are running? Is it wounded?*
>
> *So in the long run to have good monitoring, and to know what they have to monitor, you know what you are seeing and when to report.*
>
> Beth Keats: *-- And that's helpful for bringing information back? When you really clearly know what those moments when you should record something?*
>
> Monitor: *Yes. And sometimes I could say it in my language. You know, Maybe I go back to the Wildlife [Lands & Environment] Department and they took all the notes there and they put it up on the screen and some of the notes are in Chipewyan, and they can be translated.*

Monitors can also advise the development and/or selection of methods for information gathering, given their experience, knowledge, and existing practice. For example, low literacy skills were reported in Łutsel K'e as a barrier to monitor participation when programs required monitors to fill out long series of forms or complete journals. Monitors report being unable to convey their thoughts and observations adequately in writing. These individuals preferred information gathering methods that involve recording audio (so they can dictate their thoughts and observations), taking photographs, and selecting drop-down or multiple choice answers on digital forms using their phones or rugged recording devices.

Focusing on Culturally Important or Keystone Species

The physical, social, cultural, and spiritual health and wellbeing of Indigenous harvesting communities can depend on the availability of specific species, as well as the persistence of knowledge based on longstanding relationships with those species and their habitats. The status and accessibility of these valued components of the environment can, hence, serve as barometers for impacts on Indigenous communities. Identifying these culturally important or keystone species[38] and community relationships to them can be very helpful in answering the question of what to monitor.

Deciding which species are a priority—given limits to available resources—can be challenging, particularly within the context of an ecological and/or holistic view of the natural world and all of the species within it. However, limiting the scope is necessary for practical reasons, including logistics of, funding for, and manageability of a Community-based monitoring program, and/or the outputs that can feed into decision-making processes (e.g., environmental assessment categories).

Some communities have overcome this challenge by prioritizing species that they consider representative of the health of the ecosystem (e.g., keystone species). Selection criteria could reflect information requirements in a decision-making process, for example:

1. The species is heavily depended upon for harvest revenue;
2. The species is heavily depended upon as a staple food source;
3. The species is especially culturally or spiritually significant (including ceremonial uses);
4. The species has been part of Indigenous life-ways;[39] and/or
5. An ecosystem relies on the presence or absence of a species.

Once a list of keystone species is compiled, it should be reviewed and approved by community members. Then all available knowledge on the species should be brought together, including information from monitoring, interviews, workshops, previous studies and research. This aggregated information can serve as the basis to inform new research, either through the identification of gaps, or to simply be a stepping off point for new efforts to gather information about the species on this list, using research methods described in **Section 2.4 Information Gathering**.

In the case of research designed to provide information for impact assessment, the information gathered can be treated as information about a Valued Ecosystem Component, and be part of the assessment of potential impacts to this culturally important species and, in turn, harvesting activities. This process may also assist with prioritizing species and/or impact scenarios for analysis through cumulative effects assessment or further studies.

2.4

Information Gathering

There are different ways that knowledge can be documented for application in impact assessments, participation in resource management decisions, land use planning, consultation, or other environmental research/monitoring partnerships. Methods will depend on information needs and uses (e.g., the program's purpose). This section outlines some of the tools and methods for gathering information in community-based research, and applications for the information they produce.

2.4.1 Building on what you already have: review existing material

An essential first step in responding to a development proposal, impact assessment, etc..., is looking at what information may have already been gathered through past research.

Figure 2 *Using all of the transcripts from interviews over many years stored in Łutsel K'e 's archive system, we created this word cloud based on frequency of uttered words corresponding to text size. Word clouds allow frequent discussion topics to be easily visualized.*

How to search and pull together past material

If your community has ever participated in past environmental assessments, heritage assessments, land claims research, crown consultations, or academic research, the chances are high that there already exists material that may be relevant to topics within your research plan. The status of a community's repository and its accessibility can vary greatly given the extent of the capacity of the Nation to store and manage this information independently.

From stacks of paper to information

If you have paper reports, transcripts, or meeting notes that might be relevant to your project, you can expedite your review of this material by scanning it with an application equipped with OCR (Optical Character Recognition) that will convert the document into a searchable digital file. A digital collection can then be searched individually by keywords that are relevant to your inquiry, or the whole collection could be searched in a batch using software tools such as NVIVO or Trailmark.

Search results that include relevant material, or sections within this material, like paragraphs, quotes, or sentences are copied and pasted into a document where you will collect and organize these findings by topics or themes. It is important to include the metadata or reference for each finding with the text you've copied so that you can reference it properly. After you've sifted through all the material, you are ready to review and prepare a summary, citing the best quotes from what you've found.

Researchers in the Northwest Territories can also conduct an online search for material relevant to their community and the purpose of the study. Online repositories that may include published past research on traditional land use and knowledge include the Mackenzie Valley Review Board Online Registry System. The archives of the Prince of Wales Northern Heritage Center, Hudson's Bay Company Archives, and Library and Archives Canada are great sources of historical material.

2.4.2 Interviews

Research on issues related to Indigenous land use and knowledge has traditionally involved interviews. The goal of qualitative research interviews is to record the interviewee's knowledge and perspective on the subjects in question.

When interview subjects involve detailed discussions about specific places, plants, and animals, participants (interviewer and interviewee) often use maps to locate and then record the spatial information shared.

Many different types of information can be collected in interviews, including:

- Specific or observational environmental information (e.g., responses, patterns, and relationships);
- Opinions;
- Baseline needs (e.g., minimum harvesting and subsistence needs, economic costs of living, levels of income, etc.);
- Social and economic impacts; and
- Abstract concepts (e.g., valued ecosystem components, indicators and thresholds, program objectives, ideal scenarios, management schemes, frameworks).

The information should be recorded using audio/visual equipment, and these recordings should be transcribed (turned into text). Other material that may be generated during an interview can include notes, photos of the interview or that the interviewee brings with them, and/or annotated paper or digital maps.

When are interviews the best tool?

Interviews are a great tool when the history of a place needs to be understood, and when people's current wellbeing and relationship with the land needs to be articulated.

Interviews can provide:

- Insights and explanations about the past (ie: baseline information and environmental histories);
- Descriptions of and information about current land use for traditional purposes; and
- Articulations of concerns as well as reasons and context for them.

Interviews can also be a forum to share important lessons and stories that inform how to make good decisions and demonstrate respect for the land.

Definitions of Qualitative and Quantitative Research

Qualitative research is a method that crosscuts academic disciplines and subject matter. The Handbook of Qualitative Research defines it as follows:

> *Qualitative research is a situated activity that locates the observer in the world. Qualitative research consists of a set of interpretive, material practices that make the world visible. These practices transform the world. They turn the world into a series of representations, including field notes, interviews, conversations, photographs, recordings, memos to self. At this level research involves an interpretive, naturalistic approach to the world. This means that qualitative researchers study things in their natural settings, attempting to make sense of or interpret phenomena in terms of the meanings people bring them.*[40]

Quantitative research, in contrast, is based on objects that can be expressed in terms of quantity or something that can be counted. In the social sciences, a quantitative research is characterized by having a population of people or things that the researcher wishes to draw conclusions about through statistically random samples.[41]

In the field of Indigenous Knowledge and land use research, the divide between qualitative and quantitative methods is blurring. Qualitative inquiry can include counting frequencies of types of responses to a survey, for example, and qualitative inquiry can have participants apply perspectives and their own interpretations to statistical data.

Mapping Interviews

Maps can represent *some* of the information gathered from interviews, and as a visual tool, they do so easily. Both aspects—partial representation and accessibility—mean that maps can open up new pathways for interpretation.

It is important to remember that the recorded interview remains the authoritative source for the meaning and substance of information presented in a map; maps are simply a way of representing some of the information gathered. Maintaining a link between the descriptions and information interviewees share about the sites mapped can help clarify the map's role as a visual aid and not a substitute for the interview content.

Interviews that involve mapping locations are called *map biographies*. During map biography sessions, the interviewer or an assistant marks a paper or digital map with codes, numbers, symbols, or notes to document what the interviewee says about these places. The point of marking the map is to provide a visual aid to pair with what will become the transcription of the interview. As a result, the markings used are very important when it comes to understanding what was said about each location.

Section 5.G Land Use Study Best Practices contains hands-on resources, including sample interview guides and advice to conduct quality interviews that result in information that can be used for resource management participation.

Map Codes

The map markings used must be carefully considered in order for the resulting map to fulfill its function as a visual aid for the interview recording and/or its transcription. Creating a systematic code for marking sites on the map and corresponding sections in the interview is an effective way of creating links between the two.

Without a code system the interview might record the interviewee stating, for example, "over here was a summertime camp," and the map might record the site or area indicated, but the link between the two may not be explicit, clear, or preservable. The person listening to the audio, or reading the transcript will not know which map site is being discussed unless clues are given, especially if a number of sites have been mapped. In this case, if the map and interview document multiple summertime campsites, for example, it may be unclear to a researcher even just days later which of the interviewee's descriptions matches which mapped location.

When this happens each map marking becomes disconnected from the knowledge and information shared about it during the interview. The map is reduced to displaying purely spatial information detached from the context, substance, and meaning shared about it in the interview.

Developing and documenting a systematic coding system enables interviewers to preserve the links between the information in the interview and the visual aid provided by the map. When a location is mapped the mapper should state aloud in the interview which map code they are assigning to it. For example, a summertime campsite might be XS. The first summertime campsite will be marked XS1 and the second XS2 and so on.

By stating the code aloud in the interview the mapper ensures the code for the site being discussed and mapped is preserved in the audio recording. The transcriber can then add the code to the textual representation of the interview later too. This way the link between the site and the information about it is preserved in the interview, its textual record, and its corresponding visual aid. In Trailmark, the map code is embedded both in the transcript and on the map, and the link is “live.”

Mapping introduces a new level of complexity in interviews. Interviews should focus on what the interviewee shares in response to the questions asked, but sometimes the map “steals the show.” All focus can be diverted to the task of placing marks on the map and away from the discussion of knowledge and information about them held by the interviewee.

The interviewer must balance the need to listen, understand and consider what is being shared by the interviewee about places, with the task of annotating the map clearly to ensure that the information shared is manageable after the interview. For this reason, we recommend having two people work together as interviewers whenever possible: one leads the questions, listens, and asks follow-up questions, while the other annotates the map and, for recording purposes, speaks the codes/timestamps aloud as they mark them.

Given the complexity that mapping can add to an interview, it may be wise not to include it depending on the subject matter. The purpose of the interview must always be to understand what an individual has to share on a given subject and/or places, not to create as many map annotations as possible. For example, if the goal of an interview is to understand an individual’s thoughts/experiences observing environmental change, animal behaviour, and concerns about these things, not mapping may make it easier to focus on the quality of what is being shared and recorded. If place names are mentioned in the course of this, it is possible to create an annotated map after the interview to capture that aspect of the information shared.

There are a few ways to reduce the tendency of maps to reduce the knowledge shared in an interview to ‘data” points. *Section 5.G.3. Codes, Categories or Symbols* provides instructions for direct-to-digital mapping using Trailmark, and for annotating paper maps, focused on linking what has been shared in an interview to the maps that are produced.

2.4.3 Surveys

The word “survey” suggests that you are able to get a big, broad overview of a place or a subject. When you stand on a mountain and look down, you are surveying the scene.

Surveys, or questionnaires, can gather quantitative data, or qualitative data in the form of standardized responses, maps, stories, and comments, or all of the above. Surveys can stand right in the middle of the methods described in the Interviewing section and the mobile data collection section. Most importantly, they allow you to get information and views from a large group of people — perhaps even your whole community, or a community within your community — with relatively modest work.

Traditional knowledge or land use interviews are a lot of work, both for the researcher and the participant. They are usually unstructured or semi-structured: the interview follows a thematic structure, but generally goes where the knowledge-holder wants to take it. Peter Gzowski, a Canadian broadcaster, once described an interview as like being in a canoe, with the interviewer in the stern and the knowledge-holder in the bow: “You paddle, I steer.” Using a method like this means that, although you will steer the conversation toward the main themes of the interview with every knowledge holder, the material you end up with at the end of the project will be very diverse. Interviews produce a lot of information and data to manage, and that requires resources and time. Interviews are all about getting at meaning and knowledge.

Surveys are different. They are structured and systematic, with standardized questions delivered in sequence—they pose the same questions in exactly the same way. They aim for facts. Whereas a traditional knowledge interview might take several hours or even several days, a survey usually requires far less time commitment, and can therefore be delivered at regular intervals to a target population (such as harvesters). The information they produce can be more easily quantified, interpreted, analyzed, visualized in tables, graphs, and reports to inform your Nation’s governance.

The same advances in technology that are changing the way interviews and mobile data collection is done also make it possible for you to move away from paper and pen surveys to digital surveys that are easily shared as a simple link via email, website, or social media. Whereas a large traditional knowledge project might only be able to interview 5% of the knowledge holders in a community, a well-crafted and well-communicated survey can reach almost everyone.

Of course, surveys can seem impersonal, and are no substitute for sitting with an Elder on their own terms, over tea, according to their protocols, and listening deeply.

But make no mistake about it: surveys are a great technique to engage with the entire community/communities, and they can create information, and ultimately knowledge, that is otherwise difficult to capture. In fact, in the early days of the Indigenous rights movement, harvest surveys were an intrinsic part of land use research. (*See next page*).

On the History of Harvest Surveys

Today, Indigenous land use and knowledge research has become narrowly constricted by what is sometimes called "Indigenous mapping," or the map biography method. However, David Natcher (2001) has pointed out that in the early days of Indigenous lands use research, participatory mapping was not conducted on its own; it was combined with mixed-method studies of the subsistence hunting economy, often through detailed harvest surveys. In 1976, in his study "*What the Land Provides: An Examination of the Fort George Subsistence Economy and the Possible Consequences on it by the James Bay Hydroelectric Project*" Martin Weinstein combined land use data with seasonal subsistence harvesting research to determine the spatial distribution of harvesting activities of the James Bay and Fort George Cree. He then used this harvest data (quantified into food weights) to assess the economic effects of a proposed hydro-electric project on local harvesting activities.[42] The *Fort George Resource Use and Subsistence Economy Study* was one of the first to use subsistence harvest data alongside the spatial distribution of land-based activity to quantify the potential effect of industrial development. Although there are some noted exceptions, such as the Arctic Borderlands Study, the harvest study approach to traditional land use research, which would establish information on subsistence needs and management, is not being used in Indigenous lands and resources monitoring to its full potential, having been largely replaced by the map biography method on the one side, and by science-based habitat assessments on the other (both driven by non-Indigenous experts, it is worth pointing out). However, these two information streams are not enough. Justice Vickers, in *Tsilqot'in Nation v. BC (2007 BCSC 1700)*, drew attention to the impossibility of assessing infringements on rights and traditional uses using maps or ecological-based assessments alone:

> *At present, British Columbia does not have a database that provides information on the individual species of wildlife or their numbers in the Claim Area.* **The Province has not conducted a needs analysis which would inform decision makers on the needs of the Tsilhqot'in people related to their hunting, trapping and trading rights.** *Such an analysis would ensure those needs are addressed when planning and conducting forestry activities. The absence of a database or a needs analysis indicates that Tsilhqot'in Aboriginal rights in the Claim Area are not a priority with respect to timber harvesting and other forestry activities.*[43]
>
> *[Emphasis added]*

Sampling

Survey data is usually scrutinized for its sampling methodology. Social scientists try to determine what the right representative sample size is for a particular population, rather than trying to interview everyone, in order to create what they consider valid results with a low margin of error. Unfortunately, it's difficult to arrive at a representative sample size for a small population. So to develop a harvest survey for a small community, for example, many researchers have tried to get as close to 100% participation of harvesters as possible. This means that developing a good communications plan to generate buy-in and excitement about your project will be important.

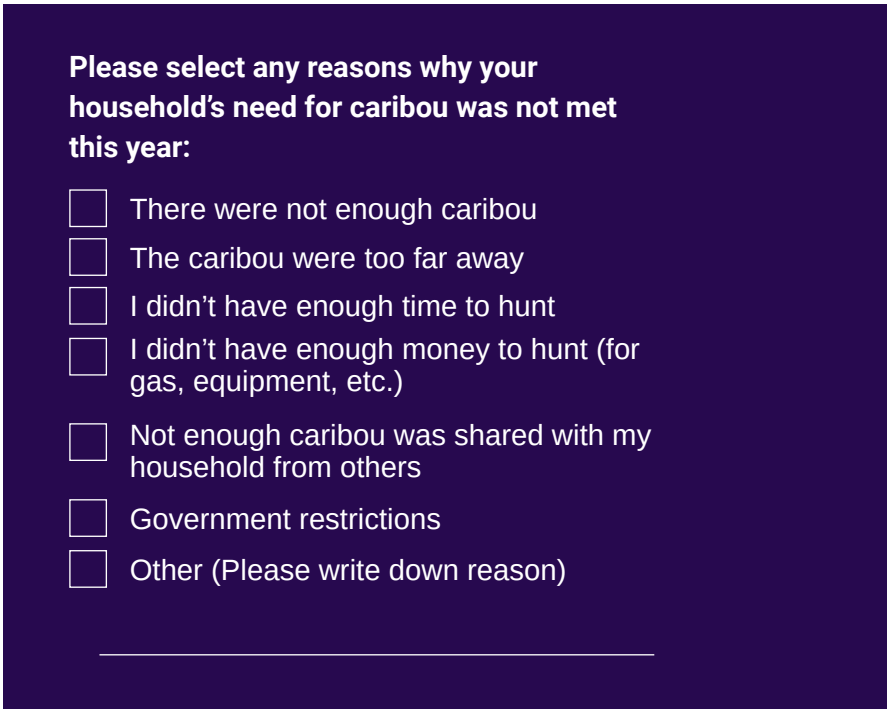


Figure 3 *Example questions within a harvest survey.*

Survey Design

Designing your survey well, putting time into testing it, and responding to feedback, will result in well-constructed and useful data that is easy to analyze and put to use. Fortunately, there are lots of resources available to help design community surveys, and lots of harvest studies readily available online for inspiration. Here are some general tips for survey design.

To connect with information needs for Impact Assessment, such as those listed in the *Practitioner's Guide to Federal Impact Assessments Under the Impact Assessment Act (2019)*, and the *Mackenzie Valley Resource Management Act (SC 1998, c. 25)*, some of the important elements you will want to gather information about in a harvest study will include the following, but this list is by no means complete:

- main tracts of water and land used by respondents in the past;
- species and resources hunted, fished, trapped, and gathered;
- main tracts of water and land used by respondents today;
- practices; seasonality;
- travel and access routes; preferred locations;
- important species and resources and the reasons why;
- household numbers and ages;
- active, occasional, or no longer active harvesters;
- amounts of traditional foods produced, received from others or the community, and shared;
- satisfaction levels of harvesters; barriers to harvesting; and
- notable changes in landscape

Additional tips for survey development include:

- Write a survey lead-in or comment that describes the purpose of the survey that can be read to or by each participant
- Keep the wording of your questions simple
- Keep the conditional or *skip logic* of your survey fairly simple; do not plunge your respondents into a maze of conditional or skip logic.
- Avoid leading questions. Use neutral language.
- Use a mixture of closed and open-ended questions, because together they will produce rich information, for example:
    - *Q1. What barriers currently prevent you from spending more time on the land?*
        - Time
        - Lack of child care
        - Lack of money
        - Lack of equipment
        - Lack of interest
        - Other (Please describe)
    - *Q2. What actions would you like to see your Nation take to increase the number of youth participating in land-based activities?*

- Keep in mind the comfort level of your respondents when using online survey tools. If you are using Trailmark web and mobile apps, [44] these tools allow you to create many different possible descriptions for spatial data, and then assign them as options to your respondents. They can identify a point, line, or polygon for instance, and select the attributes you set for them, such as “pickerel, summer, 1970s, fishing with rod” or “lake trout, fall, current use, nets.” This creates rich data for interpretation and reporting but ensure that the design is easy to use for the average user, especially Elders.

Delivery

Survey delivery, the way you actually get the survey out to people and get the information you need, is an important subject. Surveys can actually be delivered in all kinds of ways: they can be done in person (with a facilitator), by phone (with a facilitator), by mail, by hand delivery door-to-door, or online, to name a few. Each of these ways has some benefits and some drawbacks. Choose your method carefully, based on the comfort and needs of your community, balanced against your need for quality information. Elders may prefer a sit-down, facilitated one-on-one survey, whereas busy adults in the ages of 25 to 55 may prefer to do the survey themselves via a link sent to their email or via social media.

2.4.4 Workshops

Workshops bring people together to share information on a certain topic. These generally informal meetings are facilitated by an individual who shares information about the intent and plan for the workshop, guides discussion, and verifies and records information provided by participants.

Compared to interviews, workshops can take about the same amount of time, but trade depth of information for breadth of information gathered. The strength of workshops is that individuals can hear the opinions and information shared by others about a subject. This can not only build knowledge and enhance perspectives, but also trigger new insights that might not otherwise arise.

Workshops are best suited to gathering information and opinions about an issue. People can come together to listen to other perspectives on this issue, bring their own, and leave with consensus or broader understanding. Effective workshops rely upon:

1. **Clear objectives and/or goals:**
   Participants are provided the information they need to participate in a meaningful way.

2. **Values:**
   People will be engaged to participate if the topic is about things that matter to them. Framing workshop questions based on broad values instead of subjects that require yes/no decisions also helps to create an inclusive process where people who may have diverse opinions on a subject can talk about it without conflict.

For example, people will respond very differently to the question, “do we support a decision to halt hunting in our area?” and “how can we ensure the caribou can be looked after during this time?” The first question can polarize an audience by presenting a “choice” that people must argue for or against. The second option tunes into people’s shared values of looking after caribou and hunting rights for future generations, and invites some exploration of ideas on how to do that.

Workshops are not recommended for creating map biographies simply because it is so difficult during the workshop to keep the momentum of inquiry into the subject going while also marking an individual’s site on the map. It is also extremely challenging and time-consuming to keep track of which participant spoke about which site during the transcription process after the workshop, particularly when there may be multiple simultaneous speakers. The maps that come from workshops with many people also tend to produce map sites with little information attached to them and often provide a very cursory glance at the land use of the group, compared with what would be produced if each individual was interviewed individually.

Research-Sharing Circles

Depending on information needs, a research-sharing circle–also called a talking circle–may be used when the focus is on creating space and time for free-form storytelling in a manner that the participants can direct on a given topic. These settings avoid keeping a tight agenda or facilitation, which may disrupt open-ended story sharing. Instead, the atmosphere is designed to elicit storytelling.

Talking circles are usually led with acknowledgments of those present, including the ancestors, and food is typically provided to help anchor and set the tone for comfortable sharing of stories. As Kovach (2009) explains, the setting becomes less about research participants responding to questions, and more about sharing stories, which may directly or indirectly relate to the question.[45] The researcher facilitating a sharing circle will "hold space" and avoid interrupting narratives for participants who may be recalling memories that might bring strong emotions.

2.4.5 Monitoring and Mobile Data Collection

The research tools discussed so far are important. They create context, meaning, and knowledge about things, especially regarding changes in environment or society over long time periods. They are essential for describing your community's knowledge and perspectives, especially at environmental hearings, co-management board meetings, or in long-form reports on land use and knowledge for traditional purposes. But they will be of less help to you when it comes to describing and responding to events on the land that are dynamic and require direct observation and/or more precise details such as accurate location. For those conditions, you will need to rely upon some kind of on-site data collection.

There are many different types of community-based monitoring (CBM) programs, generally characterized by differing organizational principles and even philosophical approaches for conducting CBM. Although identifiable, these types or approaches are not mutually exclusive, and CBM programs sometimes combine elements typical of more than one of the types described below.

Understanding the array of models, how they work, and what their merits are, will help program designers select the right approach for their community. Selection should be driven by the purpose and desired outcomes for the program, the community's needs, interests, and capacity, as well as project scale, available resources, etc.

In depth: What is community-based monitoring?

Monitoring is the act of "maintaining regular surveillance" or, basically, checking on something regularly. In the case of environmental monitoring, which is the focus of this guide, the thing being monitored is the environment. This involves gathering information about the environment using monitors, or people and technology "used for observing, checking, or keeping a continuous record of a process or quantity." [46]

Although some prefer to describe environmental monitoring as neutral observation, in general it is understood to be observing with purpose, responsibility and/or authority. For example, Indigenous communities across Canada are establishing environmental monitoring programs to help protect and exercise their inherent rights and authority on their traditional lands.

The Łutsel K'e Dene First Nation, define monitoring, or Ni Hat'ni, as "watching the land". The goal of such monitoring is not simply passive observation; it is to "keep tabs" on the environment within Łutsel K'e Dene territory in order to support the Nation's knowledge, understanding and use of its traditional lands.

Generally speaking, environmental monitoring involves keeping track of things in the environment over time through tracking the status of identified valued components and indicators for those components. This can be done for multiple purposes, and in multiple ways. Monitoring can be done to detect change, or, in a longer and more difficult duration, used to detect trends. Using this type of environmental monitoring for environmental assessment involves understanding what drives variability, and identifying the changes that this variability can create in a future scenario.

Environmental CBM is just what it sounds like: monitoring of the environment and creating monitoring information by members of a community.[47] Community in this case can include a group of people who live in the same place, or a group of people who share particular common characteristics.[48] For example, within any community there may be other kinds of communities, such as communities of family, Elders, youth, men, women, harvesters, etc… CBM can be built around monitors from any such community.

Environmental CBM focuses on gathering information from community members through mobile data collection, surveys, interviews, workshops, etc.[49] so that it can be analyzed in order to track and evaluate the condition of valued environmental components. This information and data are then used to inform decisions about land use and environmental management.

Why is community-based monitoring important for Indigenous communities?

Today, monitoring the effects of management decisions, industrial development, and other drivers of environmental change is critical to protecting the Aboriginal and Treaty Rights of Indigenous communities.[50] Community-based monitoring is a way for Indigenous community members to play a central role in this monitoring, and for local Indigenous Knowledge, skills, and practices to be included in decision-making frameworks and processes.

Information gathered by indigenous monitors can support participation in environmental assessments or permitting if it provides evidence of how people are exercising their Aboriginal rights, or how something integral to this practice, like the availability of caribou, may be impacted.

The Łutsel K'e Dene First Nation's community-based monitoring programs are fueled by local concerns about the land and animals. Engaging local land users in a program to monitor these valued components is a way for the community to establish authoritative knowledge of their status, and the conditions required for their well-being. The monitors at Łutsel K'e keep watch over and track animal behaviour, the timing of animal presence and absence, and potential sources of pollutants that animals may be interacting with, as well as hunting activities, changes to the weather, and other conditions and abnormalities. Their knowledge of the place they live enables them to identify, track and measure change. They know the way things were in the past, and what ought to be occurring in the present.

> *We monitor everything. Every day in life you do it, you know. You wanna go out someplace, you gotta monitor your snow machine. Look at when that bird's going to come back: last year it was here, the year before it was here, this year where is it? You monitor all these things. (LKDFN Senior Monitor, April workshop, 2019).*

In Łutsel K'e, monitoring is about ensuring that the natural world and the network of relationships and obligations amongst people, and between people and animals, plants, fish, and the substances that make up the land, waters, and sky, are all maintained for the future.

Types of CBM Programs

There are many different types of CBM programs, generally characterized by differing organizational principles and even philosophical approaches for conducting CBM. Although identifiable, these types or approaches are not mutually exclusive, and CBM programs sometimes combine elements typical of more than one of the CBM types described on the surrounding pages.

Understanding the array of models, how they work, and what their merits are, will help program designers select the right approach for their community. Selection should be driven by the purpose and desired outcomes for the program, the community's needs, interests, and capacity, as well as project scale, available resources, etc.

We have identified four main types of CBM programs. These include Citizen Science, Community Participatory Survey (Human Sensors), Guardian/Ranger Programs, and Cultural System-Based Monitoring.[51]

A brief description of each of these approaches is provided on the following pages.

Types of Community-Based Monitoring

Four common, overlapping structures of community-based monitoring, organized by the degree to which they are locally driven, capture local and Traditional Knowledge/perspectives, or are conventional science facing.

Highest Degree

CULTURAL SYSTEMS-BASED

Relies on the structure of existing community, with the awareness that hunting, fishing, and harvesting communities are sensitive monitoring networks already. Of all the models, CSM goes farthest to incorporating TK and local knowledge into its approach.

GUARDIAN/RANGER PROGRAMS

Specific members of a community, with specialized training, “keep watch” and record place-based observations or gather data/information. Activities are managed with varying degrees of outside involvement from governments or researchers.

COMMUNITY PARTICIPATORY SURVEY

Surveys of local residents’ perceptions of the status of and changes in environment, past and present. Surveys designed with varying input from community members, and analyzed using social science methods

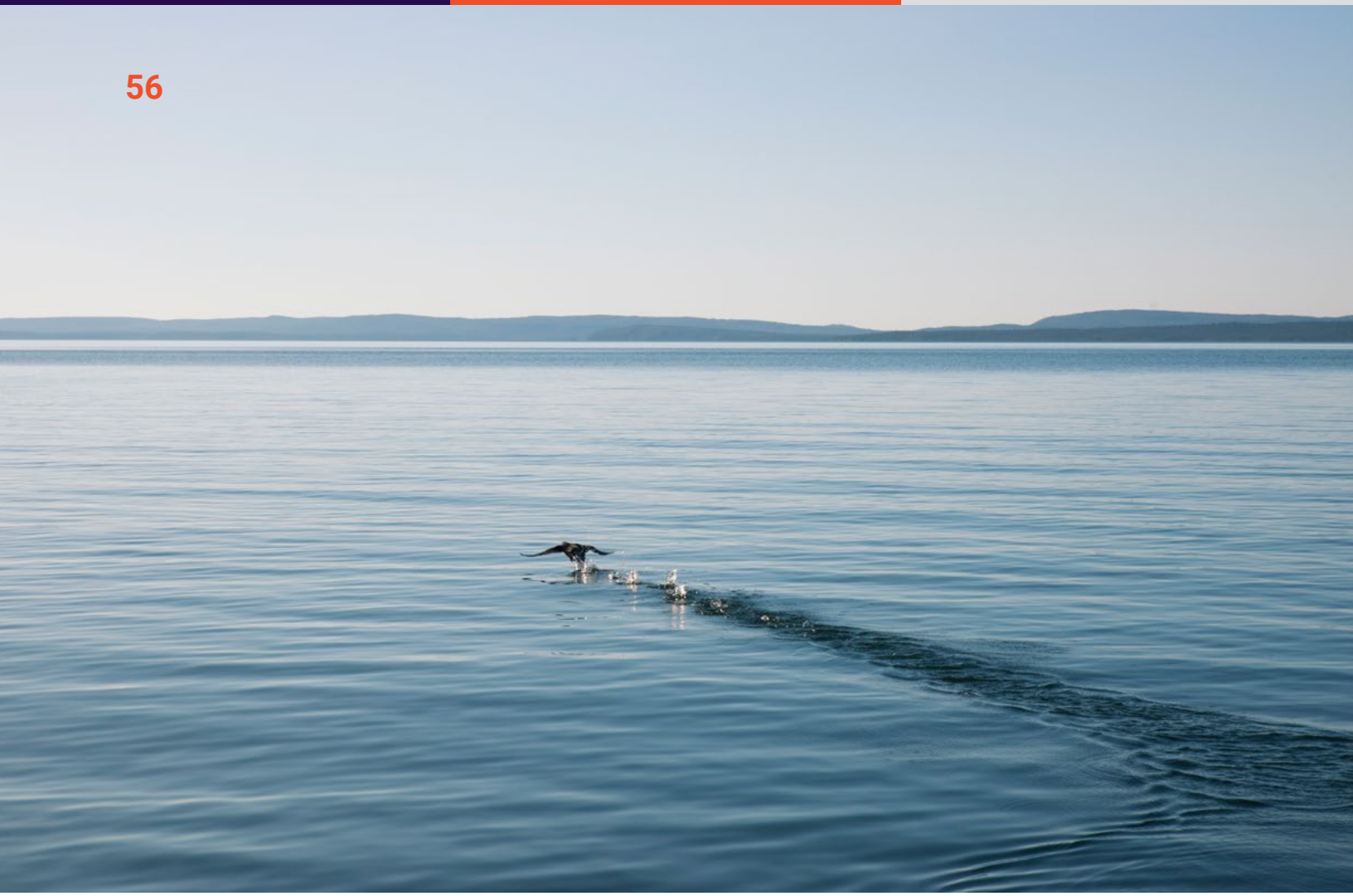
CITIZEN SCIENCE

Conventional science research projects that enlist local residents as paid or volunteer data gatherers. Usually led by university or government scientists. Monitors may use scientific instruments to record data, but their perceptions, if included, are secondary.

Lowest Degree

Degree of local participation, control and data sovereignty

Figure 4 *Types of CBM, ranging by degree of local knowledge inclusion and method. Citizen Science*



Citizen Science

Citizen science monitoring programs enlist local residents as paid or volunteer research assistants or technicians. Participants are generally trained to use scientific instruments and protocols to record scientific data, and are then dispatched to conduct monitoring in a prescribed manner.

These programs adhere to conventional scientific standards and principles (e.g., they are objective, repeatable, and consider the values and indicators observed to be separate from the impartial monitor). In other words, unlike all of the other CBM approaches discussed below, citizen science monitors record scientific data scientifically, excluding their knowledge, opinions and perceptions.[52] Citizen science monitoring also differs from the other CBM approaches discussed in that it is usually initiated, led or informed by university or government scientists, and the procedures involved are formulated to suit external information needs and applications. [53]

Some of the CBM programs often lauded for integrating Indigenous Knowledge and science are initiatives built around one of the other CBM approaches described above with a citizen science style component added on. These programs are informed by external parties, but may incorporate Indigenous concerns and environmental knowledge, for example, in selecting locations for sample collecting, or by recording local perspectives on animal health.

Community Participatory (Human Sensors)

Community participatory monitoring uses surveys and other common social science tools (interviews, workshops, etc.) to gather information. Instead of monitoring values and indicators on the land as the previous two approaches do, community participatory programs gather information by surveying local residents on their perceptions of current conditions and past or present changes in the environment. The surveys, interviews, workshops, etc. used in this approach can be cost-effective ways to engage community members and gather community-based information. The surveys and instruments used in community participatory monitoring are often designed by scientists or researchers, with varying degrees of input from community members. This is not always the case, however, and more and more communities are beginning to develop their own survey programs. The data gathered is processed using sociological, ethnographic or other social sciences methods depending on survey type, themes, and questions.

Community participatory monitoring programs led by researchers or others from outside the community require very little in the way of local capacity for data management, particularly when the researchers store the data gathered. However, in such cases communities should ensure they have clear agreements protecting their access to and control over their own data.

Ni Hat'ni monitors Shonto Catholique and Chase Lockhart head out for lake patrols

Guardian/Ranger Programs (Specialized Sentinel Patrols)

Specialized sentinel patrol programs engage specific members of a community—ideally identified and recommended by the community for their known expertise—to “keep watch”. These guardian or ranger style patrols can involve pre-set and systematic scouting routines in specific locations of interest, and can include recording place-based observations on various elements of the environment or cultural landscape that reflect local issues of importance. The types of information recorded are also predetermined, but can be based entirely on the observational needs, interests, knowledge, values and habits of monitors.

However, unlike cultural system-based monitoring, specialized sentinel patrol programs are driven by external information needs/agendas, and the information collected is used in prescribed ways. Specialized sentinel monitors are typically hired to patrol, whereas cultural system-based participants simply continue with their routine monitoring activities. Communities also tend to initiate and manage specialized sentinel patrols with outside involvement from local and regional governments or environmental non-governmental organizations.

Some patrols focus on checking on specific areas, interacting with visitors to the area, recording unsafe activities, and maintaining trails and facilities. Like the Canadian Rangers, these programs are not formally set up to gather, accumulate, and manage information or knowledge from monitors for use in decision-making or resource management. Other initiatives that identify as guardian programs do involve collecting information using monitoring methods and tools such as those outlined in this guide.[54] Some of these programs may even combine multiple CBM approaches, including specialized sentinel patrol and citizen science, for example.

Language used to describe sentinel patrol-style programs often emphasizes their role in conservation, stewardship, and enacting territorial authority. In this way, specialized sentinel patrols are often linked with promoting local Indigenous identity. The Haida Nation Watchman Program, for example, is positioned as an initiative reinforcing Haida Nationhood through the use of patrols, on-the-land presence, and Elder-Youth mentorship.[55]

Cultural System-Based Monitoring

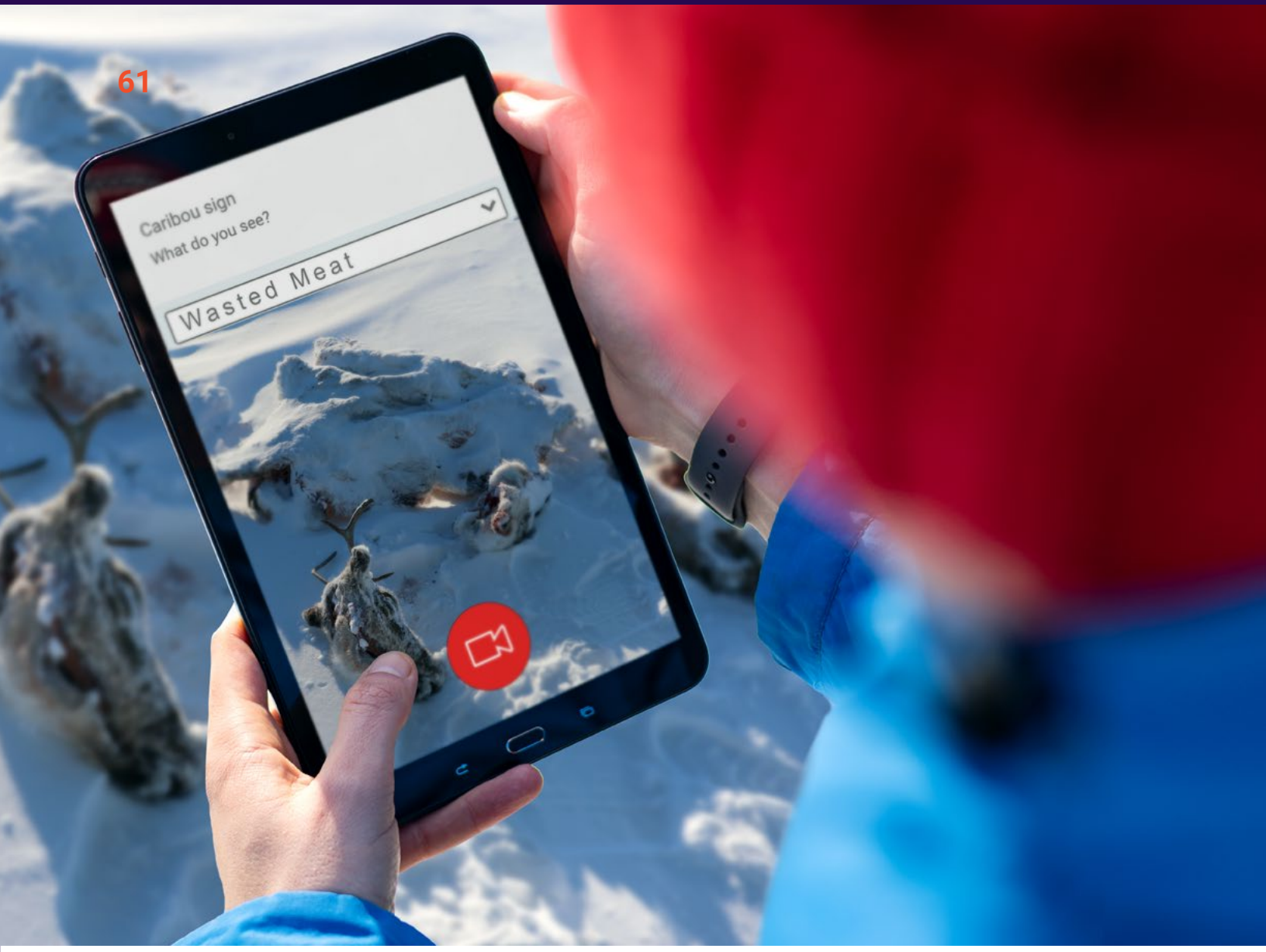
Cultural system-based monitoring is based on the understanding that harvesting communities already rely on their own informal monitoring programs to gather and exchange information about environmental conditions that affect harvesting, subsistence and traditional land use, and social and cultural life. It is based on the recognition that every hunting or resource harvesting community, at its heart, has many traditional monitoring mechanisms in place through which it ensures the survival of its way of life. Cultural system-based monitoring simply harnesses these existing monitoring activities, and the networks, structures and tools that support them, to collect and organize the information they are already gathering.

For example, a cultural system-based monitoring program may ask hunters--who are already gathering information and sharing it with one another anyway--to carry handheld devices with them on their regular trips out on the land. The hunters' monitoring activity could include using these devices to record the observations they would make when they are out on the land anyway, for example, signs of the presence/absence of animals, animal behaviour, changes in habitat, weather, etc. When the hunters return home, their observations can be collected and the information they contain can be stored and analyzed over time.

Cultural system-based monitoring is uniquely suited to include Indigenous Knowledge because the questions of when, where, what, and how to monitor are determined by local individuals who have learned how to ask and answer these very questions as part of their traditional land use. For these reasons, cultural system-based monitoring programs may require very little training on the monitoring side. Instead, monitor training may focus on how and when to report observations, and administrator training may focus on how to feed monitoring data into scientific and/or decision-making applications.

Look around your community and ask yourself, how does my community monitor traditionally? Where does it monitor the health of resources and the health of the community? There will be many answers to this question. Marty Weinstein (2000) gave an example from a Kwakiutl community in BC: "the potlatch gifts acted as a monitoring system for the chief's ability as a human and resource manager. Status changed only if the chief showed that he was not able to properly manage the group's human and natural resources. The potlatch, combined with social ranking, acted as a fully-integrated monitoring and public accountability process that would be the envy of many modern resource managers." [56]

Hunters, harvesters, and families who spend a lot of time on the land are an already-existing observer network: they are constantly watching, seeing, and responding to changing conditions. The knowledge they gather is spatially precise, dynamic, and "real-time." Their being on the land presents an excellent opportunity to ask them to gather data and information alongside the plants and animals they bring home (Cultural Systems-Based Monitoring). Your community could also identify and train a group of individuals to gather information–in a more systematic, standardized process–around the specific values and indicators identified in your community-based monitoring program design phase (Sentinel Guardian / Citizen Science).



Mobile Data Collection Using Trailmark

If using Trailmark Software, all field data collected, including photos and audio is mapped and has the time labeled automatically. These things become tied together and form the basis of in-situ community-based monitoring.

Using digital forms that are linked with an audio and camera option, monitors decide when to record an observation. The forms can be set up to record the “what” that can represent any quantitative (things counted on the land, like animal sightings) or qualitative (things described by monitors) data types. Data types can be textual (e.g. “describe what you see”), numeric (“number of animals in the herd”), boolean (e.g. yes/no), or categorical (e.g. “select from one of the samples to best describe the color of the animal skin”). Categorical (or standardized) data can later be transformed into numeric or textual information.

2.5

Analysis and Interpretation

Searching and analyzing information from interviews, workshops, surveys, or mobile data collection is a process that requires time and an organized plan.

The sophistication of searches, visualization of results, and the types of analyses possible will depend on the technology and methods used to gather and store the information. While certain kinds of complex analysis will require specialist training beyond the scope of this report, below we provide some basic ways that this information can be brought together and looked at to answer questions.

Textual analysis: search key subject words inside a database of transcripts, group results according to subjects of interest and use this as a resource to structure report writing. Remember to reference your source material while writing.

Figure 5 *Example of a data visualization 'Bubblelines' in Voyant Tools, a free textual qualitative analysis tool. In the above example, the terms 'Greyling', 'Caribou', 'Hunt', 'Gold', and 'Esker' are analyzed across nine reports and interviews. The position of the circles represent instances of the word thoughout the text from beginning to end. The scale of circles indicates clusters of that word within the text near that point in the text. It is clear that the second and fifth texts, 'Report on Greyling Habitat in Great Slave Lake and Region' and 'Greyling: An Angler's Guide to NWT ' mentions 'Greyling', but none of the other search terms. This tool can be powerful for analyzing interview data and identifying which interviewees speak about what topics most frequently, and possibly identifying relationships. For example, the first document "2020-01-03 - Interview with Jacob Joseph' uses the words 'greyling' and 'gold' frequently and often in close proximity. Perhaps he discusses impacts of gold mining on greyling or some other relationship between the topics. By clicking on the bubbles, the tool takes you to that exact point in the text.*

Survey analysis: aggregate (ie. bring together) survey results to see total and type of responses vs. number of survey respondents. For here, a percentage can be calculated of how many respondents selected answer X.

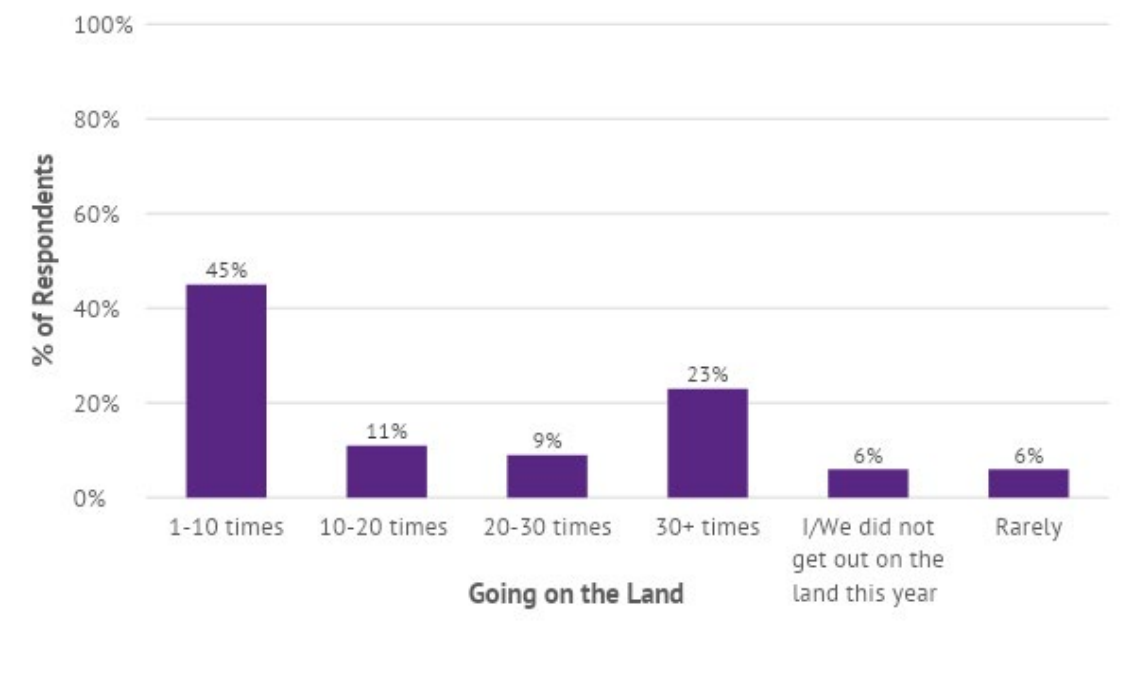


Figure 6 *Example of a data visualization output of survey results to use for analysis. This figure shows the distribution of answers to the question "In the last year, how many times did you go out on the land to harvest food?". The x axis shows the answers in the survey question, and the y axis shows the number of respondents who selected each answer. A researcher could describe these results based on these statistics, for example, that the majority of respondents went on the land between 1-30+ times (general analysis). What this means to the community could be the second part of the analysis, where these results are presented to respondents for comment. Additional questions added to the survey could assist with an analysis of what barriers exist for people to get out on the land, as well as the activities that people are practicing when they do go, the quality of their experience while out on the land, their concerns and so on.*

If done using the survey tool in Trailmark, survey results will be totaled automatically. If using paper forms, total up the survey answers one by one and compare results with the number of respondents for each question. Excel can be a very helpful tool for totaling and visualizing survey results.

These totals say something. For example, with a harvest survey, the total answers to the question "What barriers currently prevent you from spending more time on the land?" show what the most common barrier is for people. This can point out where to focus resources to support harvesters and can provide information for consideration in impact assessment, including how an industrial development proposal may interact with these identified barriers.

Spatial analysis: Searching and drawing insights from mapped information is made possible through coding information with a set of standard categories (see *Section 5.E.3. Codes, Categories or Symbols*) and using technology such as a Geographic Information System (GIS), or a custom mapping tool to store and manage the info. If spatial data is recorded with descriptions, such as a code to represent the animal or activity, names, and time period, these records can be filtered, searched, and grouped together based on these descriptive categories. These tools allow map data to be searched to understand what is observed and where, what is meaningful about it (if additional descriptions are included), how often people use an area and the location of important places and habitats.

Information gathered from various settings, such as recent mobile data collection can be looked at alongside information from digitized old maps and can show changes or continuity over time based on observations recorded, or to look at the patterns, intensity, frequency, and locations of these activities through time.

Browsing aggregate map info can also show areas that have the most map sites, and, depending on what these map sites are, these collections of sites can indicate areas of high activity and therefore high interest and importance to people.

If recorded with methods described in *Section 5.G,* information from many different interviews or mobile records on the same subject could be looked at and grouped together to understand the patterns, intensity, frequency, and locations of these activities through time. The spatial records can be sorted and searched according to category, code, or person.

Figure 7 *Mobile Data Search and Analysis:*

Viewpoint 1 (see orange box above) shows how both qualitative and quantitative data can be visualized: as a map grid with presence/absence (e.g. observation of species X), frequency map (e.g. point bubbles–the larger the bubble, the higher the frequency)–the latter could also be expressed as a heat map, or e.g. a use category map (points or areas that represent a use category).

Viewpoint 2 considers the temporal dimension expressed as a time series. As an example, consider a graph showing the number of observations of a given species for a given area, plotted against a temporal axis.

For viewpoint 3, both the temporal and spatial dimension is "baked" into the data: think about a graph that shows the frequency distribution of observed species in a given area within a defined time frame, plotted against an axis showing the different species.

Mobile Data Search and Analysis

If monitors collect information on the land digitally, a single recorded observation can include the exact location of a picture they take, and/or information about that site, either through filling out a form and/or recording audio about that location. Each observation recorded on the land should include the "what", "where" and "when" types of data. To search and analyze this information, we can look at it in multiple ways, depending on what we are interested in, from simple map searches to more complex analyses.

To begin, we can use the map viewpoint if we are interested in questions about "where" monitors have gone and what they have observed in certain locations. We look on a map to see all mobile data collection points or areas, and search for certain types of observations in certain places and time frames. If the monitors are gathering information on the presence or absence of certain animals, animal health and behaviour, or evidence of potential impacts from development activities, this information, once pooled together, can speak volumes. More complex analysis opportunities are shown in *Figure 7*.

2.6

Verification and Reporting Back

Whether from an interview, workshop, survey, or mobile data collection, showing participants their own information that has been gathered and represented in a map or a report is a very important step in the research cycle.

Research that involves gathering data out on the land, or putting activities and known places down on maps as points, lines, or polygons, can risk stripping important context and meaning from the original reason it was marked. Verification meetings create space for participants to "remind" the data produced of the knowledge behind it, if it has been forgotten or dislocated through the process of marking it down as a point on a map, or a photo. Verification or "reporting back" meetings serve to validate research in three very important ways:

1. Participants get to see what their information looks like, where it is stored, and what might be done with it. This encourages participation, reduces suspicion, and helps them to see the big picture of what monitoring is about and how they are contributing to something bigger.
2. Participants have a chance to review their information and provide comments, and request to remove or change aspects for accuracy–"to get it right". Verification of research results creates credibility, which, in the social sciences, is found through emphasis that the research material, in the eyes of research participants, accurately represents their experience.[57]
3. A group of participants can consider their consolidated information. Presented as maps, summarized concerns, reports, or survey results presented in a group setting, people can see what their collective recorded knowledge looks like, observe and analyze patterns, and discover new knowledge based on the interpretation of recorded information. These crucial insights can contribute to new management decisions and additional recommendations that can be documented and shared in the final submission.

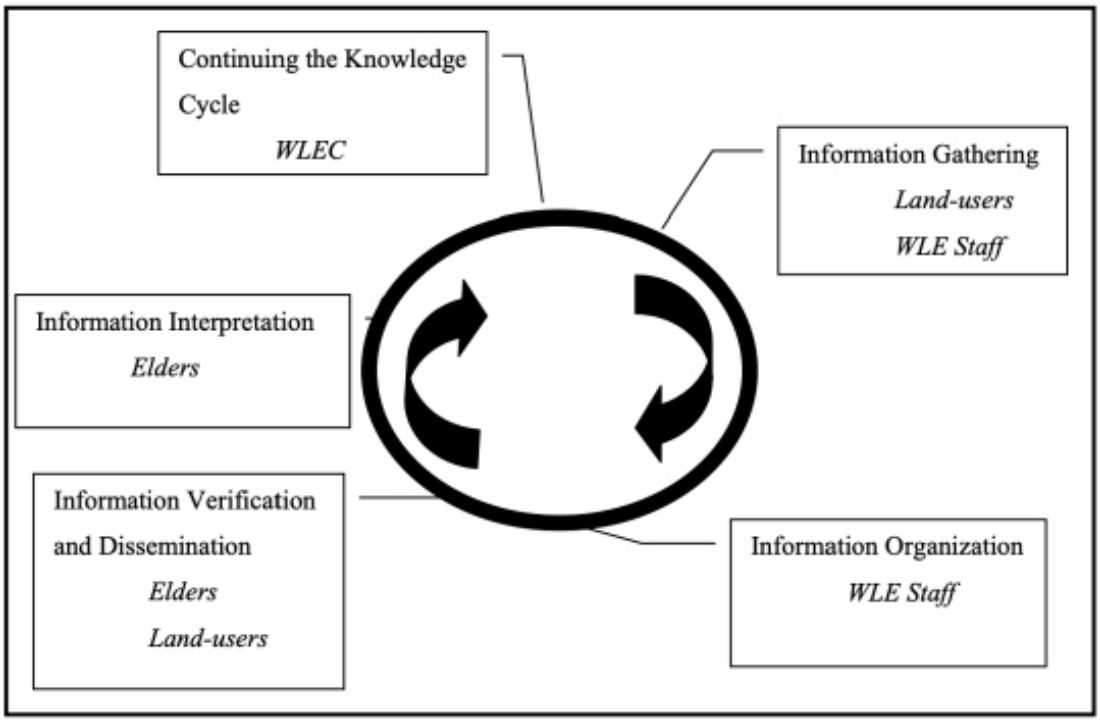


Figure 8 *The Denesuline Knowledge Cycle developed by LKDFN in 2001 is an example of a verification system that will work to create validity in research projects while also ensuring that knowledge is accumulated within the organization for use by Wildlife Lands and Environment (WLE) and Wildlife Lands and Environment Committee (WLEC) staff.*

Łutsel K'e Dene First Nation recognizes that, in looking at new information, they are building from recorded information gathered in the past from Elders. This information, retrievable in an archive, can inform their current monitoring activities and aid in understanding, and "theorizing" information as it comes in from younger generations and via different methodologies:

Łutsel K'e Senior Monitor: *You know a lot of our information, our early monitoring, its all been coming from the Elders, not young people here. Only recently the last 10 years, all this information is coming in now from the younger generation. The previous information that we had was mostly all Elders.*

So we're still doing a lot of work, still a lot of theorizing in that department, still a lot of ongoing work.

So it'd be important to keep the Elders, involved with the theorizing. Well you see it straight from the Elders to the new generation, [you can better understand] the impacts that are happening.

Research planning should include time and budget for participant verification. Verification not only adds a meaningful dimension to the analysis and interpretation of results, it also aligns with the principles of data governance and ownership, control, access, and possession (OCAP®) which emphasize the need for Indigenous Peoples to be involved in the interpretation and analysis of research involving their knowledge and data.

3.0

Data Sovereignty & Sharing

3.1

Data Sovereignty and Sharing

A key consideration for including/integrating Indigenous Knowledge is that Indigenous Knowledge is shared, not given away. Indigenous Knowledge information and data sharing refers to groups and individuals documenting, exchanging, collecting, using or disclosing Indigenous Knowledge data and information with/to each other.

Whenever Indigenous Knowledge is documented–even with the intention to preserve or disseminate it–there is a risk that it could be interpreted and used in a way that was not originally intended, anticipated or agreed upon by the Indigenous Knowledge--holder who shared it, especially if it becomes publicly available.[58]

“Publicly available” could mean reports or documents discussing, summarizing, or otherwise referring to the Indigenous Knowledge collected through projects with the knowledge-holding community, even if they don’t contain the Indigenous knowledge itself, or the raw data products documenting it.

Today the concept of intellectual property (IP) is generally recognized to extend to Indigenous Knowledge and other intangible aspects of cultural heritage, such as stories and songs. The sharing of Indigenous Knowledge-based information and data then triggers concerns about its ownership and control. Indeed, negotiations on the subject of IP for the *UNDRIP* gave rise to what has come to be known as the information and data sovereignty movement, which holds that self-governing of Indigenous information and data is fundamental to “Indigenous peoples’ right to maintain, control, protect, and develop their cultural heritage, traditional knowledge, and traditional cultural expressions, as well as their right to maintain, control, protect, and develop their intellectual property over these”.[59]

What is Indigenous Data Sovereignty?

Sovereignty refers to the rights of nations to govern themselves. In the natural resources context it means that Indigenous communities are responsible for what happens on their lands and waters. Sovereignty is about self determination. A nation cannot exist without sovereignty.

Data sovereignty extends this idea to knowledge itself. A nation cannot exist without sovereignty over the knowledge about its own territory and citizens. Knowledge is essential to stewardship and management. These are both forms of control. In the modern world, this knowledge means, in part, data.

Indigenous Data sovereignty refers to the ability of an Indigenous nation to govern the collection, ownership, interpretation, and application of information and data about everything that falls under its sovereignty -- its territories, ecological systems, the health of its citizens, etc..

Indigenous data sovereignty supports Aboriginal rights to govern land and resources. It's rooted in Common Law, and in Indigenous Laws.

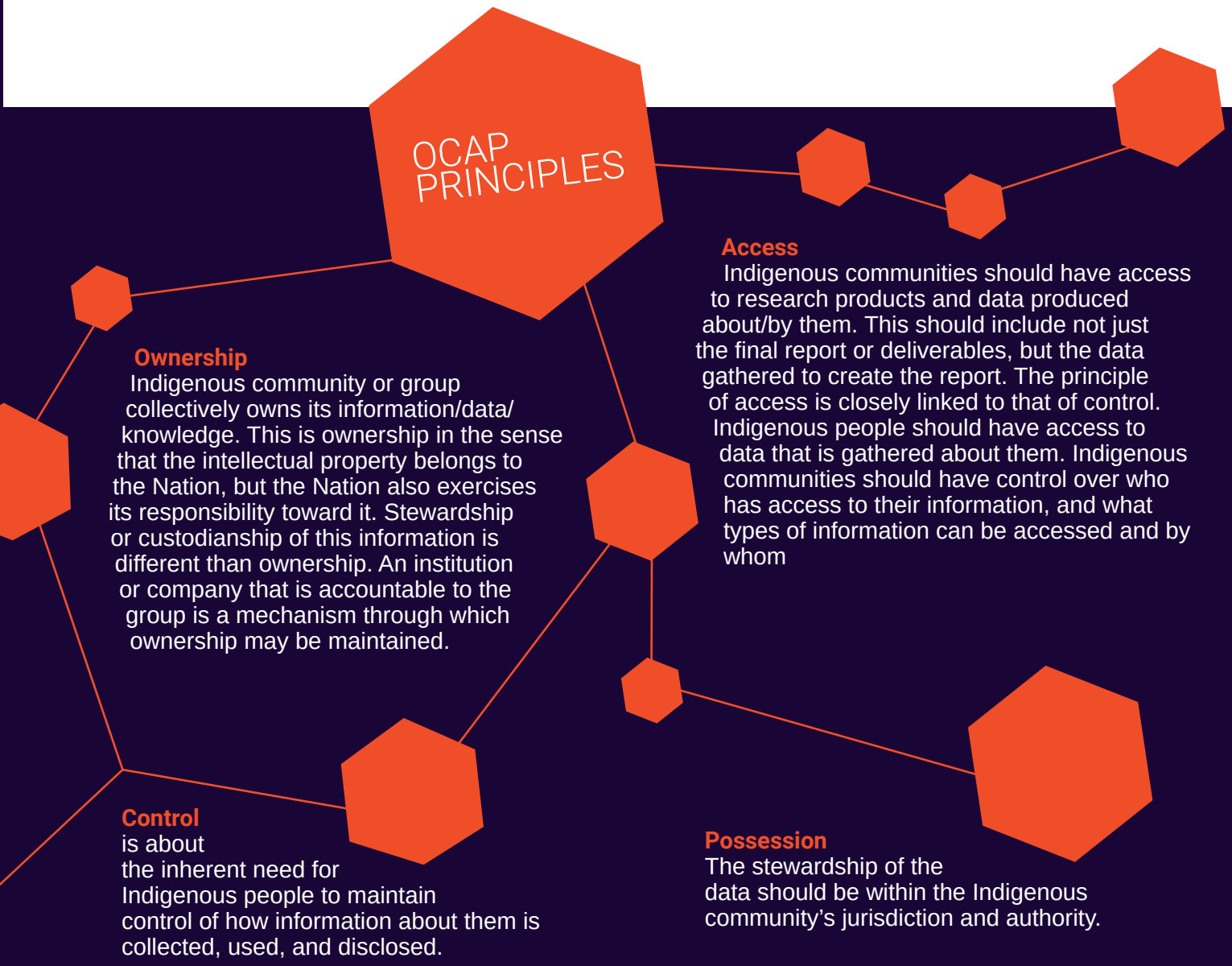
Data governance refers to how the data is owned, stored, collected, managed, analyzed and used.

Data governance and sovereignty calls on the need for capacity and access to tools and technologies to manage, maintain and control access to the data produced by or about their Nation over time.

It asks **whose interests are being served within a research relationship?** It requires that answers to this question is known as part of an informed consent process.

In Canada, issues around Indigenous communities' data control and autonomy arise, for the most part, around the kinds of location data found in traditional land and marine use and knowledge studies, especially their storage and disclosure. Concerns relate to both the control of the information and the stripping-out of its context in order to be converted to spatial data. The context for Indigenous Knowledge is always culturally specific, and some forms of knowledge might also be considered sacred or otherwise confidential, especially when exchanged in person.

Ontario's First Nations Information Governance Centre (FNIGC) has developed a set of cross-sector standards to guide how Indigenous Knowledge information should be collected, stored, and shared. These First Nations Principles are known as OCAP®, which stands for ownership, control, access, and possession.[60]



Limitations on ‘Possession’

OCAP® has been very successful as a policy statement, and has effectively become the standard for determining Indigenous information sovereignty in Canada

However, some Indigenous-led initiatives have effectively dropped the “P” from OCAP®. This is because possession, interpreted narrowly, could require Indigenous communities to physically possess all of their own data. This could exclude the use of web-based softwares and cloud data storage, effectively denying Indigenous organizations access to cutting-edge technologies in favour of onerous technological options (eg., server-side or on-site installations, etc.). Instead, many Indigenous communities are developing and adopting an array of instruments, and agreements with external parties, that enable them to own, control and access their Indigenous Knowledge while enhancing its ability to guide decision-making.

Capacity Building Efforts

To enact the principles of data sovereignty, Indigenous nation are building capacity in the following ways:

- Through investing in technical infrastructure to store, manage, and access their own data.
- Building information governance capacity by creating agreements with researchers and governments on the terms, protocols and principles of data-sharing and storage.
- Centralizing and repatriating data and information in a format that is usable by the Nation.
- Getting training in research methods that ensure that data management includes proper filing and naming of material using meta-data standards.

Data Sharing

Sharing protocols are the agreed upon codes and conventions that dictate where, when and how data sharing is allowed to happen. To protect IP and serve the First Nations Principles set out by FNIGC, processes that involve Indigenous data/information sharing require protocols to ensure Indigenous knowledge -holders and communities' ongoing ownership, control and access to their own knowledge. These can include data/information sharing agreements, licenses, access and permission structures, etc., all of which can be implemented and enhanced through appropriate use of technology. Although, it should be noted that the fields of technology, information management, Indigenous information sovereignty, knowledge co-production, Indigenous knowledge inclusion, etc., are all moving so rapidly that planning for data/information sharing protocols may need to be iterative; by the time parties in a discussion generate and agree upon a chosen path, advancements may render it obsolete.

Data/information sharing agreements are the minimum necessary ethical standard to protect the values, principles, and rights of Indigenous knowledge-holders and communities. These agreements can also provide for the ethical disclosure of Indigenous knowledge collected to others, for use in decision-making for example. Agreements may include formal contracts, and may govern and guide all aspects of sharing, including the methods, approaches, and workflows employed to gather and share Indigenous knowledge; assigning/restricting rights, access, and responsibilities and even directing the use of specific tools. All sharing agreements should include the following elements and reflect the corresponding considerations.

Element	Considerations
Project Description	• Purpose/objectives • Intent • Expected outcomes • Potential Impacts
Data Description	• Types of information • Where data exists • How data will be included • How contexts will be maintained • Data formats • Information describing the data (meta-data)
Organization and Use	• How and when will data be accessed and used? • Why? • Who is able to access/use it? • How is confidentiality protected if desired/required? • How are permissions requested/granted? • What is the time frame for this agreement?
Storage, Retention, and Disposal	• How will the data be organized/structured and managed? • How long will the data be held? • What are the back up procedures? • How will data be stored long-term? • What are the risks?
Ownership and Intellectual Property	The Agreement is only a license to share (access and steward) the communities/groups' Traditional Knowledge data The Agreement must protect each community/group's collective ownership of their TK data, and ensure they retain all intellectual property rights (copyright) All data must be shared in accordance with the principles of informed consent: understanding the intent behind the data sharing, any risks involved, and potential use – answers to the questions in the preceding sections will be critical to this.

Table 1. *Data/Information Sharing Agreements: Standard Elements and Considerations.*

All Indigenous Knowledge data and information must be shared in accordance with the principles of informed consent: understanding the intent behind the data sharing, any risks involved, and how the information will be used. In order to ensure the relevance and perceived trustworthiness of information/data sharing agreements, etc., it is recommended that these principles form the basis of a collaborative process to develop and implement these data-sharing protocols. Communities can and should also be consulted and included in the development of this process. A community-centred process for co-developing data sharing protocols could include community consultation to understand the nature, role and functionality of existing (formal or informal) data sharing protocols within the community, and engagement (eg., workshops) to identify data sharing concerns and collaborate on protocols to address them.

Every Indigenous Knowledge data and information sharing process should, formally and transparently, include information on and/or protocols related to:

- Considerations for ethical conduct, conflicts of interest, and capacity differences;
- What, when, where, why and how Indigenous knowledge information/data is being shared, and by whom;
- How Indigenous knowledge sharing will impact individuals and communities (including risks);
- Conditions and arrangements where Indigenous knowledge collection and sharing are made;
- Standards toward a clear understanding of responsibilities;
- Measures to protect individual- and community-level interests;
- Consideration for the Indigenous knowledge -holding community's information sovereignty, including its right to benefit economically from information management;
- References to other OCAP® principles
- Approaches to ensure results from projects can be shared with and accessed by Indigenous knowledge-holding communities;
- Quality control standards related to sharing information with external research projects

Guideline questions might include the following:

- Are your concerns incorporated into hypotheses underlying research?
- Are your community members incorporated into the data collection process?
- Are your community members included in the data analysis process?

Additional Resources on Data Governance

“Informing First Nations Stewardship with Applied Research: key questions to inform an equitably beneficial and engaged research process (2021). Kitasoo/Xai’xais First Nation, Klemtu, BC..
https://klemtu.com/research-guide/

> *This guide is to support researchers at all career stages and Indigenous stewardship staff alike to engage in an equitably beneficial research process in support of conservation and stewardship initiatives. It includes a series of very important questions for practitioners from government agencies, academic institutions or Industry to ask and answer as part of initial engagement with Nations, through to the project planning and dissemination stages.*

Material on OCAP® by the First Nations Information Governance Centre (FNIGC)
https://fnigc.ca/wp-content/uploads/2020/09/bbe195ddc231e3b1222d71ca4c09ae62_indigenous_data_sovereignty_toward_an_agenda_11_2016.pdf

First Nations Information Governance Centre (FNIGC) (2016). Code of research ethics, First Nations Information Governance Centre, Ottawa,
https://www.fnigc.ca/sites/default/files/ENpdf/RHS_General/rhs-code-ofresearchethics-2007.pdf

> *Outlines the steps taken by First Nations, and the First Nations Indigenous Governance Centre (FNIGC) on their behalf, towards giving expression and practical meaning to the concept of indigenous data sovereignty in Canada. It gives a more in depth examination of the construction of ideas and principles of the registered trademark of data ownership, control, access and possession (OCAP®).*

Indigenous Data Sovereignty framework of the FAIR and CARE principles created by the Global Indigenous Data Alliance.
https://www.gida-global.org/care

4.0

Conclusion

4.1

Conclusion

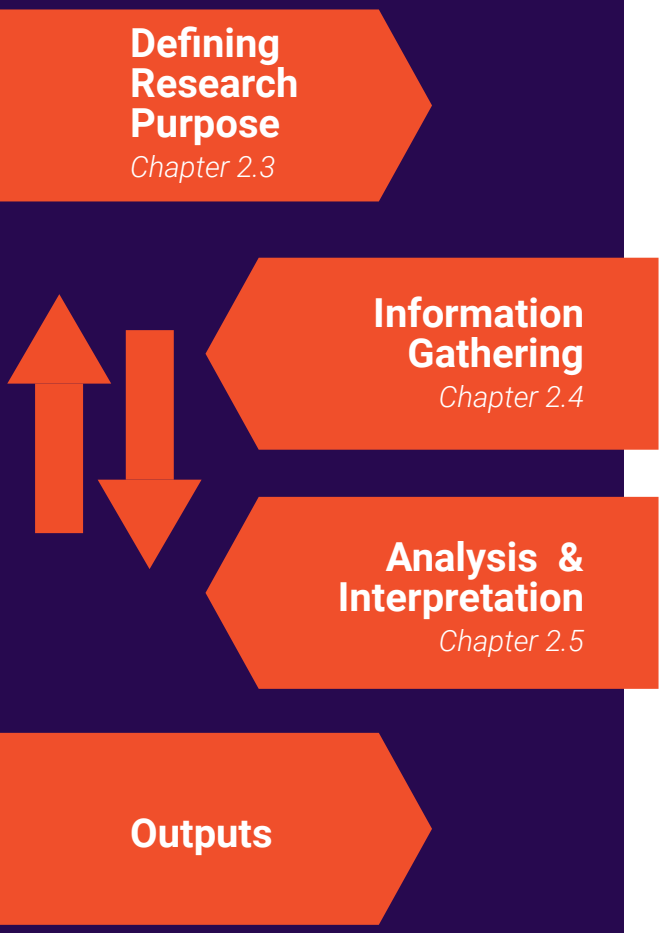


Figure 9

Community-based research can be designed to facilitate the flow of knowledge and information from community members (monitors, interviewees, workshop participants, Elders, youth, etc) to program and local leaders, and beyond for decision-making processes.

This guide is an overview of community-based research for creating information relevant for Indigenous communities participating in environmental assessments and other resource management issues and decisions. While there are many forms of community-based research methods, and each have different emphasis on gathering Indigenous Knowledge and land use information, we identify a process to follow to ensure the program is driven by community interests and concerns and can produce information relevant and available to apply in participation in resource management processes.

Understanding both community information needs, and the needs of decision-makers is at the heart of designing the purpose of community-based research, and influences the types of information to record, and the kind of tools to use to record the information. As shown in Figure 9, steps to developing a monitoring program are fueled by connecting to the purpose of monitoring, and link to an understanding of potential outputs and information needs for resource management application.

5.0

Resources

5.1

Templates for Data Governance

This section provides templates and materials to facilitate knowledge mobility and protection within the research process. This section includes templates to help establish and strengthen data governance. These templates are downloadable so that they can be modified according to exactly how an Indigenous agency wishes to organize their information sharing and control.

A. **Data Sharing Plan:**
for Nations to use as an internal guide for their data governance process. It explains how and when the other documents could be used.

B. **Informed Consent template:**
for Nations to use with research participants to ensure they are informed and consent to sharing information.

C. **Data Sharing Agreement:**
for Nations and third parties to outline what is to be shared, how it will be used, and terms of use.

D. **Data request form:**
Nations may respond to data requests from third parties by asking them to fill out this form to clearly outline their request for consideration by the Nation.

E. **Research Agreement template:**
This could be used with researchers who are working with the community to outline the type of research they are doing, how they will manage the information they collect, etc.

5.A

Knowledge Sharing Protocol & Data Management Plan

Disclaimer: this template is intended to assist Indigenous communities in the development of their own Data Sharing Protocols that reflect their laws and principles related to sharing. It is not intended to be treated as complete. It is recommended that any Sharing Protocol and Data Management Plan involve consultation with the community and review by a Nation's legal team and knowledge sharing authorities within the organization.

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[Nation Name Here] Knowledge Sharing Protocol & Data Management Plan

This knowledge and data sharing protocol describes how data and information created in [Entity Name] programs will be stored, managed, and shared externally with third parties, where appropriate, through data requests and agreements. It describes how the intellectual property of [ENTITY NAME] individuals will be protected in pursuit of the collective goals of the [ENTITY NAME] Nation, with respect to [ENTITY NAME] laws and values. It includes templates for:

A. Knowledge Sharing Protocol: This is a protocol to establish the parameters around knowledge sharing and describes the storage and technical aspects of data sharing

B. Informed Consent: A form for any [ENTITY NAME] participants in Traditional Knowledge (TK) research that is related to [ENTITY NAME] research initiatives.

C. External Data Sharing Agreement: a formal contract governing the parameters and protocols on data use, access, and storage. This agreement template can be used after a first request form is filled out, or when entering into a project with a Third Party (researchers, proponents, government and regulatory agencies, etc.) Once a Third party enters into an agreement with [ENTITY NAME], the simple request form can be used for future requests..

D. External Data Request: A form to be used by Third Parties wishing to access [ENTITY NAME]'s information

Knowledge Sharing Protocol

The [ENTITY NAME] aims to promote the interests of the [ENTITY NAME] First Nation by enhancing recognition of, and respect for, [ENTITY NAME] Treaty rights, [ENTITY NAME] Aboriginal rights and title, and [ENTITY NAME] culture and traditional knowledge. It affirms [ENTITY NAME] rights to own, use, develop and control our lands, waters and resources according to [ENTITY NAME] laws and values, and the requirement of governments to give legal recognition and protection to these rights.

This plan recognizes that the knowledge needed in the [enter purpose, such as day-to-day operations of the Entity] relies upon the intellectual property of individual members of the [Entity Name], and the collective rights of the [ENTITY NAME] Nation as a whole. This plan further recognizes that this knowledge is precious, sometimes confidential, and often sacred according to [ENTITY NAME] laws, and must be treated with the utmost care and respect toward the individuals, families, lineages, houses, communities, and the Nation that it belongs to.

Definitions

[Enter Definition of Traditional Knowledge]

TK Licenses

Based on our understanding of Traditional Knowledge [or other name of TK], the following licenses, which can be used interchangeably and in tandem with other licenses, should become mandatory for the storage and sharing of [ENTITY NAME] traditional knowledge-derived data: [61]

- TK Personal
- TK Family
- TK Band
- TK Nation
- Public
- Private
- Restricted
- Third Party

Data Collection and Documentation

Data produced or shared over the course of [ENTITY NAME] activities may comprise knowledge and observations from [ENTITY NAME] TK research participants, third party consultants, or governments; or may come from publicly accessible materials such as published articles, maps, and other archival materials--many of them created in the past with or by [ENTITY NAME] Elders who have since passed on. In many cases these materials may contain knowledge that is part of a person's TK but is also subject to someone else's copyright. Our goal is to establish a digital archive capable of acknowledging these conditions.

The "data" described below refers to the most common digital formats and materials in which this knowledge is often transferred and shared today.

- Audio files
- Video files
- Spatial (GIS) data
- Digital and hard-copy maps
- Photographs
- Survey data
- Notes
- Information sheets (consent forms, job postings, and recruitment posters)
- Presentation materials
- Data management guidance
- Data sharing agreements
- Data request forms
- Plain language reports to communities
- Interim and annual reports to funding bodies
- Etc.

Data Storage and Access

[Enter Description of data storage and access. Include the name of software or locations of data, and the process of how data collected will be stored and retrieved].

Ethics and Security

All new data will be collected through an approved informed consent process. In this process, Traditional Knowledge holders, monitors and other research participants (knowledge holders) are provided with orally and/or written information in English, that includes:

- The identity of project lead (e.g., __) and researchers (e.g.,_____), data ownership, those responsible for data access
- A comprehensible statement of the research purpose and a description of research procedures and methods
- The expected duration and nature of data usage
- A comprehensible description of reasonably foreseeable harms and benefits that may arise from research participation, as well as the likely consequences of non-action
- An assurance that participants are free not to participate, have the right to withdraw at any time without prejudice to pre-existing entitlements, and will be given continuing and meaningful opportunities for deciding whether or not to continue to participate throughout the research process
- The process for withdrawing participation
- The possibility of publication and/or commercialization of research findings
- Any perceived, actual, or potential conflict of interest on the part of researchers and/or their institutions

In addition, research participants who wish to remain anonymous are provided with the opportunity to have their identifying information removed and appear as anonymous. **An informed consent template is found in Section 5.B**.

Data Storage and Preservation

Upon data collection and project completion, digital data are ultimately stored in the digital database of the [ENTITY NAME] First Nation. This digital information management system is provided by [add name of software/tools and how it is accessed and protected]. Only users (e.g., staff, data clerks, interview participants, monitoring data collectors, etc.) authorized by the First Nation have access to this database. [Describe how a user can access the system, and if there are specific permission settings, levels of data access etc].

Hard copies of all data can also be created and stored in a secure physical location at the [ENTITY NAME], in participant homes at their request, or in the home of a designated community-based researcher hired by the [ENTITY NAME] (upon termination of contract, all materials are returned to the [ENTITY NAME]). Data archivization will follow metadata standards to be set out by [ENTITY NAME].

Data Sharing and Use

[ENTITY NAME] retains individual ownership, control, and access over information collected by its respective members that is shared to the [ENTITY NAME] database.

Data use or sharing to third parties or for applications outside of the [ENTITY NAME] activities will trigger a review of this request by [ENTITY NAME]. In advance of any data sharing, [ENTITY NAME] may wish to have the third party fill out a **Data Request Form (found in Section 5.D)**, which solicits detailed information on the project and/or research purpose that the data is being requested for, and perceived or foreseeable impacts to the [ENTITY NAME]. Completed forms are to be circulated to authorized persons within [ENTITY NAME] for review. [ENTITY NAME] will have a two week period to respond with any objections or recommend changes to the terms of the request. [ENTITY NAME] reviewers may reasonably object to the data sharing request, and this will result in the rejection of the request. After the two week period, if there are no objections or requests for revisions from [ENTITY NAME], the request will proceed with establishing a **Data Sharing Agreement (found in Section 5.C)** between the Nation and the third party.

Information that is disseminated must include a disclaimer describing limits to data use and interpretation (according to data sharing agreements) and that any contributions to other bodies of work must require approval by the [ENTITY NAME]. Any information disseminated that may be used to contribute to other bodies of work must have proper citation of the original work.

5.B

Informed Consent

Disclaimer: this template is intended to assist Indigenous communities in the development of their own Informed Consent Protocols that reflect their laws and principles related to sharing. It is not intended to be treated as complete. It is recommended that any Informed Consent Protocol involve consultation with the community and review by a Nation's legal team and knowledge sharing authorities within the organization.

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Declaration of Informed Consent

_____ *First Nation*

Declaration of Informed Consent

I _____on this _____ day of _____,
give permission for [Researcher Name] to collect my [Describe information type, ie: field data entries, interview, or conduct a survey] with me as part of the research project titled _____.

The purpose of this research project is to [insert description].

It has the following benefits to _____ First Nation: [insert description].

It has the following risks to _____ First Nation: [insert description].

The information will be archived and stored in a secure database that will only be accessible by certain individuals authorized by _____ First Nation..

By signing below, I agree to the following:

a.) I give my consent to have my words and responses regarding my knowledge and observations recorded on maps, in a field data collection device, in notes, or using audio or video recording equipment

b.) I understand that the information I share will be stored in [Nation/Entity Name's] database of traditional knowledge and mapping (GIS) data.

c.) I understand that I will receive a payment/honorarium for my participation.

d.) I understand that I will have an opportunity to verify my data, interview transcripts (if applicable) and maps and to make any edits that I would like.

e.) I grant permission to _____ First Nation to use the information in pursuit of their goals to protect _____ First Nation rights and interests.

f.) I grant _____ First Nation licence to use the information collected through my participation in this project in pursuit of their goals.

g.) I understand that in pursuit of these goals, _____ First Nation may enter into agreements with other parties to share the data in a variety of formats, including products derived from the data such as maps and reports.

h.) I understand that _____ First Nation may use the information to mentor _____ First Nation youth.

i.) I am free to choose not to respond to any questions that may be asked, without penalty.

j.) I am free to end the interview at any time that I wish without penalty and/or choose to be anonymous in my participation.

Signed this _____ day of _____, 2021 in _____.

Signature of participant:_____.

Witness Name: _____.

Signature:_____.

5.C

Data Sharing Agreement

Disclaimer: this template is intended to assist Indigenous communities in the development of their own Data Sharing Agreement that reflect their laws and principles related to sharing. It is not intended to be treated as complete. It is recommended that any Data Sharing Agreement involve consultation with the community and review by a Nation's legal team and knowledge sharing authorities within the organization.

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Data Sharing Agreement

The purpose of this Agreement is to facilitate sharing of data, data products, and information created through the [Enter Project Name] Project, which may include data associated with wildlife/marine/fisheries studies, traditional use studies, results from focus groups or individual members, and data collected by third parties such as consultant reports and archival materials from government archives. It outlines the terms of use, Intellectual Property (IP), management, and storage of information.

This agreement is made by the [First Nation Name] AND **[Proponent /Applicant Name]** (hereinafter referred to as the ”User”) regarding access to specific information or products (hereinafter referred to as “Data”).

The period of this Agreement shall be in effect from [date] until [date], or until terminated in writing by either organization.

1. Definitions

i. Data means information gathered or aggregated as part of the [Enter Project Name] Project, including information shared by [First Nation Name], its members, community participants, additional third-party that [First Nation Name] acquires, and products of data processing.

2. Scope of Release Agreement

This Release Agreement is between the [First Nation Name] and the User, and it gives the User certain limited rights to use [First Nation Name] Data. All rights not specifically granted in this Release Agreement are reserved to the [First Nation Name]. The [First Nation Name] retains ownership and exclusive title of Data, and, unless otherwise noted, of the component parts of Data, and hereby grants to the User a personal, nonexclusive, non-transferable permission to use Data based on the terms and conditions of this Release Agreement. From the date of receipt, the User agrees to reasonable efforts to protect Data from unauthorized use, reproduction, distribution, or publication.

3. Restrictions

Released Data are solely for the internal use of the User and not for use by any other person or entity unless authorized by the [First Nation Name]. This restriction applies to all reorganizations of the data, in whole or in part, and the integrations of the data with information from other sources.

4. Prohibited Use/Unauthorized Distribution

Any sale, distribution, loan or offer for use of released Data, in whole or in part, is prohibited without the expressed prior written approval of the [First Nation Name].

5. Reproduction of Products

The reproduction of hard copy products as provided by the [First Nation Name] or derived from released Data with the intent to sell for a profit is prohibited without the expressed written consent of the [First Nation Name].

6. Publication

The User may not make public the data or reports without the authorized written permission of the [First Nation Name].

7. Permitted Use

Released Data shall not be used by any other person for any other purpose than stated within this agreement. The User may copy released Data only for use by the User or for backup purposes and not for use by any other person or entity. The released Data may be used on more than one computer system at any time, provided the systems are owned, leased or controlled by the User.

8. Data protection and management

Data must be backed up electronically in a secure storage location managed by the [First Nation Name] so that it continues to be available in the event the original source materials are lost or destroyed.

9. Derived Products

Graphic displays and printed tabular listings derived from released Data may be used by the User in presentations, provided that authorized persons from the [First Nation Name] are provided an opportunity for review and approval, and that creditor attribution is given to the [First Nation Name] as custodians of the Data, and credit or attribution is also given to the original source of Data if other than the [First Nation Name].

10. General Use.

Released Data may only be used in reports or presentations directly related to the purpose described in Section 11.

11. Use of Data

List/Describe the Data requested (select all that apply):

- ☐ Categorized SpatialData for time period [dd/mm/yyyy - dd/mm/yyyy].
- ☐ Spatial Data with attribute detailed descriptions for time period [dd/mm/yyyy - dd/mm/yyyy].
- ☐ Categorized maps for time period [dd/mm/yyyy - dd/mm/yyyy].
- ☐ Summary of community engagement research for time period [dd/mm/yyyy - dd/mm/yyyy]
- ☐ Draft Reports for time period [dd/mm/yyyy - dd/mm/yyyy].
- ☐ Final Reports for time period [dd/mm/yyyy - dd/mm/yyyy].
- ☐ [Describe other information requested]

The Data that is being requested is to be used for the following: [select all that apply/describe below]:

- ☐ Develop maps featuring areas of cultural use, marine concerns, harvesting activity, and critical habitat.
- ☐ Develop strategies around wildlife/marine/fisheries and/or resource use and protection that are informed by traditional knowledge, indigenous monitoring, land use, and occupancy data.
- ☐ Compile and sort traditional knowledge, indigenous monitoring, land/marine use, and occupancy data in a manner that facilitates its use by the User for the purposes of [insert purpose].
- ☐ Backing up data electronically so that it continues to be available in the event the original source materials are lost or destroyed.
- ☐ [Insert description of use, including Project name, deliverable]

12. Additional Provisions

- *Modifications.* TThe [First Nation Name] reserves the right to make changes, corrections, additions and/or deletions to the Data and are under no obligation to inform and/or supply the User with updates.
- *Accuracy and Applications.* The [First Nation Name] makes no warranties as to the accuracy of the Data or its suitability for the User's purposes. The [First Nation Name] does not guarantee exclusivity of the use of the Data.
- *Interpretations.* In supplying the Data, the [First Nation Name] makes no endorsement of any interpretations of the data made by the User.

After the data use term has ended, any new analysis, visualizations, writing, or other representations of the data will be provided to the [First Nation Name] for secure storage. The original data will be deleted from the computers of the User.

Whenever the User includes information from the Data in a report, publication, or otherwise, the [First Nation Name] will be properly accredited.

13. User Information

Organization: _____

Contact Person: _____

Address: _____

_____

Contact # (phone, fax, cell): _____

E-mail address(es): _____

IN WITNESS WHEREOF, the parties have executed this Agreement:

Authorized Signature of User:

_____ _____

Signature: **Date:**

Authorized Signature of [First Nation Name]:

_____ _____

Signature: **Date:**

Please e-mail this agreement to:

E-mail: _____

5.D

Data Request Form

Disclaimer: this template is intended to assist Indigenous communities in the development of their own Data Request Forms that reflect their laws and principles related to sharing. It is not intended to be treated as complete. It is recommended that any Data Request Form involve consultation with the community and review by a Nation's legal team and knowledge sharing authorities within the organization.

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Data Request Form

Complete the following form below or make attachments as necessary. Please use plain language.

The [Nation/Entity] requires at least 30 days to respond to data requests. Where necessary, this request will be circulated to [Add any additional reviewers if required, such as if this agreement involves information managed through a network of Nations/Entities].

Date:_____

Researcher:_____

Institution or Organization:_____

Address:_____

Email:_____

Requested date for release [For large data set requests, provide a spreadsheet or extensive list as an attachment to this document]:_____

Project name:_____

Project dates:_____ to _____

Project information

Describe in as much detail as possible the project that this data will be used for.

Types of data

Check all that apply.

- ☐ Research Reports
- ☐ Archival Materials
- ☐ Summaries
- ☐ Spatial files
- ☐ Data visualizations (maps, graphs, etc.)
- ☐ Interview transcripts
- ☐ Audio
- ☐ Video
- ☐ Photographs
- ☐ Notes
- ☐ Other:_____

Data authorship/source/Project Name:
[Example: All interview transcripts from Jane Doe, from the Oral History Project.]

Data Subject:
[Example: Place Names, Plant/Fish/Animal Species.]

Who will have access to the data?
[Describe who will be using the data.]

How will the data be used?
[Describe in what way the data will contribute to your project. Include any benefits to the project resulting from the data.]

Will the data be shared with any third parties or publicized in any way?
[Describe if the data will be shared with any other groups. This includes publications, reports and/or presentations.]

How will the data use impact First Nations?
[Describe how the project will affect the (Nation/Entity) and/or its community members.]

How will the data impact wildlife/marine/fisheries management?
[Describe in detail how the data might affect management decisions.]

What are the risks involved with the data use?
[List all possible environmental, social, economic, cultural, and/or other risks to the use of this data.]

Data storage and disposal

[Describe how long the data will be stored for and how (including formats), and by whom. Include security measures to ensure safety. Include how data will be disposed of after its use.]

Do you have data protection insurance?

- ☐ Yes
- ☐ No

Questions?

If you have any questions regarding this data request, please contact the [Nation/Entity] coordinator: [email]

I certify that all information I have provided above is true and will notify the [Nation/Entity] coordinator of any changes.

Signature: _____

Date: _____

5.E

Research Agreement

Disclaimer: this template is intended to assist Indigenous communities in the development of their own Research Agreements that reflect their laws and principles related to sharing. It is not intended to be treated as complete. It is recommended that any Research Agreement involve consultation with the community and review by a Nation's legal team and knowledge sharing authorities within the organization.

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Research Agreement

Between
[Enter name of Researcher]
and [Nation/Entity Name]

Background

1. [Describe the Nation/Entity and its vision or goals, for example, to promote the interests, including governance and knowledge information sovereignty by enhancing recognition of, and respect for [Nation/Entity Name] Aboriginal Rights and Title.]
2. The knowledge and experiences of the [Nation/Entity Name] are of great interest to researchers both within and beyond our [Territory Description].
3. The Rights and Traditional Knowledge of the [Nation/Entity Name] are held collectively by and for the benefit of all [Nation/Entity Name] people, but often exercised by and contained within the life-world and experiences of [Nation/Entity Name] families and individual members (knowledge-holders). [Nation/Entity Name] knowledge-holders also have rights over their own knowledge, personal histories, information, and data.
4. The [Nation/Entity Name] collectively have a responsibility to protect their sovereignty, including their sovereignty over collectively-held knowledge and the information and data materials that support it.
5. The [Nation/Entity Name] supports well-designed, ethical research relationships with institutions and third parties that may benefit [Nation/Entity Name] members.

Therefore, the parties have the following understanding:

Process

6. The Researcher agrees that, in the event that he/she/they is affiliated with a post-secondary institution or other institution, he/she/they has sought and won approval from an appropriate research ethics board for the conduct of the research.
7. The Researcher acknowledges that [Nation/Entity Name] knowledge and input, via engagement with [Nation/Entity Name], has informed the research design (including methods, data collection, communications, analysis, data storage, dissemination of results, and information legacy). Ideally, [Nation/Entity Name] input into the research design process should take place before application to any relevant research ethics board.
8. The Researcher acknowledges that he/she/they will conduct their research observing the knowledge sovereignty principles described throughout this Research Agreement.
9. The Researcher agrees that he/she/they will consult with the [Nation/Entity Name] band before engaging in any research activities with knowledge-holding subjects.
10. The Researcher agrees that they will observe all governing laws of Canada related to the protection of personal data and privacy.
11. The Researcher agrees that they will observe all governing laws, including [Nation/Entity Name] laws, related to the intellectual property of [Nation/Entity Name] knowledge.

Informed Consent

12. Written informed consent of [Nation/Entity Name] knowledge holders must be secured before engaging in research involving [Nation/Entity Name] participants. Informed consent must include plain language description of the risks, benefits, and knowledge sovereignty contribution of the research project to the participants.
13. The [Nation/Entity Name], its families, and individual knowledge-holders' interests in knowledge extend to the right to benefit economically and socially from research. Opportunities for beneficial participation in the research and research outcomes and products must be identified at the engagement stage.
14. [Nation/Entity Name] knowledge holders must be compensated for their participation in the research activities.
15. [Nation/Entity Name] knowledge holders have the right to maintain control over the information that they have provided to the Researcher, and the Researcher agrees to protect and enact this right through a process that respects their ability to a.) share information anonymously, where so desired and b.) amend the content of their information without penalty.

Data Sharing, Organization, and Storage of Data

16. Whereas "data sharing" is defined as

    > The exchanging, collecting or disclosing of personal or information by an individual or organization with other individuals or organizations, such as any federal or provincial government ministry, agency, board, commission, municipality or local agency, or any party.

17. The Researcher agrees to respect the [Nation/Entity Name]'s sovereignty over its knowledge information by ensuring that the [Nation/Entity Name]'s ability to control, own, access, and possess its knowledge information is maintained.
18. Research data should be stored on a secure, encrypted server with access limited to the research team.
19. Where the Researcher is gathering qualitative interview-based data and map data, [Nation/Entity Name] will offer a research account and access to the [Nation/Entity Name] digital archival system for the duration of the research project, to ensure data compatibility at the end of the research project.
20. Data and information gathered and shared between the Parties may be used for the stated research purposes by the Researcher and by the [Nation/Entity Name] to further its interests.
21. The data and information gathered and shared between the Parties or between the Researcher and individual knowledge-holders should not be shared with any other parties without the written permission of the [Nation/Entity Name].
22. The data and information gathered and shared between the Parties or between the Researcher and individual knowledge-holders should not be posted on the internet without the written permission of [Nation/Entity Name]
23. The data and information gathered and shared between the Parties or between the Researcher and individual knowledge-holders should not be used in a wildlife or other prosecution.

Review, Return, and Publication of Data

24. Where possible and applicable, individual knowledge-holders should be given the opportunity to review the information they provided and resulting analyses prior to publication or dissemination of results.

25. The Researcher agrees to work cooperatively with [Nation/Entity Name] to resolve any differences of interpretation, where one arises.

26. The Researcher agrees to acknowledge the contribution of [Nation/Entity Name], and individual knowledge-holders in any published or disseminated work.

27. The Researcher agrees to anonymize the data and information so that anyone viewing the data or information should not be able to make a clear association between an individual and data.

28. The Researcher agrees to provide a copy of any resulting report informed by the research prior to its publication in any format to [Nation/Entity Name], and individual knowledge-holders' who participated in the research.

29. The research project should not result in a data management problem for [Nation/Entity Name] at the end of the research project. The researcher agrees to employ, to the extent possible, the data standards, types, and coding system used by the [Nation/Entity Name].

30. The Researcher agrees to share any additional relevant information or materials it gathers that may assist [Nation/Entity Name] to promote their interests, which may include reports, publications, data, or other materials. The Researcher agrees to upload this additional information, where applicable, to [Nation/Entity Name]'s digital archive.

31. The Researcher agrees to provide [Nation/Entity Name] with copies of any data gathered from [Nation/Entity Name] knowledge holders in a raw, unencrypted format. In the case of interviews, this will include digital audio or video files and may include transcripts. Where spatial data is gathered, the researcher agrees to encode the data using [Nation/Entity Name] traditional knowledge and land and marine use coding system for individuals and spatial types (Appendix A). Spatial data must be supplied to [Nation/Entity Name] in .shp, .kmz, or .kml format.

32. Individual knowledge-holders must receive a copy of any final reports that are produced from the research.

Dispute Resolution

33. In case of a dispute arising from the implementation of this Research Agreement, the Parties shall exhaust alternative dispute resolution models such as good communication, negotiation and mediation before employing other forms of dispute resolution. Parties agree to act in good faith to resolve the dispute.

Notification

34. Any notice of written communication required under this agreement may be given as follows: [insert [Nation/Entity Name] reps]

Duration of Agreement

35. The term of this Research Agreement is from the Effective Date to _____ and may be renewed.

36. The Parties may terminate this Research Agreement in writing at any time subject to 30 days notice.

Signature:_____

Date:_____

5.F

Briefing Notes Template

A key part of participation in resource management assessments is keeping decision-makers in the community informed, and holding effective meetings to discuss a proposed development in the territory, the results of research or planning, etc Chief and Council meetings often have full agendas, and are the primary--sometimes only--time a resource/lands department can share vital information. Creating a briefing note that can organize complex information into simple, clear points is a key way to ensure that issues can be contemplated in a time sensitive way.

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Briefing Notes

PREPARED FOR: [Nation name here] Chief & Council
DATE: Enter the date here
NAME: Enter your name and title
PROJECT NAME: Name of Project assigned in Trailmark (if using)
ID#: Enter the ID# assigned in Trailmark (if using)

Purpose:

[Replace the text below with a description of the purpose of the briefing note.]

The purpose of a briefing note is to advise Chief & Council, or another decision-maker about a particular issue that they need to know about, consider, and take action on. Sometimes that action may come back to you in the form of direction from Chief & Council to take following steps, or to direct another department or person to take a new action. Let's call that a Briefing Note for Action.

Other times, the briefing note might just bring Chief & Council up to speed on where a particular issue sits. Let's call that a Briefing Note for Communications.

In any case, a briefing note gives background, next steps, future events, and/or gives options for decision or requests direction or authorization from Chief & Council to do something.

Background: [Enter the Name of the Project Again Here]

Describe in short, concise sentences and short paragraphs what the issue is about, and whether the Briefing Note is for communications and to advise of planned next steps, or to seek direction or approval from Chief & Council.

Then list, in bullet points, the main background of the topic you are briefing Chief & Council on. For example:

- *A Proponent referral has been received as of July 3 advising that the Ready Mix Concrete Company of Bigelow, BC intends to apply for permits from the Ministry of Forests and Lands to apply for a quarry permit 30 kilometres north of Bigelow. The Referral is attached to this Briefing Note.*
- *The Proponent, Ready Mix, states that it wishes to engage with our Nation on the proposal before it submits an application to the government.*

Describe events that have already taken place related to this issue, for instance, if applicable.

Discussion

The discussion section of the briefing note lays out what the important issues for consideration are that you want Chief & Council to know about.

You can write short paragraphs or use bullet points.

You should include any discussion of your preliminary assessment of possible impacts on your nation's interests or rights, as well as any maps here.

If you've done an interaction analysis in Trailmark, include a discussion of the results here, either as a bullet point or as a table. For eg.:

- *Our Nation's Economic Development Strategy says that quarrying is an economic opportunity for our Nation, and represents opportunities for new revenue streams and employment (p. 96).*
- *Ready Mix has a good corporate reputation and is listed as one of the Top Five Quarry Companies in Canada, according to Forbes Magazine. (Source: Forbes Dec 2012, "This little Bigelow, BC Company is Crushing It.")*
- *The proposed area is within the nation's Breadbasket. According to a database search, it has been used as a hunting, medicinal gathering, and fishing site for generations and remains an actively used location by harvesters. According to last year's harvest study results, 40% of the deer harvested in the community came from the area.*
- *The area has been identified by the Treaty Team as a possible future land selection candidate.*
- *Residents feel very strongly about the area and it was identified in our Land Use Plan as a candidate area for a Tribal Park, although no action toward that has yet been taken.*

Next Steps

If there is already a process in place for the issue, or if you are writing a Briefing Note for Communications, describe next steps.

- *I have written to the Proponent (3 March 2022, by email) to request a zoom meeting to discuss the project. I have cc'ed Chief Smith and Councillor Johns, lands department portfolio holder.*
- *The meeting is scheduled to take place 3 April 2022. I have forwarded a copy of our Nation's economic development plan to the Proponent, and have prepared a presentation on our economic development strategy, maps of the area, and our interests, for the meeting.*
- *Randy has been hired to do catering.*

IF Chief & Council need to make a decision, or to give direction, use sections for ***Options***, ***Recommendations,*** or ***Directions Sought.***

Options

When you're giving advice, it's useful for the other party receiving the advice to see that you've considered things from different angles. Giving several options for consideration, and then describing the benefits and drawbacks of these options, helps the other party make an informed decision. You can do this as simple bullet points. For example:

Option 1: Accept the Proponent's request to meet to discuss the project, as it aligns with our economic development strategy. The meeting could include lands department staff, Chief & Council, and Legal.

Option 2: Decline to meet with Ready Mix until a more polished project description is available. Indicate that we appreciate the early engagement and recognition of our rights and economic interests; however, we are beyond capacity at the moment.

Option 3: Decline to meet with Ready Mix until the project is formally submitted for review to the Government. Although quarrying aligns with our economic development strategy, it is not the best and highest use of the area proposed for the Project. Moreover, the area is important to active harvesters in the community; 40% of the deer harvested last year by community members came from the forest block adjacent to the site.

Recommendations

Briefing Notes don't always have this section, but sometimes they do. After you've done your research, stick your neck out a little and state why one option is preferred over the others. Chief & Council will ultimately make the decision, but they might appreciate your informed opinion on the matter, from a technical point of view. Remember that you're giving advice to a decision-maker, not arguing from the heart.

Direction Sought

Be very clear about what direction you seek.

5.G

Land Use Interview Best Practices

Interviews can be a way of emphasizing and honouring the inherently personal and relationship-building aspects of community-based research, which might even be thought of as gathering and exploring inter-views. This approach involves forming a new type of relationship between researcher and informant, and one that is highly contextual, meaning that both individuals are recognized to have a role in building the understanding and knowledge that interviews can create at that moment. The role of the researcher is not to be a neutral observer, but to be forthright about their own subjective limitations, experiences, and assumptions. In an Indigenous research setting, the interview should center around deep listening and attend to the relational space between the interviewer and the person participating. In other words, instead of creating a duality of an extractive, informant-researcher type of exchange, as practitioners, we attempt to make a relationship where we are on a journey as co-learner.[63]

Interviewing is an art form. The etiquette and skill of the interviewer can often mean the difference between producing an interview that is authentic and insightful vs. one that is restrained and gives superficial information that the interviewee may feel obligated to provide.

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5.G.1. Best Practices

Good practice to help with making a quality interview:

1. **Find a calm, quiet space**, and bring good snacks and drinks/tea (listen: is there background noise that could impact the quality of your audio?)
2. **With elders, resist the urge to ask many questions.** Let go of the idea of keeping to a strict agenda and covering every question you have. Instead focus on maintaining presence, listening, and the quality of conversation.
3. **Ask open-ended questions**, not ones that can be answered with a simple yes or no. For example, “What is your earliest memory of visiting Egg Island?” vs. “Do you remember Egg Island?”
4. **Cultivate deep listening skills**: don’t interrupt, but also know when to speak up. Paraphrase what has been said back to the interview participant at key moments, to make sure you heard them right, and to see if they want to elaborate further.
5. **Ask follow-up questions** based on what you hear, and if appropriate, thoughtfully construct your question back to the research goals and purpose.
6. **Say Place Names Aloud**: As much as possible, encourage saying aloud the names of places being discussed, and even describe with precision what is being mapped ie “we are marking down this burial site on the eastern tip of Egg Island”, instead of saying “over here” when referring to a place on the map.
7. **Check the audio recording** and use back-up recording
8. **Keep the interview under two hours**, and notice the energy-level in the room. You can always split the interview into multiple sessions if there is a lot to cover.

5.G.2. Interview Guide

Create an interview guide for yourself that lists the questions you should ask or the topics that you should try to cover. An interview guide should include themes or questions that will help to supply information toward the overarching research questions, topic and purpose of the research, including “indicators” or community valued components.

A guide for a semi-directed interview shouldn’t be a tedious, rigid list of questions. It might be a dynamic map of an interview, in which you plot out the main topics you want to cover, while letting the interviewee’s experiences drive the interview.

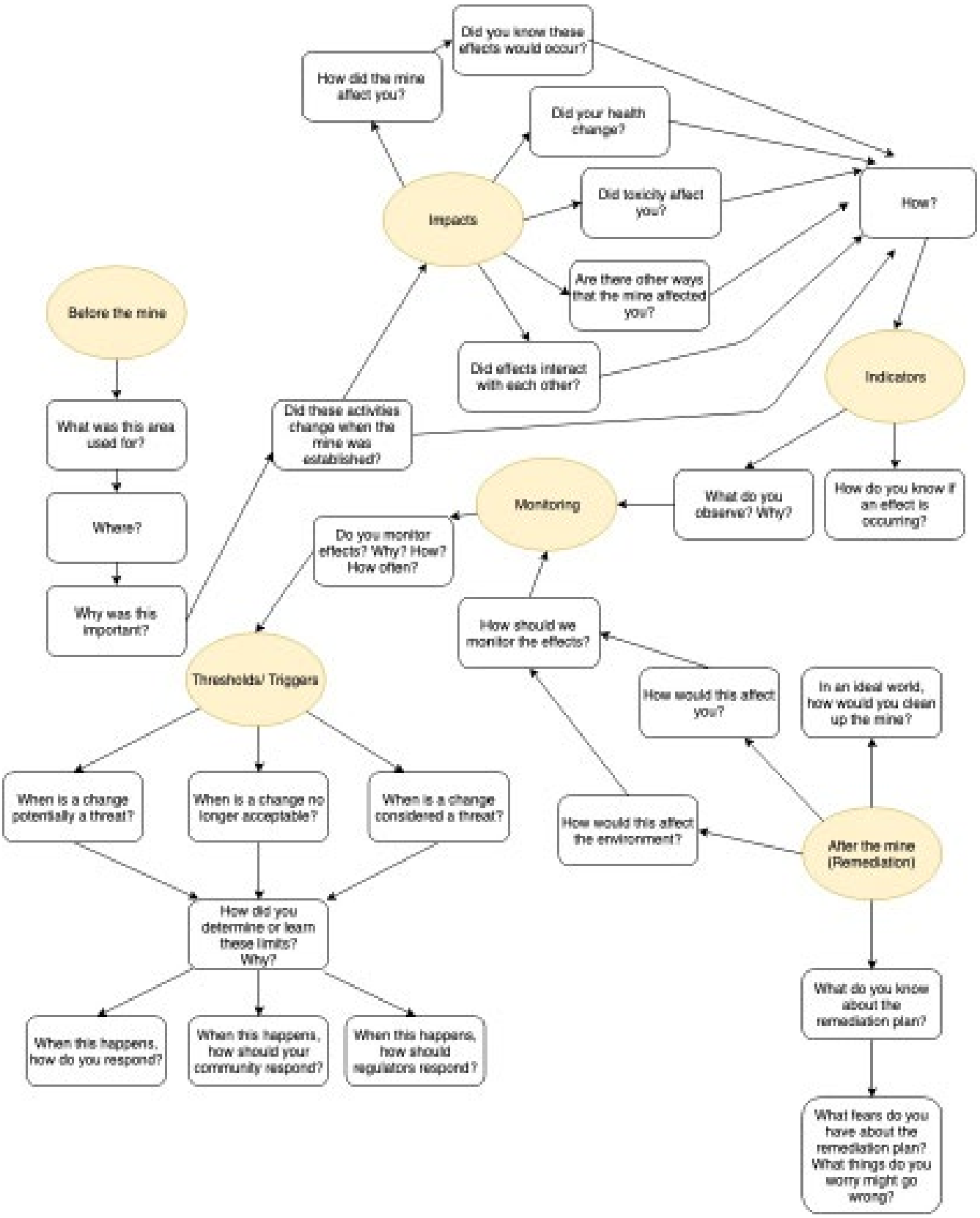


Figure 10 *An example of a topic-driven, nonlinear interview guide.*

Figure 10 is an example of a guide that could be used to understand the past and present perceptions of a gold mine, and how the mine affected traditional land use. Because good interviews (unlike surveys) rarely follow a list of questions from an interviewer in a sequential way this type of guide is helpful to remind the interviewer of a series of questions as certain topics come up, and also identify and follow-up when topics such as valued components are being touched on.

Alternatively, on the next page you'll find another example of a guide used for traditional land use and knowledge interviews to understand the current and past state of harvesting in the community and issues related to the exercise of Aboriginal rights. It has been used to develop baseline information for Indigenous land use planning. The information it gathers would apply to the consideration of development proposals within the territory, and the development of a community's land use zones informed by Aboriginal rights practices. This guide is quite extensive to show the range of dimensions of questions that could be asked to explore topics related to the exercise of Aboriginal rights. Not every question is intended to be asked, only those relevant to the interviewee. Like a game of "20 questions", the first questions are broad and intend to get a sense of which "blocks" of questions the interviewer should pick to get into more detail.

Traditional Land Use Baseline Study: Land Use Planning
Draft Example Knowledge Holders Interview Guide

Interview Details

- Start of interview / recording time (yyyy-mm-dd-00:00)
- State the name of the person being interviewed.
- The location.
- State the name of person leading the interview
- State the name of person mapping for the interview
- State the name of person taking notes and managing equipment

Biography Questions

- What is your full name?
- Where were you born?
- What community do your parents come from?
    - Mom: _____
    - Dad: _____
- What is your Mother's full name?
- What is your Father's full name?
- Where did you grow up? What community did your Grandparents come from?
    - Grandma: _____
    - Grandpa: _____
- Do you live in the community you were born in? Yes: ____ No: ___
- If you left the community you were born in, why did you/your family leave?
- How would you describe traditional knowledge?
- Who has traditional knowledge?
- What would the people in your community like to see happen with resource management, and what plans should be in place for this?
- What is needed by your community to participate meaningfully in resource management, and planning for the future?

Heritage: Trails, Camps, Cultural Sites

- Are there specific trails that you can show us that you have used in your lifetime? (Map)
- When and how do you travel these trails?
- How did you learn about these trails?
- Do you have any concerns about the use of these trails that you can share?
- Do you or your family have a cabin or camp that you visit?
- If no, did you used to?
- Can you show us where the cabin is? (MAP)
- Has there been anything that has caused a bad experience of visiting your cabin, or has prevented you from going? (MAP)
- Are there any other cabins, camps, or places where you have camped with other people? (MAP)
- Do you have any stories or concerns to share about, such as;
    - burial sites
    - cache pits
    - old village sites
    - sacred places
    - cabins
- Can you show us where they are? (Map)
- How did you learn about these things?

Traditional Use Activities & Areas - General

These are overview questions to be expanded on in the appropriate section below according to the participants land use experiences.

- Do you currently hunt, fish or gather plants or other material in the [Traditional Territory} or any other areas?
- What do you harvest? (List resources – use list to direct questions below)
- How else do you use the land? (List uses)

OR – if not:

- Did you and/or your family go out on the land in the past? What sorts of activities did you participate in on the land?
- What are the reasons that you don’t get out on the land anymore?
- Are there any types of forests or lands that were most valuable for food and medicine such as old forests, open meadows or wetlands (where the soil is very wet most of the year?

Fishing

- What kinds of fish do you harvest? (What species are targeted?) Are these the same types of fish that were used by your parents and grandparents?
- How often do you go?
- What season is best?
- Where do you go to fish? Can you show us on the map? (MAP)
- How do you get to these places? Can you show us on the map? (MAP)
- What are the places do you feel the fish are healthiest? (MAP) Do you know why?
- Are there any specific special places for fish, such as fish spawning areas that should be protected? (MAP)
- Do you know about any “Special water” places/springs that you can show us? Should these areas require protection from disturbance? (MAP)
- If these areas were to disappear or become inaccessible somehow, are there any alternative places you could go for this? (MAP)
- Are there any areas where fish availability or health has changed? (MAP) If so, what do you think has caused this change?
- Do you know of any places that you are concerned about the fish and if so, why are you concerned? (MAP)
- What are the most important species of fish to [your First Nation/Métis Group]?
- When you go fishing, is there anything that ruins your experience?
- What types of things could cause you to avoid harvesting in an area? How does that you make you feel?

Cultural Plants (Medicine)

- What kinds of medicinal plants do you harvest? (What species are targeted). Are these the same types of plants that were used by your parents and grandparents?
- How often do you go?
- What season is best?
- Where do you go to harvest this? Can you show us on the map? (MAP)
- How do you get to these places? Can you show us on the map? (MAP)
- What are the places do you feel the plants are healthiest? Do you know why? (MAP)
- If these areas were to disappear or become inaccessible somehow, are there any alternative places you could go for this? (MAP)
- What sort of other conditions are important for plants to be healthy and for good harvesting?
- Are there any specific special places for gathering these plants that should be protected? (MAP)
- Are there any areas where the plant availability and quality has really changed? If so, what do you think has caused this change? (MAP)
- Do you know of any places that you are concerned about these plant species, and if so, why are you concerned?
- What are the most important plant species for medicine to [your First Nation/Métis Group]?
- When you go gathering plants, is there anything that ruins your experience?
- What types of things could cause you to avoid gathering plants in an area? How does that you make you feel?

Cultural Plants for Food

- What are the most important plant species for food to [your First Nation/Métis Group]?
- What kinds of food plants do you harvest, such as berries or teas? (What species are targeted). Are these the same types of plants that were used by your parents and grandparents?
- How often do you go?
- What season is best?
- Where do you go to harvest this? Can you show us on the map? (MAP)
- How do you get to these places? Can you show us on the map? (MAP)
- What are the places do you feel the plants are healthiest? Why? (MAP)
- If these areas were to disappear or become inaccessible somehow, are there any alternative places you could go for this? (MAP)
- What sort of other conditions are important for plants to be healthy and to make good harvesting conditions?
- Are there any specific special places for gathering these plants that should be protected? (MAP)
- Are there any areas where the plant availability and quality has really changed? If so, what do you think has caused this change? (MAP)
- Do you know of any places that you are concerned about these plant species, and if so, why are you concerned? (MAP)
- When you go harvesting, is there anything that ruins your experience?
- What types of things could cause you to avoid harvesting in an area? How does that you make you feel?

Cultural Plants and Materials for Crafts / Firewood

- What kinds of other materials do you harvest, such as firewood or soapstone? (What species are targeted).
- How often do you go?
- What season is best?
- Where do you go to harvest this? Can you show us on the map? (MAP)
- How do you get to these places? Can you show us on the map? (MAP)
- If these areas were to disappear or become inaccessible somehow, are there any alternative places you could go for this? (MAP)
- What are the places do you feel are the best for this material? Why? (MAP)
- What sort of other conditions are important for these materials and to make good harvesting conditions?
- Are there any specific special places for these materials that should be protected? (MAP)
- Are there any areas where the availability of these materials and quality has really changed? If so, what do you think has caused this change? (MAP)
- Do you know of any places that you are concerned about these plant species, and if so, why are you concerned? (MAP)
- What are the most important plant species for food to [your First Nation/Métis Group]?
- When you go harvesting, is there anything that ruins your experience?
- What types of things could cause you to avoid harvesting in an area? How does that you make you feel?

Hunting

- What are the most important animals to hunt for the [your First Nation/Métis Group]?
- What animals do you hunt? (What species are targeted)?
- How often do you go?
- What season is best (for hunting each animal)?
- Where do you go to harvest this? Can you show us on the map? (MAP)
- How do you get to these places? Can you show us on the map? (MAP)
- If these areas were to disappear or become inaccessible somehow, are there any alternative places you could go for this? (MAP)
- What are the places do you feel are the best for hunting? Why? (MAP)
- What sort of other conditions are important for the animals you hunt?
- Are there any specific special places for these animals that should be protected? (MAP)
- Are there any areas where these animals no longer are found, or their behaviour/movement has changed? If so, what do you think has caused this change? (MAP)
- Are there any places that you are concerned about where these animals go? If so, why are you concerned? (MAP)
- When you go harvesting, is there anything that ruins your experience?
- What types of things could cause you to avoid harvesting in an area? How does that you make you feel?

Trapping

- Are you a trap line holder? Or, is someone in your family a trap line holder?
- Can you tell me about the history of your trap line?
- When were you last active on your trap line?
- Do other people use it?
- What activities do you / they do on the trap line?
- How do you manage resources on your trap line?
- What animals do you trap?
- What are the most important species?
- How often do you go trapping? What season is best?
- Where do/did you go? (MAP)
- How do/did you get to these places? (MAP)
- What are the places where the animals are the healthiest? (MAP) Do you know why?
- Are there areas were you or others have lost access to trapping? Why? (MAP)

Spiritual / Ceremonial Places

- Can you show us any important spiritual places or places for cultural practices?
- What time of year do these spiritual/Ceremonial activities take place?
- Are there places where you feel traditional spiritual/ ceremonial use areas on the land are in good condition? Why?
- Do you know of any traditional spiritual and/or ceremonial use areas, that you have concerns about? Why?
- Is there anything that ruins your experience of these places?
- What types of things could cause you to avoid coming to these areas?

Feedback on Land Use Planning Process

- What are some important things to know and include when making plans for our lands into the future?
- [Information needs?] Is there anything you would like to know more about that might be important for thinking about the future?

Place Names

- Do you know Dene names for places that you would be willing to share, such as;
    - Areas
    - Lakes
    - Rivers
    - Places
    - Trails
- How did you learn these names?

5.G.3. Codes, Categories or Symbols

If conducting an interview, prepare your code or symbol list that you will mark on the map ahead of time, and memorize it or have it handy. Use the interview guide you prepared to help direct the codes and categories you create. Also keep in mind that the community participating in the research project may already have an established set of codes and categories developed for past work, and that it can be beneficial to use and build on that existing set of codes. **Doing so can help bring together all past, present and future research and monitoring work.** However, if you create a flexible coding system (involving a combination of codes as described below), the information collected can be easily filtered compared to more rigid system of separate codes that may be the legacy of previous studies. The following is recommended because even if a more rigid system was used in the past, the combined codes can be used to query the same results.

Keep your codes, and the categories you use to group them together, simple. In the past, there was a tendency among researchers in communities to create needlessly complex information coding systems. They might have a code for caribou hunting, and a separate code for caribou habitat, and another one for caribou sighting, one more for subsistence caribou hunting, and yet another one for commercial hunting. Instead, have a group of codes for plants, animals, fish, berries, etc… and another group of codes for practices such as hunting. Then, combine codes to describe them, ie. Bathurst caribou (BC) + Hunting (H).

In addition, if using Trailmark software, information recorded by monitors or through surveys (ie, not through interviews) can be coded using the same system, making it easy to search the same codes (representing different animals or plants etc) across the whole archive and information from various types of research.

Code	Code Description	Category
AH	Ahiak Herd Caribou	Animals
BHC	Bathurst Caribou	Animals
B	Bear	Animals
BB	Bear Black	Animals
GB	Bear Grizzly	Animals
BV	Beaver	Animals
BAC	Beverly Ahiak Caribou	Animals
BI	Bison (Buffalo)	Animals
BF	Black Fox	Animals
LX	Canadian Lynx	Animals
CAT	Canadian Toad	Animals
C	Caribou	Animals
CF	Cross Fox	Animals
ER	Ermine	Animals
FX	Fox	Animals
HR	Hare	Animals
JR	Jack Rabbit	Animals
MR	Marten	Animals
MK	Mink	Animals
M	Moose	Animals
MC	Mountain Caribou	Animals
MX	Musk ox	Animals
MU	Muskrat	Animals
OT	Otter Fisher	Animals
PCP	Porcupine	Animals
QA	Qamanirjuaq Caribou Herd	Animals
RB	Rabbit	Animals
RF	Red Fox	Animals
SQ	Squirrel	Animals
WE	Weasel	Animals
WHF	White Fox	Animals
W	Wolf	Animals
WV	Wolverine	Animals
WLC	Woodland Caribou	Animals

Code	Code Description	Category
BE	Bald Eagle	Birds
BRD	Bird (any species)	Birds
CG	Canada Goose	Birds
DB	Duck Black	Birds
DC	Duck Canvasback	Birds
DG	Duck Grebe	Birds
DM	Duck Mallard	Birds
DP	Duck Pintail	Birds
E	Eagle	Birds
GES	Geese	Birds
GE	Golden Eagle	Birds
GS	Goose Snow	Birds
GHO	Great Horned Owl	Birds
GR	Grouse	Birds
LN	Loon Northern	Birds
PT	Ptarmigan	Birds
R	Raven	Birds
RBS	Robin	Birds
SHC	Sandhill Crane	Birds
GU	Seagull	Birds
SOL	Snow Owl	Birds
SNB	Snowbird	Birds
SO	Songbirds	Birds
SN	Tundra Swan	Birds
WC	Wild Chicken	Birds

Code	Code Description	Category
CI	Cisco	Fish
F	Fish (species not indicated)	Fish
LHC	Lake Herring Cisco	Fish
LT	Lake Trout	Fish
PI	Pike	Fish
S	Salmon	Fish

Figure 11a *Example Set of Code and Categories.*

Code	Code Description	Category
CC	Animal Crossing	Ecology
AD	Animal Den	Ecology
AT	Animal Trail	Ecology
CCA	Calving Ground	Ecology
ECR	Ecoregions	Ecology
CFM	Fall Migration	Ecology
FH	Fire History	Ecology
GF	Geographic Features	Ecology
MIG	Migration Route	Ecology
SM	Spring Migration	Ecology
WM	Winter Migration	Ecology

Code	Code Description	Category
CMF	Commercial Fishing	Practices
DT	Dog Team	Practices
FI	Fishing	Practices
GA	Gathering	Practices
HU	Hunting	Practices
MON	Monitoring	Practices
SNA	Snaring	Practices
TPG	Trapping	Practices
TR	Travel Route	Practices

Code	Code Description	Category
BP	Birthplace	Sites
BT	Boat Route	Sites
BA	Boundary Area	Sites
BG	Burial Ground	Sites
X	Cabin	Sites
EK	Esker	Sites
FLDG	Fishing Lodge	Sites
HS	Historic Settlements	Sites
LGF	Legendary Geographic Feature	Sites
LGS	Legendary Site	Sites
PN	Place Name	Sites
PTG	Portage	Sites
SNSH	Snoeshoeing route	Sites
SNM	Snowmachine route	Sites
SS	Special Site	Sites
SPS	Spiritual Site	Sites
TS	Tent Site	Sites
TW	Town	Sites
TP	Trapline	Sites

Code	Code Description	Category
BAL	Balsam Tree	Vegetation
BCH	Birch	Vegetation
BC	Black Currant	Vegetation
BST	Black Spruce	Vegetation
BK	Blackberry	Vegetation
BLB	Blueberry	Vegetation
BN	Bunchberry	Vegetation
CT	Cattail	Vegetation
CLB	Cloudberry	Vegetation
CRB	Cranberry	Vegetation
GSB	Gooseberry	Vegetation
JP	Jack Pine	Vegetation
PB	Paper Birch	Vegetation
RA	Raspberry	Vegetation
RSB	Raspberry	Vegetation
RR	Rat Root	Vegetation
SPR	Spruce Tree	Vegetation
STB	Strawberry	Vegetation

Figure 11b *Example Set of Code and Categories.*

Mapping Tools

If conducting an interview, decide what mapping tool you will employ during the interviews:

Recording locations on paper maps

Pros: paper maps are usually familiar to interviewees, don't require an Internet connection, they create a physical record.

Cons: they require time and know-how to create and print, the interviewee could talk about areas not shown on that map, they can be lost or mislabeled, they require time to digitize post-interview, must have proper fine-tipped pens on hand, they cannot be "zoomed in" for finer detail of areas, they are limited by what is included in the printing - ie you cannot add or remove layers once they are printed.

Direct to digital mapping

Pros: can easily show different layers and any past information the interviewee has provided, can "travel" and get up close to different areas as the interview subject may require, can more easily pick the right code for the site, and auto-assign the code sequence number (if using Trailmark), removes the need to digitize, which reduces a step that can introduce errors and saves large amounts of time, results can be easily shared and printed.

Cons: some mapping software require an Internet connection, software must be secure and have back up to prevent data loss.

Conducting the Interview

1. **Self-locate**
   Introduce yourself clearly and thoroughly: describe who you are, where you are from and what you are interested in talking about, and why you are interested. If you are from the community, let the interviewee know who your parents are.
2. **Explain Interview Importance and Future Use**
   Take the time to explain why the interview is important, where the recording will be kept, how and when the information might be used and by whom.
3. **Consent**
   Get consent to continue and to record.
4. **Interviewee Introduction**
   When beginning the interview, start with asking the interview participant to fully introduce themselves and where they are from, and how long they have lived/visited the places you will discuss.
5. **Good Practices**
   Keep in mind the good practices listed above when interviewing.

Overview: How To Conduct A Map Biography Interview

Mapping locations during the interview

Decide what you will mark on the map ahead of time, and be as consistent with this as possible. For example, if the interview topic is on caribou, you will mark down sites discussed about caribou (habitat areas, movement and travel-ways, crossings, areas hunted) using the codes you have created to describe these things. Below find a brief description of how to map interviews using paper maps or a direct-to-digital mapping program such as Trailmark.[62]

Paper Maps: Linking maps to transcripts

When leading an interview and marking down sites that are being discussed onto paper maps, what you label the map to identify each site will serve to connect what is being shared in that moment.

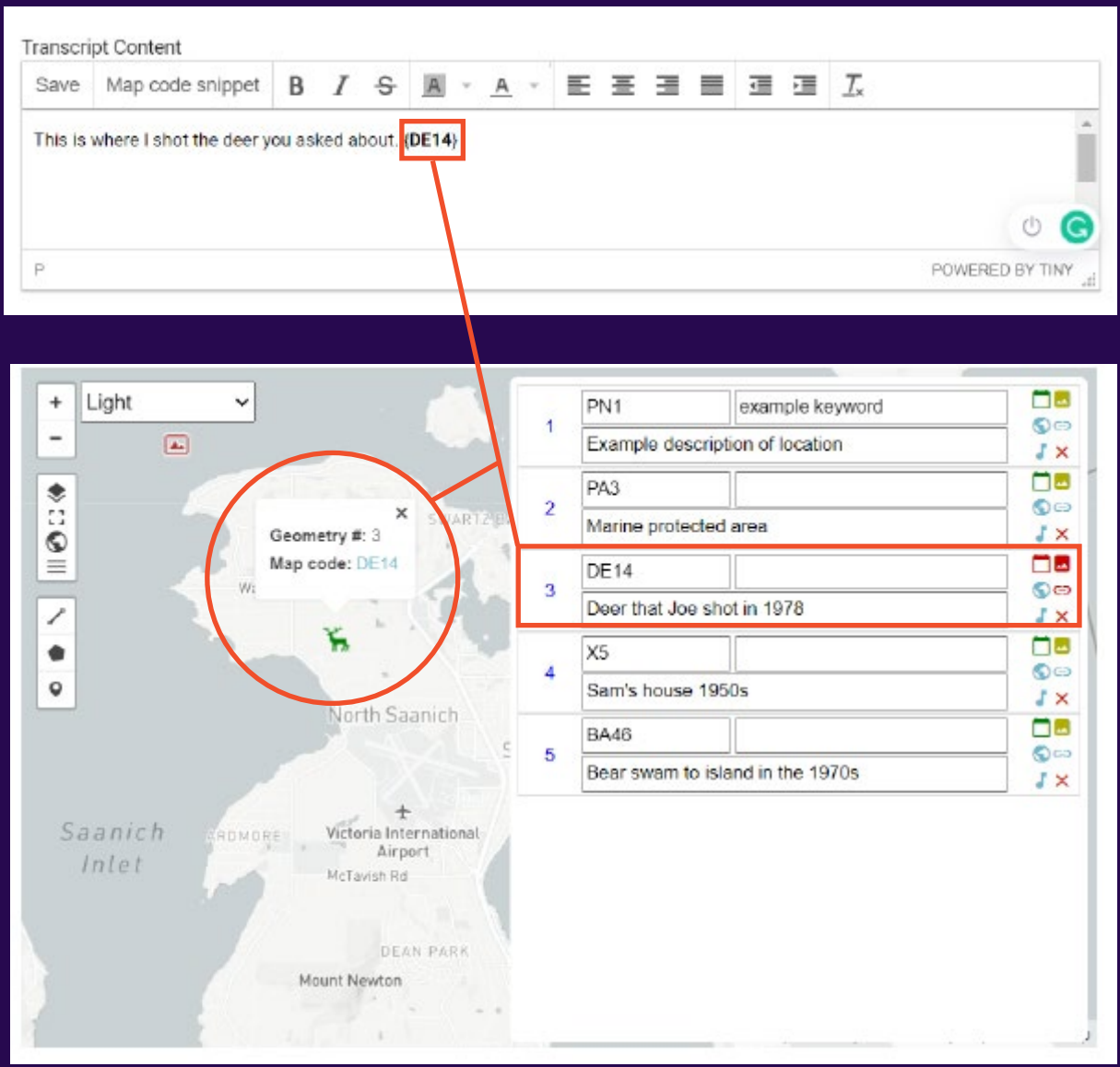
Here's how:

1. Have the code list handy, or even better, try and memorize it ahead of time. Mark each site with the code, adding a number after the code to show the order you are mapping each site (ie, the first cabin site mapped is X1, second site mapped that is a fishing spot, F2, etc).
2. Casually say the code and the number when you map it, so that the audio recording can pick it up.
3. You can also strengthen the confidence in the link of that site to what is discussed by marking down the timestamp on the audio recorder, and write it on the map site or in notes as back up. In fact, this technique can be used in place of the coding system if you are not using one.
4. When transcribing the interview, be sure to write in the code that was mentioned directly into the transcript. If using the timestamp, this will show up automatically in the transcript if you are using a transcription software like Sonix.ai
5. When digitizing the map sites, have the transcript available to make sure the codes in the transcript align with those being digitized. It is okay if in this process the map codes need to be fixed, the goal is that you get them to match – ie map code inside the transcript is the same as the sequence of the sites mapped then digitized. The numbering system used in the paper map will likely need to be updated when it is digitized so that it suits the numbering system of the GIS program you are using. If using Trailmark, this numbering system is automatically assigned so that each map site is unique inside the system (and therefor linked to its unique interview record).
6. For example, if the first cabin site is labelled on the paper map as "X1", when digitized will be assigned the next number available among all the cabin sites already digitized. X1 may turn into X13, so you will simply update the mention of X1 in the transcript to become X13.

Having the code in the transcript might seem like a lot of work, but it will pay off later. Map codes inside the transcript in Trailmark create a literal link - when you click on that map site, the transcript describing that area will appear along with any description you have added. You can also run a query of these mapped locations and Trailmark will extract these snippets of transcripts describing these locations, and you can export them into an excel sheet. See Figure 3 below.

Map / Interview Record in Trailmark

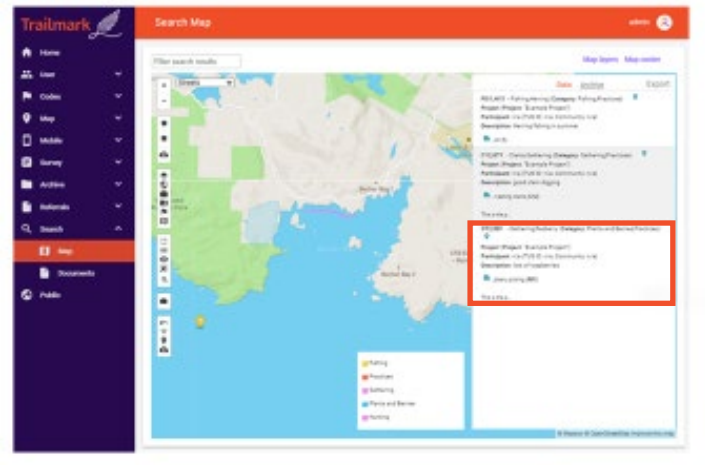
Entering a map code in transcripts allows you to generate a link between the mapped content and the transcript content.



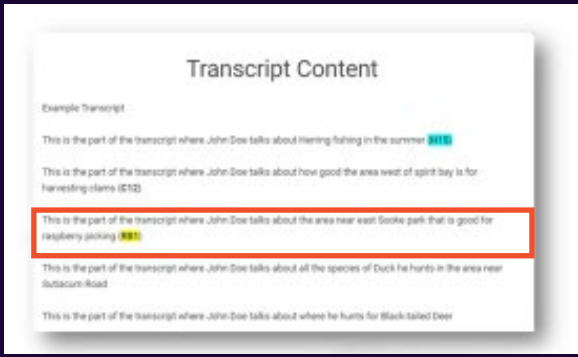
Data Search Page in Trailmark

Once a interview is linked with map codes, relevant snippets of the interview are viewable and exportable from the map search page.

1. Search Map View



2. Transcript Content



3. Spreadsheet Export Sample

Type	Code	Category	Code Name	Project	TUS ID	Participant	Keywords	Description	Transcript	Date
Project	H15,FIS1	Fishing,Practices	Herring,Fishing	Example Project	n/a	n/a	-	Herring fishing in summer	This is the part of the transcript where John Doe talks about Herring fishing in the summer [H15]	-
Project	C12,GT1	Gathering,Practices	Clams,Gathering	Example Project	n/a	n/a	-	good clam digging	This is the part of the transcript where John Doe talks about how good the area west of spirit bay is for harvesting clams [C12]	-
Project	R81,GT2	Plants and Berries,Practices	Rasberry,Gathering	Example Project	n/a	n/a	-	lots of raspberries	This is the part of the transcript where John Doe talks about the area near east Sooke park that is good for raspberry picking [R81]	-

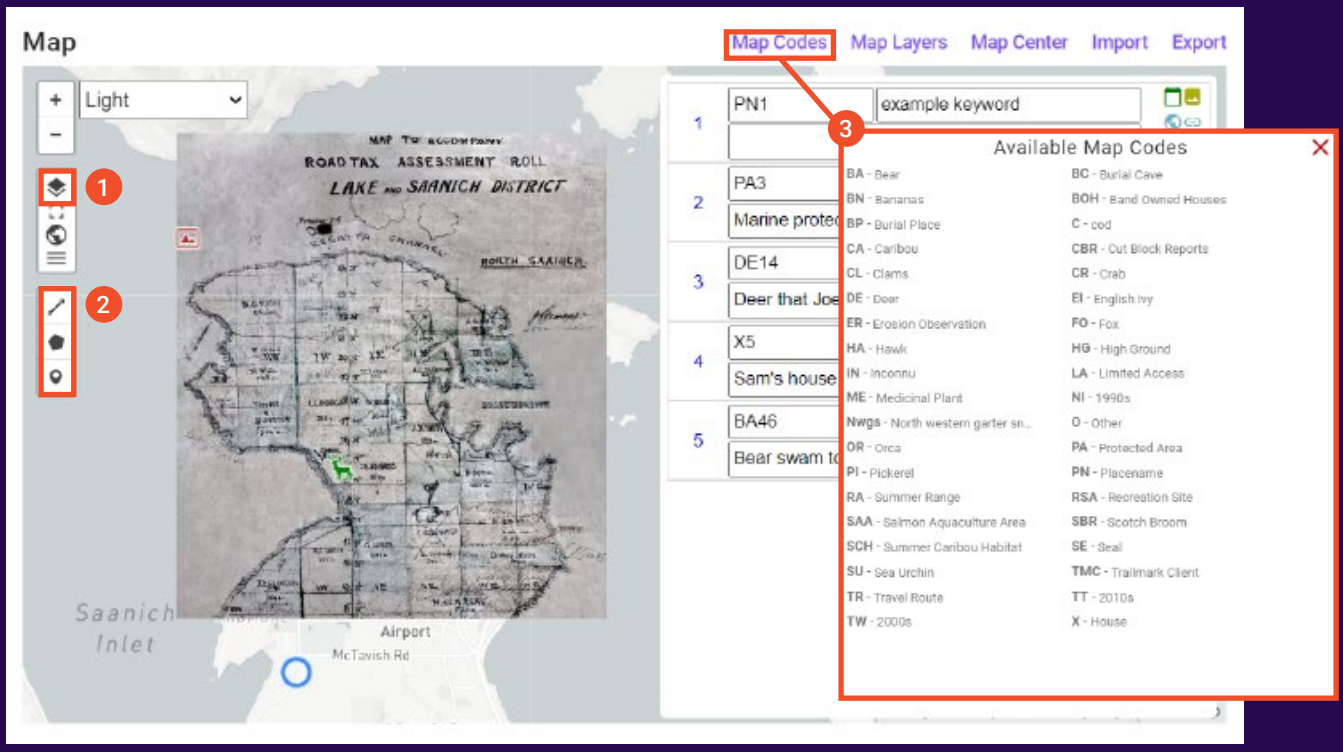
Figure 13 *Linked interview transcripts show up in when you search the map, with relevant snippets from the transcript exportable to spreadsheet format.*

Direct-to-Digital Mapping: Linking maps to transcripts

Mapping directly into a digital web-mapping service during an interview (“direct-to-digital”) can save lots of time, and allow the interview to “travel” to different areas, and zoom in to see landscape details and different map layers showing features, and, theoretically, add precision to mapping locations remembered by the interview participant. This process follows the same process as above with annotating paper maps, except you are mapping inside a web-mapping service or a GIS. If using Trailmark, you will have entered the codes and categories that your community will use ahead of time. When mapping in an interview, Trailmark will show you the list or your codes to choose from, and will automatically assign the next number to the code. Once you see the code number the map site will have, you can say this aloud so that the audio recording can pick it up for transcription later.

Figure 14 *Direct-to-digital mapping*

Map / Interview Record in Trailmark



1 Click the ‘Layers’ icon to view other data layers while you are mapping that may help orient the interviewee. This may be scanned maps or vector type layers that provide information that is not on the base maps.

2 Create map geometries using either the line, polygon or point tool.

3 Map Codes If you don’t have your map codes memorized, click on ‘Map Codes’ to pull up a list of available map codes.

6.0

References

Endnotes

1 Keats, B., Evans, P., King, D., & P. Wong. (2018). Community-based monitoring, Indigenous Knowledge, and Resource Management. Report submitted to the NWT Cumulative Impact Monitoring Program.

2 Keats, B. (2020). “Exploration of Indigenous Knowledge in Community-Based Monitoring Initiatives: Challenges and Recommendations” (Master’s thesis, Royal Roads University, Interdisciplinary Studies, Victoria, BC). Retrieved from http://viurrspace.ca/handle/10613/23273

3 Haida Nation v. British Columbia (Minister of Forests) 2004 SCC 73, [2004] 3 S.C.R. 511.

4 Mikisew Cree First Nation v. Canada (Minister of Canadian Heritage) 2005 SCC 69, supra, note 4 at para.25.

5 Lambrecht, K. (2013). Aboriginal consultation, environmental assessment and regulatory review in Canada. University of Regina Press.

6 Dale, A.; Armitage, D. (2011). Marine mammal co-management in Canada’s Arctic: Knowledge co-production for learning and adaptive capacity. Marine Policy, 35(4), 440-449. P.441.

7 Neis, B. Felt, L. (2000). Finding our sea legs: Linking fishery people and their knowledge with science and management. ISER Books.

8 Lutz, J. & B. Neis. (2009). Introduction. In Lutz, J. & B. Neis (Eds.), Making and Moving Knowledge: Interdisciplinary and community-based research in a world on the edge. McGill-Queen’s University press. pg.4

9 Turner, N.J., Marshall, A., Thompson, J. C. Hood, R. J., Hill, C. & E. Hill. (2008). “Ebb and Flow”: Transmitting Environmental Knowledge in a Contemporary Aboriginal Community. In Lutz, J.S. & Neis, B. (Eds.), Making and Moving Knowledge: Interdisciplinary and community-based research in a world on the edge. Montreal: McGill-Queens’s University Press.

10 Lutz, J. & B. Neis. (2009). Introduction. In Lutz, J. & B. Neis (Eds.), Making and Moving Knowledge: Interdisciplinary and community-based research in a worlds on the edge. Montreal, QC: McGill-Queen’s University Press. pg.7.

11 Including but not limited to: NWT Traditional Knowledge Policy (2005); Canadian Environmental Assessment Act (2012), CEAA Interim Principles (2015), CEAA Technical Guidance (2015); Impact Assessment Act of Canada (2019). Species at Risk Act, SC (2002) c 29; National Energy Board Filing Manual, 2015, S. 3.4.3 & 2015 4A-31; Yukon Environmental and Socio-Economic Assessment Act (2003); Yukon Parks and Land Certainty Act (2002); Mackenzie Valley Resource Management Act (MVRMA), (1998); Government of Nunavut Elders Advisory Committee, Nunavut Impact Review Board, n,d; Nunavut Planning and Project Assessment Act, SC (2013); BC EAO Guideline for the Selection of Valued Components and Assessme nt of Potential Effects (2013)

12 Charnley et al. (2017). Evaluating the best available social science for natural resource management decision-making. Environmental Science and Policy, 73, p.85.

13 United Nations. (2007). United Nations Declaration on the Rights of Indigenous Peoples.

14 Agrawal, A. (1995). Dismantling the divide between Indigenous and scientific knowledge. Development and Change, 26(3), 413–439; Chambers, D., & Gillespie, R. (2000). Locality in the History of Science: Colonial Science, technoscience, and Indigenous knowledge. Osiris, 15(221-240).

15 Gaydos, J. K., Thixton, S. & Donatuto, J. (2015). Evaluating threats in multinational marine ecosystems: a coast Salish First Nations and tribal perspective. PLoS ONE, 10(12), e0144861.

16 Tengö, M., Brondizio, E.S., Elmqvist, T., Malmer, Pernilla, M., Spierenbug, M. (2014).Connecting diverse knowledge systems for enhanced ecosystem governance: The multiple evidence base approach. AMBIO, 43, 579.

17 Lutz, J. & B. Neis. (2009). Introduction. In Lutz, J. & B. Neis (Eds.), Making and Moving Knowledge: Interdisciplinary and community-based research in a worlds on the edge. Montreal, QC: McGill-Queen's University Press. pg.4.

18 Scott, J. C. (1998). Seeing like a state: How certain schemes to improve the human condition have failed (Yale agrarian studies; Yale ISPS series). New Haven: Yale University Press. http://public.eblib.com/choice/publicfullrecord.aspx?p=3420352

19 Lutz, J. & B. Neis. (2009). Introduction. In Lutz, J. & B. Neis (Eds.), Making and Moving Knowledge: Interdisciplinary and community-based research in a worlds on the edge. Montreal, QC: McGill-Queen's University Press. pg.4.

20 Impact Assessment Agency of Canada. (2019). Practitioner's Guide to Federal Impact Assessments Under the Impact Assessment Act. Government of Canada

21 Mackenzie Valley Resource Management Act (S.C. 1998, c. 25). Retrieved from the Justice Laws webstie: https://laws-lois.justice.gc.ca/PDF/M-0.2.pdf

22 Mackenzie Valley Review Board. (2005). Guidelines for the inclusion of Traditional Knowledge in Impact Assessment. Retrieved from https://reviewboard.ca/upload/ref_library/1247177561_MVReviewBoard_Traditional_Knowledge_Guidelines.pdf

Additional guides on gathering Indigenous Knowledge within a research context include: Arctic Council: Ottawa IK Principles; Canadian International Development Agency: Handbook of CIDA Project Planning and Indigenous Traditional Knowledge; First Nations Environmental Assessment Technical Working Group: First Nations Environmental Assessment Tool Kit; First Nations Information Governance Centre: Ownership, Control, Access and Possession (OCAP): The Path to First Nations Information Governance; First Nations Environmental Assessment Technical Working Group: First Nations Environmental Assessment Tool Kit; Research Guide by Kitasoo/Xai'xais Stewardship Authority: "Informing First Nations Stewardship with Applied Research: key questions to inform an equitably beneficial and engaged research process (2021).

23 Keats, B., Evans, P., King, D., & P. Wong. (2018). Community-based monitoring, Indigenous Knowledge, and Resource Management. Report submitted to the NWT Cumulative Impact Monitoring Program.

24 Impact Assessment Agency of Canada. (2019). Practitioner's Guide to Federal Impact Assessments Under the Impact Assessment Act. Government of Canada.

25 Villaseñor, E., Porter-Bolland, L., Escobar, F. et al. (2016). Characteristics of participatory monitoring projects and their relationship to decision-making in biological resource management: a review. Biodivers Conserv, 25.

26 Including Margaret Kovach's (2010) "Indigenous Methodologies: Characteristics, Conversations, and Contexts", Shawn Wilson's (2008) "Research is Ceremony: Indigenous Research Methods" Kirkness & Barnhardt's (2001) "First Nations and Higher Education: The Four R's - Respect, Relevance, Reciprocity, Responsibility" and Linda Tuhiwai Smith's (2013) "Decolonizing Methodologies: Research and Indigenous Peoples".

27 Kirkness & Barnhardt first brought forward these principles through critique of Indigenous representation in academic institutions. We have modified them slightly for application to research settings outside of the university, where they remain relevant today.

28 Kanu, A. &C. DuBois, et al. (2016) Realizing the Potential of Community Based Monitoring in Assessing the Health of our Waters. Our living waters: pooling water knowledge working group http://awsassets.wwf.ca/downloads/realizing_the_potential_of_community_based_monitoring_in_assessing _the_health_of_our_.pdf, Accessed 2nd Oct 2017

29 Kitasoo/Xai'xais First Nation (2021) "Informing First Nations Stewardship with Applied Research: key questions to inform an equitably beneficial and engaged research process" https://klemtu.com/research-guide/

30 Canadian Environmental Assessment Agency (CEAA). (2015). Technical Guidance for Assessing Current Use of Lands and Resources for Traditional Purposes. Retrieved from the Government of Canada Canadian Environmental Assessment Agency website: https://www.canada.ca/content/dam/canada/environmental-assessment-agency/migration/content/0/c/f/0cf7e820-8d50-41ce-b5eb-85284095fdc5/current_use_final_draft-eng.pdf;

31 Tobias, T. N. (2009). Living proof: the essential data-collection guide for Indigenous use-and-occupancy map surveys. Vancouver, BC: Ecotrust Canada.

32 Weinstein, M. (1998). Sharing Information or Captured Heritage: Access to Community Geographic Knowledge and the State's Responsibility to Protect Aboriginal Rights in British Columbia. Prepared for '98: Crossing Boundaries, the Seventh Conference of the International Association for the Study of Common Property. Vancouver, BC.

33 MacKinnon, L., Apentiik, C., & Robinson, M. P. (2001). Revisiting traditional land use and occupancy studies: relevance and implications for resource management in Alberta. The Forestry Chronicle, 77(3), 479–489.

34 Keats, B., Evans, P., King, D., & P. Wong. (2018). Community-based monitoring, Indigenous Knowledge, and Resource Management. Report submitted to the NWT Cumulative Impact Monitoring Program.

35 Oxford English Dictionary Online. (2019). www.oed.com.

36 Weinstein, M. (2000). Pieces of the puzzle: Solutions for community-based fisheries management from Native Canadians, Japanese cooperatives, and common property researchers. The Georgetown International Environmental Law Review, 12, 375-412.

37 Kovach, M. (2009). Indigenous Methodologies. Toronto: University of Toronto Press.

38 Cultural Keystone Species is a parallel concept to ecological keystone species that includes the social, cultural importance of a species, and may bridge the physical and biological sciences. Garibaldi, A. Turner, N. (2004). “Cultural keystone species: implications for ecological conservation and restoration”. Ecology and Society. 9 (3)

39 Adapted from Gaydos, J. K., Thixton, S. & Donatuto, J. (2015). Evaluating threats in multinational marine ecosystems: a coast Salish First Nations and tribal perspective. PLoS ONE, 10(12), e0144861.

40 Denzin, N. & Lincoln, Y. S.. (2018). The SAGE Handbook of Qualitative Research. Fifth Edition. USE: SAGE Publications.

41 Liao, T. F., Bryman, A., Lewis-Beck, M. S. (2004). The SAGE Encyclopedia of Social Science Research Methods. India: SAGE Publications.

42 Natcher, D. C. (2001). Land use research and the duty to consult: A misrepresentation of the Aboriginal landscape. Human Organization, 18, 113-122. p.116

43 Tsilqot’in Nation v. BC. 2007 BCSC 1700. Section 1293.

44 Trailmark is a web-based Community based research and information management tool. It has features for archiving past information recorded by community-based research (maps, audio, transcripts etc), and inputting new information produced through either surveys, interviews, workshops, or mobile data collection. While there are other research tools out there, this guide is developed with and for Łutsel K’e Dene First Nation, who use Trailmark for these purposes. We use Trailmark as an example throughout this document to help explain concepts.

45 Kovach, M. (2009). Indigenous Methodologies. Toronto: University of Toronto Press.

46 Oxford English Dictionary Online. (2019). www.oed.com.

47 Gofman, V. (2010). Community-based monitoring handbook: Lessons from the Arctic. (CAFF CBMP Report No. 21). Akureyri, Iceland: CAFF International Secretariat. p.6.

48 Oxford English Dictionary Online. (2019). www.oed.com.

49 Gofman, V. (2010). Community-based monitoring handbook: Lessons from the Arctic. (CAFF CBMP Report No. 21). Akureyri, Iceland: CAFF International Secretariat. p.6.

50 Raygorodetsky, G. and Chetkiewicz, C. (2017). Watching, Listening, and Learning to Understand Change: Developing a Community-Based Monitoring (CBM) Initiative in Ontario’s Far North. Wildlife Conservation Society Canada. Toronto, Ontario, Canada. p.10.

51 Gofman, V. (2010). Community-based monitoring handbook: Lessons from the Arctic. (CAFF CBMP Report No. 21). Akureyri, Iceland: CAFF International Secretariat; Keats, B., Evans, P., King, D., & P. Wong. (2018). Community-based monitoring, Indigenous Knowledge, and Resource Management. Report submitted to the NWT Cumulative Impact Monitoring Program.

52 Alessa, A., Kliskey, A., Gamble, J., Fidel, M., Beaujean, G., & Gosz, J. (2016). The role of Indigenous science and local knowledge in integrated observing systems: Moving toward adaptive capacity indices and early warning systems. Sustainability Science, 11(1), 91-102.

53 Keats, B., Evans, P., King, D., & P. Wong. (2018). Community-based monitoring, Indigenous Knowledge, and Resource Management. Report submitted to the NWT Cumulative Impact Monitoring Program. P.55

54 Recent funding opportunities for Indigenous community-based monitoring have been termed guardian programs, however these initiatives use the term as an umbrella to describe any form of Indigenous monitoring that may have a conservation component. We have divided up our categories for monitoring according to methodology, rather than the components that are to be monitored.

55 Coastal First Nations. (2017). Coastal Guardian Watchman Support. https://coastalfirstnations.ca/our-environment/programs/coastal-guardian-watchmen-support/

56 Coastal First Nations. (2017). Coastal Guardian Watchman Support. https://coastalfirstnations.ca/our-environment/programs/coastal-guardian-watchmen-support/, p.393.

57 Charnley et al. (2017). Evaluating the best available social science for natural resource management decision-making. Environmental Science and Policy, 73, p.86.

58 World Intellectual Property Organization. (2009). World intellectual property indicators. Geneva, Switzerland: World Intellectual Property Organization. Retrieved from http://www.wipo.int/edocs/pubdocs/en/intproperty/941/wipo_pub_941.pdf

59 Kukutai, T., & Taylor, J. (2016). Indigenous data sovereignty: toward an agenda (Volume 38). Canberra, AU: Anu Press. Xxii.

60 First Nations Information Governance Centre. (2008.) The First Nations Principles of OCAP(R). Retrieved from http://fnigc.ca/ocap.html

61 This is a subject for community consultation. For more examples of TK Licenses, see Local Contexts: https://localcontexts.org/labels/traditional-knowledge-labels/

62 Łutsel K'e Dene First Nation use Trailmark software for a number of archival, data management, and monitoring activities, so we use this program as an example to explain these concepts.

63 Wilson, S. (2008). Research is Ceremony: Indigenous Research Methods. Fernwood Publishing. p.113.