YATIÉ THEʔĄ NUWÉ ŊËN HAÍDI XÁ

GUIDE FOR WATCHING OUR LAND

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1.0 Introduction

What is the purpose of this guide?

This guide is intended to be a resource for researchers and administrators who wish to establish community- based monitoring (CBM) programs.

There are many different types of CBM programs, and even the term community-based monitoring is defined and interpreted in many different ways. This guide is designed specifically to support programs with the objective of pooling information from monitoring participants and using this information to make decisions about resource management, for example through impact assessments or cumulative effects frameworks.

The goal of this guide is to provide advice and guidance on how CBM can be used to mobilize Indigenous knowledge so that it can be considered in resource management decisions that affect the traditional territories and practices that Indigenous communities depend on.

How was this guide produced?

This guide is the culmination of several years of research into the difficulties of inclusion of Indigenous knowledge(s) in resource management decisions. We explored these challenges from many different angles. We heard from individuals representing many points of view:

- 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 conducted:

- a review of 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; and
- a review of 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.

We partnered with Łutsel K'e Dene First Nation (LKDFN) monitors to focus our understanding of these issues. The contents of this guide are anchored in the information needs, challenges, and learning experiences brought by ŁKDFN's decades of experience implementing various types of CBM programs.

To read more about the findings of this research and related publications, please see the companion reports to this guide Community-based monitoring, Indigenous Knowledge, and Resource Management (2018)[1] or contact Beth Keats @ beth.keats@trailmarksys.com.

Definition of Indigenous Knowledge and Traditional Knowledge

As discussed in greater detail in Keats et al., (2018) "Community-based monitoring, Indigenous Knowledge, and Resource Management", definitions of both Indigenous knowledge and Traditional Knowledge (TK) can vary, and this creates issues for its consideration within a regulatory setting. For this reason, the definitions of these terms should be part of research program development and regulatory engagements.

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 here, 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". [2]

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".[3]

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.

Throughout this Project, Łutsel K'e interviewees described challenges with the term traditional knowledge (TK) and its representation in the regulatory setting. They expressed that over the years, it

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[1] Keats, B., Evans, P., King, D. & P. Wong. (2018*). Community-based monitoring, Indigenous Knowledge, and Resource Management*. Report submitted to the Northwest Territories Cumulative Impact Monitoring Program. Download from the NWT Discover portal at http://sdw.enr.gov.nt.ca/nwtdp_upload/2017-18%20-%20REPORT%20-%20NSMA%20(Shiga)%20CIMP185%20- %20Phase%202%20Report%20-%20Keats%20-%20Trailmark.pdf

[2] 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.

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

has become a “catch-all” term, with a lack of clarity or what it is and its use, especially for the monitors. They are concerned that information provided for regulatory purposes is labelled as “TK” regardless of whether this information sufficiently represents their knowledge about the world and their way of knowing.

Knowledge vs. Information/Data

This guide defines *information* as data gathered from a source (forms, surveys, GPS sites & tracks, recordings, transcripts, etc) and then organized according to its relationship to a problem or a question. In contrast, *knowledge* is defined as the critical application of consideration to arrive at an understanding.[4] Knowledge requires a *knower*, and incorporates “experiences, skills, and techniques, remembered and accumulated” (Turner et al., 2008).[5] 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.[6]

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 in co-management settings.

This guide is written with CBM program leads and monitoring participants in mind, as well as individuals involved with managing and responding to referrals from industry and co-management boards.

What’s inside?

This guide focuses on how knowledge is recorded within a CBM program, how this information becomes data, and how that data is accessed, analysed, interpreted, and transmitted for use in resource management decisions.

The guide is divided into two main sections:

[4] 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
[5] Turner, N. et al. (2008). “Ebb and Flow”: Transmitting Environmental Knowledge in a Contemporary Aboriginal Community 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.
[6] 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.

- Methodology and Objectives – this section provides a survey of various approaches to CBM and explores how the purpose and desired outputs of a monitoring program can affect the program design.
- Methods and Tools – this section provides an overview of recommended methods and tools for gathering information in CBM program, as well as for mobilizing this information for consideration by the community and decision-makers.

2.0 Background

What is 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".[7]

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.

[7] Oxford English Dictionary Online. (2019). www.oed.com.

Photo 1 Senior LKDFN Monitor Joseph Catholique.

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.

What is community-based monitoring?

Environmental community-based monitoring is just what it sounds like: monitoring of the environment and creating monitoring information by members of a community.[8] 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[9]. 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.[10] so that it can be analyzed in order to track and evaluate the condition of valued environmental components. This information and data is 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.[11] CBM 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.

The Łutsel K'e Dene First Nation's CBM 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).*

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[8] Gofman, V. (2010). *Community-based monitoring handbook: Lessons from the Arctic*. (CAFF CBMP Report No. 21). Akureyri, Iceland: CAFF International Secretariat. p.6.
[9] Oxford English Dictionary Online. (2019). www.oed.com.
[10] Gofman, V. (2010). *Community-based monitoring handbook: Lessons from the Arctic*. (CAFF CBMP Report No. 21). Akureyri, Iceland: CAFF International Secretariat. p.6.
[11] 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.

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.

What are decision-making processes?

A decision-making process is one that is shaped or moulded by information or evidence, different perspectives, argument, debate, and possibly even different knowledge systems (eg. Indigenous knowledge and science) and is empowered to arrive at influential recommendations or decisions on a particular subject. In the Northwest Territories (NWT), the various land and water boards, the Mackenzie Valley Environmental Impact Review Board, the renewable resource boards, and the land use planning boards are all decision-making processes.

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

Why should decision-making processes incorporate Indigenous information and knowledge?

The value and importance of including multiple ways of knowing (eg. science and Indigenous knowledge) into 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 data sets."[12] The *United Nations Declaration on the Rights of Indigenous Peoples* (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 originated alongside concerns for both sustainable development and updated case law on the rights of Indigenous people, recognizing that the knowledge held by Indigenous peoples about the natural world has sustained their life-ways and is critical to cultural identity and wellbeing.[14]

Federal, provincial, and territorial regulatory agencies have developed requirements to consider and incorporate Indigenous knowledge and land use in decision-making processes related to major development projects.[15] Impact assessment must consider impacts to Aboriginal rights. 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

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[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] Including but not limited to: NWT Traditional Knowledge Policy, 2005; Canadian Environmental Assessment Act 2012, CEAA Interim Principles 2015, CEAA Technical Guidance 2015; 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 Assessment of Potential Effects, 2013.

Truth and Reconciliation Commission, and, at the international law level, of the newly adopted principles of the 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.

While the obligations to assess potential impacts to Indigenous land uses and rights and include Indigenous knowledge are well established, so are the challenges in practice to do so. Better methodologies for transparent, constructive, and validated ways of identifying synergies across knowledge systems are required.[16] The challenges associated with including Indigenous knowledge in resource decision-making processes may be unique, but it's worth noting that "imperfect knowledge and uncertainties characterize and challenge environmental decision-making and governance at all levels".[17] In other words, there are challenges associated with many different forms of information from across disciplines within decision-making processes.

How does community-based monitoring support Indigenous participation in decision-making processes?

CBM empowers Indigenous communities by gathering knowledge that supports cultural survival and self-determination, and by facilitating consideration of Indigenous rights and knowledge in resource management decisions.

CBM programs can facilitate the flow of knowledge and information from community members (monitors, interviewees, workshop participants, Elders, etc.) to program and local leaders, and beyond to external parties required to consider this information in decision-making processes. Through sound methods, design and planning, CBM programs can harness local power and involvement to inform environmental decision-making.[18] This is critical: environmental research with Indigenous communities is wasted if the knowledge it gathers is not shared with and understood by decision- and policy-makers, and regulatory analysts, as well as local people.

This guide approaches CBM 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".[19] It examines tools to produce and move knowledge across boundaries, between researchers and communities, communities and decision-makers, and decision-makers and regulatory policy.

According to Lutz and Neis (2009), the greatest challenge we face in addressing the most urgent environmental and social issues is to find ways to maximize the strength of research to create knowledge, and to create pathways for its inclusion in decisions that benefit society and the

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[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] 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.
[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.7.

environment. They suggest that the problem is not a lack of information, but the ability to make and move knowledge across disciplinary, institutional, and community boundaries. They argue societies that manage to create mechanisms to successfully transmit knowledge also fail to repeat destructive behaviours. Creating these mechanisms requires designing research capable of understanding the complex interconnectedness of humans, knowledge production, and the natural and social systems we inhabit.[20]

Community-Based Research and Inputs for Impact Assessment

Risk assessment and environmental impact assessment methods are criticized for their failure to accurately account for the relationships Indigenous people have in connection with the spiritual, physical, and ecological world that form the basis of health and wellbeing.[21] Making knowledge about this connection that can be meaningfully considered within an impact assessment setting happens when it overlaps with key subjects, or value components, and works within the "metric" of the assessment itself. Understanding the information needs for a meaningful assessment to take place, and developing a CBM that can create this information is essential. These information needs can be found in the *Practitioner's Guide to Federal Impact Assessments Under the Impact Assessment Act* (2019) 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) and *Guidelines for the inclusion of Traditional Knowledge in Impact Assessment* (2005).

[20] ibid.p.4

[21] 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.

3.0 Overview to This Guide

This guide focuses on how knowledge is recorded within a CBM program, how this information becomes data, and how that data is accessed, analysed, interpreted, and transmitted for use in resource management decisions

This guide breaks the process of developing and implementing a CBM program into the following five steps:

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

Step one discusses techniques to define the monitoring purpose and information gathering plan, which forms the backbone of a CBM 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 useful to and usable by 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.

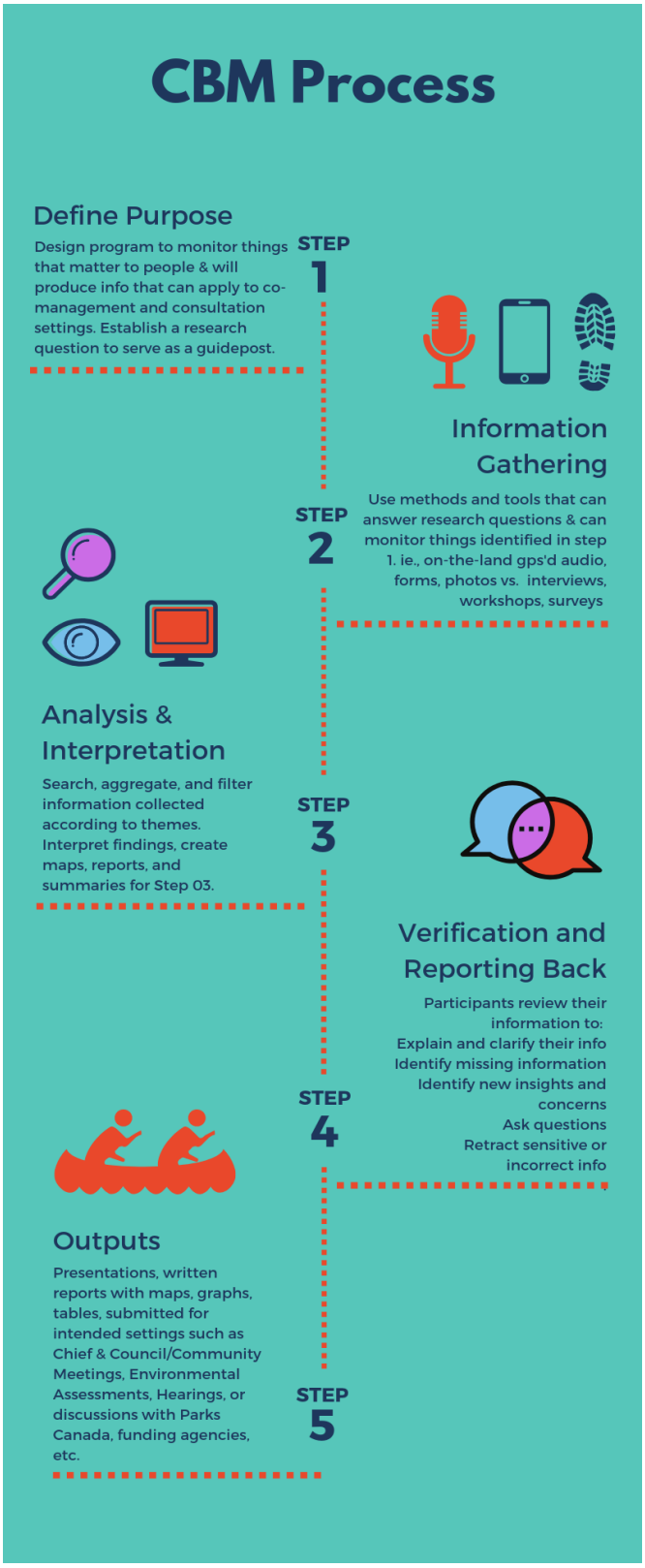

Figure 1: Steps to CBM Process.

The process outlined in this guide is intended to support the design of programs that harness the strength of CBM to gather valid, relevant and representative Indigenous knowledge in useful and useable forms and formats.

4.0 Guide to Community-Based Monitoring

This section outlines the five steps involved in developing and implementing a successful CBM program.

4.1 Define Purpose

Determining what the purpose of a monitoring program–ie. how the information gathered will be used–is an obvious and yet often overlooked step in planning what and how to monitor. But identifying the information needs of the community and relevant decision-making processes can help clarify what should be monitored and how monitoring information should be gathered. Indeed, doing so is essential to designing a program that produces useful and meaningful results.

Determining the potential applications for monitoring data and information at the outset can inform the CBM approach and technical tools selected, as well as the development of workflows, staffing requirements, and potential monitors. Identifying the applications for monitoring data and information can also increase the program's attractiveness to funders, and make it easier to provide evidence of the program's utility for any evaluation that may be required by third party funders.

Discussions about the application of information from monitoring could be held through a series of meetings with potential internal and external networking partners, such as regulatory or Lands and Environment staff, Heritage and Language departments, government resource managers (fisheries, forestry, wildlife) or other funding partners. Through these networking discussions and thinking outside the box, a monitoring structure can form that connects community information needs with program design and create outputs for the information collected to be used for multiple end uses.

Once the purpose for a CBM program is clear, program designers can consider what type of approach to conducting CBM is best suited to meet the identified objectives.

4.1.1 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 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.

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.[22]

A brief description of each of these approaches is provided below.

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.

Figure 2: Types of CBM, ranging by degree of local knowledge inclusion and method.

These programs adhere to conventional scientific standards and principles (e.g., they are objective, repeatable, and consider the values and indicators

[22] 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.

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.[23] 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.[24]

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

Photo 2: Ni hat'ni Monitor Adrian Nadaway collects fish samples to send for testing

[23] 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.
[24] 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

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.

Example: Penelakut Shellfish Survey

To understand cumulative impacts to shellfish harvesting in their traditional territory, the Penelakut Tribes developed a community-wide survey to ask about harvesting practices, current barriers and concerns. The results are helping the Tribes understand and evaluate potential impacts of proposed developments in their region.

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.

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 to gather, accumulate, and manage information or knowledge from monitors for use in

Photo 3 Ni Hat'ni monitors Shonto Catholique and Chase Lockhart head out for lake patrols.

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.[25] 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.[26]

[25] 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.
[26] Coastal First Nations. (2017). Coastal Guardian Watchman Support. https://coastalfirstnations.ca/our-environment/programs/coastal-guardian-watchmen-support/

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.

Additional Considerations

There are challenges common to all CBM 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.[27]

Community participation in CBM 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 CBM 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.

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."(393 – see footnote 21)

4.1.2 WHAT TO MONITOR

CBM programs should be designed to monitor issues and things that matter to the community. So, when it comes to the question of what to monitor, identifying the things that people already look out for when they go fishing, hunting or harvesting can be a good place to start. While they may not call it monitoring, how they talk about these things may reveal what land users already watch for, what they report back, and how. [28] The more a formal monitoring program can mirror and/or use the informal,

[27]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

[28] 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.

culturally-informed structure and functionality of this existing network the more relevant and sustainable it will be.

The Community-Based Monitoring Network, run by the Nunavut Wildlife Management Board in Nunavut is an example of a widespread monitoring network that is formed according to the animals and travel conditions that people are already watching. Hunters are trained to simply record the things they find relevant to their hunting practice and the health and population sizes of the animals they harvest.

Developing Research Topics and Questions

The question of what to monitor is most easily approached by first defining a research topic for the monitoring program in question. A sample topic could be hunting and species health and availability. Developing research questions based on that topic that the CBM will try to answer is also helpful. Research questions serve as important guideposts for keeping CBM programs on track, and can be useful for tracking the program's effectiveness for developing answers to that question. Some possible research questions for the sample topic identified could include:

- What areas and habitats are important for animals?
- How much effort is required to harvest animals?
- What concerns do hunters have?
- What changes do hunters observe in animals and/or hunting practices?

Program topics and research questions should relate to community needs; they should be focused enough to produce useful findings, but still broad enough to allow for discovery.[29]Defining 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.

Frequently, hunting and species health and availability is a topic of frequent local interest within communities, and of high interest in Environmental Assessments that include assessment and consultation on potential impacts to Section 35 Aboriginal rights. A program designed around this topic and research questions could produce information that describes current hunting activities, and existing stressors and concerns. If the program used hunters as field-based monitors, they could record observations related to the research questions identified. By recording their own tracks and activities they could enable researchers to see where hunters are going, how far they must travel to harvest food, the presence/absence of animals, observations of the animal health, and any other concerns they register.

[29] Kovach, M. (2009). *Indigenous Methodologies.* Toronto: University of Toronto Press.

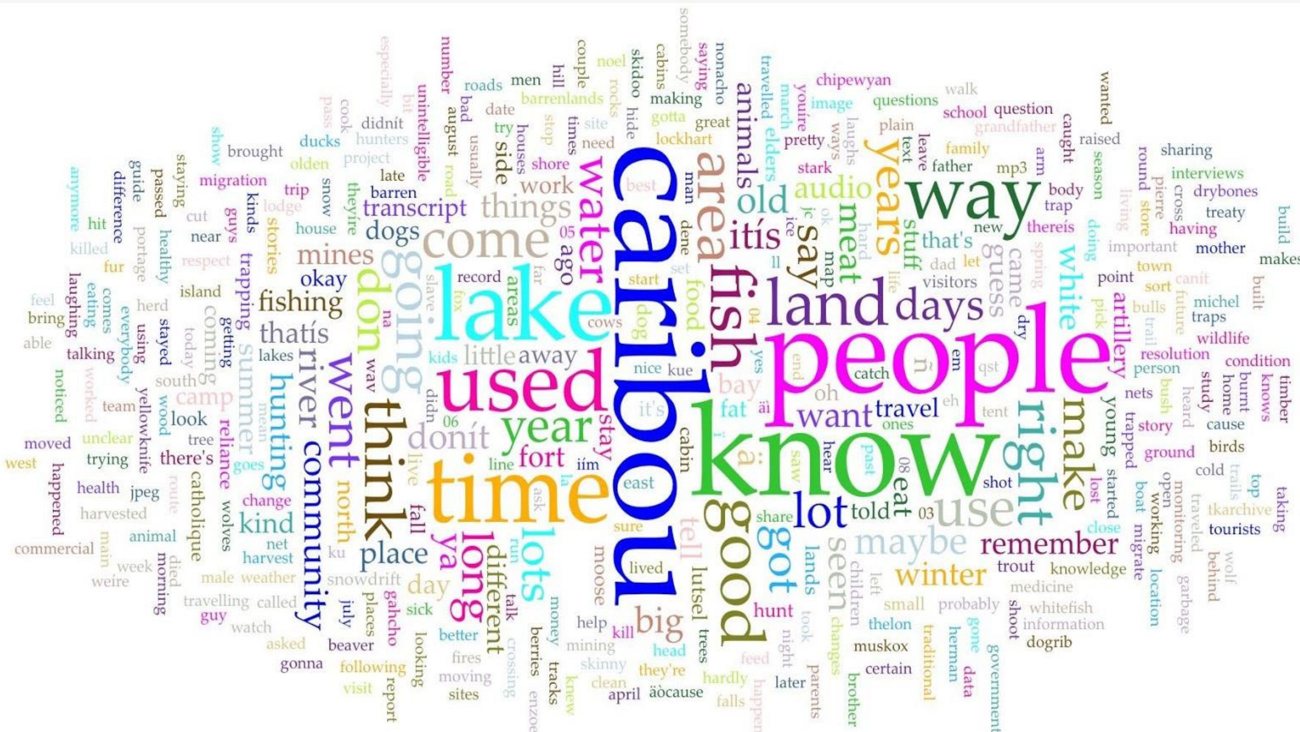

Figure 3: Using all of the transcripts from interviews over many years stored in Łutsel K'e 's archive system, we used a qualitative analysis program to create this word cloud. The most frequently uttered words over the many years of interviews are the largest. This is a great way to easily see topics most frequently raised over the years.

The following methods can also be helpful for identifying what to monitor. Selecting which of these methods to use, independently or in combination, may depend on the type and purpose of monitoring program, available resources, etc.:

- A facilitated workshop/sharing circle with community land users and elders.
- Using an archive + Geographical Information System (GIS): explore past research to identify recurring concerns, the most frequently spoken words, important areas, and areas frequently used (see figure 2), explaining the concept and seeking input on goals, key issues and things to "watch".
- Assessing regulatory information needs upcoming, current industry activities and monitoring programs, and areas of high potential for development proposals.

Connecting What to Monitor with the Monitors

Monitors report that clearly relating the purpose of a CBM program to their existing harvesting practices and/or reasons for being out on the land motivates them to participate, and makes it easier for them to envision ways to do so. The better monitors understand the reasons for monitoring and the

value of the information being gathered, the easier it is for them to determine what and when they should record.

For example, a monitor at Łutsel K'e questioned the relevance of documenting weather, snow, and ice conditions. As a hunter he constantly and habitually monitored these values using his own instrumentation and knowledge in order to ensure safe travel. But gathering this data systematically for a monitoring program interrupted his normal behaviour out on the land. When it was explained that the purpose and end-use of this monitoring data was to sustain and improve safe travel on the land for others, however, he was immediately able to understand the value of the monitoring and felt motivated to contribute to this end.

Of course, this clarity is best established at the outset of any CBM program. Clearly communicating the purpose and intended outcomes for monitoring should be an essential element of the monitor recruitment/hiring and training process. Indeed, involving monitors in defining the purpose and identifying potential end-uses for information gathered have mutual benefits both for the monitors' understanding and for the program design. The more effectively CBM programs integrate the reasons and focuses for existing monitoring efforts within the community, the better able they are to gather and record valuable information that may otherwise only be shared informally within the existing network.

> *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 to 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.*

Incorporating monitors' perspectives into the development and/or selection of methods for information gathering can also be valuable in designing a CBM program. For example, monitors in Łutsel K'e identified low literacy skills as a barrier to reporting their observations while out on the land when programs required them to fill out long series of forms or complete journals. They report being unable to convey their thoughts and observations adequately in writing. These individuals prefer information gathering methods that involve recording audio (so they can dictate their thoughts and observations), taking photographs, and selecting dropdown or multiple choice answers on digital forms.

Focusing on Culturally Important or Keystone Species

The physical, social, cultural, and even spiritual health and wellbeing of Indigenous harvesting communities can depend on the availability of specific species, as well as the knowledge based on longstanding relationships with these species and their habitats. The status and accessibility of these valued components of the environment can serve as barometers for potential impacts to Indigenous communities. Identifying these culturally important or keystone species[30] can be very helpful in answering the question of what to monitor.

Limiting this list, however–deciding which species are "important" and, by extension, which are less so–can be challenging, particularly if those deciding take a holistic view of the natural world and all of the species within it. But limiting this list may be necessary for practical reasons, including the scope and manageability of a CBM program, and/or the production of outputs that can easily feed into external processes (eg. assessment categories).

Some communities have overcome this challenge through compromise, by agreeing to select species for the list that they consider representative of the health of the ecosystem. Establishing some selection criteria can be helpful for identifying these species. These criteria could be drawn from the requirements the decision-making process information is being gathered to support, for example impact assessment. In that case, sample criteria could include:

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
4. Historically (even if not currently) the species has been part of Indigenous lifeways.[31]
5. The presence or absence of a species is integral to a specific ecosystem

Once a list of keystone species is compiled, it should be reviewed and approved by community members. Then all available community knowledge on the species selected should be brought together, including information drawn from monitoring, interviews, workshops, and previous studies and research. The CBM program can then be designed to gather information about the species on this list, using research methods described in **Section 4.2 Information Gathering.**

In the case of a CBM designed to provide information for impact assessment, for example, the information gathered can then be compared to potential impacts identified by the proponent and reviewed by the co-management board(s). This assessment can also be led by the community, and may require hiring specialists to help with identifying and demonstrating potential impacts to culturally important species and, in turn, harvesting activities.[32] This process may also assist with prioritizing species and/or impact scenarios for analysis through cumulative effects assessment or further studies.

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[30] 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)
[31] 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.
[32] ibid.

4.2 Information Gathering

There are different ways that knowledge can be documented for CBM.[33] The methods used will depend on the information needed and how this information may be used (ie. the program's purpose). This section outlines some of the tools and methods available for gathering information in any community-based research, including monitoring, and the applications for the information they produce.

4.2.1 INTERVIEWS

Qualitative research interviews attempt to understand the world from the interview subject's point of view.[34] Research on issues related to Indigenous land use and knowledge have traditionally involved interviews, and when sharing specifics about places, plants, and animals, these interviews are often use maps to locate and then annotate the spatial information that is being shared.

Broad types of information can be collected, including: specific or observational environmental information (e.g., responses, patterns, and relationships); opinions, quality of life, baseline needs (e.g., minimum harvesting and subsistence needs, economic costs of living, levels of income, etc.), social and economic impacts, abstract concepts (e.g., valued ecosystem components, indicators and thresholds, program objectives, ideal scenarios, management schemes, frameworks).

The information should be recorded through audio/visual recordings, 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 for when the history of a place needs to be understood, and when people's current wellbeing and relationship to the land needs to be given voice. 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

[33] Research methods considered to fall under the category "monitoring" can vary. Whether considered part of the CBM umbrella or not, the methods described in this section are used by Indigenous communities and their hired specialists for use in resource management applications, including consultation, planning, or impact assessment.
[34] Brinkmann, S., & Kvale, S. (2015). *InterViews: Learning the craft of qualitative research interviewing* (3rd ed.). Los Angeles, CA: Sage Publications.

- Articulations of concerns as well as reasons 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.

Mapping Interviews

Maps only ever 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. Keeping the descriptions and information about the sites mapped with the map in a report or presentation help to keep the map in its place, as a visual aid and not a substitute for the information shared. Meaning and substance is contained within the recorded interview; maps are simply a way of representing some of the information gathered.

With interviews that include mapping locations, also called “map biographies”, the interviewer, or their assistant, will mark the map with codes, numbers, symbols or notes that reflect what the interviewee is saying 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.

Imagine that someone listening to the recording of an interview is wearing a blindfold; unless place names are mentioned and the map sites are coded in a systematic way, it would be impossible for them to understand which sites on the map are being discussed and when. For example, interviewees will often point out locations on a map and say things like “over here, we used to camp every summer….”. 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 camps have been mapped. When this happens, what was shared during the interview to describe that site becomes disconnected from the mark on the map site; the map site is reduced to a simple point detached from the information, context or meaning that the interviewee shared about it.

Mapping introduces a new level of complexity into interviews. The interview should focus on what the interviewee shares in response to the questions asked, but sometimes the map “steals the show” by diverting that focus. Marking the map becomes the focus instead of the knowledge and experiences being shared by the individual in the room. 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 to 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 6.3.1 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.

4.2.2 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 un-structured or semi-structured: the interview follows a thematic structure, but generally goes where the knowledge-holder wants to take it. A famous 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, and according to their protocols, and listening deeply.

But make no mistake about it: surveys should be a core part of your community-based monitoring program, because they are one 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 Inset Box below).

Today, Indigenous land use and knowledge research has become narrowly constricted around 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 (in Natcher 2001, 116). 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. (Tsilqot’in Nation v. BC. 2007 BCSC 1700. Section 1293. [Emphasis added])*

[35], [36]

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,

[35] Natcher, D. (2001). Land use research and the duty to consult: A misrepresentation of the aboriginal landscape. Land Use Policy, 18(2), 113-122. https://doi.org/10.1016/S0264-8377(01)00011-4

[36] Weinstein, M.S. (1976). What the Land Provides: An Examination of the Fort George Subsistence Economy and the Possible Consequences on it of the James Bay Hydroelectric Project. Grand Council of the Crees (of Quebec), Montreal

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.

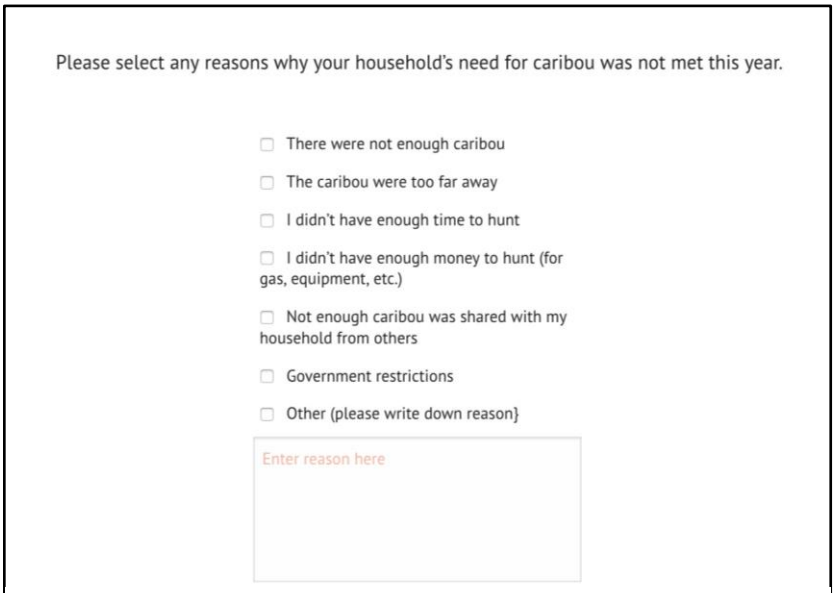


Figure 4 Example questions within a harvest survey.

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 on-line 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), 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.

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?
        - a. Time
        - b. Lack of child care
        - c. Lack of money
        - d. Lack of equipment
        - e. Lack of interest
        - f. Other (Please describe)
    - Q2. What actions would you like to see the 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,[37] this tool allows 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

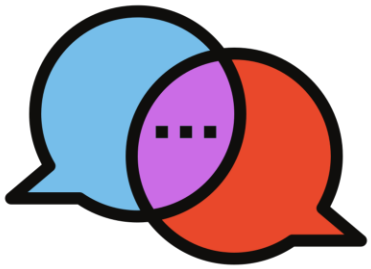
Survey delivery, the way you actually get the survey out to people and get the information you need, is an important subject. Surveys can actually be delivered in all kinds of ways: they can be done in person (with a facilitator), by phone (with a facilitator), by mail, by hand delivery door-to-door, or on-line, to name a few. Each of these ways has some benefits and some draw-backs. 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

[37] Trailmark is a web-based CBM information gathering and 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 CBM 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.

in the ages of 25 to 55 may prefer to do the survey themselves via link sent to their email or via facebook.

4.2.3 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 acknowledgements 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.[38] 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.

[38] Kovach, M. (2009). *Indigenous Methodologies.* Toronto: University of Toronto Press.

4.2.3 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.

In section 4.1.1 Types of Monitoring we describe different forms of on-the-land monitoring. Each has a slightly different method and end goal for the information it produces. 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 CBM program design phase (Sentinel Guardian / Citizen Science).

In the first example, data collection is occurring alongside the regular patterns, activities, and practices of harvesting; in the second example, data collection occurs at locations identified for the specific purpose of monitoring. But they both will require some tools and techniques of mobile data collection. Mobile data collection is just what it sounds like: gathering information on the move. It is a method of gathering on-site, qualitative (descriptions and meanings of observations) and quantitative data (things that can be counted) by using handheld devices, smartphones or tablets, or even paper and pens. Technology, such as audio recorders, cameras, and GPS can help monitors capture what they know and see, enabling them to bring this information to a central place where it can be used to inform resource management decisions.

If using Trailmark, 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"). Categorial (or standardized) data can later be

If monitoring to track change, (e.g. environmental change through mining activity), a specific area and time frame will be defined, as well as a monitoring target - something that can help to measure changes against. In other words, if we use mobile data collection for monitoring we not only need to consider the “what”, we also need to think about “against” which reference point or target we are going to measure changes. For example, if we know the timing of the moose rut every year, we will take note when it happens one month later than usual.

4.3 Analysis & 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 the most common ways that this information can be brought together and looked at to answer questions.

Basic 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.

Basic survey analysis: aggregate (ie. Bring together) survey results to see total and type of responses vs. number of survey respondents. If done using the survey tool in Trailmark, survey results will be totalled automatically. If using paper forms, total up the survey answers one by one and compare results with the number of respondents for each question.

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 a proposed development may interact with these identified barriers

Basic spatial analysis: Searching and drawing insights from mapped information is made possible through coding information with a set of standard categories (see section 5.2.2) 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.

Explore the information on the map, which, if recorded with methods described in Section 4.2.1, 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.

Mobile Data Search and Analysis

Figure 5: 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.

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 analysis.

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 5** above.

4.4 Verification and Reporting Back

Showing CBM participants their own information that has been gathered and moulded into a map or a report is a very important step in the CBM research cycle. CBM involving 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.[39]
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.

Łutsel K'e Dene First Nation recognize 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

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

inform their current monitoring activities and aid in understanding, and "theorizing" information as it comes in from younger generations and via different methodologies:

> *Lustel 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.*

4.5 Data Sovereignty and Sharing

A key consideration for integrating Indigenous knowledge into any application that is external to the communities where it is based 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 (WIPO, 2009).[40] "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 thought 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".[41]

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[40] 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

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

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 as 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.[42] 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 (e.g., Inuit Tapiriit Kanatami, 2018[43]). 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.

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, responsibilities, etc.; and even

[42] First Nations Information Governance Centre. (2008.) The First Nations Principles of OCAP(R). Retrieved from http://fnigc.ca/ocap.html
[43] Inuit Tapiriit Kanatami Position Paper: Development and Implementation of the Arctic Policy Framework. (2018). https://www.itk.ca/wp-content/uploads/2018/11/2018-APFPolicyPositionPaper-FINAL.pdf

directing the use of specific tools. All sharing agreements should include the following elements and reflect the corresponding considerations.

Table 1. Data/Information Sharing Agreements: Standard Elements and 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 (metadata)
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.

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 data collection process?
- Are your community members included in the data analysis process?

4.6 Outputs: Applying Information from CBM to External Purposes

The possible end uses–ie. decision-making applications–for information collected by cultural systems-based CBM programs have not yet been adequately explored. Even the largest and most well established CBM programs do not routinely use the data collected for regulatory or co-management purposes, or integrate it into other science-based research programs. The information is considered by program managers to have great potential for these settings; however, there is a need to chart out protocols for the use of the information, as well as methods to query the information and communicate about it to be added to the knowledge base of other, often siloed research programs. Creating these links, and making the knowledge gathered through monitoring applicable in decision-making settings is a key challenge for CBM programs.

The current lack of, and demonstrated need for, clear communications and protocols around access and use of Indigenous knowledge and information is central to this challenge. New technology continues to make data ownership, access, control, and sharing possible in ways not available to communities previously, ushering in new requirements for community data management capacity.

5.0 Conclusion

CBM programs 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 CBM 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 CBM, and influences the types of information to record, and the kind of tools to use to record the information. As shown in **Figure 6**, 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.

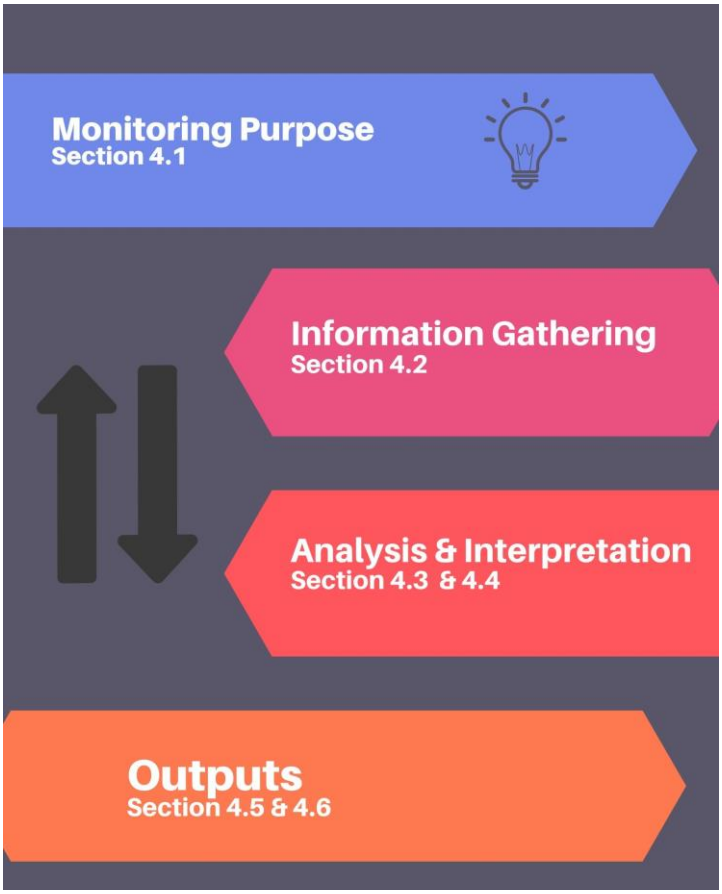

Figure 6: Community-based monitoring process

Over time, we intend to continue to expand on this guide through adding resources and case studies of CBM programs that are applying information gathering to resource management decisions**. Section 6.0 Resources** contains a few topics so far, focusing on conducting interviews. It also includes information on how to structure a digital information management system so that past research can be integrated with new and ongoing information gathering, become easily searchable, and pool information about important subjects and places for review and application in resource management decisions. Upcoming versions of this guide will include expanded resources on survey development and mobile data collection and data application.

6.0 Resources

This section provides a variety of resources that may be useful to researchers and administrators in the process of developing and implementing a CBM program.

6.1 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 in 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-learners.[44]

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.

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. **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.
4. **Ask follow-up questions** based on what you hear, and if appropriate, thoughtfully construct your question back to the CBM goals and purpose.
5. **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.
6. Check the recording and use back-up recording
7. **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.

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

6.2 Pre-Interview Prep

6.2.1 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 CBM, 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.

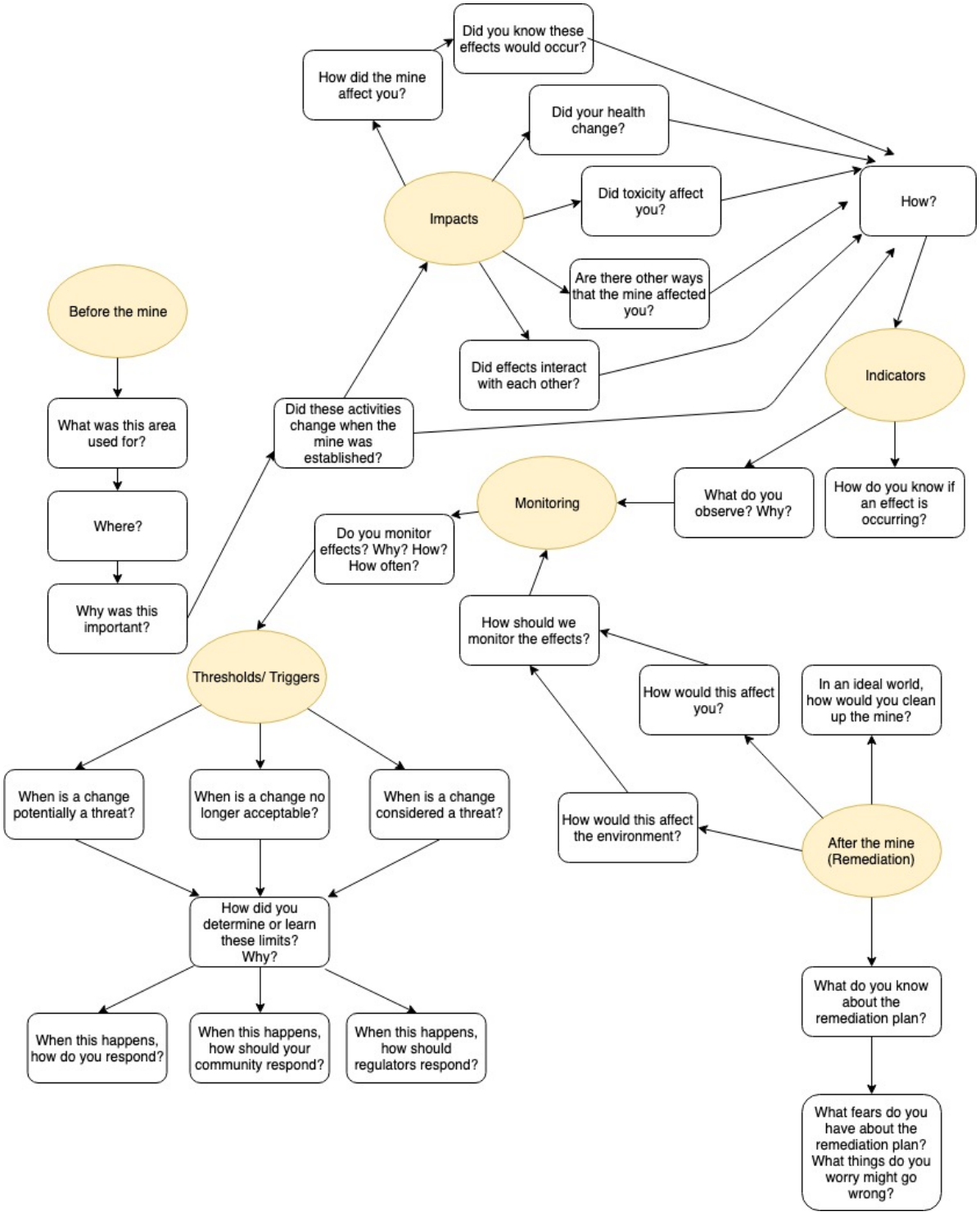

Figure 7: An example of a topic-driven, nonlinear interview guide.

Figure 3 is an example of a guide that could be used to understand the past and present perceptions of a 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 came up, and also identify and follow-up when topics such as valued components are being touched on.

Alternatively, find below 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. 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.

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Trailmark

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

Start Recording: Time: _____

- State the name of the person being interviewed.
- The location.
- The date.
- 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 AND 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?

PLACENAMES

Do you know Dene names for places that you would be willing to share, such as;

- Areas
- Lakes
- Rivers
- Places
- Trails

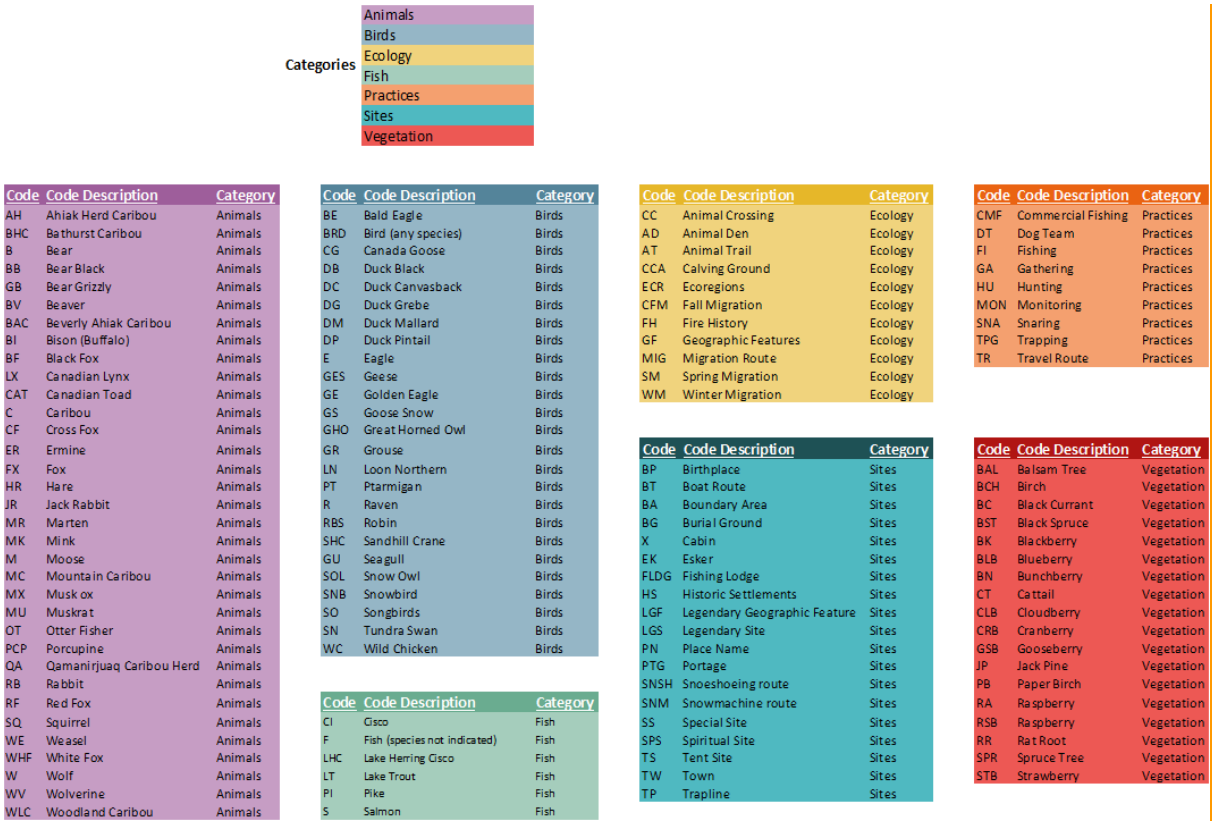
How did you learn these names?

6.2.2 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 monitoring 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 unify all past, present and future monitoring work.** However, if you create a flexible coding system (as described below), the information collected can be easily compared to work done using an alternate coding system.

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.



Categories

- Animals
- Birds
- Ecology
- Fish
- Practices
- Sites
- Vegetation

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

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 8: Example Set of Code and Categories.

6.2.3 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.

6.3 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.

6.3.1 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 travelways, 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. [45]

Paper Maps: Linking maps to transcripts

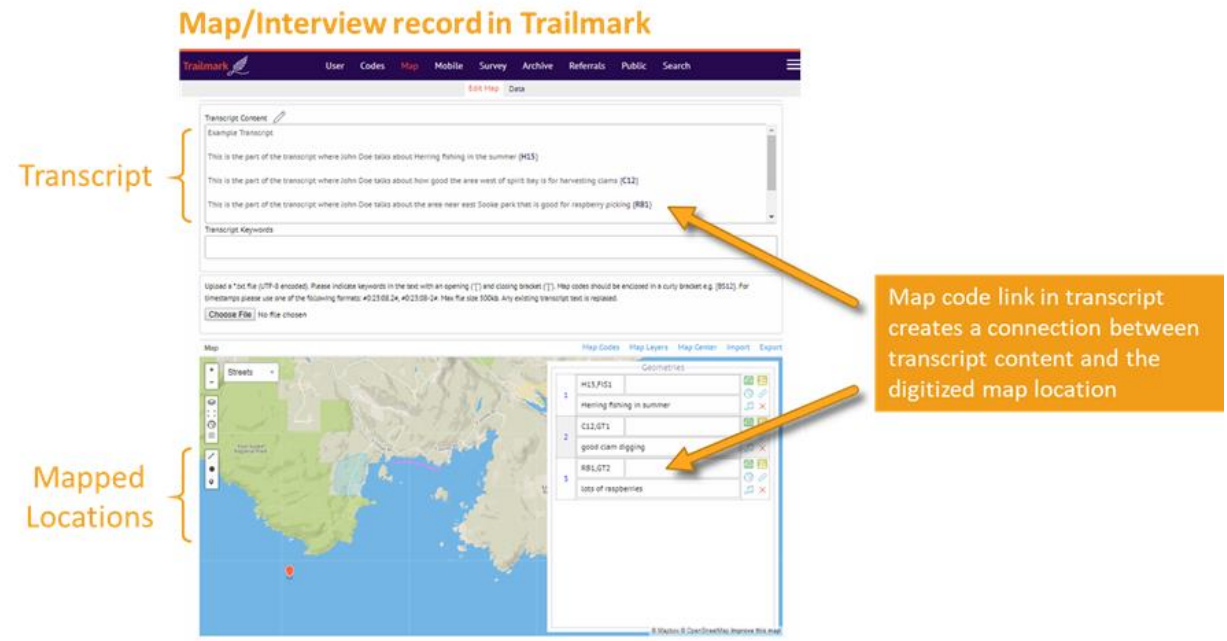
[45] Łutsel K'e Dene First Nation use Trailmark software for a number of archival, data management, and monitoring activities, so we use this program as an example to explain these concepts.

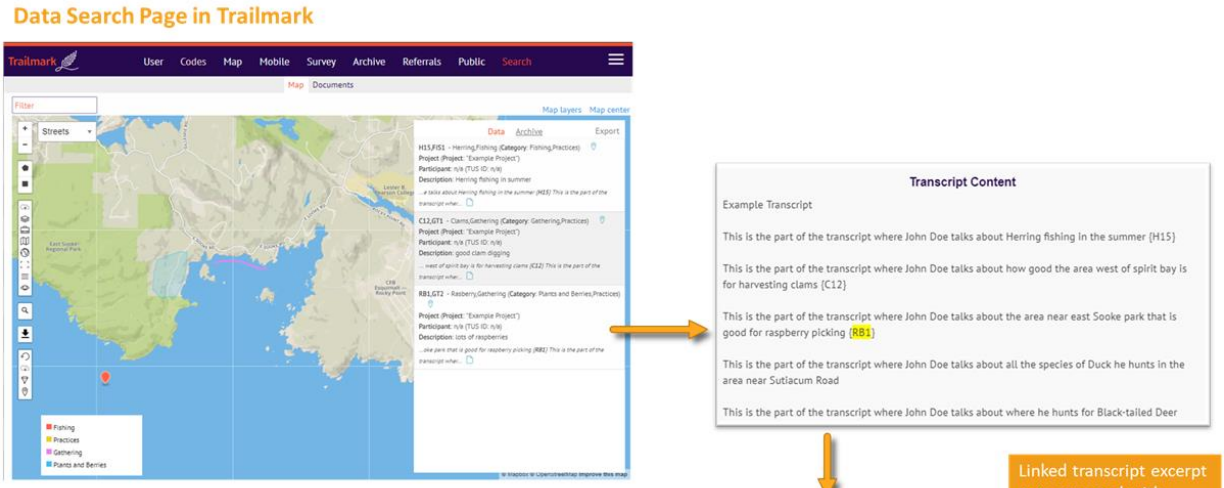
When leading an interview and marking down sites that are being discussed onto paper maps, what you label the map to identify each site will serve to connect what is being shared in that moment. Here's how:

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 ok 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).

   » 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 9** below.





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	RB1,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 { RB1}	-

Figure 9: Linking interview transcripts with maps.

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 text 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.