

Anishinaabe Science and the Workflow of Gidayaangwaami'idimin

Ezhi-Inawendiyang

By

Sarah Allen

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Advisor: Dr. Kyle Whyte

Abstract

Tribal land governance utilizes traditional knowledge systems to honor traditional, spiritual, and physical values that align with tribal goals of culturally engaged ecosystem stewardship and management. An example of this can be seen within the connection and integration of Anishinaabe and community knowledge within tribal stewardship done by the Sault Ste. Marie Tribe's Natural Resource Department through their adaptive Management and decision-making frameworks based in Anishinaabe and western Science. This research supports the goals of the Tribe's Natural Resource Department through the breakdown of various Anishinaabe knowledge and decision-making systems, reflections on past projects done by the department, and a review of 30 sources that exemplify the integration of Indigenous knowledge systems and culture into natural resource management and decision-making practices. The outcomes of this project hope to inform a standardized process for the inclusion of Anishinaabe knowledge within projects conducted by the Tribe's Natural Resource Department.

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Introduction and Project Background

Beginning in the Fall of 2024, I worked in collaboration with the Consortium for Cooperative Ecological Resilience within the Sault Ste. Marie Tribe of Chippewa Indian's Wildlife Department as a graduate student research assistant. This was through the Tishman Center for Social Justice where I worked as a Climate Justice Midwest Catalyst Fellow. As a fellow and Sault Ste. Marie Tribal member, I worked on projects that centered the elevation of Anishinaabe and Indigenous knowledge in Tribal natural resource management and decision-making.

The initial project, Gidayaangwaami'idimin Ezhi-Boodaweyang, was an updated report on an already existing tribal project completed in 2019. This project examined the intersection of Anishinaabe culture, community knowledge of the land, and fire management. This project spanned my in-person internship with the Tribe over the summer of 2025. The summer experience working in the community immersed me in reciprocal relationship building with Sault Ste. Marie Tribal members, as well as other Indigenous people that work within environmental justice spaces. These community relations allowed me to engage in meaningful and intimate work such as community interviews on traditional knowledge related to fire on the landscape. Furthermore, the summer exposed me to a prescribed burn, traditional ceremonies, cultural immersion, conferences, and a relationship to the land with human and non-human kin.

The secondary and current project, Anishinaabe Science and the Workflow of Gidayaangwaami'idimin Ezhi-Inawendiyang, was created to provide ideas for how the awareness and comprehension of Indigenous community knowledge plays a crucial role in natural resource decision-making at a Tribal level while relating to Tribal collaborative decision-making at a state, regional, and national level. This is to help identify formal procedures

to connect Anishinaabe science and community knowledge with major decisions that Gidayaangwaami'idimin Ezhi-Inawendiyang is making about the stewardship, co-stewardship, and conservation of hemiboreal and other critical habitats. The research done for this deliverable will provide necessary background on Tribal land governance both broadly and within the Sault Ste. Marie Tribe, Anishinaabe science and decision-making, traditional Anishinaabe knowledge of the land, and further insights and reflections on Gidayaangwaami'idimin Ezhi-Boodaweyang.

Tribal Land Governance

For decades, Tribal governments have created agencies or departments with missions to conserve, steward, and take care of the environments that Tribal members depend on. These units within Tribal government have different responsibilities for diverse areas of land and water that make-up Tribal jurisdictions, including reservation or trust lands, service areas, fee lands, treaty (or ceded) territories, and properties with which Tribes have compacts or other substantive agreements, including those held by federal, state, university, local, private, or conservation entities. These units draw on different knowledge systems to do their work, including honoring traditional, spiritual, and physical values that align with Tribal-led goals of culturally engaged ecosystem stewardship and management. Examples of this can include knowledge systems rooted in cultural identities such as clan governance, or collaboration and integration of western management techniques.

The Sault Ste. Marie Tribe of Chippewa Indians' Gidayaangwaami'idimin Ezhi-Inawendiyang Department is no different. Gidayaangwaami'idimin Ezhi-Inawendiyang references the way in which the natural resource department engages in their work through respectful and caring stewardship of non-human relatives such as plants, animals, and fish. The

Ojibwe name acts as a guide to their commitment to the land. Work done in a “good way” by staying grounded in Anishinaabe principles of reciprocity. The department’s environmental, fisheries, wildlife, and newly added research Consortium for Cooperative Ecological Resilience programs provide services to the Tribe’s 1836 Treaty ceded territory which encompasses the Eastern part of the Upper Peninsula of Michigan. These services include, but are not limited to, animal and fish harvesting, water and air quality management, prescribed burn impact research, and vegetation assessments.

This report was prepared to inform Tribal staff about the ways in which the workflow of the Gidayaangwaami’idimin Ezhi-Inawendiyang Department can involve Anishinaabe knowledge systems. The basis of the report is (1) a review of information about traditions of Anishinaabe science and decision-making, especially related to the land; insights from Gidayaangwaamidimin Ezhi-Boodaweyang, and a review of 30 sources that describe decision-making processes that are similar, and led by Indigenous peoples in other places.

Anishinaabe Science and Decision-Making

In 2024, the Sault Ste Marie Tribe passed a resolution “Establishing Protection of Our First Family”.¹ This resolution recognizes “Anishinaabe izhitwaawin, or ways of thinking and being, which includes a de-centralized view of human beings who are not on top of an evolutionary hierarchy, but rather dependent upon the older wiser ‘More Than Human Relatives’ that our first ancestral family created before the human beings”. The resolution is rooted in Anishinaabe spirituality and worldviews through relations with the Great Spirit, the Creation Story, and the Seven Generations Principle. The Anishinaabe creation story is the foundation of

¹ Protection-of-our-first-family-of-more-than- ..., accessed April 21, 2026, <https://ecojurisprudence.org/wp-content/uploads/2025/02/PROTECTION-OF-OUR-FIRST-FAMILY-OF-MORE-THAN-HUMAN-RELATIVES.pdf>.

the resolution, and utilizes the knowledge in which the Anishinaabeg existed long before the more than human kin. In that relationship, more than human kin have cared for the Anishinaabeg to ensure our survival through the relational existence of Anishinaabe izhitwaawin. Similar to the Creation story, the resolution references the Great Spirit's gifts to the Anishinaabeg and the role we must play in upholding and caring for those gifts. The Seven Generations principle is used as a reminder that our people need to take into consideration all relatives when making decisions for the past, present, and future, thinking seven generations ahead. This resolution not only reminds us of our tightly woven and reciprocal relationship with all kin, and the care and stewardship that is needed, but also reminds us that our relationship is embedded in every aspect of Anishinaabe life that extends beyond the human world of treaties and laws into the spiritual and cosmological realm of existence. An all encompassing existence that is braided into Anishinaabe science.

Anishinaabe science is the mode of knowledge that accompanies Anishinaabe izhitwaawin. Knowledge and education was a lifelong process that was often passed around through mentorship and storytelling. Anishinaabe knowledge transcends "other-than-human beings" to embrace the knowledge systems of children, spiritual entities, plants, and animals as teachers.² Traditionally, Anishinaabe knowledge systems have been divided by clan systems.³ Clan systems are defined by Basil Johnson as "that from which I draw my purpose, meaning, and being".⁴ The Ojibwe have often believed that there were seven original clans. Of those, include Crane, Loon, Fish, Bear, Martin, Deer, and Bird.⁵ Each of these animals encompassed their own

² Simpson, Leanne. "Stories, Dreams, and Ceremonies: Anishinaabe Ways of Learning." Tribal College Journal of American Indian Higher Education, March 7, 2012. <https://tribalcollegejournal.org/stories-dreams-ceremonies-anishinaabe-ways-learning/>.

³ Burgess, Benjamin Vincent. "Clan Destined Communities: The Persistence and Revitalization of Ojibwe Clan Identity in Ojibwe Literature." ProQuest Dissertations & Theses, 2008.

⁴ Johnston, Basil. *Ojibway Heritage*. Toronto: McClelland and Stewart, 1976.

⁵ Benton-Banai, Edward. 1979. *The Mishomis Book: The Voice of the Ojibway*. 1979, [St. Paul, Minn. Indian Country Press]. <https://ehrafworldcultures.yale.edu/cultures/ng06/documents/065>.

knowledge that would collectively help the whole of the Tribe. For example, Bear clan members are known to be the medicine people and the protectors of the Tribe. They would spend lots of time in the perimeter of the area and in the woods protecting the Tribe. It was there that they learned the knowledge of plant medicines.⁶ In this sense, the Bear is acting as a teacher and a mentor to the Bear clan members that learn from our animal relatives through the role of storytelling.

Storytelling is a major form of knowledge dissemination in Anishinaabe culture with a particular emphasis on Elders to younger generations.⁷ Storytelling is used as a “lens to see the past” to give us freedom to interpret each story as our own while acknowledging and taking into account the Anishinaabe cultural/spiritual/traditional framework in which the story is based. Some Anishinaabek communities differentiate stories into two highly intertwined categories: narrative and sacred. Narrative stories tend to range from treaty rights to gender roles while sacred stories often involve ceremonies as an intergenerational transfer of knowledge. The interwovenness of the spiritual and natural world creates a knowledge system in which many people learn from their ancestors within ceremonies as a way to gain knowledge, guidance, or support on their path. This can be more superficial in a sense that you are actively learning from the other human beings taking part in the ceremony with you, or you learn beyond that through the ceremony allowing you to communicate with the spiritual and ancestral realm.

Anishinaabe science can also be processed through gender roles with an emphasis on women’s roles. This can be within Anishinaabekwe or Anishinaabe women's roles in holding

⁶ Peterson, Misty Rose. Makwa (Black Bear). Accessed April 21, 2026.
https://www.glifwc-inwe.com/assets/Makwa_Supplemental.pdf.

⁷ Simpson, Leanne. “Stories, Dreams, and Ceremonies: Anishinaabe Ways of Learning.” Tribal College Journal of American Indian Higher Education, March 7, 2012.
<https://tribalcollegejournal.org/stories-dreams-ceremonies-anishinaabe-ways-learning/>.

tribal knowledge, as seen through their relationship with the land or the deference of knowledge onto them due to their relationship to the natural world.⁸ For example, Anishinaabekwe tend to hold critical knowledge due to their relationship to the water, which informs relations to all land-based knowledge systems as water connects many elements of Anishinaabe worldviews.⁹ This relationship with water is rooted in the anishinaabekwe's life-giving powers, which then informs their role as stewards to the water. It's a reciprocal relationship, much like the general Anishinabek relationship with the land. A relationship rooted in traditional Anishinaabe Environmental Knowledge.

Traditional Ecological Knowledge, or Anishinaabe Environmental Knowledge is based on the knowledge systems used by Anishinabek. This form of science is based in relationality, and place-based knowledge systems that are ever-present and ever-changing. Anishinaabe scholar Deborah McGregor says that Anishinaabe Environmental Knowledge comes from lived experiences and relationships, "the way we conduct ourselves and relate to other beings in Creation".¹⁰ The broader Traditional Ecological Knowledge is defined by Michael Waasegiizhig of GLIFWC as "a body of localized, ancestral knowledge and wisdom about the landscape, passed down through the generations in the form of stories, songs, placenames, and traditions".¹¹ Both definitions highlight the relationality aspect, whether it be through people, place, cosmology, ancestral, traditions, etc. Therefore, Anishinaabe science can be used in practice to steward and manage the land in a way that encompasses the care you would give a relative,

⁸ McGregor, Deborah. "Traditional Ecological Knowledge: An Anishnabe Woman's Perspective." *Resources for Feminist Research* 32, nos. 3–4 (2007): 193–.

⁹ Chiblow (Ogamauh annag qwe), Susan. 2019. "Anishinabek Women's Nibi Giikendaaswin (Water Knowledge)" *Water* 11, no. 2: 209. <https://doi.org/10.3390/w11020209>

¹⁰ McGregor, Deborah. *Anishinaabe Environmental Knowledge*. Rotterdam: SensePublishers, 2013. https://doi.org/10.1007/978-94-6209-293-8_5.

¹¹ Price, Michael Waasegiizhig. "Anishinaabe Insights: A Closer Look at Tek - Indigenous Knowledge Finds Its Way into Science & Policy." *Anishinaabe Insights: A closer look at TEK - Indigenous knowledge finds its way into science & policy*. | Great Lakes Indian Fish & Wildlife Commission. Accessed April 21, 2026. <https://glifwc.org/about-us/news/anishinaabe-insights-closer-look-tek-indigenous-knowledge-finds-its-way-science>.

because all things are relatives. This can be seen through Indigenous led land co-stewardship, in which community and culture are central in the processes that are used. For example, in Gidayaangwaamidimin Ezhi-Boodaweyang, community knowledge is utilized as a form of Anishinaabe science as ecological metrics of the land.

Anishinaabe science can be directly translated to decision-making within land co-stewardship and natural resource management. Indigenous led decision-making has been used in natural resource management across the world, often through collaborative processes that integrate western and Indigenous knowledge systems. Anishinaabe decision-making is based on the cooperative governance of reciprocity between all living things, where decisional emphasis lies in the best outcome for all parties involved, living and non-living included. This is seen in Gidayaangwaamidimin Ezhi-Boodaweyang through the effective collaborative land management of the Hiawatha National Forest and Betchler's Marsh with Gidayaangwaami'idimin Ezhi-Inawendiyang and the U.S. Forest Service.

Reflections on Gidayaangwaamidimin Ezhi-Boodaweyang

Anishinaabe science is present in natural resource management strategies with a notable example being Gidayaangwaamidimin Ezhi-Boodaweyang. This project looks at ways in which Gidayaangwaami'idimin Ezhi-Inawendiyang department can better understand the traditional ties that the Anishinaabek have with Ishkode on the land, enhance the collaboration process between community and the department, and guide future fire management for the department. The relationality that exists between Gidayaangwaami'idimin Ezhi-Inawendiyang department, the community, and the land to inform fire management is integrated throughout the project. The use of community-based monitoring metrics within fire management and decision-making exists

in a primary role to utilize Anishinaabe science to inform effective actions taken by the department. The cultural continuance of the use of Ishkode on the land is another way in which this generational component of Anishinaabe science is apparent.

Insights from Gidayaangwaamidimin Ezhi-Boodaweyang

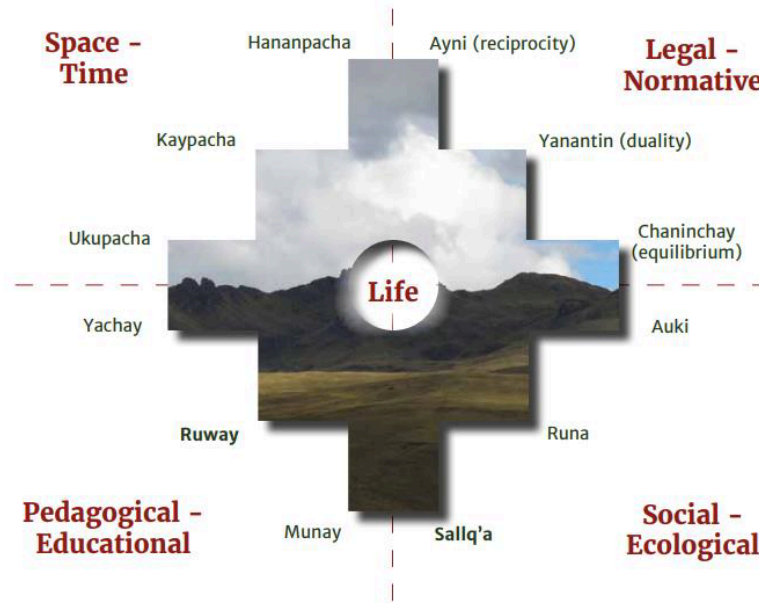
After an informal discussion with Robin and Eric Clark about their experience working in co-management spaces, their insights reflected a very empowering perspective for the revitalization and governance of Tribal natural resource management. Eric provided a constitutional foundation of thought with the relationship between Tribes and the government because of treaty rights. Treaty rights lay the groundwork for forest management, and their importance, as well as the importance of tribal lawyers, to get a “seat at the decision-making/management/constitutional table”. The ability to push the boundaries at that “table” lies in the fact that treaties are embedded into the constitution, and the government (for the most part) won’t rule against itself, so Tribes shouldn’t limit themselves if they don’t have to. Tribes should be able to create their own “table”. Robin further expanded on that to acknowledge the successful work and time that Eric has put into “rewriting the playbook” within these systems. Building off of that ability to look back at the treaties, and how Tribes are navigating the nuance to these relationships in a way that acknowledges tribal jurisdiction as sovereign nations. Tribes can do that by engaging in these decision-making or co-management processes to decenter the colonial aspect within, and center the Anishinaabe cultural and spiritual aspects. For example Robin explained the importance of referring back to, and embodying the creation story to guide rights and responsibilities as a drive to management. She said it best with

“Indigenization is taking apart the table and making it a sweatlodge” to center culture and conditions to intertwine into natural resource management.

The integration of culture, and empowerment of Indigenous and Tribally led natural resource management is the pushback that Tribes need, and Indigenous people are engaging in this all over the world through decision-making. These processes are breaking down years of colonization to build up inherent rights of Indigenous people and the land. Below includes a comprehensive list of 30 sources that can be utilized.

Review of Decision-Making Processes

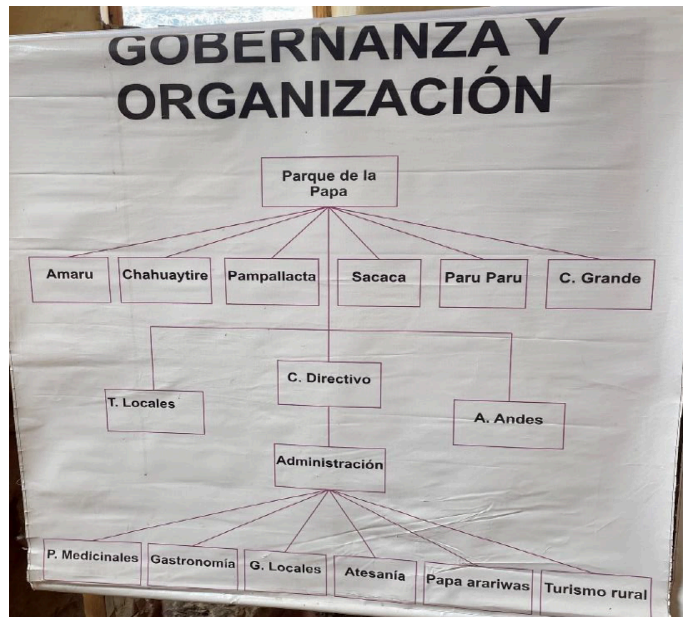
- 1) The Potato Park in Peru is an organization that advances the agroecological knowledge and farming practices of 6 Quechua communities in the Sacred Valley. The organization represents about 7000 people who, collectively, take care of 1,800 varieties of potatoes in a high altitude region. The Potato Park organization, which aims to support the economic, cultural, social, and ecological success of the 6 communities, is led by a directorate of elected persons from each of the 6 communities. The organization is governed by the Quechua cosmovision, which is a complex knowledge system that combines spirituality, environmental knowledge, sustainable practices, and education.



¹²Figure 1

Each of the communities has their own knowledge of local habitats. At the same time, the communities formed the organization to also foster new scientific research on pressing topics, including climate change and seed savings. The workflow of the organization involves the directors developing research and other experimental ideas.

¹² Figure 1. The Chakana (southern cross) was “adapted to integrate considerations of spacetime, legal-normative, socio-ecological, and pedagogical-educational in ANDES’ curriculum for biocultural education” (Asociación ANDES, 2016, p. 13).



¹³Figure 2

Each of the six communities then names its own “technical expert”, who lives there and is from the community. This person guides the community's involvement in any research or other projects. The Directors have a compact with a research organization of outsiders (though many are Quechua), a non-profit called ANDES. ANDES engages in participatory research and publishes findings in national and international venues. One of the major ways in which Quechua science is involved in the workflow is through these community-elected research workers and representatives, who directly interact with ANDES researchers. All are accountable to the overall elected directors. This system has allowed the Potato Park to launch initiatives on climate change, tourism, crafts, culinary arts, trade, food and seed security, and community projects that center schools, healthcare

¹³ Potato Park organizational flow

centers, and greenhouses. They have also created a concept to describe this model, “Biocultural Heritage Territories,” of which they shared in different parts of the world.¹⁴

2) The Makkivik Corporation in the Canadian region of Nunavut and the top third of Quebec began in 1978 as a response to administering funding from the first comprehensive Inuit land claim in Canada, also known as the James Bay Northern Quebec Land Claim Agreement (JBNQA).¹⁵ The corporation has since taken the original funding from the Inuit land claim settlement and created various subsidiaries and joint ventures to support their mission of providing for the Inuit people. The Makkivik mandate upholds objectives to process money for the Nunavik Inuit, as provided for in the James Bay and Northern Quebec Agreement, to promote the welfare and advancement of the Inuit, to protect and nurture the preservation of the Inuit way of life which includes their values and traditions, to exercise their lawful rights, and to develop and improve the Inuit communities. The Makkivik corporation funds economic and social development to secure long-term benefits for its 15 Inuit communities in Nunavik to represent all citizens. Each community works with Makkivik to engage members that are from and live in each village in the negotiation agreements and partnerships with private and public sectors. Through the current projects, communities are able to contribute their own traditional knowledge, and wants and needs to the decision-making processes for all cultural, political, and economic sectors that Makkivik works with through the voting and appointing of representatives in the executive committee and board of directors (BOD).

¹⁴ Sayre, Matthew, Tammy Stenner, and Alejandro Argumedo. "You Can't Grow Potatoes in the Sky: Building Resilience in the Face of Climate Change in the Potato Park of Cuzco, Peru." *Culture, Agriculture, Food and the Environment* 39, no. 2 (2017): 100–108. <https://doi.org/10.1111/cuag.12100>.

¹⁵ “**Lᑦᐱᔭ.**” Makivvik, April 17, 2026. <https://www.makivvik.ca/>.

The corporation itself is made up of a five-member executive committee and 16 members of the BOD, of which are elected by the community members to represent them. A two-member Board of Governors is appointed by the Executive and BOD to serve as a council of Elders. The executive committee and BOD has since created a mutually beneficial relationship within political, cultural, and economic sectors of the governments of Canada, Quebec, and the Indigenous Inuit people of Nunavut to provide consistent approaches in land claim implementation and the commitment to land claim settlements.¹⁶

- 3) The Karuk Tribe's Píkyav Field Institute was created under the Eco-cultural Revitalization branch of the Karuk Tribe's Natural Resource Department to enhance the revitalization of the people and landscapes within Karuk Ancestral Territory. It was created between the Karuk Tribe and UC Berkeley to expand Tribal capacity within the department and build upon partnerships with academic institutions to address the need for environmental education programs, to ensure long-term co-management within Karuk ancestral homelands, and educate and support Tribal and community youth in culturally relevant academic programs.¹⁷ The collaboration uses a set of guiding principles to govern future research and projects with the Tribe to ensure protection of intellectual and cultural property while recognizing tribal sovereignty. Building off of the exploitative history between institutions and Tribes in the past, the guiding policy of the institute is to engage in free, prior, and informed consent for information sharing, and protect

¹⁶ Moorhouse, Andy. The Makivik Corporation. Accessed April 21, 2026.
https://natural-resources.canada.ca/sites/www.nrcan.gc.ca/files/mineralsmetals/files/pdf/rmd-rrm/MakivikCorp_EN.PDF.

¹⁷ "Eco-Culture Revitalization." Eco-Culture Revitalization. Accessed April 21, 2026.
<https://www.karuk.us/departments/natural-resources-dnr/eco-culture-revitalization>.

traditional cultural property, intellectual property, and self-determination interests of the Tribe. The collaborators within the institute range from academics, volunteers, agency employees, journalists, film and photographers, and non-profits depending on what the Tribe needs. Each project goes through either a full or partial review process under the Karuk Resource Advisory Board. Volunteers and assistants are supervised under a researcher, project leader, or tribal employee, with each person required to have a local mentor and a confidentiality agreement with the Tribe. Set principles needed for projects include community engaged scholarship, free, prior, and informed consent, benefits to tribal community, mentorship/training/youth development, confidentiality, mutual respect, inclusiveness and empowerment, equity and reciprocity, self-determination, prior rights and inalienability, respect for Indigenous knowledge and intellectual property, and appropriate conduct. The Guidelines for the collaborative project design include establishing a review committee which includes a local knowledge holder, an employee of the Tribe, and an experienced researcher, designing project methods to remain culturally sensitive and knowledge situated, navigating consent through addressing collective rights and transparency under a review committee, the Karuk advisory board, group consent, and individual consent, planning for data sharing, and ensuring mutual benefit and fair return. This structure can be utilized in agreements with Indigenous people and research organizations across the world. For example, it could be replicated and changed to work with universities and Tribes in the area to create a mutually beneficial research relationship.¹⁸

¹⁸ Tripp, Bill. Practicing pikyav: A Guiding Policy for Collaborative Projects and Research Initiatives with the Karuk Tribe. Accessed April 21, 2026.
https://sustainableheritagenetwork.org/system/files/atoms/file/KarukTribe_PracticingPikyav.pdf.

- 4) The Alaska Native Tribal Health Consortium was created in 1997 as a non-profit tribal health organization for Alaskan Native people and Native American people that reside in the state. The consortium was catalyzed through community led health programs in collaboration with federal Indian Health Services. The caucus, along with a new central hospital built by IHS with support from tribally led non-profits, created the perfect setting for the Alaska Native Tribal Health Consortium to be created. It is the largest, most comprehensive Tribal health organization in the United States, with a board of directors that equally represents all Tribal regions in Alaska. As well as a commitment to a culturally responsive approach to wellness for Alaskan Native people by Alaskan Native people. This community health program promotes traditional lifestyle practices and prioritizes preventative health services to address the specific needs of Alaska Native communities to promote resiliency and strength-based approaches. The integration of culture can be seen through the Alaska Blanket Exercise which was created by Elders, knowledge keepers, and educators to understand and combat history and intergenerational trauma within the community. The wellness program braids together food sovereignty initiatives to combat different diseases and ailments such as diabetes and cancer through food distribution programs and educational symposiums on plants as food and medicine.. Climate initiatives under the consortium also center community knowledge to inform climate and health, environmentally threatened communities, and local observer network projects. The local observer network project employs community members and experts in traditional knowledge, western science and technology to document different environmental events using web-accessible maps.¹⁹

¹⁹ “Who We Are.” Who We Are – Alaska Native Tribal Health Consortium, April 9, 2026. <https://anthc.org/who-we-are/>.

5) The Confederated Tribes of the Umatilla Indian Reservation First Foods Initiative sprouted under the Natural Resource Department to provide proactive planning, policy analysis, and development to protect, restore, and enhance the First Foods and the exercise of associated rights reserved in the Treaty of 1855.²⁰ The initiative uses culturally relevant first foods as a model of sustainability and obligation within their department. Informed by their creation story, their model uses “serving order” to steward the land. Starting with water, and then moving to fish, big game, roots, and berries. This process reminds the department of the reciprocal relationship with the land, as well as linking their work back to the first foods of their people. The spiritual integration into the First Food Initiative encompasses the unwritten law of nature. Tribal members attend sweathouse and ceremonies to give thanks to the plants and animals that give people life. Ceremony is seen as a place that gatherers and hunters can reflect on their role while asking the ancestors for guidance and protection. A cyclical flow of kinship from human to food. The First Food Initiative is the topic of the Gatherer’s Project, a published resource that highlights the framework of the initiative, as well as showcasing Umatilla women as gatherers due to their innate relationship with the land. Umatilla women have a deep connection to the first foods due to the feminine spirit of roots which are greeted every year through a women's ceremony. In their role as gatherers, women are tasked with the important role of caring and nourishing their people. For example, in the Gathering Project, gatherers showcase their gathering ceremony of their first bag of roots,

²⁰ Gilmour, Dori Luzzo. “First Foods Lead the Way in Confederated Tribes of the Umatilla Indian Reservation Natural Resource Management.” opb, November 7, 2022.
<https://www.opb.org/article/2022/11/07/first-foods-lead-the-way-in-confederated-tribes-of-the-umatilla-indian-reservation-natural-resource-management/>.

giving it away to a special person, usually a mother-daughter pair, while thanking the women that helped them on their journey. The first food harvest is celebrated with a feast in which gatherers spend days preparing their foods to welcome home the foods to the Longhouse table. Other initiatives highlighted include specific efforts taken to support land and first foods include working with land trusts to return ancestral gathering lands, preservation of oral histories from Elder and community interviews, exploration of policy and economic valuation of gatherers, and habitat restoration. An example within the initiative can be seen through the Umatilla River Vision which links the health of the Umatilla River with the health of Tribal members through natural resource management framework that is supported by the availability of First Foods, sustainment of culture and traditions, and the involvement of Tribal members in the ecological management of the Umatilla Basin.²¹

- 6) The Kalimpong Rice, Bean, and Orchid Park is a 20,000 hectare Biocultural Heritage Territory in the Himalayan forests of West Bengal. Inspired by the community-based decolonizing research work done in the Potato Park in Peru, eleven Lepcha and Limbu Indigenous groups have created the Kalimpong Rice, Bean, and Orchid park that sustains more than 60 food crops and 200 traditional crop varieties including 20 varieties of bean. This park was a product of collaboration between the Lepcha and Limbu people, the International Institute of Environment and Development, Lok Chetna Manch, and the Centre for Mountain Dynamics. The goal for this park is to utilize sustainable use rights

²¹ Huesties-Wolf, Althea, Colleen Sanders, Ermia Butler, Carl Merkle, Chris Marks, and Eric Quaempts. "Gatherers Project." CTUIR Department of Natural Resources, First Foods Policy Program , September 2024. <https://ctuir.org/departments/natural-resources/first-foods-policy/climate-adaptation-1/gatherers-project/>.

to contribute to forest and agrobiodiversity conservation for the livelihood of all people using Lepcha and Limbu methods of stewardship such as reciprocal rituals of farming, and place-based indicators. To put this into praxis, the Lepcha and Limbu worked with researchers within their community to co-design and facilitate local level participatory surveys to gather information such as ceremonies and seasonality, and significance of agriculture from the ten villages within this site area to understand traditional land uses linked to the biocultural heritage landscapes to foster Indigenous knowledge revitalization. The park implemented storytelling and participant observation such as origin stories of the Lepcha and Limbu communities, cultural context, settlement history and connection with the landscape. Other community connections included mythological narratives of the land. These cultural initiatives were shared by Elders and knowledge holders. The work done with the Lepcha and Limbu communities include Tribal representatives in the establishment of a Biocultural Heritage Territory, promote and support traditional crop farming and festivals, promotes traditional houses, institutions, and youth organizations, integrate biocultural concerns, recognize the importance of agricultural heritage systems, and restore customary sustainable use and forest rights.²²

- 7) The Aliansi Masyarakat Adat Nusantara (The Indigenous Peoples' Alliance of the Archipelago) or AMAN Appraising Economic Performance of Indigenous People's Sustainable Landscape Management in Indonesia was created to study natural resources and the economic value they hold in sustainable landscape management for 6 Indigenous territories in rebuttal to the narrative that Indigenous people are economic obstacles. The

²² Lepcha, Elen Tshering, Nawraj Gurung, Ajay Rastogi, and Krystyna Swiderska. Safeguarding lepcha and Limbu Cultural Values and worldviews for conservation and sustainable development in the Eastern Himalayas, India | International Institute for Environment and Development. Accessed April 21, 2026. <https://www.iied.org/20361g>.

study itself focuses on the everyday life and cultural values of these Indigenous groups while assessing their economic performance by comparing their economic value with ones set by the government such as gross domestic product and regional minimum wage. The study takes the communities' everyday lives to create economic valuation based on the understanding of the local economy system, and local wisdom and knowledge related to ecosystem resources and production systems. For this survey, interviews, informal and formal discussions, group discussions, and field surveys were conducted to accentuate participation and inclusion as close to economic appraisal as possible. The study results show that local culture and wisdom of the Indigenous people are integral to the preservation and conservation of nature, and are crucial in the constant and sustainably managed assets. This integration allows the people to maintain the ecological conditions and natural resources that bring advantages to them. One way in which the Indigenous people maintain this relationship is through the valuation of resources as kin vs. commodity. For example, rice is treated like a living thing, with respect which creates a relationship of care instead of waste.²³

- 8) The Shyagya Committees in Tsum-Nubri Valley encompass a 54,417 hectare area in the Western Himalayas in Nepal. The valley is a Buddhist cultural heritage site and sacred natural site across the Budhigandaki-Shiarkhola River within the Manaslu Conservation Area. The Tumba Indigenous peoples of this area declared Tsum-Nubri Valley as “Shyagya” or a non-violent area, influenced by non-violence rooted in the Buddhist religion that shapes the everyday lives of the Tumba. In 1998, the valley was absorbed

²³ Alhudawi, Usman, and Iim Siti Masyitoh. “The Role of the Aman in Strengthening Citizenship Competencies of Indigenous People Regarding to Customary Land Rights.” *Advances in Social Science, Education and Humanities Research*, 2022. <https://doi.org/10.2991/assehr.k.220108.085>.

into the Manaslu Conservation Area under the jurisdiction of the Department of National Parks and Wildlife Conservation.²⁴ The management of this conservation area falls under the National Trust for Nature Conservation. Through the Manaslu Conservation Area Project, the National Trust has established 7 Conservation Area Management Committees. Under these community based committees, the Tsumba have organized into women's, farmers, and youth groups with the goals of conservation and community development. The Conservation Committees' roles are to provide institutional platforms for community development, preserve the culture, religion, and identity of the Tsumba, organize festivals, promote culture and non-violence beyond the valley, and establish relationships with government, political leaders and conservation agencies. The conservation of nature and culture is woven into the declaration the Tsumba have of non-violence that is guided by spirituality through Buddhist philosophies. Leaders of the village also play important roles, often characterized by clan, and spiritual knowledge that enforce community decisions and rules, settle disputes, and manage land-based rituals embedded in their spirituality. The leaders devote their life to Shyagya traditional knowledge. Cultural festivals also play an important part in sustaining Tsumba cultural values and belief of nature-culture conservation for new generations. Traditional doctors engage in rights over the collection and distribution of medicines in the valley due to their specialized knowledge of the land. Spiritual leaders are integrated to preserve culture and spirituality, while teaching religious norms and values. The conservation of the land falls under the intersections between nature and culture as a spiritual commitment to the Tsumba and their designation of the valley as Shyagya. The

²⁴ Rai, Jailab Kumar, and Nima Lama. "Tsum Valley: Nature-Culture Stewardship of the Tsumba People in the Western Himalaya, Nepal." *Territories of Life*, May 20, 2021. <https://report.territoriesoflife.org/territories/tsum-valley-nepal/>.

biocultural conservation and practices of the Tsumba are thriving due to the persistent collective action of the Tsumba leaders, knowledge keepers, and community members. This designation began as a symbolic claim that eventually reached a consensus with government officials to respect and comply with non-violence as community bylaws. Although this consensus has been reached, there are currently no state, legal or policy designations or recognition for voluntary declaration of non-violence, customary laws and institutions. Despite this, the Tsumba remains committed to the co-management of the Manaslu Conservation Area. Indigenous people across the world can build off of the integration of Tsumba religion, spiritual leaders, knowledge holders, and community members for their own natural resource management that can emulate this design using their own culture.²⁵

- 9) Treaty 3, stewarded and led by the Grand Council Treaty #3 is a constitutional agreement between the Saulteaux Anishinaabek and the Canadian government. The treaty ended up giving the Canadian government access to lands across Northwestern Ontario and Eastern Manitoba in exchange for money, various goods, and hunting, fishing, and natural resource rights on reserve lands.²⁶ It is important to note that this treaty was not created in fair and equitable terms.²⁷ The environmental department within Grand Treaty 3 engages in land stewardship through a number of current initiatives and priorities rooted in Manito Aki Inakonigaawin (MAI) which is a sacred resource law of the nation that has

²⁵ Rai, Jailab Kumar, Neema Lama, and Bas Verschuuren. "Sacred Tsum Valley: Improving biodiversity conservation with lessons for effective management of protected areas in Nepal". In *Asian Sacred Natural Sites, Philosophy and Practice in Protected Areas and Conservation*, B. Verschuuren and N. Furuta (eds). London: Routledge, pp. 2021-2033 (2016)

²⁶ Filice, Michelle. "Treaty 3." *The Canadian Encyclopedia*. Historica Canada. Article published August 17, 2016; Last Edited May 26, 2025.

²⁷ Kane, Carlie. "Treaty 3: Honouring Its Truths." Canadian Museum for Human Rights, October 13, 2023. <https://humanrights.ca/story/treaty-3-honouring-its-truths>.

existed since time immemorial and is based in the governance that the land, people, and the future is protected. Their environmental department is currently working on a MAI toolkit to guide Treaty #3 in decision-making practices to uphold MAI through respecting the land and waters, providing offerings to spirit and creator when benefiting harvest, hunting, or fishing, knowledge for treaty rights to the land, and understanding the responsibility as a caretaker of the land. The MAI toolkit highlights the importance of Anishinaabe science with critical involvement of ceremonies led by Elders and knowledge keepers of the Tribe. Ceremonies guide the decision-making process to ensure care and reciprocity to Earth and Spirit. In addition to these ceremonies, the decision-making process is guided by Elders of treaty #3 who use ceremonies and traditions to ask Spirit for guidance to move forward.²⁸

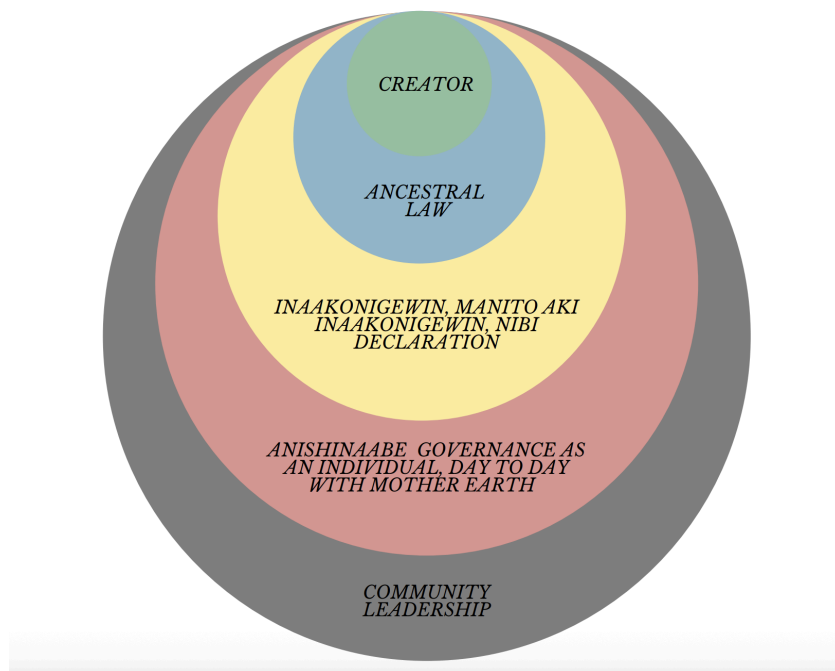


Figure 3.²⁹

²⁸ Lipscombe, Winter Dawn, and Treaty #3 Elders. Manito Aki Inaakonigewin Information Package. Accessed April 21, 2026. <https://gct3.ca/wp-content/uploads/2023/02/MAI-Toolkit.pdf>.

²⁹ Figure 3. Anishinaabe Rule of Law per MAI toolkit

Guided by MAI, the Grand Treaty Council has a Territorial Planning Unit (TPU) called Zhaagimaa Waabo, which was created to build relationships and fulfill the sacred responsibilities to land, water, air, and all other relations. The TPU's values are rooted in Anishinaabe teachings, ceremonies, and protocols, and are used to uphold Anishinaabe jurisdiction and inakonigaawin (law). The TPU has four key areas of which are Relationships and Partnerships, Water, Climate Change and Environment, Organization and Leadership, and Innovation/Communication. Within 'Relationships and Partnerships', relationships with treaty #3 communities and knowledge keepers are prioritized in engagement processes to strengthen partnerships with each nation and external groups. In 'Water, Climate Change, and Environment', Anishinaabe Elders guide these sectors in spiritual guidance, ceremonies, protocols, and land-based teachings to create caring and reciprocal relationships to land through the blend of Anishinaabe and western science. In 'Organization and Leadership', teams within Treaty #3 meet the needs of mandates and jurisdiction led by Anishinaabe science and protocols, for example hiring a knowledge keeper for each unit and connecting with Elders to lead teachings and processes. In 'Innovation/Communication', all approaches to management must be grounded in Anishinaabe jurisdiction and communicated across treaty communities. For example, annual week long camps that bring together Elders and youth to learn from the land and each other. These toolkits and planning units can be utilized within tribal nations and Indigenous communities to create a standard plan and agreement

within stewardship and decision-making spaces. Specifically guiding decision-making with external partners in a way that is rooted in cultural values while being guided by Elders, knowledge holders, and community members.³⁰

10) The Parks Canada Indigenous Stewardship Policy was created by Parks Canada, a national agency under the Minister of the Environment, Climate Change and Nature to protect and present nationally significant examples of natural and cultural heritage, and the Indigenous Stewardship Circle, a group of Indigenous leaders established under Parks Canada to foster development and policy renewal that supports Indigenous stewardship with the overall goals to strengthen (re)connections to the land, water, and ice, amplify Indigenous voices while supporting Indigenous leadership, and respect Indigenous knowledge systems and ways of knowing. The Indigenous Stewardship Policy was created with the purpose of laying the foundation for effective collaborative stewardship between Indigenous communities and Parks Canada to support cultural continuity, cultural safety, and healing, as well as implementing the United Nations Declaration on the Rights of Indigenous Peoples within all places run by Parks Canada, and National Office Directorates.³¹ The Policy includes seven relational elements that guide and support the conservation goals of First Nations, Métis, and the Inuit people. The first element is ‘Acknowledgements, Apologies, and Redress’ through commitments to process and make space for listening and sharing past and ongoing injustices. The second element is long-term relationships informed by equality rather than hierarchy. The third is

³⁰ “Zhaagimaa Waabo (TPU).” Grand Council Treaty #3, October 29, 2025.
<https://gct3.ca/environmental/zhaagimaa-waabo/>.

³¹ Parks Canada Agency, Government of Canada. “Overview of the Indigenous Stewardship Policy.” Parks Canada Agency, Government of Canada, November 4, 2024.
<https://parks.canada.ca/agence-agency/aa-ia/politique-policy/apercu-overview#english>.

learning and understanding through enhancement and building of cultural competencies among team members in Parks Canada. The fourth is shared governance for Indigenous people in decision-making. The fifth is cultural continuity to encompass the active connections and revitalization of Indigenous people and their traditional territories, treaty lands, and ancestral homelands through ceremony, language sharing, Indigenous conservation activities, place-based learning and knowledge-sharing, and harvesting for food, medicine, and other purposes. The sixth is economic opportunities to emphasize ways Parks Canada can offer tangible benefits to the social and economic wellbeing of Indigenous people. The last element is the maintenance and dependence of Indigenous Knowledge Systems

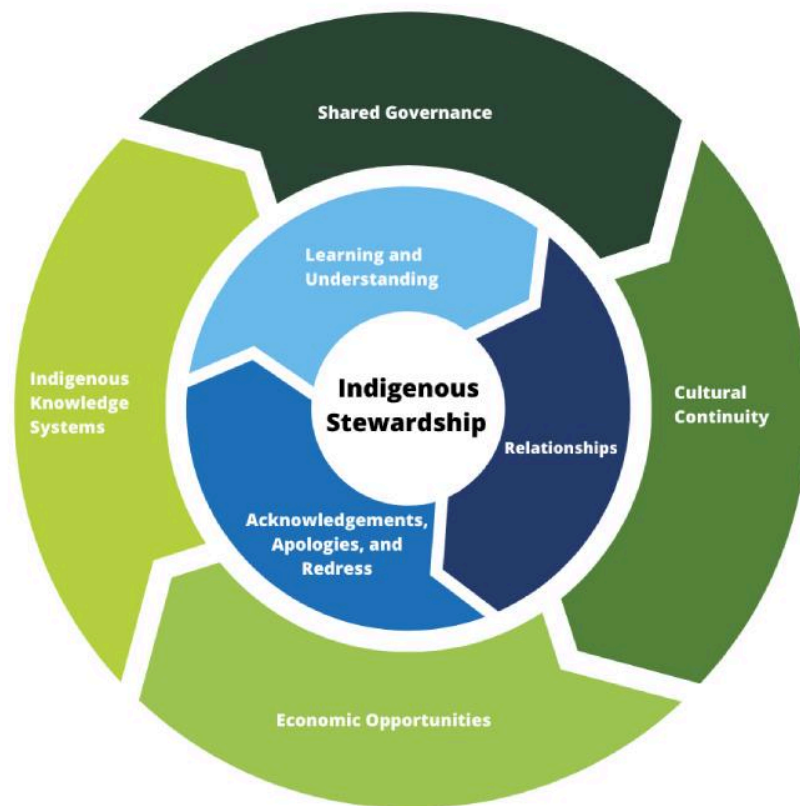


Figure 4.³²

³² Figure 4. The seven interconnected elements of the Indigenous Stewardship Framework

The expected result of this policy is the production of a co-developed stewardship plan at each place determined locally with Indigenous partners, implementation of the stewardship framework and policy, creation of bilateral plans when necessary, a determined life cycle and periodic review for each policy, annual reporting in conjunction with Indigenous partners and other Parks Canada reporting processes, and reporting back to Indigenous communities. The main Indigenous Stewardship Policy will be reviewed every 5 years and will be adapted and responded to as necessary by the needs of the Indigenous partners.³³

11) The Bears Ear National Management Plan is a finalized resource management plan for the Bears Ear National Monument (BENM) in Utah between five commission Tribes —The Hopi Tribe, Navajo Nation, Ute Mountain Ute Tribe, Zuni Tribe, and the Ute Indian Tribe of Uintah and Ouray Reservation, and the Bureau of Land Management (BLM) and the U.S. Forest Service (USFS). The Bear’s Ear Commission (BEC) made up of the five Tribes entered into an Inter-governmental cooperative agreement with the BLM in recognition of the importance of Traditional Indigenous Knowledge about the land and objects within the monument’s boundaries. In the creation of the Resource Management Plan, the BEC and their Cultural Resources Subcommittee coordinated with these federal agencies through weekly and bi-weekly management and planning meetings, input on the implementation of the scoping process, development of alternatives plans, preparation of documents, document review, and finalized documents.

³³ Parks Canada Agency, Government of Canada. “Indigenous Stewardship Policy.” Parks Canada Agency, Government of Canada, November 7, 2024. <https://parks.canada.ca/agence-agency/aa-ia/politique-policy/complete>.

The management plan highlights Tribal co-stewardship in the land management of BENM with federal entities and the Tribal BEC through facilitation, enhancement, and supplement coordination and cooperative management of the BENM. Under this co-stewardship plan, the Tribes are to ensure Traditional Ecological Knowledge and local knowledge informs the BLM and USFS decision-making processes while making sure it is reflected in the decisions, engage in ongoing collaborative dialogue knowledge sharing, and learning programs for all parties involved to address resource management, tribal priorities, and a shared understanding of Tribal context of the landscape, and provide the Tribes opportunities to review and contribute to BLM and USFS policies. The ensurement of Tribally led co-stewardship will be facilitated through the use of cultural advisors and knowledge holders in every step of the process. The process incorporates the intergenerational connection to the land and the responsibility that exists in that, the relationship to sacred and ancestral landscapes that Tribal communities have in BENM, and harvesting for Tribal members due to the reciprocal and caring relationship they have to the land. The use of Indigenous knowledge in the co-stewardship decision-making process will be utilized for the management of wildlife habitats, soils, water, vegetation, viewsheds, skies, and soundscapes, recreation, culturally relevant plants and animals, paleontological resources, and air quality. Specific examples of management include the freedom to engage in culturally relevant management such as fire reduction projects, confidentiality agreements of cultural practices, protecting of cultural objects and ancestral remains, and prioritization and support for Tribal research, volunteer opportunities, and trainings. All parties will meet annually to evaluate, maintain, amend, and monitor the resource management plan and develop an annual joint work plan that

sets the yearly priorities for BENM, and engage in quarterly meetings to collaborate and consult with the Tribes on land management priorities. This process has the potential to be replicated in Indigenous sacred and ceremonial areas around the country as a way to create a clear and extensive co-management agreement.³⁴

12) The Snowchange Cooperative is an independent non-profit developed out of northern Finland in the early 2000s through collaboration and cooperative agreements across Finland, Russia, Canada, and Indigenous groups within the three northern regions.³⁵ Snowchange functions primarily as a network and scientific organization devoted to the preservation and documentation of Indigenous knowledge and traditional ecological knowledge with a heavy emphasis on advancing community based work and community controlled national efforts to mitigate climate change impacts, enhance biodiversity and protect waterways. The cooperative's current work centers on landscape “rewilding” which outlines a large-scale process to restore rivers, lakes, forests, peatlands, and wetlands to serve as biodiversity hotspots and carbon sinks to eventually lead to the return of species, water tables, ecosystem revitalization, and carbon trapping to benefit local communities and interconnected catchments. Snowchange owns 8800 hectares of recovering land, and partners with land concessions on 62,000 hectares. The Rewilded sites are utilized as Indigenous and Community Conserved Areas. Current sites include the Njauddamn River Collaborative Management with the Sámi people in the Lapland, the flagship wetland and peatland site of Linnunsuon Kosteikko, and the protected

³⁴ Bureau of Land Management. “Bears Ear National Monument Record of Decision and Approved Resource Management Plan .” US Department of Interior, Bureau of Land Management , January 2025. https://www.bearscoalition.org/wp-content/uploads/2025/01/BENM_BLM-ROD_20250114_508_signed.pdf.

³⁵ Snowchange cooperative. Accessed April 21, 2026. <https://www.snowchange.org/>.

biodiversity hotspot of Kivisuo. Each site is inventoried using scientific analysis of GHG data, species of relevance, vegetation surveys, and limnological stocktaking through the support of cultural heritage and community-based monitoring.³⁶ Within the co-management approach that Snowchange engages in with Indigenous people, they employ methods such as conducting initial oral history reports with the local community to establish a scientific overview of existing biodiversity values, and utilizing toponymic place knowledge, and Indigenous scales of time to inform land stewardship. For example, Snowchange engaged in interviews with Komi Elders to collect general oral histories of hunting, fishing, and land oppression during the Soviet era, but also to monitor environmental and weather changes using their local knowledge of the land to observe changes such as increase in mosquitoes or seasonal differences in species behavior now versus the past. Specific cultural recommendations emphasize the need to talk with and map cultural knowledge now due to knowledge holders getting older. These recommendations include creating signs, brochures, and posters to preserve and share cultural history and knowledge, mapping of place names in their original and local language, and potentially develop national parks to conserve the land.³⁷

- 13) Volume 1 and 2 of the Status of Tribes and Climate Change Report (STACC) was created by the Institute for Tribal Environmental Professionals (ITEP) and funded by the Bureau of Indian Affairs (BIA) Tribal Climate Resilience Program as a way to elevate Indigenous Knowledge Systems (IKS) within climate science and educate people on the

³⁶ Snowchange. Accessed April 21, 2026. <https://www.landscaperewilding.org/>.

³⁷ Mustonen, Tero, and Pauliina Feodoroff. "Ponoï and Näätamö River Collaborative Management Plan ." Snowchange Cooperative , 2013. https://www.snowchange.org/pages/wp-content/uploads/2014/05/Naatamo_sisus_1205_p.pdf.

relationality of climate within Tribal communities. The STACC Working Group of Indigenous authors range from all different Tribes, environmental organizations, and institutions. In the creation of this report, there was a steering committee that met every other week to discuss the concepts included. In addition, there was a team of narrative authors that contributed personal perspectives and experiences in climate change work. The peer review process for this report covered four aspects—internal peer review by authors of the report and ITEP staff, federal agency review from representatives of the BIA, single blind external peer review by three scholars, and final author and steering committee review. The peer review process was incredibly in-depth due to the sensitive, diverse, and inclusive nature of the report. The report itself was written for Tribal managers, leaders, and community members, climate assessment teams, federal and state agencies, non-governmental organizations, and other decision-making bodies. Indigenous people and Tribes across the world could utilize this specific process in their own natural resource management reports to integrate traditional knowledge. For example, a specific Tribe could emulate the STACC report process, by recruiting narrative authors that hold traditional knowledge on a specific topic or knowledge system such as cultural burns, while engaging scholars and other professionals in peer review. The broad nature and audience of the STACC report makes it an ideal example of how to cater to a specific audience in a respectful and culturally appropriate way while centering Indigenous knowledge systems. The overall report contains key messages on the necessity to have a deep relational understanding of IKS and how it is essential to responding in the climate crisis, cross-cutting recommendations to emphasize the need of IKS in environmental stewardship, specific recommendations for Indigenous-led conservation and resource

management, changes toward knowledge hierarchies, and the fostering of intergenerational knowledge in Indigenous-led stewardship. With each chapter reflecting the topic as well as including background knowledge, current examples, and specific recommendations.³⁸

14) The Naxi Seedpark or Stone Village is governed by four Naxi-Moso mountain communities along the Jinsha river in the Yunnan province of southwest China. The seedpark itself is a community-managed biocultural heritage territory (BCHT) informed by the Potato Park in Peru that utilizes cultural knowledge from the Dongba religion that the Naxi-Moso communities engage in. The agriculture in the villages depend on terrace farming and irrigation systems that have been subject to rapid economic development and negative impacts due to climate change which lead to the decline of traditional culture and farming knowledge. To combat this, the Farmers' Seed Network (FSN) started working with the villages to strengthen the internal governance and capacity of the Four Village Network to create a model for effective village participation and co-management, to cooperate with research institutions in sustainable conservation and the use of farm seeds, plants, and traditional ecological culture, and to support development of ecological agriculture, eco-tourism, enhance the market value of agricultural products and the level of community diversified livelihoods, and strengthen climate resilience. Using this approach, each community organized into a network to feature different cultural resource management and adaptation systems. The traditional

³⁸ Adams, M. M., Leonard, K., Montano, N. M., Walker, A., Sindoni, R., & Panek, B. M. (2025). Good Fire and climate change: The return of Indigenous fire stewardship. In B. M. Panek (Ed.), *Status of Tribes and Climate Change*, Vol. 2. Institute for Tribal Environmental Professionals, Northern Arizona University. <http://nau.edu/staccreport>

governance system of the Naxi-Moso communities is one rooted in religion, landscape, and kinship. For example, conservation of sacred sites that are protected by specific Gods and Goddesses. The Dongba religion is deeply integrated into conservation and sustainability within the territory. Across the four villages, knowledge holders are working to teach Dongba language and symbols, establish seed banks and cultural museums, enforce traditional practices and encourage Elders to oversee management processes to engage in an integrated socio-ecological system perspective, and a community-based participatory action research approach. The network engaged in a free, prior, and informed consent process with community leaders to address research questions through oral histories, focus groups, semi-structured interviews, participatory natural resource and biodiversity mapping, and village meetings. The primary participants were respected Elders and knowledge holders, women farmers, and youth. The outcome of this research included two books on the biocultural history of one of the four villages, and an oral history of the culture, creation of stories to form community-based adaptation cases published on UNEP and FSN website, two workshops between the villages, community leaders, researchers, and Elders to strengthen connections and promote the exchange of seeds and traditional wisdom, and a FSN report for COP 15.³⁹

- 15) Tūpuna Maunga o Tāmaki Makaurau Integrated Management Plan (IMP) is a co-management plan for the Tūpuna Maunga or ancestral mountains in New Zealand.

³⁹ Song, Yiching, Guanqi Li, Yanyan Zhang, Xin Song, and Krystyna Swiderska. Indigenous Naxi-Moso Cultural Values and worldviews for sustainable development: Four village biocultural heritage coalition, Yunnan, china | International Institute for Environment and Development, August 2021. <https://www.iied.org/20376g>.

Under the Tāmaki Collective Treaty settlement in 2014, the Tūpuna Maunga were returned to the Mana Whenua Tribes in Auckland, NZ which resulted in the Tūpuna Maunga Authority which created equal co-governance of the mountains between the Tribes and Auckland Council. The collective legal entity of the mountains is held in the Tūpuna Taonga o Tāmaki Makaurau Trust. The Tūpuna Maunga Authority is composed of six representatives from the Tribe, six representatives from the Auckland Council, and one non-voting government representative. While the ownership of the mountains falls under the Trust, the governance and decision-making is overseen by the Authority, and day-to-day management is overseen by the Auckland council under the accordance of the collaborative annual operational plan and agreed upon operating procedures. The IMP is the principal policy for the mountains, which acknowledges the traditional knowledge used by the Māori people, creates the foundational values of restoration, protection, and management of the mountain, replaces the former reserve management plan, and puts into place the ‘Values and Pathways’ of the plan of which include: spiritual, cultural and heritage, landscape, ecology and biodiversity, living connection, economic and commercial, and recreational values. The IMP is implemented in phases and each ‘Value and Pathway’ will have their own individual plan within the whole IMP to guide overarching strategies, guidelines, Tūpuna Maunga plans, and operational planning framework. Under the implementation of this plan, there will be a monitoring strategy for Tūpuna Maunga which will address the effectiveness of the guidelines, strategies and plans. This monitoring will incorporate a heritage inventory, aerial records of Tūpuna Maunga, Waahi tapu / Waahi taonga where desired by mana whenua, flora and fauna, animal and plant pests, erosion, and structural and road management. Traditional Maori

knowledge will also be integrated into the monitoring system through the incorporation and acknowledgement of sacred places such as Tihi, restoration and promotion of cultural features, valued land forms, and natural and geological features, integration of traditional Te Aranga design features, building of culturally relevant, low-impact, and locationally appropriate structures, culturally relevant signage and art that reflects mana whenua worldviews, and the use of statutory advocacy. There will be a triennial monitoring report prepared for the mountains, and the IMP is reviewed every 5 years.⁴⁰

- 16) The Cuyabeno Wildlife Reserve in Ecuador includes 11 Indigenous communities within 5 nationalities. Living within the reserve boundaries are approximately 600 Indigenous people. Due to the threat from oil and timber extraction, illegal hunting and trafficking of wild species, monocultural agriculture model, the expansion of agriculture into Indigenous territory, and the rise of tourism. Multiple established “Use and Management Agreement” of the land between Indigenous organizations and the Wildlife Reserve were created due to the negative impacts of threats. The main purpose of the agreements was to preserve the biological and cultural integrity of the reserve under an alliance between Ministerio del Ambiente Ecuador (MAE). The enabling factors in the success of the agreements were the empowerment and active participation of Indigenous organizations in the area, negotiation strategies between the organizations and the government, MAE’s openness to participatory planning processes, premonition of the sustainable use of natural resources, and the acknowledgment of the protected area by local communities.

⁴⁰ Tūpuna Maunga o Tāmaki Makaurau Authority. Tūpuna Maunga o Tāmaki Makaurau Integrated management plan, November 2022.
https://maunga.nz/assets/Integrated-Management-Plan/Tupuna-Maunga-Integrated-Management-Plan-Amended-2022_FINAL.pdf.

These agreements allowed for the creation of Indigenous land boundaries, the establishment of protected areas, and the promotion of Indigenous rights to live in the Reserve and exert their rights for natural resources.⁴¹ An example of this can be seen by the Zábalo Indigenous group within the reserve. The Zábalo have their own governance system called *sampima coiraye*, or care for the forest based on deep ecological knowledge and place-based understandings of land stewardship. For example, a reciprocal species-based regulatory system on hunting, exploitation of forest resources, and over fishing. The agreements also allowed for the successful incentive and conservation strategy of Socio Bosque. This strategy created a financial incentive for private landowners, farmers, and Indigenous communities that are committed to the conservation and protection of the forests within the Reserve which resulted in 86,000 hectares of preserved land within the Reserve that reduced the risk of agricultural advancement. Socio Bosque worked with Indigenous communities to engage in tourism activities to allow for sustained co-management of natural resources within the communal spaces of the Reserve.⁴²

- 17) The Dhimurru Land Management Aboriginal Corporation is located in the Northern Territories of Australia and aims to address natural and cultural management priorities identified by its members. To address environmental impacts due to climate change, and uncontrolled access to Dhimurru land, the corporation has established a ‘two-ways’

⁴¹ Borbor Laínez, Luis Alberto. “An Example of Governance and Participation of Indigenous People and Nations in the Management of the Cuyabeno Wildlife Reserve, Ecuador | Panorama.” Panorama Solutions for a Healthy Planet, September 2025.

<https://panorama.solutions/en/solution/example-governance-and-participation-indigenous-people-and-nations-management-cuyabeno>.

⁴² Esbach, Michael S., Carlos Urgilés-Verdugo, Wendy R. Townsend, and Carlos Yiyoguaje. “Hunting for Sustainability: Indigenous Stewardship in the Cofán Territory of Zábalo.” Conservation Letters 17, no. 6 (2024). <https://doi.org/10.1111/conl.13065>.

approach in which Indigenous and non-Indigenous knowledge is used with final decision-making being made by the corporation as the land owners. Under this land management, the corporation has executed a number of ecological projects such as traditional fire management resources, the establishment of the Dhimurru Indigenous Protected Area, and the creation of the Dhimurru Ranger scheme to build local capacity and skills to manage resources. The corporation is also involved in land management agreements with other organizations such as the Northern Land Council, Environment Australia, and the Parks & Wildlife Commission NT. The current land management agreement establishes an advisory group to provide formal recommendations of the land management, recognizes Dhimurrur Land Management Aboriginal Corporation as the agency established by the Aboriginal Yolngu land owners for managing natural and cultural resources, requires a plan of management, and delegates the issuing of visitor permits for recreation areas within the territory. Biodiversity conservation within the territory uses regulatory mechanisms such as the Indigenous Protected Area agreement with the government to support Dhimurru priorities, the Land Management Agreement, and the implementation of laws to enforce protection for recreation areas. It also uses financial mechanisms such as visitor permit income to fund land-management activities, contracting of services, and merchandising of products developed by Dhimurru, and community/motivational mechanisms such as education, awards, and philanthropy. Success measures built into land-management include the ‘two-ways’ approach, landscaping, biodiversity objectives, traditional resource management, effective partnership, and the use of agreements backed by community, state and commonwealth. This agreement can be replicated to broader Indigenous groups across the world by

establishing advisory groups for the specific region of tribal land to provide recommendations for land management. This could allow for whichever Indigenous group or Tribe to exert their sovereign land rights as a way of land management recognition and land management planning of a certain space/forest/ecosystem. A potential replication of this could take place in a specific treaty land such as a national forest. This would enable the Tribe to enforce their own rules and regulations on the land, engage in treaty rights such as hunting and gathering, engage in ceremonies, as well as engage in financial benefit for regulation of the permits on the land for visitation, camping, or leisure.⁴³

18) The Moolawang Ngayagang Yanba program under the Norwegian Research Council Project of The Integration of *Indigenous Knowledge Systems into Mapping, Planning and Environmental Decision Making: The Role of Community-Based Impact Assessments as a Strategic Planning Tool* (INDKNOW) is a 13 week Aboriginal knowledge informed program implemented on Lake Illawarra in New South Wales. The program was led and facilitated by an Aboriginal knowledge custodian of the Illawarra region. Throughout the weeks, the participants connected with localised Aboriginal cultural knowledge, Aboriginal environmental management approaches, and Aboriginal ways of Caring for Country. Each week of the program was organized differently with weeks ranging from full day face to face workshops on the lake, self-guided learning modules, online group discussions, and workshops on applying decision-making. The placed-based program

⁴³Roeger, Steve. "DHIMURRU LAND MANAGEMENT ABORIGINAL CORPORATION (NORTHERN TERRITORY)." INTEGRATION OF BIODIVERSITY INTO REGIONAL NRM PLANNING, n.d. <https://www.dcceew.gov.au/sites/default/files/env/resources/7bb0f4d3-aa76-4367-bf97-648d208acf1b/files/dhimurru.pdf>.

took non-Indigenous planners, scientists, decision makers, and community members to develop a relationship with the Lake to impact their future decision-making processes, and be introduced to the relational and generative way of Aboriginal knowledge using Aboriginal relational philosophy known as Maramal. Maramal is an interconnected set of frameworks used to identify Aboriginal worldview with an emphasis on land-based knowledge that needs to be learned in a hands-on and personal structure. The frameworks include Country, Kinship, Culture, Journey, and Connectedness which coincide with the Respect, Responsibility, Reciprocity, Regularity, Routine, and Relevance. These frameworks were taught by the Aboriginal facilitator through pictures, collages, short stories, poems, paintings, and dioramas. The outcome of this program found that participants were able to effectively create relationality with the people and land around them in a way that fostered multiple ways of knowing. The participants also believed that this program was fundamental in changing their view of the Lake and land-management for the better.⁴⁴

19) Social science focused ecosystem-based management between the Nuu-Chah-Nulth First Nations Forestry department and the Scientific Panel for Sustainable Forest Practices in the Clayoquot Sound wove together Traditional Ecological Knowledge and western science to create silvicultural systems of variable retention. This created a prime example of how both sciences can be used together for effective ecosystem management in forestry. The Clayoquot Sound Scientific panel was created by the government of British

⁴⁴ Kennedy, Jade, Catherine Howlett, Michelle Voyer, and Monica Seini. "Moolawang Ngayagang Yanba:Developing Relationships with Lake Illawarra", *Arctic Review on Law and Politics* 15, 1 (2024): 180-201, doi: <https://doi.org/10.23865/arctic.v15.6301>

Columbia to create innovative standards for sustainable forest management in the Clayoquot Sound's old-growth temperate rainforests which at time was a highly contested environmental conflict due to clearcut logging and industry. The panel included four members of Nuu-Chah-Nulth First Nations, each with their own expertise in traditional knowledge, history, language, culture, and resource use. The success of this collaborative management came from the adoption of the Nuu-Chah-Nulth inclusive process for the basis of decision-making and the commitment of panel members to using it. This process is characterized by a shared mutual respect, reciprocal inclusivity, and a shared commitment to working towards the common goal of a healthier planet. The process was based on the respect-based principle of everyone having the right to speak, to be heard, and to be understood, while allowing constructive disagreement. The panel expressed that the process created space for each member to exercise patience, flexibility, tolerance, endurance, and faith, while characterizing inclusive respect for all individuals and their values and opinions about knowledge systems, and creating space for open dialogue and consensus. The foundational underpinnings of this process focused on Nuu-Chah-Nulth spiritual teachings in addition to traditional ecological knowledge to create a relational Nuu-Chah-Nulth foundation in the ecosystem-based management and to engage cultural literacy, and the use of Hahuulhi or Nuu-Chah-Nulth traditional stewardship of the land, water, and resources, as a property model to determine ecosystem management within the traditional boundary lines to develop cross-cultural skills. This integration of Nuu-Chah-Nulth knowledge and western science created the space for effective ecosystem-based management in Canada. The integration of Nuu-Chah-Nulth knowledge can be replicated to any Indigenous group and their

knowledge systems. Specifically in the creation of an inter-disciplinary panel that encompasses different aspects of intertwined Indigenous knowledge holders, government officials, and ecosystem based scientists. This panel can be rooted in any specific Indigenous decision-making sciences to conform to the place-based knowledge systems in the area. Each Indigenous group can follow the lead of the Nuu-Chah-Nulth and integrate their own spiritual customs and ceremonies, and community and Elder knowledge to create their own standards in forest or land management.⁴⁵

20) The Indigenous Phenology Network (IPN) is a grassroots organization that focuses on understanding ecological changes in seasons and life cycles, and the impacts to land and species that are significant to Indigenous people. The network focuses on relationship building, Indigenous community centered work, and weaving both Indigenous and western knowledge systems. The network uses the foundation of reciprocal principles in their work known as the Relational Doctrine. The Doctrine focuses on kinship between all things in the natural world, ancestral teachings similar to the seven grandfather teachings, intergenerational and land-based learning, neighborhood and community priority, sustainable economic development, work in policy sectors, and resource regeneration. The network is currently partnered with the Olohana Foundation, the Fort Belknap Indian Community, the USA National Phenology Network, the National Ecological Observatory Network, the American Indian Higher Education Council, and the Smithsonian Institute. The network has a fluid Information Rights protocol when

⁴⁵ “A Vision and Its Context: Global Context for Forest Practices in Clayoquot Sound.” Clayoquot Sound Scientific Panel. Accessed April 21, 2026.
https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-resource-use/land-water-use/crown-land/land-use-plans-and-objectives/westcoast-region/clayoquotsound-lud/clayoquot_lud_scientificpanelrpt_vision.pdf.

uploading plants into the USA National Phenology Network Nature's Notebook System to make sure it falls within respect and recognition of the Tribe it is connected to.⁴⁶

Current work being done by the IPN include ongoing agro-ecological efforts for gardens and trails such as the Phenology Learning Path at the College of Menominee Nation. This project in particular created a public trail on the College of Menominee campus that encouraged people on the trail to contribute their phenological observation on the trail to an online data collection site. The public trail included signage of the culturally important plants on the trail which included their names in the Menominee language. The goal of this path is to monitor the changes in the plants but to also empower the students in phenology, ecology, and culture. This project can be replicated for any Indigenous knowledge, for example Anishinaabe knowledge within tribal land in National Forests. This kind of project could contribute to a wider database of the monitoring of phenology of the area using community observations and knowledge. Which could then be used to inform resource management practices in the area.⁴⁷

- 21) The Indigenous Navigator is a set of data focused resources that allow Indigenous people, organizations, communities, NGOs, and journalists free access to Indigenous made community-generated data. The Navigator monitors the UN Declaration on the Rights of Indigenous People, human rights conventions and conferences that are relevant to Indigenous people, sustainable development goals, and outcomes of the Work Conference on Indigenous Peoples.

⁴⁶ "Indigenous Phenology Network." Indigenous Phenology Network | USA National Phenology Network. Accessed April 21, 2026. <https://www.usanpn.org/community/IndigenousPhenologyNetwork>.

⁴⁷ Lenart, Melanie. "Shifting Seasons: A Phenology Project at College of Menominee Nation Is Monitoring the Impact of Climate Change on the Region's Forests." Native Science Report, June 7, 2021. <https://nativesciencereport.org/2021/06/shifting-seasons/>.

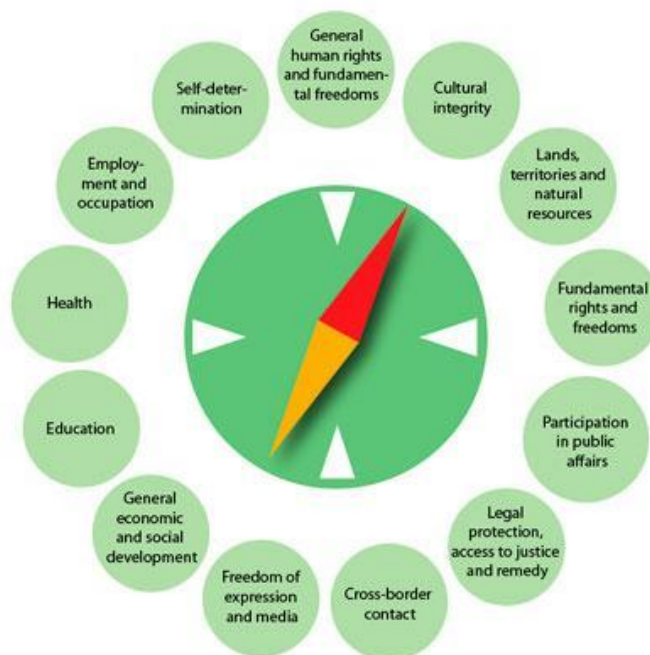


Figure 5. ⁴⁸

The development of this tool was in response to the lack of quality data that concerned Indigenous peoples human-rights and sustainable development monitoring processes at community, local, regional, national, and international levels. As well as allows for the facilitation of Indigenous communities to generate and monitor their own data. This can serve the purpose of raising awareness for Indigenous rights and empowerment, guide self-determination and Indigenous-led governance, hold states accountable, ethically deliver data on Indigenous communities, provide evidence for compliance, guide policy and development programs, and garner attention for the recognition and protection of Indigenous rights. Specific tools for the Navigator include a database and comparative matrix to track changes in legislation and covered domains for guidance and methodology, comprehensive questionnaires for Indigenous groups to use to collect

⁴⁸ The 12 thematic domains from the UNDRIP's 46 articles that the Indigenous Navigator developed indicators for.

qualitative and quantitative data, the Indigenous Navigator Index which rank countries performance with recognition and implementation of Indigenous peoples rights, and indicators framework that detects gaps in policy implementation, holds people accountable, and monitors implementation strategies. A specific example of exploration could be in collaboration, and co-stewardship within tribal governments and federal agencies. Specifically, in a way that creates a database of community-based monitoring metrics that could be used to inform and guide decision-making in natural resource management. This database would give all parties consensual access to Indigenous knowledge within program and management development. Tribal members, and other Indigenous scientists could potentially contribute to this database to give feedback on current management practices.⁴⁹

22) CHIRAPAQ, or the Centro de Culturas Indigenas del Peru (Center for Indigenous Cultures of Peru) under Transformative Pathways is rooted in the continued progression and development of Indigenous Andean and Amazonian life systems through the organizational processes for action, advocacy, and cultural positionality in national and international policy spaces that need critical cultural engagement. Their main areas of work include the strengthening of intercultural citizenship of Indigenous people while promoting the visibility of discrimination that Indigenous people face, fighting against gender violence, health, and education inequity that exists for Indigenous women and children, increasing participation of Indigenous women in decision-making processes, and revitalize community-based management and ownership of land to combat

⁴⁹ “What Is the Indigenous Navigator?” Indigenous Navigator. Accessed April 21, 2026. <https://indigenousnavigator.org/what-is-the-indigenous-navigator>.

environmental issues caused by land insecurity, climate change, and lack of Indigenous representation in leadership. The methodologies that CHIRAPAQ uses include three fundamental pillars of gender equality, intergenerationality, and interculturality to promote the mission of generating and supporting human rights of Indigenous people. The specific sectors of work that they engage in cover Indigenous food sustainability, the use of Indigenous knowledge to combat climate change, the use of Indigenous communications to engage in storytelling based activism, the promotion of intercultural education, fighting against gender violence, the protection and preservation of Indigenous intellectual property, fighting against racism and discrimination, and working towards health equity for Indigenous communities. To support communities in this work, there is training to strengthen Indigenous leadership and support CHIRAPAQ's overall mission. The methodology used in the training is built off of the "peer-to-peer" and "learning by doing" approaches, and the cultivation of inclusive and safe learning environments to create empowerment in Indigenous communities. The training modules are created and published by CHIRAPAQ to include a number of readings, videos, presentations, and digital tools. Each training is adapted to be offered at community, regional/national, and international levels and cover workshops, online courses, discussions, seminars, and in-person meetings. Each community program lasts three years, and each regional/national and international program lasts six to nine months to ensure competency in organizational strengthening, public policy advocacy, human rights promotion, and civic participation. With a final diploma being granted at the completion of the program. This could broadly be used within Tribal context to create training modules for community members that include workshops and readings of place-based

Indigenous knowledge to increase cultural competency which can include women's roles, land revitalization and stewardship, hunting/trapping, food sovereignty, data sovereignty, and/or other topics that each Indigenous group needs.⁵⁰

23) The establishment of a Biocultural Heritage Territory in collaboration with the Kenya Forestry Research Institute (KEFRI) and the Mijikenda Indigenous group in Rabai Kenya in the Kaya forests was implemented to conserve biodiversity in sacred forests and surrounding landscapes in a way to revitalize pre-colonial land stewardship practices and to establish community-led in site gene banks. This task was known as the 'Darwin project'. The projects objectives were to enhance climate resilience and food security by sustaining natural resources, traditional crops and resilient crops in Rabai, promote economic development by developing value-added products and services rooted in biodiversity and traditional knowledge as seen through ecotourism, protect community rights to the land and resources while practicing their rights to self-determination, and promote traditional ecological values like Rabai 'Mudzini' concept. To help guide project initiatives and engage stakeholders, participants established a project advisory committee that included representatives from KEFRI, Kenya Agriculture and Livestock Research Organization, Kaya Elders, local administration (area chiefs), village Elders, community researchers, and county government departments. The committee has ten members including women, youth, Christians, and Muslims. Utilizing the Potato Park decolonising action-research approach, the Indigenous Rabai in Kaya are promoting traditional knowledge being passed down using traditional research methods such as participatory transect walks and story-telling. The primary methodology used in this process was

⁵⁰ "Chirapaq Español." chirapaq.org.pe. Accessed April 21, 2026. <https://www.chirapaq.org.pe/es>.

rooted in community dialogue as a way to revalue the knowledge and leadership of Indigenous communities, share generational knowledge from Elders to youth, and engage in reciprocal and relational storytelling. The indicators for the success of this project focus on income levels, gender inclusivity, community and Kaya Elder empowerment, forest degradation status of tree density and diversity, attitudes towards Elders, and community involvement in cultural ceremonies. Community gatherings included conversation between 50 Rabai community members including Elders, community researchers, women and youth, representatives from local governments, KEFRI, and the National Museums of Kenya with a focus on eliminating power dynamics through the use of traditional physical spaces. Each day of the gathering integrated Indigenous knowledge systems to inform and guide conversation such as traditional prayers, open dialogue on the revitalization of Rabai culture such as clan groupings and customs and discussion within clan groupings to cover the effectiveness of clan dialogue in reviving cultural practices.⁵¹

24) The Columbia River Inter-tribal fish commission was created by the Confederated Tribes and Bands of the Yakama Nation, the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation of Oregon, and the Nez Perce Tribe in 1977 to create a unified voice in fisheries management. The commission runs on a consensus mode where each member Tribe receives one vote so that each action may only be granted if there is agreement between the four Tribes. This model allows for unified power when dealing with organizations and governments

⁵¹ Swiderska, Krystyna, Simon Mitambo, and Mwaniki Mwanaah. Establishing a biocultural heritage territory in Rabai, November 2025. <https://www.iied.org/22684iied>

outside of their own. The commission's projects cover restoration of specific first species and habitats, research, and climate change adaptation plans from the four Tribes, and the Columbia River Basin. Community members and knowledge holders are integrated within these plans to utilize community engagement and traditional knowledge systems. For example, in the *Wy-Kan-Ush-Mi Wa-Kish-Wit*, or the Spirit of the Salmon Plan, Elder and communal knowledge of changes in phenology, historical fishing traditions, and relationships from ceremonies and other traditional knowledge was used as a documentation principle that was foundational to the rest of the plan. Another example of the involvement of community knowledge can be seen in the Yakama Climate Adaptation plan in which Tribal Elders shared their observations in the change of harvest times for their first foods. The management and enforcement of the commission is through policy support and workshops, an Inter-Tribal Police Department, archeological protection, victim assistance program for people that have experienced environmental harm and abuse, a tip line for suspicious fishing activity, and a mobile command center. The commission also provides scholarship and internship opportunities for students, Salmon Camp, presentations and toolkits for schools, and various public resources on the work being done.⁵²

25) The Native American Rights Fund (NARF) created the Sovereign to Sovereign Cooperative Agreements repository through partnerships between the NARF and the University of Montana Bolle Center for People and Forests, the Gallagher Law Library, and the Native American Law Center at the University of Washington School of Law to

⁵² "Who We Are." Columbia River Inter-Tribal Fish Commission, November 4, 2021. <https://critfc.org/about-us/who-we-are/>.

develop an online repository of materials that concern tribal and federal land co-management to consolidate resources on sovereign to sovereign cooperative land management agreements and practical applications. The creation of the repository followed principles from the UN Declaration on the Rights of Indigenous Peoples, and the free, prior, and informed consent of all Tribes included in the material prior to making them public. This includes a data sovereignty protocol that respects the rights of the all involved Tribal nations. The repository contains materials that deal with agency authorities, laws and regulations, agency guidance, Tribal guidance, federal landscape planning, Tribal consultation, public disclosure, Indigenous knowledge and co-knowledge production, dispute resolution, sacred places, and scholarship and webinars. This repository can utilize evidence-based research that justifies the use of Anishinaabe knowledge systems within natural resource management. Specific materials that can be referenced include papers under the ‘Scholarship’ tab, of which include topics on ‘Co-Management Frameworks’, ‘Tribal Interests and Co-Management’, “Foundational Cases of Tribal Co-Management in the U.S.”. “Examples of Co-Management/ Co-Stewardship”, “Sub-Delegation Doctrine & Inherently Governmental Functions”, “Consultation”, “Traditional Ecological Knowledge (TEK), Indigenous Knowledge & Co-Knowledge Production”, “Confidentiality & Indigenous Data Sovereignty”, “Landback”, and “Treaty Rights”. With an emphasis on “Traditional Ecological Knowledge (TEK), Indigenous Knowledge & Co-Knowledge Production” which contain examples of Tribes in the Arctic and West Coast that centralized their traditional knowledge systems.⁵³

⁵³ The Native American Rights Fund, the University of Washington School of Law, the Henry Luce Foundation, the Wilderness Society, the Bolle Center for People and Forests at the University of Montana, the Native American Law Center at the University of Washington School of Law, the Wilburforce Foundation, and First Nations Development

26) The Swinomish Community Environmental Health Indicators evaluate the health of the Swinomish and Coast Salish people and the impacts from climate change on the Coast Salish Sea. The environmental health indicators employ ecological, biophysical, and social disciplines to identify coastal adaptation for Coast Salish communities. The indicators have two main goals 1.) Depict non-physical aspects of community health 2.) Illustrate how Indigenous community health is affected by climate change impacts on their Indigenous foods, habitats, and archaeological resources. The Swinomish Tribe collaborated with Tseleil-Waututh First Nation, USGS Pacific Coastal and Marine Science Center, and Western Fisheries Research Center to engage in scenario modeling, and indicator sensitivity assessments to reach their goals. The Environmental Health indicators used the Indigenous Health Indicators in the context of climate change for this project. The Indigenous Health Indicators include “Community Connection” in which members of the community actively participate in community function and help out in harvest, preparation, and storage of natural resources, “Natural Resources Security” in which the local natural resources are abundant and accessible to a healthy community, “Cultural Use” in which the community is able to use their natural resources to perform their cultural traditions in a respectful and fulfilling way , “Education” in which knowledges are passed down from generation to generation within the community, “Self-determination” in which communities develop and supervise their own healing, development, and restoration programs, and “Well-being” in which community members maintain connections to meaningful locations without future risk. The five tasks in their

Institute. “Sovereign-to-Sovereign Cooperative Agreements.” University of Washington School of Law. Accessed April 21, 2026. <https://lib.law.uw.edu/cooperative/introduction>.

methodologies include finalizing project collaboration through MOUs to have a clear understanding of the purpose of the project, data collection, access to data, review of data, and dissemination of the findings. Compiling existing data on chosen environmental indicators for the two communities to include land within reservation/reserve boundaries, appropriate indicators for both communities, and sufficient existing data for the indicators. Compiling community health data within its respective Indigenous Health Indicator and Environmental Indicator. Piloting the testing in facilitated workshops in the community to collect demographic data, evaluate and rank the current health status, discuss maps and data of climate change impacts, evaluate and rank the indicators for future use, and assess priority concerns. The last task was the community health impact assessment that used impact assessment metrics to result in either the positive or negative change between current and future health status for each indicator, and weight the priority of each indicator. The results of these indicators will hopefully be able to develop and inform policies that promote coastal property development setbacks, buy-outs, or land swaps to accommodate long-term community health and ecosystem function as well as hazard mitigation. Next steps include integrating even more biophysical and social sciences.⁵⁴

27) The community-based Monitoring (CBM) research approach created by the Wildlife Conservation Society Canada is rooted in the epistemology of “Watching, listening and learning to understand change”. It is grounded in Multiple Evidence Based (MEB) Approach that offers a framework developed and adopted by the UN Intergovernmental

⁵⁴ Donatuto, Jamie, Eric E. Grossman, John Konovsky, Sarah Grossman, and Larry W. Campbell. “Indigenous Community Health and Climate Change: Integrating Biophysical and Social Science Indicators.” *Coastal Management* 42, no. 4 (June 27, 2014): 355–73. <https://doi.org/10.1080/08920753.2014.923140>.

Science-Policy Platform on Biodiversity and Ecosystem Services to integrate Indigenous, local, and scientific knowledge for sustainability. The community-based monitoring (CBM) approach rooted in the MEB approach was created to reflect the interest and needs of the local community in relation to environmental change. The CBM approach ranges from external monitoring designed and implemented by researchers, contractors, and consultants, often with funding from government agencies, non-government organizations, or industry, to locally based, community driven monitoring based in Traditional Ecological Knowledge. The CBM toolbox contains several approaches of which are observer based documentation that center community based monitoring methods, seasonal calendars as metrics, and Indigenous Language Documentation to incorporate place names on the land. Specific approaches that can be utilized include “sentinel” or “patrol” in which communities observe, monitor, and collect data on issues of concern, examples include diaries by fisherman, hunters, or trappers. “Surveying Human Sensors” approach in which interviews or community meetings are utilized to discuss perceptions of environmental statuses regarding species, processes, or functions. The “Maintenance Monitoring” approach that involves community members as the primary data collectors of environmental risk observation. The most successful CBM projects tend to focus on the issues expressed by the community, engage the community in governance, and cost less. Examples of successful projects that utilize CBM range from species monitoring through the Community Moose Monitoring Project, traditional territory monitoring through the Coastal Guardian Watchmen Network, and monitoring development activities through the Mikisew Cree First Nation CBM project. The development of a CBM framework that utilizes Anishinaabe science that community

members hold would be ideal to highlight the need for meaningful involvement of Indigenous partners and training in Anishinaabe methods of observing, understanding, and disseminating information. As the Anishinaabek use their own science on the land, the CBM toolkit can be adapted to highlight and lift up the knowledge systems that are being observed.⁵⁵

28) *Bridging Indigenous and Western Sciences in Freshwater Research, Monitoring, and Management in Canada* seeks to discuss the challenges of bridging the two different sciences through the analysis of published case studies that do bridge the two sciences in ecological research, monitoring, or natural resource management across Canada's aquatic ecosystems. The primary research questions looked at "What methods, models, and approaches have been used in studies that seek to bridge Indigenous and western sciences in freshwater research, monitoring, or management in Canada?". Methodology primarily included systemic mapping of empirically reported articles. The articles used went through a thorough statistical screening process, as well as having to meet specific criteria such as 'studies focused on ecological research and monitoring that report a direct or indirect observation from Indigenous and western science, studies focused on the processes or practices of bridging knowledge systems within decision-making, and studies concerned with perceptions of ecological or environmental phenomenon. After the articles were found and screened they were then put into a database in the form of a map based on case studies. The geographical distribution found that the most articles came

⁵⁵ 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.

from British Columbia, and the Northwest Territories.⁵⁶ The analysis of the articles found that community-based participatory research was the most prevalent methodology, and that there were four different Indigenous methodologies used: Indigenous Métissage or the decolonizing research methodology that braids Indigenous and Canadian histories, stories, and places, for example, place-education or storytelling from the community. Spirit-Centered or the knowledge that Anishinaabe methodology must always utilize spirituality, for example, the use of tobacco as an offering in exchange for knowledge or support. Two-eyed Seeing or the utilization of both Indigenous and western knowledge to engage in meaningful collaboration.⁵⁷ Lastly, Anishinaabe Mino-Bimaadiziwin or the ‘Good Life’ that centralizes Anishinaabe ways of knowing with an emphasis on willing participation that transcends the binary to intertwine Indigenous methodology and epistemology, for example being grounded in the Seven Generations Principle. In addition to these Indigenous methodologies, there were four western methodologies that were adapted into Indigenous cultural context. Those include mixed methods, Emic-etic approach, community-based participatory research, and storytelling. This article hopes to use this information as a way to utilize all forms of knowledge to strengthen decision-making to impact policy, management, and research.⁵⁸

⁵⁶ Alexander, Steven M., Jennifer F. Provencher, Dominique A. Henri, et al. “Bridging Indigenous and Western Sciences in Freshwater Research, Monitoring, and Management in Canada.” *Ecological Solutions and Evidence* 2, no. 3 (2021). <https://doi.org/10.1002/2688-8319.12085>.

⁵⁷ Bartlett, Cheryl, Murdena Marshall, and Albert Marshall. “Two-Eyed Seeing and Other Lessons Learned within a Co-Learning Journey of Bringing Together Indigenous and Mainstream Knowledges and Ways of Knowing.” *Journal of Environmental Studies and Sciences* 2, no. 4 (2012): 331–40. <https://doi.org/10.1007/s13412-012-0086-8>.

⁵⁸ Debassige, Brent. “Re-Conceptualizing Anishinaabe Mino-Bimaadiziwin (the Good Life) as Research Methodology: A Spirit-Centered Way in Anishinaabe Research.” *Canadian Journal of Native Education* 33, no. 1 (2010): 11–.

29) *A Global Assessment of Indigenous Community Engagement in Climate Research*

provides a global systematic review of the levels of Indigenous community participation and decision-making processes, and the indicators that go along with this. The methodology for community engagement includes conceptualizing Indigenous communities and knowledge systems through a mutual understanding of Indigenous communities and knowledge systems. Developing an analytical framework for examining community engagement in research by scaling levels of community participation and identifying indicators for responsible community engagement.

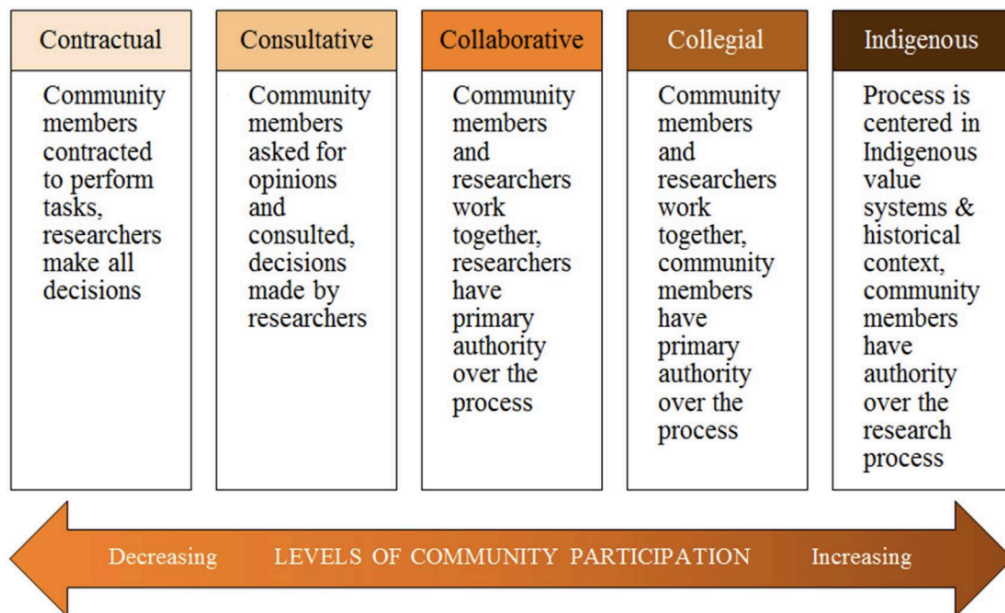


Figure 6.⁵⁹

Among the findings of this study, the patterns that existed in the most responsible community engagement featured engaging Indigenous community members throughout the entire process emphasizing the need for full community immersion when working

⁵⁹ Scale for assessing levels of Indigenous community participation based on who has authority over the research process

with Indigenous people. Full immersion is seen as continuity in Indigenous community and local knowledge throughout all stages of the research process from the conception of a project to the final deliverables and outputs. This can be seen in the three research stages which include ‘design’ specifically proposal development, defining goals and objectives, and defining research questions, ‘implementation’ specifically fieldwork, sampling, data collection, and monitoring, and ‘analysis’ specifically data interpretation, and evaluation. The six indicators examined accessibility to the findings to community members, relevance of concerns, issues, or interests defined by the community, credibility to the Indigenous community members for their contributions, if ethics and guidelines were followed with an emphasis on Free Prior and Informed Consent, if the study addressed rights and risks for Indigenous communities, and the quality of reporting of the outputs of the study. Protocol development and review panels building off of systemic review framework for panel consultation, literature review, and qualitative synthesis and analysis. Screening and inclusion criteria that were developed and refined by the panel. Data collection and analysis from full-review articles that met the inclusion criteria to develop a coding structure to monitor community participation. Overall findings found that 87% of climate studies practiced an extractive model that engaged in minimal participation and decision-making of Indigenous communities. Highest levels of Indigenous participation were found in Northern Canada and Alaska, as well as the North American Arctic. Similarities within these communities include research regarding engagement and documentation of Indigenous communities such as high use of Indigenous data sovereignty and ethical responsibilities for these communities. Across disciplines, interdisciplinary, multidisciplinary, and transdisciplinary research that

included both Indigenous scientists and community members engaged in the most non-extractive model.⁶⁰

30) *Indigenous Storytelling and Land Stewardship in Northern Canada* explores the use of storytelling as a way to intersect traditional narrative practices and land stewardship in Indigenous communities. Particularly, in the use of these frameworks of storytelling as a land governance methodology for sustainable resource management. The article used a mixed-methods approach that combines literature review, qualitative analysis, and community-based participatory research. The article builds off of storytelling as a traditional form of knowledge systems through the lenses of seasonal cycles, species behavior, environmental indicators, and sustainable harvesting practices. This framework was used to discern each narrative story into a knowledge domain such as “seasonal cycles”, storytelling elements such as “Narrative timing, character interactions”, practical applications such as “harvesting schedules and migrations timing”, and contemporary relevance such as “climate adaptation planning”. The collaborative framework was divided into framework components such as “community engagement”, key elements such as “Elder consultation and youth involvement”, implementation strategies such as “regular meetings and cultural protocols”, and success indicators such as “community participation rates”. The use of these frameworks can be applied in various ways, for example in climate adaptation planning, the incorporation of Indigenous storytelling, and traditional ecological knowledge can develop more effective and culturally appropriate

⁶⁰ David-Chavez, Dominique M, and Michael C Gavin. “A Global Assessment of Indigenous Community Engagement in Climate Research.” *Environmental Research Letters* 13, no. 12 (2018): 123005-. <https://doi.org/10.1088/1748-9326/aaf300>.

responses to change whether that be in biodiversity conservation efforts or sustainable development initiatives. Specific ways in which these two Indigenous methodologies can be utilized can be seen through storytelling about wildlife behavior, habitat management, and ecological relationships that compliments western ideals of natural resource and conservation planning. Development initiatives can also benefit from storytelling and traditional governance strategies to develop systems that support environmental protection and community well-being. All together, these frameworks and systems can be used as a continuous support for and by Indigenous communities and their sovereignty to help foster collaborative relationships of different knowledge structures.⁶¹

Conclusion

The research done in this deliverable examined the ways in which Anishinaabe science and Indigenous community knowledge are integral to natural resource management and decision-making at the Tribal level while relating to Indigenous collaborative decision-making at state, regional, and national level. The connection to Anishinaabe science and community knowledge within Gidayaangwaami'idimin Ezhi-Inawendiyang is vital to the co-stewardship, and conservation of hemiboreal and other critical habitats as seen through the reflections and insights from Gidayaangwaami'idimin Ezhi-Boodaweyang. This includes the role that clan governance, storytelling, gender roles, and Anishinaabe Environmental Knowledge play in Anishinaabe science. The goal of this deliverable is to create a foundation of knowledge that can be utilized in future projects within Gidayaangwaami'idimin Ezhi-Inawendiyang.

⁶¹ Roy, Daniel, Julia Tremblay, and Lucas Meyer. "Indigenous Storytelling and Land Stewardship in Northern Canada." *Global Society and Knowledge Review*, April 2025. <https://journal.grasglobal.org/index.php/gskr/article/view/18>.

Through the application and analysis of Anishinaabe science and the 30 examples of the integration of Indigenous traditional knowledge present in this document, this research will contribute to a final deliverable that Dr. Kyle Whyte and I will create for Gidayaangwaami'idimin Ezhi-Inawendiyang. This deliverable will be a final workflow plan that demonstrates how community knowledge and Anishinaabe knowledge are capable of being elevated to different decision scales and will feature a protocol for how this integration can be achieved in a systematic and culturally respectful way. Therefore, creating a standardized document that can be utilized when framing Anishinaabe knowledge systems within current and future collaborative projects such as the Hemiboreal Decision Support Project.

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