



Indigenous Centre for
Cumulative Effects



RESPECT FOR THE NATURAL ORDER
INDIGENOUS CUMULATIVE EFFECTS 101

APRIL 2026



Respect for the Natural Order: Indigenous Cumulative Effects 101

April 2026

Cumulative Effects 101 Working Group: Alexandra Bridges, Christine Hutchinson, Mark Cliff-Phillips, Carol Crowe, Pepita Elena, Dawn Hoogeveen, Tara Joly, Aaron Marchant, Danielle Wilson

Graphic design by Hands on Publications / Cover art by Vincent Design / Cover photo by Edgar Bullon

This report is available **en Français**



Indigenous Centre for
Cumulative Effects

104 – 360 College Street, Toronto, Ontario M5T 1S6
t: 819.410.0580 / **e:** info@icce-caec.ca



CONTENTS

PART 1	RESPECT FOR THE NATURAL ORDER	4
	Opening Words by Danielle Wilson	4
	About the Indigenous Centre for Cumulative Effects	6
	Introduction to the Report	7
	A Knowledge Carrier Opening by Carol Crowe	8
PART 2	INDIGENOUS UNDERSTANDING OF CUMULATIVE EFFECTS	10
	Self-Defining Indigenous Cumulative Effects	10
	Why are Cumulative Effects Important?	11
	Impacts of Settler Colonialism	12
	Indigenous Science in Cumulative Effects	13
PART 3	SUCCESS STORIES	15
	Community-based Environmental Monitoring: Lac La Ronge Indian Band	16
	Cumulative Effects Simulation Modelling: Fort McKay Métis Nation	17
	Indigenous Guardian Programs: Nuxalk Guardian Watchmen	18
	Oral Histories and Storytelling as Baseline Data Collection: Successes in Tłıchǫ and Sahtu Territories	19
	Indigenous-led Cumulative Effects Management Program: Metlakatla First Nation	20
IN CLOSING	Promoting Indigenous-led methods in Cumulative Effects	22
	References	23
APPENDIX 1	TAC Miro board Session	25
APPENDIX 2	Role of Collaboration and Partnerships	26



PART 1

RESPECT FOR THE NATURAL ORDER

II-SAAK-SIN-HI-IN RESPECT FOR THE NATURAL ORDER

By Danielle Wilson, ICCE Executive Director



There is no direct word in the Nuu-chah-nulth language for *cumulative effects*, but *li-saak-sin-hi-in* carries a teaching that speaks to it deeply. It reminds us that we, as people, are inseparable from the environment around us and hold a responsibility to uphold

and care for the natural order. To preserve and respect this natural order is also to preserve our culture, traditions, and language.

Indigenous peoples were the first stewards of these lands. Our knowledge transcends generations and shapes our ways of being. We rely on the waters, air, lands, and all beings for sustenance, shelter, food, trade, and economic opportunity. Maintaining the natural order has always been a core part of Indigenous governance and rights – taught by our ancestors and carried forward for future generations. Understanding and respecting this order is foundational because our identities, survival, and responsibilities are interwoven with the environment that sustains us.



Indigenous understandings of cumulative effects are deeply relational and inherently intersectional to land, culture, governance, and spirituality, and cannot be separated from one another. While environmental change affects everyone to a degree, it does not impact all people equally; it interacts with social, cultural, political, and economic realities in layered ways. For Indigenous peoples, the cumulative impacts of colonization, dispossession of land and traditions, environmental contamination, and systemic inequalities overlaps with our responsibilities to land, water, air, and all beings. The impacts of this intersectionality are clear – on our bodies, communities, culture, governance systems, and future generations.

This is why Indigenous knowledge of cumulative effects must be grounded in *li-saak-sin-hi-in* – in the understanding that everything is connected. The environment that surrounds us shapes our language, songs, and creation stories. These elements are not separate resources; they are our relations, teachers, and ancestors. They form the basis of our being and influence the diverse ways Indigenous peoples experience and respond to environmental changes. By acknowledging the intersectionality, it helps us recognize these layered realities, ensuring we do not overlook the different responsibilities, inequalities, burdens, or strengths carried by women, men, Two-Spirit peoples, Elders, youth, rural and urban community members.

li-saak-sin-hi-in is a way of honouring our ancestors – and acknowledging that long after each of us completes our Earth journey, the natural order will remain.

As part of this natural order, and as guests on these lands, none of us are merely observers or passive participants. We all share in the responsibility to uphold and protect the lands that surround us. *li-saak-sin-hi-in* is a way of honouring our ancestors – and acknowledging that long after each of us completes our Earth journey, the natural order will remain. How we recognize these intersections, uphold our responsibilities, and protect the land now becomes the legacy we leave for future generations. 🌍



ABOUT THE INDIGENOUS CENTRE FOR CUMULATIVE EFFECTS

The Indigenous Centre for Cumulative Effects (ICCE) is a non-political, non-profit organization founded in November 2019. Its goal is to create networks and share knowledge to support First Nations, Inuit, and Métis communities in culturally relevant cumulative effects assessment, monitoring, and management. This effort aims to enhance Indigenous well-being and decision-making. ICCE is a community-driven organization that prioritizes community input and expertise.

ICCE is governed by a fully Indigenous Board of Directors and supported by the Technical Advisory Committee which is a network of cumulative effects practitioners (Indigenous and non-Indigenous) who provide technical and scientific expertise relevant to cumulative effects, including promoting the respectful and reciprocal centering of Indigenous knowledge in cumulative effects management.

In 2022-2023, ICCE conducted a national needs assessment by consulting Indigenous communities across Canada to identify their unmet needs in cumulative effects. This report and current ICCE initiatives are informed by this completed national Indigenous cumulative effect needs assessment. The needs assessment process involved focused and regional dialogue sessions. Based on the outcomes of the needs assessment, the Technical Advisory Committee members examined ICCE's strategic plan priorities, activities, and progress, which informs the CE 101 initiative and *Respect for the Natural Order: Indigenous Cumulative Effects 101*.

INTRODUCTION TO THE REPORT

The purpose of this report is to introduce cumulative effects and explain the concept, with a focus on Indigenous perspectives, diversity, knowledge, and leadership. We also set the stage for ICCE to continue cumulative effects knowledge sharing and our work, including though providing tools and resources for communities grounded in Indigenous ways of knowing and Indigenous research methods.

There is a great importance in understanding and centering Indigenous knowledge beyond regulatory confines and check box approaches to traditional ecological knowledge (TEK). The significance of Indigenous jurisdiction and rights is particularly critical as Crown governments move towards accelerating development through projects of national interest.

Community contributions to Indigenous cumulative effects as a knowledge base are extensive. They range in example from the work of Metlakatla First Nation on indicators rooted in Metlakatla values to legal advances in the *Yahey* decision and community-based guardian and monitoring initiatives.

Legal obligations in the United Nations Declaration on Indigenous Peoples, as well as in Section 35 of the Constitution, provide critical leverage points within which Indigenous decision making over cumulative effects takes place. Continued efforts in centering Indigenous cumulative effects will be required for a sustainable future.

Respect for the Natural Order: Indigenous Cumulative Effects 101 is a report crafted by the Indigenous Centre for Cumulative Effects Technical Advisory Committee CE 101 Working Group with the support of ICCE

We foreground that Indigenous peoples have diverse understandings of cumulative effects, including unique and self-defined understandings of everything being connected.

staff, to introduce and explain the concept of Indigenous cumulative effects, with a focus on Indigenous perspectives, knowledge, and leadership. A second purpose is to help guide future ICCE cumulative effects programming and further refine ICCE cumulative effects knowledge sharing.

In this report *Respect for the Natural Order: Indigenous Cumulative Effects 101*, we offer a knowledge carrier opening, and background on Indigenous cumulative effects. We do this in the context of self-determination and through the intent of foregrounding that Indigenous peoples have diverse understandings of cumulative effects, including unique and self-defined understandings of everything being connected, as understood in Nuu-chah-nulth through *li-saak-sin-hi-in* as outlined in the report preface. We then offer a critique of the context through which cumulative effects regulation operates and conclude by outlining examples of Indigenous cumulative effects success stories. 🌈

A KNOWLEDGE CARRIER OPENING BY CAROL CROWE

RECLAIMING CUMULATIVE EFFECTS: INSIGHTS FROM INDIGENOUS LAW, SPIRITUALITY, AND CULTURAL VALUES



Traditional knowledge is ceremonial, and it is also governance and Indigenous law. We begin by asking how ceremony

comes into Indigenous laws, including Indigenous cumulative effects regulatory regimes and an invitation to understand unique context and capture the spirit and cyclical nature of culture and environment. Cultural safety we acknowledge as not the job of Indigenous peoples, we all must participate in the work of cumulative effects, climate change, knowledge exchange and sharing.

The words written here can never replace the teachings of Elders and knowledge holders or the experience of ceremony. It is through the guidance of Creator that our learning truly comes alive connected to the deep relationships we maintain to the land, waters, air, rocks, soil, and all living beings.

Each Nation or community holds its own distinct cultural practices, teachings, and responsibilities for caring for Mother Earth in a holistic and interconnected way. At the same time, the following is offered as a reflection of the shared understandings and common values held by many Indigenous peoples across Turtle Island, throughout Canada, and around the globe. These insights guide us in understanding natural law, spiritual connection, and the cultural values that remind us of our shared equality and our duty to be stewards of the land and waters.

Indigenous natural law is a living, dynamic system that traditionally guided community decision-making, stewardship of lands and waters, and the practice of respect and reciprocity toward all Creation.

Natural law, from an Indigenous perspective, is a sacred and holistic understanding originating from the Creator and deeply connected to the land, ancestral stories, and the natural world's observable laws. It shapes the relationships among all beings; humans, wildlife, plant life, air, soil, water, everything on Mother Earth and defines the fundamental responsibilities Indigenous peoples hold to maintain balance and harmony within the environment and the broader universe. These teachings are inseparable from cultural values and spiritual guidance, emphasizing the interconnectedness and equality of all life. Rather than being a fixed set of rules, Indigenous natural law is a living, dynamic system that traditionally guided community decision-making, stewardship of lands and waters, and the practice of respect and reciprocity toward all Creation.

Today, as Indigenous peoples continue to reclaim (see sidebar) and uphold their traditional roles and responsibilities, natural law remains a foundational element of Indigenous legal traditions and is essential to understanding how these relationships with the natural world have been sustained over generations.

The concept of cumulative effects, as it is often understood today, emerged largely from the impacts of the human industrial revolution onward, including pollution, development, and increasing use of chemicals that continue to affect ecosystems, health, and traditional ways of life. Long before the rise of industrial activity, Indigenous peoples had practices, laws, and ways of knowing rooted in balance and reciprocity to address environmental disruptions, though these disturbances were not caused by industry but by human activity that sometimes required realignment with natural cycles. This inherent approach to maintaining harmony has always been part of Indigenous knowledge systems, passed down through generations, guiding how communities live in respectful relationships with the natural world. 🌍

The term “reclaim” acknowledges the historical context in which Indigenous Peoples in Canada faced systemic oppression, including the imposition of numerous colonial laws and policies that outlawed ceremonial and cultural practices. These restrictions, alongside other abuses, deeply disrupted Indigenous ways of life. Today's reclamation efforts are part of a broader movement toward reconciliation, involving governments, settler populations, and Indigenous communities working together to address and heal the lasting impacts of these past injustices.

INDIGENOUS UNDERSTANDING OF CUMULATIVE EFFECTS

SELF-DEFINING INDIGENOUS CUMULATIVE EFFECTS

Cumulative effects are self-determined and defined by First Nations peoples and communities. Each jurisdiction and First Nation, Inuit and Métis community in Canada has its own way of defining and explaining cumulative effects.

Cumulative effects assessment, from a regulatory lens, entails an assessment of identified changes with a focus on where these changes come from and what impacts they have had or will have in the future. From the standpoint of the Indigenous Centre for Cumulative Effects, there are many definitions of cumulative effects, reflecting the diversity amongst First Nations, Inuit, and Métis communities and peoples.

Here are a few examples of how cumulative effects are defined:

The Metlakatla Cumulative Effects Management (CEM) Program defines cumulative effects as “changes to the environment or human well-being resulting from the combined impacts of past, present, and future development projects and human activities” (Metlakatla First Nation 2019, 13). This definition emphasizes the

interconnectedness of Indigenous values and the need for a holistic, long-range management perspective.

The following definition is about understanding how multiple activities, including those related to the project under assessment, can collectively impact the environment over time and space and comes from a northern regulatory agency. The Nunavut Impact Review Board defines cumulative effects as the accumulation of changes to the environment caused by human activities (for further definitions see Government of Canada, n.d.). These changes result from the incremental impact of a development when added to the effects of other past, present, and reasonably foreseeable future developments.

Cumulative effects can be described as “changes in the environment caused by multiple interactions among human activities and natural processes that accumulate across space and time” (CCME 2014). At stake is “death by a thousand cuts” (Smith and Jones, 2021), or the degradation of interconnected social, cultural, and ecological systems by multiple industrial activities.

WHY ARE CUMULATIVE EFFECTS IMPORTANT?

Cumulative effects analyses quantify the holistic, long-term assault on Indigenous well-being, ways of life, and traditional territories. For many Indigenous peoples, well-being is inseparable from the land; therefore, the aggregation of impacts from multiple developments – like forestry, mining, and oil and gas – destroys the ecological integrity of traditional hunting, fishing, and gathering grounds.

This environmental degradation directly leads to a loss of food security, compromised physical health from pollution, and significant cultural damage, as the ability to pass on Indigenous knowledge, language, and ceremonial practices connected to the land is eroded.

These impacts are protected through Indigenous rights emerging case law as well as Section 35 of the Constitution Act, that outlines the duty to consult and accommodate. Further, Canada has entered into treaties with First Nations also providing Indigenous peoples with significant rights to well-being which is connected to maintaining a sustainable land base.

Ultimately, cumulative effects represent a systemic challenge to Indigenous rights and

self-governance. When governments approve projects on a piecemeal basis without assessing their combined and compounding harm over time and space, they undermine the constitutional promise of protecting Aboriginal and treaty rights. Addressing cumulative effects is critical to upholding the Crown's honour, as it forces a shift away from short-sighted development toward regional land-use planning and co-governance and Indigenous-led governance models. This ensures that the collective capacity of the land to sustain Indigenous ways of life, not just the viability of the next project, is the primary focus of all resource management decisions.

Cumulative effects assessment and management can be powerful tools for First Nations, Inuit, and Métis communities because they force settler governing bodies and project proponents to move beyond a narrow, project-by-project review towards a holistic assessment that accounts for the historical, current, and future impacts of all development across a territory. This better reflects impacts on Indigenous rights and how impacts are felt on the ground. By insisting on a cumulative effects

The 2021 *Yahey* decision marked the first time a Canadian court found that the cumulative effects of decades of industrial development had unjustifiably infringed the rights of the Blueberry River First Nation to hunt, trap, and fish under Treaty 8 (Hamilton & Ettinger 2022). In fact, the court interpreted Treaty 8 broadly and found that it guaranteed Blueberry the right to continue their “way of life” in their traditional territory, ensuring their customs, practices, resource use, and spiritual connections would not be significantly affected. The ruling established a new legal test for infringement – a “significant or meaningful diminishment” of a Nation’s ability to exercise its rights – and declared that the Crown’s power to “take up” land is not limitless (Cook, 2025; Gimenez, 2023). This decision fundamentally changed resource management by forcing the BC government to acknowledge the systemic failure of its regulatory processes to account for cumulative impacts and requiring the negotiation of new, legally enforceable mechanisms to manage future development and protect Indigenous rights (Duncanson et al., 2023).

approach, and ones that are community-led, Nations can establish that the overall health of their territory's environment (which directly supports constitutional rights, ways of life, and well-being) has reached an unacceptable threshold, essentially triggering a legal line in the sand. This approach provides a robust legal and technical foundation to demand systemic change, enabling Nations to shift the regulatory focus from simply mitigating the harm of a new project to demanding regional land-use planning and co-governance mechanisms necessary to restore, manage, and protect their lands and resources for future generations.

IMPACTS OF SETTLER COLONIALISM

Settler colonialism is a governing system where a foreign power moves in, seizes the land, and works to permanently replace Indigenous inhabitants, dismantling their existing political structures and ways of life. As the Truth and Reconciliation Commission's final summary report stated: "The Canadian government pursued this policy of cultural genocide because it wished to divest itself of its legal and financial obligations to Aboriginal people and gain control over their land and resources" (TRC 2015: 3). This project of dispossession is ongoing in Canada and has created the foundation for cumulative effects experienced by Indigenous communities today.

Historically and presently, colonial governance has violently disrupted traditional Indigenous

stewardship practices, impeding Indigenous rights to access and control their territories, which undermines the ability to care for the land and mitigate environmental damage. Consequently, when colonial government agencies or project proponents conduct formal cumulative effects assessments (CEAs), these evaluations often focus narrowly on project approval rather than holistic community well-being (Clogg et al., 2017, Adams et al., 2023; Cannon et al., 2024).

This narrow methodological focus, combined with the underlying colonial system that has already caused so much damage, leads to a significant lack of relevancy, applicability, and trust in the assessment process itself. However, Indigenous communities continue to pursue a resurgence of governance and land stewardship practices, leveraging hard fought rights recognition (e.g., UNDRIPA) and court cases (e.g., *Yahey*) to pursue Indigenous-led cumulative effects assessment and management, as part of a larger project of cultural resurgence.

Towards this end, a methodological and governance shift is needed to move away from fragmented, reactive cumulative effects frameworks to Indigenous-centric cumulative effects frameworks that uphold Indigenous laws, governance and self-determination. UBC sustainability scholar Jennifer Cutbill (2022: 6) notes that Indigenous-centric cumulative effects frameworks require proactive and accountable co-governance, embracing relational accountability, holistic healing and reciprocity. Cutbill's work is well complemented by Indigenous cumulative effects scholarship and work that promotes Indigenous science in cumulative effects.

Nations can establish that the overall health of their territory's environment has reached an unacceptable threshold, essentially triggering a legal line in the sand.



INDIGENOUS SCIENCE IN CUMULATIVE EFFECTS

Countering the impacts of settler colonialism and providing strength to transformation of cumulative effects management, Indigenous scholars have done tremendous work forging pathways to improve the field. As Lawrence Ignace argues, transformative governance is required to incorporate Indigenous identities into cumulative effects assessment and management (2025). The purpose of this section is to highlight the importance of drawing on Indigenous science in cumulative effects management, building on Ignace's poignant intervention. Regulators must work beyond the incorporation of traditional ecological knowledge (TEK); to improve cumulative effects management, a redefinition of how TEK is implemented is required, and we offer an entry point through honouring Indigenous science, as outlined below.

Traditional ecological knowledge (TEK) is a term that is popularly used in Western knowledge systems and can be defined as a cumulative body of knowledge and beliefs about the relationship of living beings with one

another and their environment, it encompasses the biophysical, spiritual, economic, social and cultural aspects of the environment (Sallenave, J. 1994). TEK is the accumulated knowledge base acquired by Indigenous peoples over many generations and is parallel to Western scientific disciplines.

TEK is progressively being impacted over time by Western scientific and technical knowledge processes, particularly in the context of environmental planning and development. However, despite these influences TEK held by Indigenous peoples can adapt to external change and internal pressures of human ecology and ongoing learning, knowledge can change and move to respond to new environmental, social or economic conditions (Gómez-Baggethun, E. et al. 2013). The resiliency of TEK is less grounded in if knowledge is lost or kept, rather that Indigenous communities are retaining the ability to generate, transform, transmit and apply knowledge (Gómez-Baggethun, E. et al. 2013). The maintenance of ongoing capacity

to update, test and evolve knowledge systems is critical for TEK regeneration and resilience over time. There are many terms to describe TEK, all of which are an attempt to approach and describe Indigenous knowledge systems. The term 'knowledge' can be understood as a state of knowing or understanding and is generally accepted in western frameworks as the sum of what is known by individuals, communities, society and humanity (Little Bear, L. 2009).

Knowledge that is produced is subject to change, it is dynamic and is influenced by perceptions, language, education, experiences, intuition, culture, paradigm (*a pattern of doing or thinking, a way of understanding*) and worldview (Aikenhead, G.& Michell, H 2011). Indigenous worldview carries a deep commitment and obligation to protect and maintain relationality, and a deep respect and reverence for all of the beings of creation (Gauthier, P. et al. 2025; Cajete, G. 2000;). The appearance of a worldview is deeply conditioned by human senses and intellectual mechanisms, and may vary considerably across different beings (Little Bear, L. 2000).

Western scholarship continues to address Indigenous worldviews and perspectives of the natural world from a Western point of reference and framework (Atwood, S. et al. 2024). The practice of doing 'cumulative effects assessment', is dependent in part on the thinking of the scientist or researcher doing the work. Different paradigms demand

different research methods (Aikenhead, G.& Michell, H 2011). Rather than framing knowledge exclusively through the lens of 'decolonization' which arguably reinforces the filtering of Indigenous knowledge and perspective through the western lens (Atwood, S. et al. 2024), we can instead focus on Indigenizing the practice of knowledge accumulation and regeneration and to define cumulative effects assessment through Indigenized worldview and Indigenous scientific paradigms, such as through the concept of *the respect for natural order*, for example.

The underlying methodologies of doing cumulative effects assessment from a Western standpoint are extractive and largely biophysical, relying on inputs, data and tools that exclude knowledge and values processes outside of the western science paradigm (Adams, et al. 2024).

In contrast, Indigenous scientific paradigms have always included the practical relationships with the natural world, and the direct relationships that communities of people have maintained with the spirit of place and space (Cajete, G. 2000). Land and place-based relationality is informed by the reciprocal responsibilities to place (Gauthier, P. et al. 2025). Indigenous peoples have always been aligned with a cumulative effects perspective in the maintenance of our sacred responsibilities and have holistically considered all our relations and maintaining balance and harmony with the natural world. 🌍

COMMUNITY REFLECTION: Given the state of Indigenous cumulative effects, how do we heal? Where are the opportunities for healing in Indigenous cumulative effects work?



PART 3

SUCCESS STORIES

Indigenous communities from across Canada have established cumulative effects programs that involve local community members involved in the protection, monitoring and management of activities occurring throughout their lands and territories. These programs serve as a model for effective stewardship, guided by Indigenous science, laws, values and governance.

These programs serve as a model for effective stewardship, guided by Indigenous science, laws, values and governance.

On the following pages are just a few of the many success stories taking place across the country.

Some of these success stories involved collaboration in partnerships. For a list of potential collaborators, see Appendix 2.



COMMUNITY-BASED ENVIRONMENTAL MONITORING: LAC LA RONGE INDIAN BAND

The Lac La Ronge Indian Band (LLRIB) is a Woodland Cree Nation in north central Saskatchewan, with ancestral lands stretching across the Churchill River region. For the Woodland Cree people, this land is more than geography; it embodies cultural pride, resilience, and a profound connection to their past.

However, the increasing industrial activities such as exploration, forestry, and mining – within the LLRIB's traditional territory have raised significant concerns among traditional land users. The cumulative impacts of these developments threaten not only the land but also the health of the interconnected waterways that sustain their communities. These waterways are vital for sustenance, cultural identity, and the practice of traditional ways of life.

In response to these challenges, the LLRIB established the Community Environmental Monitoring Program (CEMP), with funding from the Indigenous Centre for Cumulative Effects. The CEMP initiative aims to monitor and preserve the health of the waterways that are so essential to the community.

In the spring of 2023, the LLRIB's Lands and Resources staff connected with community members to identify key water sampling locations. This engagement was rooted in understanding both environmental concerns and cultural significance, ensuring that the voices of the community shaped the program's direction. The monitoring program has successfully facilitated the collection of water sampling over several years and expanded into other areas. This important work is not only about collecting data; it has also spurred growing interest and participation within the community. It also created meaningful economic opportunities for Elders, youth, land users, knowledge carriers and Indigenous-owned businesses. This renewed engagement underscores the Lac La Ronge Indian Band's unwavering commitment to environmental stewardship and cultural preservation, ensuring that their ancestral lands and waterways are protected for future generations.

The Lac La Ronge Indian Band program has facilitated water sampling over several years and expanded into other areas.



CUMULATIVE EFFECTS SIMULATION MODELLING: FORT MCKAY MÉTIS NATION

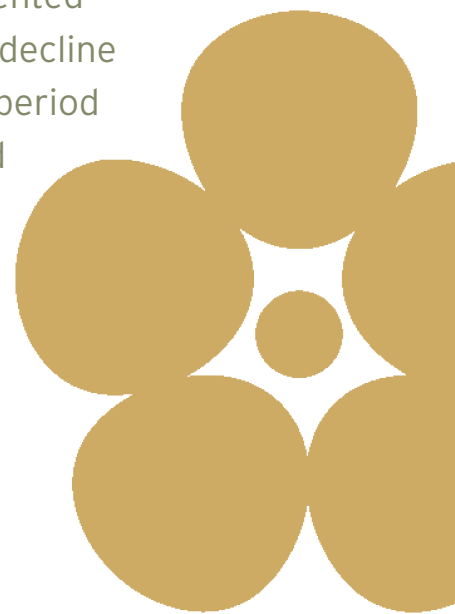
Fort McKay Métis Nation is in northeastern Alberta, within Treaty 8 territory. The Fort McKay Métis conducted a study that drew upon a critique of traditional environmental assessment processes that have been inadequate in incorporating cumulative impacts of industrial activity on rights to hunt, fish and trap.

The study brought together Indigenous knowledge and simulation modeling to develop a reliable picture of cumulative effects, including impacts on land and culture.

This work enabled the development of practical tools such as indicators and baselines to assist in the understanding of cumulative effects over time on key species such as moose and cranberry and allowed for the development of a clear and well-documented narrative of the decline over a 120-year period of access to land and cultural activities.

Fort McKay Métis' work provides a compelling counterweight to the limitations of a traditional project-focused study. (For more information on this project, see Carlson et al., 2025).

Fort McKay Métis Nation's simulation modelling allowed for the development of a clear and well-documented narrative of the decline over a 120-year period of access to land and cultural activities.





INDIGENOUS GUARDIAN PROGRAMS: NUXALK GUARDIAN WATCHMEN

The Nuxalk Guardian Watchmen of British Columbia's Central Coast are one example of how Indigenous communities are creating a continuous on-the-land presence, ensuring that their resources are sustainably managed and protected. The Nuxalk Guardian Watchmen are the "eyes and ears of Nuxalk territory" and play a critical role in all aspects of environmental and cultural stewardship (Nuxalk Nation, n.d.). The Guardians conduct regular patrols and monitoring exercises throughout the territory, checking for compliance and ensuring that rules and regulations are followed, as well as that land and marine agreements are implemented effectively. The Guardians are also researchers; they collect data, conduct surveys, and carry out and support scientific studies including analysis of many marine species.

The Guardians conduct themselves in accordance with Nuxalk Nation laws and authority to care for and protect their lands and waters to maintain the region's rich ecological and cultural diversity. Central to their work is "passing on knowledge from one generation to the next" and this involves training the next generation is prepared to carry on this important work.

The Guardians have legal authority to enforce their laws in their territory.

In 2022, the Nuxalk Guardians joined the Kitsoo Xai'xais Guardians in signing a Memorandum of Understanding with BC Parks to run a pilot project that ensures the Guardians have park ranger authority. This partnership allows for shared compliance, with the Guardians receiving official legal authority to enforce their laws in their territory. The Nuxalk Guardian Watchmen are also part of a larger network of guardians called the Coastal Stewardship Network, which coordinates their efforts with other First Nations to enhance training, establish a regional monitoring system, and explore other opportunities for collaboration.

Sources:

- Indigenous Guardians Toolkit. *Coastal Stewardship Network*. indigenousguardianstoolkit.ca/communities/coastal-stewardship-network
- Nuxalk Guardians: *The eyes and ears of their territory*. coastalfirstnations.ca/resources/nuxalk-guardians-the-eyes-and-ears-of-their-territory/
- Nuxalk Nation. *Stewardship*. nuxalknation.ca/stewardship/



ORAL HISTORIES AND STORYTELLING AS BASELINE DATA COLLECTION: SUCCESSSES IN TŁİCHQ AND SAHTU TERRITORIES

Baseline data represents the environment's state before major change and can include scientific metrics such as water quality, species counts, and vegetation surveys. Indigenous observations of seasonal calendars, harvest records and oral mapping, for example, are significant measure of Indigenous science and can provide a benchmark for detecting change. Detecting change, in turn, enables communities to challenge incomplete or misleading environmental or cumulative effects assessments. This can help prevent the acceptance of degraded conditions as 'normal.'

For example, the **Tłıchq Government's** TAEMP program collects multi-year baseline data on fish, water, and sediments in the Tłıchq region, combining traditional knowledge with scientific sampling. For more information, see the Wek'èezhì Renewable Resources Board documentation on the *Tłıchq Aquatic Ecosystem Monitoring Program*.

Significantly, Elders' stories and oral histories hold environmental baselines and traditional knowledge not recorded in scientific literature. Elder storytelling may convey past species

abundance and migration paths. These shifts in water patterns, freeze-up dates, or vegetation cover are crucial to monitoring and understanding cumulative effects, as is the timing of culturally significant seasonal events. Indigenous and Elder led narratives help communities establish cultural baselines, define thresholds, and guide what and how to monitor.

For example, Dene Elders in the **Sahtu region** of the Northwest Territories recall earlier freeze-up of the Mackenzie River – mid-October historically – compared to current later freeze periods, influencing travel, harvesting, and safety. Elder knowledge is critical to understanding cumulative effects. For more information on data collection for Indigenous Use-and-Occupancy surveys, see Tobias, T. (2023). *Living Proof: The Essential Data Collection Guide for Indigenous Use-and-Occupancy Map Surveys*.





INDIGENOUS-LED CUMULATIVE EFFECTS MANAGEMENT PROGRAM: METLAKATLA FIRST NATION

The Metlakatla Cumulative Effects Management (CEM) Program was established by the Metlakatla First Nation to make sure Metlakatla values, needs, and priorities are reflected in all aspects of cumulative effects management and decision making.

A key part of the Metlakatla CEM Program is data collection, both socio-economic data through the Metlakatla Membership Census, as well as environmental data through the Metlakatla Clam Surveys. Having control of their own data collection methods and data has allowed Metlakatla to meet their unique needs, interests, and values of the community and allowed Metlakatla to leverage cumulative effects management results in environmental assessment processes and treaty negotiations.

Having control of their own data collection methods and data has allowed Metlakatla to leverage cumulative effects management results in environmental assessment processes and treaty negotiations.

For example, off-reserve housing was included as a valued component in the Aurora LNG project review application as a direct result of Metlakatla Census housing data. Metlakatla was able to show the proponent that core housing needs were a significant issue for Metlakatla households in Prince Rupert.

Off-reserve housing was included as a valued component as a direct result of Metlakatla being able to show the proponent that core housing needs were a significant issue.

The CEM Program has also helped Metlakatla secure funding agreements with the provincial and federal governments, resulting in long-term staff positions for the Metlakata Stewardship Society.

Since the Metlakatla CEM Program was first developed in 2014, we have seen several regional and provincial cumulative effects initiatives on BC's North Coast. Many of these initiatives have looked to the Metlakatla CEM Program for guidance, which results in better resource management at the regional level and indirectly benefits Metlakatla.

Learnings from the Metlakatla First Nation CEM program include:

- Strong leadership is important. While a range of community engagement methods were used the Metlakatla Census, was the most effective tool for connecting community values to aspects of CEM.
- Building the internal capacity needed to carry on CEM work can be challenging. Graduate students were an invaluable resource to the CEM Program. Mentoring and training Metlakatla members over the next few years is underway for the long-term management of the Metlakatla program.
- The Metlakatla CEM Program is rooted in Metlakatla values, which may not be shared or identified as priorities by other Indigenous groups or governments. However, Metlakatla has enjoyed success sharing its methods with regional initiatives, believing that a broader understanding of Metlakatla's CEM will improve overall decision making in the region and support Metlakatla goals. Much of the CEM information and data has not been shared with external parties due to concerns around data sharing and confidentiality. Metlakatla is working on a data management plan to be able to share data securely with consistent guidelines. 🌐

Sources:

- Metlakatla CEM. *Successes and Challenges*.
metlakatlacem.ca/our-progress/success-challenges/
- Metlakatla First Nation. *Cumulative Effects*.
metlakatla.ca/stewardship/cumulative-effects



IN CLOSING

PROMOTING INDIGENOUS-LED METHODS IN CUMULATIVE EFFECTS

First Nations, Inuit, and Métis communities are using a variety of innovative tools and methods to support them in undertaking cumulative effects work. Methods include guardian programs, geographic information systems (GIS) that enable knowledge carriers to enter data on apps while on the land, community-based monitoring tools, the centering of Indigenous science in baseline data collection, simulation modelling, and Indigenous-led indicator frameworks, among others.

Future directions for Cumulative Effects 101 include expanding areas for knowledge mobilization and storytelling, including ongoing partnerships and collaboration with communities. Brining this work to community will include community-based validation and training sessions, as well as a companion workbook (see Appendix 1 for future draft workbook modules). This is a living document and initiative, intended to be iterative and change over time.

Our audience is broad and for anyone interested in gaining more knowledge or connecting over Indigenous cumulative effects. This includes communities in the early stages of considering what cumulative effects means to them and all First Nations, Inuit, and Métis peoples.

Our intention is that *Respect for the Natural Order: Indigenous Cumulative Effects 101* will serve as a launching point for furthering Indigenous cumulative effects dialogue, and provide leverage for improved regulation, monitoring and follow up from First Nations, Inuit, and Métis viewpoints, through Indigenous leadership to contribute to the shared responsibility to uphold the lands that surround us through respectful and processes grounded in culture, traditions, language, and reciprocity. 🌍

REFERENCES

- Adams, M. S., Tulloch, V. J. D., Hemphill, J., Penn, B., Anderson, L. T., Davis, K., Avery-Gomm, S., Harris, A., & Martin, T. G. (2023). Inclusive approaches for cumulative effects assessments. *People and Nature (Hoboken, N.J.)*, 5(2), 431-445. doi.org/10.1002/pan3.10447
- Aikenhead, G. S., & Michell, H. (2011). *Bridging cultures: Scientific and indigenous ways of knowing nature*. Pearson Canada.
- Atwood, S. B., Bruised Head, N. P. (Chief B. M., Brunson, M. W., First Rider, A. (State of B. L., Frandy, T., Maffie, J., Provost, A. (Many V. M., & Weasel Moccasin, M. (Berry C. P. (2024). Níksókowaawák as Axiom: The Indispensability of Comprehensive Relational Animacy in Blackfoot Ways of Knowing, Being, and Doing. *Society & Natural Resources*, 37(5), 769-790. doi.org/10.1080/08941920.2023.2180696
- Cajete, G. (2000). *Native science: Natural laws of interdependence* (1st edition.). Clear Light Publishers.
- Canadian Council of Ministers of the Environment. (2014, April). *Canada-wide definitions and principles for cumulative effects* (PN 1541). ccme.ca/en/res/cedefinitionsandprinciples1.0e.pdf
- Cannon, S. E., Moore, J. W., Adams, M. S., Degai, T., Griggs, E., Griggs, J., Marsden, T., Reid, A. J., Sainsbury, N., Stirling, K. M., Barnes, A. A. Y. S., Benson, R., Burrows, D., Chamberlin, G. R., Charley, B., Dick, D., Duncan, A. T., Liddle, K. K. M., Paul, M., ... The Indigenous Data Sovereignty Workshop Collective. (2024). *Taking care of knowledge, taking care of salmon: Towards Indigenous data sovereignty in an era of climate change and cumulative effects*. *FACETS*, 9, 1-21. doi.org/10.1139/facets-2023-0135
- Carlson, M., Straker, J., Berg, K., Bockstael, E., Borle, E., Bindle, L., Belisle, C., Bonnyman, M., Faichney, F., & Golden, D. (2025). Bringing Together Indigenous Knowledge and Simulation Modelling to Assess Cumulative Impacts to Indigenous Land Use in Northeastern Alberta, Canada. *Environmental Management*, 75(11), 2960-2976. doi.org/10.1007/s00267-025-02235-w
- Cook, C. (2025). *Accumulating justified effects: Extending Yahey to infringements*. University of Toronto Faculty of Law Review, 83 (2), 149. CanLII Docs 1989. canlii.org/en/commentary/doc/2025CanLIIDocs1989
- Clogg, J., Smith G., Carlson, D., & Askew, H. (2017). *Paddling together: Co-governance models for regional cumulative effects management*. West Coast Environmental Law. icce-caec.ca/wp-content/uploads/2022/07/2017-06-wcel-paddlingtogether-report.pdf
- Cruikshank, J. (1998). *The social life of stories: Narrative and knowledge in the Yukon Territory*. University of Nebraska Press.
- Cutbill, J. (2022). *Towards an Indigenous-centric cumulative effects framework*. University of British Columbia Sustainability Scholars Program. sustain.ubc.ca/sites/default/files/2022-050_Towards%20an%20Indigenous-Centric%20Cumulative%20Effects_Cutbill.pdf
- Duncanson, S., Sutherland, S., Peden, M., & Thrasher, K. (2023). *The regulation and litigation of cumulative effects on Indigenous rights following the Yahey decision and Blueberry River First Nation settlement and the potential effects on the energy industry*. *Alberta Law Review*, 61(2), 279-306. doi.org/10.29173/alr2766

- Gimenez, R. M. (2023). Cumulative rights infringement in British Columbia Treaty 8 Territory: The need for a renewed environmental decision-making framework under treaty law. *UBC Law Review*, 56(3), 699-742. commons.allard.ubc.ca/cgi/viewcontent.cgi?article=1334&context=ubclawreview
- Gauthier, P. E., Chungyalpa, D., Goldman, R. I., Davidson, R. J., & Wilson-Mendenhall, C. D. (2025). Mother Earth kinship: Centering Indigenous worldviews to address the Anthropocene and rethink the ethics of human-to-nature connectedness. *Current Opinion in Psychology*, 64(Complete). doi.org/10.1016/j.copsyc.2025.102042
- Gómez-Baggethun, E., & Reyes-García, V. (2013). Reinterpreting Change in Traditional Ecological Knowledge. *Human Ecology*, 41(4), 643-647. doi.org/10.1007/s10745-013-9577-9
- Government of Canada. (n.d.) *About cumulative effects*. canada.ca/en/services/environment/cumulative-effect/about.html.
- Hamilton, R., & Ettinger, N. P. (2022). The future of treaty interpretation in *Yahey v. British Columbia*: Clarification on cumulative effects, common intentions, and treaty infringement. *Ottawa Law Review / Revue de droit d'Ottawa*, 54(1), 109-150. doi.org/10.7202/1111095ar
- Ignace, L. (2025). Transformative governance of cumulative effects through an Indigenous outlook. *Frontiers in Ecology and the Environment*. doi.org/10.1002/fee.70004
- Kwon, K., Gunton, T., Rutherford, M., & Zeeg, T. (2024). Setting Tiered Management Triggers using a Values-based Approach in an Indigenous-led Cumulative Effects Management System. *Environmental Management*, 1-20. doi.org/10.1007/s00267-024-02075-0
- Little Bear, L. (2000) "Jagged Worldviews Colliding." In *Reclaiming Indigenous Voice and Vision*, Vancouver: UBC Press. 77-85.
- Little Bear, L. (2009). *Naturalizing Indigenous knowledge: synthesis paper*. Canadian Council on Learning's Aboriginal Learning Knowledge Centre. cssspnql.com/en/produit/naturalizing-indigenous-knowledge/
- Metlakatla CEM. (2019.) "Metlakatla Cumulative Effects Management: Methods, Results and Future Direction of a First Nation-led CEM Program." metlakatlacem.ca
- Napoleon, V. & Friedland, H. (2016). An Inside Job: Engaging with Indigenous Legal Traditions through Stories. *McGill Law Journal / Revue de droit de McGill*, 61(4), 725-754. doi.org/10.7202/1038487ar
- Nuxalk Nation. (n.d.) nuxalknation.ca
- Sallenave, J. (1994). Giving traditional ecological knowledge its rightful place in environmental impact assessment. *Northern Perspectives*.
- Smith, G., & Jones, J. (2021, July 21). *Tipping points: What Blueberry River First Nations' court victory means for ecosystems and biodiversity*. West Coast Environmental Law. wcel.org/blog/tipping-points-what-blueberry-river-first-nations-court-victory-means-ecosystems-and-biodiversity

APPENDIX 1

TAC MIRO BOARD SESSION

Cumulative Effects 101 Modules DRAFT

1. Ways of knowing and being
 - a. Cultural history/ sense of place and space/ continuity over time
 - b. Respect for protocol/ cultural safety
 - c. Natural law/ Indigenous law/ Indigenous ways of knowing and being
2. Capacity building – Getting started
 - a. Self-assessment/ asset inventory/ community profiles
 - b. Doing a needs assessment/ creating workplans
 - c. Capacity funding/ generating revenue streams
 - d. Knowledge transfer – building in-house capacity and leveraging consulting expertise/ examples
3. Crown and Colonial Systems
 - a. Environmental Resource Management (IA regulatory regimes)
 - b. Case law/ legal instruments
4. Tools and Methods
 - a. Study types/ values mapping/ census and planning activities
 - b. Development of indicators
 - c. Technologies and their uses
 - d. Devising queries/ scenarios
 - e. Research practices and data collection
 - f. Resources/ studies/ resource library (standalone?)
5. Relationship Building
 - a. Grassroots organizing/ Participatory action research/ governance models
 - b. Consultations/ ethical spaces
 - c. Relationship to the natural world
 - d. Inter-intra community relations building/ indigenizing research practices
 - e. Shared interests and overlapping priorities/ protocols and collectivism
6. Planning
 - a. Planning practices and theory: historic and contemporary
 - b. Policies/ procedures/ framework examples
 - c. Place based issues and regional differences
 - d. ACE Techs/ data collection with purpose
 - e. Data management (informed by data sovereignty)
 - f. Land Management regimes/ land tenure models
 - g. Territorial assertions/ Addition to reserve/ Comprehensive land claims/ community comprehensive planning/ interventions
 - h. Interventions and regulatory pathways to advance CEA
7. Implementation and Follow-Up
 - a. Evaluation and monitoring programs/ audits/ report cards
 - b. Reporting and updating information and plans/ managing bureaucracy
 - c. Updates and incorporating new and emergent information
 - d. Metrics – successes/ thresholds

APPENDIX 2

ROLE OF COLLABORATION AND PARTNERSHIPS

1. Government Agencies

Governments can support Indigenous-led efforts by:

- Sharing technical tools (e.g., satellite imagery, lab facilities).
- Co-funding guardian and monitoring programs.
- Supporting co-management boards and respecting Indigenous data governance.

2. Industry

Industry partners should:

- Incorporate Indigenous indicators into environmental tracking.
- Transparently share monitoring data.
- Fund long-term monitoring beyond project life spans.

3. Indigenous Communities

Collaborations among Indigenous communities enable:

- Tracking regional patterns (e.g., caribou migration changes).
- Sharing protocols and safeguarding data.
- Coordinated advocacy and stronger collective impact.

4. Academic Institutions

Universities and colleges can help by:

- Providing training in GIS, ecology, or social research.
- Co-creating tools and methods aligned with Indigenous priorities.
- Respecting Indigenous research standards and principles.

5. Subject Matter Experts

Specialists in health, climate modeling, legal frameworks, or policy can contribute:

- Technical insight when aligned with community goals.
- Contextualized assessments and strategies to strengthen community-led assessments.





Indigenous Centre for
Cumulative Effects

104 – 360 College Street, Toronto, Ontario M5T 1S6
t: 819.410.0580 / e: info@icce-caec.ca