Co-design for a sustainable future

Empowering ocean communities to lead change

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Canadian Commission

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Introduction

The United Nations Decade of Ocean Science for Sustainable Development (2021–2030) presents a transformative opportunity to redefine how ocean science is conducted and applied worldwide.

UN Decades are not intended to be celebratory; they are calls to sustained action. In particular, the Ocean Decade seeks to:

- stimulate ocean science, knowledge generation, collaboration, and exchange to reverse the decline of the state of the ocean system
- catalyze new opportunities for sustainable development of this massive marine ecosystem, and
- develop the scientific knowledge and the partnerships needed to gain a better understanding of the ocean system and deliver science-based solutions to achieve the 2030 Agenda for Sustainable Development.[1]

The UN General Assembly mandated UNESCO's Intergovernmental Oceanographic Commission to coordinate the preparations and implementation of the Decade. As part of this global initiative, the Canadian Commission for UNESCO's Ocean Decade Working Group is advancing and promoting co-design as a critical approach to ensure ocean science is inclusive, equitable, and impactful. This document explores co-design's role in fostering collaboration between technical experts and communities, emphasizing its potential to create innovative, community-driven solutions to some of the world's most pressing challenges.

1 United Nations Decade of Ocean Science for Sustainable Development (2021–2030) | UNESCO

What is co-design, and who is it for?

The term "co-design" is widely used by those involved in the Ocean Decade. What does co-design mean, and who benefits from it?

At its core, co-design is a way to connect **policy makers** with **science practitioners** (e.g., academics, NGOs) and **users** (e.g., local fishers, Indigenous communities, local resource managers) to create solutions that are both scientifically innovative and meaningfully integrated within the communities they affect.

Co-design honours the creative capacity of diverse knowledge systems, cultures, and experience. In fact, co-design means that the lived experiences of users have as much value as the technical expertise of science practitioners. Even more importantly, co-design actively supports the rights of users to shape decisions about their own lives and environments — a concept known as self-determination.

Self-determination is especially vital for groups who have been excluded from decision-making structures due to colonialism, systemic oppression, and other inequities. Co-design has the potential to help correct these imbalances over time by ensuring solutions are not designed *for* communities, but rather *with* them.

Why is co-design a good way to find solutions?

- It harnesses diverse expertise, generational knowledge, and creative capacity. Combining lived experiences with technical know-how sparks creative and practical solutions.
- It fosters ownership and investment. When communities and users have a hand in designing solutions, they are more likely to support and sustain them — because the solutions are fit-for-purpose, legitimate, and meaningful.
- It builds resilience. By addressing local needs and values, co-designed solutions help communities better manage challenges like climate change, economic disruptions, and other global crises.

What makes co-design unique?

Co-design isn't just another form of community consultation. When done well, it:

- Helps key community organizations secure the funding and resources they need to continue their work;
- Builds strong, trusting, and long-lasting relationships between local communities and the people or groups participating in co-design solutions;
- Encourages change at all levels — starting with collaboration within communities and growing to influence larger systems, like institutions and policies; and
- Helps people in communities learn practical skills, like using new technology or communicating across cultures, while also guiding organizations to embrace new contexts of cultural humility, local knowledge, and equitable inclusion.

Four models of co-design

CCUNESCO's Ocean Decade Working Group has identified four distinct models of co-design:

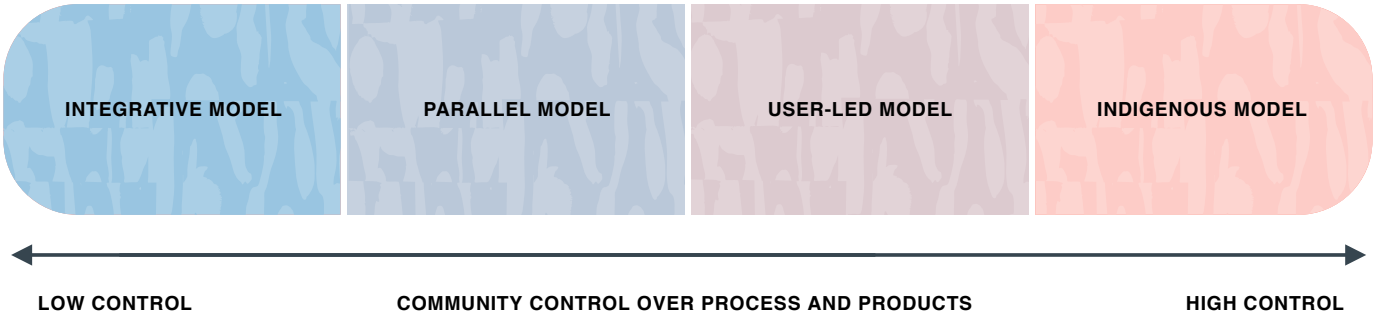
- *Integrative co-design*
- *Parallel co-design*
- *User-led co-design*
- *Indigenous co-design*

These models, developed through extensive research, reflect different levels of user engagement and are adaptable to various contexts. While the focus here is on ocean science, the lessons apply broadly to many fields that require community engagement, including public health, technology, and urban development.

The examples of models in action focus on Indigenous communities, reflecting Canada's national context and the significant contributions of Indigenous-led research to co-design methodologies. However, it is important to note that these approaches are not exclusive to Indigenous contexts. They represent a spectrum of approaches that can be adapted to meet the needs and priorities of diverse communities, knowledge systems, and partnerships.

SCALE OF PARTICIPATION

Figures were adapted from the Arnstein's Ladder of Citizen Participation.[2]



2 Arnstein, Sherry R. "A Ladder of Citizen Participation," JAIP, Vol. 35, No. 4, July 1969, pp. 216-224.

LEGEND ELEMENTS

KNOWLEDGE AND DATA

INDIGENOUS & LOCAL KNOWLEDGE SYSTEMS

WESTERN KNOWLEDGE SYSTEMS

EPISTEMOLOGIES

INDIGENOUS & LOCAL WAYS OF KNOWING

WESTERN WAYS OF KNOWING

OTHER

TOOLS & RESOURCES

These legend elements inform the visual representations of the four co-design models outlined in the following pages.

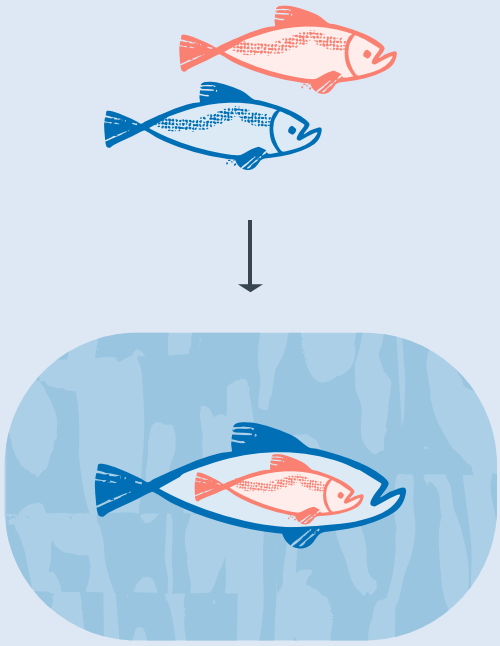
It is important to note that while Indigenous-led and user-led models have the highest level of community involvement, all four models of co-design have a responsibility to return some benefits to the community. Note that they are all appropriate for different contexts.

1. *Integrative co-design: Bridging knowledge systems through genuine collaboration*

Integrative co-design is similar to traditional consultation methods, but with a key difference: it fosters genuine conversations with communities rather than simply extracting information and leaving. It emphasizes knowledge translation, helping to ensure that local, place-based insights are effectively communicated to decision-makers such as elected officials, natural resource managers, and policy makers.

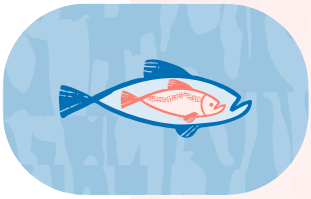
This model values the wisdom that comes from generations of living in and caring for a place, and helps communicate it in ways that are effective for climate reports, funding applications, or policy discussions. The goal is to honour and respect this knowledge while ensuring it is understood by those in power.

The process requires humility from researchers, who must acknowledge their own biases and limitations, and commit to authentically representing community perspectives by positioning themselves as learners. While finances or timelines may place practical constraints on the process, the core principle remains: respect the community, honour its knowledges, and build a partnership where local voices are central to the work.



INTEGRATIVE CO-DESIGN

In this model both Western scientific knowledge and Indigenous & local knowledge are framed in Western scientific terms. By reshaping Indigenous & local knowledge to fit into Western knowledge systems and Western scientific language, it is more utilitarian. There is a loss of the fullness of the Indigenous & local knowledge as the cultural perspectives and values that shape it are not engaged with.



INTEGRATIVE CO-DESIGN IN ACTION

In recent years, Indigenous Peoples' involvement in Canada's impact assessment process has become a strong example of integrative co-design, where diverse people, including Indigenous peoples and local knowledge holders and scientific experts work together to translate complex environmental knowledge across different cultural and technical languages.

The process is not about simply extracting Indigenous knowledge, but instead about creating a collaborative space where traditional ecological knowledge can be meaningfully integrated with Western scientific methodologies to fulfill assessment requirements for projects proposed to take place in diverse contexts, including Indigenous lands.

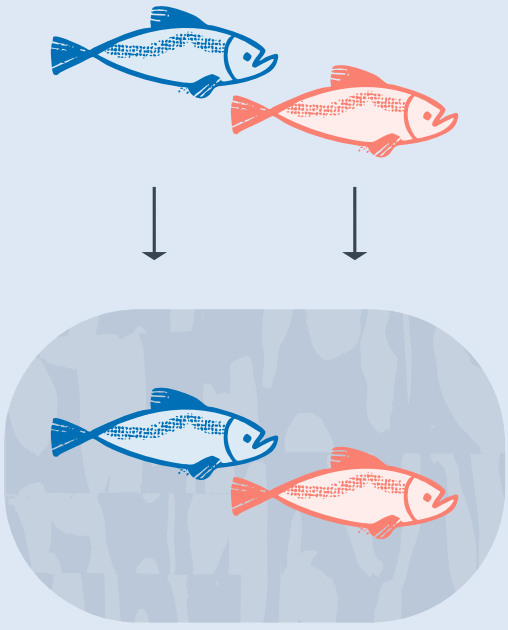
By developing shared frameworks for understanding socio-ecological risks, Indigenous peoples and scientific practitioners are learning to communicate across knowledge systems, ensuring that impact assessments become more comprehensive, culturally sensitive, and protective of local and collective rights. While barriers to true Indigenous self-determination remain — like the fact that final decision-making still rests with the government — this approach represents a significant shift towards more inclusive and respectful knowledge production.

2. *Parallel co-design: Expanding knowledge systems side by side*

Parallel co-design is a collaborative approach that respects and maintains the integrity of both Western scientific and local knowledge systems that are tied to specific communities and environments. Rather than merging these systems, it allows them to grow independently while working together to address shared challenges.

This model encourages dialogue, mutual learning, and capacity-building on both sides, ensuring each knowledge system contributes equally to a common set of goals. It relies on cultural humility — recognizing that no one can fully judge knowledge rooted in another worldview — and prioritizes trust and respect to prevent one system from dominating the other.

Although building trust-based partnerships takes time, the benefits are significant. Parallel co-design strengthens both knowledge systems, supports self-determination, and creates lasting relationships, offering a balanced way to address complex issues like resource management and environmental sustainability.



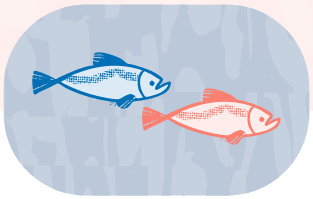
PARALLEL CO-DESIGN

In this model Western scientific knowledge and Indigenous & local knowledge systems grow separately, side-by-side, without forcing local knowledge to fit within Western structures. Instead of prioritizing one system over the other, both are valued equally in answering research questions.

PARALLEL CO-DESIGN IN ACTION

The FISHES project (Fostering Indigenous Small-scale fisheries for Health, Economy, and Food Security) is a groundbreaking collaboration between researchers at Université Laval, Concordia University, Carleton University and Indigenous communities in the subarctic and Arctic area. It brings together scientific genomics and local Indigenous knowledge to tackle sustainable fisheries management.

By creating a true partnership where Indigenous rights-holders from Inuit, Cree, and Dene communities co-design research, define priorities, and share knowledge, the project demonstrates how scientific understanding and traditional wisdom can be brought together to address complex environmental challenges. Instead of treating Indigenous knowledge as secondary, FISHES treats it as an equal, essential component of understanding and protecting subarctic and Arctic fisheries, ultimately empowering communities to shape their own sustainable future.



3. *User-led co-design: Empowering local leadership*

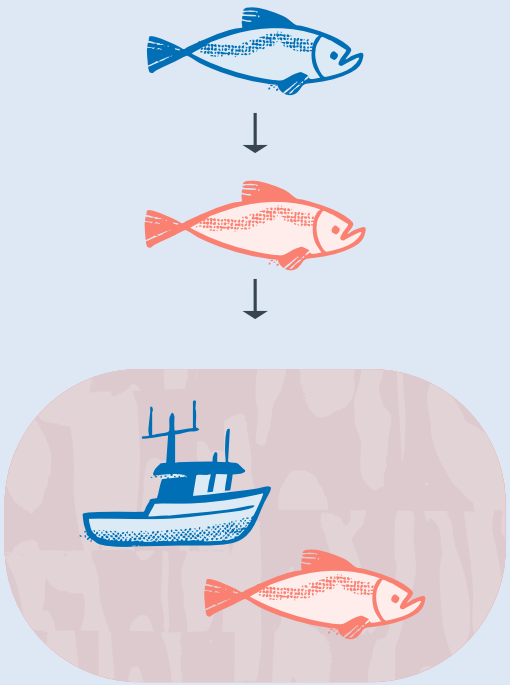
User-led co-design turns the traditional research approach on its head by giving power to the people most directly affected by a challenge. In this model, community members — not outside experts — set the priorities, ask the questions, and guide the process. Researchers take on a supporting role, offering tools, resources, and guidance while stepping back to let people in the community take the lead.

This approach often starts by working with trusted community leaders who can bring together individuals with the skills, networks, or interest to drive the co-design process. Peer facilitators from within the community help build trust and ensure that activities are meaningful and relevant to local contexts. The result is stronger community ownership of solutions, deeper trust, and a greater capacity for participants to solve problems on their own terms.

By encouraging flexibility, creativity, and autonomy, user-led co-design empowers participants to explore solutions that align with their realities, making the process both impactful and sustainable. While it demands significant time, resources, and trust-building, it ultimately fosters innovation, strengthens community leadership, and ensures that the people most affected by challenges are at the heart of the solutions.

USER-LED CO-DESIGN

In this model, Indigenous & local values and processes assume a leadership role, supported by external tools, resources and guidance (e.g. scientific equipment, human and financial resources). It empowers local leadership with the highest level of community participation and self-determination of the four models, and the local community benefits from new knowledge acquired through engagement with the tools and resources. The boat in the figure on the right represents tools & resources, see the legend on page 5.



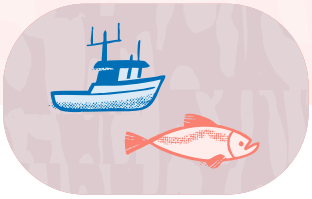
USER-LED CO-DESIGN IN ACTION

Protecting the cultural value of the Lobster-Eelgrass system for the Essipit Innu First Nation

As surface water temperatures rise, the American lobster is becoming more common in the St. Lawrence Estuary. The Conseil de la Première Nation des Innus Essipit (CPNIE) wants to ensure that the community's lobster harvest remains sustainable while also protecting the eelgrass meadows where fishing takes place.

The CPNIE contacted research partners from the University of Quebec in Rimouski, Parks Canada and Fisheries and Oceans Canada to design a project that would help them better understand the lobsters and eelgrass meadows system in order to develop sustainable harvesting practices managed by and for members of the Essipit community. The project is funded by the Government of Quebec in the context of the Plan for a Green Economy 2030.

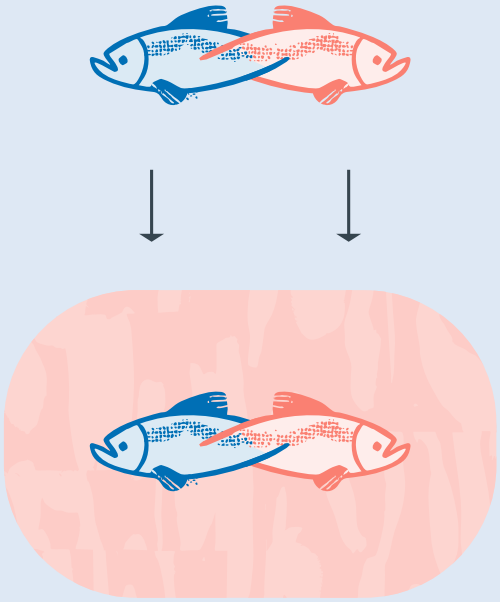
This collaboration began during the funding application process and continues through a steering committee that oversees fieldwork and outreach activities. The project aims to help the community build resilience against climate change while strengthening local expertise and stewardship, empowering the Essipit Innu First Nation to monitor and protect their environment more effectively toward transformative science for all.



4. *Indigenous co-design: Leading with sovereignty and cultural respect*

At its core, Indigenous co-design is about self-determination and cultural sovereignty — ensuring that Indigenous communities set the goals and methods of a project so it reflects their values, needs, and priorities. It takes a big-picture view, recognizing how people, places, and systems are all connected, and it ensures that these relationships are respected throughout the co-design process.

By rooting collaboration in cultural practices, such as Mi'kmaw "Two-Eyed Seeing," Indigenous co-design fosters equity, self-determination, and respect. This approach also encourages Indigenous and Western knowledge systems to work side by side and together, making the most of each one's strengths without overshadowing or dismissing the other.



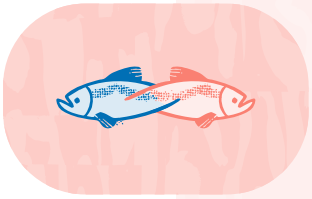
INDIGENOUS CO-DESIGN

This model functions similarly to parallel co-design except importantly, there is a braiding between Western and Indigenous knowledge systems. The process is shaped by Indigenous culture and methodology, such as the concept of Two-Eyed Seeing. This model places a particular importance on nurturing relationships during and beyond the research process, and there must be direct benefits returned to the community.

TWO-EYED SEEING (ETUAPTMUMK)

The concept of Etuaptmumk was developed in Atlantic Canada by Mi'kmaq Elders Albert and Murdena Marshall, with Dr. Cheryl Bartlett. It encourages viewing the world through both Indigenous and Western eyes, using one eye for each to integrate Indigenous ways of knowing with Western scientific approaches. It recognizes the strengths of Indigenous and other knowledge systems and teaches that learning to use both lenses can benefit lands and waters, as well as humanity.

By focusing on collaboration that is rooted in respect and shared understanding, Indigenous co-design creates space for solutions that honour both traditional knowledge and modern challenges.



INDIGENOUS CO-DESIGN IN ACTION

In Mi'kma'ki, on Canada's east coast, the *Apoqnmatulti'k* project — meaning "we help each other" in Mi'kmaw — is reshaping collaborative ocean science through a model grounded in Indigenous values, shared governance, and mutual respect. Founded in 2018, *Apoqnmatulti'k* brings together Mi'kmaq communities, academic institutions, government agencies, and local fishers to co-design research that supports the health and stewardship of culturally and ecologically significant aquatic species.

The project is a partnership between the Ocean Tracking Network, the Unama'ki Institute of Natural Resources, the Confederacy of Mainland Mi'kmaq, commercial fisher Darren Porter, Acadia University, Dalhousie University, and Fisheries and Oceans Canada. Guided by the Mi'kmaw principle of *Etuaptmumk* (Two-Eyed Seeing), this collaboration ensures that Indigenous and Western knowledge systems contribute equally to research design, decision-making, and outcomes. Every stage — from setting priorities to collecting data and sharing results — is co-developed and co-delivered by all partners through a shared governance structure that emphasizes transparency, accountability, and accessibility.

Apoqnmatulti'k is more than a research project — it's a living partnership that demonstrates how inclusive, community-driven science can build trust, strengthen stewardship, and offer holistic solutions that honour the rights and responsibilities of Indigenous peoples. It offers a model of Indigenous co-design that is not only effective in Mi'kma'ki, but adaptable to other regions seeking more respectful, resilient, and just relationships with the ocean.

Toward transformative science for all

The Ocean Decade represents an opportunity to reimagine how science is conducted — from knowledge co-production to dissemination and action — by actively dismantling systemic power imbalances in traditional research. Moving from extractive, top-down approaches to inclusive, bottom-up methods requires co-design models that prioritize self-determination, creativity, and user-led solutions.

At its core, co-design in the Ocean Decade embodies the UN Sustainable Development Goals' promise to "leave no one behind." Achieving true inclusivity, however, demands more than participation; it requires marginalized voices to lead and shape research processes. Transformative science must foster equity, build relationships, and empower those historically denied power and autonomy. By centering leadership in the hands of communities, we can co-create solutions that not only address pressing challenges but also uphold justice and sustainability for future generations.

Recommended reading

Bartlett, C., Marshall, M., & Marshall, A. (2012). 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(4). https://link.springer.com/article/10.1007/s13412-012-0086-8

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