Canadian Ocean Literacy Coalition

La coalition canadienne de la connaissance de l'océan

UNDERSTANDING OCEAN LITERACY IN CANADA

ATLANTIC REGIONAL REPORT

JUNE 2020

Canadian Ocean Literacy Coalition

La coalition canadienne de la connaissance de l'océan

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Cover photos: Justine Ammendolia, SOAR
Background photo: SOAR

EXECUTIVE SUMMARY

Photo: Gordon Slade

This report is one of five regional reports that support a Canada-wide study conducted by the Canadian Ocean Literacy Coalition (COLC) to establish a baseline seascape of ocean literacy (OL) in Canada. The study's results will be used to develop an evidence-based national OL strategy and implementation plan.

This Atlantic Regional Report shares the findings from the Atlantic provinces – Newfoundland & Labrador (N.L.), Nova Scotia (N.S.), Prince Edward Island (P.E.I.), and New Brunswick (N.B.). Two lead researchers focused on this region – one dedicated to N.L. (Justine Ammendolia) and one dedicated to N.S., P.E.I., and N.B. (Julia Ostertag). The regional study drew on interviews with representatives from 48 organizations, an online organizational survey (61 participants), and a document scan (73 documents). The study considers the practice of OL within nine sectors to explore current understandings of OL, identify strengths, gaps, and barriers to OL, and propose recommendations for advancing OL regionally and nationally.

The key strengths of OL identified in the region are relationships and collaboration; place-based knowledge and experiential learning; ocean engagement through raising awareness about plastic pollution; women leaders; Two-Eyed Seeing; and workforce development.

The key barriers to OL identified include a lack of funding and the competitive nature of funding; conflict and a lack of trust due to siloed relationships; difficulties overcoming human separation from coasts and the ocean; and a gap in OL initiatives around human and ocean health connections.

Three preliminary recommendations emerged from the research. They are: invest in OL; include OL in the curriculum across Canadian educational systems; and make the ocean visible and accessible to all Canadians through a watershed approach. In addition, the report summarizes ten key messages that reflect regional strengths and challenges to inform ongoing consultations for advancing OL regionally and nationally.

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** The above partners directly contributed to supporting this region's research. See Appendix G for complete list of all funding partners.*

INTRODUCTION:

FRAMING OUR CANADA-WIDE STUDY

Canada has the longest coastline in the world and jurisdiction over an area of ocean equivalent to about 55% of the country's landmass.[1] For the 6.5 million Canadians living in a coastal zone[2] the ocean is deeply embedded in the fabric of community livelihoods, food security, and well-being. Across Canada, the ocean is a major economic driver, the backbone of weather and climate systems, and a recreational playground for millions of Canadians and global visitors. Ocean conservation is increasingly highlighted as a priority, as signalled by Canada's pledge to establish marine protected areas covering 25% of our ocean waters by 2025 and 30% by 2030.[3]

The ocean space is not just about species and industries; it is also about people, livelihoods, relationships, and identity. A knowledgeable and engaged citizenry is required to support and ensure ocean and community health, sustainable ocean economies, and social equity.

The Canadian Ocean Literacy Coalition (COLC) iis an alliance of organizations, networks, institutions, and communities working together to better understand and advance ocean literacy (OL) in Canada. Widely accepted internationally, OL is defined as "**understanding our impact on the ocean and the ocean's impact on us**.[4]" COLC's primary project, since its inception in 2018, has been to lead a Canada-wide research initiative to better understand Canadians' varying relationships with the ocean and to examine how OL is understood and practiced across different regions and sectors. The aim of this work is to establish a baseline *seascape* of OL in Canada, and in so doing, to co-develop an evidence-based national OL strategy and implementation plan.

This report presents the results for the Atlantic Region. It is one of a set of five regional reports and one national report that are available at www.colcoalition.ca.

Heading Photo: Fogo Island, N.L., Photo Credit: Randy Gillespie, Shorefast

Photo: Doing ieldwork to assess tidal lows, Grand Passage, N.S., Photo Credit: SOAR

OUR APPROACH AND METHODS

Through a collaborative research approach, and drawing on qualitative and quantitative methods, the study focuses on five Canadian regions (Pacific, Inuit Nunangat, Atlantic, St. Lawrence, and Inland Canada), as well as nationally. The study moves beyond an examination of OL in the context of formal education and youth to consider the practice of OL within nine sectors: Government, NGO and Advocacy, Academia and Research, Industry, Education, Community, Media, Cultural Heritage, and Health.

Data was primarily collected from participants who are directly engaged in OL, or in other ocean-related work that: (1) advances **ocean knowledge** systems (e.g., scientific, Indigenous, expert, local, etc.); (2) strengthens **ocean values** (e.g., life-sustaining, economic, personal, communal, etc.); and/or (3) implements **ocean actions** (i.e., individual behavioural change, social justice actions, policy changes, etc.).

THE STUDY WAS GUIDED BY THREE CENTRAL RESEARCH QUESTIONS.

1. What is the current understanding and state of OL in Canada?
2. What are the current strengths and barriers of OL in Canada?
3. What are the key recommendations to advance OL in Canada?

5 REGIONS

9 SECTORS

3 DIMENSIONS OF OL

Figure 1: The conceptual framework used for the study, integrating the five regions, nine sectors, and three dimensions of OL – ocean knowledge, values, and actions

Below, Table 1 outlines the eight data collection methods used in the study, and provides the sample total for each method, nationally and for the Atlantic Region. See Appendix E for further details on research methodology, ethics, and links to research tools.

TABLE 1: COLC RESEARCH BY THE NUMBERS

Data Method	Description	National (Total Data)	Atlantic Data
Canadian Ocean Literacy Survey (COLSurvey)	National online survey with COLC members' networks & interested Canadians (For Findings Report PDF)	1,359 respondents	337 Respondents (NL=181; NS=115; NB=35; PEI=6)
Nanos Poll	National poll conducted with random sample (For Findings Report PDF)	1,010 respondents	100
Document Scan	Documents and reports reviewed for context	332 (256 regional/76 national)	73 documents (see Appendix A)
Interviews	Semi-structured, 45 minutes (see Appendix C)	188	52 participants* (NS=25; NL=18; NB=7; PEI=2) (see Appendix B)
Ocean Literacy Mapping Survey (OLMSurvey)	Organizational-level online survey for OL providers	136 respondents	61 participants** (NS=27; NB=14; NL=9; PEI=2) (see Appendix D)
Youth Workshops	Researcher facilitated, semi-structured focus groups (For Youth Report PDF)	3 workshops – 210 youth total	*National scale only*
Arts-based Engagement	Public interactions with artwork and research question (For Arts Report PDF)	5 interactive art works - 250 responses	1 artwork 8 responses
Media & Social Media Scan	Course-scale analysis of topics discussed in Canadian media & twitter (For Media Report PDF)	1,253 articles; 88 influential accounts (800+ followers)	*National scale only*

**From 48 organizations; **From 52 organizations*

ATLANTIC REGION:
BACKGROUND CONTEXT

Known as *Mi'kma'ki* by the Mi'kmaq who have lived in the region since time immemorial (archaeological findings indicate Mi'kmaq presence for at least 10,500 years)[5], the Atlantic provinces, in the context of this report, include Prince Edward Island, New Brunswick, Nova Scotia, and Newfoundland & Labrador.[6]

The Atlantic region, with coasts on the Northwest Atlantic Ocean, has some of the most productive marine environments in the world, with a wide range of habitats including diverse coastal areas.[7] Migratory animals, such as whales, turtles, sharks, and seabirds, also live in the northwest Atlantic. The waters of the Atlantic are impacted by the cold Labrador Current from the Arctic and the warm Gulf Stream from the south, as well as everything that flows into the ocean, from smaller local watersheds to the St. Lawrence and its continuum from the Great Lakes and beyond.

Understanding human relationships to the ocean in the Atlantic region begins by acknowledging that, for countless generations, First Nations of the Wabanaki Confederacy (Mi'kmaq, Peskotomuhkati, Wolastoqey, Penobscot, and Abenaki), Innu, Inuit, and Beothuk in Newfoundland and Labrador (until the 19th century[8]) have been deeply intertwined with the Atlantic Ocean, coasts, and freshwater systems.

Indigenous relationships with fresh water and the sea changed drastically with the arrival of French, Spanish, and British explorers, traders, missionaries, and settlers in the 1500s. While the Acadians maintained a special relationship with the Mi'kmaq, their systems of dikes and aboiteaux (sluices that control water flow) began to dramatically transform coastal marshlands into agricultural land.[9] As colonization and settlement began in earnest in the 1700s, mounting tensions led to the creation of the Peace and Friendship Treaties signed between the British and Mi'kmaq, Peskotomuhkati, Wolastoqey, and Penobscot delegates. McMillan and Prosper write, "in the reciprocal promises of the treaties, it was guaranteed that Indigenous hunting, fishing and gathering assets and strategies would be protected."[10] These treaty rights were upheld in 1999 by the Supreme Court's *Marshall* Decision, one of numerous court decisions that have recognized contemporary Indigenous rights to access fisheries.[11]

Today, the Atlantic region is defined by treaties and a web of municipal, provincial, federal, and international jurisdictions, including Marine Protected Areas (MPAs), Large Ocean Management Areas (LOMAs), Coastal Management Areas (CMAs), and Lobster Fishing Areas (LFAs).

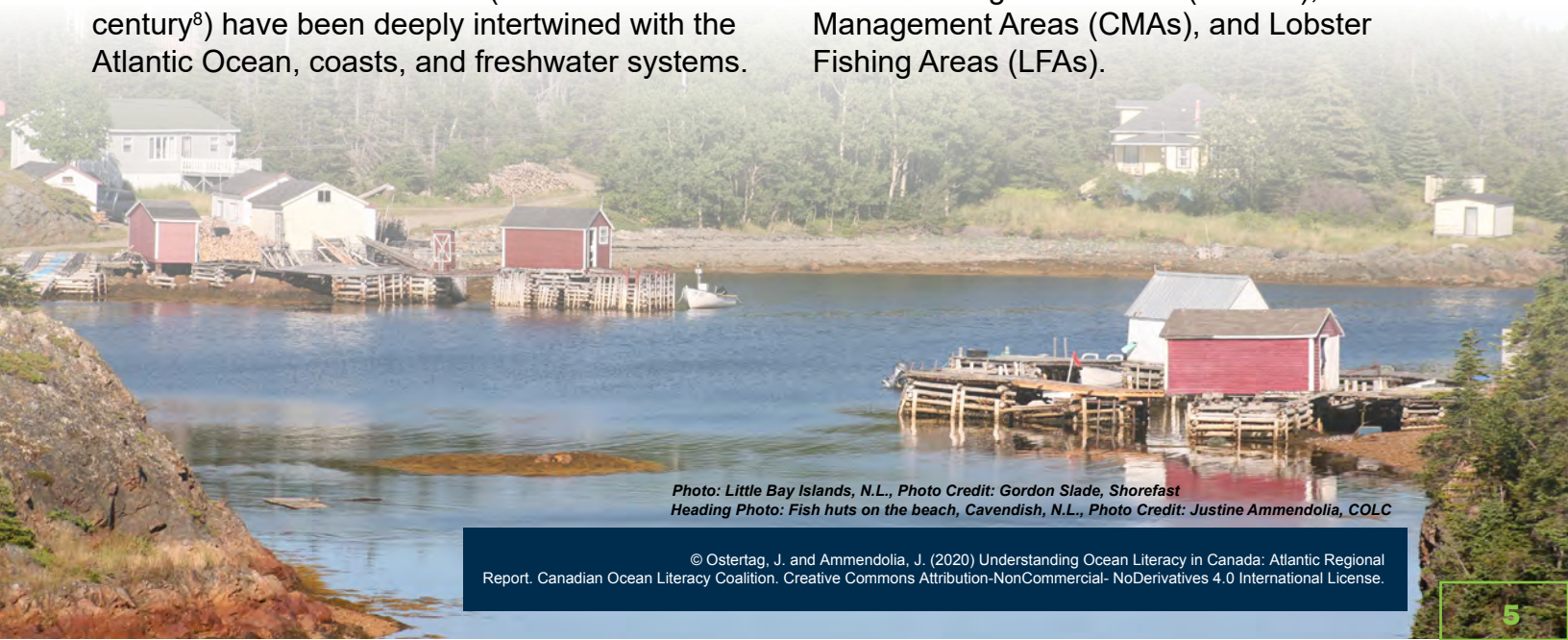


Photo: Little Bay Islands, N.L., Photo Credit: Gordon Slade, Shorefast
Heading Photo: Fish huts on the beach, Cavendish, N.L., Photo Credit: Justine Ammendolia, COLC

This already complex seascape is increasingly impacted by human activities, from invasive species, to changes to coasts and wetlands, to climate change.[12,13] Climate change is altering ocean conditions, leading to rising water levels and higher temperatures, increased extreme weather events, reduced sea ice cover, ocean acidification, coastal erosion, deoxygenation of ocean water, and changing ocean currents. These changing ocean conditions,[14] for instance, impact the migration patterns of the endangered North Atlantic Right Whale. As a result of increasing mortalities due to entanglements and vessel strikes, Fisheries and Oceans Canada (DFO) closed certain fishing areas and imposed changes to shipping traffic.[15] While these measures are vital to protecting the whales, the impacts of closures on fishing communities are notable.

Restrictions to fisheries also risk deepening the legacy of conflict between ocean stakeholders and rights holders, such as fishing communities, industry, scientists, NGOs, Indigenous communities, and the federal government. This legacy across the Atlantic provinces is particularly notable in Newfoundland and Labrador, which remains profoundly impacted by the cod fisheries moratorium put into effect in the 1990s due to the cod stock collapse. As a result, over 30,000 workers lost their jobs, many coastal communities and their ways of life disappeared, and food security remains challenging with reduced access to fish.[16]

Atlantic Canada's relationship with the ocean has largely been shaped by commercial and small-scale fisheries, marine transportation, offshore oil and gas development, national defence, and tourism. However, this ocean economy is also rapidly changing. While family-based and commercial fisheries and aquaculture still make important contributions to the economy,[17] the rise of a migrant workforce is reshaping regional fisheries towards corporate seafood processing.[18] A 'blue economy' [19,20,21] is also emerging in Atlantic Canada connected to a wide range of innovations in ocean technologies, high-speed digital communications, marine renewable energies, ocean observation, ocean pharmaceuticals, resource extraction, ocean restoration, blue carbon, and tourism.

i Newfoundland & Labrador, with its distinct identity from the maritime provinces, is shaped by its unique geography, history, culture, weather, economic realities, and its sheer physical isolation from the rest of the country. N.L.'s significant connection with the ocean is evident economically, where the maritime sector (fisheries, oil and gas exploration/ extraction, tourism, transportation, manufacturing & construction, and the public sector) contributed 20.3% of N.L.'s provincial GDP in 2016, compared with 3.2% in Canada's maritime regions more generally.

SOURCE: Fisheries and Oceans Canada. (2016). Gross Domestic Product Contribution to Provincial & Territorial Economies, 2016. Retrieved May 18, 2020, from http://www.dfo-mpo.gc.ca/stats/maritime/tab/mar-tab2-eng.htm

Photo: Landscape of Ramah Bay, N.L., Photo Credit: Justine Ammendolia, COLC

A diverse set of skills and knowledge are needed in these emerging ocean sectors, and career training is required to meet this need. In recognition of these changes, the federal government and other partners have invested substantially in the blue economy in the region, launching organizations like Canada's Ocean Supercluster, the Centre for Ocean Venture and Entrepreneurship (COVE), Ocean Frontier Institute (OFI), the School of Ocean Technology (Fisheries and Marine Institute of Memorial University of Newfoundland), among many others.

Similar to most of Canada, concentrated OL efforts in Atlantic Canada over the last decade have been largely driven through the formal and informal education sectors, focusing on increasing ocean sciences content in school curricula (e.g., Oceans 11, Nova Scotia; Ocean-STEM Teacher Institute, Memorial University/ Oceans Learning Partnership); communicating ocean sciences in museums (e.g., Discovery Centre), aquariums (e.g., Petty Harbour Mini Aquarium, Back to the Sea Touch Tank Hut, Huntsman Marine Science Centre), and interpretive centres (e.g., Parks Canada); and changing perceptions around ocean careers in the emerging ocean technology sector.[23] However, OL is not limited to the education sector and is shaped by a broad range of factors (e.g., knowledge shared through family, community, and employment) as well as sectors (for instance, municipalities, insurance companies, media, health, and cultural organizations all have a stake in enhancing OL). This study seeks to extend OL beyond purposeful OL initiatives to include a broad range of OL-related projects, programs, and organizations.

> For Canadian Prime Minister Justin Trudeau, "a blue economy is about harnessing the potential of our oceans, seas, lakes, and rivers – resources that Canada is privileged to have in abundance – to make life better for all, particularly women, young people, Indigenous peoples, and people living in developing countries. It means tapping into the latest innovations, scientific advances, and best practices while building prosperity and conserving our waters for future generations." Currently, many definitions of the blue economy are in use, and advocates call on policy makers to ensure that sustainability and equity define the blue economy (Bennett et al., 2019).

Photo: The Narrows, St. John's, N.L., Photo Credit: Justine Ammendolia, COLC

EXPLORING THE TERM 'OCEAN LITERACY'

For the majority of study participants, the concept of OL was a new, unfamiliar term or a difficult concept to use for public engagement (65% of OLMSurvey respondents "never" or "seldomly" use the term OL). For a smaller subsection of respondents, largely within the formal/informal education sector, OL was a familiar term and perceived as useful.

The term was frequently described as being too academic or "schoolish," too abstract and difficult to understand, a buzzword that lacks connection to place and action, and a concept that is difficult for inland Canadians to connect with, as well as to translate. Below is a brief sample of participants' quotes that reflect these perceptions.

Despite these limitations, interview participants recognized that OL has strengths when considered more broadly, such as: OL is a high-level term used by governments (e.g., Galway Statement[24]), is helpful for grant-writing, has the potential to unite diverse groups at a national level, works at an intuitive level to describe many ocean-education and communication practices even when these are not officially labelled as OL, and has relevance as a concept for career-related education in the emerging blue economy. Below is a brief sample of participants' quotes that reflect some of these diverse perceptions of the term's strengths.

> *"Ocean literacy, even the term literacy itself, is kind of an elitist term. And even the language that comes out of ocean science, it's more or less elitist. And the access to data, that's elitist."*
> ***– Angie Gillis, Associate Executive Director, Confederation of Mainland Mi'kmaq***

> *"I feel like a lot of people don't know that term, so I think before you even engage in these communities you have to do a lot of work, or people in that field of ocean literacy need to do a lot of work to explain what it is, why it's important, and how it's relevant."*
> ***– Dalhousie University faculty member***

> *"The only thing that concerns me is that it sounds too schoolish. As a former science teacher, I had students who, when they thought they were learning science, right away barriers went up. Because they thought, 'I don't like science. Science is hard.' Oftentimes these were the girls in my classes who were already bending to perceived social norms. I don't want to setup barriers by using terminology that precludes people from participating."*
> ***– Kimberly Orren, Co-founder and Project Manager, Fishing for Success***

> *"I think OL is a more useful term than ocean conservation. What I've learned working with our Mi'kmaq partners, for example, is when I use that term ocean conservation, they say, 'No, we're not working towards conservation we're working for sustaining a resource for the future of our people, our family, our children.'"* ***–Amy Hill, Project Manager, Apoqnmatulti'k Project, Ocean Tracking Network***

> *"We very much use the term depending on the audience. It resounds mostly when we're writing formally; for grants and such. It is a term that government understands. We use it when we're talking to people nationally, but not necessarily locally or informally. We don't often use ocean literacy when we're reaching out to our audiences about workshops and their content. The term 'literacy' comes with a lot of baggage. We often use 'ocean knowledge' or 'ocean understanding' whenever we're working with the public, especially with Indigenous communities. We tend to flex with it. Ocean literacy is the formal term, it's the suit that all the other less formal terms fit within"* ***– Shannon Harding, Director of Programs, Clean Foundation***

> *"A lot of organizations that I talk to, especially working on protection and conservation, don't consider themselves people who are doing ocean literacy or anything. But when they talk, they say the word mentoring. They talk about awareness. They talk about all that stuff. So, I think they don't even realize that they're doing OL."*
> ***– Anna Naylor, Manager of Learning Programs, COVE***

> *"In addition to these approaches to ocean literacy, I would like to see the word 'relationship' in this definition. What is our relationship with the ocean? Also, ocean literacy is a multidisciplinary idea, not only from science."*
> ***– Saiqa Azam, Assistant Professor, Faculty of Education, Memorial University of Newfoundland***

> *"For me, an ocean literate person is someone who looks at the ocean with endless curiosity and wonder, and who is always interested in what changes in the ocean mean for life on land."*
> ***– Fred Whoriskey, Executive Director, Ocean Tracking Network***

MAPPING OCEAN LITERACY INITIATIVES

Expanding OL beyond the education sector broadens what is conventionally understood to be an "ocean literacy initiative" to include projects and organizations that have never before been brought together under this term. Organizations featured in the Atlantic Region OL Map (see Figure 2 below) and the Atlantic Region OL Asset Map Table have been included if they contribute to: (1) mobilizing an increased understanding of the ocean across diverse knowledge systems; (2) strengthening ocean values that are connected with the ocean; and/or (3) implementing personal and collective engagement and ocean actions. While this map of identified organizations and initiatives is not exhaustive, it highlights the kinds of projects that currently are taking place across the region, offers possibilities for collaboration and networking, and identifies gaps/opportunities to be filled by future initiatives.

One region, distinct cultures

OL is practiced in many different ways across Atlantic Canada. OL in Atlantic Canada is deeply connected to local communities, which have diverse histories, place-based knowledges, cultures, and identities. These various identities are apparent in cultural heritage, music, and language, particularly for Indigenous communities.

In mapping OL across the region, these differences in cultures and OL practices must be considered. There is a risk, for example, that "distinct francophone and Acadian cultures in the region, particularly with their strong marine connections, may 'drown' in an anglophone ocean" (Anne Fauré, Conservation Council of New Brunswick). Acadian expressions derived from experiences with the sea (e.g., *amarrer, se chavirer, débarquer, embarquer, haler*) are forms of OL that are easily lost in translation. Newfoundland and Labrador is also unique historically, culturally, economically, and geographically. As a result, OL in N.L. reflects these differences and, as Mary Alliston Butts (CPAWS – N.L.) notes, "it is important that protocols, procedures, and approaches are culturally and geographically relevant."

HOW DO ATLANTIC RESIDENTS LEARN ABOUT THE OCEAN?

77% VISITING THE OCEAN (71% in the rest of Canada)

72% SCHOOL (72% in the rest of Canada)

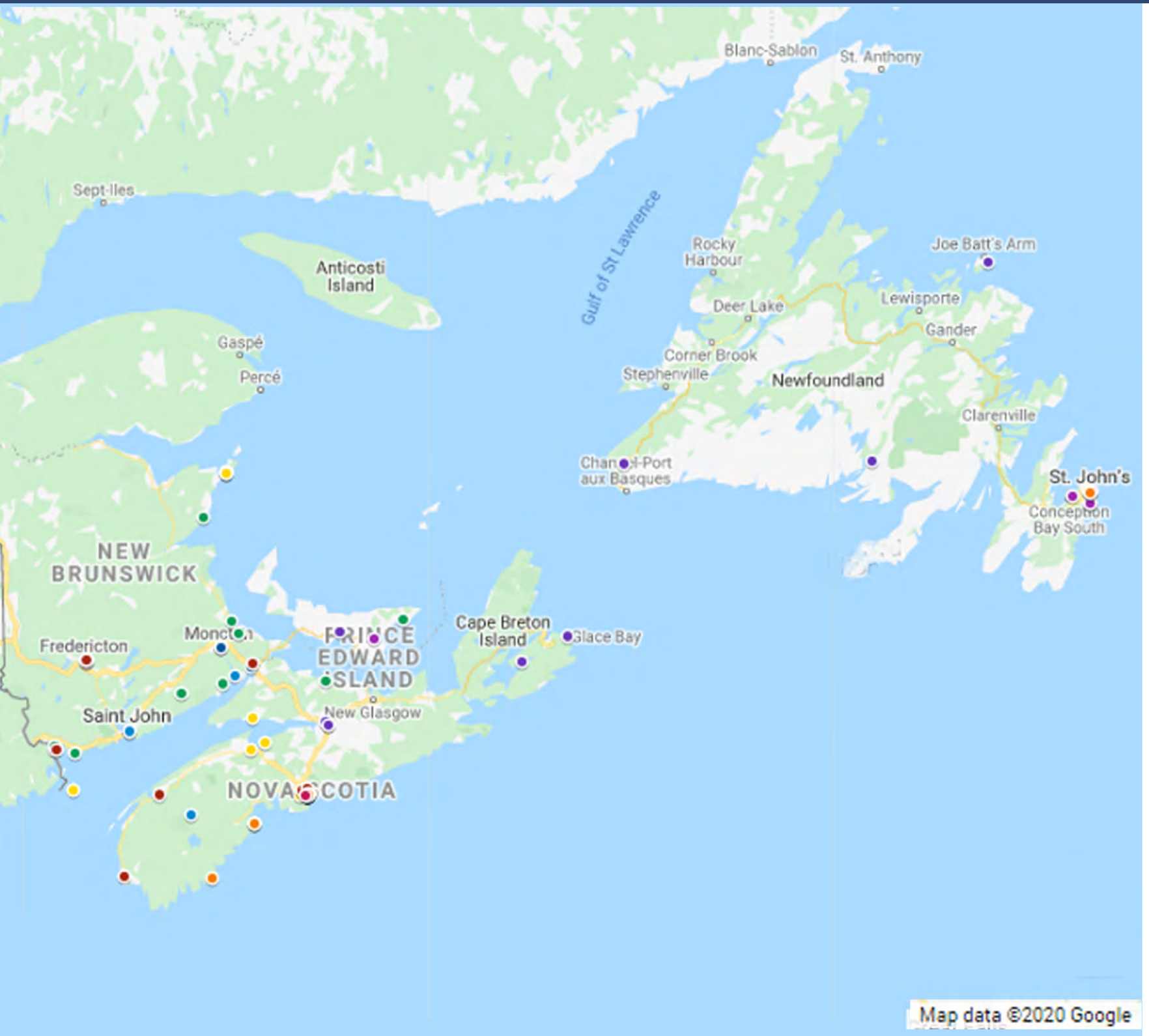
71% MEDIA (77% in the rest of Canada)

60% VISITING MUSEUMS/AQUARIUMS (64% in the rest of Canada)

57% RECREATIONAL ACTIVITIES (65% in the rest of Canada)

57% FAMILY, FRIENDS AND/OR COMMUNITY MEMBERS (47% in the rest of Canada)

Findings from 337 Atlantic respondents (NL=181; NS=115; NB=35; PEI=6) to the Canadian Ocean Literacy Survey



Sector Breakdown	Number of Organizations
Education	15
NGO and Advocacy	26
Media	1
Government	12
Academia and Research	24
Indigenous/Community	11
Cultural Heritage	7
Health	1
Industry	10
Multisectoral	1

OL Initiatives Engagement Type	Number of Organizations
Information Resources	79
Interactive Activities	82
Expanding Capacity	39

Figure 2: Atlantic Regional Ocean Literacy Map

Figure 2: Preliminary sample of the interactive digital National Ocean Literacy Asset Map that will be part of the National Ocean Literacy Strategy. The emerging map can continue to evolve throughout the United Nations Decade of Ocean Science for Sustainable Development (2021-2030), serving as a useful indicator of increasing OL engagement, reach, and impact.

KEY FINDINGS:
REGIONAL STRENGTHS OF OCEAN LITERACY

Across the diverse sectors included in this report, we have identified six key enablers of OL in Atlantic Canada: (1) Relationships and collaboration; (2) Place-based knowledge and experiential learning; (3) Ocean engagement through raising awareness about plastic pollution; (4) Women leaders; (5) Two-Eyed Seeing; and (6) Workforce development.

1. RELATIONSHIPS AND COLLABORATION

The importance of carefully developed and maintained local or regional relationships and collaboration within and between organizations, with the general public, rightsholders (e.g., Indigenous communities), and stakeholders (e.g., fishing associations) was identified by many participants as the key to their success. For others, developing these relationships was identified as an important goal to expand their ocean initiatives, expand their networks, build new partnerships, and overcome barriers (funding, competition, redundancies among organizations). Nearly all participants recognized that developing and maintaining relationships was the starting point for project success (See Appendix F, Homarus Eco-Centre case study).

This emphasis on collaboration was particularly noteworthy when participants were asked to identify "OL Leaders." While participants listed a wide range of regional and national ocean-related organizations (e.g., Ocean School, Oceans Learning Partnership, Clean Foundation, CaNOE, Dalhousie University, Memorial University, DFO, Shorefast, Ocean Wise, WWF-Canada) or individuals (e.g., Boris Worm, Jane Adey, Lyne Morissette, Omer Chouinard, Angie Gillis, Shelley Denney, Ken Paul, Kimberly Orren) in the region no one leader was clearly identified. Rather, participants consistently emphasized the importance of many people and organizations doing great work together. Shared by Boris Worm, Scientific Director, Ocean School: "I don't think we need a leader or a leading organization. It's very Canadian to have this multi-faceted approach." Pisces's Ocean Assemblage is an example of an initiative that contributes to building relationships across ocean sectors by allowing organizations to share and learn about ocean research projects and events. Similarly, Canada's Ocean Supercluster, based in the Atlantic, supports networking and collaboration across the ocean industry sector, as can be seen by its ocean asset map.

Collaboration also allows for integrated approaches to conservation planning and implementation, based on the broad engagement of individuals representing different expertise, mandates, and authorities. "The value of these participatory initiatives to exchange knowledge and perspectives in terms of OL is difficult to quantify, but increasingly important as communities struggle with decisions around sea-level rise and potential impacts of these decisions on coastal ecosystems (ecosystem services, landward migration of key biogenic habitats including rockweed and saltmarsh systems)" (Staff, Environment and Climate Change Canada – Canadian Wildlife Service).

Heading Photo: Island Harbour, Fogo Island, N.L., Photo Credit: Gordon Slade, Shorefast

Photo: Children explore the coastal zone at the Homarus Eco-Centre, Pointe-du-Chêne, N.B., Photo Credit: Homarus, Inc.

In the OLMSurvey, organizations identified that their most important partnerships are local (80%) and regional (63%). Only 32% of partnerships are national, while very few organizations engage extensively with international partners (14%).

2. PLACE-BASED KNOWLEDGE AND EXPERIENTIAL LEARNING

Whether located in large coastal cities or small coastal communities, participants consistently noted that meaningful place-based connections and hands-on learning experiences are central to successful OL initiatives. Indigenous communities in particular have tremendous place-based knowledge that contributes to understanding the interdependencies between humans, land, and sea (see Two-Eyed Seeing below). Kimberly Orren, Founder of Fishing for Success N.L., described how their work builds personal connections to the ocean through "community-based programming that gets people physically in the space. All five senses are engaged, and they just have a personal experience that you couldn't describe to them in words, in a box-shaped classroom with no windows and a book in front of them or even a video." Similarly, at New Brunswick's Huntsman Marine Science Centre, Tracey Dean (Education Director) clearly identified the ocean and coast as central to their educational approach: "to bring the students from all over Eastern Canada to the ocean, to learn about it, is much better than talking about it. It gets them out of their comfort zone."

Museums, aquariums, interpretive centres, eco-tourism operations, recreation (recreational fishing, kayaking, diving, surfing, etc.), and citizen science projects across the region provide place-based, experiential learning opportunities for people of all ages to foster meaningful connections with the coast and ocean.

The importance of connections to place for OL initiatives was identified by OLMSurvey participants. The vast majority of Atlantic

CASE STUDY # 1: **Shorefast, Fogo Island, Newfoundland**

Founded by Fogo Islanders Zita Cobb and her brothers in 2004, **Shorefast**'s mission is to build economic and cultural resilience on Fogo Island. Connection between place and ocean health is central to Shorefast's work. As Gordon Slade, Shorefast Board member, said, "We don't necessarily foster relationships with the ocean on Fogo Island because they really already exist. You know, the people of Fogo Island are already very ocean literate because they live near the ocean and work on the ocean. What we do try to do is to help them understand the value and importance of their ocean literacy and their relationships with the ocean."

Shorefast exemplifies its holistic, place-based approach in its New Ocean Ethic, a series of initiatives designed to create a world where healthy oceans and healthy communities can both thrive. By addressing economic needs and by working directly with communities, Shorefast is laying the groundwork for lasting ocean conservation achievements. Specific initiatives include oil spill response training for local fishermen; a ban on single use plastic bag use; annual observance of World Oceans Day; development of an online Fogo Island Ocean Atlas; an Adopt-an-Island project with Grade 5 and 6 students at Fogo Island Central Academy; and the annual Canada Ocean Lecture Series.

This connection to place fosters a sense of belonging and identity, yet it also connects people to *"a shared global fate; all places are interconnected. Advancing our universal interests while nurturing the specificity of each place will contribute to our shared well-being."* (Zita Cobb).

Photo: Swish Artist studio in Tilting, Fogo Island.
© Gordon Slade, Shorefast

projects are located on the coast (83%), with 39% offered virtually/online, followed by 37% taking place on (or in) the ocean, 37% occurring inland, and 10% indoors in classrooms, labs, conferences or museums.

3. OCEAN ENGAGEMENT THROUGH RAISING AWARENESS ABOUT PLASTIC POLLUTION

In 2019, the Clean Foundation hosted its second Clean Ocean Summit, bringing together organizations and change-makers from across the Atlantic provinces and across multiple sectors (federal, provincial, and municipal governments; NGO; fishing and seafood industry; plastics industry; First Nations; academia; business; and community organizations) to determine solutions for marine waste, especially consumer plastic and fishing debris. This focused mobilization around plastic pollution in the ocean reflects an awakening to the crisis of marine waste in Canada[25] and internationally,[26,27,28] and one that was echoed repeatedly throughout this study by a wide range of organizations. The public's concern with ocean pollution (and plastic marine waste in particular) was identified in the COLSurvey as the most critical threat facing the ocean (similar to findings by Oceans North in their 2019 public opinion study[29]). Relatedly, "reducing ocean pollution" was also identified as the top collective action required to protect the ocean (results for Atlantic Canada: (1) Reducing ocean pollution (65%), (2) Reducing carbon tied with Supporting a just transition (45%), (3) Increasing public awareness and education (39%), and (4) Creating a network of MPAs (35%).

Shoreline cleanups and surveys (e.g., the Great Canadian Shoreline Cleanup) were identified by participants as powerful engagement tools leading to increased ocean awareness and ocean actions. Interview participants such as the Discovery Centre, Huntsman Marine Science Centre, Conservation Council of New Brunswick, Nature Trust of New Brunswick, Oceans Week Halifax, Fishing Gear Coalition of Atlantic Canada (FGCAC), Canadian Parks and Wilderness Society – Newfoundland & Labrador Chapter (CPAWS), the Ocean Science Centre all engage the public through plastic pollution reduction efforts. For instance, the Ship to Shore program was developed in Nova Scotia (Clean Foundation) and adapted the N.L. context by CPAWS -N.L in collaboration with local communities, marine vessel operators, harbour management, and fish harvesters. In addition, Max Liboiron's CLEAR lab (Civic Laboratory for Environmental Action Research) at Memorial University specializes in monitoring plastic pollution that offers interdisciplinary approaches to plastics pollution research based on citizen science, community interest, and social justice.[30]

Noteworthy, however, are challenges related to this surge of interest in plastic pollution. For instance, Matt Abbott, Fundy Baykeeper and Marine Conservation Director, Conservation Council of New Brunswick, is concerned about "making sure it's not just a flash in the pan. It can take all the air in the room." While competition for funding and the public's interest are concerns, plastic pollution is a critical issue that mobilizes collaboration between diverse sectors and draws important connections between human health-ocean health as well as freshwater and saltwater. As shared by Wendy Watson-Wright, Founder and CEO, 7 Mile Bay: "I do think that we should use the fact that people are worried about plastics. Every time you hear plastics, you hear ocean. You know that the ocean is connected to all rivers and all watersheds."

Photo: The Homarus Eco-Centre's mobile lab teaches students about lobsters, Pointe-du-Chêne, N.B., Photo Credit: Homarus, Inc.

CASE STUDY #2: **Full-hearted womxn leaders - Oceans Week Halifax**

When internationally recognized expert on maritime law and policy Elisabeth Mann-Borgese returned to Halifax from the UN Earth Summit in 1992, she collaborated with local organizations to host Halifax's first Ocean's Day (June 8th), long before World Oceans Day (WOD) was formally adopted by the UN in 2008.[1,2] It is perhaps unsurprising then that it is in Halifax that this one-day event has expanded into Oceans Week and that two womxn co-founded this community-driven event (womxn is a term used in place of "women" that explicitly includes not only cis women, but also trans women and femme/feminine-identifying genderqueer and non-binary individuals).

Since 2016, Oceans Week Halifax (OWHFX) has become an emergent, dynamic, inclusive, community-driven, and highly collaborative series of public events that strive to connect the broader public with the ocean through workshops, lectures, recreational activities, beach cleanups, and more. OWHFX is a catalyst that amplifies the work of the vibrant ocean community network throughout the region. In 2019, OWHFX hosted the world's largest oceans' week celebration with more than 40 events supported by over 35 organizations and held over 10 days. They are part of the leadership team launching Oceans Week Canada, (June, 2020) to support the emergence of more ocean day/week events across Canada, inland and coastal.

There are many lessons to be learned from OWHFX about building inclusive and accessible approaches to ocean literacy. For instance, OWHFX co-founder Alexandra Vance advocates for womxn and femmes entering diverse ocean sectors. Alexandra also celebrates that womxn are increasingly playing decisive roles in redefining our relationships with the ocean: "In Halifax, young women 25 to 40-years old are entirely engulfed in this passion for the ocean and are either volunteering or have actually been successful in making it a professional venture. They are full-heartedly involved, and I can't even tell you how happy that makes me. There's a real benefit of having womxn and femmes in this space. We just get it; we don't have to explain ourselves. We can speak from the heart and get it done."

4. WOMEN LEADERS

In interviewing participants across the nine sectors for this study, it became apparent that women leaders play a significant role in communicating the importance of the ocean throughout Atlantic Canada (i.e., 71% of interview participants were female). The role of women leaders in connection to diverse ocean sectors was also recently celebrated at the Maritime Museum of the Atlantic in Halifax, where visitors were introduced to 17 maritime women with the "Sea in her Blood" exhibit. While women's relationships to the sea have largely been hidden for much of history, the exhibit depicted maritime women's connections to the ocean through the efforts of an Indigenous water protector, youth ocean activist, fisher, ship captain, surfer, boat builder, naval officer, sailor, athlete, and marine animal rescue responders. The perspectives of women in a traditionally male-dominated ocean space and sector are key in developing inclusive OL; however, it remains to be seen whether women will continue to rise into high-level decision-making roles outside of the NGO, education, and academic sectors.

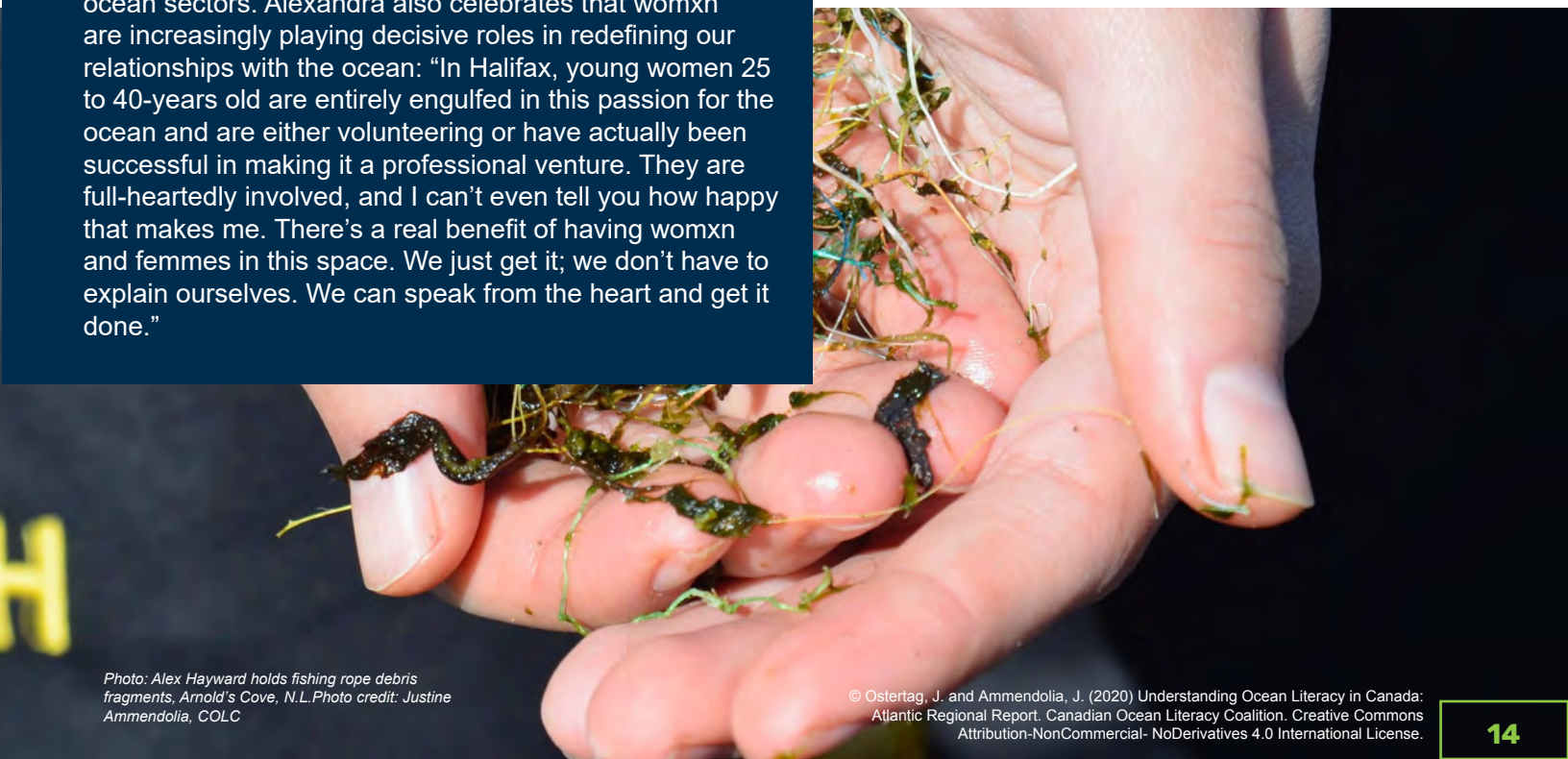


Photo: Alex Hayward holds fishing rope debris fragments, Arnold's Cove, N.L.Photo credit: Justine Ammendolia, COLC

5. TWO-EYED SEEING

Across the Atlantic region there is a growing shift toward co-creating ocean knowledges through collaborations with Indigenous peoples. One concept in particular expresses how western knowledges and Indigenous knowledges can be brought together: Mi'kmaq Elder Albert Marshall's practice of *etuaptmumk* (Two-Eyed Seeing). The Apoqnmatulti'k project places Two-Eyed Seeing at the centre of its approaches: "*Etuaptmumk* is the practice of bringing together different knowledge perspectives in a way that enhances sustainability of shared natural resources. It governs *what* Mi'kmaw do and *why*. Research is more effectively designed and carried out when western, Mi'kmaw, and local knowledge systems are integrated from the beginning" (See Appendix F, Apoqnmatulti'k case study).

Etuaptmumk furthers *netukulimk*, "a Mi'kmaq concept that recognizes that the sustenance that you need is physical and spiritual, and that when you are taking to sustain yourself one must always be conscious of the seven generations to come."[34] This practice also takes place within an acknowledgement of *M'sit No'kamaq*, which "translates to 'all my relations', and acknowledges that Mi'kmaq people are related to all those with whom they share their territory. The concept of 'all my relations' acknowledges the spirit in all species and implies reciprocal responsibilities. For example, if an eel gives itself to take care of the Mi'kmaq people, then the Mi'kmaq people must also take care of the eel."[35] Practicing *Etuaptmumk* requires understanding Mi'kmaq laws (e.g., land held in communal ownership[36]), Peace and Friendship Treaties, spirituality, cultural practices, and language, as well as protocols that govern how knowledge is owned, shared, and controlled. For instance, at the Mi'kmaw Conservation Group, western scientists, traditional knowledge holders, and local experts are linked together in a chain. This network has led to a deeper understanding of local ecosystems and the ability to protect heritage places and species in new ways.

For organizations seeking to build relationships with Indigenous peoples so that ocean knowledges are inclusive of Indigenous knowledges, it is key that *Etuaptmumk* be integrated at the outset and not as an afterthought. As Angie Gillis, Associate Executive Director, Confederation of Mainland Mi'kmaq, explains:

"If we're going to start talking solutions maybe we've missed a step by not having Indigenous knowledge and science integrated at an earlier stage. Maybe that's where we come together and try to do that together, rather than trying to move forward without an Indigenous perspective."

6. WORKFORCE DEVELOPMENT

Building connections between OL and career literacy is an emerging Atlantic success story and one that is approached differently by various organizations. While COVE's Workforce Initiative is closely aligned with the blue economy and marine industries, Clean Foundation prepares youth through internships in a wide range of ocean and environmental sectors. In N.L., Fishing for Success's Girls and Women Who Fish program focuses largely on connecting women to food fisheries, and in P.E.I., the Department of Fisheries and Communities (PEI DFC) offers the Future Fishers Program which provides financial and educational support for new entrants into the P.E.I. lobster fishery. The

Photo: The Ocean Tracking Network provides students with hands-on shark tagging experience by taking them off the coast of Halifax, Nova Scotia to study blue sharks (OTN)

PEI DFC is also working with a few local high school teachers to offer fisheries information sessions and to support a new course that offers career training related to fisheries and oceans (e.g., sustainable fishing practices, conservation awareness, and traditional fishing- husbandry). Universities, colleges, and trades programs have also focused on career preparation to develop strong marine sectors and the blue economy (e.g., Nova Scotia Community College's Ocean Technology program, Fisheries and Marine Institute of Memorial University of Newfoundland's Centre for Applied Ocean Technology).

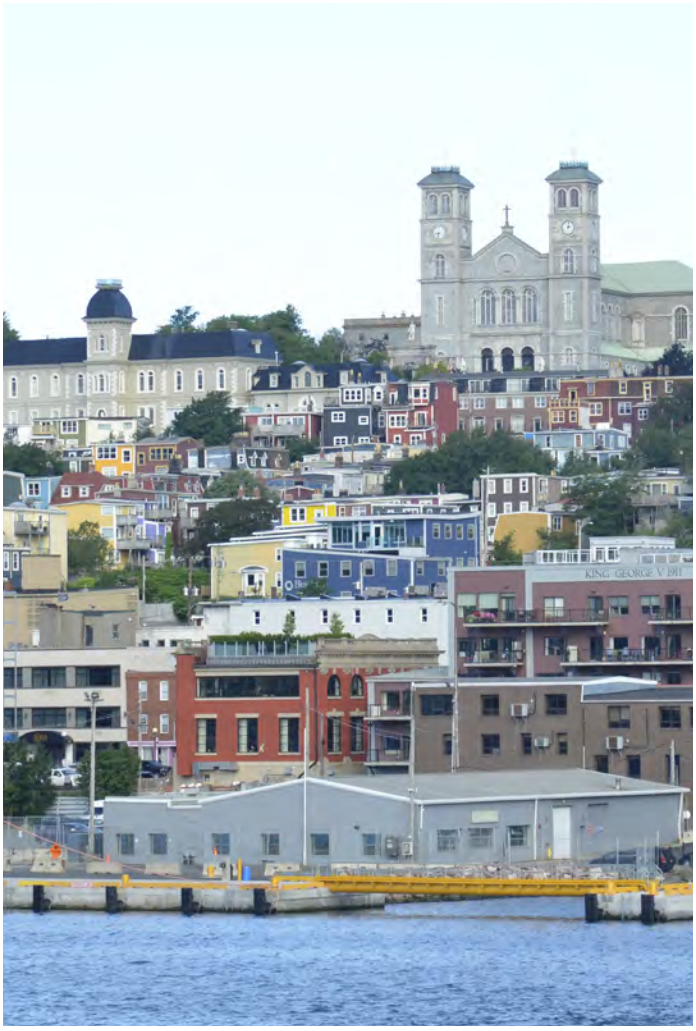


Photo: Port of St. John's, N.L.,
Photo Credit: Justine Ammendolia, COLC

CASE STUDY # 3: **Ocean Literacy for Ocean Careers COVE Workforce Initiative**

Located on the Halifax Harbour, the Centre for Ocean Ventures and Entrepreneurship (COVE) "is an ocean tech business hub that encourages collaboration across sectors to connect local, national, and international companies in the ocean industry."[37]

One major barrier that has been identified in developing the ocean economy has been the lack of a skilled workforce. Sherry Scully, COVE Workforce Initiative Executive Director, conducts primary research in workforce development, including future skills analysis for new and mid-career employees, to ongoing research into students' perceptions and intentions for entering the ocean sector. These latter studies have found that "a significant proportion of students expressed fear, lack of interest, or outright aversion to the ocean as their reasons for not considering an ocean-related career (only ~12% of students indicated an interest in the marine industry)." Her research also indicates that there are many reasons to explain students' lack of interest in ocean careers (as well as that of their parents and educators – two key influencers in career pathway decisions), including that ocean careers continue to be perceived as "wet, dangerous or dirty," male-dominated, and plagued by boom and bust cycles. These ideas persist despite evidence that the industry has evolved into a high-tech, stable, and thriving industry. In addition, the majority of youth have a limited understanding of the scope and variety of blue economy careers, with most recognizing traditional sectors like the Navy and commercial fishing, but few demonstrating awareness of cutting-edge sectors like the ocean tech industry, advanced manufacturing, aquaculture, and marine renewable energy.

To address these challenges, the COVE Workforce Initiative offers workshops for youth across Nova Scotia in schools and Mi'kmaw communities,[38] Summer Institutes for educators across Canada, conducts research, provides internship opportunities, and develops educational materials. Two notable resources are Taking making into classrooms: Ocean Toolkit (ocean STEM experiential learning and design thinking challenges) and Wave of the Future! (resource books introducing young people to the sustainable blue economy).

KEY FINDINGS:
BARRIERS TO OCEAN LITERACY

Interview participants and OLMSurvey respondents identified several key barriers to delivering OL-related programming as well as advancing OL more generally. Funding was identified as the most significant barrier by far, particularly in terms of the lack of funding and the competitive nature of funding. Other barriers include: the ongoing impacts of conflict and a lack of trust due to siloed relationships; difficulties overcoming human separation from coasts and the ocean; and a gap in OL initiatives around human and ocean health connections.

1. LACK OF FUNDING AND THE COMPETITIVE NATURE OF FUNDING

Participants of the OLMSurvey identified funding as the largest, most significant barrier (85%), followed by 74% identifying the "competitive nature of funding applications" as the second largest barrier (see Table 2). In terms of funding sources, respondents identified their primary source as provincial government (64%), second source as federal government (61%), and third as research grants (48%). Not only are these funding sources highly competitive and often restrictive in terms of the kinds of projects that are funded, they are also highly impacted by elections and political agendas. This frequently leads to short-term projects with limited funds to cover staffing. Many interview participants noted that politics directly impacted funding availability to sustain their programs, though they generally also shared a more hopeful outlook for the current political climate. Closely related to the funding barrier is the third most common barrier identified in the survey: lack of infrastructure (63% of respondents). While infrastructure can be widely interpreted (e.g., the need for wharves, boats, office space, monitoring equipment, aquarium equipment, buildings), much of the infrastructure required to connect with the ocean is cost-prohibitive and inaccessible, particularly considering that many of the participating organizations are smaller, community-based NGOs.

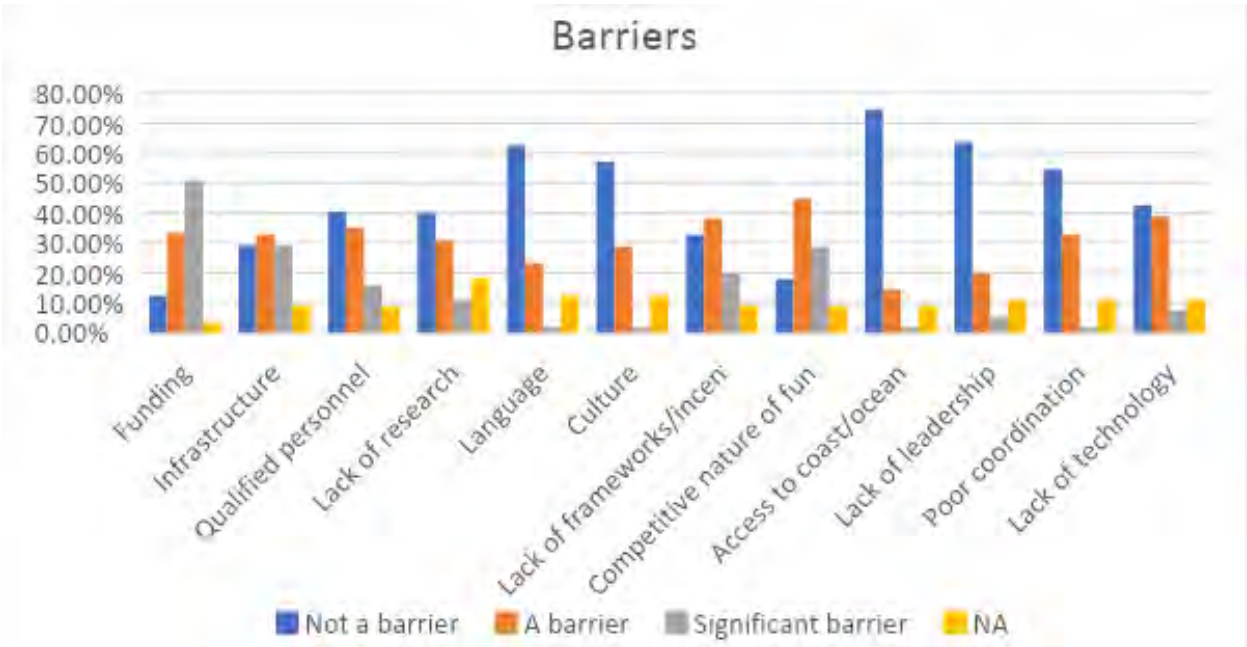


Table 2: Barriers identified by OLMSurvey participants, Atlantic provinces

Heading Photo: Capelin "roll in" on the beach during their annual spawn, near St. John's, N.L., Photo Credit: Gordon Slade, Shorefast

This funding barrier is also closely linked to the "time" barrier frequently noted by interview participants. Many participants explained how completing funding applications drained their limited staff time to develop and deliver programs or communicate the results of projects to communities or the broader public.

Participants in N.L. were clear in expressing concern that the lack of funds in their province disproportionately creates barriers compared to initiatives in other parts of Canada. As Kiley Best, Petty Harbour Mini Aquarium Board Chair, noted: "If you compare us to even Halifax or Vancouver - those places have higher populations, a more diverse big business sector, and households with more disposable income. Things that we can't compete with in Newfoundland. We have to be very creative when it comes to fundraising. Our operation wouldn't exist without higher than average volunteer contributions." She adds that the short tourist season compounds the funding barrier as revenue streams are limited: "Compared to aquariums in B.C., take Ucluelet for example, it's open from May to December. We are open June to September, the tourist boom season, and if we try to stretch that out into October, we just bleed financially, the visitation just isn't there." Newfoundland and Labrador's geography also creates additional funding barriers. As N.L. writer and performer Dave Paddon explains, "It's difficult to travel outside the Northeastern Avalon due to expense. Newfoundland is geographically massive to travel within to share your work." Media coverage in N.L. is also impacted by a lack of funding: "It's very rare that you'll see a national or international level publication that talks a lot about Newfoundland and Labrador. I'd definitely like to see more media outlets, especially the larger outlets, funding deep reporting" (Interviewee, N.L. Journalist).

2. CONFLICT AND LACK OF TRUST DUE TO SILOED RELATIONSHIPS

Building relationships and collaboration was clearly identified by participants as the most significant enabler to delivering ocean-related initiatives. In-depth conversations with participants across the Atlantic provinces, however, consistently highlighted that legacies of conflict and distrust between government, industry, NGOs, Indigenous peoples, the media, and academia continue to act as profound barriers. What this apparent contradiction suggests is that successful initiatives such as the ones profiled above have learned important lessons on how to build relationships that break down the siloes that continue to hamper ocean-related initiatives in Atlantic Canada.

Historically and today, conflicts around ocean issues (such as Indigenous fishing rights, Boat Harbour,[39] oil & gas development, Marine Protected Areas (MPAs)) may increase division, siloed relationships, and, at times, violence, intimidation, and harassment online, on the water,[40,41] and on the job. For instance, a couple of women participants expressed that they may face "heat" for engaging the public on ocean issues: "We certainly take our fair share of heat over different decisions that are made and sometimes that can be really detrimental or a huge deterrent to some people because they don't want to go to an event where you're going to get yelled at" (Interviewee, N.S. Department of Energy and Mines). As well, a CBC journalist noted that certain ocean publications can elicit aggressive comments from online trolls. These concerns highlight a potential barrier for communicating controversial ocean-related information, particularly if conflict disproportionately impacts marginalized individuals and communities (e.g., Indigenous people, women, people of colour).

Distrust between Indigenous and settler society (governments, industry, communities, etc.) remains a considerable barrier in the region that is only touched on briefly in this report but requires extensive relationship-building and reparation efforts to undo the ongoing erasure of Indigenous rights to the ocean,[42] Indigenous knowledge of the ocean, and Indigenous ways of being with the ocean.

In order to advance OL, it is key to "unbundle complex situations" and build trust and confidence (a) in the sources of ocean knowledge; (b) across siloed relationships; and (c) in data management.

a. **Distrust in the sources of knowledge**: The ways in which knowledge is created – particularly through scientific research and consultations – was frequently questioned by participants that work closely with fisheries, government, academia, Indigenous organizations, and NGOs.

"Academics cross their t's and they dot their i's and they cite everything perfectly and they publish a paper that can be defended regardless if it has zero [actual results due to poor methods]. It's not an accurate paper by our [local, Indigenous fisheries] standards. They didn't even look at the right time of year [for the fish species]. So, therefore, we will have conflict on that problem." - Darren Porter, Fisherman, Marine Institute of Natural and Academic Sciences

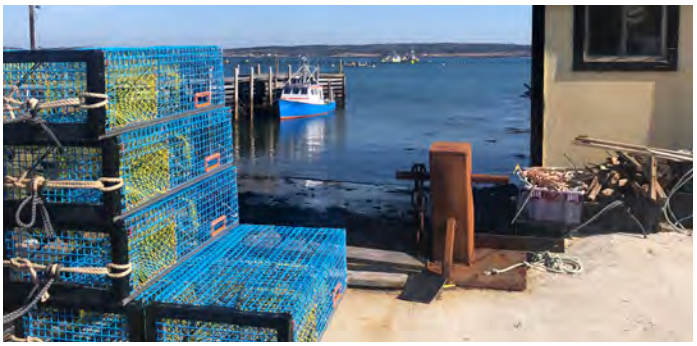


Photo: Fishing, tidal power, aquaculture, and the Research Vessel Grand Adventure, near Westport, Brier Island, N.S., Photo Credit: SOAR

b. **Siloed relationships:** While many organizations and leaders have made considerable progress toward building trusting relationships, distrust remains a deeply rooted barrier in the region and results in ocean initiatives occurring within siloed relationships.

"I think sometimes we're our own barrier. There is distrust of non-profits in some communities, especially when aligned with the federal government on contentious issues. We all need to be better at breaking down those barriers to communication and building trust to address the large challenges that we collectively face." – Jordy Thomson, Marine Science and Conservation Coordinator, Ecology Action Centre

"I think the number one barrier would probably be the nervousness of a lot of individuals to speak to media, or to speak to reporters about their work. You go down to the dock and there's half a dozen fishermen and nobody wants to talk to you, that's going to be trouble for you. If you call up the university and talk to a few researchers and they just don't want to be quoted, or they don't want to be named, or they don't want their studies referenced, then that's going to be a problem." – Interviewee, N.L. Journalist

c. **Distrust in data management:** Trust in data and trust in relationships comes together with the need for data management, open access to data, and transparency in data. Indigenous data management needs to be based on Indigenous OCAP (Ownership, Control, Access, and Possession - OCAP® is a registered trademark of the First Nations Information Governance Centre).

"One of the big challenges that is rampant in our world is the silos and how we're not very good at talking to one another and finding ways to collaborate and integrate, and it's especially glaring or apparent when it comes to data." – Christina MacDonald, Executive Director, COINAtlantic

"I think information management or technology is sometimes one of the biggest barriers to allowing open science. When we're talking about data, data is getting bigger and more complex all the time. And finding a way to share it is difficult, even between departments just because of the way we're structured." – Interviewee, Atlantic Science Enterprise Centre (ASEC)

3. OVERCOMING HUMAN SEPARATION FROM COASTS AND THE OCEAN

Atlantic respondents to the COLSurvey indicated that their proximity to the ocean shapes their day-to-day actions much more directly than respondents in other regions across Canada (80% strongly agree or agreed, compared with 60% of non-Atlantic respondents). Accessing the ocean was also not identified as a barrier to OL (see Table 2) and, as described above, connections to place are at the heart of ocean initiatives in the region. Nevertheless, many interview participants noted that perceptual, jurisdictional, structural (i.e., based on inequalities), and physical separation from coasts and the ocean continue to act as significant barriers.

To begin, many participants struggle to overcome their own and the general public's perceptions of the ocean as a vast, endless, blue blanket where what happens in the ocean is invisible, "over there – separate from us" (Interviewee, Fishing Gear Coalition of Atlantic Canada). Ocean educators noted that even fishermen whose livelihoods depend on the ocean may have a narrow understanding of the ocean's complex and largely hidden ecosystems, and that adult learners in particular are often resistant to learning about the ocean. According to Joana Augusto, Ocean Gallery and Science Experience Coordinator, Discover Centre, "Some people think they know all that there is to know about the ocean. You try to make them see that there's more, that there's a connection between them and the ocean. So, it's interesting meeting that resistance. It's usually easier with the kids than with the adults." For some, the very fluid nature of water and everything that moves through water adds another layer of complexity. Mary Gorman, Member of Save our Seas and Shores Coalition (SOSS), says, "it's really been a huge struggle in terms of making people understand that water moves, so does oil, so do migratory species. And if you're not going to keep industry out of bodies of water, then they're not protected. Period!"

Similarly, jurisdictional issues blur connections to the ocean and result in confusion around who is responsible for making decisions for a healthy ocean and coasts. Kes Morton, Founder, Pisces Research Project Management, illustrates these

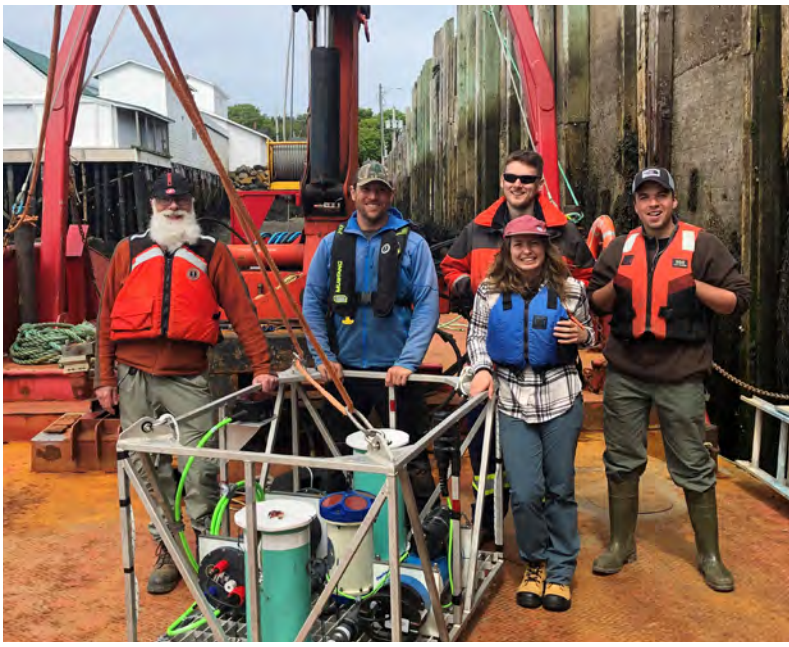


Photo: Researchers from Dalhousie University, Memorial University, and SOAR preparing for deployment of a multi-instrument bottom lander to monitor ish, Grand Passage, N.S., Photo Credit: SOAR

challenges when it comes to the nearshore: “In Atlantic Canada we have this ridiculous scenario where nobody really knows who’s responsible for the nearshore. The Fundy Ocean Research Centre for Energy (FORCE) liaises with DFO and it liaises with Department of Energy, and the Department of Fisheries and Aquaculture (DFA) would love to get in there as well. But Energy and DFA are provincial, DFO is federal. No one’s really sure who’s in charge. I don’t think we have clarity.”

A barrier to connecting with the ocean for many participants is the challenge that the ocean is perceived as an elitist concern and access to the ocean (and ocean economies) is limited for marginalized communities. As such, participants identified that inclusive approaches to OL are needed to overcome this structural barrier (see Fishing for Success Case Study, Appendix F). For instance, newcomers to Canada or migrant workers in fish processing plants[45] may have deep connections with the ocean or may be disproportionately impacted by a changing ocean, and yet these voices are missing in current OL discourses. Sylvia Calatayud, an ocean photographer and newcomer to Canada, explained how she and other newcomers were not able to maintain their professional connection with the ocean: “I have a colleague here and she was a marine biologist but when she came to Canada she was not able to find work and continue her work. I know other professionals that already had a connection with the ocean, and they couldn’t continue either.” Some organizations, like the Surfing Association of Nova Scotia (SANS), have identified this gap and are actively working to ensure that surfing (and the connections to the ocean that surfing fosters) is inclusive for black Nova Scotians[46] and Mi’kmaq youth[47].

The coasts and ocean are also rapidly changing due to climate change, introduced species, habitat loss, and other stressors. Ultimately, it is difficult to connect with a changing ocean when species that matter to you are no longer available, or the places that matter to you are no longer accessible (e.g., See Adam Fenech’s Climate Lab at U.P.E.I. for resources to visualize and plan for the impacts of climate change on coastal environments). This is a particularly painful barrier for Mi’kmaq, for whom the loss of eel or salmon or access to places to fish is much more than a loss of food. It also signifies a loss of Indigenous rights, connections to place, community ties, language, identity, knowledge, and spirituality.[48,49]

Photo: Iceberg and ship off the coast of Northern Labrador, N.L., Photo Credit: Gordon Slade, Shorefast

4. GAP IN HUMAN AND OCEAN HEALTH CONNECTIONS

Findings from the study suggest few participants explicitly connected human and ocean health (and the lack of health sector participants is a telling limitation of this study). For Céline Surette, Environmental Scientist, Université de Moncton, however, the connection between human health and ecosystems (from watersheds to ocean) is of vital importance.

Her interdisciplinary research in New Brunswick and around the world has shown that the movement of contaminants through ecosystems has serious human health and social justice implications. The recently released documentary co-directed by Ellen Page, *There's something in the water*, based on the work of Ingrid Waldron,[50] also highlights the need for anti-racist approaches to engaging and empowering communities to understand and advocate against social and environmental injustices that connect human and ocean health.

Community marine debris monitoring survey, Placentia Bay Ocean Debris Team (PODS), Terrenceville, N.L. Photo credit: Justine Ammendolia, COLC

PRELIMINARY RECOMMENDATIONS TO ADVANCE OCEAN LITERACY

Three clear recommendations emerged from Atlantic participant interviews and survey responses for advancing OL in the region. They are: (R1) investing in OL; (R2) including OL in the curriculum across Canadian educational systems; and (R3) making the ocean visible and accessible to all Canadians through a watershed approach.

R1. INVEST IN OL

Funding and competitive funding processes were identified as the two most significant barriers to OL. In order to build staff capacity and sustain initiatives, there is a need to:

1. Increase and diversify funding opportunities, particularly for sectors and regions that lack funds and address barriers noted above
2. Establish sustained funding opportunities for multi-organization/sector initiatives
3. Support long-term initiatives that demonstrate measured impact over time
4. Increase funding for communication and outreach (e.g., science communication, media (formal and informal), arts-based communications, technologies)

Photo: Community Aquatic Monitoring Program (CAMP), Groupe de développement durable du Pays de Cocagne, N.B., Photo Credit: GDDPC

R2: INCLUDE THE OCEAN AS PART OF SCHOOL CURRICULA

One of the clearest recommendations for advancing OL regionally and nationally was the importance of including the ocean in school curricula. Participants noted some key curricular and pedagogical characteristics of OL to consider when including the ocean in curricula:

1. Place-based in terms of a focus on local species, waters, and their interconnections with other species and regions
2. Community-based in terms of drawing on local expert knowledge (Indigenous, food fisheries, science) and building relationships with these knowledge holders
3. Inquiry-based and experiential in terms of developing hands-on learning experiences that respond to real issues, develop solutions, and increase civic engagement
4. Integrates ocean knowledges across diverse subject areas (not just ocean sciences) – arts, media and storytelling were noted frequently
5. Integrates career literacy to develop interest and awareness of opportunities in emerging ocean sectors and sustainable blue economies (for youth, parents, and educators in diverse communities)

Heading Photo:Header: SOAR Research Vessel Grand Adventure returning from its deployment of the multi-channel hydrophone system with the Dalhousie Engineering team, N.S., Photo credit: Neil Green

FURTHERMORE, OL EDUCATION WOULD BENEFIT FROM:

1. Integrating OL into pre-service and in-service teacher training as well as educational research
2. Continuing to expand French and English-language OL communities of practice regionally, nationally, and internationally (in line with CaNOE's current efforts)
3. Strengthening Indigenous language education in connection with land- and sea-based cultural practices
4. Making OL teaching and learning resources readily accessible.

R3. MAKE THE OCEAN VISIBLE AND ACCESSIBLE TO ALL CANADIANS THROUGH A WATERSHED APPROACH

The need to make the ocean more connected to people's lives and values is limited by the perception that the ocean is a vast, empty "blue desert" that is disconnected from Canadians' lives, whether they live inland or in coastal communities. Watersheds (and other phenomena like weather and climate) emphasize that there is no boundary between "green" and "blue" and, while this expanded understanding of the connection between land and sea may seem overwhelmingly large, it also offers opportunities for local direct action that makes a difference globally.

1. Use a watershed framework to connect freshwater and ocean as a strategy to engage inland Canadians in OL
2. Understand that watersheds, weather, and climate (including climate change) are all interconnected[51]
3. Connect current interest in marine plastic and debris to health, watersheds, and the ocean, with a message that "what happens on land affects the ocean" (Céline Surette, Université de Moncton).

KEY MESSAGES:

In addition to these three clear recommendations, key messages emerged throughout the research that reflect regional strengths and challenges. These messages will be explored further during the subsequent engagement phase as regional findings and recommendations will be used to draft a national strategy and implementation plan for advancing OL in Canada. Key messages include:

1. Build trust and break down silos between diverse groups through equal partnerships and collaborations
2. Encourage knowledge co-creation projects among diverse stakeholders and rightsholders
3. Develop OL networks within regions based on regional strengths and barriers; Coordinate regional networks nationally
4. Ensure Indigenous voices, knowledge, and rights are integrated at the outset of projects and partnerships
5. Recognize that OL is required beyond formal education to include outreach initiatives that engage the general public and diverse sectors
6. Communicate OL through creative approaches to storytelling, arts-based engagement, media, etc.
7. Share research data openly, transparently, and through accessible platforms; Follow OCAP procedures (Ownership, Control, Access, and Possession) for Indigenous knowledge information governance
8. Foster accessibility and inclusivity for OL
9. Recognize that OL must be culturally and regionally relevant
10. Recognize the urgency of the current ecological crises while adopting solutions-based approaches to taking action

CONCLUSION

‘NO LONGER A LONELY PLACE’

For many, the ocean has long been seen as a vast, blue, empty expanse that stretches endlessly to the horizon. However, this idea of the vast ocean being “too big to fail” or, more recently, “too big to fix,” is changing. As this report suggests, a growing wave of change-makers recognizes that the ocean is “too big to ignore.”[52] In reflecting on how interest in the ocean has changed, Wendy Watson-Wright (Founder and CEO, 7 Mile Bay) said, “Working in the ocean used to be lonely, but it’s not a lonely place anymore.” While not all the organizations included in this study may identify as OL initiatives, they are contributing in their own ways to this unique wave. It is a wave created by passionate people committed to co-creating trustworthy, credible knowledge that responds to the needs of local communities and draws on local expertise and Two-Eyed Seeing. Most importantly, these people are responding to urgent crises in our human-ocean relationships through collaborative efforts to bring together diverse voices and perspectives with deep connections to Atlantic communities, coasts, and the ocean.

Heading Photo: Homarus, Inc.

Photo: Local youth observes the Jetyak robotic vessel and Research Vessel Grand Adventure (SOAR) departing Freeport Harbour for testing in Grand Passage, N.S., Photo credit: Amy Tudor

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APPENDIX B: INTERVIEW PARTICIPANTS

NOVA SCOTIA, NEW BRUNSWICK & PRINCE EDWARD ISLAND

Organization/community/initiative	Participant
Clean Foundation	Shannon Harding
Ocean School	Boris Worm
ASEC (Atlantic Science Enterprise Centre)	Staff person
Coldwater Lobster Association	Staff person
Confederacy of Mainland Mi'kmaq (CMM)	Angeline Gillis
Conservation Council of New Brunswick	Matthew Abbott (contributions from Anne Fauré)
COVE (Centre for Ocean Ventures & Entrepreneurship)	Anna Naylor (contributions from Sherry Scully)
Discovery Centre	Joana Augusto
Ecology Action Centre	Jordy Thomson
OFI (Ocean Frontier Institute)	Wendy Watson-Wright
Apoqnmatult'ik Project Manager (OTN)	Amy Hill (contributions from Shelley Denny, UINR)
Bramber Weir (MINAS)	Darren Porter
COINAtlantic (Coastal and Ocean Information Network)	Christina MacDonald
Back to the Sea Society	Magali Grégoire
SOSS (Save our Seas and Shores Coalition)	Mary Gorman
Homarus Eco-Centre/Maritime Fishermens' Union	Maryse Cousineau (contributions from Dounia Daoud)
The Huntsman Marine Science Centre	Jackie Walter & Tracey Dean
Maritime Aboriginal Peoples Council	Bryan Martin
Nature Trust of New Brunswick	Staff person
Oceans Week Halifax	Alexandra Vance
Université de Moncton	Céline Surette
PEI Department of Fisheries & Communities	Staff person
Fishing Gear Coalition of Atlantic Canada	Staff person
Pisces Research Project Management Inc.	Kes Morton
Nova Scotia Department of Energy & Mines	Two staff
Community member	Sylvia Calatayud
CBC	Journalist
Ocean Tracking Network	Fred Whoriskey & Staff person (contributions from Brendal Townsend)
Mi'kmaq Confederacy of PEI	Randall Angus
APTN (Aboriginal Peoples' Television Network)	Trina Roache
Dalhousie University	Professor

NEWFOUNDLAND & LABRADOR INTERVIEW LIST

Organization/community/initiative	Participant
Johnson Geo Centre Memorial University (MUN)	Andrea van Nostrand
CPAWS, NL Chapter of the Canadian Parks and Wilderness Society	Mary Alliston Butt
NL Artist, Writer and performer of recitations	Dave Paddon
Shorefast, Fogo Island Inn	Gordon Slade; Randy Gillespie
Manuels River	Gillian Davidge
Fishing for Success, Island Rooms	Kimberly Orren
Marine Institute Journal of Ocean Technology (JOT)	Dawn Roche
Mini Aquariums (Petty Harbour, Bonne Bay Marine Station) CaNOE	Kiley Best
Newfoundland Aquaculture Industry Association (NAIA) Community Outreach Coordinator	Darrell Green
The Rooms	Angela Noseworthy
Ocean Quest	Rick Stanley
Educator, PhD Candidate Memorial University	Patrick Wells
NL Provincial Public Library	Mark McCumber
Fisheries and Marine Institute of Memorial University of Newfoundland (MUN) DeCarbonize NL	Dr. Brett Favaro
N.L. Freelance Media/Reporter	Journalist
Faculty of Education (MUN)	Dr. Saiqa Azam
Memorial University (MUN) Ocean Science Center (OSC) Ocean Learning Partnership (OLP)	Danielle Nichols

APPENDIX C: INTERVIEW QUESTIONS

1. From your perspective, how does your organization (or community) foster a relationship with the ocean?
2. Is ocean literacy a useful or familiar term for you(r) organization? If so, how do you define it? If not, why?
3. What factors contribute to the success of your (organization's) work on ocean literacy? (can include ocean knowledge(s), ocean values, ocean action(s))
4. Can you provide some specific examples of positive impacts from your (organization's) work (specific to OL)?
5. What are the key challenges and barriers to your (organization's) work on ocean literacy?
6. What would you like OL to look like in Canada by 2030? How do you think we can get there?
7. Do you have any long-term goals for your organization goals for OL in Canada? If so, what are they? If not, why not?
8. How would you like to see ocean literacy defined in Canada?
9. Who would you identify as a leader in OL in Canada? Why?
10. What are your (organization's) most important partnerships, networks, collaborations, for ocean literacy work?
11. Are there any organizations (or communities/ groups) you would like to work with in the future (on OL)?
12. Are there any people within this region/sector that you think I should interview?

APPENDIX D: ATLANTIC REGION OL ASSET MAP TABLE - LIST OF ORGANIZATIONS

The list below represents organizations that are included in the Atlantic Region OL Asset Map Table. The organizations that participated in the OLMSurvey are marked with an asterisk. NB: Initiatives listed here may have changed their programming due to COVID-19. All content is based on pre-pandemic information.

Education

Back to the Sea Society*
Discovery Centre*
Fishing For Success, Island Rooms
Green Schools Nova Scotia*
Halifax Regional Center for Education*
Huntsman Marine Science Centre*
Johnson Geo Centre (Memorial University)*
Manuels River Hibernia Interpretation Centre*
Montague Regional High School*
New Brunswick Aquarium and Marine Centre
NS Department of Education and Early Childhood Development*
Nova Scotia Sea School*
Oceans Learning Partnership
Ocean School*
Petty Harbour Mini Aquarium*

NGO&Advocacy

ACAP Saint John*
Atlantic Salmon Federation
Bay of Fundy Ecological Partnership (BoFEP)*
Campaign to Protect Offshore NS, Council of Canadians
Canadian Parks and Wilderness Society Newfoundland Labrador (CPAWS-NL)
Canadian Parks and Wilderness Society New Brunswick Chapter (CPAWS-NB)
Canadian Parks and Wilderness Society Nova Scotia Chapter (CPAWS-NS)
Canadian Sea Turtle Network*
Clean Foundation*
Coastal Action*
COINAtlantic, Coastal and Ocean Information Network Atlantic
Conservation Council of New Brunswick*
Eastern Charlotte Waterways
Ecology Action Centre*
Fishing Gear Coalition of Atlantic Canada (FGCAC), Dalhousie University*
Homarus, Inc.*
Marine Animal Response Society (MARS)
Nature Trust New Brunswick*
New Brunswick Environmental Network*
Ocean Net*
Pays de Cocagne Sustainable Development Group / Groupe de développement durable du Pays de Cocagne*
PEI Watershed Alliance
Save Our Seas and Shores Coalition (SOSS)*
Shediac Bay Watershed Association / Association du bassin versant de la baie de Shediac*
Tabusintac & Esgenoôpetitj Watershed Association*
Verts Rivages*

Government

Atlantic Science Enterprise Centre (ASEC)*
Bedford Institute of Oceanography
Canada's Ocean Supercluster
Canadian Wildlife Service, Atlantic Region
Cape Jourimain Nature Centre
Cape St. Mary's Ecological Reserve, Province of Newfoundland and Labrador
Department of Fisheries and Communities, Prince Edward Island
Kejimkujik National Park and National Historic Site, Parks Canada Scientourism
Parks Canada -Atlantic
SAREEN Sustainable and Renewable Energy Education Network, Nova Scotia Department of Energy and Mines
Shepody Shorebird Discovery Centre
The Hopewell Rocks, Tourism New Brunswick

Academia & Research

Acadia Tidal Energy Institute, Acadia University
Atlantic Canada Coastal and Estuarine Science Society (ACCESS)
Atlantic Climate Adaptation Solutions Association (ACASA)
Atlantic Water Network, Saint Mary's University
Baccalauréat en développement durable et zone côtière, Université de Moncton, Shippigan Campus
Civic Laboratory for Environmental Action Research (CLEAR), Memorial University
CIOOS Atlantic
Dalhousie University
Department of Chemistry and Biochemistry, University of Moncton / Département de chimie et biochimie, Université de Moncton*
Department of Ocean Sciences, Memorial University*
Environmental Information: Use and Influence Research Program Dalhousie University
Fishermen & Scientists Research Society
Fundy Ocean Research Centre for Energy (FORCE)*
Grand Manan Whale & Seabird Research Station
International Ocean Institute, Dalhousie University*
Marine Institute of Memorial University*
Memorial University*
Marine Institute of Natural and Academic Sciences (MINAS) & Bramber Weir (Darren Porter & Erica Porter)
Ocean Frontier Institute (OFI), Dalhousie University*
Ocean Tracking Network*
Pisces Research Project Management Inc.*
SOAR - Sustainable Oceans Applied Research Ltd.*
Sharks of the Atlantic Research and Conservation Center (SHARCC)
Valores - Institut de recherche des zones côtières - Coastal Zones Research Institute

Indigenous Government/Community

Atlantic Policy Congress (APC) of First Nations Chiefs Secretariat
Cape Breton Environmental Association*
Confederacy of Mainland Mi'kmaq*
Intervale Associates*
Maritime Aboriginal Peoples Council (MAPC)*
Miawpukek First Nation*
Mi'kmaq Confederacy of PEI*
Mikmaw Conservation Group, The Confederacy of Mainland Mi'kmaq*
Oceans Week Halifax*
Shorefast*
Unama'ki Institute of Natural Resources

Industry

Aster group
Bay of Fundy Inshore Fishermen's Association
Centre for Ocean Ventures and Enterprise (COVE)*
Clearwater seafood
Coldwater Lobster Association*
Engineers Geoscientists New Brunswick*
Fundy North Fisherman's Association
Irving Shipbuilding
Jasco Applied Science
Sweeney International Marine Corp.*

Cultural Heritage

Between Breaths, Neptune Theatre
Encyclopedia of Local Knowledge
Fisheries Museum of the Atlantic
Harrison Lewis Coastal Discovery Centre
Maritime Museum of the Atlantic
Re-imagining Atlantic Harbours for 2050 (RAH)
The Rooms Corporation

Health

New Brunswick Children's Environmental Health Collaborative

Media

CBC

Multisectoral Orgs

Apoqnmatulti'k

APPENDIX E: RESEARCH ETHICS AND METHODS SUMMARY

Drawing on qualitative and quantitative methods through a collaborative research approach, the study focused on five Canadian regions (Pacific, Inuit Nunangat, Atlantic, St. Lawrence, and inland Canada), as well as nationally. As a Mitacs-funded and Canadian Ocean Literacy Coalition (COLC)-led project, the research team included postdoctoral fellows, graduate students, supervising professors at partner universities (Dalhousie, Ottawa, Simon Fraser and Trent), and an extensive network of industry/organizational partners located across Canada.

In order to co-develop a national OL strategy based on regional findings and recommendations, the team engaged in three central lines of inquiry:

1. reviewed regional ocean-related studies, reports, policies, media, and other publicly available documents for linkages to OL through a focused document scan. This process also contributed to OL mapping.
2. conducted semi-structured interviews and a comprehensive asset mapping methodology to understand the ways in which OL is being interpreted and implemented regionally across nine pre-identified sectors; and
3. conducted a national online ecosystem survey (COLS - Canadian Ocean Literacy Survey), as well as a National Poll, conducted by Nanos Research, for the general Canadian public.

In addition to the above lines of inquiry, an arts-based methodology was used led by a team of artists (one per region), 3 youth workshops (e.g., focus group approach), and a Canadian media content analysis and social media scan.

Interview data was organized by key questions (see Appendix C) and then coded and categorized into key themes. The findings from the interviews were then examined with the findings from the OLM (regional/organizational) Survey and the COL (national) Survey. A convenience sample of self-identified participants within the COLC network was used along with a snowballing technique to further expand the initial sample (i.e., participants suggested others to interview and participate in the OLMSurvey). This report primarily focuses on data collected from participants who are directly engaged in OL or in other ocean-related work. Data collected from a random sampling of the Canadian public took place via the national poll conducted by Nanos Research and the arts-based research data.

To view these research tools and related reports, please visit: https://colcoalition.ca/research-tools/ and https://colcoalition.ca/our-projects/regional-reports/atlantic-region/

All research tools and protocols were approved by Dalhousie Research Ethics, REB# 2019-4891as the lead (national) research institution.

Validation: The draft Atlantic Regional report, in-depth case studies, and a baseline table with OL initiatives organized by sectors were sent for review to the participating organizations and individuals. This final report reflects this review process.

APPENDIX F: CASE STUDIES

Six case studies were co-created in the Atlantic Region together with the respective organizational participant. Three of these case studies appear in the main body of the report. The remaining three case studies are in this appendix.

CASE STUDY #4: BUILDING BRIDGES BETWEEN SCIENCE AND SOCIETY - HOMARUS ECO-CENTRE

Caption: New Brunswick students learn about juvenile lobster with the mobile lab. Photo Credit: Homarus, Inc.

Located on the Pointe-du-Chêne Wharf near Shediac, New Brunswick, the Écocentre Homarus Eco-Centre is an interpretive center that offers interactive experiences to discover the world of lobster and marine ecosystems. The educational centre is part of Homarus Inc., the scientific research and education branch of the Maritime Fishermen's Union (MFU), which "has given itself the mandate to develop educational tools to educate fishermen, the public and young people on the importance of conserving marine habitat and marine resources."

Over the past few years, Homarus has shifted toward filling a regional gap for public education on the ocean through interactive and hands-on learning experiences for tourists, community members, schools, and daycares. In partnership with the Atlantic Science Enterprise Centre (ASEC), Homarus also brings its mobile lab to connect with school groups in Moncton.

This close relationship with the fishing industry, scientists, government, and educators allows for the multidisciplinary team at Homarus to connect both fishermen and locals with the incredible life below the surface, an invisible world that sustains the fishery.

For instance, Homarus is involved in an Eastern-Canada-wide collaborative project on the "coexistence between fishermen and species at risk in the southern Gulf of St. Lawrence," a hot topic in the area that could impair the regional economy. One of the outcomes of this project are educational tools on the work that fishers, communities, government, and scientists are doing to prevent North Atlantic Right Whale entanglements in the Gulf of St. Lawrence.

Deeply connected to local communities, fisheries, and local ecosystems, Homarus offers a much-needed model of ocean literacy that builds bridges between science and society: "Our members are on board with all of our projects. This really helps, especially when we go ahead with new ideas, like visiting schools, talking about fisheries, talking about the oceans, talking about the marine food chain and what's the life cycle of a lobster, and how everything is impacted. And because the communities know that our programs come from the fishermen, they're really well received. And you can see how the students like it, even when we visit inland schools" (Maryse Cousineau, Homarus Inc.).

CASE STUDY #5: "WE HELP EACH OTHER" - APOQNMATULTI'K

One project that offers key insights into collaborations, building trust, and creating shared knowledge based on Two-Eyed Seeing is the three-year Apoqnmatulti'k project. In Mi'kmaw, Apoqnmatulti'k means *We help each other*.

According to the project's website, "Apoqnmatulti'k aims to increase our collective understanding of the movements and seasonal habitats of eel, lobster, and tomcod in Atlantic Canada's Bay of Fundy and Bras d'Or Lake ecosystems." The project is a partnership between Unama'ki Institute of Natural Resources (UINR); Mi'kmaw Conservation Group, Confederacy of Mainland Mi'kmaw (CMM); Darren Porter/ Marine Institute of Natural and Academic Science (MINAS); Ocean Tracking Network (OTN); Acadia University; Dalhousie University; and Fisheries and Oceans Canada (DFO). The project is funded through a Natural Sciences and Engineering Research Council of Canada (NSERC) Strategic Partnership Grant.

Shelley Denny, Director of Aquatic Research and Stewardship, UINR, and Bras d'Or Lake study area co-lead, notes the importance of "the willingness of the partners to learn to do things differently, and the courage to help each other because you don't know what you don't know. This sets our partnership apart from others and is in line with Mi'kmaq concepts of relying on many people for knowledge rather than one person (expert)."

Through the project, diverse knowledge holders and experts come together to "help each other." For instance, Darren Porter, a Bay of Fundy fisherman, shares local expert knowledge and provides safe access to the ocean for researchers and their students on his boat. In Eskasoni First Nation (Bras d'Or Lake), Skyler Jeddore connects with his Mi'kmaw community, culture, and language while using western science to tag *katew* (eel) and *jakej* (lobster).

Time together on boats and a commitment to learning the Mi'kmaw language, governance structure, and culture have helped to build trust. While co-creating knowledge through Two-Eyed Seeing may take more time, Apoqnmatulti'k project participants are excited to share what they've learned with others. As Darren Porter says, "We're all happy with the way the data was produced because we do it together. That's true ocean literacy. There is no way for one person or one side of this equation to actually produce true ocean literacy. It needs to be a meaningful partnership that is completely equal."

CASE STUDY #6: ACCESS TO THE OCEAN FOR ALL - FISHING FOR SUCCESS

"When we look throughout human history, we have fished since the beginning. As soon as we could walk down to the shore we've been fishing. If you look at any culture, any culture near rivers, streams, ponds or oceans, those people have fished. They have fishing stories."
- Kimberly Orren, Co-founder and Project Manager, Fishing for Success

"Fishing for Success is a non-profit social enterprise dedicated to living, sharing, and celebrating the traditional fishing knowledge and culture that sustained generations of Newfoundlanders and Labradorians."[1]

Located in Petty Harbour, Newfoundland, Fishing for Success is based on the idea that all humans have a shared heritage of fishing and that fishing connects communities to each other, connects us to both shared and diverse histories, and connects us to the ocean. It is also deeply premised on social justice and the idea that fishing should be a "safe space" accessible to everyone – youth, girls, women, the LGBTQ community, newcomers, people who ride transit, disabled people, people without boats, and, especially, people who don't know anything about fishing!

By going fishing, building small wooden dories, making nets, cooking fish, learning traditional music, using fish for art, and dozens other activities for audiences of all ages, Fishing for Success strives to make everyone feel welcome and "have their own personal relationship with the ocean and with the water."

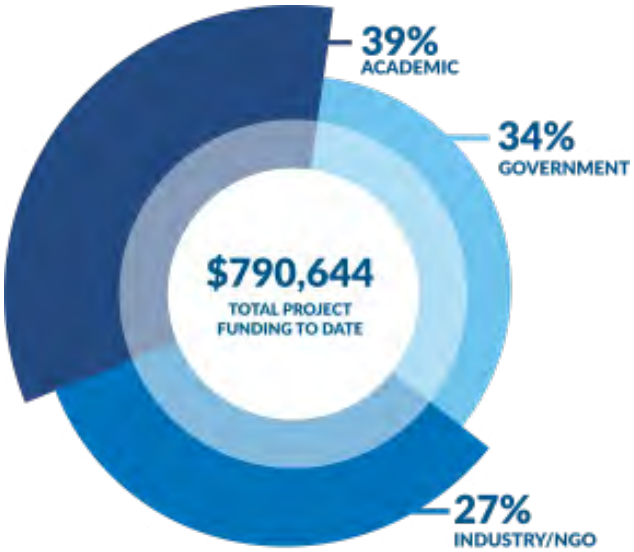
Together with Suzy Haghighi, Association for New Canadians, Kimberly Orren has developed the Women Sharing Heritage (WiSH) program to connect newcomer women with Canadian born women (volunteers from the Girls Who Fish program) and with land, sea, and community. WiSH has been recognized by the Centre for Addiction and Mental Health as a 'promising practice.' Fishing for Success also collaborates with local organizations to increase food security for Indigenous, LGBTQ2S, and other marginalized communities. While Newfoundland and Labrador have long-standing food security challenges, these have become exacerbated by the current COVID-19 crisis.[2]

Fishing for Success exemplifies inclusive approaches to ocean literacy based on social justice, an 'economy of care,' and a holistic blend of traditional knowledge, local knowledge, scientific knowledge, historical understandings, place-based connections, and the arts.

[1] Island Rooms of Petty Harbour - Home of Fishing for Success, Inc. (n.d.). Retrieved May 2, 2020, from http://nebula.wsimg.com/929a87f1b90a69749a89122fc0cae96e?AccessKeyId=69502EC907C5484E6638&disposition=0&alloworigin=1

[2] Thornhill Verma, J., Bavington, D., & Orren, K. (2020, April 10). Commentary: How and Why We Fish (Part 2). The Independent. Retrieved from https://theindependent.ca/2020/04/10/commentary-how-and-why-we-fish-part-2/

APPENDIX G: STUDY FUNDING



The COLC is comprised of NGO, government, academic, industry, and philanthropic organizations. Our funding reflects this collaboration.

Total Project Budget to date: **$790,644**

Federal Government	**$266,630**
Fisheries and Oceans Canada	$200,000
Environment and Climate Change Canada	$20,000
Polar Knowledge Canada	$25,000
Science Horizons Internship Program	$13,750
Ingenium (Canadian Museum of Science and Technology)	$5,000
Natural Sciences and Engineering Research Council of Canada	$2,880

Industry/NGO/Philanthropic	**$220,750**
Students on Ice	$63,750
Ocean Wise	$50,000
NIVA Inc.	$25,000
Clean Foundation*	$25,000
Canadian Commission for UNESCO	$18,000
Stratos Inc	$15,000
McConnell Foundation	$10,000
Ocean Networks Canada	$9,000
Baffinland	$5,000

** with support from Environment and Climate Change Canada*

Academic	**$303,264**
Mitacs	$169,664
Ocean Frontier Institute	$80,000
Marine Environmental Observation, Prediction and Response Network	$23,600
Ocean Frontier Institute Seed Fund	$20,000
Marine Institute	$10,000