



Canadian  
Ocean  
Literacy  
Coalition

La coalition  
canadienne de  
la connaissance  
de l'océan

# UNDERSTANDING OCEAN LITERACY IN CANADA

## **PACIFIC REGIONAL REPORT**

JUNE 2020





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# EXECUTIVE SUMMARY

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 report shares the findings from the Pacific Region, which for the purposes of this study focuses exclusively on British Columbia (B.C.). B.C. is Canada's most biologically diverse province, and home to 198 distinct First Nations, with varied cultures, histories, and traditions. The majority of its 5.1 million citizens live in urban, coastal areas.

Although OL is widely practiced in the region, it is not a term that is commonly used or that resonates. Ocean stewardship, knowledge, connection, and relationship were found to be much more commonplace terms encompassing OL in B.C.

**Several key strengths** of OL were identified in this region including First Nations stewardship and leadership; long-running OL initiatives and reach; place-based, experiential learning; multi-faceted research; and multi-sectoral partnerships.

The primary **barrier to OL** identified in B.C. was funding and the competition for it. Other barriers include inequitable access to the ocean and OL initiatives, fragmented governance, and a disconnect from nature.

**Eight preliminary recommendations to advance OL** in the Pacific Region **emerged from the study**. These include: investment in OL; more coordinated collaborative action across the region; recognition of Indigenous knowledge as essential for OL; inclusion of experiential OL in school curricula; better communication of the connections between ocean, climate change, biodiversity, sustainable economies, and health; increased accessibility and inclusivity; bridged inland/water perspectives with coastal/ocean; and expansion of OL to include the political visibility of the ocean.

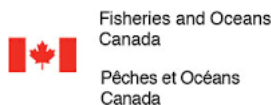
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Heading Photo: Life by the ocean in the Metro Vancouver region ©Lilia Yumagulova

\* 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.<sup>1</sup> For the 6.5 million Canadians living in a coastal zone<sup>2</sup> 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.<sup>3</sup>

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) is 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.**”<sup>4</sup> 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 Pacific Region – British Columbia (B.C.). It is one of a set of 5 regional reports and one national report that are available at [www.colcoalition.ca](http://www.colcoalition.ca).



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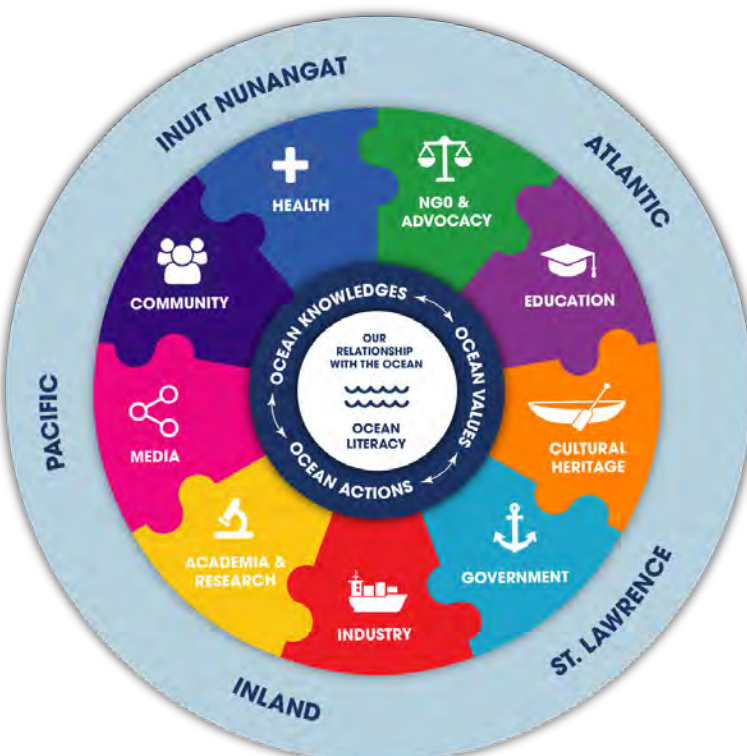
## OUR APPROACH AND METHODS

Through a collaborative research approach, and drawing on qualitative and quantitative methods, the study focuses on five Canadian regions (Atlantic, Inuit Nunangat, Pacific, 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 Pacific 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	Total Data (National)	Pacific Data
Canadian Ocean Literacy Survey (COLSurvey)	National online survey with COLC members' networks & interested Canadians ( <a href="#">For Findings Report PDF</a> )	1,359 respondents	341 respondents
Nanos Research Poll	National poll conducted with random sample ( <a href="#">For Findings Report PDF</a> )	1,010 respondents	153
Focused Document Scan	Documents and reports reviewed for context	332 (256 regional/76 national)	50 documents (see Appendix A) + references
Interviews	Semi-structured, one-on-one, 45 minutes (Appendix C)	188	36 participants (Appendix B)
Ocean Literacy Mapping Survey (OLMSurvey)	Organizational-level online survey for OL providers	136 respondents	53 participants* (Appendix D)
Youth Workshops	Researcher facilitated, semi-structured focus groups ( <a href="#">For Youth Report PDF</a> )	3 workshops – 200 youth total	<i>National scale only</i>
Arts-based engagement	Public interactions with art work and research question ( <a href="#">For Arts Report PDF</a> )	5 interactive art works - 250 responses	1 art work- 42 responses
Media & Social Media Scan	Course-scale analysis of topics discussed in Canadian media & twitter ( <a href="#">For Media Report PDF</a> )	1,253 articles; 88 influential accounts (800+ followers)	<i>National scale only</i>

*\*53 organizations participated in the OLMSurvey and an additional 67 organizations/initiatives were identified by these participants and/or the research team to include in the Pacific Region OL Asset Map Table. See Mapping OL Initiatives section.*

# PACIFIC REGION: BACKGROUND CONTEXT

Canada's Pacific marine ecosystems consist of 450,000 square kilometres of ocean, over 6,500 islands, and more than 27,000 kilometres of shoreline along B.C.<sup>5</sup> The region's scenic coastal landscapes range from sandy beaches and low-lying deltas to dramatic cliffs and mountainous fiords that shape climate, diverse ecosystems, ways of life, economies and cultures<sup>6</sup>.

B.C. is home to 198 distinct First Nations, each with their own rich culture, history, and traditions<sup>7</sup>. B.C. has the greatest diversity of Indigenous cultures in Canada, with seven of eleven unique language families located exclusively in the province – more than 60% of the country's First Nations' languages.<sup>8</sup>

B.C. is the most biologically diverse of Canada's provinces and territories and encompasses a wide range of ecosystems, from coastal rainforests and estuaries, to dry interior grasslands, to alpine tundra and northern boreal forest.<sup>9</sup> Its coast is home to thousands of species of marine invertebrates, over 400 species of fish, 31 known different marine mammals, and over 150 species of seabirds, shorebirds, and coastal waterfowl.<sup>10</sup> The Pacific Ocean nourishes globally significant ecosystems, which are "a source of sustenance and spirit" for the peoples of B.C.<sup>11</sup>

For coastal communities, the ocean is the backbone of community well-being and the local economy through tourism, fishing, and other maritime activities.<sup>12</sup> Nearly three quarters of B.C.'s 5+ million population<sup>13</sup> live on or near the

coast, with over half of the population living in the Metro Vancouver Regional District.<sup>14</sup> Ocean-based industries are vital to B.C.'s economy contributing \$11.1 billion to GDP annually, of which marine recreation makes up 33% and the fisheries and seafood sector makes up 12%.<sup>15</sup> Metro Vancouver's \$4.8 billion/year tourism industry<sup>16</sup> relies on parks, beaches, and waterways. In addition to direct economic benefits, the Pacific North Coast region provides \$92 billion annually in ecosystem services, while aquatic ecosystems in the Lower Mainland alone provide up to \$61 billion.<sup>17</sup>

The health of B.C.'s marine ecosystems is at risk. Several factors such as climate change, extreme weather events, microplastics, disease in sea stars, invasive species, and increasing underwater noise are just some of the challenges faced by the species, their home ecosystems, and the people and communities that closely depend on them.<sup>18</sup> B.C. also has the most species at risk of any Canadian province or territory.<sup>19</sup> However, this region is also a source of hope and inspiration for ocean solutions, an outcome that has been attributed in part to increasing awareness and a more broadly accepted stewardship ethic.<sup>20</sup>

As a region that changed from government-led active culling of wild killer whales in the 1960s<sup>21</sup> to 2018, when the B.C. public mourned with Southern Resident Killer Whale Tahlequah (J35) as she carried her dead calf for 17 days, the Pacific Region offers unique lessons in ocean literacy.

Heading Photo: Elinor Gavin, freeimages.com

Photo: Pod of Killer Whales, by NOAA on Unsplash

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# EXPLORING THE TERM 'OCEAN LITERACY'

The term 'ocean literacy' was not widely used in the Pacific Region: 13% of OLMSurvey respondents 'frequently,' or 20% 'sometimes,' used the term. Participants expressed the term's limitations and the need (and ideas) for a broader, more inclusive framing.

In defining OL, participants called for a better connection with Indigenous ways of knowing the ocean; understanding the ocean as one interconnecting whole; having an emotional connection that fosters empathy and action; connecting across regions to include and celebrate biological and cultural diversity; seeing local waterways as our connection to the ocean; and seeing the multiple benefits that the ocean provides.

“Let's assume that literacy means using words that help you to understand a process. The words that we use in oceanography - like phytoplankton and the deep scattering layer - are not familiar words to people. If you say, "more rain will produce more vegetation," we can understand that because we see it in our gardens. In terms of literacy, the words that we use to describe the oceans are rare for most conversationalists.”  
**Dr. Timothy Parsons, oceanographer, born in 1932**

“Literacy does not express the importance of empathy and emotional connection that we see as key elements of policy decisions and individual behaviour.”  
**Joachim Carolsfeld, Executive Director, World Fisheries Trust**

“Could we make this term something that actually hits people in the guts?”  
**Jackie Hilderling, Marine Detective and Marine Education Research Society**

“Communicating [ocean literacy] in a way that is tangible to people is important because a lot of people wouldn't necessarily see the linkage between themselves and the ocean.”  
**Leslie James, Director Environmental Sustainability, BC Ferries**

“The term 'ocean literacy' is difficult to connect with... we work very hard to support the connections that exist between our member-communities and the ocean, their territories.” **OLMSurvey participant**

“Ocean literacy to me is an understanding of the past, present, and future of humanity's relationship with the ocean.”  
**Nathan Bennett, Chair of the IUCN People and the Ocean Specialist Group**

“OL in Canada should include knowledge, values, and attitudes, and include a focus on Indigenous cultures and their long-standing connections to the sea. It should also take a unique cultural view so that there's an overarching sense of ocean literacy, but it's nuanced with a contextual place-based aspect which really reflects the Canadian view of multiculturalism. Ocean literacy then has many different facets, depending on where you are, and that's an important distinction from other global definitions.”  
**David Zandvliet, Professor, Simon Fraser University; UNESCO Chair, Bio-cultural Diversity and Education**

“When I think about the ocean, I think about it being a spiritual sacred relationship first. And then I think of another part of the relationship: it's our food...Who are we as Indigenous people without salmon and even what does salmon look like without us First Nations as well? We are so connected. We have this saying, which is hishuk ish tsa'walk, which means 'everything is when we're connected to everything.' The ocean...it's who we are, it isn't separate from us. I really believe that it's our lifeline for many reasons.”  
**Melody Charlie, a Nuu-chah-nulth leader**

“We give young people an emotional understanding of ocean literacy, which is based in science.” **Willow Beck, Sea Smart**

“Our waters are all connected - connecting people to their local waters eventually connects them to the ocean.”  
**Christianne Wilhelmson, Executive Director, Georgia Straight Alliance**

“Ocean Literacy is more than just science and it would be beneficial to all Canadians to define it from a holistic approach, i.e. how the ocean impacts our health, our economy, our environment, our spirituality.”  
**Canadian Network for Ocean Education**

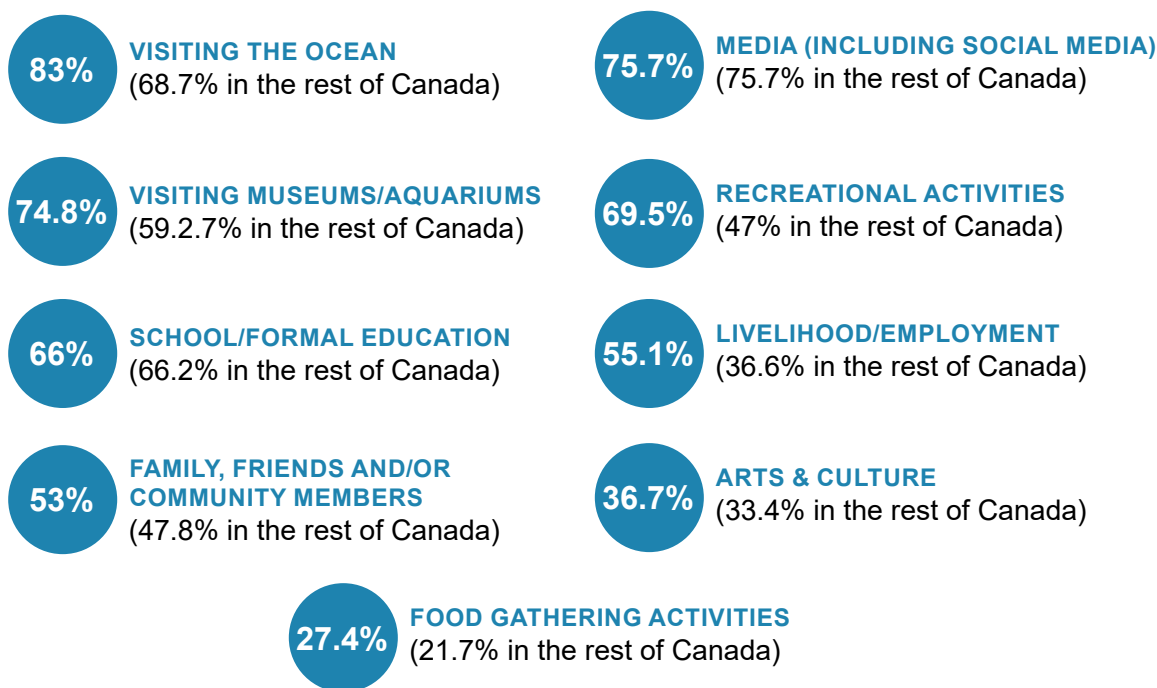


## MAPPING OCEAN LITERACY INITIATIVES

Our mapping process included a document scan (such as website resources, media, books, etc.) and information about initiatives collected through interviews and OLMSurvey participants. The process showed a wide diversity of OL initiatives across the nine sectors, target audience (organized by age), and the type of engagement, organized by categories: 1) information resources (e.g., general information, pamphlets, websites, reports); 2) interactive activities (e.g., experiential education, hands-on), and 3) expanding capacity which includes intensive and immersive multi-day initiatives/experiences such as training and leadership development.

With over 120 organizations included on the Pacific Region OL Map (see Figure 2), education was the largest represented sector (38 organizations), followed by NGO & Advocacy (16 organizations), and Media (16 organizations). Partnerships were another clear theme given the collaborative cross-sectoral nature of OL initiatives in the region. A list of all organizations and OL initiatives that appear on the map below can be found in Appendix D. Click [here](#) for the full Pacific Region OL Asset Map Table. The aim is to integrate all regional OL Asset Map tables into a digital National OL Asset Map as part of the national OL strategy, and that can continue to evolve throughout the United Nations Decade of Ocean Science for Sustainable Development (2021-2030).

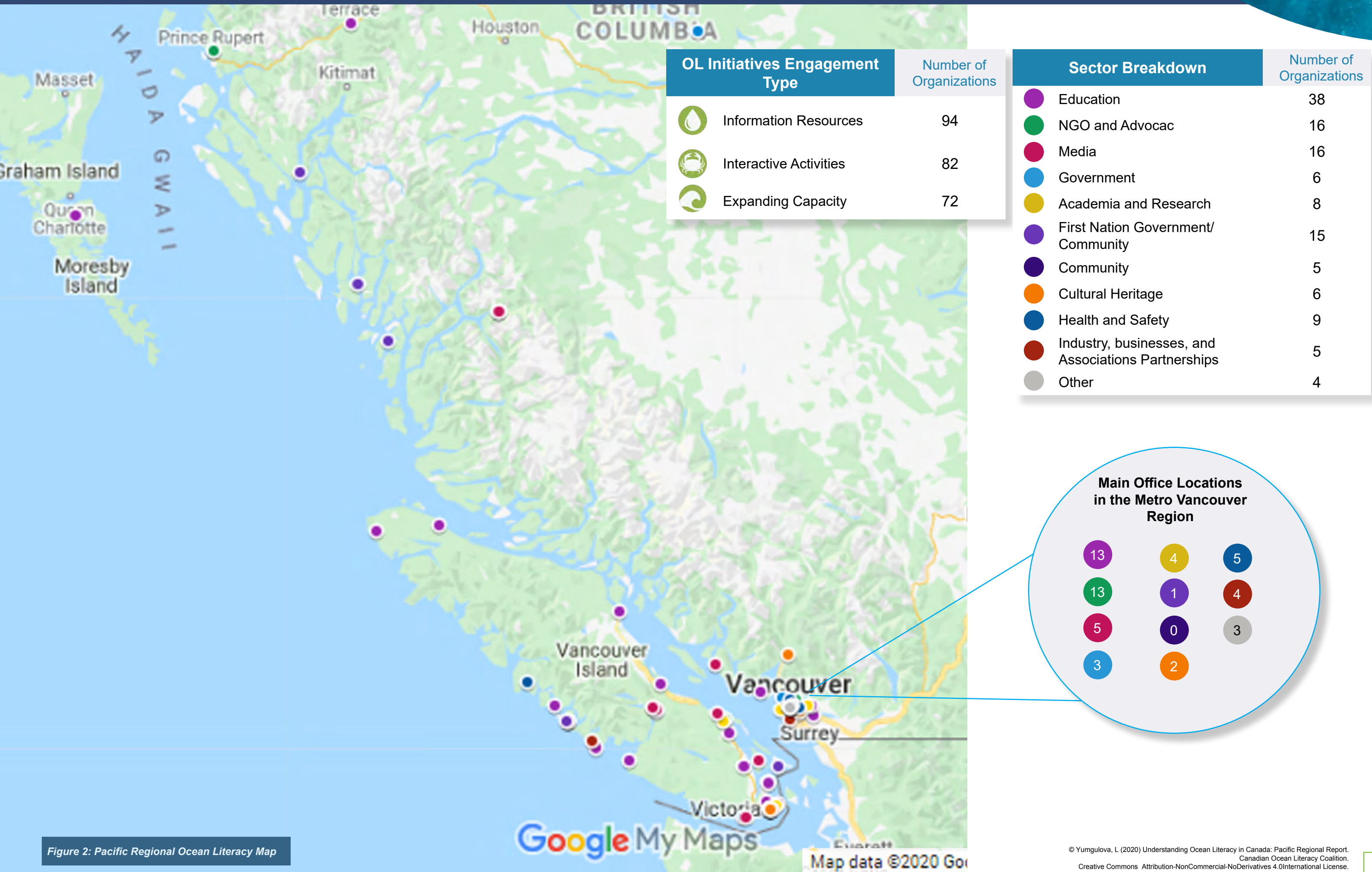
## HOW DO PACIFIC REGION RESIDENTS LEARN ABOUT THE OCEAN?



*Findings from 341 B.C. respondents to the Canadian Ocean Literacy Survey*



MAPPING OCEAN LITERACY INITIATIVES: ORGANIZATIONS





# KEY FINDINGS:

## STRENGTHS OF OCEAN LITERACY

The Pacific region is home to many organizations and initiatives that influence British Columbians' and Canadians' relationships with the ocean. We identified five regional strengths. These include: First Nations stewardship and leadership; long-running OL initiatives and reach; place-based, experiential learning; multi-faceted research; and multi-sectoral partnerships. Each of these strengths will be discussed below.

### 1. FIRST NATIONS' STEWARDSHIP AND LEADERSHIP

Indigenous peoples in this region have for thousands of years served as stewards of their homelands and waters by upholding and exercising their own legal traditions, which long pre-date the arrival of European settlers along the coast.<sup>22</sup> Ocean knowledge is handed down from generation to generation.<sup>23</sup> Stewardship and sustainable harvesting of marine species – kelp, herring roe, scallops, geoducks, oolichan, salmon, rockfish, halibut, and other sea life – are vital to the well-being and cultural continuity of people and communities.<sup>24,25,26</sup> First Nations' stewardship and leadership continues strong today as highlighted by the following examples.

The [Coastal Guardian Watchmen](#), a [Coastal First Nations'](#) (CFN) initiative, focuses on monitoring, stewardship, and protection of the participating Nations' coastal territories. As stated in the Coastal Guardian Watchmen mission: *"We derive our authority and jurisdiction from our traditional laws to manage and safeguard the lands and waters of our territories for the health of future generations."*

The Heiltsuk Nation, one of the nine Nations who are part of the CFN alliance, has established the Heiltsuk Oceans Act, entitled

[\*Ḥa'ikilaxsi čislá wáwáxtusa gáyáqla qnts dmxsaḥv: to respect and take care of our ocean relatives\*](#) and is an integral part of Gvi'l'las (traditional laws) and Heiltsuk Constitution.<sup>27</sup>

Another leadership example shared in this study is the aquatic resource management department of the [Nuu-chah-nulth Tribal Council](#) which is named Uu-a-thluk, meaning "taking care of." Working closely with First Nations, governments, communities, businesses, and environmental organizations, Uu-a-thluk ensures the sustainable management of ocean and freshwater marine resources in the Nuu-chah-nulth territory. The department also produces newsletters, books, guides, and cookbooks about coastal ecosystems on the west coast of Vancouver Island.

Beyond governance, intergenerational leadership and personal relationships with the ocean, land, and culture are also strengthened through such initiatives as the [Tribal Canoe Journey](#), an annual Indigenous voyage and gathering in the Pacific Northwest in which hundreds of ocean-going canoes travel from their home waters to a host Nation, stopping to visit different communities on the way (see Appendix F for case study).



## 2. LONG-RUNNING OL INITIATIVES WITH FAR-REACHING IMPACTS

British Columbians and visitors to B.C. have a remarkable number of opportunities for ocean learning. Since opening in 1956, the [Vancouver Aquarium](#), Canada's first aquarium, has connected more than 40 million people to the ocean's wonders. The [Ucluelet Aquarium](#), Canada's first Catch-and-Release aquarium, located on Vancouver Island, reaches over 35,000 visitors annually.

For 15 years, B.C. Ferries and Parks Canada's Coastal Naturalist Program has informed, educated, and inspired ferry passengers about the wonders of B.C.'s coast, reaching 170,000-200,000 people annually. The region is also home to ocean-focused media, such as [Hakai magazine](#), which is free, and supports a global conversation about the world's coastlines.

There are multiple ocean "champions" leading OL work in the Pacific region. [Ocean Wise](#), a not-for-profit organization focused on ocean education, research, and conservation was identified as an OL leader. As Danika Strecko, Ocean Wise's Ocean Literacy Manager, shared: "Our strengths are our diversity of resources and initiatives spanning across research, citizen science, education, and service learning, as well as our ability to reduce geographic barriers to connecting with the ocean through online programs, outreach, and volunteer programs." The [Canadian Network for Ocean Education](#) (CaNOE), founded in B.C. in 2013, is the first pan-Canadian non-profit society established with the aim of advancing OL. It was identified by education-related interviewees as a strong community of practice for knowledge and resource sharing for teachers and community educators. Individual champions were also identified, such as the [Marine Detective](#), a handle used by award-winning educator Jackie Hildering. With 25K followers, Hildering's globally-featured work raises awareness about life in the Northeast Pacific Ocean through her online presence, photography, books, and presentations (see Appendix F for case study).



*The Ucluelet Aquarium, Ucluelet ©Lilia Yumagulova*

**Collective Reach of OL efforts:** Results of the regional-focused OLMSurvey show that there exists strong programming reach across age and population groups. Engagement of young adults (age 20-29) was the highest at 83% across all organizations surveyed, followed by adults (78%), youth (age 13-19) at 72%, children (age 5-12) at 62%, seniors at 57%, and young children (age 0 to 4) at 32%. The reach across population groups was also broad, with 80% of participants suggesting that their initiatives engage First Nations communities and 50% engage newcomers to Canada. The majority of OL programming reported focused on individuals and communities, followed by regional and provincial programming, with the least emphasis placed on national and international reach. With respects to language, all programs are available in English, with 26% available in French. Other languages include Indigenous languages (e.g., Kwakwaka'wakw of the Kwakwaka'wakw First Nations), Spanish, German, and Arabic.

**Staffing Capacity to promote OL:** nearly 80% of surveyed organizations had staff dedicated to OL. However staffing numbers ranged from high capacity for few organizations to many organizations with low(er) capacity consisting of a few paid OL staff, seasonal positions, and numerous volunteers. Participants also highlighted the importance of, and need for more, paid media and communications positions for OL.



### 3. PLACE-BASED, EXPERIENTIAL LEARNING

Experiential learning, best expressed as “hands-on, hands-wet, feet-wet” learning, is a strength of the region. It unfolds through youth empowerment programs, summer camps, eco-tourism, and a variety of immersive learning experiences. Experiential learning is seen as key to fostering curiosity, a sense of wonder, connection, and love. Impressively, nearly 45% of OLMSurvey participants identified their initiatives as happening on (or in) the ocean and 87% taking place along the coast. 60% provide some form of online OL programming.

Below is a sample of place-based experiential learning initiatives with quotes or descriptions to highlight the breadth and impact of what is available in B.C.:

#### Immersive programs for children to young adults that foster personal connection to the ocean:

[Shaw Centre for the Salish Sea](#) (Sidney): “Our summer camps are immersive, multi-day programs that allow children to really explore the Salish Sea bioregion and the incredible diversity within. Our school programs, designed to fit within the B.C. school curriculum, help to instill a sense of place.” *Leah Thorpe, Director of Operations*

[Hooksum Outdoor School](#) (Hesquiaht territory, mid-west coast of Vancouver Island): “Being able to always be on the water 24/7 or inside the water, it was tough, but gaining all that strength throughout the few weeks I found that I had more respect for my land, my surroundings, and more value towards the water.” *Ashiele Thomas, Ahousaht First Nation, Hooksum Participant*

[Bamfield Marine Sciences Centre](#) (Bamfield): established in 1972, “We provide life-changing immersive experiences for approximately 3,000 overnight field trip participants annually, and 250 university students taking for-credit courses.” *Chris Neufeld, Associate Director of Education*  
[Ocean Literacy and Leadership Camp](#) (Hornby Island): young women, age 15-18, participate in an all-female, six-day, five-night camp focused on leadership skills and ocean protection.

#### Hands-on experiences in classrooms and communities that strengthen capacity:

Fisheries and Oceans Canada (DFO) [Stream to Sea Program](#) with Salmonids in the Classroom (throughout B.C. and the Yukon): For nearly 40 years the program connected thousands of students to their watersheds and enabled an understanding of how salmon and people are connected to and rely on healthy oceans: “The people we have delivering the program



“The Ahousaht, we are actually known in our language as “the people with our backs towards the land and the mountains.” So we actually look at [the ocean] and we rely on our water.” *Ashiele Thomas*

Photo: Ahousaht First Nation ©Lilia Yumagulova



are based in communities, building strong ties with other partners in each community, allowing for locally developed and meaningful ocean literacy initiatives, capacity building, and broader connections.” *Christy Wilson, Education Coordinator*

[ONC’s Ocean Sense program](#) (Victoria): enables learners and educators to explore, analyze, and observe the ocean by using real-time data and resources from coastal and deep-sea observatories.

World Fisheries Trust’s [Seaquaria Ocean Education](#) (Victoria): provides permanent Seaquaria in schools and supports teachers’ with the pedagogical use of this educational tool.

[Ocean to Eye Level Consulting](#) (Vancouver): supports local educators and entrepreneurs in coastal communities in opening public marine education centres and mini aquaria.

### **Ecotourism that fosters cross-cultural understanding and care for the ocean:**

[Eagle Wing Whale and Wildlife Tours](#) (Victoria): “Being on the Salish Sea and using all five senses to experience this remarkable ocean ecosystem first-hand changes people’s perspective of their big blue backyard and connects them to a world that previously only existed in their imaginations. Awareness of these connections inspires people to be more aware of their own footprint, make better

choices, and become conscious stewards of the marine environment.” *Mika Ogilvie, Social Sustainability Manager*

[The Wya Point Surf Shop](#) (Ucluelet): “We have our own teachings about things that are spiritual, intimate, and are really protected. They belong to families. But at the same time, I know how especially with tourism how that’s changed. For me, promoting to people globally, it’s a good thing. We always promote safety and a really healthy respect for the ocean.” *Tyson Touchie, owner*

## **4. MULTI-FACETED RESEARCH**

Respondents highlighted the importance of credible and unbiased research as a basis for OL. The importance of accessibility of research was often stressed. As an example, Katherine Came, Communications Manager with the Institute for the Oceans and Fisheries at the University of British Columbia shared: “A paper in an academic journal may not change public policy, but the way it is presented to people so they understand what it actually means can have a huge impact.”

The Pacific Region has a well-established research capacity, with initiatives that range from academic, government, and NGO research programs and institutes to citizen science and community-led service learning projects. A few examples are outlined below.



## Academic:

- The University of Victoria's [Ocean Networks Canada](#) is a network of ocean observatories in Canada, delivering ocean data in real-time for research that helps communities, governments, and industry make informed decisions.
- The University of British Columbia's (UBC) [Ocean Leaders](#) program aims to prepare the next generation of interdisciplinary marine scientists and social scientists to bridge "the gulf between science and society." Also based at UBC, the Institute for the Oceans and Fisheries' [Sea Around Us](#) initiative provides comprehensive fisheries statistics (including unreported/underreported catches and sectors) on a global scale, divided by country.

## Research institutes:

- The [Coastal Ocean Research Institute](#) conducts ocean science research and through their signature [Ocean Watch reports](#) provides accessible, rigorously researched, and visually engaging snapshots of coastal ocean health on seven themes: species and habitats, clean water, sense of place and well-being, coastal development and livelihoods, stewardship and governance, oceanography and climate change, and seafood.

## Citizen-science partnerships:

- B.C.'s [Cetacean Sightings Network](#), which began in 1972 as a three-day public census of killer whales across B.C., maintains consistent sightings data that are used by researchers, NGOs, and government
- The [Ucluelet Aquarium Society's](#) Microplastic Citizen Science Surveys and Sea Star Wasting Citizen Science Surveys.
- The [Marine Research Education Society](#) has maintained sightings databases of the Humpback and Minke Whales since 2004, with data going back to the 1980s.

## Government

### CASE STUDY # 1: [Pacific Science Enterprise Centre \(PSEC\)](#)

PSEC is a hub for innovative aquatic science that fosters partnerships between the government, the scientific and academic communities, Indigenous peoples, industry, and the public.

Begun in 1970 as a federal science laboratory, in 2016 three years of funding were made available as a pilot program to explore new ways of delivering federal science. PSEC became one of two Fisheries and Oceans Canada (DFO) Science Enterprise Centres. Steve Macdonald, PSEC's



Designated Senior Officer, says "Government science delivery can now be less formal and have more facets, offered to all aspects of society, earlier and available to more people."

PSEC takes advantage of nearby fresh and salt water sources, modern laboratories and aquarium facilities, and access to Vancouver's port and universities to create strong research it can communicate with the public. It also collaborates with citizen scientists on research on glass sponges, climate change impacts and monitoring of ecosystem trends and recovery.

***"There is more urgency to get the message out and more public demand to participate in finding solutions." – Steve Macdonald***

PSEC collaborates with academic, industry and community-based science partners, and contributes to reconciliation by adapting to First Nations feedback. It engages the public through community seminars, World Oceans Day and open house celebrations, an educational extension with a high school science academy, elementary school programs and public tours. Government, academia, community, and industry input were used to co-design the PSEC pilot project.





## 5. MULTI-SECTORAL PARTNERSHIPS

A key enabler of OL that emerged is the importance of strong partnerships across multiple sectors (including event-specific partnerships, such as [World Oceans Day](#)). Most partnerships are local or regional, another indicator of the strong place-based emphasis of OL in the Pacific.

As an example, [CoastSmart](#) is a public safety pilot-project in the Pacific Rim (west coast of Vancouver Island) designed to enhance coastal safety along the shoreline and in the surf zone through communication and education. Led by [Parks Canada](#), the [District of Tofino](#) and the [District of Ucluelet](#), CoastSmart is a partnership between local businesses, media, communications, marketing partners, non-for-profit, and education/training sectors. As shared by Josie Osborne, Mayor of Tofino: “[The CoastSmart Ambassadors]... it’s very, very powerful when you have people from diverse parts of life who all speak about the ocean” (see Appendix F for full case study).

Another defining feature of partnerships in the region is the **focus on action and the intent to work with multiple knowledge systems**. [The Marine Planning Partnership \(MaPP\)](#), brought together 18 First Nations and the Province of B.C. to develop marine plans for the Great Bear Sea, to protect First Nations communities and build sustainable coastal economies. One outcome of this partnership is the [Exploring the Great Bear Sea Curriculum](#). Organized by grades and connected to the new B.C. curriculum, it uses film, research, local knowledge, and place-based stories to explore Indigenous Knowledge, collaborative science, marine planning, biodiversity, sustainable resource management, and marine stewardship.

The [Howe Sound/Atl’ika7tsem Marine Reference Guide](#) (Tides Canada Initiatives Society) uses an immersive bottom-up approach to build relationships and gather information from diverse knowledge systems (e.g., Western, local, Traditional), and create decision-support tools. Fiona Beaty, Project Director, shared: “This approach strengthens our project’s ability to ensure that the information and deliverables created reflect the values and needs of Atl’ika7tsem’s community, and build effective ocean literacy, adaptive capacity, and socio-ecological resilience.”

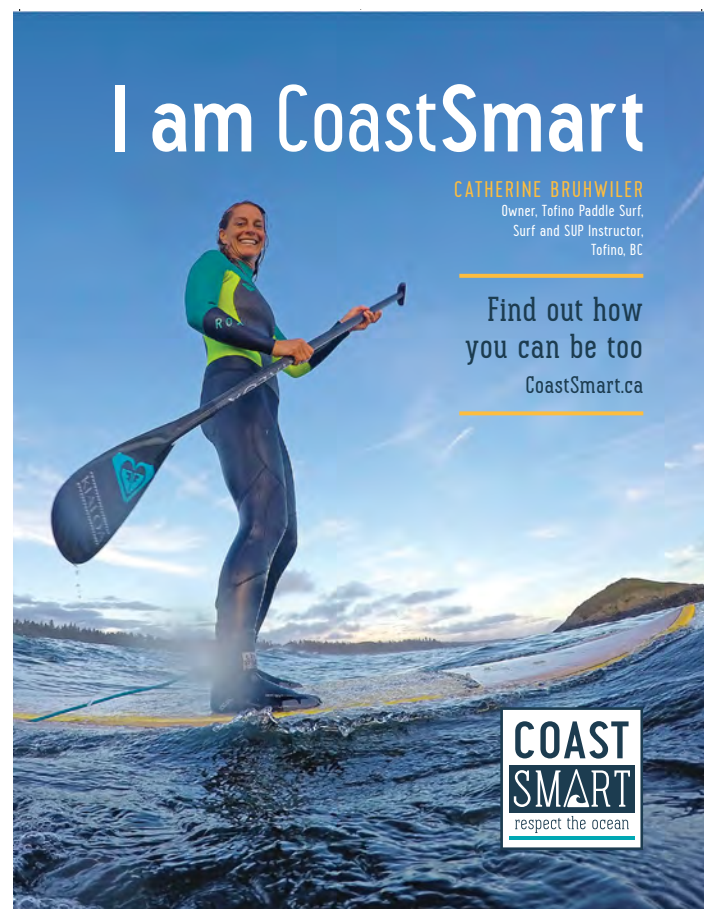


Photo: CoastSmart Ambassador Catherine Bruhwiler.  
©CoastSmart



Several participants expressed the need for increased knowledge and capacity exchange. As Carinna Kenigsberg, Manager of Community Partnerships at [Power to Be](#) put it, we need to “educate people to move outside of silos, beyond the specific region or typical groups that people work with and start to see how they could partner or align with other industries and expertise.”

## CASE STUDY #2: Enhancing Cetacean Habitat and Observation (ECHO) Program

The ECHO Program is a Vancouver Fraser Port Authority-led initiative aimed at better understanding and managing the impact of shipping activities on at-risk whales throughout B.C.’s southern coast. A collaboration of 100+ partners, including scientists, shipping industries, conservation and environmental groups, First Nations communities and government agencies, the ECHO Program’s aim is to develop mitigation measures that will lead to a quantifiable reduction in threats (such as underwater noise, ship collisions, and environmental contaminants) to whales as a result of shipping activities.

Born out of the recognition of increasing commercial vessel activity, the DFO’s Species at Risk Act Recovery Strategies and Action Plans, and the recognition of the importance of the coastal ecosystem that sustains populations of cetaceans, the ECHO Program started slowly by undertaking research to better understand how underwater noise from large commercial vessel traffic effects whales. This research led to the introduction of voluntary mitigation action which was developed in partnership with industry.

The ECHO Program has led to a voluntary vessel slowdown for the past three years. In 2019, more than 80% of vessels participated in the slowdown through ~30 nautical miles of southern resident killer whale critical habitat. The voluntary nature allowed cross-border involvement as the inbound lane is in US waters and the outbound lane is in Canadian waters. The collaborative approach encouraged all partners to provide insight into the voluntary measure and over time, to continually adjust the parameters to achieve both high participation and quantifiable noise reduction for the whales.

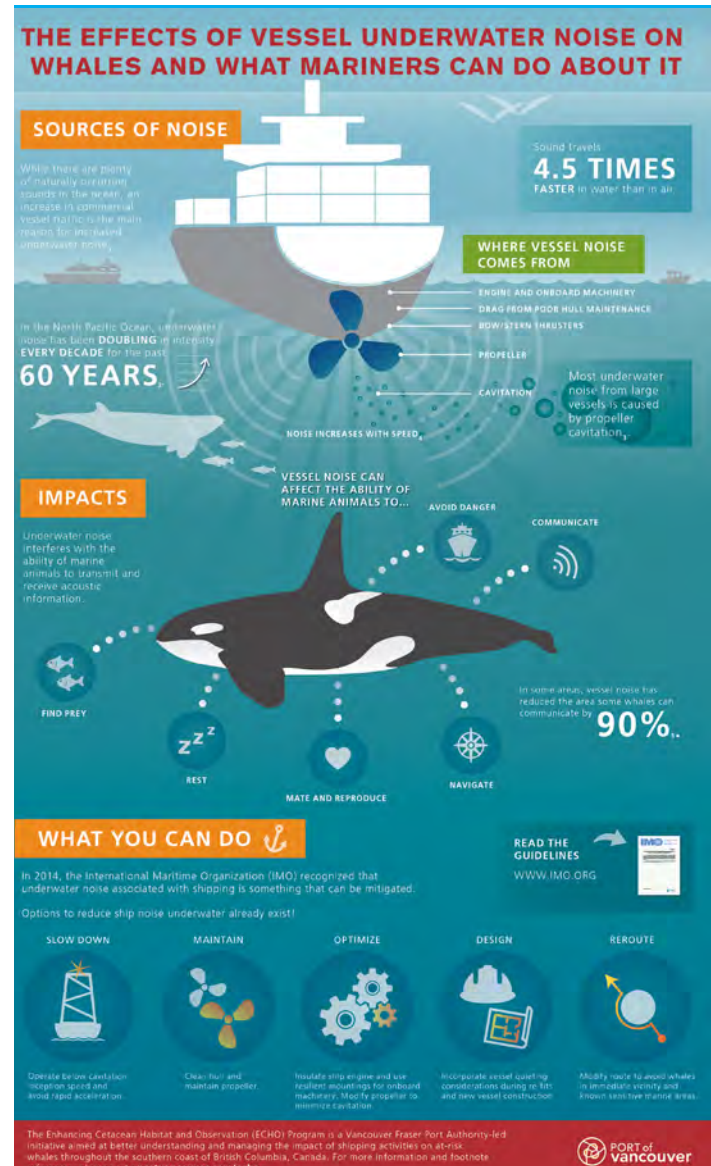


Photo: Underwater Noise Infographic  
 ©Vancouver Fraser Port Authority

# KEY FINDINGS:

## BARRIERS TO OCEAN LITERACY

Funding was identified as a barrier by 93% of the OLMSurvey respondents ('a significant barrier' - 57%; 'a barrier' - 36%). The competitive nature of funding applications was identified as a barrier by 73% of the respondents (a 'significant barrier' - 26%, a 'barrier' - 47%). Other barriers include equitable access to the ocean and OL initiatives, fractured governance and silos, and an overall disconnect from nature.

### 1. FUNDING

Limited dedicated funding and the competitive nature of funding applications were identified as the most significant barriers to advancing OL. The need for long-term funding was especially stressed given that effective initiatives take time to establish. Insufficient funding impacted capacity, with many initiatives relying on volunteer, part-time, and seasonal staff. Participants also mentioned that political priorities affect funding.

The OLMSurvey results show organizations access diverse sources of funding. As illustrated in Figure 3, donors/donations (58% of the respondents) and foundations (56%) were the most common sources of funding, followed by the federal government (47%).

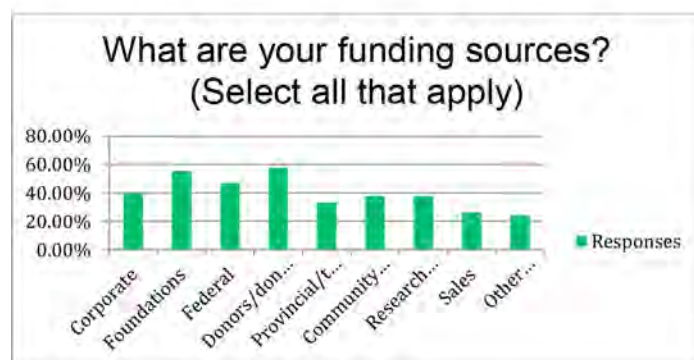


Figure 2: Sources of OL funding in the Pacific Region

The interviews showed that OL organizations and initiatives rely on diverse donation types: from bottle drives for community-led initiatives, to \$1000+ donations for established charities. For example, Ocean Wise's [AquaVan 150: Connecting Communities to Coastlines](#), brought animals, marine artifacts, and hands-on interactive activities to 150,000 children and youth from Vancouver to Halifax in 2017. James Bartram, VP of Education and Youth, shared, "Part of the story that we almost never tell is that of a \$1.2 million project, [only] about \$600,000 came from the Canadian Heritage. The balance was mostly raised in small donations from Vancouverites. When presented with the opportunity, individual Vancouverites donated \$5,000 and \$10,000 and shared their good fortune with kids across the country."

The region is home to **innovative funding models**. For example, Mike Irvine, Co-founder and CEO of [LIVE IT](#), developed a for-profit company that is also a social impact group. LIVE IT adapts an organization's outreach initiatives into live streamed stories connecting the next generation to experts in the field in real-time. "That is a valued service, so we're able to charge for that accordingly. If we can come up with solutions that help not just government but also industry and we could collaborate on that so that it's a win-win scenario, you can definitely find the finances to support you."

Lack of **long-term funding** was identified as a particular challenge. MakeWay (formerly Tides Canada) and the Raincoast Conservation Foundation are model examples of



organizations that creatively and collaboratively resource community-led work. An Indigenous interviewee said of MakeWay, “they put time in the community, listen to what is needed, and work with communities to come up with creative solutions.”

## 2. INEQUITABLE ACCESS TO THE OCEAN & OL INITIATIVES

86% of the OLMSurvey respondents identified access to the coast as “not a barrier,” in line with the majority of BC’s population living on the coast. However, interviews show that access can be a barrier for subsets of the population. Funding for transportation, for example, is a challenge as some schools cannot afford school buses let alone boat trips.

Participants expressed the need for more inclusive OL initiatives, to remove barriers based on income, ability, geography, and other social and demographic variables. Two examples of successful inclusive OL initiatives are:

- [Power To Be](#), removes the barriers for access to the ocean and nature for people with differing abilities, work made more challenging by seasons, weather, and the challenges faced by the people they work with.
- Ocean Wise’s [Ocean Bridge](#) program “connects Canadian youth from coast to coast to coast empowering them to make a difference towards ocean conservation.” Each cohort of forty youth, age 18 to 30, reflect the socio-cultural, economic, and geographic diversity of Canada.



Photo: Pacific Ocean Bridge program  
©Ocean Wise. Photo credit: Kyle Singbeil.

First Nation interviewees from urban areas identified **access to landing sites and using canoes for transportation** as barriers in areas that restrict non-motorized traffic. First Nation interviewees in remote communities found distance to be a barrier to forming partnerships and accessing resources, as well as for transportation for youth to OL initiatives outside of their communities.

Although lack of technology was not identified as a barrier by 69% of OLM participants, and online learning and ocean campaigns were seen by interviewees as effective ways to reach multiple audiences and remove barriers, access to high bandwidth virtual online OL initiatives is a challenge in remote First Nation communities.

## 3. FRACTURED OCEAN GOVERNANCE

Participants noted the fractured system of ocean governance as a barrier. In particular, fractured responsibilities between jurisdictions and the siloed nature of ocean-related sectors were identified. Taken together, there is a lack of governance structures needed to account for the interconnectedness of ocean and coastal systems, as illustrated by the following two examples.

**Fractured responsibilities between jurisdictions** create heightened barriers in the case of an emergency. A Heiltsuk interviewee shared: “Perfect example was with the Nathan E Stewart oil spill<sup>28</sup> – when we met with the feds and province about who is responsible for the cleanup and costs. The feds would say, well, we only deal with the marine, and the province would say terrestrial, and when we would ask, ‘well who does the intertidal’ – no answer. Funnily, that’s when we jumped in and said ‘Well, lucky for all of you, Heiltsuk does it all, marine, terrestrial, and intertidal.’”

The **siloed nature of ocean-related sectors** was a point highlighted by several participants. As an example, “Many different groups will focus intensely on one aspect of marine ecology or conservation, without mentioning the other sectors involved in that area. For example,

during our sustainable harvesting programs, many individuals can name different positive or negative aspects of fish farming or salmon fishing, but lack information on how fisheries are managed in Canada, on what different groups are engaged in those fisheries, on how other sectors affect fisheries (such as logging, noise pollution from shipping, etc.), or on how many people and in what capacity the fishing industry employs.” *OLMSurvey participant*

#### 4. NATURE DISCONNECT

Participants reflected a disconnect from nature – perceiving ourselves as separate from nature – as a fundamental barrier to fostering a respectful relationship with the ocean. They observed that the ocean is “out of sight and out of mind” in the daily life of most Canadians, with the exception

of Indigenous and coastal communities.

**Fear and a focus on negative impacts on the ocean** were seen as barriers. Jackie Hildering pointed out: “If you’re trying to connect people to the ocean, to put things forward about how the ocean is sick, that’s not going to help. Something like sea star wasting or any other problem needs to be put forward as another symptom of the same disease, which means that the solutions are the same. It is about having connection, understanding connection between land and sea, but also how our actions here impact humans and species on the other side of the planet.”

**Technology as taking people away from the ocean and nature**, was also identified by some participants, especially First Nations and community-level interviewees.



Photo: Alabaster Nudibranch on Giant Kelp, just below the surface (3 m depth).  
 ©Jackie Hildering; [www.TheMarineDetective.com](http://www.TheMarineDetective.com)



# PRELIMINARY RECOMMENDATIONS TO ADVANCE OCEAN LITERACY

## R1. INVEST IN OL

As funding and competitive funding processes were identified as the two most significant barriers to OL, there is a need to:

1. Increase federal funding;
2. Establish sustained funding opportunities for multi-organization/sector joint initiatives;
3. Support long-term initiatives that demonstrate measured impact over time; and
4. Better demonstrate the value and benefits of OL investment to the industry sector.

## R2. FOSTER MORE COORDINATED AND COLLABORATIVE ACTION ON OL ACROSS THE REGION AND CANADA

While partnerships were a major enabler of OL in the region, participants stressed the importance of more coordinated action and leadership across regions and sectors to harness collective potential and to ensure that individual initiatives are being strategic and

successful. Most commonly suggested ways were to:

1. Create a national-level organization with strong and meaningful regional representation that can support and monitor long-term progress of OL;
2. Create regional OL innovation hubs for fostering cross-sectoral innovation, capacity exchange, and resource sharing; and
3. Expand OL to better include industry, media, and health sectors.

*"I'd say all of us should be singing from the same song sheet...not just doing our own things on the side, but contributing to the exponential sharing of [ocean literacy resources]." Melanie Knight, CEO, Ocean to Eye Level*

## R3: RESPECTFULLY RECOGNIZE INDIGENOUS KNOWLEDGES

The majority of participants voiced that Indigenous Knowledge must be better recognized as a cornerstone for fostering a respectful relationship with the ocean. Suggested actions included:

1. Form long-term meaningful partnerships and joint initiatives with Indigenous communities; and
2. Invest in and support Indigenous marine training programs, ecotourism, and education.



Photo: Canoe landing ceremony, Paddle Together event, Vancouver ©Liila Yumagulova

Heading Photo: ©Jonathon Reynolds

*“Canadian Ocean Literacy will respect and support the enduring knowledge systems of diverse Indigenous peoples. Indigenous laws, traditional ecological knowledge and Inuit Qaujimajatuqangit are recognized as different but also as facets of modern Canadian ocean science. These knowledge systems cannot be subsumed by western science and will stand on distinct yet equal footing distinguishing Canadian Ocean Literacy itself from other models such as those of the Americans and Europeans.” CaNOE*

#### R4: INCLUDE THE OCEAN AS PART OF SCHOOL CURRICULA IN B.C. AND NATIONALLY

For advancing OL, respondents frequently recommended that the ocean be a mandated part of school curricula in B.C. and nationally. Specifically, curricula should:

1. Show the richness and diversity of regional coasts and cultures;
2. Be place-based and focused on local species and waters (rather than tropical);
3. Provide experiential, hands-on, solution-focused learning for high school students, as the students prepare to transition to further education and/or workforce opportunities;
4. Integrate ocean, climate, and biodiversity learning through an interdisciplinary approach; and,
5. Include Science, Technology, Engineering and Math (STEM), STEAM (inclusion of Arts) and Indigenous Knowledge approaches.

Also, the education sector needs to:

6. Integrate OL into pre-service and in-service teacher training;
7. Make OL learning resources readily accessible to diverse and inland school systems and classrooms across the country, reducing barriers faced in teaching about the ocean; and
8. Teach to a generation, because OL takes time and requires a sustained effort to connect students emotionally and transform their behaviours/actions.

#### R5. MAKE BETTER CONNECTIONS BETWEEN OL AND BROADER ISSUES

Participants voiced that OL needs to be connected to other issues that directly influence the ocean, with climate change and health being highlighted most often. Suggested ways included:

1. Establish and promote public initiatives that focus on linking healthy ocean ecosystems and human health; and
2. Move from species to systems, connecting OL to climate change, biodiversity, sustainability, and economic development.

*“[If] in 2030, you go out to a coffee shop, you pick up a conversation with somebody and they know that the ocean provides half of their oxygen. It’s as basic as that. Then I think we’re getting somewhere.” Rashid Sumalia, Institute for the Oceans and Fisheries, UBC*

#### R6. FOSTER ACCESSIBILITY AND INCLUSIVITY FOR OL

While access to the ocean was not a barrier for the majority of the study participants and their organizations, access to ocean education was acknowledged as a privilege that was not available to certain populations. Suggested



ways from participants to support access and inclusion:

1. Increase diversity and equity for OL initiatives through ensuring access to the ocean and experiential learning for people with differing abilities and socio-economic backgrounds;
2. Make the oceans meaningful and visible in the daily lives of Canadians: use accessible language and broader communication through coverage in the media and in daily conversations.

## R7. DEVELOP A SHARED OCEAN IDENTITY BY BRIDGING INLAND AND COASTAL PERSPECTIVES ON THE VALUE OF THE OCEAN TO CANADIANS

Differences in perceptions of the ocean, and the need to bridge and connect across perceptions, were frequently mentioned by the participants, along with ways to move forward:

1. Coordinate efforts and collaborative partnerships between freshwater and ocean-focused organizations and initiatives, bridging water and ocean literacy efforts in Canada; and
2. Celebrate, through art and media, the cultural diversity related to water across Canada.

*“It is essential that there is an approach aimed at Canadians having an ocean identity regardless of how far they live from the coast; for Canadians to understand that the Ocean is the life-sustaining force on the planet (food, oxygen, carbon dioxide buffering, habitat, weather and climate) and takes the form of lakes, rivers, rain, snow, water from the tap as it flows through its cycle.” Jackie Hildering, Marine Detective*

## R8. EXPAND OL TO INCLUDE THE POLITICAL VISIBILITY OF THE OCEAN

Participants were interested in seeing politicians and policy makers engaging more with the public on ocean issues – ocean health, conservation, and sustainable ocean economies.

1. Integrate OL understanding into the work of policymakers.
2. Include ocean health and livelihoods in all major decisions.
3. Inform electorate on the issues of ocean health and ocean governance.

*“I would like to see a collaborative, sustained effort targeted at the voting population. To make ocean conservation a topic on provincial and federal agendas, more people need to be whispering in the ears of politicians. We live in a maritime province, but seldom is the coast mentioned in the throne speech or party platforms.” OLMSurvey respondent*



# CONCLUSION



This report, while aiming to share how OL is understood and practiced in B.C., can only present a fraction of the inspiring diversity and depth of B.C.'s OL seascape, one that is fueled by passion, love, and the dedication of dozens of ocean champions at a community, regional, and national levels. The Pacific Region is home to influential organizations in OL, big and small, that collectively shape how we think about the ocean, and the consumer choices we make. It is a space that feels competitive at times to its practitioners, in its dynamic and evolving nature. It is also a space that gave birth to numerous partnerships that advance OL in a way that no single organization can do.

Overall, one of the most remarkable characteristics of OL in the region, and a major source of hope for the future, is the evidence of the capacity for change. This capacity was

mentioned across nearly all sectors, such as education, NGO and advocacy, industry, community, academia and research, and local and federal government. Several participants mentioned how the region has moved from a government installed machine gun to kill killer whales to seeing them as role models for parenting, female empowerment, and a symbol of how we can do things differently when we finally realize that we are about to lose what we hold dear. The industry participants reflected on the degree of change due to tighter regulations but also due to increasing public expectations to do better.

It is this capacity for change that was seen as tremendously important in moving forward, when 'knowledge replaces fear' and creates a sense of connection and empowerment to act. This is the essence of ocean literacy in the Pacific Region.

*Heading Photo: © Yanick Lesperance/ Students on Ice Foundation*



*Photo: A child takes first steps on Wreck Beach, Pacific Spirit Regional Park ©Lilia Yumagulova*



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## APPENDIX A: FOCUSED DOCUMENT SCAN LIST

The document scan list reflects the reports and resources that were recommended by regional COLC members and study participants, providing important regional and background context. The scan helped to inform and guide aspects of the regional engagement phase, including interview and OLMSurvey questions, participant recruitment, and points of interconnectivity.

In total, over 120 documents were scanned. Any documents that were referenced in the report appear in the References. All relevant recommended OL assets (e.g., information resources) appear in the Pacific Region OL Asset Map Table. The rest of the documents, 50 total, appear in the list below.

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*Home: Braiding Indigenous Science with Western Science*, Book 2. 2nd edn. Victoria, BC: University of Victoria is used under a CC-BY-NC-SA 4.0 International License, except where otherwise noted.

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## APPENDIX B: INTERVIEW PARTICIPANTS

Organization/community/initiative	Participant
Ahousaht First Nation	Ashiele Thomas
British Columbia Ferry Services Inc.	Leslie James
Canadian Network for Ocean Education	Three organizational representatives
David Suzuki Foundation	Bill Wareham
Deep Bay Marine Field Station	Organizational representative
District of Tofino	Josie Osborne, Mayor
Dr. Parsons, Oceanographer	
Fisheries and Ocean Canada, Ecosystem Management Branch	Christy Wilson
FishEye	Maéva Gauthier
Georgia Strait Alliance	Christianne Wilhelmson, Executive Director
Haida Gwaii – Ocean Matters	Josina Davis
Indigenous Service Canada – BC	Organizational representative
IUCN People and the Ocean Specialist Group	Nathan Bennett, Chair
Livelt	Mike Irvine
Marine Detective	Jackie Hildering
Marine Research Education Society	Jackie Hildering
Nuu-chah-nulth leader	Melody Charlie
Ocean Networks Canada	Organizational representative
Ocean to Eye Level consulting	Melanie Knight
Ocean Wise	Danika Strecko
Ocean Wise	James Bartram
Pacific Science Enterprise Centre	Steve Macdonald
Parks Canada	Nathalie Chouinard-Nolet
Parks Canada	Randy Mercer
Power To Be	Carinna Kenigsberg
Qqs Projects Society	Jess Housty
Shaw Centre For the Salish Sea	Leah Thorpe
Simon Fraser University	Professor, David Zandvliet
Squamish Nation Ocean Canoe Family	Chiaxsten Wes Nahanee, Cultural Guide
Squamish Nation Ocean Canoe Family	Shucks (Larry) Nahanee, President
University of British Columbia, Department of Curriculum & Pedagogy, Faculty of Education	Sandra Scott
University of British Columbia, Institute for the Oceans and Fisheries	Professor Rashid Sumaila
University of British Columbia, Institute for the Oceans and Fisheries	Katherine Came, Department, Communications Manager
Vancouver Fraser Port Authority	Two organizational representatives
West Coast Environmental Law	Organizational representative

Additionally, three participants requested to remain anonymous.





## 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: PACIFIC REGION OL ASSET MAP TABLE - LIST OF ORGANIZATIONS

The list below represents organizations that are included in the Pacific Region OL Asset Map Table. The organizations that participated in the OLMSurvey are marked with an asterisk. Three organizations/institutions had different individuals participate in the survey. These included UBC (4 responses representing different departments and initiatives), Ucluelet Aquarium Society (2 responses), and Sea Smart (2 responses).

### Education

Bamfield Marine Sciences Centre\*  
BC Parks Foundation\*  
Be the Change Earth Alliance  
British Columbia Marine Conservation Analysis (BCMCA)  
Burrard Marine Enhancement Society\*  
Camosun College  
Canadian Network for Ocean Education\*  
Clear Seas Centre for Responsible Marine Shipping\*  
Coast Mountain College  
Deep Bay Marine Field Station\*  
Eagle Wing Whale and Wildlife Tours\*  
Fisheries and Oceans Canada - Stream to Sea Program\*  
Great Bear Education and Research Project  
Haida Gwaii Institute  
Hakai Institute\*  
Jill Brown, Grade 1 teacher, School District 85\*  
Live It\*  
Maaqtusiis School\*  
Marine Education and Research Society\*  
Nicholas Sonntag Marine Education Center  
North Coast Ecology Society  
Oak Bay High School\*  
Ocean Ambassadors Canada\*  
Ocean Networks Canada\*  
Ocean Wise Conservation Association\*  
Pacific Wild  
Plastic Bank  
Raincoast Conservation Foundation  
Sea Smart\*  
Shaw Centre for the Salish Sea\*  
Stewardship Centre for BC  
Strawberry Isle Marine Research Society  
Swim Drink Fish Canada\*  
The Marine Detective\*  
Ucluelet Aquarium Society\*  
West Vancouver Environmental Science Academy\*  
Western Maritime Institute  
World Fisheries Trust - Seaquaria Ocean Education\*

### NGO & Advocacy

BC Marine Parks Forever Society  
Canadian Parks and Wilderness Society: BC Chapter  
Dogwood BC  
Ecotrust Canada  
Emerald Sea Protection Society  
Georgia Strait Alliance\*  
Living Oceans Society\*  
MakeWay (formerly Tides Canada)  
Nature Vancouver  
Nature Conservancy Canada  
Power To Be Adventure Therapy Society\*  
Sierra Club of BC Foundation  
Surfrider Foundation  
T Buck Suzuki Environmental Foundation  
The David Suzuki Foundation\*  
West Coast Environmental Law\*

### Government

BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development\*  
BC Parks  
District of Tofino  
Indigenous Services Canada BC  
Metro Vancouver\*  
Pacific Science Enterprise Centre (DFO)\*

### Academia & Research

BCIT  
Nancy Turner  
Sea Around Us (based at UBC)\*  
Simon Fraser University\*  
Snively Gloria and Wanosts'a7 Lorna Williams  
The University of British Columbia\*  
The University of Victoria  
Vancouver Island University

### First Nation Government/Community

Coastal First Nations - Great Bear Initiative\*  
Gitga'at Nation  
Great Bear Sea  
Kitasoo/Xai'Xais Nation  
Metlakatla First Nation  
Nuu-chah-nulth Tribal Council



Qqs Projects Society  
Nuxalk Nation  
The Council of the Haida Nation  
Wuikinuxv Nation



### Community

Alberni Aquarium and Stewardship Center  
Clayoquot Biosphere Trust  
Clayoquot Cleanup  
PEPÁKEN HÁUTW Foundation  
Southern Gulf Island Community Resource Centre\*

### Industry, businesses, and associations

BC Ocean Boating Tourism Association  
Boating BC Association  
British Columbia Ferry Services Inc.\*  
Ocean to Eye Level Consulting\*  
The Vancouver Fraser Port Authority\*  
The Wya Point Surf Shop  
ThisFish Inc.

### Cultural Heritage

British Columbia's Knowledge Network  
Squamish Ocean Canoe Family  
Staying the Course Staying Alive  
The Maritime Museum of BC  
Tribal Canoe Journeys  
Vancouver Maritime Museum\*

### Health and safety

BC Centre for Disease Control  
Canadian Red Cross  
First Nation Health Authority  
Hooksum Outdoor School\*  
Lifesaving Society  
Parks Canada - CoastSmart Campaign\*  
Royal Canadian Marine Search and Rescue  
Shandy Kariatsumari, Lifesaving Instructor and Surf Instructor Trainer, Tofino, BC\*  
The BC & Yukon Branch of the Lifesaving Society

### Media

Alberni Valley News  
BC Shipping News  
Beyond Boarding  
Bob Turner  
CBC  
Coast Mountain News  
Ha-Shilth-Sa  
Hakai Magazine\*  
Harbour publishing  
Kingfisher Press  
Meomi  
SeaWestNews  
Strong Nations Publishing  
The Georgia Straight  
The Narwhal  
The Tyee

### Other

Coast Funds  
Sitka Foundation  
Tides Canada Foundation  
Western Canada Marine Response\*

### Partnerships

BC Ferries, the Vancouver Fraser Port Authority-led Enhancing Cetacean Habitat and Observation (ECHO), and Ocean Wise\*  
Girl Guides BC Council and Ocean Networks Canada  
Ocean Wise and Fisheries and Oceans Canada\*  
Ocean Wise and WWF  
WWF (Marine Matters)/DFO/Haida Gwaii Marine Group/Gwaii Haanas\*

## 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 (Atlantic, Inuit Nunangat, Pacific, 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/pacific-region/>

All research tools and protocols were approved by Dalhousie Research Ethics, REB# 2019-4891 as the lead (national) research institution, as well as by Simon Fraser University REB# 2019s0334 for the Pacific regional engagement.

Validation: The draft Pacific 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

A total of five case studies were co-created in the Pacific Region together with the respective organizational participant. Two of these case studies in abbreviated form appear in the main body of the report. In this appendix, all five case studies appear in full form.

### CASE STUDY #1: TRIBAL CANOE JOURNEYS: REVIVING AND HEALING THE CONNECTIONS WITH THE LAND, WATER, AND ONE ANOTHER

In 1989, Emmett Oliver (Quinault) organized the inaugural “Paddle to Seattle” event. In 1993, under the leadership of Frank Brown of the Heiltsuk Nation, the first annual [Qatuwas](#), or “people gathering together” was hosted in Bella Bella, B.C.

Canoe skipper and cultural guide, Chiaxsten Wes Nahanee of the Squamish Nation shared how the canoe journeys transformed his life by reconnecting him to his culture and the ocean, and helping him find his way:

“I don’t remember as a kid even wanting or knowing I was native. I know we were ‘those Indians,’ but that’s about it as a kid, as a teenager. I was the bad kid, the black sheep of the family. You either be a troublemaker, an alcoholic, or a druggie.

In ’87 the family put me through ceremony, gave me the name Chiaxsten [which means the one who looks after the laws and protocols of his people in Sk̓wx̓wú7mesh]. Threw a whole bunch of responsibility on me; didn’t smarten me up right away.

And then in ’93 I was asked if I would join in on the tribal journeys to Bella Bella, and so ended up being selected for that crew and went. I met people from other Nations, and sitting by the fire each night, they would share songs with us.

We didn’t have many of our own songs, celebration songs out until ’93 when we got our first canoe, the Kxwulth, and that’s when the first crew, we started our training and educating ourselves on our culture, as a lot of us didn’t have that cultural aspect yet; we were still learning about other ways.

And then after a while, in ’93 when we were on the journey, a couple of them actually received songs as we were paddling to Bella Bella; just listening to the winds and everything. I have a couple of songs myself; a whole Rolodex of songs [laughs]. Powwow, Haida, Nisga’a, some Cree and Ojibway, some Lakota songs. It’s just a passion for singing”.

### CASE STUDY #2: COASTSMART

[CoastSmart](#) is a public safety project in the Pacific Rim region of B.C. designed to enhance coastal safety along the shoreline and in the surfzone. Led by [Parks Canada](#), the [District of Tofino](#), and the [District of Ucluelet](#), the project aims to reduce public risk and enhance coastal safety near-water and in the surf zone through communication and education.

## Key success factors:

**Funding:** The pilot project was funded by the Government of Canada.

**Multi-sectoral partnerships:** The CoastSmart Network includes the following sectors: Local businesses (e.g., accommodation, surf schools, rentals, guiding); communications and marketing; education and training (i.e., AdventureSmart; Lifesaving B.C.; Raincoast Education; School District 70); Government, media, and the non profit sector, as well as Wild Pacific Trail, Ucluelet Aquarium, and Pacific Rim Whale Festival.

**Building on existing and successful local, national, and international models:** The objective of CoastSmart was not to create a new initiative per se, but to bring working initiatives together. This was done by building on examples that worked locally: “Every surf school with every surf lesson... they are doing their part to educate people about the ocean” and internationally, through such campaigns as ‘Respect the Water’ in the United Kingdom.

**Community support and champions:** CoastSmart ambassadors (highly respected and accomplished community members in emergency response, surf instruction, accommodation, tourism, government or business) are endorsing coastal safety through their networks. The key educational messages and resources are shared with the Network’s customers, friends, family, and colleagues.

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*“The CoastSmart program’s community champions That’s very, very powerful when you have people from diverse parts of life who all speak about the ocean”. – Josie Osborne - Tofino Mayor*

**Barriers:** Ensuring ongoing support and resources; stability and funding; having to educate within the respective organizations as to why this is important; and monitoring of effectiveness.

## CASE STUDY #3: THE MARINE DETECTIVE

Through an active online presence with nearly 25K Facebook followers, books and other publications, and invited presentations, the [Marine Detective](#) is a handle under which Jackie Hildering, an award winning educator, works to raise awareness about the life-sustaining Northeast Pacific Ocean. Her work illuminates the hidden fragility, beauty, and mystery of life in this cold, dark world. Jackie’s work focuses on action and common solutions by fostering “the precaution, the connection, the using less, and the empowerment for change through consumer and voter behaviour”.

### Key success factors (in Hildering’s words):

**Illuminating life beyond the surface:** “I am relentlessly trying to show the imagery below the ocean: From trying to do it in a gentle way with children in my Find the Fish books so that they are presented with an image where they look for the fish and that means that they are imprinting on what the bottom of our ocean looks like. My most successful images are those that are right below the surface where you can see the sun, where you can see the trees even in the imagery, so that people get a better understanding of what life is there, hidden from us, right below the surface.”

**Sparkling a sense of wonder based in science:** “The wonders, the connections, the importance of the ocean... Don’t compromise a truth in science in your attempts to educate. Never do that. There has to be the integrity, especially in this day and age of speaking for truth, facts, and science, because they, themselves, are endangered species.”





Reflection on Hilderling's work from an industry-sector interview participant:

*"Jackie's Find the Fish Friday on Facebook, it's great, it's sort of like the Where's Waldo of marine biology. It gets people looking. I have a bunch of my friends every Friday, we try to find the fish and a lot of times we can't. It definitely gets people talking and it's a shared learning and it's such a great example of biodiversity, right here."*

## **CASE STUDY #4: PACIFIC SCIENCE ENTERPRISE CENTRE (PSEC): A PLACE-BASED HUB FOR FOSTERING INNOVATION THROUGH PARTNERSHIPS**

Since 1970, this research facility has seen a number of internationally recognized successes but also challenges that reflected the political ebbs and flows of ocean sciences as a federal priority. At the lowest ebb only two federal scientists occupied the site with a fraction of the operational support needed for the complex infrastructure. The most recent Liberal regime brought an enthusiasm for federal science and provided three years of funding for a pilot program to explore new ways of delivering federal science. In 2016, the Science Enterprise Centres –Pacific and Atlantic (in Moncton) - were born.

### **Key success factors:**

**Robust research capacity:** With its partners, the centre offers a broad spectrum of research that takes advantage of several sources of fresh and saltwater, modern laboratories and aquarium facilities. Topics range from ocean pollution, sustainable fisheries and aquaculture, kelp forest productivity, large mammal collision avoidance systems, nearshore monitoring for oil spill preparedness, risk assessment of fish with novel traits, citizen science collaborations in areas that include glass sponges, climate change impacts, and ecosystem monitoring to measure trends and recovery.

**Partnerships and outreach:** The centre seeks research synergies through numerous collaborations with Ocean Wise and other like-minded academic, industry, and community-based science partners. The centre's public engagement and outreach includes community seminars, open house celebrations, and educational extension with a high school science academy, elementary school programs, and public tours.

**Adaptive approach:** The centre fosters an adaptive environment in which processes and resources can be leveraged based on DFO's and partners' evolving and changing needs. Another aspect of adaptability is the inclusive management structure with the researchers and community, along with government and industry input, to co-design and develop the pilot project.

Steve Macdonald, who has anchored this institution through the smooth and rough waters over the past 35 years, reflected on changes in ocean literacy over his lifetime: "It's changed with the advent of the Vancouver Aquarium, with school programs to bring salmon into the classroom and the classroom into our laboratory, with our collaboration with national museums through Ingenium, and with sponsoring community events. Government science delivery can now be less formal and have more dimensions, offered to all aspects of society and available to more people. And how has this happened? Certainly the public's perception of the oceans as once being stable, unchanging, and capable of surviving a variety of environmental insults has itself changed. Perhaps now with an awareness of how seriously we can alter entire ecosystems and ultimately the entire planet, not just individual parts of it, there is more urgency to get the message out and more public demand to

participate in finding solutions. So, while I am pleased to see acceptance of the Science Enterprise Centre concept as a partial solution, it's unfortunate that its genesis is ultimately based on sad events."

## CASE STUDY #5: ENHANCING CETACEAN HABITAT AND OBSERVATION (ECHO) PROGRAM

The [Enhancing Cetacean Habitat and Observation \(ECHO\) Program](#) is a Vancouver Fraser Port Authority-led initiative aimed at better understanding and managing the impact of shipping activities on at-risk whales throughout B.C.'s southern coast. Born out of the recognition of increasing commercial vessel activity, the DFO's Species at Risk Act Recovery Strategies and Action Plans, and the recognition of the importance of the coastal ecosystem that sustains populations of cetaceans, the ECHO Program aims to develop mitigation measures that will lead to a quantifiable reduction in potential threats to whales as a result of shipping activities. These threats include acoustic disturbance (underwater noise), physical disturbance (ship collisions), and environmental contaminants.

### Key success factors:

**Collaboration and partnerships:** As a collaborative regional initiative, the ECHO Program has benefitted from partnerships and contributions from [over a hundred collaborators](#), including scientists, shipping industries, conservation and environmental groups, First Nations communities, and government agencies.

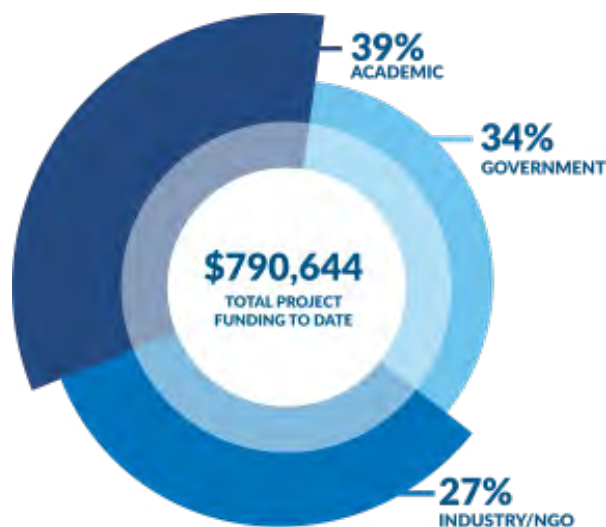
**Time:** The program took a slow and measured approach to make change. The Program started by undertaking research to better understand how underwater noise from large commercial vessel traffic affects whales. This research gave way to the introduction of voluntary mitigation action which was developed in partnership with industry.

**Voluntary commitment:** The Program has led a [voluntary vessel slowdown](#) for the past three years. In 2019, more than 80% of vessels participated in the slowdown through ~30 nautical miles of southern resident killer whale critical habitat. The voluntary nature of the initiative allowed cross-border involvement, as the inbound lane is in US waters and the outbound in Canadian waters. The collaborative approach encouraged all partners to provide insight into the voluntary measure and over time, to continually adjust the parameters to achieve high participation and quantifiable noise reduction for the whales.

**Adaptive approach:** As one of the interviewees stated: "Whales aren't static, and neither is this issue." In adopting a voluntary and adaptive approach, the program has been able to build on its successes gradually by expanding the slowdown area, increasing the participation rate, and adjusting speed targets. The efforts of all participants has resulted in noise reduction that can be measured using hydrophones underwater.



## 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