



A Canadian Ocean Literacy Strategy

August 1, 2018

DEVELOPMENT PLAN: DRAFT 2
For Discussion



Fisheries and Oceans
Canada

Pêches et Océans
Canada



École des
Océans



To send feedback on this document and/or to join the coalition, please email:
admin@COLCoalition.ca

Table of Contents

1. BACKGROUND AND METHODOLOGY	3
1.1 Limitations	4
2. DEFINING OCEAN LITERACY	4
2.1. Ocean Literacy Principles	5
3. TOWARDS A CANADIAN OCEAN LITERACY STRATEGY	5
3.1. Canada's Ocean Literacy Seascape	5
3.2. International Momentum	6
3.3. Need for a Canadian Ocean Literacy Strategy	7
3.4. Emergence of the Canadian Ocean Literacy Coalition	8
3.5. Canadian Ocean Literacy Strategy Objectives	8
4. CANADIAN OCEAN LITERACY STRATEGY RECOMMENDATIONS	9
4.1 Canadian Ocean Literacy Coalition	9
4.2 Consultation & Information Gathering	9
4.3 Ocean Literacy Research & Monitoring	10
4.4 Piloting Key Mobilization Activities as Part of Strategy	10
5. CANADIAN OCEAN LITERACY STRATEGY SYNTHESIS	13
APPENDIX	14

AUTHORS

Lisa (Diz) Glithero, PhD (Lead Author)

Adjunct Professor, Faculty of Education,
University of Ottawa

Education Lead, Canada C3

Janet Stalker (Co-Author)

Program Director, Ocean School

Dalhousie University / Ocean Frontier Institute

1. Background and Methodology

The Ocean Literacy (OL) Development Plan broadly outlines the recommended approach for developing an ocean literacy strategy for Canada, and for establishing a Canadian Ocean Literacy Coalition. The Coalition will create the Canadian Ocean Literacy Strategy while also providing an informal opportunity to improve research, coordination, collaboration, and communication across Canada's diverse ocean literacy landscape.

The initial draft of the OL Development Plan (Draft 1.2) was created in April 2018 under the guidance of an informal multi-partner oversight committee (see Appendix A for members) with financial support from Fisheries and Oceans Canada. The original intention was to create a roadmap for how best to establish a Canadian Ocean Literacy Strategy. Completed during a brief nine-week project window in February and March 2018, the initial draft was informed by one-on-one consultation with 38 stakeholders from a variety of sectors (see Appendix B for consultation demographics and questions), a review of existing national and international ocean literacy (and related) frameworks (see Appendix C), and findings from an ocean literacy literature review conducted as part of the overall project. Draft 1.2 was then circulated and discussed among additional stakeholders via a dedicated full-day workshop on April 26, 2018, in Ottawa. The primary outcome from the workshop and related consultations was consensus that

- 1. a Canadian Ocean Literacy Strategy is needed to**
 - ii. clarify Canada's existing ocean literacy landscape;
 - iii. identify and prioritize the gaps and barriers to Canadian ocean literacy, and create a plan to strategically address them (e.g., capacity building, community of practice development, research, policy changes, curricula enhancement, program/resource development);
 - iv. create a plan for establishing an OL research and monitoring program for Canada; and
 - v. identify strategic opportunities to foster a stronger connection with the ocean in Canada's national identity.
- 2. collective work on a strategy could provide additional, and needed, opportunities to foster communication and coordinated collaboration across the ocean literacy landscape in Canada; and**
- 3. an ocean literacy "coalition" would be a useful way to bring Canadian stakeholders together to facilitate these objectives.**

Following the workshop, a variety of committees were formed to move the proposed Canadian Ocean Literacy Coalition (OL Coalition) forward. In addition, Fisheries and Oceans Canada again provided financial support for the OL Development Plan to be further revised based

on input from the workshop and subsequent feedback from a growing number of interested individuals and organizations.

The OL Development Plan (Draft 2) provides the recommended roadmap for developing a Canadian Ocean Literacy Strategy. A supporting document – ***the Canadian Ocean Literacy Coalition: Framework*** – has also been created to supplement the Development Plan and provides the framework for the mandate, membership, and governance structure of the Coalition. Note that both these documents are considered dynamic and evolving documents to be managed by the emerging Coalition.

1.1 LIMITATIONS

It is important to acknowledge the likelihood for unintentional cultural, sectoral, and/or geographical bias in the Coalition's efforts to date. Although representatives from the Atlantic, Arctic, Pacific, and Great Lakes / St. Lawrence regions of Canada have been involved in these efforts since early 2018, as well as representatives from the education, academic/research, government, industry, and NGO sectors, representation was not equal nor broad. In particular, more engagement of Indigenous peoples from across Canada in the co-creation process is critical in moving Coalition efforts forward, as is more engagement of inland Canadians and representatives from industry.

2. Defining Ocean Literacy

The term “ocean literacy” was first generated in the United States as part of a growing effort to improve scientific understanding of the ocean. Since that time, the term has been widely adopted around the world, with each country/region bringing its own perspective on what ocean literacy means in its communities.

In Canada, ocean literacy is most commonly defined as the extent to which a person understands our influence on the ocean, and the ocean's influence on us. Our perspective on ocean literacy is that it is broader than scientific understanding alone. In Canada, ocean literacy includes an understanding of the global ocean (e.g., western knowledge and Indigenous knowledge), as well as respecting and understanding the crucial role of the ocean in Canadian, Indigenous and world heritage, culture, society, environment, and economy. Note that a formally accepted definition for ocean literacy in Canada has not yet been adopted. Several key considerations for a slightly adapted definition of ocean literacy for Canada emerged from the consultation process (see Appendix D).

2.1 OCEAN LITERACY PRINCIPLES

The landmark “Essential Principles and Fundamental Concepts of Ocean Sciences” framework was first published in 2002 by the Centres for Ocean Sciences Education Excellence (COSEE) and other US partners. It was further expanded to specific US K–12 science curricula alignment by the National Marine Educators Association in 2010, and revised again in 2013 to align with the US National Next Generation Science Standards (see Appendix D). This framework and corresponding OL principles were specifically created to inform ocean science education in the US, but were also broadly applicable to science in general. Subsequently, the US OL Principles were adapted for use in the European Union. Some countries, such as Portugal, expanded the principles to include geography, social studies, culture, art, and music in their efforts to link ocean knowledge to curricula. Other countries, such as France, were not involved in the OL movement, but instead took the education-for-sustainability route to arrive at a similar place.

In Canada, there is broad recognition that ocean literacy spans all aspects of human-ocean interaction and understanding (e.g., environmental, scientific, cultural, social, economic), and is important for people of all ages and sectors (not just youth). Establishing a set of uniquely Canadian OL principles that extend to youth education is encouraged — a process that the Canadian Network for Ocean Education (CaNOE) is leading at its upcoming [National Symposium on Ocean Literacy](#) in July 2018.

Analysis of the OL Development Plan project also revealed the need for OL principles to recognize that Indigenous knowledge has been inextricably linked to the ocean for thousands of years. In short, OL is a relatively new term for something that has always been known, understood, and practised by Indigenous peoples since time immemorial. There is strong consensus to ensure Indigenous knowledge and culture are an important part of Canada’s national ocean literacy leadership, principles, and activities.

3. Towards A Canadian Ocean Literacy Strategy

3.1 CANADA’S OCEAN LITERACY SEASCAPE

Early Canadian ocean literacy practitioners included groups like the Vancouver Aquarium (1956), Marine Institute of Memorial University (1964), Huntsman Marine Laboratory (1969), Western Canadian Universities Marine Sciences Society (1970), Bamfield Marine Sciences Centre (1972), International Ocean Institute, Canada (1972), International Centre for Ocean Development (as an NGO in 1985, coming into existence between 1986–1992 as a federal

Crown Corporation of Canada), and the Great Canadian Shoreline Clean-Up (1993). With the Gwaii Haanas Agreement (1993), Canada's Oceans Act (1996), and the growth of international activities around ocean sustainability — such as World Oceans Day (1992), the United Nations Sustainable Development Goals, and Education for Sustainability — Canadian activities related to ocean sustainability and ocean literacy increased. In turn, a range of conservation, education, industry, advocacy, and policy efforts emerged over the next 25 years. (See *History of OL in Canada* report).

More recently, the Galway Statement, signed by Canada in 2013, was the first international agreement wherein ocean literacy was foundational. In response, in 2014, the [Canadian Network for Ocean Education \(CaNOE\)](#) was launched, marking the first national network in Canada with a primary mandate of advancing ocean literacy. Canada also joined the UNEP Clean Seas campaign in 2017. Today, the Government of Canada is making strong moves to highlight its growing recognition of the role of the ocean, including the launch of the Oceans Protection Plan — the largest multi-agency government initiative in Canadian history — and the inclusion of a focus on the ocean “both as a precious part of our natural heritage and as a source of sustainable economic opportunity” as part of the five themes of Canada's 2018 G7 Presidency. See [Charlevoix Blueprint for Healthy Oceans](#) (more in Section 3.3).

Figure 1 serves as an initial schematic highlighting key groups and initiatives in Canada's current ocean literacy landscape. At the core of the figure are seven OL stakeholder groups identified to date. In the outer rings are a variety of national and international initiatives, frameworks, and/or calls to action discussed throughout the consultation phase as potential (and not exclusive) opportunities for strategic alignment insofar as the integration of OL activities within and across some of these identified stakeholder groups can be accomplished. These groups should not be viewed as exclusive or distinct silos, but rather interconnected allies and partners. However, **a more in-depth asset mapping exercise is needed to fully and accurately identify those playing a part in Canadian OL and to determine a collective articulation of the myriad of connection points and relational contributions of these groups.**

3.2 INTERNATIONAL MOMENTUM

Internationally, there exists a growing number of organizations, collaborations, and initiatives focusing on and/or integrating ocean literacy, including the Sea Change and ResponSEable projects in the EU; national marine educator associations (NMEA) in the EU, US, Canada, and Pacific Ocean regions; the trilateral Atlantic Ocean Research Alliance Ocean Literacy Working Group (US, EU, and Canada via DFO and CaNOE); and a variety of international ocean literacy collaboration and strategic planning activities, such as the three-year ocean literacy roadmap currently in development by the Intergovernmental Oceanographic Commission of UNESCO. Note that **strategically developing ocean literacy activities in Canada and around the world is essential for making progress towards almost all of the [UN Sustainable Development Goal 14 targets](#)**. See Appendix E for a longer list of OL initiatives around the world.

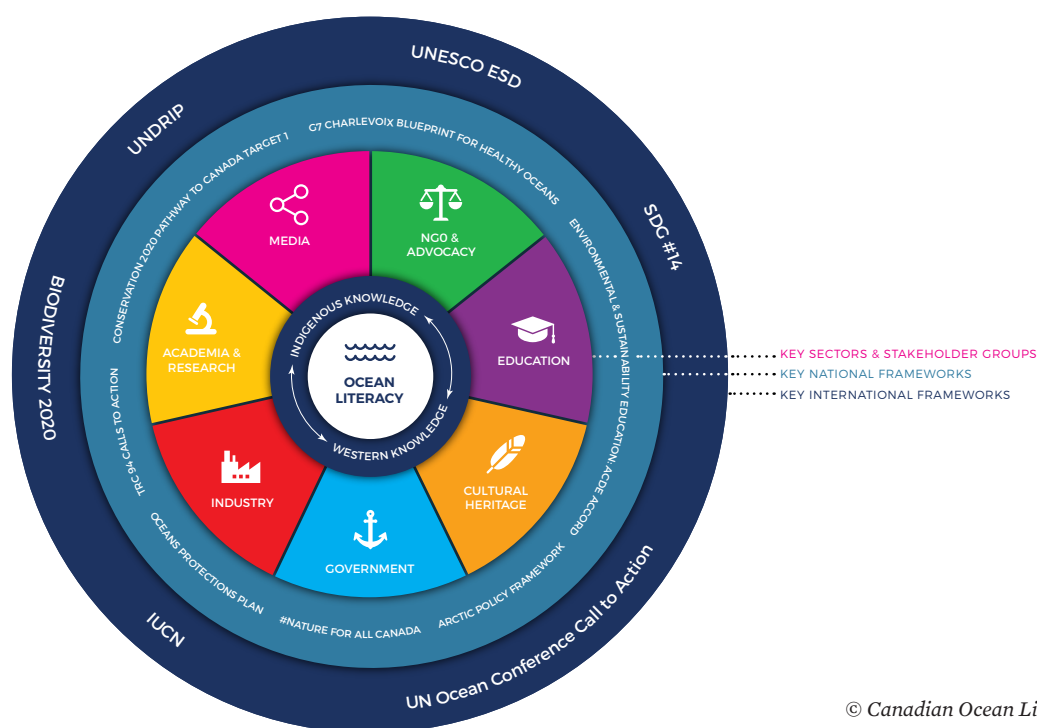


Figure 1

© Canadian Ocean Literacy Coalition, 2018

3.3 NEED FOR A CANADIAN OL STRATEGY

Canada is an ocean nation, with the longest coastline of any country in the world. The ocean is deeply embedded in the fabric of Indigenous and non-Indigenous communities and cultural heritage; it is a major driver of our economy, the backbone of our weather and climate systems, and a recreational playground for millions of Canadians and global visitors. Ensuring that these vital roles become part of the consciousness of all Canadians underscores the essential role of a national strategy. The ocean, and our inextricable link to it, needs to become a more prominent national narrative and a bigger influencer on our choices regarding sustainable behaviours.

As Canada moves towards meeting key national and international commitments that are directly or indirectly linked to ocean literacy, having a uniquely Canadian strategy would support strategic engagement across five key regions — Atlantic, Arctic, Pacific, Great Lakes / St. Lawrence, and Inland Canada — including strong Indigenous leadership. Key mobilization and engagement activities within these identified regions could feed into a coordinated pan-Canadian vision — one that celebrates our regional diversity and fosters a more ocean-literate citizenry in Canada. Having a unified national vision and strategy would also enable Canada to take on a more significant leadership role in the growing international community of practice focused on advancing global ocean literacy.

Strong linkages between ocean literacy and sustainable economic opportunity were also common across the consultations. Particular linkages were made with respect to knowledge mobilization activities within Innovation, Science, and Economic Development Canada — especially via programs of the tricouncil agencies (NSERC, CIHR, and SSHRC). Growing time and financial investments

in ocean infrastructure (e.g., Churchill Marine Observatory, Ocean Networks Canada), intragovernmental initiatives (e.g., Oceans Protection Plan), and science-industry initiatives (e.g., Ocean Supercluster, Northern Marine Transportation Corridors Initiative) underscore the strong economic opportunity presented by the ocean and ocean literacy. Specific to workforce development, for example, the **Marine People Partnership** report, an extensive report on Canadian workforce development in the marine industry, cited “improving ocean literacy of our young people by building interest, engagement, awareness and knowledge base” as a strategic recommendation for strengthening the size and capabilities of Canada’s marine industry workforce.

Further attention was drawn to the essential role ocean literacy plays in supporting the translation of science to knowledge and understanding that informs policy and decision makers, as well as the general public, insofar as values, attitudes, behaviours, and action are concerned. In prioritizing ocean literacy, value is then placed on knowledge mobilization and effective communication and outreach efforts across/between sectors and with the general public. In turn, enhanced communication, dissemination, and outreach catalyzes understanding, opportunity, and engagement that can then lead to actual behaviour change. In 2017–2018, a dynamic collaboration of Canada’s leading ocean scientists, Indigenous leaders, artists, and communicators drafted **Beyond 2020: Open Letter on Ocean Priorities for the Canadian Government**. Timing and alignment are providing a remarkable opportunity for interested and invested organizations, networks, institutions, and individuals to come together and co-develop Canada’s first Ocean Literacy Strategy.

3.4 EMERGENCE OF THE CANADIAN OCEAN LITERACY COALITION

As noted in Section 1, the Canadian Ocean Literacy Coalition (OL Coalition) has been established. The OL Coalition framework (see supporting document) emerged directly from the OL Development Plan project over the past six months and was clearly identified as a necessary and critical foundation through which (a) a Canadian OL Strategy could be co-developed and implemented, (b) OL Research supported, and (c) communication and collaboration among OL community improved. See Appendix F for a summary of key needs identified throughout the consultation process and the extent to which these needs pointed towards the establishment of a coordinated OL Coalition.

3.5 CANADIAN OCEAN LITERACY STRATEGY: OBJECTIVES

There are five primary objectives for the Canadian OL Strategy, as noted below. As the OL Coalition grows, however, these objectives may be adjusted and/or expanded. Note that Coalition objectives and activities beyond developing the national strategy (see 3.4), such as supporting OL research and fostering communication and collaboration across the OL landscape, will be further fleshed out by the OL Coalition once a National Coordinator is hired.

1. Clarify Canada's existing ocean literacy landscape.
2. Identify and prioritize the gaps and barriers to Canadian ocean literacy, and create a plan to strategically address them (e.g., capacity building, community of practice development, research, policy changes, curricula enhancement, program/resource development).
3. Create a plan for establishing an OL research and monitoring program for Canada.
4. Identify strategic opportunities to foster a stronger connection with the ocean in Canada's national identity.
5. Identify strategic opportunities to engage in Ocean Literacy initiatives and partnerships at the international level.

4. Canadian Ocean Literacy Strategy: — Recommendations

A variety of activities are required to develop a Canadian Ocean Literacy Strategy that meets the five strategic objectives outlined above and includes broad consultation, consideration for Canada's rich diversity of peoples and perspectives, and a strong research foundation. This section outlines these recommended activities.

4.1 CANADIAN OCEAN LITERACY COALITION

Although the foundations for the Canadian Ocean Literacy Coalition are coming into place, additional work is needed to solidify the Coalition so that it is able to successfully facilitate the development of the Canadian Ocean Literacy Strategy. Getting an interim Advisory Council and National Coordinator in place, and working together effectively, reflect the immediate priorities, along with the need to grow and diversify the Coalition. See document ***A Canadian Ocean Literacy Coalition: Framework*** for more details.

4.2 CONSULTATION AND INFORMATION GATHERING

Under the direction of the Advisory Council, the National Coordinator (and/or additional staff) will establish regional working groups to facilitate the broader consultations and regional engagement essential to developing an effective Canadian OL Strategy. Initially, five working groups are envisioned: Atlantic, Arctic, Pacific, Great Lakes / St. Lawrence, and Inland Canada. Each regional working group is comprised of interested Coalition members (invited and self-

identified) and includes a multi-sectoral, transdisciplinary, and multi-cultural cross-section of members that is representative of, and responsive to, the regional diversity that makes each working group unique and essential to the broader national strategy. Each regional working group will have co-chairs (one Indigenous / one non-Indigenous) who are Coalition members, and at least one of these co-chairs will serve on the Advisory Council. Ideally, each working group will be supported by a paid full-time Regional Coordinator that reports to the National Coordinator. Responsibilities of the regional working groups include

- holding broad and diverse regional consultations;
- completing an asset mapping exercise that identifies what organizations in the region are affecting ocean literacy, how they are affecting it (intentionally or unintentionally), and what demographic group they are affecting;
- conducting a gaps and opportunities analysis for ocean literacy in the region, as well as analysis of the barriers and motivations to ocean-positive behaviours in the region;
- analyzing existing Canadian, regional, provincial, and municipal policies, frameworks, strategies and/or events for co-alignment and integration opportunities (e.g., the Ocean Protections Plan);
- identifying strategic opportunities to foster a stronger connection with the ocean in Canada's national identity;
- providing a summary report and set of recommendations to the National Coordinator at the end of December 2019 (a 16-month period) to be synthesized into the Canadian OL Strategy; and
- reviewing and providing input to the draft Canadian Ocean Literacy Strategy.

Note that the specific responsibilities of the working groups may be adjusted as the Coalition grows.

4.3 OCEAN LITERACY RESEARCH AND MONITORING

To create an effective ocean literacy strategy, a variety of data around the current state of ocean literacy in Canada — including information on demographic and/or subject area variability — is needed. However, there is only a small body of existing research on ocean literacy in general, and research specific to ocean literacy in Canada is even more difficult to come by. As such, a large-scale project to answer key research questions should run in parallel with the consultation and information gathering work described in Section 4.2 to address this gap.

Under the direction of the Advisory Council, a Research Program Committee (co-led by Canada's Indigenous community and supported, pending funding, by a full-time Research Coordinator) will identify and prioritize key OL-related research questions, identify Canadian and international expertise in the area, and come up with a plan on how to fund the research program. A more specific set of suggested tasks includes

- developing and executing an annual benchmarking process (i.e., Canadian ‘report card’) with measurable criteria to monitor and assess Canada’s annual progress in implementing ocean literacy in Canada;
- identifying and prioritizing critical areas for research on ocean literacy, human behaviour, science communication, and other areas essential for the development and iteration of effective ocean literacy programs;
- mobilizing resources to carry out high-priority research (ideally in partnership with the tricouncil agencies and Canada’s colleges and universities), including Indigenous research on how to foster an intergenerational culture of sustainability;
- developing pathways and mechanisms to ensure that research findings are utilized by end-users;
- utilizing research program insights and findings into the final Canadian Ocean Literacy Strategy;
- monitoring and reporting on Canada’s annual World Ocean Day (WOD) activities, community engagement, and virtual community of practice contributions to ocean literacy;
- advocating for additional ocean literacy-related research as a priority area of interdisciplinary knowledge among Canada’s research communities; and
- engaging Canadian partner agencies in applied and basic research and training at the international level.

Several priority research areas and gaps were outlined in **Dr. Scully’s OL Literature Review**. See Appendix G for a synthesis of recommended research areas and gaps, as well as other recommended actions related to OL research put forth throughout the Development Plan process.

As a start, it is recommended that the Research Program Committee put together an NSERC/SSHRC proposal for funding to support a research team to address priority questions, such as What and who does ocean literacy affect? What and who affect ocean literacy? What programs, activities, and/or policies effectively impact ocean literacy rates? What affects ocean-positive behaviours? What is the level of ocean literacy in Canada (with data segmented by demographics, etc.)? How can we measure ocean literacy?

4.4 PILOTING KEY MOBILIZATION ACTIVITIES AS PART OF STRATEGY

To ensure that the development of a national strategy is not simply a high-level bureaucracy-building process, and that momentum occurs *on the ground* in regions, several suggestions of key mobilization activities to pilot and incorporate into the strategy-building process were put forth in the consultation phase. These ideas include the following:

- a. Co-developing a Virtual Community of Practice (vCoP) with Indigenous Communities: Fostering greater connectivity and meaningful engagement with Indigenous communities, including remote and coastal communities, is central to knowledge building and engagement activities.
- b. Identifying national pilots/flagships: Aspects of current ocean literacy-related programs across the country could be identified as pilot/flagship projects that target different audiences/sectors to trial ocean literacy impact metrics in partnership with the research team. Furthermore, aspects of existing programs could serve as national pilots/flagships to catalyze new programs. Supporting pilot/flagship programs in all regions of the country would be critical, including Indigenous-led initiatives. These pilot/flagship programs should leverage government investment with CSR-Philanthropy and/or NGO funds. As examples:
 - i. Train-the-Trainer Summer Institutes: Two-week training institutes in the summer that are open to all sectors could fit within the CPC Conservation Professional Development program and/or the Federal Government DM leadership training program. Potential funding to pilot an OL train-the-trainer summer institute could emerge through a joint agreement with DFO-ECCC, as well as through the larger national NGO community (Nature Conservancy of Canada, World Wildlife Fund Canada, Ocean Wise, Canadian Wildlife Federation, Oceana).
 - ii. Five-day Professional Development Summer Institutes for Teachers on Ocean Literacy and recognized Additional Qualification Courses for Teachers through accrediting Faculties of Education (e.g., UOttawa, OISE of UToronto, UBC, MUN).
- c. Increasing ocean content in provincial/territorial K–12 school curricula: An Ocean Education Committee would be established to integrate emerging OL principles and pedagogical frameworks into school curricula. Although challenging to ensure a coordinated national approach to educational reform here in Canada, several parallel processes to advance similar efforts (e.g., environmental education) have proven effective. These include working with (a) Council of Education Ministers, (b) Canadian Association of Deans of Education (CADE), (c) First Nations Directors of Education Association and National Forum, (d) Inuit Tapiriit Kanatami (ITK) and Education Leadership in Inuit Nunangat, (e) Métis National Council / Métis Nation Education Strategy Leads, (f) Canadian Teachers' Federation, and (g) Canadian Association of School System Administrators.
- d. Strengthening CaNOE: The OL Coalition acknowledges that supporting CaNOE's growth as a national network that is focused specifically on ocean literacy, and is currently volunteer based, should be a priority of the Coalition's efforts. As an international example, EMSEA moved from being a volunteer-driven group formed in 2011 to a formally registered charity in 2016 as part of the Sea Change Project. Noteworthy, Sea

Change views EMSEA as one of the key components of its post-project legacy. Supporting CaNOE to strengthen its board of directors, improve visibility, grow capacity, scale up conference efforts, and more, would directly serve to advance ocean literacy in Canada.

5. Canadian Ocean Literacy Strategy

— Synthesis

Under the direction of the Advisory Council, the National Coordinator serves as lead writer of the national strategy with the support of the regional working group co-chairs and coordinators. Information gathered primarily throughout the activities outlined in Section 4 will be utilized to draft the Canadian Ocean Literacy Strategy. The strategy will then be vetted by Coalition members and revised before final dissemination and implementation.

APPENDIX

APPENDIX A: OL DEVELOPMENT PLAN COMMITTEE MEMBERS

Ocean School, Ocean Frontier Institute, and Ingenium served as the initial catalyst of the nine-week (January to March 2018) Ocean Literacy Development Plan project. These organizations brought together an informal multi-partner oversight committee to collaborate on the plan:

Jason Armstrong, Ingenium Corp

James Bartram, Ocean Wise

Tara Donaghy, DFO

*Lisa (Diz) Glithero, University of Ottawa / Canada C3
(Development Plan Lead Author)*

Geoff Green, Students on Ice

Heather Murray, CaNOE

Sherry Scully, Scully Research Consulting (Literature Review Author)

Janet Stalker, Ocean School / Ocean Frontier Institute (Development Plan Co-author)

Anne Stewart, CaNOE (History of OL Author)

APPENDIX B: CONSULTATION DEMOGRAPHICS AND GUIDING QUESTIONS

DEMOGRAPHICS (BY SECTOR): 38 TOTAL

Education: 11	Academic/Research: 5
Industry: 3	Government: 5
Indigenous: 5	NGO/Advocacy: 4
Media: 2	International: 3

GUIDING QUESTIONS:

1. Starting from a widely accepted and basic definition of ocean literacy as being the extent of peoples' understanding of their influence on the ocean and how the ocean impacts them, how does this definition align with thinking within/across your sector? Are any elements missing?
-

2. Does ocean literacy matter in your sector? Why? Why not?
3. What is happening in your sector right now that might directly or indirectly relate to ocean literacy?
4. What are the biggest needs/challenges in your sector right now related to the ocean / ocean behaviours?
5. What are the biggest opportunities/incentives in your sector right now related to the ocean / ocean behaviours?
6. Are there indicators relevant to ocean literacy in your sector that (could) help assess/measure related impacts/outcomes?
7. What is needed in your sector to advance ocean literacy?
8. Any recommendations on what would be an effective engagement/consultation process with stakeholders in your sector? In other words, what is the best way to engage a broad community of stakeholders within this sector? And what kinds of information do you think your sector would value pulling together to advance ocean literacy efforts in Canada?
9. How does this ocean literacy conceptual framework resonate with you? Strengths? Limitations? Missing content/representation? From your sector perspective, are there other national or international unifying frameworks/commitments that an emerging National Ocean Literacy Strategy needs to align with/consider?

APPENDIX C: INTERNATIONAL OCEAN LITERACY FRAMEWORKS/ PROCESSES REVIEWED

Although others exist, three international ocean literacy frameworks and/or processes were reviewed for the purposes of this development plan. These include (1) Sea Change, (2) ResponSEable, and (3) NMEA's Ocean Literacy Framework, Campaign and Principles.

1. **Sea Change Project** (see Section 3.2) and <http://www.seachangeproject.eu/>. Three particular documents were reviewed, including
 - a. Key Achievements http://www.seachangeproject.eu/images/SEACHANGE/Media_Centre/sc_KA_booklet.pdf
 - b. Collective Impact Assessment Framework http://www.seachangeproject.eu/images/SEACHANGE/SC_Results/D8.1public.pdf
 - c. Meta-Analysis of the Consultation Reports http://www.seachangeproject.eu/images/SEACHANGE/SC_Results/Deliverable-3.3.pdf

2. **ResponSEAbLe** is an ocean literacy initiative in the EU that is directly linked with the Sea Change Project. The central aim is the creation of ocean literacy tools or products to foster greater public awareness and engagement. To learn more, visit: <http://www.responseable.eu/>
3. **NMEA's Ocean Literacy Framework, Campaign and Principles** (as discussed in Section 2.1) was led by the ocean science and ocean education sectors. The landmark "Essential Principles and Fundamental Concepts of Ocean Sciences" framework launched by the Centres for Ocean Sciences Education Excellence (COSEE) and other US partners (first published in 2002) and corresponding OL principles were specifically created to inform ocean science education in the US. Two key documents were reviewed for the purposes of this development plan, including
 - a. Ocean Literacy Principles and Fundamental Concepts <http://www.coexploration.org/oceanliteracy/documents/OceanLitChart.pdf>
 - b. NMEA Special Report #3: ocean literacy campaign http://www.coexploration.org/oceanliteracy/NMEA_Report_3/NMEA_2010.pdf

APPENDIX D: OCEAN LITERACY DEFINITION, CONSIDERATIONS, AND PRINCIPLES

The first widely circulated definition of ocean literacy was established in the 1990s by a coalition of ocean science and ocean education leaders in the United States responding to growing concerns about human impact on the global ocean and a void of ocean science competency and knowledge in schools. The emergent definition reads: **"Ocean Literacy is an understanding of the ocean's influence on you, and your influence on the ocean.** An ocean literate person:

- a. understands the essential principles and fundamental concepts of ocean literacy;
- b. can communicate about the ocean in a meaningful way; and
- c. is able to make informed and responsible decisions regarding the ocean and its resources."

For more details, visit: <http://oceanliteracy.wp2.coexploration.org/>

KEY CONSIDERATIONS FOR AN ADAPTED DEFINITION OF OCEAN LITERACY FOR CANADA

- a. A need to acknowledge the notions of change and rate of change that we are historically living in;
- b. Ensuring that ocean literacy does not simply speak to the scientific and ecological connections between humans and the ocean, but also to the emotional, experiential,

cultural heritage, economic, psychosocial, and aesthetic dimensions of the human-ocean relationship;

- c. Inclusion of Indigenous ways of knowing is essential to the Canadian context. As noted by an Indigenous representative, some of the most valued knowledge keepers are “illiterate.” Thus, use of the word literacy creates a perceived barrier to initial engagement/interest for some. Furthermore, it was anecdotally noted on a few occasions throughout the consultation phase by both Indigenous and non-Indigenous Canadians that many Indigenous Canadians might find it a foreign concept that a society would need an intervention to help its people appreciate and understand that the land, sea, and people are interconnected;
- d. The argument that the use of the word literacy suggests a direct and narrow link to education (i.e., curricula), putting it at risk of being a less-relevant concept for other sectors (e.g., industry);
- e. A recognition that ocean literacy is best described as a spectrum, meaning that a person should not be considered ocean illiterate, but instead, more or less literate among various dimensions of the human-ocean relationship; also related and noteworthy, one can be ocean literate insofar as demonstrating a relational understanding of/with the ocean, yet lack understanding of the role of the ocean in the larger global environment / climate system (i.e., systems thinking);
- f. A demonstrated tension between those who feel that ocean literacy should include the notion of enabling action (i.e., that ocean literacy is beyond simple awareness and understanding; that it is ultimately about fostering and enabling behaviour change, and thus requires action) versus those who feel that a democratic definition is essential (i.e., activism is a choice, not directed);
- g. A shared recognition that if this definition has been widely accepted and is in use internationally, then Canada should not spend significant time (re)crafting another (e.g., years were lost in efforts to define biodiversity); and
- h. Use of the word stakeholder or sector was questioned in relation to the importance of Indigenous rights when it comes to the ocean; stakeholder is a term that many First Nations and Indigenous peoples identify as a business term, and one that is often perceived as offensive. Although it is a term that has been adopted into other areas (beyond business), it comes with history and baggage, and in turn, is being rejected more and more in some dialogue. It should not be assumed that stakeholder engagement is the same as Indigenous engagement.

NMEA'S 7 ESSENTIAL PRINCIPLES OF OCEAN LITERACY

1. Earth has one big ocean with many features;
2. The ocean and life in the ocean shape the features of Earth;

3. The ocean is a major influence on weather and climate;
4. The ocean makes Earth habitable;
5. The ocean supports a great diversity of life and ecosystems;
6. The ocean and humans are inextricably linked; and
7. The ocean is largely unexplored.

Some suggested considerations put forth during the consultation process for possible adaptation(s)/extension(s) of these OL principles to serve a Canadian context include the following:

- The ocean is vulnerable;
- The ocean has and continues to play a critical role in the development of human civilization;
- The ocean plays an important role in Canada's society, culture, and heritage;
- A substantial part of Canada's economy depends on the ocean;
- There are a variety of interesting and rewarding careers linked to the ocean; and
- Individual actions matter there are things that an individual and/or group of individuals can do to reduce negative impacts on the ocean.

APPENDIX E: OTHER EXAMPLES OF OCEAN LITERACY PROGRAMS AROUND THE WORLD

- Research Center for Marine Education through UTokyo's Ocean Alliance (Japan) reaches 10 million elementary and junior high school students and three million high school students through their Marine Education Literacy Program.
- Two Oceans Aquarium (Cape Town, South Africa) works with school groups, has a mobile aquarium program, provides job shadowing programs, and trains restaurants in sustainable seafood practices.
- Ciência Viva (Portugal) builds upon the Ocean Literacy initiative to make the Ocean Literacy principles relevant to the Portuguese context.
- Save our Sea (Bangladesh) has turtle, shark, and marine debris programs focused on initiating and advancing marine literacy across Bangladesh.
- Oceano Azul Foundation (Portugal) has a goal to reach all school children between five and nine years old in Portugal to bring awareness around ocean sustainability.
- Nausicaa and its Blue Society.

OTHER EXAMPLES OF OCEAN LITERACY GOVERNMENT PARTNERSHIPS

- The College of Exploration (United States) works with government bodies to provide review and pilot-test support for their ocean literacy curricula and other curricula.
- The Environmental Protection Agency (United States) put in place a Gulf of Mexico Ocean Literacy project to reach underserved and underrepresented middle school teachers and students.

UNITED NATIONS OCEAN CONFERENCE CALL TO ACTION

- Strategically developing ocean literacy activities in Canada, and around the world, is essential for making progress towards almost all UN Sustainable Development Goal 14 targets. The “Our Ocean, Our Future: Call to Action” put forward at the UN Ocean Conference in June 2017 (NYC, US) specifically cites “supporting plans to foster ocean-related education, for example as part of education curricula, to promote ocean literacy and a culture of conservation, restoration and sustainable use of our ocean” as one of the urgent actions recommended to conserve and sustainably use the ocean, seas, and marine resources. This specific wording was introduced by the Ocean Frontier Institute, one of the Coalition members.

APPENDIX F: KEY NEEDS IDENTIFIED IN DEVELOPMENT PROCESS

Through the initial consultation and research process, a variety of important insights were provided on key needs in order to develop a Canadian Ocean Literacy Strategy, including (taken from Draft 1.2 of OL Development Plan)

- a. establishment of a formal pan-Canadian and multi-sectoral national ocean literacy coalition, including a representative Council and sectoral or regional working groups to develop a National Ocean Literacy Strategy;
- b. establishment of a much broader consultation process;
- c. establishment of a multi-sector OL Community of Practice;
- d. creation of a national communication strategy around OL, including a prospectus/tool-kit on OL in Canada to broaden, diversify, and scale up partner organizations and overall public engagement (e.g., infographics, fact sheets, videos, success stories, upcoming events, links to partner organizations, etc.);
- e. creation of a digital platform for coordination, communications, shared resources, shared messaging, and overall collective impact;
- f. establishment of multiple strategic OL mobilization activities that run in parallel to one another (as opposed to sequentially);

- g. identification and establishment of diverse streams of multi-year funding to support efforts to advance OL; and
- h. establishment of effective mechanisms/modes to leverage and amplify upcoming events that directly or indirectly relate to advancing OL efforts (e.g., collaborate to amplify OL in Canada through World Oceans Day).

APPENDIX G: PRIORITY RECOMMENDED RESEARCH AREAS & GAPS

The literature review examines literature from peer-reviewed journals, industry reports, and NGO websites, conference proceedings, and unpublished research to establish a baseline of what we know, what has been tried, what has worked well, and where gaps remain, all to better inform an evidence-based approach to developing a National Ocean Literacy Strategy. Literature was examined in areas relating to public and key-stakeholder engagement, communities of practice, Indigenous perspectives, formal and informal approaches to ocean education, and methodologies for assessing impact. Key findings from this review include the following:

- a. Knowledge holding was found to correlate with numerous factors; however, the most significant factor in influencing the shift to knowledge mobilization and motivation to act was trans-situational conditions (i.e., being connected to the issue, seeing the impact of the issue on them and their families/communities).
- b. Findings showed that youth did have an impact and did develop agency through their community and citizen science (CCS) experiences when certain conditions were in place, including having long-term CCS experiences and having repeated experiences to build connections to a place or issue, and having a chance to explicitly contribute to authentic research. Several researchers recognize citizen science as a paradigm for a collaborative approach to tackling broad and complex issues that fall into the socio-scientific categories.
- c. Research from Indigenous scholars outlined the necessary components of Indigenous pedagogy for successful programs promoting Indigenous knowledge and the necessary components for integrating western science into Indigenous learning programs. This work emphasized grounding programs in Indigenous philosophies of education and Indigenous ways of teaching and learning, which reinforces the concept that Indigenous knowledge is not only content but also process. The research identifies how traditional ecological knowledge (TEK) reflects the Indigenous connection with land, ocean, resources, and culture.
- d. Studies found that social network sites and other digital channels can be effective tools for ocean researchers to reach the public and share recent findings, but that not all sites are effective at building interaction, dialogue, and participation from and between users.

- e. The critical influence of media's framing of environmental issues was explored by several researchers. Researchers found that the media tended to overutilize conflict frames, focusing their reporting on polarized stakeholder views, and were not effective at conveying the key issues that were most germane to the public. Research showed that while the public does tend to trust information from the media, the level of reporting left the public poorly informed about the most relevant issues and the science in which those issues were grounded.

The literature and the search for research also highlighted key research gaps and opportunities that are essential to supporting an evidence-based strategy for developing an ocean literacy research plan and a Canadian Ocean Literacy Strategy. Some recommendations for further study include the following:

- f. Research to examine the utility and efficacy of formal and informal curricula and resources in terms of if and how they are being utilized by educators, and in turn, the impact on student ocean-positive attitudes, behaviours, and activities. Additionally, research into sustained behaviour and attitude change arising from ocean literacy programs, education, awareness campaigns, and communication strategies.
- g. Research to develop a more informed understanding of how to match communication channel with message, or channel with stakeholder group, in order to increase receptivity of communication. It would also be helpful to understand which channels most readily influence public perception in order to either leverage these channels better with appropriate communication or to monitor these channels for counterproductive messages. And finally, more research is needed to understand how to influence the media to adopt more productive frames to better leverage their agenda-setting capabilities.
- h. Research that examines learning transfer and integration of scientific and personal knowledge on issues relating to marine and coastal areas, particularly regional or local issues, where personal or community impact can be more readily apparent to determine if the same argumentation skills are applied. It would also be interesting to understand how different stakeholders view and prioritize different socio-scientific issues, and how culture, beliefs, values, demographics, and regions influence these perceptions.
- i. Develop a framework and criteria to assess the impact of informal education and awareness programs, such as citizen science programs, public talks, youth informal education, digital and online awareness and information initiatives, and intersector/interstakeholder sharing sessions.
- j. Examine how individuals and groups make the cerebral-to-affective leap between science knowledge and awareness into feelings of concern, responsibility, and readiness to act in ocean-positive ways. It would be useful to understand what factors facilitate or mitigate this transfer, and what factors are common to and unique among key stakeholder groups.

OTHER RECOMMENDED ACTIONS RELATED TO OL RESEARCH

- A 5-to-10-year commitment to an annual national survey on OL to see if coalition efforts are moving the needle over time. One suggestion is to include OL in the [National Nature Survey](#). Of further consideration is the need to demonstrate improvements in species and habitats through this work in order to establish any credence. OL must balance knowledge and understanding with empathy and personal actions.
- Create quantitative and qualitative instruments that evaluate retention of OL in terms of knowledge and attitude that drive behaviors, including what works for different age groups, cultural groups, socio-economic groups, and geographic regions. These tools could be refined within the cohorts of the National Pilots/Flagships (see Section 4.4) but freely available to the Coalition along with the raw data. Such an approach may assist in leveraging Mitacs funding, for example.
- Inuit Tapiriit Kanatami recently launched [Inuit research strategy for the North](#). For far too long, Indigenous peoples in the Arctic have been marginalized and kept out of many decisions regarding the research, management, and use of resources (including ocean resources) in their homelands. This is slowly changing, but much more needs to be done to ensure Inuit rights are incorporated into OL and all aspects of ocean research, management, and resource use.
- Of related interest, the National Science Foundation (NSF) in the United States has recently announced the themes for its “10 Big Ideas” for future investment, and one of the ten ideas is called “Navigating the New Arctic” (see <https://www.nsf.gov/pubs/2018/nsf18048/nsf18048.jsp>). Noteworthy, the Arctic is the only regional theme identified on this list of 10, signifying it as an area of great importance and opportunity for more research (e.g., community-based monitoring and larger-scale satellite monitoring).