

# Implementation, Characteristics and Effectiveness of Canadian Ocean Literacy Strategy

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**Abstract**— In recent years, Canada has continuously taken action to protect its marine resources and environment, and its development in marine education ranks among the top in the world. However, further efforts are needed to cultivate ocean literacy. In order to better adapt to the UN Ocean Decade, Canada officially inaugurated and implemented the Canadian Ocean Literacy Strategy in 2021, mainly setting strategic goals from three aspects: ocean knowledge, ocean values and ocean behavior. Nine action streams were identified as a common action framework to support the continued promotion of ocean literacy in 2025-2030, and to assist Canada in carrying out the international ocean literacy movement. This strategy has achieved a series of results since its implementation, with notable results in three priority areas of Education & Engagement, Research & Impact, Leadership & Advocacy, enhancing the ocean literacy of all.

**Keywords**— Canada, marine education, ocean literacy, strategy.

## I. INTRODUCTION

Canada is a maritime power, bordered by the Arctic Ocean, the Atlantic Ocean, and the Pacific Ocean, with the longest coastline in the world. The oceans it borders are not only the source of food, resources, and livelihoods, but also an important influencing factor on climate and ecosystems, occupying an undeniable position in national life. Canada is the earliest country in the world to implement comprehensive ocean legislation and attaches great importance to the development of marine education. Since the opening of the Vancouver Aquarium in 1956, Canada has been continuously committed to raising public awareness of the ocean. Fisheries and Oceans Canada, one of the federal government departments, has proposed that priorities for ocean development should include “education and public participation”.<sup>1</sup>

As a result of policies related to marine education, marine education in Canadian universities, middle schools, primary schools, and the public has gradually been launched, greatly improving the level of ocean awareness among students and the public. Nevertheless, in the face of the rising global attention to the oceans in the new century, especially with the implementation of the United Nations Decade of Ocean Science for Sustainable Development (“UN Ocean Decade 2021 to 2030”), Canada has gradually come to understand the inadequacies of the existing marine education in the cultivation of people’s ocean literacy. It led to the creation of the national Canadian Ocean Literacy Strategy (2021-2024), which is progressive and pioneering around the world.

## II. ORIGINS OF CANADIAN OCEAN LITERACY STRATEGY

The formation and promulgation of the Canadian Ocean Literacy Strategy benefited by the collaborative efforts of the Canadian Ocean Literacy Coalition (COLC) and other organizations and institutions. In particular, the research

developed by COLC on marine strategies and the participation of universities played a crucial foundational and leading role.

### A. Development of Ocean Literacy in Canada

Fundamentally speaking, ocean literacy refers to the knowledge, understanding and responsible behavior of the harmonious relationship between humans and the ocean. In Canada, there are various factors that influence the formation of this relationship, including politics, economy, culture, and education. Although “ocean literacy” as a term has a wide impact internationally, it has not received a basic understanding for many citizens in inland areas of Canada. Unlike previous concepts related to marine education, “ocean literacy” is a new framework for understanding homes that have been lived in for thousands of years. In the past half century, Canada has carried out many marine education activities. However, compared to the goals of the “UN Ocean Decade”, it is not difficult to find that there is a long way to go in the development of ocean literacy. Previous generations of Canadian citizens have clearly received insufficient marine education in their formal schooling and most of them have been exposed to the oceans through informal education programs.<sup>2</sup> As a result, the public is generally indifferent to marine issues and lacks relevant basic knowledge. It is urgent to find effective ways to improve the marine knowledge and literacy of citizens and guide them to participate in marine conservation actions. Thus, Canadian Ocean Literacy Strategy has historical continuity and realistic needs.

At the beginning of the 21st century, as Canada’s emphasis on oceans continued to deepen, the publications of *Canada’s Oceans Strategy* in 2002 and *Oceans Action Plan* in 2004 provided important guidance for the specific implementation of Canada’s follow-up marine action plans. In 2013, Canada, together with the European Union and the United States, jointly signed the *EU-US-Canada Galway Statement on Atlantic Ocean Cooperation* and reached a major strategic partnership

<sup>1</sup> Federal Marine protected Areas Strategy [EB/OL].<https://www.dfo-mpo.gc.ca/oceans/publications/fedmpa-zpmfed/index-eng.html>.

<sup>2</sup> Sherry Scully. Marine People Partnership Student Intentions

and Perceptions Survey: Report of findings, analysis and recommendations. [R].Institute for Ocean Research Enterprise(IORE),2016(06):1-65.

through the creation of the Atlantic Ocean Research Alliance (AORA).<sup>3</sup> They consulted on cooperation in Atlantic Ocean research to better understand the Atlantic Ocean and to promote the sustainable management, utilization, and development of its marine resources. As the basic conceptual framework of the Galway Statement, “ocean literacy” runs through all the priority areas of the AORA. At the same time, the AORA Ocean Literacy Working Group was established to identify strategic pathways for the development of ocean literacy, including in marine science, formal and non-formal marine education, government, business, and industry.<sup>4</sup> In 2020, Canada joined the Global Ocean Alliance (GOA) and advocated for international actions, that is, to protect at least 30% of the world’s oceans by 2030 through the establishment of marine reserves and other effective marine conservation measures. The government of Canada has further established specific targets to protect 25% of the world’s oceans and coastal areas by 2025, and strive to achieve a protection rate of 30% by 2030.<sup>5</sup> In support of the “Ocean Decade”, Canada also organized the North Atlantic Symposium in Halifax, Nova Scotia, which researchers, industry, government departments and stakeholders gathered to discuss scientific knowledge, technological innovation and capacity-building related to marine education in North Atlantic countries.

Many universities in Canada have taken a pioneering role in developing ocean literacy education, as exemplified by the Ocean School program initiated by Dr. Boris Worm (Ocean Frontier Institute, Dalhousie University).<sup>6</sup> To meet the growing demand for inquiry-based marine education resources and teaching support, and to further increase ocean awareness and ocean literacy among Canadian teenagers, the program provides a free online educational experience, integrating science, technology and storytelling into marine education. The forward-thinking approach combined with leading-edge educational technology and stunning visual effects, creates an attractive comprehensive learning experience for students, with short films, 3D, VR, and other innovative pedagogical methods. Not only does it cultivate students’ ocean literacy, but it also enhances learner and teacher engagement. For this purpose, Fisheries and Oceans Canada provided \$250,000 in partnership funds for the development of Dalhousie University and the Ocean School program.

### B. Marine Strategy Research Led by COLC

On September 20, 2018, the Canadian Ocean Literacy Coalition was officially established as a national cooperation organization at the Ocean Expo in Halifax, Scotia. It first operated in the form of an independent national program office, and now it is under the leadership of the Fisheries and Oceans Canada.<sup>7</sup> COLC is composed of government departments,

universities, non-governmental organizations, academic institutions, communities, and individuals. Among them, universities play a leading role in promoting ocean literacy education in Canada, with the aim of enabling Canadians to better understand, value and care for the oceans.

An all-female team led by COLC and comprised of university partners conducted a marine strategy research nationwide, aiming to better understand the diverse relationships between Canadians and the ocean and to explore how to effectively promote and practice ocean literacy. The goal is to establish a bottom-up, regionally focused, and community-driven national strategy. Its main content is a field survey-based study, “Understanding Ocean Literacy in Canada (2019-2020)”, and the results directly influenced the formation of Canadian Ocean Literacy Strategy. This marine strategy research focused on examining how ocean literacy education is promoted and practiced across the country, employing public opinion surveys and a combination of qualitative and quantitative research methodologies. Collecting relevant data from over 3,000 target audiences from September 2019 to March 2020, the research mainly focused on three aspects of awareness, strengths and barriers, key suggestions for advancing ocean literacy in Canada, and provided essential support and factual basis for the development of the strategy.

### III. CONTENTS AND FRAMEWORK FOR THE IMPLEMENTATION OF CANADIAN OCEAN LITERACY STRATEGY

More than 400 organizations and 3,000 Canadians were involved throughout the development of Canadian Ocean Literacy Strategy. In March 2021, Canada released *Land, Water, Ocean, Us: A Canadian Ocean Literacy Strategy* and its annex *Implementation Plan: Pathways for Collaboration*.

#### A. Strategic Objectives and Conceptual Framework

By means of multi-stakeholder actions, the overall vision of Canadian Ocean Literacy Strategy is to ensure a healthy, equitable and sustainable relationship with Canada’s waterways and global oceans for present and future generations. The overarching strategic goals are set in terms of ocean knowledge, ocean values and ocean actions, which correspond directly to the three dimensions of ocean literacy education. The first is the goal of ocean knowledge. That is, to deepen the understanding of how the oceans affect people and how people’s decisions and actions affect the oceans. It is important for ocean literacy and the sustainable development of the oceans to popularize ocean knowledge in the society. Increasing public ocean knowledge will provide an effective understanding of the interactions between human beings and the oceans. The second is the goal of ocean values. That is, to enhance the positive awareness of the oceans among the public, and to promote and develop a

<sup>3</sup> European Commission. EU, US, Canada launch Atlantic Ocean research alliance  
[EB/OL] .[https://ec.europa.eu/commission/presscorner/detail/en/IP\\_13\\_459](https://ec.europa.eu/commission/presscorner/detail/en/IP_13_459)

<sup>4</sup> Atlantic Ocean Research Alliance. AORA Ocean literacy Working Group  
[EB/OL] .[http://www.atlanticresource.org/files/teracy-working-group\\_n4vdubdc7cnseau5i5xc3b/](http://www.atlanticresource.org/files/teracy-working-group_n4vdubdc7cnseau5i5xc3b/)

<sup>5</sup> Fisheries and Oceans Canada. Canada joins Global Ocean Alliance: Advocates for protecting 30 per cent of the world’s ocean by 2030

[EB/OL] .<https://www.canada.ca/en/fisheries-oceans/news/2020/07/canada-joins-global-ocean-alliance-advocates-for-protecting-30-per-cent-of-the-worlds-ocean-by-2030.html>

<sup>6</sup> Ocean Frontier Institute, Dalhousie University. Ocean School  
[EB/OL] .<https://www.ofi.ca/programs/ocean-school>

<sup>7</sup> Canadian Ocean Literacy Coalition. Our Story  
[EB/OL] .<https://colcoalition.ca/about/#team>

greater degree of caring ethics. Ocean values are the fundamental views of mankind on the value of the oceans and the fundamental criteria for evaluating relevant marine activities. Enhancing ocean values is therefore the central objective of the ocean literacy strategy. The third is the goal of ocean actions. That is, to promote changes in societal ocean actions through the reduction of barriers and extensive public participation to achieve improved ocean health, community livelihoods and human well-being. Improving ocean actions is a direct goal of the ocean literacy strategy and a powerful way to enhance people’s ocean literacy and protect sustainable development of the oceans. It is with these three goals in mind that the Canadian Ocean Literacy Strategy builds its overall conceptual and content framework (see Figure 1), which includes ocean literacy and definitions, three strategic goals, ten subject sectors, four cross-cutting perspectives, nine action streams, and national and international frameworks.



Fig. 1. Framework of Canadian Ocean Literacy Strategy.<sup>8</sup>

From the overall conceptual framework, it can be seen that the three strategic goals of Canadian Ocean Literacy Strategy are integrated, coordinated and advancing together, playing a guiding role as the central part of the strategy and providing overall direction for different actions. Canadian Ocean Literacy Strategy also has a longer-term goal of establishing Canada’s international leading position in ocean literacy.

### B. Strategic Core with Nine Action Streams

At the core of Canadian Ocean Literacy Strategy are nine action streams that address national priorities for ocean literacy development in Canada. The impacts of each action stream are primarily measured based on corresponding goals, and the overall progress and impacts achieved under these goals will contribute to the advancement of the three overarching strategic goals.

The first action stream is to develop the digital Canadian Ocean Literacy Map & Community Platform. On the one hand,

it is to support, cooperate and coordinate with an increasing number of practice groups; on the other hand, it is to measure and capture changes and trends in ocean literacy education during the “Ocean Decade”. The second action stream is to establish the Canadian Ocean Literacy Community Microgrant Program. Canadian ocean literacy initiatives are related to region, culture, and language, and most of them are driven by the community. The development of this grant program can make funding more accessible, processes more streamlined and actions more sustainable. The third action stream is to strengthen ocean education. It is mainly to increase marine knowledge education and effective teaching practice in formal and informal education, and enhance students’ awareness of exploring, loving, and protecting the ocean. Efforts to improve ocean education in Canada have focused on building specialized faculties, integrating related resources, and increasing marine field exploration. The fourth action stream is to grow Ocean Week Canada. Canada continued to support the annual World Ocean Day activities, which has been expanded into Ocean Week learning and celebration activities. By organizing events in different communities on multiple coasts, people are made aware of the important role the ocean plays in their daily lives and how local waterways connect people and the ocean. The fifth action stream is to enhance ocean knowledge sharing through media communications, storytelling & the arts. With the help of digital media and other media, diversified art works display and storytelling, the dissemination of marine cultural knowledge is increased. It can not only deepen the public’s understanding of the ocean, but also stimulate the awareness of marine protection. The sixth action stream is to amplify and advance youth engagement in ocean conservation & sustainable blue economy opportunities. On the one hand, it encourages diversified young people to support and participate in the decision-making process of marine conservation policies to varying degrees, and to actively participate in marine protection actions. On the other hand, it raises national consciousness of the sustainable blue ocean economy and encourages nationals to capture the opportunities for rapid development of the blue economy. The seventh action stream is to evaluate and improve the current state of access & diversity within Canada’s blue spaces & ocean-related sectors. The status of diversity in Canada’s oceans and other water streams is being explored through access work and assessments conducted by ocean-related sectors to effectively address the vulnerability of communities to changes in the oceans, while removing associated barriers to access to ensure that all Canadians can successfully access and benefit from blue ocean spaces. The eighth action stream is to improve government integration of water-ocean-climate literacy in policy & public engagement. The primary task is to improve the coordination between governments at all levels, to better connect various initiatives such as land, freshwater, ocean, and climate. The ninth action stream is to build ocean & human health connections.

<sup>8</sup> Canadian Ocean Literacy Coalition. Our Work [EB/OL]. <https://colcoalition.ca/our-work/canadas-ocean-literacy-strategy/>.

These nine action streams not only provide direction for the advancement of ocean literacy in Canada, but also provide ideas for the further implementation of the national framework plan and recommendations for concrete implementation initiatives for the international framework. The purpose of Canadian Ocean Literacy Strategy is to build a cultural and geographic concept that can be shared across languages and communities through the combined efforts of all actors, based on a full recognition of the broader meaning of ocean literacy. This aim has been incorporated into nine action streams that will further guide the implementation of the Canadian Ocean Literacy Strategy and, furthermore, provide a common framework for action during the United Nations Decade of Ocean Science for Sustainable Development (2021-2030).

*C. Subjects, Approaches and Plans for Strategy Implementation*

The first is the subject of strategy implementation, as shown in TABLE I<sup>9</sup>. There are many ways to contribute to the sustainability of the oceans, healthy waterways and the well-being of society, and anyone can get involved to have a greater effect through collaboration.

TABLE I. Subject and project description of strategy implementation.

Subject	Project Description
Youth	Drive innovation in all marine-related sectors; Initiate and participate in creative marine education activities.
Arts & Culture	Motivate and engage different audiences through various means; Provide creativity and lay an emotional foundation for Canadians to establish connections with the ocean continuum.
Industry	Innovate water and marine sustainability practices; Create training and career opportunities; Develop products and services to achieve sustainable and equitable blue economy.
Government	Through supervision and legislation, formulate regulations related to marine health, sustainable utilization, and acquisition; Support research, education, and exchange activities.
Research	Support more social science and ocean literacy research; Link research with the real life of citizens; Provide basis for evidence-based decision-making.
Education	Promote learning experience for people of different ages.
Health	Strengthen the understanding of the relationship between the ocean and human health through the following ways: food; Drugs; Biotechnology; Physical, mental, and spiritual health.
Media	Share diverse ocean stories; Provide information and participation for different audiences all over Canada; Promote the normalization of marine behavior.
Community	Lead social initiatives to support the health of local waterways, oceans, and livelihoods; Address local priorities through nature-based solutions.
Non-Governmental Organizations & Foundations	Raise public awareness of ocean issues; Advocate fair and responsible policies; Support capacity sharing and community-led solutions.
Faith	Help Canadians develop ties with waterways and oceans through core teachings, beliefs, and practices.

<sup>9</sup> Canadian Ocean Literacy Coalition. Canadian Ocean Literacy Map and Database [EB/OL] .https://colcoalition.ca/our-work/ol-map-database/.

<sup>10</sup> Lisa (Diz) Glithero, Sarah MacNeil. Land, Water, Ocean, Us: A Canadian

The second is the way to implement the strategy. Canadian Ocean Literacy Strategy is accompanied by an implementation plan, which is a dynamic document, outlining effective ways to make progress in nine action streams. In the implementation plan, each action flow follows a logical framework (see Figure 2). The nine action flows are carried out around their respective goals, and specific actions and precautions are formulated in combination with the actual situation of the participants. The action flows are effectively promoted through different ways of participation, and the process of the action flows is evaluated according to key performance indicators in a certain period, and the areas that need to be improved are summarized, so as to correct the deviation and correct the rightness for the follow-up action flows.



Fig. 2. Framework of Canadian Ocean Literacy Strategy.

At the beginning of 2021, each action stream set up a separate action group to work closely with the staff of COLC. These action groups always play an important coordinating role, promoting cooperation within Canada, keeping every action stream in a positive momentum, and insisting on monitoring and measuring the progress of actions. Canadian Ocean Action Stream Tracker (C.O.A.S.T) is a tool to track community-led projects and the field progress of each action stream on different coasts.<sup>10</sup> The evaluation of collective progress will be included in the initial strategic implementation stage (2021-2024) and the rest of “Ocean Decade” (2025-2030). In addition, other assessment tools have been used to track the progress and impact, such as the directional survey of the baseline results in 2020 and informal opinion polls, which examined the changes in Canadian public perception and values of the ocean.

Finally, the ten-year plan for the implementation of the strategy. Canadian Ocean Literacy Strategy is intentionally designed as an adaptive strategy, and the nine action streams reflect the current Canadians’ understanding of ocean literacy, which is constantly developing in this era full of uncertainty and rapid change. The strategic plan evaluates the implementation progress of the strategy in 2024 and formulates new or adjusted actions and implementation approaches to better cope with existing priorities and emerging challenges. The updated strategy will in turn support the continuous promotion of ocean literacy development from 2025 to 2030.

III. CHARACTERISTICS OF CANADIAN OCEAN LITERACY STRATEGY

A. Scientificity

The scientific nature of Canadian Ocean Literacy Strategy mainly comes from sufficient strategic research. The basis of investigation and research is the premise of implementing the strategy in Canada and the basis for achieving sustainable development of the ocean. COLC has established cooperative relations with Dalhousie University, Victoria University,

Ocean Literacy Strategy[R]. Halifax: Canadian Ocean Literacy Coalition,2021.

Quebec University, and other universities, exchanged and shared the latest technologies and research methods. The annual impact report published every year updates the general situation of Canadian ocean literacy in time, which provides ideas and basis for the next strategic implementation.

#### B. Synergy

The successful formulation and implementation of Canadian Ocean Literacy Strategy benefited from the coordination work of COLC. By holding activities in different fields, COLC promotes all action streams in an all-round way—encourages the public to actively participate in marine activities, improves ocean literacy education, and promotes related research work. In addition, the leadership and funding from the Fisheries and Oceans Canada, and the joint efforts of organizations and institutions such as Ocean School, Ocean Frontier Institute and Ingenium are also important conditions for the implementation of Canadian Ocean Literacy Strategy.

#### C. pertinency

The initial task of COLC is to explore and formulate an ocean literacy strategy in line with Canada's development situation and created the report *A Development Plan: Building a National Ocean Literacy Strategy*. On the one hand, the projects related to the implementation of the strategy focus on three priority areas and formulate action streams around ocean literacy education, ocean literacy research and global ocean literacy. On the other hand, the objectives and conceptual framework of the strategy are defined, and different subjects are encouraged to actively participate in the practice of ocean literacy. At the same time, specific measures and strategies are formulated according to the objectives to promote the all-round and multi-angle development of ocean literacy.

#### D. Dominance

Canadian Ocean Literacy Strategy plays a leading role in the development of ocean literacy in Canada. According to the strategic objectives, specific implementation plans, and measurement standards are formulated, and related activities are guided in the direction of the objectives, to ensure that more people can participate in the practice of ocean literacy and jointly promote the development of ocean literacy. In addition, the strategy advocates cultivating young students' awareness of exploring, loving, and protecting the ocean, and promoting the integration of ocean literacy into formal curriculum education and informal marine education, which has important leading significance for the improvement of marine education in Canada.

#### E. Connectivity and Futurity

The formulation of Canadian Ocean Literacy Strategy is not only the development of the past, but also an important link to the future, echoing the general trend of the development of ocean literacy in the world. *Canada's Ocean Decade Newsletter*, a publication published by the Fisheries and Oceans Canada

since January 2022, is also updating the research reports and latest news about the ocean in Canada, showing the new achievements and realizing the interconnection with international ocean literacy actions. COLC will also systematically elaborate the latest research results and implementation of the strategy in its annual impact report, which will point out the way forward for the development of ocean literacy in Canada from 2025 to 2030, providing a common framework for actions during the "Ocean Decade".

#### IV. EFFECTIVENESS OF THE IMPLEMENTATION OF CANADIAN OCEAN LITERACY STRATEGY

Since its implementation in 2021, Canadian Ocean Literacy Strategy has achieved remarkable results, and 14 ocean literacy projects in three priority areas (Education & Engagement, Research & Impact, Leadership & Advocacy) have achieved certain results and promoted the development of nine action streams. In 2022, it was found that the initial action stream list lacked an important part of the work of COLC. To make up for this loophole, the strategy proposed to add a tenth action stream: contributing to the leadership and publicity of ocean literacy.<sup>11</sup>

##### A. Promote the Related Research of Ocean Literacy

To explore whether the strategic measures implemented are conducive to the achievement of the goals, it is necessary to study, monitor and evaluate the impacts of ocean literacy, and objectively measure the progress of the national strategy. Firstly, a strategic impact measurement plan has been formulated, which can monitor the projects and activities implemented according to the national strategy and share information about progress, impacts, and sustainability with the ocean literacy community. From the increasing audience of publicity lectures to the positive changes in people's knowledge, values and actions, the impact measurement plan is trying to find the connection between the short-term impact of ocean literacy activities and the long-term goal of human beings to protect the ocean. According to the impact results in 2022 and the analysis of the implementation of the plan, an impact measurement framework that is more in line with the measurement standards was formulated, and seven strategic impact reports were compiled.<sup>12</sup> In addition, Ocean Literacy Research Community (OLRC) is jointly founded by COLC and dozens of international partners,<sup>13</sup> aiming at identifying the priorities and gaps of ocean literacy research, sharing, and designing influential ocean literacy research through cooperation, and integrating the results into policies and practices to strengthen global ocean literacy. OLRC has set up five research working groups to develop courses on marine science and ocean literacy learning, to make the government realize the value of ocean literacy and incorporate it into the national curriculum.

Finally, it is to promote the development of Public Perceptions Research (PPR). PPR is a follow-up survey of

<sup>11</sup> Canadian Ocean Literacy Strategy. The National Strategy Impact Report 2022[R].Halifax: Canadian Ocean Literacy Coalition,2023.

<sup>12</sup> Canadian Ocean Literacy Coalition. COLC Publications [EB/OL].<https://colcoalition.ca/our-work/colc-publications/>.

<sup>13</sup> Canadian Ocean Literacy Coalition. Ocean Literacy Research Community [EB/OL] .<https://colcoalition.ca/projects/ocean-literacy-research-community/>.

Canada's ocean literacy survey in 2019-2020, aiming at exploring the recent interaction between Canadians and oceans, the public's views on the ocean, and the ways in which different regions and departments understand and practice ocean literacy. The review compared the results of the survey with those of other surveys in Canada from 2019 to 2022, to deepen the current understanding of the concept of the ocean and determine the future research direction. PPR is very important for understanding the public's views on the ocean and measuring the impacts of ocean literacy measures. At the same time, it also provides ideas for the path adjustment of Canadian Ocean Literacy Strategy and improves the related research on ocean literacy to some extent.

### *B. Form a Networked Channel for Improving the Ocean Literacy of All*

In the first year of the implementation of Canadian Ocean Literacy Strategy, COLC raised \$2.5 million for 14 ocean literacy initiatives, and the ocean literacy community grant program launched in February 2023 also provided easier access to funds for community-driven ocean literacy projects.<sup>14</sup> The project funds raised will be used to build ocean literacy projects such as Canada Blue School. From April 2022 to March 2023, these key measures produced 88 new ocean literacy resources, which directly gave more than 1.4 million Canadians the opportunity to receive marine education and participatory experience. The leaders of ocean literacy education in Canada have cooperated with various national education committees, to jointly promote the integration of ocean literacy into formal curriculum education. Canadian Network for Ocean Education (CaNOE) provides further support for this. Through its huge membership and cooperation network, it creates and promotes opportunities for marine education in all parts of Canada, provides a platform for learning, dialogue and communication between individuals and institutions,<sup>15</sup> and contributes to the development of ocean literacy in Canada.

Blue Schools in Canada refers to schools that conduct experiential learning in ocean, freshwater and coastal areas with purposes and plans.<sup>16</sup> Students and teachers are required to actively participate in the learning activities provided by the school or initiate their own activities. They show how to apply learning resources and share learning results on the Internet. Canada's Blue School project focuses on creating opportunities for schools, students, and formal or informal educators to cultivate ocean literacy and has achieved good results. Together with its partners, Blue School project has developed a "learning center" to collect innovative resources from different marine education organizations in Canada and make it into a toolkit for schoolteachers and community educators. In February 2023, COLC and the team members of Blue School, held the "School Day" in the agenda of the 5th International Marine Protected

Areas Congress (IMPAC5) in Vancouver. A total of 300 students from 7 schools participated in this interdisciplinary learning experience. At the same time, it united with the All-Atlantic Blue Schools Network, and conducted daily live broadcast in IMPAC5. Young marine professionals introduced the relevant marine situation and answered questions. More than 1,000 students from 10 countries participated in the course, which received a good response.

### *C. Further Improve the Ocean Literacy of Canadians*

Canadian Ocean Literacy Strategy attaches importance to the collaboration of the project, advocates that everyone is the responsible subject for the implementation of the strategy. COLC realizes that by improving ocean literacy, people's enthusiasm for marine sustainable development policies and marine protection behaviors can be stimulated. The initial intention of ocean literacy is not to cultivate more marine scientists, but to cultivate the public with more marine knowledge, so that they can understand their influence on the ocean and the influence of the ocean on their lives and take actions to improve and protect this symbiotic relationship.

As one of the action streams, Ocean Week Canada is jointly organized by COLC and other partners. The activities are rich in content, ranging from interactive giant maps with augmented reality applications to sacred journey exhibitions, interactive art performances, lectures by marine experts, shoreline cleaning activities and film screenings, with more than 600,000 participants every year.<sup>17</sup> COLC has also created some free ocean literacy tools and resources for the Ocean Week. The first is a series of toolkits, including school toolkits, vocational toolkits, museums and aquariums toolkits, public libraries and community groups toolkits, help all people to strengthen marine education and promote the popularization of marine knowledge. The second is the giant undersea map named "Ocean, Fresh Water and Us" and AR app. Under the guidance of AR app, people can walk around the map and feel the species diversity of marine reserves, the different voices of marine protection work in Canada and other human and geographical features. According to statistics, there are 20 maps available for free use in schools, educational conferences, museums and science centers, and there are over 70,000 registered map users in Canada.<sup>18</sup> The last is the video collection and artist center planned by COLC, which strengthens the sharing of marine culture through video and art. The video collection includes the coastal stories from SOI Foundation, the water resources defense initiated by domestic leaders and the awareness-raising activities of Ocean Week Canada. The artist center advocates the integration of art into ocean literacy, bringing unique opportunities for marine participation to all parts of the country through a series of

<sup>14</sup> Canadian Ocean Literacy Coalition. Ocean Literacy Community Grants [EB/OL] .<https://colcoalition.ca/projects/community-microgrant-program/>.

<sup>15</sup> Canadian Network for Ocean Education [EB/OL] .<https://oceanliteracy.ca/>.

<sup>16</sup> Canadian Ocean Literacy Coalition. Blue Schools Canada [EB/OL] .[2023-08-12]. <https://colcoalition.ca/projects/blue-schools-canada/>.

<sup>17</sup> Canadian Ocean Literacy Coalition. Ocean Week Canada [EB/OL] .<https://colcoalition.ca/projects/ocean-week-canada/>.

<sup>18</sup> Ocean Week Canada. Giant Floor Map Program [EB/OL] .<https://oceanweekcan.ca/blue-learning-lab/map/>.

lectures, creative community seminars and immersive experiences led by artists.

#### *D. Play a Typical Leading Role in the Development of Global Ocean Literacy*

To improve the Canadians' ocean literacy and accelerate the development of global ocean literacy, COLC has participated in many regional, national, and international initiatives, including national ocean literacy projects and domestic and international lectures. These efforts have made Canada more prestigious and leading in the development of global ocean literacy. Ocean Literacy with All (OLWA) is an ocean ten-year recognition project led by the Intergovernmental Oceanographic Commission of UNESCO and global partners.<sup>19</sup> It is dedicated to strengthening international partnerships and networks, supporting related research and activities designed and implemented by different stakeholders, and promoting the development of global ocean literacy. As one of the founding partners, COLC led and participated in the research part of the project, focusing on formulating a global ocean literacy research plan, filling the existing knowledge gaps, promoting international ocean literacy research cooperation, and strengthening the links and exchanges between existing ocean literacy networks.

In addition, COLC has actively participated in other international projects such as the Galway Statement on Atlantic Cooperation and the All-Atlantic Ocean Research and Innovation Alliance, which will help realize the sustainable development agenda in 2030 and make more contributions to the "Ocean Decade". Leaders of COLC were also invited to attend domestic and international conferences, forums, and activities, and introduced the ongoing ocean literacy work in Canada. In 2022, the representatives gave six major speeches in Portugal, the United States and Brazil,<sup>20</sup> exchanging the latest views on ocean literacy and the "Ocean Decade", and reached cooperative partnerships with 19 institutions and organizations, striving for global exchanges and cooperation.

#### V. CONCLUSION AND DISCUSSION

Ocean literacy broadens our view of the ocean and its role in our lives. Improving ocean literacy can ensure that everyone can understand the overall impact of human beings on the ocean and what measures we need to take to solve these impacts. Therefore, it is imperative to develop ocean literacy. COLC has formulated the world's first national ocean literacy strategy, which guides Canada's domestic and international ocean literacy work, promotes Canada's participation in global marine sustainable development, and helps Canada become a global leader in promoting and maintaining marine health. The goal of Canadian Ocean Literacy Strategy is to mobilize more nationals and partners to participate in the marine protection team, enhance Canadians' ocean literacy and ability, better understand, value and care about the ocean, make contributions to marine protection and its sustainable development, and ensure that

present and future generations enjoy a healthy and sustainable ocean fairly.

At present, the world is facing the crisis of ocean and climate, especially after Japan's nuclear polluted water discharged into the sea, people pay more attention to the protection of the marine environment. We clearly realize that the sustainable development of the ocean is related to human welfare, and the state of ocean literacy will largely determine how people respond to the urgent marine challenges. On the occasion of the "Ocean Decade", the launching and implementation of Canadian Ocean Literacy Strategy is of great guiding significance. Other countries should strengthen their support for ocean literacy at the national level, treat marine-related issues with stricter regulations and stronger government participation, to ensure the sustainable development of ocean literacy.

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