



Mobilizing Ocean Research for Canada

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This report summarizes a Council of Canadian Academies (CCA) workshop on enhancing the environmental, societal, and economic impacts of ocean research in Canada. Convened at the request of the Marine Environmental Observation, Prediction and Response Network (MEOPAR), the workshop examined both successful outcomes and instances where anticipated impacts were not realized. Although a MEOPAR representative attended as an observer, they did not participate in recruiting participants or developing the report, which the CCA authored and published.

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The Council of Canadian Academies (CCA) offices in Ottawa are located on the unceded traditional territory of the Anishinaabe Algonquin People, who have cared for these lands for millennia.

The CCA is committed to reconciliation and honouring Indigenous sovereignty. Through our work in providing evidence for decision-making, we recognize that a wide range of knowledges and experiences contribute to building a more equitable and just society. We encourage all who engage with our work to further learn about and acknowledge the past and present context of the land now known as Canada and of the Indigenous Nations and Peoples who steward it.

Workshop Participants

Participants contributed to the workshop as individuals and did not represent their organizations of affiliation or employment. Each participant was selected for their knowledge, experience, and demonstrated leadership in fields relevant to workshop discussions. Participants were given an opportunity to review a draft of the report to ensure the summary accurately reflected their discussions.

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Key Messages

- Canada's ocean research system produces high-quality science, but can struggle to translate research into environmental, societal, and economic benefits.
- Successful research projects are designed and sustained based on a fulsome appreciation of Indigenous rights, knowledge systems, and leadership. Early and sustained engagement with Indigenous Peoples, communities, and end users is critical to achieving impact.
- Knowledge mobilization is a major bottleneck in the research-to-impact pathway. Despite strong evidence generation, insufficient attention to and investment in communication, translation, and user-focused outputs reduce the uptake of research findings. Ensuring the right contextualized knowledge is available to policy-makers at the right time is a key challenge and opportunity.
- Many of the key strategies that could enhance the impact of ocean research are beyond the reach of a single researcher or research project.
- The effective use of ocean research is hindered by the lack of shared vision and weak connections among researchers, policy-makers, and industry. Mounting interest in the Blue Economy could be an opportunity to articulate and advance such a vision. Dual-use R&D also offers a new way forward, with the potential to access new partnerships and resources, while highlighting the growing importance of ocean research in achieving several national priorities.



1

Introduction

The ocean holds the keys to an equitable and sustainable planet.

(UNDOSSD, 2021)

Canada is an ocean nation. It is home to the world's longest coastline and borders three oceans (Ganter *et al.*, 2021). Ocean research, when done well, has far-reaching impacts that benefit society, the natural environment, and the Canadian economy. Research has clearly demonstrated the key roles oceans play in climate regulation and supporting human health and well-being (IPCC, 2022; UNESCO-IOC, 2024). It is invaluable to marine planning decision-making and critical to informing the location and management of marine protected areas (MPAs) (e.g., Grorud-Colvert *et al.*, 2021; Heidt & Jones, 2023; Oestreich *et al.*, 2025). Research and monitoring of sea ice, guided by local knowledge, is supporting safe travel, sustainable livelihoods, and cultural activities while fostering economic development (SmartICE, 2021). Research on the impacts of climate change on sea level is informing community adaptation and planning (NCCEH, 2023), while ocean technology and entrepreneurship present an opportunity to grow the economy and develop the workforce (NASEM, 2025). On the west coast of Canada, British Columbia hosts more than 1,000 ocean technology companies, while on the east coast, a wide variety of multinational companies are developing and commercializing ocean technologies (IIC, 2021). Efforts are underway to create an innovation environment that would grow Canada's ocean economy from 1.6% to upwards of 5% of overall GDP by 2035 (OSC, 2023).

There is a strong sense that Canada's ocean research strengths often fail to fully translate into benefits for the environment, the economy, and communities.

At the same time, there is a strong sense that Canada's ocean research strengths¹ often fail to fully translate into benefits for the environment, the economy, and communities. Recognizing this shortfall and building on the Council of Canadian Academies' (CCA) past work,² the Marine Environmental Observation, Prediction and Response Network (MEOPAR) sponsored the CCA to convene experts to examine ways to improve the impacts of ocean research.

1 In 2013, Canada ranked 7th for the number of peer-reviewed papers and 11th in terms of scientific impact (CCA, 2013).

2 In 2011, the Canadian Consortium of Ocean Research Universities approached the CCA to develop two expert panel reports. The first, 40 Priority Research Questions for Ocean Science in Canada, identified priority research questions, while the second, Ocean Science in Canada: Meeting the Challenge, Seizing the Opportunity, offered an evidence-based assessment on the state of ocean science in Canada (CCA, 2012, 2013).

CCA–MEOPAR engagement activities

In 2025, the CCA and MEOPAR undertook a series of engagement sessions and an online survey to better understand the various needs, priorities, and perspectives across the ocean research community in Canada. The engagement sessions attracted 70 participants across three in-person events in Vancouver, Trois-Rivières, and Halifax, and two webinars. A total of 177 individuals responded to the online survey. The engagement sessions and survey collected insights from academia, industry, government, and the non-profit sector, resulting in a snapshot of the needs and gaps in Canadian ocean research capacity and emerging priorities.

One of the top challenges raised in the survey was funding, reflecting the reality that ocean research is a costly endeavour and that current funding levels (as well as restrictions on how funds can be used) constrain research directions and outcomes. Another leading challenge was coordination and collaboration across the ocean research system, stemming from Canada’s vast geography and jurisdictional fragmentation. Variability in infrastructure, gaps in research vessel availability, and the high costs of accessing and maintaining the vessels that do exist are persistent problems. Other important focus areas for the ocean community included:

- data management and governance;
- education and training;
- recognition of Indigenous rights;
- the need for a shared vision; and
- Canada’s role in global ocean research.

Many respondents highlighted the importance of revisiting priority-setting exercises in ocean research (see Box 1.1) or reassessing the state of ocean research in Canada, given the scientific, physical, and political dynamics that have shifted since the CCA’s earlier work on these topics. However, the need to scrutinize areas of weakness in Canadian ocean research and identify methods to overcome them was the most preferred focus, which motivated the focus of the present workshop. Specifically, MEOPAR asked the CCA to convene a group of experts to address the following questions:



Workshop Questions

- In light of emerging trends, what are the key barriers to enhancing the impact of ocean research in Canada?
- What strategies can best enhance the impacts of ocean research in Canada?
 - What capacities, governance systems, and collaborations are needed to improve the impacts of ocean research?
- What emerging trends could reshape the barriers or influence the most promising strategies?

Box 1.1 Defining ocean research

Throughout this report, the term ocean research is used to encompass all research conducted in, on, around, and in relation to the oceans. Ocean research extends well beyond academia and the physical sciences to include community perspectives and knowledge. This inclusive term also recognizes that all oceans are ultimately connected as one global ocean.

Workshop approach

To address MEOPAR's questions, the CCA convened 18 experts in Ottawa in April 2026 for a discussion on strategies for enhancing the impacts of ocean research for Canada. Experts contributed a wide range of perspectives and experience, including voices from academia, industry, government, and non-profits, working across the three coasts and across disciplines and knowledge systems.

The workshop was facilitated using a web-based group decision support system. Participants used software designed to support idea generation, consolidation, and evaluation. Ideas were grouped thematically based on participant discussions.

This report presents a summary of the workshop deliberations, supplemented by evidence from the literature and input received through the 2025 CCA–MEOPAR engagement activities (see Figure 1.1). Workshop participants were given the opportunity to review a draft of the report for accuracy prior to publication.



Figure 1.1 Sources of evidence and insight informing this report

This report draws on published evidence and extensive engagement conducted throughout 2025 and 2026, culminating in the April 2026 workshop.

2

Emerging Trends

Workshop participants were asked to reflect on emerging trends that are influencing the production and impact of ocean research. The mounting impacts of climate change on ocean access, the expanding recognition that oceans are interconnected and require international partnerships, and the growing push for resource development were all acknowledged. The following three issues were seen as most likely to influence ocean research and its impacts going forward.

Technological advances

Rapid technological development that supports the collection, analysis, management, and dissemination of ocean data was identified as a key trend. AI, for instance, affects several dimensions of ocean research, from potentially providing instant analysis of real-time data flows, to supporting navigation and experimentation by autonomous vessels, to underpinning more accurate or computationally efficient predictive models (NASEM, 2025). More broadly, ocean technology and the translation of ocean research could alleviate some of the resource challenges, while also contributing to the Blue Economy and potentially growing the marine workforce (ORCA, 2019; NASEM, 2025).

One workshop participant described how synergistic advances in cloud computing and AI, combined with purposefully designed technologies that automate data processing, analysis, and reporting, can support a timelier process for delivering ocean insights to their potential users (e.g., in policy-making). This was contrasted with the current paradigm, in which data collection and the publication of research findings occur over months to years, often at considerable cost, sometimes without the results being published, missing opportunities for impact. This trend has implications for both real-time data collection and the re-use of data from prior data collection efforts. It also dovetails with the proliferation of participatory science and community-led research, since these generate large volumes of data with vested user interest in translating that data into actionable knowledge. Despite growing public and government interest in the potential of emerging technologies, realizing their beneficial impacts relies on alignment among autonomous data collection platforms, AI, computing, and data infrastructure. Public procurement processes could also play a role in facilitating technology adoption.

Geopolitical shifts are influencing multiple dimensions of ocean research and cannot be ignored.

Security and sovereignty

Geopolitical shifts are influencing multiple dimensions of ocean research and cannot be ignored. In response to these shifts, an increasing focus on security and sovereignty could shape the trajectory of the Canadian ocean research enterprise for decades to come, according to several workshop participants. This can be understood in part by the dual-use potential of the infrastructure and equipment used in ocean research. Bathymetric and acoustic monitoring data, for instance, can be used for civilian navigation or wildlife monitoring, as well as for military purposes. In the present context, ocean research initiatives conducted beyond a country's national jurisdiction are increasingly perceived as pursuing geopolitical motives, such as establishing a presence in contested or strategic waters. Recent examples include expeditions by Chinese research vessels in the Arctic and other international waters (Coyne, 2024; Funairole *et al.*, 2024; Sasazawa, 2024; Panchal, 2025).



Sovereignty and security issues may align with ocean research, with workshop participants noting that the defence and trade implications of more accessible Arctic waters are directly linked to climate research. In other areas, a renewed focus on defence will alter the trajectory and funding landscape of some ocean research activities. The implications of this trend are nuanced, however, and go beyond funding; the growing focus on security, defence, and governance of dual-use R&D creates tensions across a previously globalized and open research landscape, with related risks and opportunities (CCA, 2025).

Many ocean research challenges are global and transcend a country's borders or exclusive economic zone. Multinational institutions are increasingly active in promoting a shared understanding of these global challenges and could serve as a forum for coordinating action; however, political shifts are creating friction points and international disengagement. A workshop participant pointed to opportunities for new partnerships in regions of the world that Canada has not previously prioritized, such as Africa, in light of shifting relationships with longstanding partners and the federal government's ambitions to engage with other middle powers (PMO, 2026a).

Shared decision-making with Indigenous Peoples

Throughout the workshop, participants emphasized that respect for Indigenous Peoples as rights-holders must be a baseline principle for ocean research moving forward, as part of the necessary work to advance reconciliation. There was a recognition that expectations relating to Indigenous participation continue to evolve. Indigenous Peoples exercise their inherent rights to lead ocean research activities in line with their priorities. Along the path toward reconciliation, expectations regarding Indigenous involvement and agency in research continue to grow, and researchers and research institutions need to evolve. Similarly, a growing body of legal work is clarifying and upholding the rights of Indigenous Peoples with respect to activities taking place on their Land and Waters. Ocean researchers will need to take these changing realities into account from project inception, recognizing where decision-making authorities reside.

For example, the growing attention on the Arctic and related ties to ocean research must account for Inuit rights at the outset. The 2023 Inuit Tapiriit Kanatami (ITK) The Oceans that We Share report emphasizes the need for these rights and accompanying priorities to be reflected in decisions about infrastructure investments and marine economic development (ITK, 2023), and the ITK Inuit Strategy on Research speaks to priorities around research conducted in Inuit Nunangat, including ocean research (ITK, 2018).

Workshop participants reiterated that ocean research can be more impactful when it supports and invests in Indigenous knowledge systems, and when decision-making and research planning align with Indigenous priorities. The Aboriginal Aquatic Resource and Oceans Management departments are Indigenous-led organizations that provide technical services for marine issues, including fisheries and resource management, presenting opportunities for potential partnerships where Indigenous priorities and knowledge systems are centred (AAROM, n.d.). Increasing Indigenous leadership in ocean research will contribute to innovative approaches to ocean health and the Blue Economy. Indigenous-led capacity in ocean-based industry and commerce provides an opportunity to advance Indigenous leadership in ocean research and policy.

Increasing Indigenous leadership in ocean research will contribute to innovative approaches to ocean health and the Blue Economy.



3

Improving Impact at the Project Level

Workshop participants shared successes and failures in individual ocean research projects and described the factors that contributed to those outcomes. Barriers to achieving project impact and strategies to improve impact were subsequently explored in greater depth. Early engagement and relationship building emerged as core activities from this discussion, and many of these lessons have the potential to be generalized or adapted across the ocean research landscape (Figure 3.1).

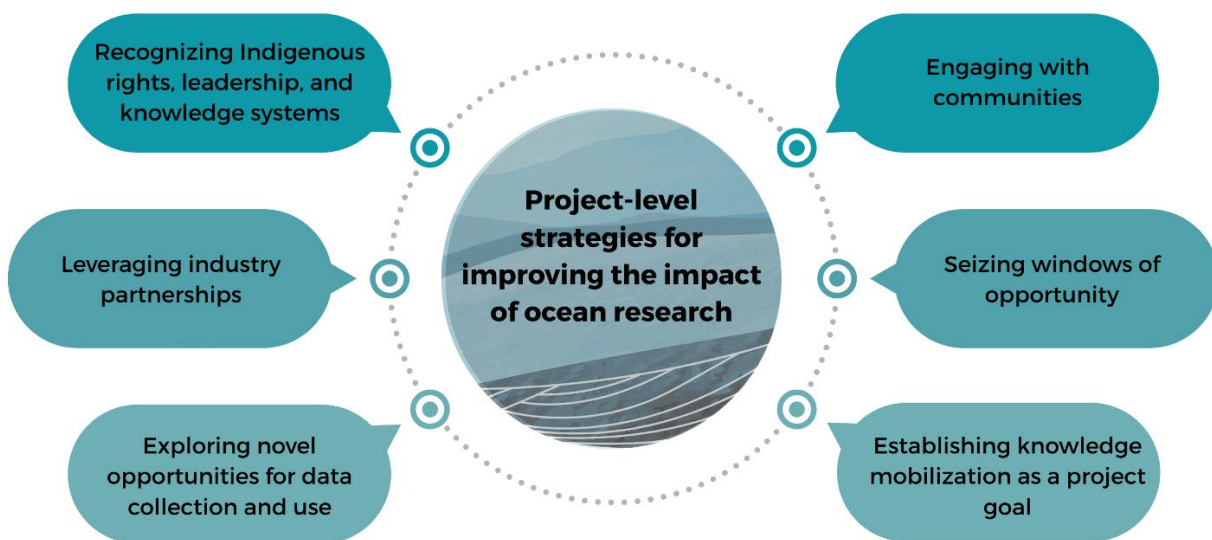


Figure 3.1 Project-level strategies for improving the impact of ocean research

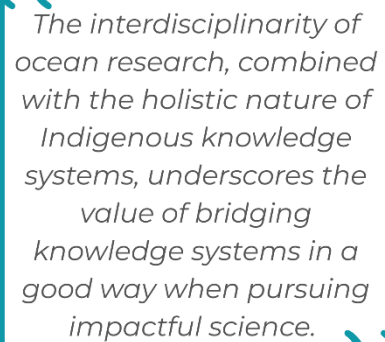
Workshop participants identified a range of strategies to support research impact at the project level.

Recognizing Indigenous rights, leadership, and knowledge systems

Indigenous Peoples hold longstanding relationships with, and responsibilities for, the ocean. These relationships include histories, oral traditions, and numerous other dimensions of Indigenous knowledge systems, characterized by a deeper understanding of the interconnectedness of oceans, coasts, and lands. The interdisciplinarity of ocean research, combined with the holistic nature of Indigenous knowledge systems, underscores the value of bridging knowledge systems in a good way when pursuing impactful science. Challenges persist in respectfully and productively engaging with Indigenous knowledge systems (CCA, 2026; CCUNESCO, 2026). Indigenous Peoples' priorities for ocean health may not be reflected in research priorities, due to factors such as academic incentive structures and governance and decision-making frameworks that remain insufficiently inclusive.

Workshop participants underscored that it is imperative to move beyond paradigms that assume a passive involvement of Indigenous Peoples in ocean research, where Indigenous communities are positioned as partners to be approached by scientists and scientific institutions. Workshop participants instead highlighted Indigenous capacity to actively design, conduct, and lead ocean research initiatives. This capacity includes leading scientific expeditions on vessels owned by Indigenous organizations, and fisheries management efforts, such as those carried out by the Nunavut government, where priorities and schedules are determined through community engagement and guided by Indigenous knowledge systems (e.g., Gov. of NU, 2023, n.d.; ONC, n.d.). These activities can yield a range of benefits, including promoting ocean literacy and education, generating economic and commercial opportunities, supporting Indigenous knowledge systems, and, in some cases, advancing Indigenous sovereignty and culturally essential relationships with the ocean.

Participants repeatedly pointed to the need for ocean research activities to uphold Indigenous rights, understand the diversity of Indigenous Peoples in Canada, and appreciate the scale of Indigenous ownership and operation of major marine commercial enterprises with significant assets (e.g., Clearwater, n.d.; Newdock, n.d.). In some cases, this means establishing practices to ensure accountability when navigating community partnerships and maintaining ethical collaboration practices, while in others, it means recognizing Indigenous capacities in ocean research, including Indigenous-led expeditions, mapping projects, and commercial fishing ventures. Workshop participants identified Indigenous autonomy as an overarching principle in ocean research in Canada.



The interdisciplinarity of ocean research, combined with the holistic nature of Indigenous knowledge systems, underscores the value of bridging knowledge systems in a good way when pursuing impactful science.

Engaging with communities

Coastal communities play a crucial role in many ocean research initiatives and can make important contributions at all stages of the research lifecycle, from study design and data collection to the communication of research results. During the workshop, several participants shared their experiences of how the relationship between researchers and coastal communities can influence impact. Impacts are strengthened when coastal communities are engaged in the identification and prioritization of research questions, and when ocean research projects provide opportunities for local training and applications of research findings. Engagement with coastal Indigenous communities can overlap with efforts to bridge knowledge systems for mutual benefits. Workshop participants identified several success stories: initiatives to promote safe navigation of sea ice and enhance search and rescue capacity in the Arctic; community-requested and community-informed research into declining narwhal populations; and research partnerships to inform marine traffic management based on cultural practices and to preserve ecosystem health. In each case, Indigenous partners contributed to research design and leadership in decision-making, which ensured that local needs were met and the research was guided by Indigenous knowledge systems.

Workshop participants noted that projects that provide the flexibility and time for discussions in the early development and design phases can support multiple interests through research activities. Early decisions on data management plans and research governance are similarly beneficial. Fostering flexibility and open dialogue requires a close relationship between partners. Building and maintaining relationships with coastal communities for ocean research requires both time and funding.



Typical funding and political cycles contribute to the disruption of relationships, which workshop participants noted as both frustrating for communities and wasteful for public investments in research.

Sustained and meaningful community partnerships require significant human and financial resources for both academic and non-academic researchers. Workshop participants stressed the value of maintaining long-term partnerships to enhance the ongoing production of impactful research outcomes. Typical funding and political cycles contribute to the disruption of relationships, which workshop participants noted as both frustrating for communities and wasteful for public investments in research. The implementation of marine spatial plans in coastal British Columbia provides an example of a partnership sustained for more than a decade (Short *et al.*, 2023). Beyond its initial objectives, this partnership has succeeded in bridging Indigenous and western

knowledge systems, building resilient institutional knowledge, and providing a foundation upon which new initiatives can easily be layered. While the partnership benefited from sustained political will, it also relied on committed participants and a blended funding model that included long-term philanthropic support.

Leveraging industry partnerships

Workshop participants shared examples of successes and pitfalls in collaborating with industry and pursuing commercialization efforts in ocean research. Although workshop participants raised several additional systemic challenges in translating ocean research—including limited domestic capital and a lack of policy coordination—they viewed the establishment of close, timely links among researchers, industry, and end users as a key predictor of success. The importance of early engagement thus emerged as a key theme, echoing the above discussion on community partnerships. For example, close cooperation at a project's outset creates opportunities to adjust course so that the project better serves commercial partners. It can also allow for transparent discussions of expectations and the terms of agreement for potential benefits and cost-sharing. In the experience of one workshop participant, this was instrumental in the successful commercialization of a sonar-based bathymetry application in an uncrewed underwater vehicle—the nature of which differed from what the partners had initially envisioned. Conversely, a lack of engagement leads to misalignment among end users, technology developers, and researchers along the commercialization pathway.

Similarly, with increasing investments in dual-use R&D, it is essential for research partnerships to begin early enough to avoid overspecialization, which may close the door to procurement opportunities by the federal government. In doing so, technologies can be better supported through commercialization,

avoiding scenarios in which intellectual property (IP) developed in Canada goes undeveloped or only reaches commercial maturity in other jurisdictions.

Seizing windows of opportunity

Workshop participants discussed opportunities to augment ocean research by enhancing alignment and partnerships. For example, there is room to build on current practices in the use of *ships of opportunity*, i.e., vessels travelling with a purpose outside of ocean research but that can nevertheless host equipment or researchers. A renewed emphasis on charting in the Arctic may create related opportunities to conduct other scientific measurements. The Cooperative Research Ships model in shipbuilding and hydromechanics R&D was raised as a potentially promising approach to emulate (CRS, n.d.). It consists of an international partnership in which resources are pooled through a cost-sharing model, and research priorities are set through an internal competitive process. Research sponsors in Canada have offered or continue to offer analogous programs; however, such funds are not intended to support large-scale research projects in their entirety (e.g., NSERC, n.d.). In recognition of this, workshop participants agreed that a more modular approach could be warranted, where segments of large projects are divided among researchers and then combined to provide more fulsome results.

Exploring novel opportunities for data collection and use

Data collection can be a costly endeavour, but in certain cases, impact can be achieved without conducting original studies. A workshop participant described a recent effort using AI combined with satellite imagery to monitor coastline erosion in MPAs (e.g., Cong *et al.*, 2026). By pooling existing data, researchers and government scientists collaborated to identify a range of applications in MPA management, which were then screened against existing data. The end result is reported to be driving efficiency gains across related Fisheries and Oceans Canada (DFO) activities and freeing up additional capacity to manage protected areas.



Participatory science initiatives have also been identified as a pathway for pursuing ocean research with high potential for community impacts. Those initiatives and other decentralized collection activities can yield data that would otherwise not be collected due to practical and financial constraints. During the workshop, participants highlighted community hydrography as one example (e.g., DFO, 2023): bathymetric and hydrospace data collected in remote areas across Canada support navigation and other activities, strengthen local knowledge systems, and create opportunities for collaboration across the public, academic, and non-profit sectors. In some cases, the technology used in support of participatory science programs can be repurposed for other community needs, either to collect the community's own data or to offer data collection as a paid service.

Establishing knowledge mobilization as a project goal

Knowledge mobilization in ocean research can fulfil a variety of essential functions: better connecting research to potential users, generating products and tools for use by communities participating in ocean research, and improving ocean literacy while communicating the value of ocean research, particularly outside the maritime community.

A lack of attention to knowledge mobilization was perceived by workshop attendees as a main factor in the failure of ocean research to achieve impact. One participant described the global issue of marine plastic pollution as a key example of failed knowledge mobilization in the ocean research community. Despite the well-documented harms of plastics and the global scale of the problem, awareness remains insufficient to support coordinated mitigation efforts. Participants also raised concerns that some institutions, despite receiving public funding for ocean research, were failing to participate in or adequately resource outreach activities. This can contribute to the erosion of public trust in science and its value, diminishing public willingness to fund ocean research. This latter point is exacerbated by the challenge of misinformation and disinformation, which is affecting researchers more broadly.

The extent to which ocean research in Canada suffers from a capacity problem in collecting or using data varies according to the operating context. The capacity to ensure that this data effectively drives policy and investment, however, was viewed by workshop participants as a widespread problem. Workshop participants emphasized that ensuring the right data outputs are available in the right format at the right time for policy-makers is a key challenge and an opportunity for knowledge mobilization. One example of a successful activity in this area was a database of fisheries subsidies across jurisdictions, which provided a cohesive evidence base that was used to support global agreements at the World Trade Organization to identify and discipline jurisdictions employing subsidies that were detrimental to the health of fisheries (Sumaila *et al.*, 2024).

In the examples provided during the workshop, the actors responsible for knowledge mobilization varied. Regardless of who is mobilizing knowledge, resourcing these activities is essential, and workshop participants emphasized the importance of integrating mobilization and communication efforts into research priorities. For example, the OceanCanada partnership has used video content to mobilize partnership outputs, receiving a 2021 Social Sciences and Humanities Research Council (SSHRC) impact award in recognition of these efforts (OceanCanada, n.d.-a; SSHRC, n.d.). Plain language communication of research contributions and ideas is essential, as is the recognition of local expertise in promoting ocean research literacy.

4

Improving Impact at the National Level

Many of the key strategies that could enhance the impact of ocean research are beyond the reach of a single researcher or research project. Workshop participants identified several strategies that apply across the country (Figure 4.1). While DFO occupies a unique role in this space, many actors play important roles in shaping impact.



Figure 4.1 National-level strategies for improving the impact of ocean research

Many of the strategies that could enhance the impact of ocean research are cross-cutting and best deployed at a national scale.

Articulating a shared vision for ocean research

A lack of a common vision for ocean research has been a longstanding challenge for the research community. The CCA's Expert Panel on Canadian Ocean Science (2013) identified a vision gap, stating that "in contrast to other countries, or other disciplines in Canada, no comprehensive national strategy or vision currently exists for ocean science in Canada. This makes it difficult to prioritize needs and comprehensively plan investments for ocean science." This problem persists, and feedback during engagement sessions noted that this lack of vision hinders coordination. Workshop participants noted that previous mandate letters to the Minister of Fisheries and Oceans had been somewhat helpful in filling this void, but department-specific mandate letters have not been issued in recent years.

Workshop participants noted that the concept of the Blue Economy has generated significant momentum (see Box 4.1). They speculated that the current lack of clarity around Canada's approach to developing the Blue Economy and unfamiliarity with the ocean (particularly for institutional investors) limits investment in this space because investors lack a clear picture of the landscape of opportunities and risks. Canada's Blue Economy strategy, if appropriately articulated and resourced, could provide this direction.

Box 4.1 The Blue Economy

The concept of the Blue Economy is relatively recent, emerging from perspectives advanced by Small Island Developing States at the United Nations. Proponents of this approach seek to reconcile ocean-focused economic development with sustainability imperatives and community involvement, ensuring that it creates benefits across society and supports healthy ecosystems.

(UNCTAD, 2014)

Workshop participants identified Horizon Europe as a program that has helped shape this shared vision in Europe. Restore our Oceans and Waters is one of five large-scale initiatives funded under the program, and it identifies specific areas of focus (EC, n.d.-a,-b). Globally, priorities have also been identified as part of the UN Ocean Decade (UNESCO-IOC, 2024), with examples ranging from understanding the impacts of marine pollution to clarifying the linkages between human health and ocean health.

A national strategy for ocean research that aligns with broader national priorities could offer opportunities across multiple sectors. For example, in response to emerging risks and changing geopolitical dynamics, the federal government has pledged investments in defence spending and dual-use infrastructure to support national security and international trade (GC, 2025; PMO, 2026b). Related initiatives to catalyze dual-use R&D, such as the Defence Industrial Strategy, provide a new lens through which ocean R&D priorities and coordination can be viewed moving forward (GC, 2026). A workshop participant similarly invoked the nascent Bureau of Research, Engineering and Advanced Leadership in Innovation and Science (BOREALIS) to suggest that funding for dual-use R&D may be allocated with greater speed, lower administrative burdens, and according to different incentives than typical public funding. One participant noted that while the academic community may be eager to support a growing focus on defence, the mechanisms for engagement and alignment of research efforts are currently unclear. The lack of a national ocean identity was raised as a related challenge (see Box 4.2).

A national strategy for ocean research that aligns with broader national priorities could offer opportunities across multiple sectors.

Box 4.2 Canada as an ocean nation

Workshop participants viewed stronger public ocean literacy and engagement as an essential foundation for impactful ocean research. Roughly one in three people in Canada see the ocean as directly influencing their daily life, while a little less than half of the population see their day-to-day actions as influencing the oceans (COLC & Nanos, 2024). Globally, the UN Ocean Decade identifies restoring society's relationship with the ocean as one of ten focal areas (UNESCO, 2021a). Workshop participants suggested that ocean literacy could be improved through K–12 education. This could also inoculate against the effects of disinformation and misinformation that exist online, particularly regarding climate change (Kelly *et al.*, 2022; CCA, 2023).

Enhancing coordination

Coordination of ocean research in Canada is challenged by geographic distances, distinct coasts, and varied research domains (CCA, 2013). The barriers posed by disciplinary, institutional, and sectoral silos within the ocean research community are well-documented and contribute to coordination challenges across the ecosystem. As one workshop participant noted plainly, “research conceived, executed, and siloed entirely within a single institution rarely leaves it,” underscoring the importance of fostering a willingness to cross silos. Workshop participants noted that, in the context of research impact, these coordination challenges can easily trickle down to individual projects and collaborations, as different actors may target different forms of impact. At a macro level, a lack of coordination can contribute to misalignment between decision-making processes and community needs. Scientific knowledge may advance more slowly than community knowledge, and a lack of timeliness can create challenges in aligning ocean management with community needs, thereby limiting impact.

Workshop participants identified several strategies to improve coordination.

- **Convening a national annual conference:** There is no domestic equivalent to the World Ocean Summit that could convene Canada's ocean research sector. Such a conference could strengthen Canada's identity as an ocean nation, be organized around specific themes and targeted outcomes, and support domestic uptake of innovations from abroad by attracting international participants. At a practical level, it could also reduce regional siloing of work, focus research on priority concerns, identify national gaps, and create national metrics of success for Canada.
- **Linking ocean research and policy:** Effective communication between researchers and government counterparts could promote uptake of a broader range of ocean research data and knowledge in policy-making. Research provides the evidence needed to support the enactment of global targets for ocean protection, which in Canada are operationalized through MPAs. Research also plays a key monitoring role.
- **Strengthening connections between government and the rest of the ocean research community:** DFO's Canadian Science Advisory Secretariat provides an important platform to elevate scientific research to science advice, for instance, by leveraging longstanding studies of juvenile cod data to

inform recent discussions on expanded fishing quotas (Lewis et al., 2022; DFO, 2025). Outside this forum, ocean researchers may struggle to access relevant partners within DFO or other relevant government departments and agencies (e.g., Environment and Climate Change Canada).

- **Supporting pathways to commercialization with enhanced coordination:** Tighter connections among researchers, industry, and investors could support commercialization efforts and improve the chances of scaling Canadian inventions domestically. In the absence of such supports, inventions can fail to reach the market or may be commercialized abroad, with the economic gains from domestic research strengths also being achieved outside of Canada. Some workshop participants suggested that a central coordinating body for ocean research could be the most effective way to establish a shared vision, operationalize the Blue Economy strategy, and enhance coordination. Participants were divided on how this might take shape. Some suggested that this body be distinct from DFO and other government bodies, allowing its mandate to be more narrowly focused. Others proposed advancing these goals via existing organizations. A network of networks was also proposed to improve communication and coordination at the regional and national levels. Any approach will face challenges, given that actors may be reluctant to relinquish power or accept greater centralization of control, there are considerable differences among the groups involved, and there are uneven levels of resourcing across Canada's three coasts.



The current approach to international collaboration and engagement in ocean research would also benefit from improved coordination. Ocean research is a global venture replete with transnational research activities and international consortia funded by both public and private entities (UNESCO, 2021b; Lewis *et al.*, 2025). Participation in international collaborations and major projects not only unlocks funding streams but can also provide access to infrastructure (e.g., vessel time) that is already difficult to obtain (ORCA,

2017, 2023). Fragmentation and the lack of a national vision curtail Canada's ability to have a cohesive approach to pursuing international partnerships (ORCA, 2017). Individual examples of research partnerships pursued at institutional or governmental levels are not lacking (e.g., UBC, 2025; ISED, 2026; U of T, 2026, most recently). However, in some peer jurisdictions, there are institutions whose mandates specifically include engagement with the international ocean research community with a unified voice (e.g., Ifremer, n.d.). Some CCA-MEOPAR survey respondents highlighted that funding models are generally inadequate to secure participation in major international projects, and that Canada's participation in such ventures lags that of peer countries. In one tangible example, workshop participants noted that the government had historically funded Canadian ocean researchers' participation in the work of the IPCC, but that support has since been discontinued, requiring researchers to use research funds for international engagement (Singh, 2025). These same participants argued that, given the stakes, ensuring Canadian participation should be a government priority and be funded accordingly.

Funding research for impact

During the workshop, participants reiterated several well-known barriers relating to academic culture and incentive structures that can constrain partnerships with Indigenous Peoples and coastal communities. Early engagement done well requires funding to build relationships prior to data collection, so that community priorities and Indigenous knowledge systems are centred from project inception. There is a need to ensure upstream funding to support the important conversations that happen in the early planning stages, as well as downstream funding to support knowledge mobilization and community benefit. Participants noted that some grant programs provide seed funding for precisely these purposes, but this practice is not consistently employed by research sponsors in Canada. One such program supported by SSHRC is OceanCanada, a long-term partnership grant in which 19 research groups are working together “to understand and address threats facing Canada’s Arctic, Atlantic and Pacific coastal-ocean regions and seek opportunities to develop a shared vision for the future of our oceans—one that promotes the health and well-being of people living on coasts as well as the marine environment” (OceanCanada, n.d.-b).

There are also promising developments within the scientific community that can support knowledge mobilization and community benefits. For example, the concept of research excellence is evolving and expanding to value achievements outside of academia (DORA, 2012; SSHRC, 2026; UCalgary, n.d.). Ongoing efforts to reform the evaluation of research excellence, such as the narrative CV, can further encourage research engagement outside of academia. At the workshop, participants suggested that placing greater value on the impact of graduate research relative to its novelty could also be helpful. They also noted that these reforms are likely to unfold in line with shifts in other countries, and that European work in support of the Coalition for Advancing Research Assessment is creating considerable momentum (CoARA, n.d.). Establishing knowledge mobilization as a project goal could serve as a stepping stone toward internalizing it as a project requirement.



Managing data

Ocean research both produces and relies on a wide range of regional and global data garnered from a variety of measurement and observation systems (UNESCO, 2021b). The increasing volume and rate of data generation in ocean research is a global issue, and many jurisdictions are struggling to keep pace with required investments in infrastructure and personnel to host the data and maintain its integrity and interoperability (NASEM, 2025). Moreover, ocean data can be dual-use, prompting efforts to define criteria and mechanisms to assess risks and manage access (CCA, 2025). Fragmentation and siloing of research along disciplinary or institutional lines create barriers in the effective sharing and uptake of data. The challenges are exacerbated by inequities in data infrastructure, particularly in Northern settings, which prevent the effective sharing of oceanographic (and other environmental) data, thus increasing barriers to accessing research (ITK, 2023). The CCA–MEOPAR engagement sessions and survey indicated that funding, infrastructure, and personnel are insufficient to overcome these barriers and adopt best

practices in research data management, including the widespread use of data standards and principles such as FAIR and CARE (Carroll *et al.*, 2021; GIDA, n.d.). FAIR principles speak to the importance of making data findable, accessible, interoperable, and reusable. CARE principles call for collective benefit, authority to control, responsibility, and ethics. Domestically, some of these principles are operationalized in part through OCAP³, the First Nations principles of ownership, control, access, and possession (FNIGC, n.d.). Workshop participants noted that there may be tensions between the FAIR and CARE principles. For instance, open data is more vulnerable to misuse. They suggested that one way to implement the CARE principles is through improved attribution. For example, meta-analyses need to be more considerate of how data are incorporated and where they come from, and co-authorship may be appropriate to ensure credit is given appropriately. Box 4.3 describes data labelling as an approach to uphold CARE principles.

Box 4.3 Labelling of ocean data by Indigenous Peoples

Data-labelling systems controlled by Indigenous Peoples can support continuous monitoring of the active research phase in compliance with the principle of data sovereignty (ONC, 2023). In 2023, Ocean Networks Canada (ONC) and the Canadian Integrated Ocean Observing System (CIOOS) piloted a labelling tool for datasets in collaboration with Indigenous coastal communities. Applying this labelling tool that was developed by Local Contexts, communities can create and apply a customized label to a dataset by adding “provenance information and contextual metadata (including community names), protocols, and permissions for access, use and circulation.” This labelling system allows for transparent but controlled accessibility of data in compliance with the principles of CARE for Indigenous data governance (ONC, 2023). These principles advance the cultural security of Indigenous data and help ensure that Indigenous Peoples control them and benefit from sharing them (Carroll *et al.*, 2021; GIDA, n.d.). Some researchers believe that the CARE principles represent an important foundation for working with Indigenous data and that they will evolve and mature as they are applied in Indigenous communities (Carroll *et al.*, 2021).

Adapted with permission by CCA (2025)

For many communities that partner with academic researchers, the CARE and FAIR principles are not sufficient for mobilizing research results or maximizing their impact. Engagement session participants noted a lack of support and incentives for creating tailored data products for knowledge mobilization. This gap hinders efforts to improve meaningful collaboration with Indigenous communities, in particular. Challenges also exist in leveraging ocean data to better understand maritime investment risks and opportunities for the Blue Economy (GDFA, 2023). Workshop participants noted that the need to better leverage data is closely related to coordination and collaboration. A lack of trust may discourage reliance on data from external sources.

³ OCAP[®] is a registered trademark of the First Nations Information Governance Centre (FNIGC). To fully understand these principles, see their website at <https://fnigc.ca/ocap-training/>.

Several parallel efforts are underway to advance progress on data-related issues. CIOOS provides a platform for mobilizing research data across Canada, potentially overcoming a key challenge raised multiple times during the workshop surrounding access to data in a timely and predictable manner (CIOOS, n.d.). CIOOS is also establishing standardized methods for data collection, archiving, and management to support interoperability and exchange. One workshop participant suggested that the private sector could play a role, given the untapped financial benefits of better mobilizing ocean research data.

The Basin-Scale Events and Coastal Impacts (BECI) project was similarly mentioned as a tool to deliver data products accessible to broad audiences (BECI, n.d.). BECI moves research from spreadsheets and databases into actionable, decision-supporting information, such as infographics, dashboards, and indicators, and provides thresholds for action on species of interest. Importantly, these products support subsequent discussions in other settings where the research is relevant. Similar applications have been developed by startups involving technologies developed in Canada to mobilize ocean knowledge faster and at scale (e.g., eOceans, Ward-Paige *et al.*, 2013, 2022). Recently published strategies by Ocean Networks Canada and MEOPAR each pledge to bolster infrastructure, facilitate open data and data-sharing, and support data-related knowledge mobilization (MEOPAR, 2025; ONC, 2025). Canada's Ocean Supercluster, meanwhile, provides resources for researchers and innovators to make use of a data registry hosted by the organization, as a component of a broader IP and data strategy (OSC, 2024a,b).

Strengthening and diversifying the talent pool

Canada has a longstanding track record for producing highly qualified personnel in ocean research (CCA, 2013). The CCA–MEOPAR survey reinforced the perception that the community considers



Workshop participants underscored the centrality of co-operative education opportunities, particularly at the graduate level.

Canada's human capacity for ocean research a relative strength. Nevertheless, there are specific opportunities to build on this strength. For example, during the engagement sessions, participants reported that existing programs and curricula generally struggle to prepare trainees to appropriately engage with communities involved in and affected by ocean research, and the place-based knowledges they hold. Trainees are also seen as having limited exposure to the entrepreneurial or business dimensions of ocean research, potentially curtailing or delaying their contributions to the Blue Economy upon entering the labour market. These reflect challenges institutions face

in designing educational programs that simultaneously meet the interdisciplinary needs of ocean research (particularly given its expanding overlap with climate research) while adapting to growing demands for job-readiness, including technological proficiency. Workshop participants noted that a lack of diversity in ocean research is limiting the talent pool and suggested that efforts to make academia a safer space for Indigenous students could help to remedy this.

Approaches to integrating practical and work-integrated learning experiences into training programs are considered promising. Workshop participants underscored the centrality of co-operative education opportunities, particularly at the graduate level. Such opportunities can improve the flow of knowledge

between academia and industry and improve workforce readiness among graduates. Participants suggested that such opportunities should be available to all graduate students working in ocean research. College-based marine technology programs may more directly support industry needs, and establishing and maintaining strong industry connections is also central in this context.

Engagement discussions also identified missed opportunities to integrate new data science and AI technologies in ocean research and suggested that exposure to such technologies in typical training programs is insufficient. Moreover, challenges exist in attracting trainees from data-related disciplines, despite the growing need for those skills across ocean research.

5

Closing Reflections

The overarching sentiment from workshop participants was that there was ample scope for enhanced impact and that the benefits of these efforts would be substantial. To conclude the workshop, participants were asked:

Ten years from now, assuming substantial improvements in the impacts and outcomes of ocean science are being felt across all coasts, what has gone right?

The varied suggestions reflected a few core aspirations:

- Recognition of Indigenous rights leads to enhanced roles for Indigenous Peoples in decision-making;
- Healthy oceans and coastal communities contribute to reconciliation and well-being;
- A thriving Blue Economy improves domestic sustainability and economic performance and enhances Canadian leadership on the international stage;
- A more connected research system enables responsive policy-making; and
- Improved ocean literacy contributes to a shared national identity of Canada as an ocean nation.

6

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