



STRATEGIC PLAN

2017-2022



MARINE ENVIRONMENTAL OBSERVATION
PREDICTION & RESPONSE NETWORK



 MEOPAR



Strategic Plan 2017-2022

MEOPAR Overview

Established in 2012 through Canada's federal Networks of Centres of Excellence Program, MEOPAR is a national network of academic researchers and students, government scientists, and partners in the private, NGO and community sectors working together on marine issues.

In March 2017, the Minister of Science, Dr. Kirsty Duncan, announced that MEOPAR would receive a further \$28.5 million in core funding to support the next cycle, from 2017-2022 (known as Cycle II).

An independent not-for-profit, MEOPAR works to identify and address the challenges and opportunities in the marine environment, working to advance knowledge and technology for the benefit of the Canadian society and economy.

This document provides an overview of the goals and objectives of MEOPAR, its scope, structure and activities.

After five years of operation, MEOPAR now includes many people, many partners, many activities and many academic institutions, and having this shared view enables each to act cohesively and in service of MEOPAR's mission.

MEOPAR

- Is hosted at Dalhousie University, with a Network extending across the country to every province and territory in a variety of disciplines.
- Funds research, trains students, mobilizes knowledge and communicates results in the area of marine risk and resilience.

Strategic Plan - Longterm Outlook

MEOPAR takes a three-phase view of its long-term outlook. The middle cycle bridges the start-up phase to our longer-term impact, with our role evolving through the lifespan of the Network.



CYCLE I (2012-2017)
Build Capacity



CYCLE II (2017-2022)
Strengthen Pathways



CYCLE III (2022-Indefinite)
Sustain Momentum

As a Network rather than an institute, we link centres of excellence together to bring about more effective leveraging of resources, training talent and mobilizing knowledge, rather than solely housing our expertise internally. Results are building as we work to develop the structure and approach needed for the long-term.

In its first Cycle, MEOPAR established organizational and network structures and programs; built new tools and cores for observation, prediction and response; created expert capacity; and developed new partnerships.

In Cycle II, MEOPAR is building on our first Cycle through meaningful research with a potential for real-world impact. We are working to create and develop our programming in the areas of training, research and knowledge mobilization; strengthen our national and international partnerships; and increase our Network's capacity in marine risk and resilience.

Our strategic plan for Cycle III is to sustain the momentum we have created and broaden our network with new partnerships and greater impact, with the goal of delivering benefit to the Canadian economy and society that will last beyond MEOPAR's lifespan.



Risks and Opportunities





The Changing Ocean

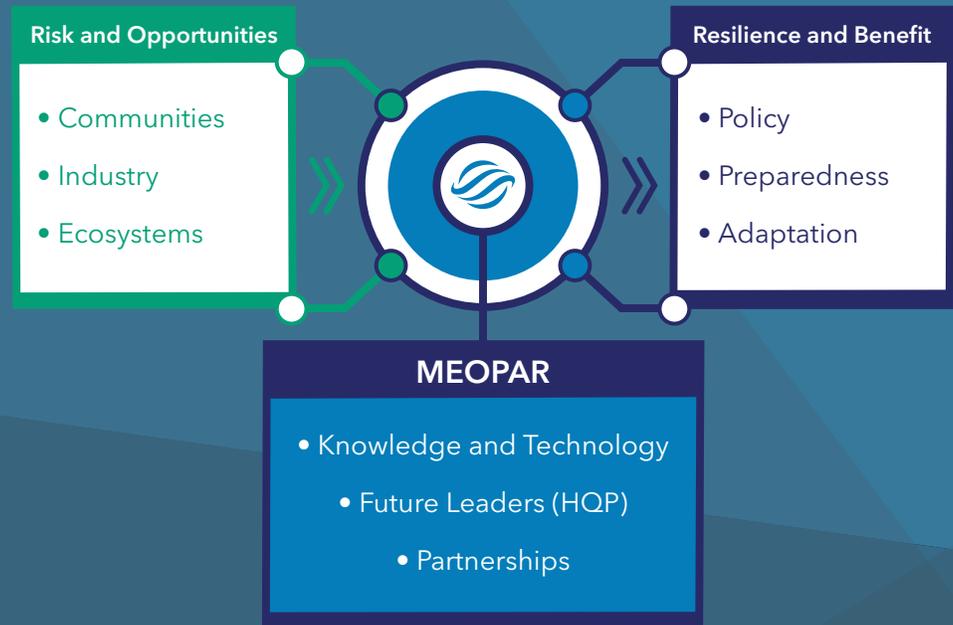
The marine environment has always presented humankind with great economic opportunities coupled to major risks.

These new and altered risks and opportunities are driven by natural systems and phenomena, including the effects of climate change, and exacerbated as a result of humankind's rapidly changing use of the ocean.

We can be passive and react as best we can, or we can proactively respond and better position the Canadian economy and society using research to find the answers.

Our future depends on an informed relationship with the changing ocean and coastal zone.

Changes in Environment and in Uses of Marine Environment



Risks and Opportunities

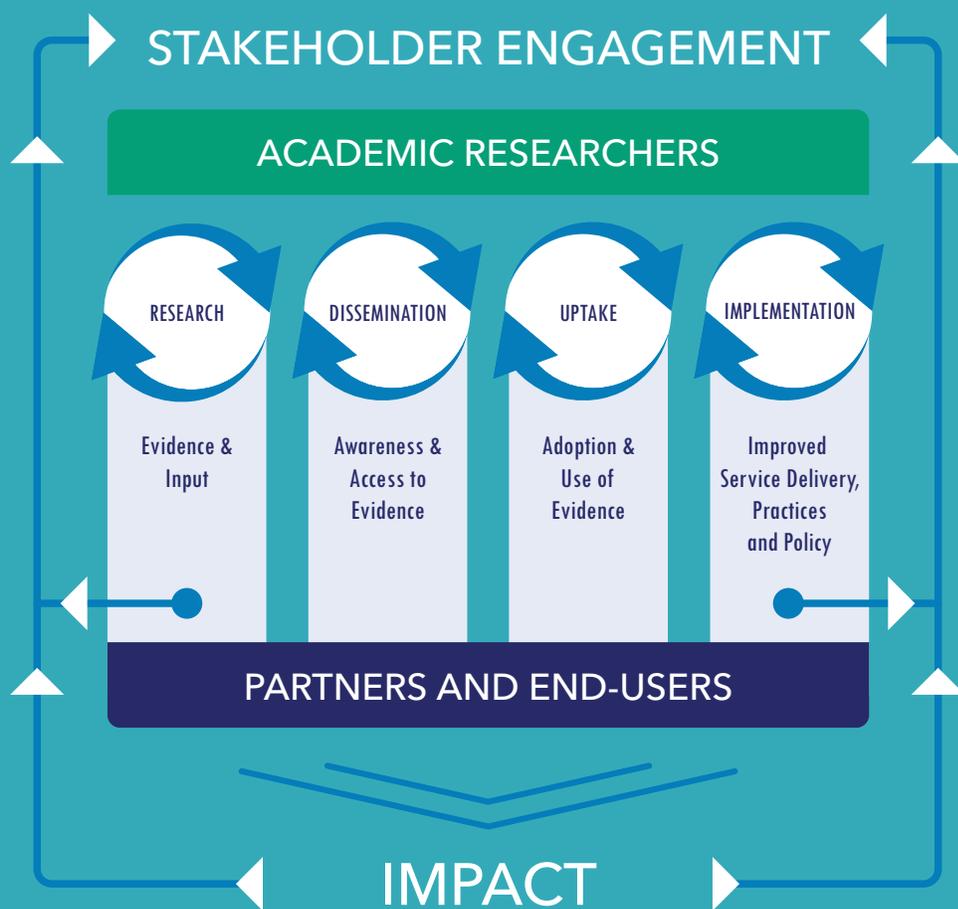
Climate change will have a profound impact on the ocean and its ecosystems because of the ocean's importance to the global climate system. Along with the risks this brings, there are also potential economic opportunities that arise, such as the potential for increased shipping in the Arctic due to melting ice. Canada will need to respond to changes in climate both through long-term adaptation and the identification of new economic realities, and short-term management of disasters.

The Importance of the Ocean to Canada

- Canada has the world's longest coastline, spanning over 200,000 km, of which over three quarters is Arctic. Canada's Exclusive Economic Zone covers 6 million square km of ocean, 2/3 the size of our landmass.
- Canada's geographic breadth brings with it a variety of environments, from mid-latitude temperate to high arctic polar.
- Canada's coastal communities depend on living and non-living resources that come from these vast and diverse environments.
- Canada is dependent on international trade: our Maritime Sector GDP was \$36 billion in 2012, and the value of marine trade shipped to and from Canada nearly doubled between 2003 and 2014.



Areas of Impact





Impacts are the contributions and value that MEOPAR's programs and investments create over the long term. MEOPAR has identified three impact areas to guide our activities over the next five years.

Impact Area 1

Competitive, Sustainable Ocean Industries

MEOPAR generates knowledge, tools and best practices to enable industry to be safe, competitive, environmentally responsible and efficient when operating in the ocean environment.

Risks and Opportunities for Ocean Industries

Canada's changing marine operating environment can compromise operations, complicate infrastructure planning, and affect efficiency. Science has the potential to inform ocean industries as they respond to challenges and take advantage of new opportunities generated by environmental changes.

Measuring Impact

The success of competitive, sustainable ocean industries will be seen in three ways:

1. Canada will leverage science and technology for sustained competitive advantage
2. Science will underpin risk-informed investment
3. Canada will improve its investment in science infrastructure

Impact Area 2

Government Ocean Policy, Regulation and Operations

MEOPAR researchers engage with government and industry in the generation and transfer of knowledge, approaches and qualified people.

Risks and Opportunities for Government Policy

The complex and changing nature of the marine environment can present significant challenges to the smooth and sustainable operations of industry and to effective policy creation.

Sound science is a fundamental component of informing decisions that lead to safe, equitable, and sustainable practices to minimize negative impacts on the marine environment.

Measuring Impact

The success of science and technology-enabled policy, regulation and operations will be seen in three ways:

1. Science will inform government decision-making, environmental protection and commercial operations
2. Canada will strengthen its international leadership
3. Canada will enhance business certainty through science-informed regulation



Impact Area 3

Ocean Science-literate Society

MEOPAR facilitates informed planning and adaptation to climate and ecosystem changes, and preparedness for marine hazards for governments, industry and civil society.

Risks and Opportunities for Society

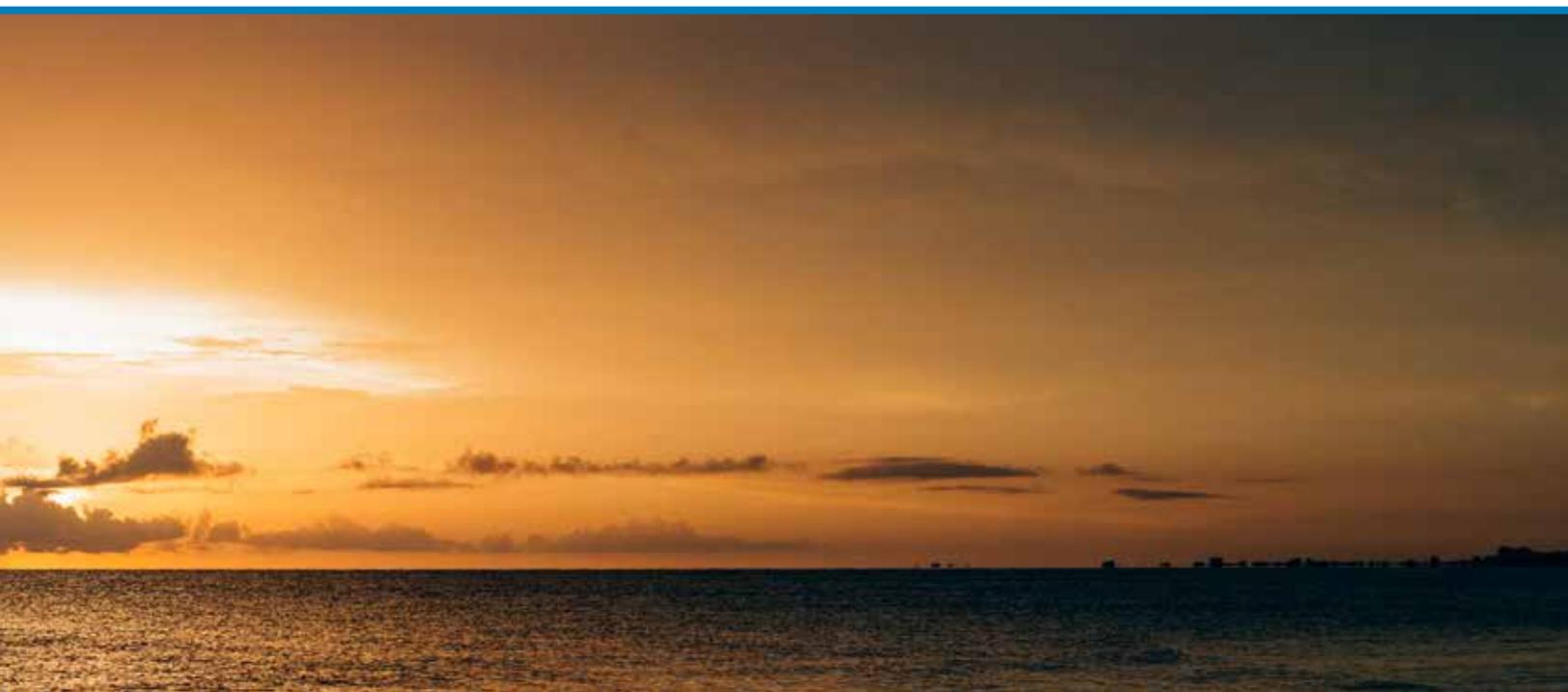
Canada's coastal communities, from cities to villages, are disproportionately affected by changing environmental conditions compared with inland communities.

Canada can manage risks and opportunities only when we better understand the profound influence of the changing ocean on the environment and climate.

Measuring Impact

The success of an ocean-literate and ocean-committed society will be seen in three ways:

1. Science will inform risk perception
2. Community grassroots adaptation will improve
3. Society's capacity for scientific knowledge will increase





Addressing Four Key Challenges



MEOPAR's Outcomes

MEOPAR's research and training programs for Cycle II seek to address risk, support sustainable economic development, and inform public policy decision-making in these four key challenge areas, each with a defined outcome.

Addressing these challenges requires a networked, multi-disciplinary approach capable of translating knowledge of the physical, ecological, economic and technological changes and phenomena associated with marine risk, into solutions that are of value for Canadians.

MEOPAR's nationwide network of researchers includes disciplines as diverse as climate science, marine genomics, satellite remote sensing, ocean engineering, marine ecology, meteorology, risk assessment, economics, planning, physical oceanography, statistics, and sociology.



Challenge 1: Ocean Observation

Observation is the Foundation

Understanding ocean processes requires data sets of sufficient spatial resolution and temporal scale provided by long-term monitoring programs and the ability to integrate data from various sources. Sustainable management of resources, marine safety, forecasting and other ocean services require rapid and open access to these data. We also risk losing data as formats and technology change; for example, one study found that as much as 80 percent of raw scientific data collected in the early 1990s is inaccessible. As such, the Ocean Observation challenge has two components: first, conducting observations in a very large, diverse and always-challenging environment; second, developing a way to assemble, integrate and disseminate that information as broadly as possible so that it can be put to effective use by a range of disciplines addressing many public policy challenges.

The Coordination Gap

Canada's ability to accurately understand and predict ocean conditions is directly dependent on access to high-quality ocean observations, yet observational data in Canada is currently scattered across dozens of different project-specific, local, regional and national networks.

"Despite the many instances of successful collaboration in Canada, coordination in key areas, such as ocean observation, is lacking ... There is no effective national-level mechanism to coordinate the allocation of resources and facilitate the sharing of infrastructure and knowledge among ocean scientists. This also hinders the sharing of resources and knowledge at the international level".

The Outcome that Meets the Challenge

Outcome: The establishment of a national, multi-sectoral approach to ocean observation and data management.

Challenge 2: Forecasting / Projection

Managing Marine Risk

Economic and societal use of the ocean is extending into regions where our forecasting ability is weak and/or conditions are changing rapidly (e.g. the North). We depend on forecasts and future projections to effectively manage risk and take advantage of opportunity.

How to Respond

Forecasting is used for short-term safety and efficiency. Projections enable longer term planning for assets and infrastructure. For example, accurate forecasting ensures that a particular vessel transit can occur safely, while accurate projections enable planning for optimal vessel design, route selection and port infrastructure. Together, these are the basis for evidence-based planning.

Forecasting and projections provide insight into the changing nature of hazards and risks, in order to inform the choices that society makes in the development of communities and socio-economic activities.

The Outcome that Meets the Challenge

Outcome: Improved predictability of ocean and atmospheric conditions on weather and climate timescales.

Challenge 3: Coastal Resilience

Vulnerability of Communities and Ecosystems

Canada's coastal communities and ecosystems face multiple challenges, including short and long-term climate changes such as storm intensity and frequency, and sea level rise. The Vancouver declaration on Clean Growth and Climate Change of March 2016 (clause 4) stated "Canada's northern and coastal regions are particularly vulnerable and disproportionately affected by the impacts of climate change." For communities to respond effectively to these challenges, decision makers must have access to the best available information regarding future changes and how they will interact with other social drivers and determinants of change, health, and sustainability.

How to Respond

Developing models that accurately predict changes at the community level is challenging. MEOPAR researchers are working to understand the effects of climate change and climate variability on communities, and to communicate what we know, what is at risk, and what is uncertain. MEOPAR is working to help people and their communities respond effectively to change - to both slow and sudden changes.

The Outcome that Meets the Challenge

Outcome: Adoption of methodologies for assessing the vulnerability of coastal communities and marine ecosystems to the impacts of climate change and ocean acidification.



Challenge 4: Marine Operations / Transportation

The Changing Landscape

The nature of marine transportation, marine resource extraction and offshore operations along Canada's coasts is changing rapidly: increased volume and vessel size, greater operational "reach" (e.g. into the Arctic) and exploitation of new sources of natural resources like oil and bitumen. Combined with changing public perceptions and tolerance levels on acceptable risk to the environment, these create altered risk scenarios and affect the efficiency of marine operations.

How to Respond

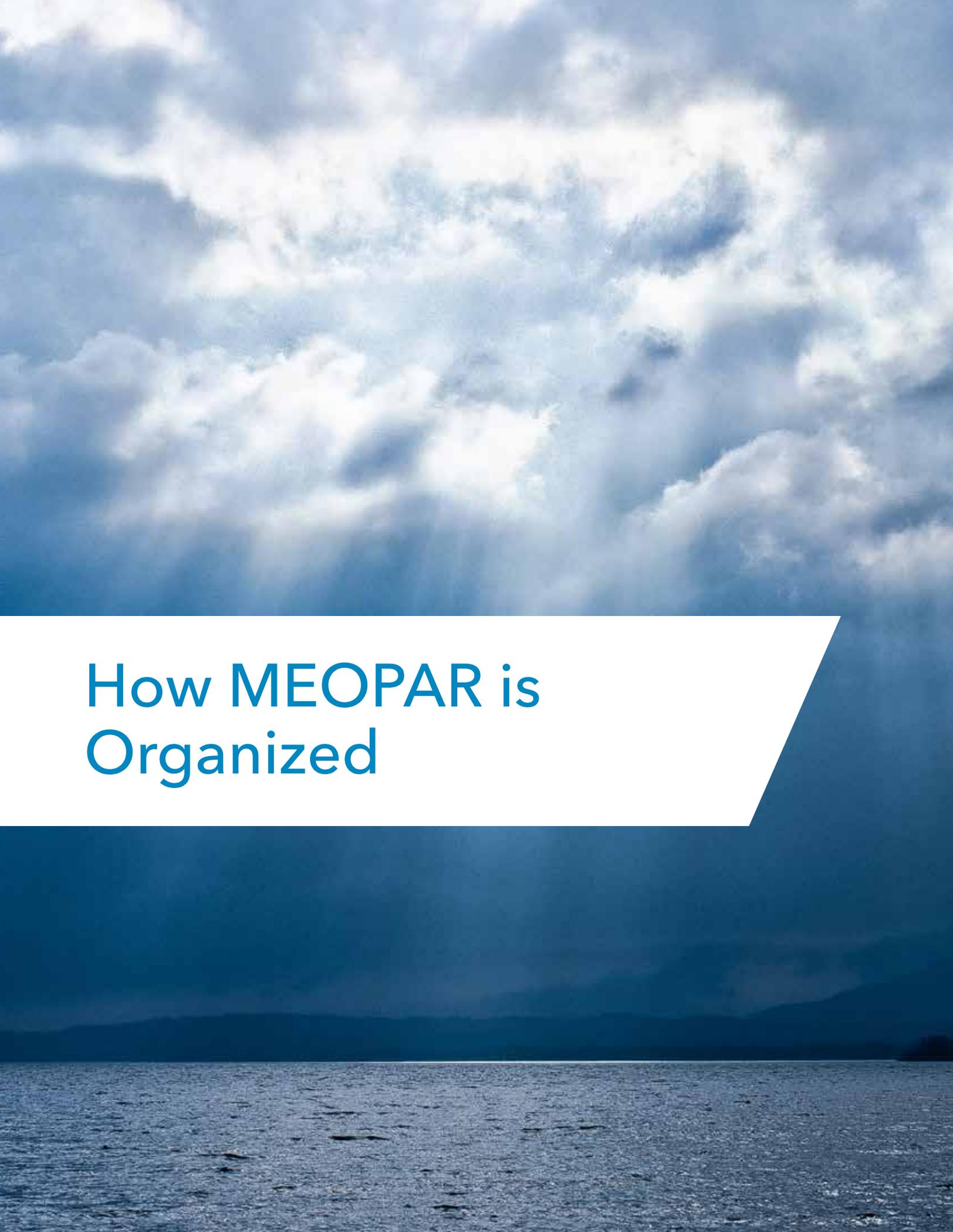
The probability of an accident occurring and the nature and severity of impacts depend on many factors - some controllable, such as through planning and safety protocols, and others less so, such as severe weather events, which are expected to become more frequent and intense in a changing climate. Effectively understanding and managing the risks to and from shipping are essential for the Canadian economy and social wellbeing.

There are risks both from ships and to ships. The national benefit to managing risks from ships includes not only the avoidance of the immediate consequences of an accident, but the maintenance of Canada's reputation as a responsible steward of the natural environment. Managing risks to ships- protecting marine transportation from natural risks- is essential to maintaining the Canadian economy and international competitiveness.

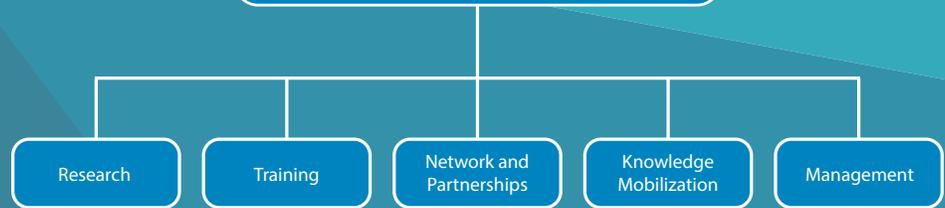
The Outcome that Meets the Challenge

Outcome: Reduced risk and improved efficiency for marine industry operations.





How MEOPAR is Organized



MEOPAR is organized into five main program areas:

1. Research
2. Training
3. Networking & Partnerships
4. Knowledge Mobilization
5. Management

Each program area is dedicated to addressing the four socio-economic challenges.

Research Program

Excellence of Research

The starting point for reducing risk and increasing resilience is knowledge of hazards and associated vulnerabilities, including how they change over time.

To Support Research

- In ocean observation and data management.
- That advances Canada's ability to predict ocean and atmospheric conditions on weather and climate timescales.
- In coastal community and ecosystem resilience.
- Into technology and data solutions that minimize risk and maximize efficiency of marine industry operations.



Thematic Structure

The thematic structure shows where MEOPAR’s research activities address the different marine risks. We use it to connect a wide range of projects and disciplines to each other and to users.

This is represented as a matrix defined by pressures (which create impacts or effects) and areas of vulnerability (which feel the impacts or effects). The areas of vulnerability allow MEOPAR projects to be readily linked to where (and by whom) impacts are felt and, therefore, can also be connected readily to end-user needs.

MEOPAR		Areas of Vulnerability		
		Coastal Communities	Marine Ecosystem & Living Resources	Marine Industries
Pressures	Theme 1 Environmental Change			
	Theme 2 Human Activity			

Theme 1: Environmental Change

This theme addresses risks and opportunities that arise as a result of marine environmental change. This includes risks associated with natural hazards such as wind, fog, earthquakes, icebergs, toxic algae outbreaks, etc. The impacts of these naturally hazardous phenomena are, in several cases, altered by human activity (e.g. by pollution or human-induced climate change). Research projects investigating the impacts of human-induced, large-scale environmental changes (e.g. ocean acidification, sea level rise) are also incorporated under this theme.

Theme 2: Human Activity

This theme addresses risks and opportunities arising from pressures that are a direct consequence of human activity within the marine environment and from technological change. This includes risk of ship collision, oil spills and offshore accidents as well as impacts of coastal development and locating of coastal industries.

Three Areas of Vulnerability

The areas of vulnerability feel the impacts or effects of the pressures.

Coastal Communities

- Large cities to small communities.

Marine Ecosystem and Living Resources

- The marine ecosystem itself, which provides valuable services and has its own inherent value. Industries that depend directly on living marine resources (e.g. the fishing and aquaculture industries).

Marine Industry

- Shipping, offshore oil and gas, tourism, ocean technology, the consulting sector, etc.

How the Structure Organizes Research

Some projects focus on particular hazards and are aligned with either Theme 1 or 2. Some will focus on preparedness and response of particular sectors, or the overall sustainability of a particular regional ecosystem, regardless of hazard, or addressing a range of hazards.

The thematic structure allows for flexibility in organization and assignment of projects to themes, and allows results to be aggregated in multiple ways. By considering the vulnerability of communities and sectors, MEOPAR is able to strengthen knowledge transfer from groups of projects to particular end-users.

The Research Core Model

Research projects are supported by three cores: the Observation, Prediction and Response Cores. The Cores allow for sharing of key expertise, instrumentation and knowledge transfer activities that are of general relevance to MEOPAR projects as well as to closely-related activities outside the Network. Cores provide technical support and central functions - in the form of equipment, technical expertise, technicians, training, and quality assurance.

Core activities extend beyond that of a typical project, supporting individual projects and playing an important role in knowledge mobilization.

Observation Core

The Observation Core promotes national and international sharing of data and expertise, and works to support the coordination of observation programs:

- Maintains and deploys technical expertise for ocean observation in strategic locations.
- Supports shared access to observing infrastructure.
- Encourages technological developments, knowledge sharing and training related to ocean observing.

Prediction Core

The Prediction Core houses expertise to support, develop, and apply models and approaches to prediction to make them more precise, region-specific, and interpretative of socio-economic impacts:

- Develops models.
- Delivers training on selected topics pertaining to numerical modeling and prediction.
- Maintains a code resource bank to help researchers improve their model coding.
- Provides project support and advice.

Response Core

The Response Core is a focal point for technical expertise, information and engagement on the impacts of marine hazards and opportunities for response:

- Develops shared information resources, such as a web-based database, to support response components of MEOPAR projects and external stakeholders.

Research Calls

In Cycle I (2012-2017), researchers in Canadian universities were invited to submit proposals that advanced the research priorities of MEOPAR. Through five research calls, 43 multi-year projects were funded.

In April 2017, at the start of Cycle II, MEOPAR had 21 projects continuing from Cycle I, and 16 new projects selected and initiated.

MEOPAR anticipates several additional calls for research in 2017 through 2022. To standardize our process, the call or calls are released in the month of September, with proposals due in November, decisions made in December, successful applicants notified in January, and funds flowing no later than April.

Partnered Research Calls

Throughout Cycle I, partnerships were built from the bottom up within projects. These relied on researchers contacting partners as they developed a proposal. As MEOPAR became more established, the Network started to play a greater role in connecting non-academic partner organizations with the research community. Towards the end of Cycle I, Irving Shipbuilding Inc. made a substantial investment in MEOPAR research by providing funds that initiated nine research projects.

MEOPAR is focusing on partnered calls in Cycle II as an efficient means to match the best researchers and ideas from across Canada with the interests, needs or capacity of the Network and its partners. The approach creates nationwide and international partnerships that bring together the key individuals and organizations needed to respond to complex Canadian challenges.

Cycle II has been initiated with calls that include six contributing partners. Building on the model of the Irving partnership, the Network is successfully leveraging considerable additional funding to undertake research in the four socio-economic challenge areas.

Benefits to MEOPAR Partners

MEOPAR's partnered calls provide non-academic partners with the ability to leverage research funds and research capacity. Partners can access an established, nationwide network of top researchers, and make use of a tested call-for-proposals, peer-review, reporting and grant management procedure. Investigators and the partner each benefit from the value-added aspects of a major research network, including: access to core expertise, training programs, related projects, project management and communication.

Partners can also contribute in-kind support to MEOPAR and its researchers. MEOPAR recognizes that there are many partners and end-users who are not in a position to contribute research dollars into a partnered call. MEOPAR is interested in proactively engaging with these organizations to better understand their needs and interests. By connecting them to the MEOPAR research program, we ensure that MEOPAR's work contributes valuable knowledge to address marine risks.

Scientific Integrity

Scientific integrity is a core value of MEOPAR's operations. In partnered calls, partners work with MEOPAR to define the specific research subject area. The MEOPAR Research Management Committee comprises scientific experts who ensure that the best possible objective science is produced.

All projects must directly contribute to achieving one or more of MEOPAR's four outcomes, and all undergo independent peer-review and follow MEOPAR's monitoring and reporting requirements.

Open Calls

The MEOPAR calls for proposals during 2017-2022 will also allow for proposals to fill gaps in the four challenge areas that are not covered by partnered calls, to ensure all four outcomes are achieved. The open components are where the needs of other partners and end-users can be addressed.

Training Program

Purpose of MEOPAR's Training Program

The capacity to observe, predict and respond to future marine risk depends on the academic and professional preparation of our Highly Qualified Personnel (HQP). MEOPAR provides HQP with multi-disciplinary training experiences that will enable them to be mobile, global citizens, employed within or outside of academia. This is accomplished through a series of specific training initiatives and HQP participation in research projects.

MEOPAR's Training Program familiarizes HQP with the full range of economic, social, and ethical implications of the Network's research by involving them in activities from the initial research discovery to its practical application. MEOPAR is training the next generation of inter-disciplinary marine experts to meet the needs of Canada's future ocean sector.

Training Program Objectives

- To create a pool of HQP with expertise to address complex marine issues in MEOPAR's four outcomes.
- To provide regional, national and international opportunities for networking and collaboration between HQP from different projects and fields of study.
- To increase HQPs' career-management skills, including communication, leadership, ethics and project management.



Training Program Initiatives

Early-Career Faculty Program

Provides a progression and retention pathway by funding research projects led by early-career faculty.

Employer Connector

Bringing HQP to potential employers.

MEOPAR Training Award

Support for self-identified training requirements.

Mentorship Program

Connecting HQP to mentors.

Post-doctoral Employment Fellowship Program

A funded fellowship with a non-academic employer.

Internship Program

Providing internships in industry and government.

Visiting Fellowship

Bringing international researchers to work on MEOPAR projects.

Networking and Partnerships

MEOPAR partners with organizations in two ways:

1. At the Network level, through partnered Calls for Proposals, workshops, Expert Fora, and special events;
2. At the Project level, through active collaborations with investigators, in-kind contributions of equipment, sharing of facilities, or provision of data.

We welcome the opportunity to partner with other Networks, industry, government and other organizations.

Networking and Partnership Objectives

- To establish partnerships between the MEOPAR academic community and organizations, including other academic institutions, industry, government, and not-for-profits.
- To connect the people in the MEOPAR network to each other, and to people in industry, government and not-for-profit sectors across multiple subjects, organizations and jurisdictions.

Partnership Tools

Please visit meopar.ca to see current tools and programs available.

Research Partnerships - MEOPAR seeks to partner on research projects related to our mandate. Partner involvement may include cash contributions, active research collaborations, or in-kind contributions such as equipment donation, equipment use, data provision or sharing of facilities.

Knowledge Mobilization Partnerships - MEOPAR works to mobilize the knowledge gained through research to provide value for Canadians. Partner involvement may include collaborating with MEOPAR researchers to solve a particular industry problem, finding real-world applications for research results, commercializing products and applications developed as a result of MEOPAR projects, or transferring knowledge and technology to end users.

Training Partnerships - Our Highly Qualified Personnel (HQP) participate in MEOPAR training in order to prepare them for successful careers. Employer tours, mentorships and connections help to equip students for the next steps in their careers, while also ensuring that employers have access to a well-trained and qualified workforce.

MEOPAR Events - MEOPAR regularly holds events to bring together Network researchers, partners, policy makers, industry and relevant communities such as the Annual Scientific Meeting, the Annual Training Meeting, workshops and Expert Fora. Partners may participate through funding or in-kind contributions, participating in the events as attendees, or contributing expertise through presentations and panel discussions.

Knowledge Mobilization

MEOPAR Activities Benefiting Canada

MEOPAR funds projects that will have an impact on end-users to benefit Canadian society and the economy. Knowledge mobilization is the process used to take knowledge out of the research phase and into the impact phase. Investigators doing excellent research must have a firm grasp of how and where the results can be mobilized.

MEOPAR activities are designed to positively affect public policy; government program and service delivery; community and industry operations; and commercialization and technology development.



Knowledge Mobilization Objectives

- To ensure MEOPAR supports research and activities that have the potential for impact and benefits for Canadians.
- To provide knowledge mobilization training, tools, techniques and funding opportunities to increase the uptake of MEOPAR research.

Knowledge Mobilization Tools

The Research Partnership Opportunity Fund enables partners to identify a problem/research need (or a commercial opportunity) and a potential researcher/project that can assist in solving that need, using MEOPAR funds to supplement the partner investment. This fund enables access to the MEOPAR network of researchers.

Communities of Practice disseminate findings and enrich research with interactions among researchers, practitioners, policy-makers, and community members and groups. It is also an ideal forum for informing MEOPAR researchers about leading edge developments, and identifying gaps and opportunities for new research.

Task groups are focused, short-term (usually less than 12 months) teams that are responsible for delivering a defined outcome (e.g. white paper, best practices guide, research gap analyses etc.).

Expert Fora provide opportunities for intensive exchanges of ideas and perspectives between researchers and partners/end-users and are used to communicate scientific findings directly with policy makers, industry and communities.

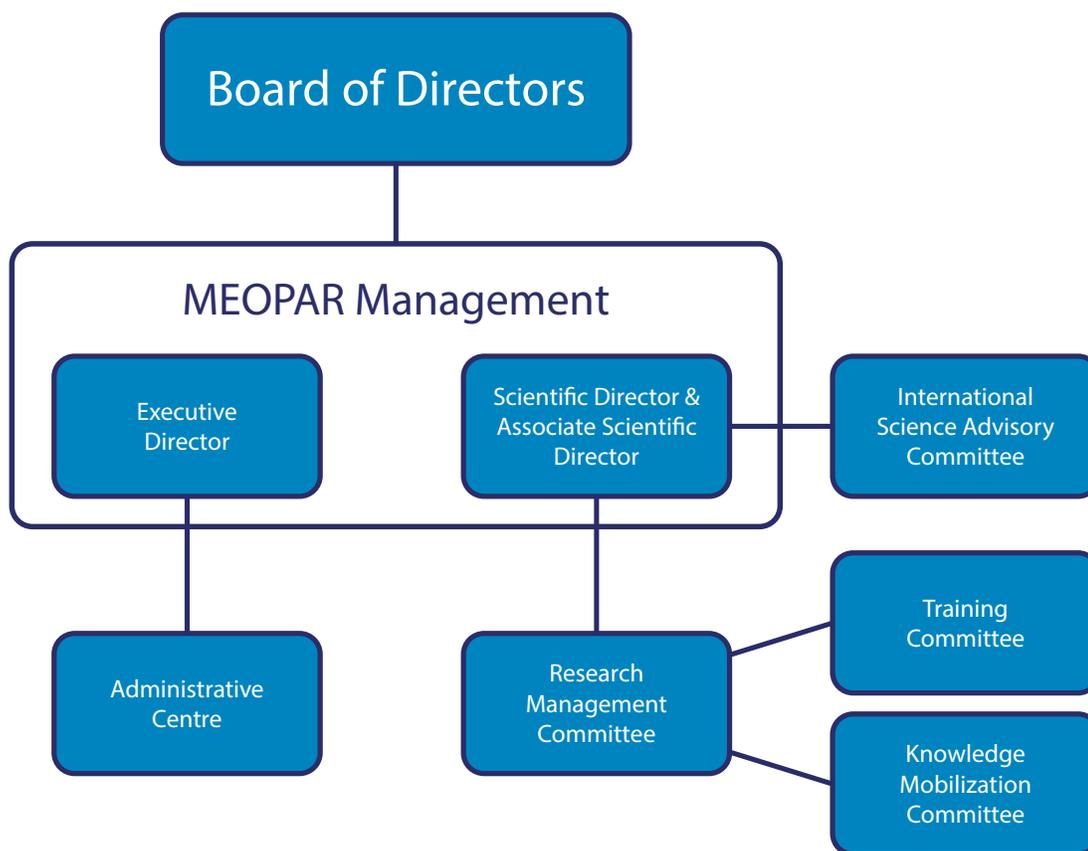
The Technology Development and Commercialization Fund is open to any MEOPAR research project demonstrating promising technology development or commercialization opportunities. The fund covers patent, trademark or trade secret costs; legal/professional fees; or market assessment studies.

KM educational resources provide tools and techniques for researchers and HQP to incorporate into their research projects.

Management

MEOPAR's Organization

MEOPAR is a federally-recognized not-for-profit corporation, hosted at Dalhousie University, with a Board of Directors that oversees the strategy and exercises oversight of operations. The members of the corporation are all universities with faculty who receive MEOPAR funds. The Administrative Centre provides the day-to-day business management of the Network.



Scientific Excellence

The International Science Advisory Committee provides strategic advice on MEOPAR's scientific direction. The Research Management Committee provides oversight and quality assurance (including peer review) on the execution and progress of MEOPAR's research and training programs. It is the primary research quality and evaluation body that reviews project proposals and core activities, recommending project approval and funding to the Board, and considers progress of each project.

Scientific Leadership

The Scientific Director and Associate Scientific Director provide science leadership to the Network. Working with the supporting science committees and the research theme leads, they ensure that research, training and networking and partnership activities deliver on MEOPAR's strategic plan and meet the highest standards.

Objectives

- To provide efficient and effective network governance and operations management.
- To provide sound MEOPAR financial management.
- To raise awareness of MEOPAR's activities to target audiences, including media, industry and potential future partners and end-users.
- To communicate MEOPAR activities to the Board, NCE, network participants, and other ocean organizations.



Conclusion

This document has outlined MEOPAR's strategic plan as it moves forward from Cycle I to Cycles II and III. As a forward-looking document, it is designed to complement our annual reports, which look back at the progress of our program areas.

The challenges and opportunities facing Canada in a changing ocean environment are too broad for any one organization to seize alone, and many organizations are performing excellent work in these and related sectors. It is for this reason that we are a network, bringing together people, partners and projects from across multiple sectors and regions. We believe that this approach will have greater impact than working in isolation, positioning MEOPAR's work to live on in our research impacts, long after individual projects end.

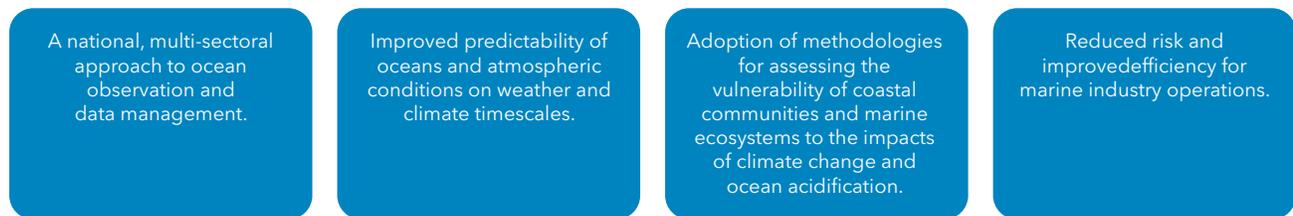
Appendix

MEOPAR 2017-2022

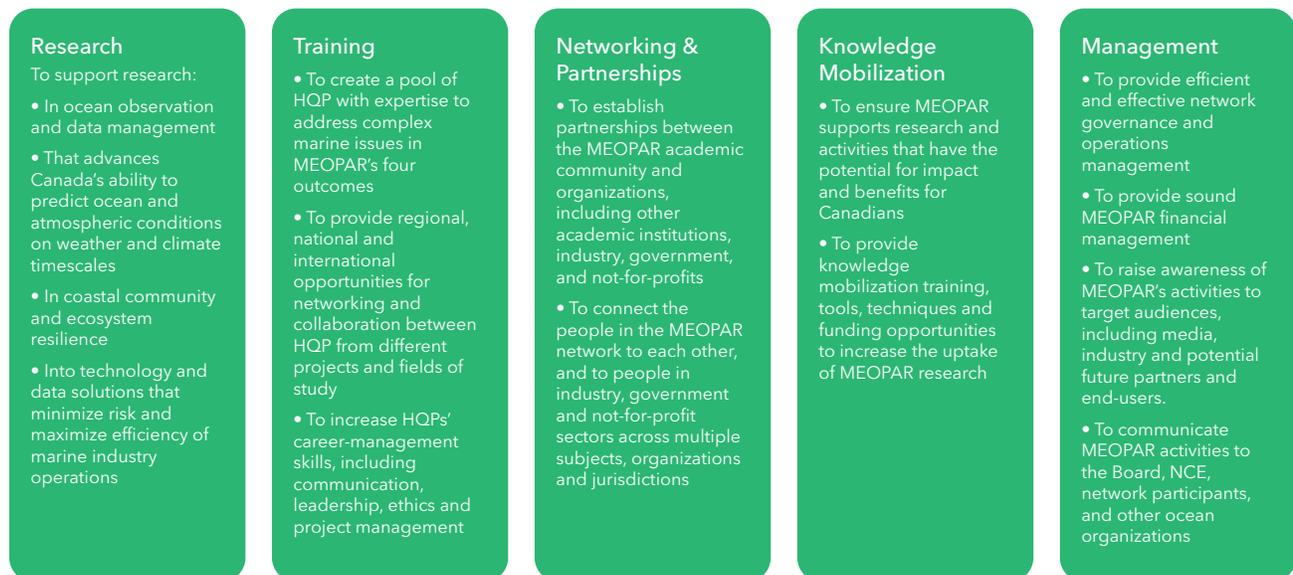
Impacts



Outcomes



Program Objectives



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BC Ferries

BC Ferries

