MEOPAR

What We Heard Report

Contents

About the Authors

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Mr. Munro runs his own consulting company, Trestle Networks Inc. with a focus on building bridges in Canada's Innovation Ecosystem.

Helen C. Joseph provides advisory and management consulting services primarily on science and policy issues of oceans, climate change, and the Arctic. To date, services have been provided to Canadian government and academic clients, as well as to international clients. Prior to this consulting career, Helen worked in the Government of Canada, retiring as a Government Executive working on the interface of science and policy in the area of ocean science; climate change and adaptation science; Arctic issues; and international ocean matters.

Executive Summary

Over the past months, consultations were undertaken with ocean science stakeholders via three different avenues so as to gain a broad base of insight. Discussions centered on the strengths of the current MEOPAR network that should be carried forward, as well as thoughts and ideas on future partners, priorities, and upcoming funding opportunities. In total, over 75 individuals provided their insight and guidance on the future directions of a new MEOPAR. The first consultation activity was a Webinar held during the MEOPAR Annual Scientific Meeting with the majority of participants representing the academic sector. This was followed by a Post-Webinar Survey that was broadly distributed and where respondents were from the academic and government sectors. Finally, one-on-one interviews were held with over thirty key individuals who are either directly involved with MEOPAR, active in ocean science activities in Canada, or are senior managers in government or industry. As expected, input varied across the three consultation activities depending on the type of engagement activity (e.g. online survey vs interviews) as well as by the respondent's sector (e.g. academic, industry or government). In combination, however, the above engagement activities provided an unprecedented insight into the successes of MEOPAR that might be considered for a future organization, into who new partners might be, as well as what their priorities could be. All of the above stakeholder engagement effort was done in the recognition that success will be measured by developing an agenda for the future that is relevant and impactful and that will attract sufficient resources to sustain the organization.

Across these different avenues of engagement, by far the most frequently cited success of MEOPAR is its ability to network and collaborate with a wide range of partners across space, discipline, and sector. It is evident that MEOPAR's track record is very highly regarded in relation to networking and bringing a consortium of expertise from numerous institutions and various disciplines together to work on a specific challenge. One statement read as follows:

"MEOPAR brings together students, researchers, and technicians focused on marine sciences and coastal communities in a way that no other organization in Canada can claim."

MEOPAR was described as bringing diverse aspects of ocean science together, to make ocean science in Canada more than the sum of its parts. The training opportunities that MEOPAR offers and facilitates for the next generation of ocean professionals are considered by many individuals as very successful. These opportunities have been provided to Highly Qualified Personnel (e.g. Masters, PhD, and Post-Doctoral students) as well as to Early Career Scientists enabling them to build their careers, develop networks, and be exposed to more senior scientists. The consultations frequently referenced the success of the MEOPAR Communities of Practice and their value in the ocean science community. They are considered as a strength of MEOPAR and have proven to be of real value

across the community. As well, the expertise gained by MEOPAR in the development of the Canadian Integrated Ocean Observing System (CIOOS) was considered as a major strength of the network. CIOOS is seen as a very good example of the collaboration, negotiation and networking skills that MEOPAR have achieved. Finally, the success achieved by MEOPAR in addressing challenges associated with an aging ocean-going fleet and its equipment, and the increasing costs of their operation, were recognized (e.g. National Research Vessel Task Team, and Modular Ocean Research Infrastructure (MORI) initiatives). With respect MEOPAR's scientific strengths, the most cited example was their ocean prediction activities including monitoring and observations, data management and analysis, both which drive better predictions on various time and spatial scales.

Across the consultations, the priority policy areas that were most frequently cited as areas for a future MEOPAR organization to explore included the Blue Economy, the UN Decade of Ocean Science, and Climate Change (e.g. the ocean-ice-atmosphere science around observing and predicting, as well as adapting and responding).

Future partnerships with ocean industries are seen as a major opportunity for a new organization. Initiatives, such as Canada's Ocean Supercluster and COVE (Centre for Ocean Ventures and Entrepreneurship), have come online since the start of the NCE MEOPAR in 2012. There was acknowledgement that these initiatives could present opportunities for ocean industry partnerships. In addition, new or expanded partnerships were also proposed with governments (expanded federal, and new provincial/territorial and local governments), insurance industry and Indigenous communities.

A wide breadth of funding opportunity ideas and approaches were identified for a new MEOPAR organization. These ideas ranged from specific funding opportunities within the federal granting councils (e.g. New Frontiers in Research Fund, Alliance Grants, etc.), to lessons learned from the ongoing COVID pandemic on the need to integrate national science efforts, to a membership/ subscription approach for knowledge access. It was generally acknowledged that the best approach in today's funding environment for a future MEOPAR organization would likely be to have a mosaic approach of different funding sources and different time frames. It was suggested that the focus of any funding, at least initially, should be on sustaining MEOPAR's Administrative Centre, which could then be used to find innovative ways to raise money and focus efforts for funding.

There was a need recognized for the new MEOPAR organization to fill an existing national gap and to become the national integrator or "national glue" within Canada that ties all the various ocean science organizations together. This would see an organization that could add value to the major ocean science players by linking them together along their respective strengths by increasing profile and capacity on any given subject, but also reduce competition and play to the respective strengths found in each organization.

Finally, the need for a new MEOPAR organization to develop a value proposition was frequently referenced in the consultations. The value proposition would need to identify challenges and support government policy and would then need to demonstrate how the new MEOPAR would go about developing the solution through networking, facilitating and collaborating across the ocean community, including academia, industry, government and network institutions.

Introduction

The Networks of Centres of Excellence (NCE) MEOPAR was initiated in 2012 and is scheduled to conclude by March 31, 2023. Developing a strategy to examine how MEOPAR might evolve over the next few years' demands active and ongoing consultation with the ocean community that has been involved with significant efforts in ocean science, ocean protection and sustainable ocean use initiatives over recent years.

A *Consultation Plan*[1] was developed that outlined the approach to obtain stakeholder input that would inform the development of a strategic plan for sustaining MEOPAR beyond the life of the NCE funding program. Underpinning the Consultation Plan activities was the preparation of a number of documents that supported overall consultation efforts to sustain MEOPAR. The report, *Assessment on Ocean Science in Canada*[2], examined the landscape of ocean science initiatives that were in place when MEOPAR was launched, followed by a selected set of ocean science initiatives, both domestic and international, that have come on-stream in the interim period. It also described several successful ocean alliances that provided insights on how MEOPAR might transform itself to a future beyond the NCE program funding. Overall, the Assessment Report provided a backdrop to the discussions around what role MEOPAR might seek to take on as it moves from the NCE program to a new future. In addition, a *Comparison Matrix of MEOPAR Achievements*[3] was prepared that reported on key initiatives undertaken by MEOPAR against the Socio-Economic Challenges and Impacts identified from the MEOPAR Strategic Plan. It provided a single snapshot view of MEOPAR to date and highlighted the organization's strengths, gaps, and potential opportunities.

The first activity undertaken to engage with stakeholders was the hosting of a dedicated Consultation Webinar, during the MEOPAR Annual Scientific Meeting (ASM). The Webinar solicited ideas and recommendations from the ocean community on the future of MEOPAR and also asked in-depth questions about who future partners might be, as well as what their priorities could be. After the ASM Consultation Webinar, a series of open-ended survey questions were distributed to many individuals within the ocean science community using the online Microsoft forms application. Finally, both prior to, and following, the ASM Consultation Webinar, interviews were conducted with key individuals who are either directly involved with MEOPAR, active in ocean science activities in Canada, or are senior managers in government or industry. The interviews provided an opportunity to gather advice from influential and knowledgeable people and to consolidate potential ideas for significant portions of the *Sustaining MEOPAR* strategy paper.

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1   Report: *Consultation Plan—Sustaining MEOPAR*, October 2020

2   Report: *Assessment on Ocean Science in Canada*, MEOPAR, November 2020

3   Excel Sheets: Comparison Matrix of MEOPAR Achievements, MEOPAR, November 2020

In total, the range of consultation activities engaged with, and received input from, 72 participants (see Figure 1). Almost half of the participants were from the academic sector, with government participants representing over one-quarter of the participants. The remaining participants were from industry (including consultants and industry facing organizations) and the "other" category includes not-for-profit organizations and networks such as Ocean Networks Canada, Ocean Frontier Institute, etc. All of the above stakeholder engagement effort was done in the recognition that success will be measured by developing an agenda for the future that is relevant and impactful and that will attract sufficient resources to sustain the organization.
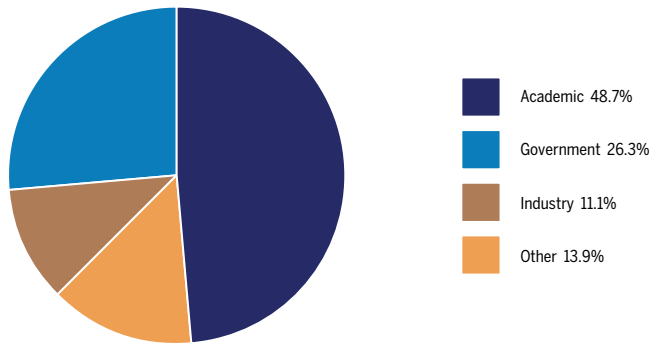

Academic 48.7%

Government 26.3%

Industry 11.1%

Other 13.9%

Figure 1: Break-down of Participants engaged in all the Consultation Initiatives

Annual Scientific Meeting Consultation Webinar

The Zoom-based Consultation Webinar was held to gain ideas and recommendations from the ocean community on the future of MEOPAR and in particular to gain insight into the strengths of MEOPAR, to explore potential partners and to obtain information on what the priorities of these partners may be. Real-time surveys provided focus to the webinar with all questions being multiple choice.

Three-quarters of the Webinar participants were from the academic sector, had received funding from MEOPAR, and had also partnered with MEOPAR for research purposes. A slightly smaller percentage, 70% had partnered with MEOPAR for other related activities (e.g. science training, networking activities, etc).

Half of the participants considered that MEOPAR was best at facilitating informed planning and adaptation to climate change planning and adaptation to climate and ecosystem changes, as well as preparedness for marine hazards for governments, industry and civil society. The top three responses for what was considered as the most valuable expertise within MEOPAR were: enabling networking and partnerships; conducting research (including activities of observation, prediction and response); and providing training opportunities.

In terms of MEOPAR's potential future clients and partners, the category of Government(s) was overwhelmingly considered the most likely sector, with Fisheries and Oceans Canada (DFO) seen as MEOPAR's strongest partner and supporter, followed by Environment and Climate Change Canada (ECCC), Transport Canada, and Natural Resources Canada (NRCan). Government's priorities were seen as widespread, including: Improved environmental predictions, Blue Economy and economic growth, and Emergency preparedness. In terms of what Government departments might want from MEOPAR, almost three-quarters of the participants felt that it would be policy relevant ocean science results for decision making, prioritized by current government mandates. When queried as to which province or territory might be most likely to become MEOPAR's strongest partner, the provinces of Nova Scotia and British Columbia were each identified at over 80%. Following these, were the provinces of Quebec and then Newfoundland and Labrador. The Blue Economy and economic growth were identified as the top priority for provinces/territories followed by public safety, environmental response, and then emergency preparedness.

Ocean industry was the second sector identified by respondents as key to a future MEOPAR. In delving into the marine transportation sector more closely, respondents replied that the group most likely to be a client or partner of MEOPAR would be commercial shipping, followed by fishers, ferry

operators or cruise ships, and offshore oil and gas operators. The purpose for this partnering was considered to be for current sea conditions and long-term climate change impacts (i.e. sea level rise, tidal changes etc.) followed by other marine hazard information and weather data/storm events.

Coastal communities were also considered as a sector that might be willing to invest in a future MEOPAR, with emergency preparedness considered their greatest priority. Public safety and environmental response were also highly rated.

In regard to Indigenous communities, the respondents rated several priorities in a near equal status - emergency preparedness and environmental response were the top two priorities, followed closely by improved environmental predictions, public safety, and understanding the ocean and ecosystems.

When asked about where a future MEOPAR should concentrate its efforts to obtain funding to support research activities, the majority of respondents felt that all of the funding agencies (e.g. Natural Sciences and Engineering Research Council (NSERC), Social Sciences and Humanities Research Council (SSHRC), and provincial granting agencies) should be considered.

Finally, in regard to what function academe could serve for a sustained MEOPAR, the overwhelming response felt that it was in the way of in-kind support (e.g. buildings and infrastructure), followed closely by scientific collaboration.

Post-Webinar Online Survey

After the ASM Consultation Webinar, a series of open-ended survey questions were distributed to the Webinar participants, ASM attendees, as well as to members of both the MEOPAR Research Management Committee and the MEOPAR Board using an online Microsoft forms application. These questions were intended to delve more deeply into the subject of the status of ocean science in Canada. They were not multiple choice and allowed recipients to freely form responses.

QUESTIONS ON OCEAN SCIENCE IN CANADA

Note: In responding to the questions in this section on Ocean Science in Canada, several respondents considered the question as relating specifically to MEOPAR and not (as intended) in relation to ocean science more generally in Canada.

1.   Are all the activities coordinated as well as they could be?

The responses were mixed in that some felt that more coordination is needed, stating that clearly there are many gaps and lacking structures to review and support coordination. However, others felt while there is always room for improvement in coordination that MEOPAR was really good at coordinating ocean science activities.

In this section, several respondents stated that there were opportunities for more coordination and linkages between the MEOPAR Cores; that the Cores could work together towards some shared goal(s) that are not currently being taken advantage of. The Cores were described as operating independently of one another for the most part but that they should be highly dependent on one another. Better coordination between the MEOPAR Communities of Practice was also suggested, so as to enable best practices and lessons learned to be shared.

Other responses stated that there was room for more coordination in national ocean science as the provinces tend to work in silos and that even within the federal government, there appears to be no coordination amongst the various departments. The value of the training activities and workshops was emphasized by others; as well as noting that there is room for more linkages between science disciplines, training and outreach, and also in finding ways to coordinate academic research and industry.

2.   Are there gaps in our overall approach to ocean science, protection, and use?

At the national approach level, it was stated that there seems to be a disconnect amongst the different ocean sectors when it comes to priority, efforts and long-term vision. Others suggested that there was a need for more communication and that relevancy/connectivity to industry should be considered.

Other areas of gaps that were identified included access to satellite oceanography in which Canada has invested heavily; the Arctic, where stronger partnerships with relevant federal government departments should be necessary; ocean and coastal governance responses; as well as linkages from local to global scales not being emphasized as much as they could be.

3.   What else should we be doing?

The need for more communication was identified, suggesting the need to regularly communicate both the goals and achievements of MEOPAR; as well as improving the MEOPAR web site to showcase not only who is researching what, but also to address why this work is important to Canadians. There were suggestions that more effort is needed to present the value of the science done through MEOPAR to various groups of stakeholders; and, that more work should be done with regard to working with Indigenous people. There was a comment that while MEOPAR has built an excellent network within Canada, more collaboration with international partners should be encouraged. Another suggestion was that specific workshops should be conducted in subject areas that would link together researchers from different provinces and create closer ties. They stated that some of these linkages were made during workshops and online/in person presentations, but one of the strengths of MEOPAR is to bring researchers from all over Canada together, who might otherwise not be tempted to collaborate. The development of a framework for MEOPAR was suggested that would assess the quality and impact of science. The example of the Canadian Academy of Health Sciences framework[4] was referenced that identifies three impact categories: advancing knowledge, capacity building, and informing decisions. Each category has sub-categories and key performance indicators could be applicable to MEOPAR. Finally, the work of the National Research Vessel Task Team was cited as a successful initiative that needs to be continued.

4.   How do we sustain these efforts?

In regard to funding, it was suggested that the focus of any funding, at least initially, should be on sustaining MEOPAR's Administrative Centre, which could then be used to find innovative ways to raise money and focus efforts for funding (e.g. the creation of the Fathom Fund by the Centre). It was stated that MEOPAR's research program is excellent and the training opportunities highly valued by students and post-docs. This should ideally be maintained. In addition, it was noted that both Canada and coastal provinces would benefit if decision-makers could be tied into MEOPAR's work. Structured dialogue activities would allow researchers and administrators to exchange ideas and give added value to the research undertaken by exploring its significance and practical use for decision-making. The need for additional communication efforts was again highlighted, stating that there is a need to show more of the value of the work accomplished through MEOPAR. One suggestion was to start a series of virtual meetings with one or two groups presenting on their activities; and perhaps presentations being made to coastal communities or industries to determine their needs.

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4   Making an Impact – A Preferred Framework and Indicators to Measure Returns on Investment in Health Research, Report of the Panel on the Return on Investments in Health Research, January 2009. Canadian Academy of Health Sciences Framework -- https://cahs-acss.ca/wp-content/uploads/2011/09/ROI_FullReport.pdf

SPECIFIC QUESTIONS ABOUT MEOPAR EFFORTS

1.   What expertise does MEOPAR have?

Many of the respondents spoke of the ability that MEOPAR has to connect people across space, discipline, and sector. The expertise of MEOPAR to link science and applications/impacts was considered as excellent and possibly unprecedented in Canada. MEOPAR was described as very good at connecting scientists to their communities and stakeholders, and as having created a great network of researchers all over the country. Another common theme expressed by respondents was the expertise of MEOPAR related to collaboration. The ability of MEOPAR to collaborate across-Canada was emphasized, as was the ability to know who is doing what across Canada and who best to talk to in order to get things done. The collaboration of natural science – social science was cited as excellent with co-projects, and co-publications. An additional reported area of collaboration was that of collaboration amongst sectors – academia, government(s) and industry. One statement read as follows: "MEOPAR brings together students, researchers, and technicians focused on marine sciences and coastal communities in a way that no other organization in Canada can claim". Training was also identified as expertise within MEOPAR, as was the expertise in Knowledge Mobilization. From a science discipline perspective, MEOPAR's expertise was noted in the areas of ocean modelling, strong marine research capabilities in numerous areas, and in all areas of ocean observation, prediction and response.

2.   What is MEOPAR's niche in the ocean science community?

The multidisciplinary and interdisciplinary characteristics of MEOPAR to address science issues was frequently referenced, noting the ability to link the academic community with government, industry, provinces, NGOs, communities. The pan-Canadian nature of the NCE was also reported by several as a niche as it gives to MEOPAR a "cultural" characteristic that is not found in other scientific communities. In regard to scientific disciplines, it was noted that MEOPAR has a niche in the construction and validation of ocean models, ocean prediction development, and climate change science.

3.   What does MEOPAR do best and why should governments, partners, industry and granting agencies support it?

In response to what MEOPAR does best, it was described as follows – "MEOPAR ties the many threads of ocean and coastal science together into a cohesive and comprehensive body. From micro-organisms to coastal communities, from ship-based to satellite sensors, from data to policy, MEOPAR addresses nearly every aspect of coastal science in Canada and helps coordinate researchers to address shared goals." The themes of coordination, networking, and integration were repeated in various ways by almost all the respondents. MEOPAR was described as bringing diverse aspects of ocean science together, to make ocean science in Canada more than the sum of its parts. Another wrote that MEOPAR could connect the research community across Canada by creating, facilitating and supporting collaborations and leveraging funds. MEOPAR was seen as good at leveraging collaborations to do more than any sector, location, discipline could do on their own. And that the NCE provided the training and research partners for academics to stretch into new areas and make substantial contributions, thereby providing a place for more applied research. In a similar perspective, it was stated that MEOPAR allows for important research to occur, and then works to get that research out to the needed stakeholders. Given its links and partnerships, MEOPAR can generally do this better than a single granting council such as NSERC.

4.   What is it that MEOPAR is really good at?

Many of the respondents replied that MEOPAR was really good at building scientific collaborations across the country, by bringing good people together to do good science. One of MEOPAR's strength is its diversity and opportunity for collaboration across fields, organizations, and geographies. Another respondent spoke of MEOPAR's ability to consider multiple aspects of ocean science, from oceanography, to modelling, to social science, and Indigenous knowledge. In addition, MEOPAR's ability to identify common problems and to take a leadership role in kick-starting research was reported by one respondent. The example of MEOPAR's work on CIOOS was cited as an example here. The excellent opportunities provided for Early Career Scientists by MEOPAR was noted - both in terms of funding and networking. The latter is especially valuable to HQPs given that the collaboration often occurs between governments and industry, instead of just within academia. Another area that MEOPAR was identified as being very good at was in the development and coordination of innovative research activities; linking these with HQP training activities, and workshops for members.

5.   MEOPAR has three areas of concentration — monitoring; modeling and prediction; and focused response. Where do you think the future of MEOPAR should concentrate?

The responses were as follows: Monitoring – 10; Modelling – 12; and Response – 15.

Questions about MEOPAR's Potential Partners and Clients

INDUSTRY

When asked who might be considered as potential industry partners, the range of responses was quite broad. However, the most frequently referenced industries included shipping and ports, transportation and ferries, fisheries and aquaculture, tourism and recreation, offshore resource extraction (e.g. oil industry). In regards to the question about what purpose and priorities industry might partner on, respondents noted that further engagement and discussion would be needed to determine this but these could generally include: environmental pollution mitigation and adaption; emergency response; impact of climate change on marine species; tracking ship traffic, reducing conflicts, prediction of demand, prediction of dangers (e.g., oil spill, animal contacts); and, potential impacts to ports, transportation system, logistics in the event of a major coastal hazard event. Finally, in response to the question concerning work industry would be willing to fund, the responses were clear that industry will fund their priorities and again noted that these priorities still need to be determined. However, statements were made that industry priorities might include: adaptation to climate change; environmental impact assessment; integrated coastal development; preservation of ecosystem values; impacts of ships on wildlife; and, environmental monitoring activities.

GOVERNMENTS

Respondents were quite consistent in identifying the following federal government departments as the most possible Government partners: DFO and the Canadian Coast Guard, ECCC, NRCan and Transport Canada. Less frequently noted were the Department of National Defence and the Royal Canadian Navy. At the provincial level, several respondents identified provincial organizations in British Columbia (e.g. BC Emergency Preparedness) but not in other provinces. It was observed that municipal governments are possibly more important than provincial governments as they have direct interest in impacts in their local waters. Regarding what purpose Governments might partner, there was a range of responses in the survey, but the responses generally related to Government's need for better and more reliable information that help them to address their priorities and mandate. Possible areas of priority could include: climate change adaptation (e.g. DFO, ECCC, and NRCan); needs of observations and predictions for operational marine forecasts; needs for skilled future employees/ scientists; and any initiatives that cannot be led or housed within their organizations. Another observation was that most of the Government's research efforts focus on the east and west coasts, but less so on the north coast, and perhaps a future MEOPAR would be able to fill in this gap.

ACADEME

In response to the question of who academic partners might be, the respondents generally agreed that these are the universities on the east and west coasts and somewhat less in central Canada and that these included undergraduate and graduate students, post graduate researchers (research assistants/ PDFs), professors, industry scientists, and associated government scientists. In regard to what purpose might academe partner, there was a range of options identified including access to funding; equipment and other facilities; networking; collaborations; leverage; HQP training opportunities; expansion of research horizons; as well as emerging areas where academe could demonstrate relevance to their work. For the question, what work might Academe be willing to fund or seek funding to support, it was noted that academe really do not fund work but that they can provide the following: in-kind support (e.g. equipment, ship time, etc.); skilled, educated students and faculty; assistance in seeking funding; as well as the knowledge and skills for funded research.

COASTAL COMMUNITIES

In defining who coastal communities might be, these were described as including: communities situated near, or reliant upon access to the coasts; communities vulnerable to coastal and marine hazards; and communities focused on tourism and recreation along our coasts. More specifically, they were described as including municipalities, local service districts, planning commissions, associations and public or private entities like ports, etc., all of which are interested in the climate and environmental conditions affecting their operations. It was noted that the communities vary across the country and so they will have different structures and needs. It was also emphasized that these communities along the coast need to include both Indigenous and non-Indigenous. In regard to what purpose coastal communities might partner, these needs were identified as: better understanding of shared coastal/ marine environments; environmental protection; protection of marine transportation and shipping

access; preparedness and response to coastal/marine hazards; job creation and protection as well as risk management, response preparedness, prediction of what might come in the future (prediction) regarding the impact of climate changes on their community. Finally, in response to what work coastal communities might be willing to fund or to seek funding to support, these topics included: a better understanding the impacts of changing marine environments on their communities; opportunities to enhance economic sustainability that is balanced with ecological sustainability; as well as infrastructure improvements, reinforcements, and upgrades, coastal monitoring and coastal hazard response and preparedness.

INDIGENOUS ORGANIZATIONS AND COMMUNITIES

The respondents were in agreement, when replying to who Indigenous organizations and communities are, stating that they are as varied as coastal communities across the regions. In addition these Indigenous communities are, in many cases, people who have lived and depended on the sea for generations. In regard to what issues Indigenous communities might partner, it was noted that the issues are likely the same as for other coastal communities and possibly include climate change adaptation of coastal communities, adaptation and emergency measures planning. It was noted that the structure of the interactions and needs will differ for Indigenous communities. When asked the question regarding what work Indigenous communities might be willing to seek funding for, it was noted that priorities would need to be co-identified and work activities co-designed with the communities. Suggestions for topics included: pilot projects in climate change adaptation planning; sharing knowledge, experiences and science to understand the impacts on their communities and traditional life; as well as opportunities to increase Indigenous research leadership, and the ability to influence policy.

FUNDING AGENCIES

Most respondents stated that the federal tri-council of granting agencies could be the most significant potential funders, particularly NSERC and SSHRC. The Canadian Foundation for Innovation was also mentioned by several as another potential source of funding. Provincial agencies were rarely cited by respondents but opportunities were seen to exist with provincial non-government organizations (e.g. Pacific Salmon Foundation, Pacific Wildlife Foundation). With respect to specific available funding programs, respondents most frequently identified the New Frontiers in Research Fund and the Alliance Fund as possibilities. Connection Grants and Partnership Grants were also referenced, as were possibilities of international partnerships (e.g. European Union). In response to the question regarding how future MEOPAR science priorities fit possible program criteria, the lack of a coherent and comprehensive ocean strategy for Canada was noted as a challenge, and that it would be easier for program alignment and coordination if such an overarching strategy existed. Others saw that a patchwork of funding sources would be necessary from various sources, and/or the government could be encouraged to re-consider large funding envelopes.

Final Question - Is there any other advice that you would like to provide that will help sustain MEOPAR?

It was noted that the future MEOPAR should focus on its strengths, build partnerships, and build around unique strengths that it is good at and that are not done by others. One of the strengths that could be built upon was MEOPAR's ability to create interdisciplinary projects that would not be funded through NSERC or SSHRC. The need for a future MEOPAR to become more visible, more communicative with potential stakeholders, and reactive to small local needs was suggested as well. Consideration was suggested for MEOPAR to seek direct financial support from DFO and NRCan, as well as seek linkages with other networks with overlapping priorities such as Coastal Zone Canada, Réseau Québec Maritime or ArcticNet.

One-on-One Interviews

One-on-one interviews were conducted with over thirty key individuals who are either directly involved with MEOPAR, active in ocean science activities in Canada, or are senior managers in government or industry (see Annex 1 for Listing of Interviewees). These influential and knowledgeable individuals were generous with their time and willing to share their insight on the strengths and successes of MEOPAR to date, as well as exploring future possibilities for a new organization. The interviews provided an opportunity to gather advice from and to consolidate potential ideas for significant portions of the Sustaining MEOPAR strategy paper.

Common Themes on MEOPAR's Current Strengths

Throughout the interviews there were several common themes on MEOPAR's current strengths, relating to functions within the NCE that should be considered to be carried forward into a future organization. These strengths included: Networking, Communities of Practice, Training, CIOOS, and the Coordination of Research Vessels. In addition to these strengths, there were also common scientific disciplines that were identified in the interviews as having been very successful within MEOPAR. This latter category included ocean prediction activities including monitoring and observations, data management and analysis, both driving better predictions on various time scales (see also under CIOOS below). Another success that was referenced was the work conducted by MEOPAR researchers on the endangered Right Whales on the east coast, citing MEOPAR's ability to test drive new monitoring techniques and ideas, develop an operational approach and then undertake knowledge mobilization to government managers (e.g. Fisheries and Oceans Canada). An analysis was undertaken by conducting a word search in the interviews to determine the number of times certain MEOPAR strengths and/or future opportunities were explicitly mentioned. These results are shown in Figure 2.

CIOOS 34
Policy 32
Training 11
Collaboration 14
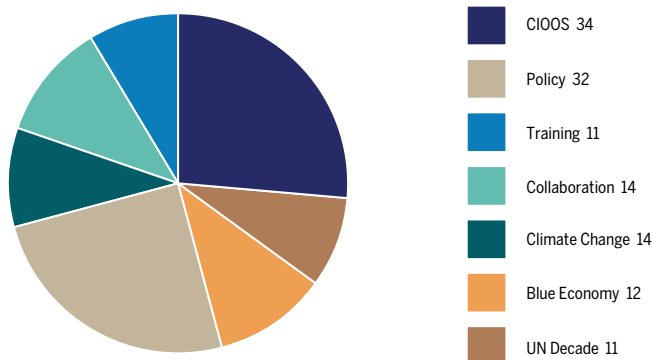Climate Change 14
Blue Economy 12
UN Decade 11

Figure 2: Word Search on Terminology Used in Interviews

Throughout the interviews there were several common themes on MEOPAR's current strengths, relating to functions within the NCE that should be considered to be carried forward into a future organization. These strengths included: Networking, Communities of Practice, Training, CIOOS, and the Coordination of Research Vessels. In addition to these strengths, there were also common scientific disciplines that were identified in the interviews as having been very successful within MEOPAR. This latter category included ocean prediction activities including monitoring and observations, data management and analysis, both driving better predictions on various time scales (see also under CIOOS below). Another success that was referenced by one interviewee was the work conducted by MEOPAR researchers on the endangered Right Whales on the east coast, citing MEOPAR's ability to test drive new monitoring techniques and ideas, develop an operational approach and then undertake knowledge mobilization to government managers (e.g. Fisheries and Oceans Canada).

NETWORKING STRENGTHS

By far, the most frequently cited strength within MEOPAR is its ability to network and collaborate with a wide range of partners. It is evident that MEOPAR's track record is very highly regarded in relation to networking and bringing a consortium of expertise from various institutions and varied disciplines together to work on a specific challenge. They were observed to be able to build collaborations with multi partners rather than the classic of one partner at a time. One interviewee described MEOPAR's networking success as "federating the ocean science community" in support of important ocean actions. There was a clear desire amongst the interviewees that a future organization needs to maintain and grow this networking skill set and to put it to work across federal departments, provincial ministries, ocean industries, academia, and other networks (e.g. ArcticNet, Ocean Frontier Institute (OFI), Ocean Networks Canada (ONC), Réseau Québec Maritime (RQM), etc.).

It was noted by one interviewee that a key benefit of the NCE MEOPAR was that their funding could be shared, and how MEOPAR developed ways to leverage these funds that went well beyond the simple dollar value of what they brought to the table. It was commented that the NCE funding provided to MEOPAR put them in a position to attract partners because they could put resources on the table, enabling them to incentivize groups and connect between silos of funding. The individual added that this has allowed MEOPAR to provide significant focus to their work in terms of excellence, relevance and usability. Another interviewee commented that the funding provided for MEOPAR's administrative infrastructure that enabled the facilitation and nurturing of various partnerships — this is also important to be successful.

Many interviewees clearly stated that much of the success achieved by MEOPAR is an off-shoot of their networking and partnering efforts. Networking could be considered as both research coordination as well as coordinating research management across the community. MEOPAR was described as having facilitated a pan-Canadian approach to research in ocean science, where there is now easy collaboration across disciplines, across sectors and across agencies and there is space to negotiate solutions and priorities to issues. One interviewee noted that the coordination in ocean science across the country has improved under the NCE MEOPAR and that governments need to realize the importance of the networking achieved by MEOPAR, adding that the success of this networking was considered especially important as Canada wants to grow our capabilities and be more

recognized internationally. Several interviewees stated that the networking skills and the successful track record in this area is perhaps the most important feature to maintain in moving forward from the current MEOPAR. One suggestion from the interviews was that the networking and coordination activities described above should be expanded to include more provincial activities and resources.

COMMUNITIES OF PRACTICE STRENGTHS

The NCE MEOPAR supports Communities of Practice (CoPs) across multiple disciplines in their network. These CoPs help to mobilize knowledge, enrich research and encourage collaboration between academics, practitioners, policy-makers and community groups by bringing together ocean science related expertise. They have served as an ideal opportunity to inform MEOPAR researchers about new developments and information gaps. Each CoP operates independently as a grassroots initiative, supported by MEOPAR. The CoPs have been formed to work on a wide range of issues including ocean acidification, climate risk for coastal transportation infrastructure, marine shipping risk, ocean gliders, ocean data management, and more.

Several interviewees referenced the success of these CoPs and their value in the ocean science community. They are considered as a strength of MEOPAR and have proven to be of real value across the community. A number of interviewees suggested that a future organization could continue to facilitate their growth and development, especially in a national scope.

TRAINING STRENGTHS

The topic of training was another strength of MEOPAR that was often cited in the interviews. This training was applicable to Highly Qualified Personnel (HQP) including Masters, PhD, and Post-Doctoral students as the next generation of ocean professionals. The training opportunities that MEOPAR offers and facilitates are considered by many individuals as very successful and included coordinating training opportunities and facilitating additional activities beyond the formal training activities such as internships, workshops, supporting travel to appropriate conferences and events, and developing networks (e.g. the Communities of Practices). It was seen as an excellent and complementary feature to the classical higher education.

In addition, there was recognition amongst some of the interviewees of the education and experience gained by Early Career Scientists that could be considered as training, adding that MEOPAR has demonstrated success in enabling these early career researchers to build their careers, develop networks, and be exposed to more senior scientists.

There was good support for training to be an important component in a future organization. One interviewee suggested that the training could be expanded; stating that they support the coordination in universities for the classic HQP efforts but would like to see it expanded to the ocean workforce in many of its contexts. For example, MEOPAR could facilitate and coordinate training efforts but also liaise with industry and governments to understand what the ocean community really needs in the way of human resource capabilities and link that knowledge with the university and college trainers. The professional development for mid-career ocean practitioners was also suggested as a consideration in this expanded approach to training.

CANADIAN INTEGRATED OCEAN OBSERVING SYSTEM (CIOOS) STRENGTHS

The Canadian Integrated Ocean Observing System, CIOOS, is a newly launched online platform for sharing, discovering and accessing ocean data in Canada. CIOOS works across the nation and across sectors to unite the knowledge, expertise, and infrastructure of Canada's ocean observing community. Three CIOOS Regional Associations have been established: Pacific, Gulf of St. Lawrence, and Atlantic (reference https://cioosatlantic.ca/). CIOOS is currently an initiative of the Fisheries and Oceans Canada with MEOPAR providing financial support, scientific expertise, and management advice.

The effort expended, and expertise gained, by MEOPAR in the development of CIOOS was considered by several interviewees as a major strength of the network. CIOOS is seen as a very good example of the collaboration, negotiation and networking skills that MEOPAR have achieved. CIOOS reflects the consideration that ocean observation followed by data management, analysis and prediction are key components of MEOPAR to date and could be in the future. CIOOS was considered by several interviewees to have done rather well and that the strengths of CIOOS established to date need to continue to be built upon.

The continued, and possibly expanded, development of the CIOOS platform is considered by several interviewees as a strong contender as the core within the new organization's future. It was noted by several interviewees that critical issues facing the global ocean, e.g. ocean acidification, ocean warming, and increases in fresh water from glacier melt, all require a sound understanding of ocean conditions with accurate and timely ocean observations. One of the challenges facing global nations, including Canada, is improved earth system modelling. To address this challenge, enhanced and where possible real-time, ocean observations are needed. It was felt that CIOOS could be critical for this. It was frequently stated that CIOOS is important to Canada and to the Canadian Government and that it should be approached at that level - not simply as an agenda item of one single federal department (e.g. Fisheries and Oceans Canada) but also potential interests within NRCan, ECCC, Transport Canada, as well as provincial and municipal governments. It was suggested repeatedly that the future CIOOS could be framed in the national interest and beyond that of the current MEOPAR and DFO relationship. From an ocean industry perspective, interviewees also noted that CIOOS was an important initiative of MEOPAR and it was suggested that additional partners from industry should be engaged in future efforts. It was suggested that ocean industry may not be aware of what CIOOS could do for them; and that there may be a need for a future organization to reach out to industry so that they would be more active players both in contributing to and drawing data / information from CIOOS.

The need to develop a value proposition for a new MEOPAR organization was referenced by several interviewees, and CIOOS was identified as a possible example in this regard. It was suggested by one interviewee that a value proposition in this case might include the challenges of common platforms with standards, the state of observation technology and what might be needed, a statement on knowledge gaps that need to be filled, and science gaps that demand attention. The value proposition would have to identify these challenges and then demonstrate how the new MEOPAR would go about developing the solutions through networking, facilitating and collaborating across the ocean community, including academia, industry, government and network institutions.

Finally, some interviewees suggested that as CIOOS evolves and grows that it should also include national coordination of the approach and challenges associated with ocean observations, such as tools, sampling/observation techniques, data management, interoperability, modelling, etc. One interviewee stated that the use of standards and sound data management are very important for national efforts such as an expanded CIOOS. It was noted by several interviewees that ocean observations are not an end to themselves, but the observations must drive models, predictions, and decisions for the overall health and sustainable use of ecosystems and ocean users.

RESEARCH VESSEL COORDINATION STRENGTHS

Ocean-going research vessels are a key component of marine science research infrastructure. Vessels and their associated equipment play a key role in supporting and enabling ocean and coastal research and monitoring activities. Within Canada and at the international level, challenges such as aging fleet and equipment, and increasing costs of operation, are facing this critical infrastructure. There are now serious limitations in terms of geographical/ temporal availability of vessels, flexibility of use, and multi-sectoral access to available capacity.

Selected interviewees identified the success achieved by MEOPAR to better define and address this problem. To date, MEOPAR has established a _National Research Vessel Task Team_ with representation from end-users and other interested parties across Canada to proposed practical solutions to address the immediate capacity crisis. It will focus on the larger vessels required for offshore research and include consideration of the needs of users in academia and the private sector as well as different levels of government. In addition, MEOPAR is working with industry partners on the _Modular Ocean Research Infrastructure_ (MORI) initiative to develop containerized labs that could be placed on "workhorse" industry and possibly naval vessels in order to convert them into sophisticated research vessels on a temporary, as-needed basis. The ability to have mobile research infrastructure that could be placed on workhorse vessels offers a means of supporting modern ocean research by many countries worldwide that do not currently have access to specialized research vessels, including developing countries. These efforts are considered by many interviewees as strengths of the current MEOPAR that should be considered for a new organization.

Common Themes on New Areas to Explore in a Future Organization

Across the interviews, two topics were frequently referenced as possible new areas for a future organization to explore: the Blue Economy, and the UN Decade of Ocean Science. However, in addition to these common themes, there were other ideas that were proposed by two or three of the interviewees; these ideas include:

- Improving **earth system modelling**, recognizing the need for ocean observations to drive predictions that in turn will drive society's resilience

- An understanding of the **ocean and human health** as a new relatively unexplored dimension of ocean science (e.g. possible source of new medicines)

- The use of **satellite data to enable ship tracking** as a new means to manage marine traffic and any possible associated challenges (e.g. ship spills, emergency response)

- **Improving communications** of the work conducted by MEOPAR; there was frequent acknowledgement that the work conducted by MEOPAR is very well respected in government and academia via partnerships but that it is not well known in any wider circles

- Developing the knowledge base required for and **expertise in the management of Canada's ocean space,** including Marine Protected Areas (MPAs) and management zones

- The **alumni of MEOPAR represent a valuable asset;** determine how best to take advantage of this asset

- Developing a **national role in ocean knowledge management** with possible various forms including regular reporting to clients and members, webinars, subject specific meetings, etc.

- Enhancing **capabilities in the social sciences** to help both understand policy and operational needs as well as translate results to the user communities

BLUE ECONOMY

The 'Blue Economy' is an emerging concept which encourages better stewardship of our ocean or 'blue' resources. The concept is gaining momentum at global, regional, national and local levels. The World Bank has defined the blue economy as "the sustainable use of ocean resources for economic growth, improved livelihoods and jobs, and ocean ecosystem health". The Blue Economy concept is the underpinning of the *Commonwealth Blue Charter* that highlights in particular the close linkages between the ocean, climate change, and the well-being of the people. The *Commonwealth Blue Charter* itself is an agreement amongst all 54 Commonwealth countries that was signed in 2018 to actively cooperate to solve ocean-related problems, and to meet commitments for sustainable development. Action Groups have been formed to implement the *Commonwealth Blue Charter*, with ten topics identified, each with national champions. Canada has been identified as the Commonwealth champion on Ocean Observation, with national funding support for this work. Other Action Groups of relevance to Canadians include those on Ocean Acidification; Marine Protected Areas; Ocean and Climate Change; Sustainable Blue Economy; and Sustainable Coastal Fisheries. Within Canada, mandate letters to federal Ministers have included statements on the development of a Blue Economy strategy for Canada.

It is apparent that the Blue Economy will be a major policy initiative. As Canada moves forward in adopting and implementing aspects of the Blue Economy, several interviewees stated that the future MEOPAR organization could have a role to play in moving this concept forward. It was also suggested across the interviews that as Canada and global nations look for economic opportunities in a post-pandemic world that a "green recovery" or even a "blue recovery" could be amongst the Canadian policy initiatives. These are seen by several interviewees as strong possibilities for building into a future MEOPAR organization.

UNITED NATIONS DECADE OF OCEAN SCIENCE

The United Nations proclaimed a Decade of Ocean Science for Sustainable Development, to be held from 2021 to 2030. In accordance with the direction from the United Nations General Assembly, the Intergovernmental Oceanographic Commission (IOC) of UNESCO has led preparatory and planning work. The Decade will provide a common framework to ensure that ocean science can fully support countries' actions to sustainably manage the ocean and more particularly to achieve the 2030 Agenda for Sustainable Development. The Decade is described as providing a 'once in a lifetime' opportunity to create a new foundation, across the science-policy interface, to strengthen the management of our ocean and coasts for the benefit of humanity.

The Decade will be another major policy initiative for Canada both at the international level as well as nationally. It was suggested by several interviewees that the future MEOPAR organization could position itself to lead and/or coordinate Canada's contribution(s) to the Decade. The current MEOPAR has clearly demonstrated networking and partnering skills, described as "national glue" attributes that would position a new organization to coordinate the Decade's activities within Canada, likely in close collaboration with DFO. Another interviewee observed that a future MEOPAR should be more visible in international discussions around the ocean and that it could serve as a coordinator of information and knowledge about what Canada is doing, probably in partnership with DFO as well. Finally, it was noted that the UN Decade offers a catalyst for Canada to rally around an ocean strategy and to play a prominent role in the international ocean efforts. One interviewee described UN Decade opportunity as the "soft launch" of an approach that engages all the significant ocean players in Canada behind a set of major goals and objectives.

IMPLEMENTATION ARM OF ORCA (OCEAN RESEARCH IN CANADA ALLIANCE)

The Ocean Research in Canada Alliance was established in 2016 to improve the coordination of ocean science and technology (S&T) in Canada. ORCA brings together Canada's ocean S&T community to increase collective knowledge, align efforts, and forge stronger collaborative ties. The Alliance is a forum to share information, discuss priority issues, connect with the wider science community, and collaborate on ocean S&T initiatives in Canada. Membership (with over 500 members and 160 organizations) reflects the diversity of Canada's ocean community, and includes academic institutions, government departments, granting agencies, non-governmental organizations, Indigenous groups, and industry.

There was a mix amongst the interviewees as to those in favour of this priority and those who did not support it at this time. Selected interviewees suggested that a future MEOPAR organization could consider ORCA as a possible component based on the networking skills acquired within the current MEOPAR. By comparison, other interviewees expressed caution about tying the new organization to ORCA until a clearer mandate was developed for ORCA.

Common Themes on New Partners to Explore in a Future Organization

As noted earlier, the interviewees were unanimous in speaking very positively of MEOPAR's networking and partnering skills. It was noted that the networking has been primarily with federal government departments and other ocean-related networks (under various federal and provincial funding arrangements, e.g. Ocean Networks Canada, Réseau Québec Maritime, Ocean Frontier Institute and others). As stated by one interviewee, the ocean science community needs to work more closely together and not wait for the government to facilitate this behaviour, adding that the philanthropic sector should be looked at as a possible partner. They said that this partnering and funding is done in other countries but not so much in Canada. The interviewees identified several areas where new or expanded partnerships might be pursued in a new organization.

In consideration of future potential partners with whom the new MEOPAR might engage, the interviewees most frequently mentioned either one of the federal government departments or industry. Figure 3 provides the results of a word search analysis conducted on the interview notes, showing that government was referenced 49 times (NRCan-3; ECCC – 25; ISED – 9; and, DFO – 12). Potential industry partnerships were also referenced 49 times in the interview notes.
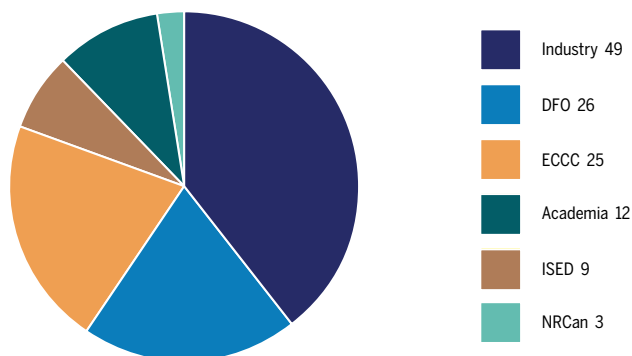

Industry 49

DFO 26

ECCC 25

Academia 12

ISED 9

NRCan 3

Figure 3: Word Search from Interviews regarding Potential or Current Partners

Ocean Industry - Many interviewees suggested that future partnerships with ocean industries could be explored, and that this could be a major opportunity. It was noted that the effort to engage industry directly was not a hallmark of NCE success in general and that it would take extra and specific effort by a new organization to achieve this. It was observed that a new MEOPAR organization would have to be overt in approaching industry from the perspective of understanding and helping to solve their problems rather than looking for industry to support science activity already planned. Furthermore, it was also stated that this approach would require the conversation to become industry-centric rather than R&D-centric. The R&D might be how a new organization would solve their issues and not the primary purpose of approaching the industry in the first place. Another interviewee stated that a future organization that wanted to engage with industry would most likely need to conduct specific applied research project work that demonstrates value added for the company or companies in question. Several interviewees spoke about the growing interest and support for the Ocean Supercluster and COVE (Centre for Ocean Ventures and Entrepreneurship) across the industry sector and that these emerging initiatives could present opportunities for ocean industry partnerships.

One specific example of this new area of partnering that was suggested was to look at how a new organization could partner with COVE by identifying and providing new ideas to COVE, who in turn would examine and evaluate these ideas from a commercialization point of view.

There was one opinion noting that the ocean technology sector is starting to engage more directly in the Blue Economy, mostly due to recent awareness of the efforts in this area, and that it is therefore timely to look at ways that a new organization that could satisfy these needs / opportunities. It was also noted that engaging industry in a future MEOPAR will most likely be done through specific applied research project work, and by way of example cited marine renewal energy potential including tidal, wave and off-shore wind. In consideration of future partnerships with industry, there was a suggestion that perhaps Innovation, Science and Economic Development Canada (ISED) might be a source for some support, and for providing assistance with coordination efforts with COVE and the Ocean Supercluster.

There was one interviewee who spoke of the ocean industry not having the time to "shop" an idea around to the various players in the ocean science community and questioned whether a future MEOPAR - COVE partnership could be the way to integrate the two communities with COVE being industry facing and the new MEOPAR being the R&D facing component that would also build networks of expertise to accommodate the industrial need. The same interviewee highlighted that fact that industry "time" and R&D "time" often did not align – that industry would normally be looking for a short turn around answer while R&D often takes a longer time. This would be a challenge that would need to be addressed on both sides, managing expectations.

Finally, another interviewee noted that in terms of partnering with industry that a future organization should work through industry associations rather than going company by company. They noted that support by an industry sector would eliminate the perception of favouring one company over another and that a future MEOPAR would be seen as being more in the broader public domain.

Federal Government – The existing networking activities with the federal government departments (particularly with Fisheries and Oceans Canada) was recognized by many interviewees as being very extensive, but additional opportunities were also identified. It was noted by one interviewee that ECCC has released the report "Climate Science 2050: Advancing Science and Knowledge on Climate Change" and that there may be opportunities for a new organization to partner with ECCC and its associates to deliver on climate change initiatives. This individual also noted that government cannot achieve these goals by themselves and that organizations like a new MEOPAR will be critical to success going forward.

Provincial, Territorial and Municipal Governments – Many interviewees observed that it is important to have the provinces, territories and local governments involved in a future MEOPAR, with someone noting that there are only two provinces in Canada that do not have an ocean coastline. Another interviewee said that science input is needed for decisions and investments at all levels of government - federal, provincial, municipal and local - as they identify policy and operational needs, with a focus on specific requirements (i.e. fisheries, ports, coastal infrastructure etc.) On a similar path, another interviewee stated that a new MEOPAR should be able to provide value at national, provincial, municipal and local levels by feeding into policy and stated operational requirements at the various levels. This would take the form of customizing what might be prepared for

national consumption down to lower and more focused levels through characterization of knowledge to fit the needs. They also noted that this could be a service that the new organization could market to coastal communities, coastal cities and ocean provinces.

By contrast, another interviewee thought that the provinces would have very little activity with the new MEOPAR, except for individual projects. They believed that provinces are most likely to support organizations that are within their jurisdictions and that this is mostly by lobbying, letters of support etc. and that there is little likelihood of major financial support except perhaps on very specific projects that align with their policy objectives.

Indigenous Communities – There was a need identified by interviewees to address the question of Indigenous knowledge both in terms of creating space for Indigenous Traditional Knowledge (ITK) to be enabled by Indigenous communities as well as determining how to integrate ITK with western science results. Another interviewee commented that a new MEOPAR organization will need to engage with Indigenous communities in a more serious fashion - both in terms of CIOOS and the broader arena of relevant ocean science.

Insurance Industry – In terms of the future focus of a new MEOPAR, the insurance industry was identified as a potential client and partner by interviewees. One interviewee noted that the insurance industry could be a key networking partner especially as it relates to risk for coastal communities and issues such as sea level rise, flooding potential, increased storm damage, etc. It was suggested that the Insurance Bureau of Canada might be a place to start this conversation.

Input on Possible Future Funding Options and Approaches

The interviews provided a wide breadth of ideas and approaches that could be pursued as part of a strategy for a new MEOPAR organization. These ideas ranged from specific funding opportunities within the federal granting councils, to lessons learned from the ongoing COVID pandemic on how to integrate national science efforts, to a membership/subscription approach for knowledge access. Several interviewees acknowledged that the best approach in today's funding environment for a future MEOPAR organization would likely be to have a mosaic approach of different funding sources and different time frames. The interviewees who participated in the MEOPAR Annual Scientific Meeting indicated their support for the webinar discussions that outlined the need to develop a value proposition for the new MEOPAR organization that supports government policies. One interviewee noted that there should be two criteria for inclusion in the future MEOPAR strategy; these are value for money for governments, industry, communities etc. and relevance building off the Council of Canadian Academies' report[5] with its three big gaps. As well, several interviewees spoke that any new organization must consider both public money as well as private funding. One interviewee was very specific that the strategy being developed for the new organization must refrain from referring itself as the MEOPAR 2.0, stating that wording is important and that the 2.0 idea implies more of the same and given that the NCE program is cancelled, that isn't viable. The same interviewee recommended that the strategy for renewal should speak of a "platform" and not a "project" or "program" as these may be too limiting in scope.

5   Council of Canadian Academies, 2013, Ocean Science in Canada: Meeting the Challenge, Seizing the Opportunity. The Expert Panel on Canadian Ocean Science. https://cca-reports.ca/reports/ocean-science-in-canada-meeting-the-challenge-seizing-the-opportunity/

Lessons Learned by Governments from the global pandemic on the need for integrated science "hubs" - Given the COVID pandemic response, interviewees spoke of how government is learning the value of an integrated scientific response to decision making. One interviewee made reference to an increasing push from the centre of government, with talk about "integrated Hubs of expertise" where capacity, capability, and HQP can all work together to a common objective. They also suggested that government funding agencies such as the Canadian Institute on Health Research, NSERC, and to a lesser extent (so far) SSRHC, are all headed in this direction. They stated that indications of this new approach may be seen in the future budgets, fiscal updates or both. The goal of such integrated hubs of expertise was described by another interviewee as having academia, industry and the public service all working "seamlessly" together in this Hub design. Other interviewees affirmed this message, stating that a lot of lessons have been learned from the COVID-19 experience in terms of getting the science needed to support major policy decisions, stating that our innovation system is badly fragmented and that the government is seeing this same situation becoming apparent with other major files. In addition, another interviewee suggested that given our current Canadian fiscal situation vis-a-vis the COVID pandemic, that near term future funding for science, including ocean science will be constrained.

Funding Opportunities within Federal Granting Councils - The ending of the NCE funding program means that the current NCE MEOPAR finds itself re-inventing itself. There still remains funding programs within the federal Granting Councils which could represent opportunities. These program funds are outlined below.

New Frontiers in Research Fund (NFRF) of the Tri-Councils – This new fund was identified by several interviewees as a fund that the new MEOPAR organization should be prepared to apply for. One interviewee reinforced that this NFRF is primarily for projects/programs that are multidisciplinary in nature and that these need to address the mandates of all three Granting Councils; another interviewee indicated that MEOPAR was perfect for this fund given these requirements to be multidisciplinary across both natural and social sciences. An interviewee noted that the NFRF may not be a primary source for a new MEOPAR but that it does present some opportunities. Another interviewee observed that the funding from the cancelled NCE program was basically shifted to this NFRF indicating that considerable funds might be available.

Alliance Grants (NSERC) – Several interviewees spoke of the NSERC Alliance Grants as a possible funding source. One interviewee described the fund as potentially relevant to a new MEOPAR organization as the fund is generally run as a set of projects rather than a network and that each successful project would be funded at a lower level than the NCE funding. The interviewee suggested that a new organization could well have a number of Alliance projects on the go at the same time and even projects of varying duration; and that the Alliance grants could be thought of as breaking the sections or chapters of current MEOPAR activities into distinct Alliance Projects and seek funding for each accordingly. They proposed that the current MEOPAR could apply and operate one or more Alliance grants while the current NCE is still operating, but the projects would have to be clearly distinct from MEOPAR activities. The NSERC website describes two streams of Alliance grants - one with cash contributions from partners like Provinces, Industries etc. and those cash contributions could be matched on a 2 to 1 basis by NSERC. The other stream, currently funded at a lower level is for projects without partner cash contributions. One interviewee stated that the overarching key to

success of Alliance finding is the need for clearly defined deliverable(s that are in the interest of an d benefit to Canadians; and also noted that First Nations participation / engagement is a significant asset when making an Alliance application. Finally, they noted two additional points: "In-Kind contributions" are not being considered as they previously were; and, that Provincial or Federal use of products or services from an Alliance grant would be seen as serious engagement and strongly supported.

Membership or Subscription Mode of Funding – A few interviewees have had experience with a membership or subscription mode of funding, and these individuals spoke of this model as another possible approach to funding a new MEOPAR organization. The report "An Assessment of Ocean Science in Canada[6] cited the example of the Canadian Water Network which has been successful in utilizing this membership approach. One interviewee stated that this membership model of funding might be most attractive to coastal communities, insurance companies, shipping (in all its forms), offshore gas and oil, etc. Another interviewee considered provincial agencies as a possible supporter of the membership model. They suggested that such a membership in the new MEOPAR organization could provide members with priority access to knowledge as well as a seat at the table to help establish future research priorities. Another interviewee observed that this membership mode of funding is increasingly drawing attention and being considered by other science areas.

Input on New Organization as an Integrator or "National Glue" across the ocean science community

Many of the interviewees spoke of the need for the new MEOPAR organization to fill an existing national gap and to become the national integrator or "national glue" within Canada that ties all the various ocean science organizations together. The idea that was proposed in various ways by many interviewees was to have an organization that would add value to the major ocean science players by linking them together along their respective strengths by increasing profile and capacity on any given subject, but also to reduce competition and play to the respective strengths found in each organization. One interviewee envisioned this as having the new organization serve as the "glue" to bring the multidisciplinary skills together and that they would also need to be the interlocutor with both industry and government so both see a return on their investments. It was stressed by another interviewee that under the national glue model, the new MEOPAR organization will need to have access to both the carrot (profile and growth for collaborators and the stick (authority from government as part of their mandate to play the role of the glue). Another interviewee stated that this new "national glue" approach would mean that the organization would likely not have its own standalone mandate for R&D but that they would primarily need "core funding" for this. Further on this approach, another interviewee stated that if a new MEOPAR was to take on the national coordination role, then they would not be able to have an R&D program of their own as it would be open to the perception of conflict of i nterest but that some seed money would need to be specifically allocated to help overcome barriers that researchers faced in accessing programs. Another interviewee described a scenario where MEOPAR could be the primary interlocutor with the federal and provincial agencies for the purpose of coordinating efforts to support policy mandates, but not however, for managing

their respective efforts to obtain funding (at least in the beginning). One interviewee observed that Canada does not have an organization similar to the U.S. National Oceanic and Atmospheric Administration (NOAA) and that a new organization could learn from the NOAA model and improve upon it, especially from an efficiency in the use of resources perspective. Another interviewee stated that if MEOPAR was going to be the glue that brought expertise together across the country, then the way to start was to pick a significant project that was of i nterest to industry and to the government(s), and to then build a coalition of the willing to demonstrate what could be done. They suggested that the project would need to be significant enough to attract resources and that aiming high to a major scale that would result in world leading results - two possible topics that were proposed were: establishing, monitoring and management of Marine Protected Areas (including all the technology and management expertise necessary); or an issue facing the Arctic.

Reflecting on the possibilities of further networking with ocean industry, one interviewee suggested a scenario where OFI, ONC, ArcticNet, RQM and/or others could serve as the engines of research, a new MEOPAR organization could serve as an integrator/the builder of networks and COVE could serve to advance commercialization aspects.

In referencing back to the report, entitled "An Assessment on Ocean Science in Canada"[7], the example of a German research alliance was seen by one interviewee as a possible model to consider in this capacity of a national integrating organization. The German Marine Research Alliance (Deutsche Allianz Meeresforschung – DAM) was formed in 2019 to link leading German marine research institutions. The objectives of DAM are to strengthen the sustainable use of the coasts, seas and ocean through research, data management and digitalization, infrastructure and transfer of knowledge. To this end, the DAM is working together with its member institutions to develop solution-oriented knowledge and to communicate potential courses of action to politics, business and civil society. The German DAM alliance and their associated governance outlines how they can apparently coordinate and facilitate ocean research activities without having their own program of research. By working together, they are able to overcome similar barriers and challenges.

There were discussions with several interviewees around a win, win, win scenario whereby the company or industry gains, the academic sector gains, and the value to Canada through support to policies makes government a winner as well. These discussions resulted in a three circle Venn diagram being proposed showing the three wins and the idea that a future MEOPAR organization should strive to operate in the very centre where all three circles overlap. In the later interviews, the three circles were expanded to four circles – including government, industry and academia, as well as network institutes (e.g. ONC, OFI, ArcticNet, RQM, etc.) with a new MEOPAR organization working in the middle of the overlap. This four circle Venn diagram approach saw immediate benefit by one interviewee who described it as national coordination role and being a "one stop shop" for the governments.

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7   Report: *Assessment on Ocean Science in Canada*, MEOPAR, November 2020

Input on Challenges and Opportunities of a New Organization

During the interviews, challenges and opportunities were identified that will need to be addressed in the development of a future MEOPAR organization. Several interviewees noted their concerns about the crowded space amongst ocean science organizations and the possible saturation in particularly the Atlantic region of Canada where there has been a growth in new ocean-related initiatives and activities. As one interviewee candidly stated, the ocean industry sector has significant challenges in distinguishing the various organizations in the ocean science space, especially as they often show up at each other's events. Several interviewees questioned the sustainability of the current extensive suite of organizations across the ocean community and that a more integrated approach is needed for the organizations to be stable, sustainable, and probably more productive. One interviewee suggested that focus should be on the big policy agenda of the government, citing climate change and the Blue Economy as examples. Another interviewee noted that the overall goal for the ocean science community, and perhaps for the broader ocean community writ large, is for Canada to '"punch above its weight". To achieve this objective, they said that this will demand a much more integrated ocean community across Canada than currently exists. They added that there is duplication and overlap in the ocean science space and that not every organization in the ocean space today will necessarily survive long term, and that the ability to define a specific niche in this space will be important.

And finally, one interviewee noted there are significant differences in the ocean science community now as compared to 2012 when the MEOPAR NCE was approved. They commented that new networks have been funded or extended and that in developing a path forward, they encouraged the network to consider these differences when establishing a value proposition that might well be different from the original MEOPAR vision / mandate.

Annex 1: List of Interviews conducted

(ORDERED BY APPROXIMATE INTERVIEW DATE)

1. Karen Dodds, Chair, MEOPAR Board of Directors; former ADM S&ṬECCC

2. Marc Fortin, Vice-President, Research Partnerships, NSERC

3. Larry Mayer, Professor and Director School of Marine Science and Ocean Engineering Center for Coastal and Ocean Mapping, University of New Hampshire

4. Anya Waite, Associate VPR (Ocean), Dalhousie University; Scientific Director, Ocean Frontier Institute

5. Wendy Watson-Wright, 7 Mile Bay Consulting; former ADM Science, DFO; former Executive Secretary IOC

6. Bob Walker, Former Chair, MEOPAR Board of Directors; former ADM DRDC

7. Martin Taylor, Former VP Research, University of Victoria

8. Jim Mitchell, Former head, Sussex Circle

9. Catherine Blewett, Chief Strategic Engagement Officer, OFI; former Deputy Minister, DFO

10. George Enei, ADM, Office of the Chief Science Advisor; former ADM Corporate and ADM S&T, ECCC

11. Arran McPherson, ADM Ecosystem and Ocean Science, Fisheries and Oceans Canada

12. Paul Snelgrove, Professor, Memorial University; DFO Departmental Science Advisor; Director, Canadian Healthy Oceans Network; Associate Science Director OFI

13. Ariane Plourde, Former Director, ISMER- UQAR; former DFO Regional Director, Quebec Region

14. David Fissel, Former CEO, ASL Environmental Sciences Ltd.; Lead Author of CCA Report

15. Martha Crago, VP Research McGill University, former VP Research Dalhousie and Chair of CCORU

16. Kendra MacDonald, CEO, Canada's Ocean Supercluster

17. CEO of Council of Canadian Academies – no notes; recommended the referral to David Fissel

18. Guillaume St-Onge, Scientific Director, ISMER-UQAR

19. Melanie Nadeau, Director, COVE

20. Nipun Vats, ADM for Science & Research, Innovation, Science and Economic Development Canada (ISED)

21. Stefan Leslie, Nova Scotia Research; former Executive Director, MEOPAR

22. Kate Moran, President and CEO, Ocean Networks Canada

23. Jacqueline Goncalves, A/ADM, Science and Technology, ECCC

24. David Henry, Director General, Atmospheric Science and Technology, ECCC

25. Ron Pelot, Associate Scientific Director, MEOPAR

26. Douglas Wallace, Scientific Director, MEOPAR

27. Rodrigo Menafra, Managing Director, MEOPAR

28. Dany Dumont, RQM, Former MEOPAR Prediction Core and former UQAR

29. Denis Hains, Former DG Canadian Hydrographic Service, DFO

30. David Harper, DG Monitoring & Data Services. MSC – ECCC

31. Michael Schultz, German Marine Research Alliance (member of the MEOPAR International Science Advisory Committee)

32. Diane Campbell, ADM Meteorological Services of Canada, ECCC with Russ White, DG Prediction Directorate, ECCC

33. David Castle, Office of the Chief Science Advisor, Senior Policy Advisor; former VP Research, University of Victoria

34. Peter Nicholson, former head of Council of Canadian Academies

35. Marc D'Iorio, ADM Science and Technology, ECCC