

Influences on advice and decision-making in the DFO Maritimes Region:
Opportunities for improving integrated coastal and ocean management (ICOM)

By

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ABSTRACT

Integrated coastal and ocean management (ICOM) is an approach used by marine managers and practitioners to balance ecosystem health and preservation with the sustainable development of multiple ocean activities. In Canada, ICOM plans are developed and implemented by the Government of Canada, through the Department of Fisheries and Oceans (DFO). The experiences and expertise of DFO program staff can lend itself to the development of future ICOM plans and tools. Program staff from the Aquatic Ecosystems Sector at the DFO Maritimes Region frequently engage in decision-making processes as part of their regulatory responsibilities in addition to providing advice internally at DFO and to external partners. The purpose of the research project is to identify the factors influencing the advisory and decision-making processes of three key programs in the Aquatic Ecosystems Sector: Marine Planning and Conservation, Aquaculture Management, and the Fish and Fish Habitat Protection Program. Structured interviews (n=9) were conducted with program staff from the Bedford Institute of Oceanography, and content analysis was conducted to identify influences on advice and decision-making. Four key themes emerged: Types and formats of information, policies and regulations, program organization, and program capacity and expertise. Based on research results, this paper offers program specific recommendations as well as recommendations for advancing ICOM in the Maritimes Region.

Keywords: Integrated coastal and ocean management, advice, decision-making, Department of Fisheries and Oceans, Maritimes Region, Canada

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LIST OF ABBREVIATIONS

AAR	Aquaculture Activity Regulations
BSMP	Lofoten – Barents Sea Integrated Management Plan
CCFAM	Canadian Council of Fisheries and Aquaculture Ministers
CFIA	Canadian Food Inspection Agency
CSSP	Canadian Shellfish Sanitation Program
DAAF	Department of Agriculture, Aquaculture and Fisheries (New Brunswick)
DFO	Department of Fisheries and Oceans
DoF	Death of Fish
EBM	Ecosystem-Based Management
ECCC	Environment and Climate Change Canada
ENGO	Environmental Non-Governmental Organization
ESSIM	Eastern Scotian Shelf Integrated Management Initiative
FFHPP	Fish and Fish Habitat Protection Program
HADD	Harmful alterations, disruptions, or destruction
ICOM	Integrated Coastal and Ocean Management
I&T	Introductions and Transfers
LOMA	Large Ocean Management Area
MAT	Maritimes
MOU	Memorandums of Understanding
MPC	Marine Planning and Conservation
MSP	Marine Spatial Planning
MPA	Marine Protected Area
NSDFA	Nova Scotia Department of Fisheries and Aquaculture
SARA	Species at Risk Act
SIDS	Small Island Developing State

CHAPTER 1: INTRODUCTION

The world's oceans are facing significant levels of pressure as a result of human's dependency on the ocean for food, energy, recreation, and transportation. Competing uses for ocean space include fisheries, aquaculture, shipping, tourism, and oil and gas extraction. The impacts from these activities are further amplified by climate change, pollution, and invasive species (Merrie et al., 2014). Management strategies for addressing these growing pressures, and reducing conflict in ocean spaces, have been the subject of considerable research (Lewison et al., 2015; Hobday et al., 2013). Integrated coastal and ocean management (ICOM) has been recognized as a management approach which aims to balance ecosystem health and preservation with the sustainable development of ocean resources. ICOM is defined as "the coordination of planning and management activities and policy development within and between sectors of activity (industries, community) and governments to deliver Ecologically Sustainable Development (ESD) of the ocean and its resources, based upon an understanding of ecological, social, cultural and economic values" (IOM-WG, 2003). It is becoming increasingly apparent that ocean activities cannot be managed in isolation; therefore, integrative approaches need to be developed and implemented (Guénette and Alder, 2006). ICOM offers a holistic, ecosystem-based and knowledge-based approach to achieving ecological, economic, and sustainability goals (Winther et al., 2020).

Many countries around the world have adopted an ICOM approach for managing their ocean and coastal resources, including Australia, Norway, Canada, and the United States. As well as island states such as Seychelles, Fiji, and Mauritius. In 1998, the Australian Government released Australia's Oceans Policy, with the twin goals of conservation and economic development. Despite the government's initial goal to achieve integration across sectors and

jurisdictions, gaps in Australia's oceans governance model proved to be an impediment to effective ICOM (Vince, 2018). Norway was another early adopter of ICOM and ecosystem-based management (EBM). The Lofoten – Barents Sea integrated management plan (BSMP) was first initiated in 2001 and later adopted in 2006. BSMP was the first of three regional integrated management plans, with the others occurring in the Norwegian Sea and the North Sea (Olsen et al., 2016). Each regional plan has objectives for preserving the marine environment while sustainably pursuing economic interests. These objectives are based on four key areas: pollution, safe seafood, accidents and associated pollution, and biodiversity (Hoel and Olsen, 2012). Norway is among the countries with the most advanced ICOM programs and has therefore been used as an example for ICOM best practices (Kroepelien et al., 2007; Hoel, 2010).

More recently, Marine Spatial Planning (MSP) was used in Seychelles as a way to holistically manage the islands marine resources. MSP (also known as 'maritime spatial planning') is a new form of integrated ocean management which seeks to balance the demand for development with ecosystem conservation in order to achieve social and economic goals for a marine area (Ehler, 2018). MSP represents an evolution from older integrated oceans management approaches and offers new solutions for organizing uses in the marine space and interactions among them. Seychelles is a Small Island Developing State (SIDS) and an important biological hotspot that is highly vulnerable to coral bleaching and marine degradation (Sherman, 2005). The goal of the Seychelles MSP Initiative is to protect 30% of the Seychelles' waters by 2020 and support the nations Blue Economy Roadmap and other national strategies (SMSP, 2019). Due to the vulnerability of the Seychelles to disasters, climate change adaption processes are being incorporated into the MSP Initiative.

Despite differences in approaches and outcomes, countries that have implemented integrated ocean management plans all share a common goal of achieving marine conservation objectives while advancing multiple ocean activities and uses.

1.1 The Department of Fisheries and Oceans Canada (DFO) and ICOM

The Department of Fisheries and Oceans (DFO) is responsible for developing policies and programs in support of Canada's ecological, economic, and scientific interests in oceans and inland waters (DFO, 2020). On January 31st, 1997, the *Oceans Act* came into force and Canada became the first country in the world to adopt comprehensive integrated oceans management legislation. The intent of the *Oceans Act* is to conserve and protect Canada's oceans for generations to come, while sustainably managing the use and development of ocean resources. Section 31 of the *Oceans Act* requires the Minister of DFO to "lead and facilitate the development and implementation of plans for the integrated management of all activities or measures in or affecting estuaries, coastal waters, and marine waters that form part of Canada or in which Canada has sovereign rights under international law" (Oceans Act, 1997). The Integrated Oceans Management Program was the lead program responsible for developing Integrated Management Plans (IMPs) and the application of marine conservation tools. Previous ocean management initiatives focused on a single ocean activity, whereas the Integrated Oceans Management Program was founded on a holistic ecosystem-based approach (DFO, 2018a). The program was designed to implement Canada's Oceans Strategy (2002), including two phases of funding: The Oceans Action Plan (2005-2007) and the Health of the Oceans (HOTO) Initiative (2007-2012). The delivery of the program occurred in the departments six regions: The Pacific Region, Quebec Region, Maritimes Region, Central and Arctic Region, Gulf Region, and Newfoundland and Labrador.

The establishment of five Large Ocean Management Areas (LOMAs) was a central strategy in the implementation of ICOM in Canada according to DFO (IOC-UNESCO, n.d.a). The five LOMAs were: 1) the Eastern Scotian Shelf Integrated Management Area; 2) Placentia Bay and Grand Banks; 3) Gulf of St. Lawrence; 4) the Beaufort Sea; and 5) the Pacific North Coast Integrated Management Area (PNCIMA). To support ICOM in the LOMAs, advisory and technical committees were established at the regional or sub-regional level. Strategic management plans have been developed for all five LOMAs; however, only two have been approved by DFO, the Beaufort Sea in 2010 and PNCIMA in 2017 (IOC-UNESCO, n.d.a). In 2011, the program adopted a bioregional approach and thirteen marine bioregions were established. The bioregional approach was thought to improve both MPA network planning and broader integrated oceans planning. Figure 1 shows the five LOMAs and the thirteen marine bioregions, which overlap in their geographic footprints. Findings from an internal audit conducted in 2016 revealed an internal concern that a shift away from LOMAs and towards marine bioregions would result in less attention towards integrated management (DFO, 2016). In a 2018 evaluation of the Oceans Management program by DFO, it was found that a lack of operational guidance for ICOM, and limited action plans to implement existing ICOM plans, have hindered progress on the broad oceans mandate (DFO, 2018a).

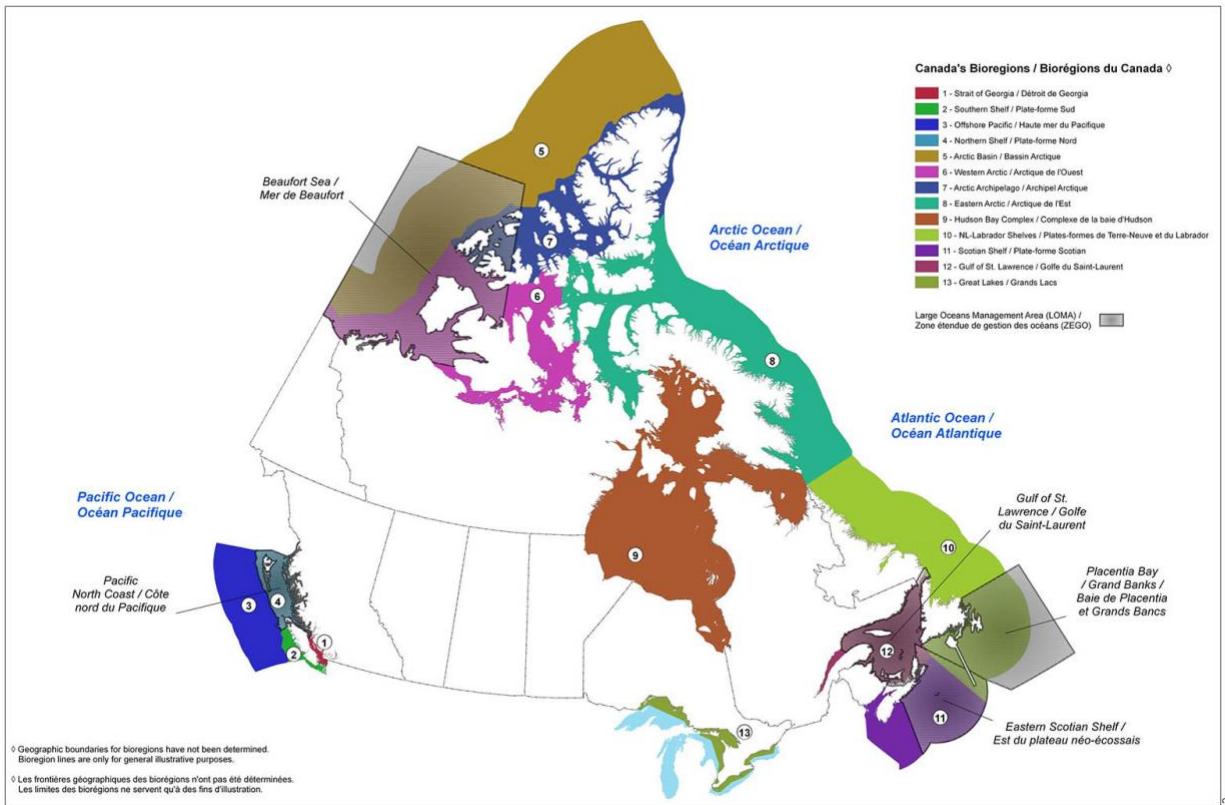


Figure 1. Canada's five Large Oceans Management Areas (LOMAs) and thirteen marine bioregions (DFO, 2017).

1.1.2 Integrated Coastal and Ocean Management in the Maritimes Region

The Eastern Scotian Shelf Integrated Management (ESSIM) Initiative was one approach taken by DFO to implement ICOM in the Maritimes Region. The ESSIM Initiative was announced by the Minister of DFO in 1998, with the goal of managing the marine resources and activities within the Eastern Scotian Shelf (ESS). The ESS was selected as the planning area because it contained “important living and non-living marine resource, high biological diversity and productivity, and increasing levels of uses and competition for space” (DFO, 2007). Throughout the ESSIM Initiative, and after its conclusion in 2012, various studies have evaluated its effectiveness in ICOM development and implementation (Ross and Breeze, 2016; Rutherford et al., 2005; McCuaig and Herbert, 2013), sometimes through a comparison with

other ICOM approaches (Foster et al., 2005; Yao, 2008). A common finding amongst these studies was a low commitment to the Initiative by the federal government and a general lack of leadership for plan implementation. DFO does not have sole jurisdiction over many activities and ocean users within the ESS, which one study found to be a barrier to effective implementation (Yao, 2008). Other studies found issues with the collaborative planning process and the adoption of an ecosystem-based management (EBM) approach, which were two key components of the ESSIM initiative. Flannery and Cinnéide (2012) argued that the Initiatives sectoral based implementation strategy meant that there was little need for stakeholders to collaborate, resulting in a lack of shared purpose or interdependency among stakeholders. However, the DFO Maritimes Region was pioneering the development of an ICOM plan and therefore adopted a “learn-by-doing” approach (McCuaig and Herbert, 2013).

In 2014, the Maritimes Region published the Regional Oceans Plan, which represented an evolution from the ESSIM Initiative. The Regional Oceans Plan focused on three areas: the Scotian Shelf, Atlantic Coast, and the Bay of Fundy. The key priorities of the Plan included implementing ocean and coastal management measures using a risk-based approach, developing a Marine Protected Areas (MPA) network, managing Marine Protected Areas and other conservation areas, and facilitating environmental preparedness and response (DFO, 2014). Current ICOM in the Maritimes Region is a reflection of the lessons learned from the ESSIM Initiative, as well as other initiatives in the Maritimes and beyond (DFO, 2018b). Future ICOM in the Maritimes Region is expected to build on these plans, while taking into consideration changes in the global ocean environment.

1.2 Management Problem and Research Objectives

Integrated ocean management is being advanced as part of the evolution of DFO's Oceans Program. As outlined in Section 1.1, the development and implementation of ICOM in Canada has not been without its challenges. ICOM in Canada is evolving based on lessons learned from previous initiatives (such as ESSIM) and emerging goals for the future. Analysis of regional programming will provide insights into how ICOM can better support the advisory and decision-making processes that influence the marine environment. Through structured interviews with program staff from the Maritimes Region, followed by content analysis of the interview data, this research highlights how the advisory and decision-making processes of each program can be improved. Through providing advice to proponents or making decisions about activities in the marine environment, program managers and staff are responsible for upholding DFO's mandate to ensure Canada's aquatic ecosystems and fisheries are sustainable and economically successful. Therefore, these processes are important to study and evaluate. Based on the analysis of participant interviews, both program specific recommendations and general ICOM recommendations are provided. The resulting recommendations may support the development of integrated ocean management plans, such as MSP. It is unlikely that future management plans will be able to address all issues raised by program staff; however, having these articulated and understood will be useful in the development of DFO's Oceans Program. Based on the utility of this work within the study sample, this research could be expanded to other branches or government departments that have a role to play in oceans management.

CHAPTER 2: BACKGROUND

2.1 The Aquatic Ecosystems Sector

The study sample for this research was selected from the Aquatic Ecosystems Sector of the DFO Maritimes Regions. The Maritimes regional headquarters is located in Dartmouth, Nova Scotia. As shown in Figure 2, the Maritimes Region is a large and diverse region, which encompasses an 8,600-kilometer coastline (DFO, 2018c). Through various programs and initiatives, the Aquatic Ecosystems Sector plays a critical role in fulfilling the management requirements outlined under the *Oceans Act*, the *Species at Risk Act*, and the *Fisheries Act*. Managers in the Aquatic Ecosystems Sector are responsible for conducting ecosystem-based research and providing advice in regard to fisheries, fish habitat, aquaculture, ocean resources, and the recovery of species at risk (DFO, 2020). Activities in the Aquatic Ecosystems Sector include carrying out aquatic ecosystems research, managing and approving projects near water, managing aquatic species at risk, protecting marine resources, and aquaculture management. The study sample for this research includes the following three programs: Marine Planning and Conservation (MPC), Aquaculture Management, and the Fish and Fish Habitat Protection Program (FFHPP). There are more than three programs within this Sector; however, due to the scope of this project and the research objectives, only three programs were analyzed. This chapter provides a background on the programs included in this study, including an overview of the advisory and decision-making functions of each program, which are summarized in Figure 3.

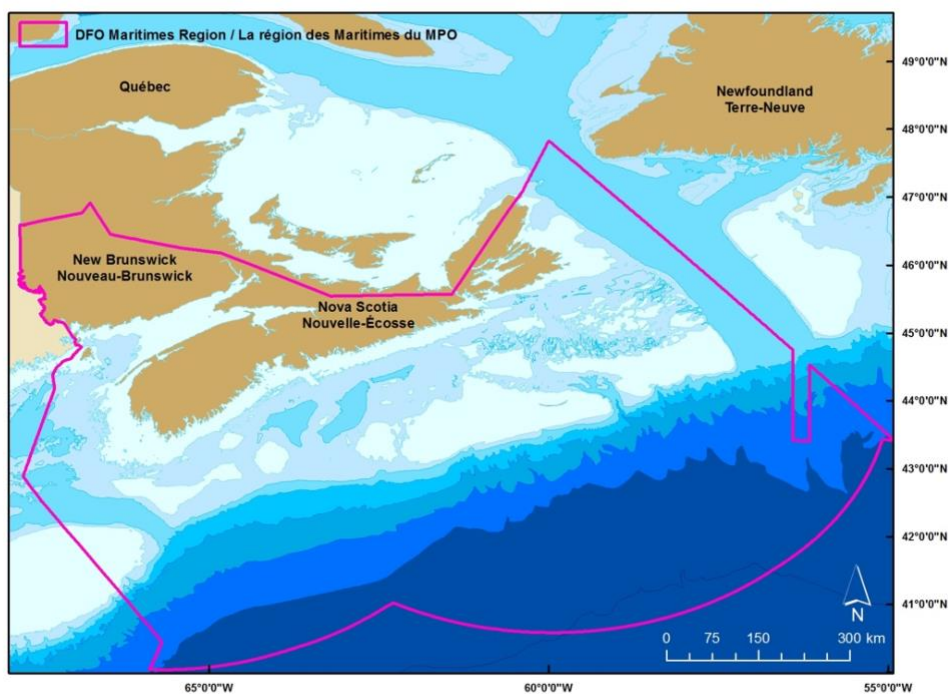


Figure 2. DFO Maritimes Region Boundary Map (DFO, 2018c)

2.2 Marine Planning and Conservation (MPC)

The Marine Planning and Conservation (MPC) program, previously named Oceans Management, uses an integrative and evidence-based approach to addressing various ocean issues, including oceans health, marine habitat loss, declining biodiversity, and growing demands for access to ocean space and resources (DFO, 2018b). The *Oceans Act* provides the legislative basis for the MPC program, whereas Canada's Oceans Strategy provides a framework for managing marine and coastal ecosystems. For advisory and decision-making processes, program staff from MPC consider information on ecological, social, and economic impacts in order to ensure the sustainable use of Canada's ocean resources. As described in the *Act*, key components

of the program include establishing Marine Protected Areas (MPAs) and developing and coordinating the implementation of a national systems of MPAs, developing and implementing integrated ocean management plans, and establishing marine environmental quality (MEQ) guidelines (*Oceans Act*, 1996).

2.2.1 Marine Protected Areas (MPAs)

The Marine Protected Areas (MPAs) program is responsible for leading and coordinating the development of a national system of marine protected areas, for reasons outlined in the *Oceans Act*. MPAs are a management tool used by DFO to protect and conserve marine biodiversity. MPAs have been shown to provide many benefits, including ecosystem conservation and restoration, fisheries improvements, climate change mitigation, and the reduction of disaster risk (IUCN WCPA, 2018). As well, MPAs support local Canadian economies and coastal communities. 14 *Oceans Act*-designated MPAs currently exist across Canada, comprising of roughly 6% of Canada's marine and coastal areas (DFO, 2020). The three streams of work within the MPA program are: network planning (the identification of sites); the management of existing sites; and advancing Areas of Interest (AOIs) or other conservation tools. Multi-stakeholder advisory committees and consultation methods are used for facilitating advice externally. Stakeholders in MPA development include industries (such as fishing), the provinces, and the Mi'kmaq of Nova Scotia. Internally, managers from the MPA program provide advice to senior management about MPA development and implementation. When necessary, managers from the MPA program will seek out information from within the department (i.e. DFO Science) to formulate advice.

2.2.2 Marine Spatial Planning (MSP)

The Intergovernmental Oceanographic Commission of UNESCO defines Marine Spatial Planning (MSP) as “a public process of analyzing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic and social objectives that have been specified through a political process” (Ehler and Douvère, 2009). Important outcomes of MSP include enhancing compatible uses, reducing conflict between incompatible uses, and reducing conflicts between human activities and nature (Ehler, 2018). MSP is an internationally recognized tool in ocean planning and has been adopted in approximately 65 countries worldwide (DFO, 2018d). Within MPC, the MSP program will take on the role of developing an integrated oceans management plan for the Maritimes Region. Recently, DFO was given a funding package (from 2019 to 2024) to support integrated management in the form of MSP. There are four streams of work within the MSP program. The first stream of work is the development of an online atlas for data publication, data use, and data exploration. The second stream of work is governance to support MSP, such as developing relationships and capacity with First Nations, Indigenous organizations, the provinces, and industry. The third stream of work is creating and publishing decision-support tools to support MSP and, lastly, developing a Marine Spatial Plan by 2024. The focus of these four streams of work is to support better decision-making by plan users. Plan users may include program staff from all Sectors of DFO, other government departments, industry, environmental non-governmental organizations (ENGOS), and others. Currently, the MSP program provides advice internally with respect to program development, such as advice on the scope of the plan, decision-support tools, and the content of the plan. Advice is also provided in terms of how to advance MSP with respect to stakeholders, including the provinces, First Nations, and

Indigenous organizations. At the end of the 5-year funding period it is anticipated that the plan will provide advice for ocean use and the development of new ocean activities, which aligns with the definition of MSP provided by Ehler and Douvère (2007). The program is primarily advisory and does not engage in high-level decision-making. The advice is intended to categorize and communicate current use of ocean spaces, which will also support conflict management particularly for emerging activities. Since MSP is in the early stages of development, the format of the advice has yet to be decided. When developed, the plan will be multi-faceted, with online interactive maps and online accessible decision-support tools. The hope from the MSP team is that all ocean industry and regulators will benefit from the tools and products provided by the Plan, particularly when making decisions.

2.2.3 Marine Environmental Quality (MEQ) Monitoring

Marine Environmental Quality (MEQ) guidelines are measurable targets for integrated management and MPA plans, under which management decisions are made (DFO, 2018a). The regional MEQ program aims to identify urgent marine quality issues, identify management gaps, and address gaps through regulatory and non-regulatory measures. The initial focus of the MEQ program is on stressors caused by marine shipping activities, such as underwater noise and its associated effects on marine species. Other MEQ issues include marine contaminants, marine debris, and microplastics. The MEQ program is responsible for providing advice in two focus areas. The first is a focus on science, such as research to address knowledge gaps of underwater noise and its effects on species. The second focus area is on management, which aims to coordinate the management of underwater noise and other tools to address ocean stressors.

2.3 Aquaculture Management

Within DFO's overall mandate, the department's vision for aquaculture is "to benefit Canadians, now and in the future, through the culture of aquatic organisms, while upholding the ecological and socio-economic values associated with Canada's oceans and inland waters" (DFO, 2019). Aquaculture activities in Canada are regulated and managed by various federal, provincial, and territorial bodies. In the Maritimes Region, the aquaculture industry is regulated through the *Fisheries Act* and various regulations and policies, including the Aquaculture Activities Regulations, the Fishery General Regulations, and the Aquaculture Policy Framework. Provincial authorities, such as the Nova Scotia Department of Fisheries and Aquaculture (NSDFA) or the New Brunswick Department of Agriculture, Aquaculture and Fisheries (DAAF), are responsible for issuing aquaculture leases and licenses. As well, several federal government departments and agencies are involved in the regulation of Canada's aquaculture sector, including the Impact Assessment Agency of Canada, the Canadian Food Inspection Agency, Health Canada, and Transport Canada. The Aquaculture Management program is responsible for ensuring that all approved aquaculture activities align with the department's mandate and vision. The Aquaculture Management program upholds this responsibility through various advisory functions and decision-making points, such as providing advice to the provinces regarding aquaculture site reviews, administering the Introductions and Transfers (I&T) licensing program, and providing advice and support to DFO's role in the Canadian Shellfish Sanitation Program (CSSP), which is carried out in conjunction with the Canadian Food Inspection Agency (CFIA) and Environment and Climate Change Canada (ECCC).

2.3.1 Aquaculture site reviews

Staff in the Aquaculture Management program provide advice to the provinces regarding finfish and shellfish aquaculture site proposals in the Maritimes Region. When managers receive an application from a proponent, the information in the application is evaluated by different sectors within the department. The different sectors review the proposal in accordance to their mandates. Senior advisors in Aquaculture Management package the advice from the sectors into a formal letter of advice, which is sent to either the NSDFA or the DAAF. The letter of advice details mitigation and avoidance measures. The letter of advice influences the decision by the provincial departments to issue an aquaculture licence or not. The ultimate decision to issue an aquaculture license is made by the provincial government. Program staff also provide advice informally to public proponents, First Nation communities, or the province. This type of advice can range from information about the application process, to guidance on monitoring or testing, or an explanation of the Aquaculture Activity Regulations (AAR).

2.3.2 Introductions and Transfers (I&T)

Managers in the Aquaculture Management program make decisions regarding licensing for Introductions and Transfers (I&T). The I&T process is triggered when there is a proposal to remove live fish from one habitat and transfer the fish to a different fish habitat or a fish rearing facility. The I&T processes is used for transferring stocks to and from aquaculture sites, for public display, or for research. The decision to authorize an I&T permit is based on whether the proposal meets the requirements of section 56 (a-c) of the Fisheries General Regulations (FGRs), which are generally categorized as ecological, disease, and genetic requirements. A preliminary risk screening and, if required, a formal risk assessment is conducted to inform the decision.

2.3.3 Canadian Shellfish Sanitation Program (CSSP)

The Canadian Shellfish Sanitation Program (CSSP) is a federal food safety program that is administered by the Canadian Food Inspection Agency (CFIA), Environment and Climate Change Canada (ECCC), and DFO. The goal of the CSSP is to minimize the health risks related to the consumption of contaminated molluscan shellfish such as oysters, mussels, and clams (Government of Canada, 2019). The role of DFO in achieving this goal is to open and close shellfish harvest areas, monitor harvest activities within these areas, and notify the public of harvest area closures. Within Aquaculture Management, operational advice is provided through letters of advice, analysis of briefing notes, and analytical notes on policy. This advice influences decisions regarding governance amendments, briefing note material, and resource allocation within CSSP.

2.4 Fish and Fish Habitat Protection Program

The Fish and Fish Habitat Protection Program (FFHPP) is a program of the Aquatic Ecosystems Sector that administers and ensures compliance for development projects that occur in and around aquatic ecosystems, both marine or freshwater. The program goals are: 1) to conserve existing fish and fish habitat resources; 2) to protect these resources against future impacts; and 3) to restore fish habitat (DFO, 2020). As well, biologists in FFHPP provide advice to different stakeholder groups, such as ENGOs, provincial and federal government agencies, or Indigenous groups and First Nations. Work done in the FFHPP is carried out under the fish and fish habitat protection provisions of the *Fisheries Act* and the relevant provisions of the *Species at Risk Act*. Program biologists review proposed projects and assess their potential effects on fish and fish habitat, provide advice on how to avoid and mitigate causing harmful alterations, disruptions, or destruction of fish habitat (HADD) and the death of fish (DoF). As well as issue

authorizations and permits, if required, and provide expert regulatory advice during environmental assessments and impact assessments.

2.4.1 Proposed projects in and around fish habitat

Program biologists in FFHPP provide expert advice regarding the effects of proposed activities on fish and fish habitat or aquatic species at risk. Proposed projects can range from small-scale projects relating to highways, bridges, or culverts, to large-scale projects such as offshore oil and gas, or in-stream tidal power. Biologists in the FFHPP provide advice on whether a project requires a *Fisheries Act* authorization or a *Species at Risk Act* (SARA) permit based on its potential cause prohibited effects to fish and fish habitat or to aquatic species at risk. When reviewing a proposed project, biologists determine the potential effects to fish and aquatic species at risk and provide advice on measures to avoid and mitigate the HADD and/or DoF. When impacts cannot be completely avoided or mitigated, biologists provide advice on measures to offset residual impacts to help counterbalance the effects. Issuing *Fisheries Act* authorizations and SARA permits are the responsibility of the Minister.

2.4.2 Environmental Assessments and Impact Assessments

Another key responsibility of program biologists in the FFHPP is participating in federal and provincial environmental assessment or impact assessment processes. During environmental or impact assessments, FFHPP biologists provide expert advice in regard to fish and fish habitat and aquatic species at risk. During an environmental or impact assessment, advice is provided to other federal and provincial regulators, such as Nova Scotia Environment for provincial assessments, the Impact Assessment Agency of Canada for federal impact assessments, or the Canada Nova Scotia Offshore Petroleum Board for assessments under the *Accords Act*. Aside

from direct regulatory advice provided through these processes, program biologists also provide advice that is scientific and technical in nature around the status of fish and fish habitat and aquatic species at risk.

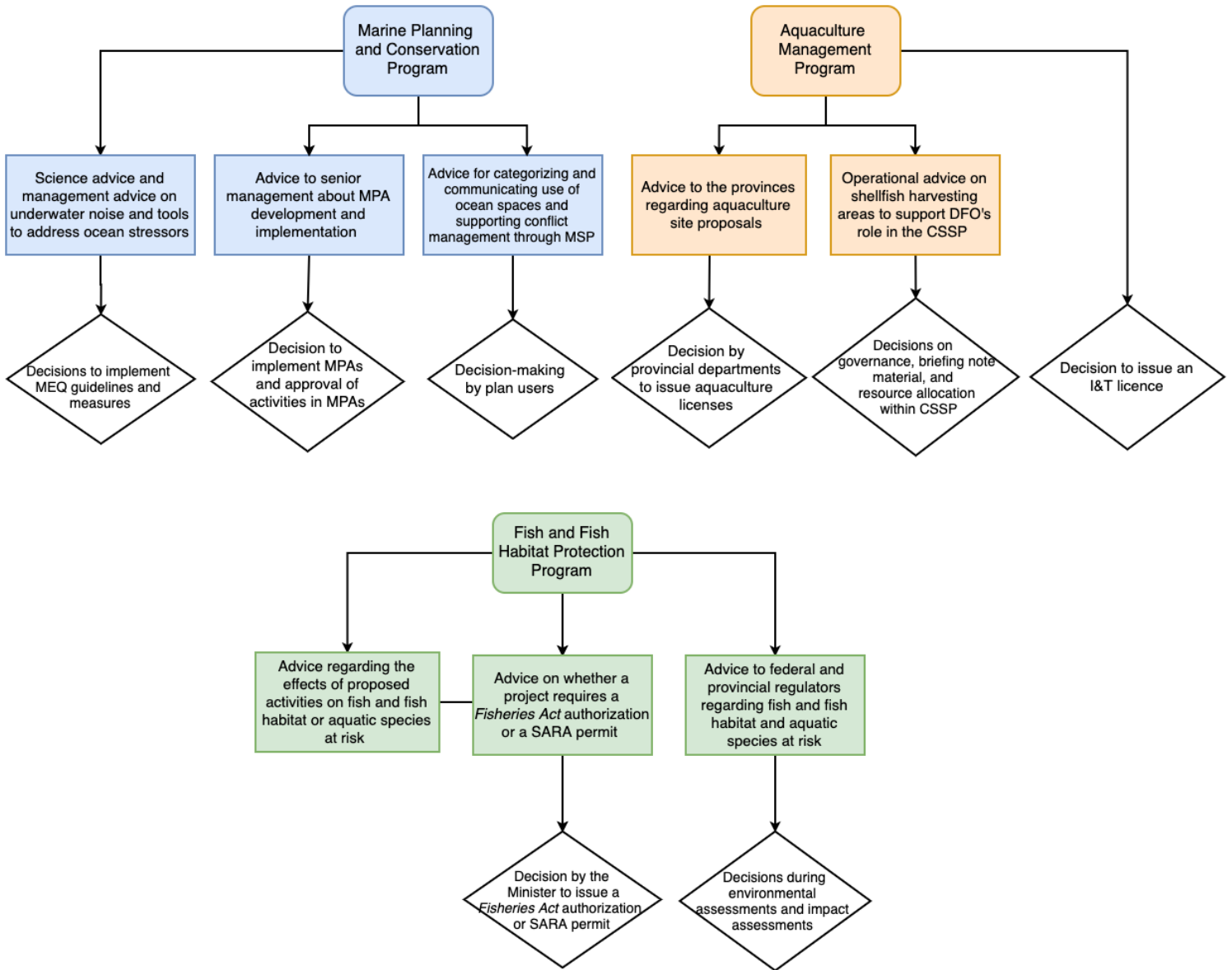


Figure 3. Advisory and decision-making points of three key programs in the Aquatic Ecosystems Sector.

CHAPTER 3: METHODS

3.1 Structured Interviews

To fulfill the research objectives, structured interviews (n=14) were conducted with program staff from the Aquatic Ecosystems Sector in July and August 2020. A study sample of 9 interviews from three programs was selected for analysis in order to narrow the scope of the project. An equal number of participants were included from each program: MPC (n=3), Aquaculture Management (n=3), and FFHPP (n=3). The staff were selected based on their role within the program and participation included Section Heads, Regional Managers, Senior Advisors, and Senior Biologists. For MPC, staff from the MSP and MPA programs were included in the study; however, there was no participation from the MEQ program. Interviews were carried out over Microsoft Teams, a communication platform that can be used for audio meetings. The majority of the interviews were audio recorded following oral consent from the participant. For interviews that were not audio recorded, detailed notes were taken by the researcher. Participants were given a copy of the questionnaire one week prior to their interview. The interview script and questionnaire are provided in Appendix III. On average, the interviews were 1.25 hours long, but ranged from 45 minutes to 2 hours. Ethics approval to conduct the study was obtained through the Marine Affairs Program Ethics Review Standing Committee (MAP2020-06), which is provided in Appendix I.

Part 1 of the questionnaire asked participants to provide a brief overview of their program's activities, including key decision-making points and advisory functions. Part 2: Phase 1 of the questionnaire asked participants to provide a more detailed description of advice. Part 2: Phase 2 asked participants to comment on the factors influencing the advice provided by their program. The questions were designed for participants to identify changes to these factors that

would improve the advisory and decision-making processes of their program. Part 3: Phase 1 of the questionnaire asked participants to provide a more detailed description of decision-making points for their program. Part 3: Phase 2 asked participants to comment on the factors influencing decision-making. Oftentimes, participants had a difficult time differentiating between advice and decision-making. Many participants had the same responses for Part 2 and Part 3, whereas others believed they only provided advice and did not make decisions. Nonetheless, the aim of this research is to identify where there may be improvements to these processes based on staff experience, rather than differentiating and characterizing actions as ‘advice’ or ‘decision-making’. For the data analysis, Part 2 and Part 3 of the questionnaire were combined and simplified to factors influencing advice and decision-making.

3.2 Data Analysis

Audio-recorded interviews were transcribed non-verbatim (excluding non-speech sounds, false starts, self-corrections, and stutters) into a Microsoft Word document for content analysis. Content analysis is a research method for describing and making valid inferences from data to their context, in order to provide knowledge, new insights, a representation of facts, and a practical guide to action (Krippendorff, 1980; Elo and Kyngäs, 2008). The transcripts were analyzed using NVivo (Version 12), a qualitative data analysis software. Analysis began with multiple readings of the 9 interview transcripts to identify key phrases and segments. Coding was used to mark segments of the interview data with descriptive words, which were then categorized into themes and sub-themes. A code in qualitative analysis is a word or short phrase that assigns a summative, salient, and/or evocative attribute to a selection of language-based or visual data (Saldana, 2016). To help guide the analysis, the overarching themes were identified prior to the analysis. The themes were: types and formats of information, policies and regulations,

governance structures and collaboration, and program capacity. The themes represent factors influencing advice and decision-making, whereas the sub-themes provide more specific examples of these factors. Throughout the analysis, similar sub-themes were merged. Follow-up interviews were conducted with a few participants when the researcher needed clarification about an aspect of the transcript or when the participant wanted to provide additional information.

3.3 Limitations

Since participants were interviewed about their own programs, it is impossible for this research to be objective. Due to participants subjectivity, there is the potential for unintentional bias in this research. In order to address potential bias, the participants were reassured that their responses would be kept anonymous and that there was no risk for participating in this research study (i.e. participation would not cause ramifications to their position). Prior to and throughout the interviews, participants were reminded that the intention of this research is to produce recommendations for management plans that will improve the advisory and decision-making processes of key programs, based on the issues identified by staff. Therefore, it was in the best interest of participants to answer the questions honestly. Participation for this study included staff from three programs in the Aquatic Ecosystems Sector of the DFO Maritimes Region exclusively; therefore, the results from this study may not be reflective of the needs or perspectives of all programs, sectors, or regions. Nevertheless, this study presents a learning opportunity for managers and staff beyond the study sample.

CHAPTER 4: RESULTS

4.1 Types and formats of information

In order to formulate advice and make decisions, program staff must seek out relevant information from within the department or from external sources. Government decision makers and their advisors must choose from a wide range of available information, often while facing competing views from stakeholders, as well as financial and time constraints (MacDonald et al., 2016). The type of information and the format in which it is stored and received is important and can influence the decision-making process. When asked about improvements to the current types and formats of information available, participants were given the following examples to help guide their responses: data, maps, frameworks, and analytical tools. These examples provide the sub-themes for this category. None of the participants commented on improvements to frameworks, therefore, it was not listed as a sub-theme. Later in the questionnaire, participants were asked about the consideration of cumulative effects when providing advice. Since cumulative effects assessments are a type of information, this was the fourth sub-theme. Table 1 provides a summary of changes to the types and formats of information for improving program specific advice and decision-making.

4.1.1 Data

Four of the nine participants (44.44%) thought that knowledge gaps, data quality and accessibility, and scale are more limiting to advice and decision-making than the format in which information is received. For Aquaculture Management, improved knowledge of fish pathogens and fish disease in wild and genetic fish would greatly improve risk assessments. Furthermore, data with improved spatial and temporal resolution would help with conducting risk assessments, particularly by determining the spatial distribution of fish and fish habitat. For FFHPP, there is a

knowledge gap in eelgrass delineation and mapping. One participant identified data gaps as a bigger challenge than the format in which information is received in, commenting:

We have technical experts that can receive and comb through scientific papers and information and maps and frameworks. If we're saying [it is] factors influencing, I'd like to see more data or more collection, that's bigger of a gap than the format that the information is received (FFHPP-C2).

In MPC, there are three main streams of information for providing advice: scientific information, socio-economic information, and the viewpoints of stakeholders. According to one participant from MPC, the most difficult type of information to access is the viewpoints of stakeholders. In terms of socio-economic information, this participant would benefit from information about the economic costs that certain decisions would have on different interest groups. The importance of socio-economic information in the advisory and decision-making process was echoed by another participant in MPC. This participant suggested the introduction of an integrated analysis tool for determining economic trade-offs between different sectors. For example, a way to compare aquaculture site development versus ongoing seasonal lobster fishing in a given area or bay.

4.1.2. Maps

Access to current, comprehensive, and reliable spatial information (such as maps) is critical for informing decision-making in coastal and ocean management arenas (Canessa et al., 2007). Maps were identified as a common format of information for nearly all of the participants. Six of the nine participants (66.66%) indicated that there is room for improvements with the current mapping tools. Maps were described as extremely beneficial for searching and displaying information to support advice and decision-making. The most important aspects of mapping

tools, according to participants, are that they are easily searchable, detailed, and include many layers. For Aquaculture Management, small-scale human use mapping products, geo-located landings, and more detailed layers on existing maps were identified by one participant as key improvements areas for this format of information. There is currently a lot of mapping done of the harvesting sector and fisheries; however, one participant from MPC would benefit from mapping of the processing sector as well. Specifically, a way to spatially represent how changes to the biomass of a fish, or harvesting, impacts the processing sector. This type of mapping would reveal insights into the dependency of a coastal community on a given resource.

4.1.3 Analytical Tools

In terms of analytical tools, two participants (22.22%) emphasized the need for improved clarity and scientific knowledge on suitable risk tolerance thresholds when deciding whether or not to advise the provinces to issue an aquaculture license. When making decisions about licensing, staff from Aquaculture Management are responsible for conducting a risk assessment based on three categories of risk (ecological, disease, genetic). Currently, there is a lack of guidance surrounding the threshold of risk for conducting risk assessments. Having pre-established thresholds would help streamline the authorization process and allow for better advice and decision-making.

4.1.4 Cumulative Effects Assessments

The consideration of cumulative effects is required to support the management decisions of multiple DFO sectors (Murray et al., 2020). The term cumulative effect describes the changes to the world's ecosystems as a result of exposure to multiple human disturbances (Hodgson et al., 2019). Under the Fish and Fish Habitat Protection Provisions of the amended *Fisheries Act*

(enacted in June 2019 with royal assent to Bill C-68) it is a requirement for staff to consider cumulative effects when carrying out regulatory responsibilities. Specifically, this requirement indicates the necessity to assess cumulative effects in the context of fish and fish habitat protection. Although there is no mention of cumulative effects in the *Oceans Act*, several guiding documents outline the importance of considering cumulative effects when developing integrated oceans management, such as Canada's Oceans Strategy (2002). Three participants (33.33%) indicated that cumulative effects assessments and broader cumulative effects considerations could be improved.

One participant from MPC would like to see integrative cumulative effects assessments done in advance before the decision-making authority receives the information or advice. This participant believes that it should be a requirement for DFO to provide the analysis of data in advance, such as cumulative effects assessments, rather than giving discreet data sets to decision-makers (i.e. the province). In order for that to occur, there needs to be a public, agreed upon framework to operationalize the cumulative effects assessment, which is currently being developed.

In Aquaculture Management cumulative effects are considered by analysis of spatial and temporal interactions by various industries and other projects impacting fish and fish habitat. In order to assess cumulative impacts, advice is gathered from different sectors and layered. One participant indicated that cumulative effects analysis is a major part of the siting work for aquaculture and that there is always room for improvement.

In FFHPP, when a project requires a *Fisheries Act* authorization, managers must consider cumulative effects from other projects that have previously been authorized or future projects that the program knows will need to be authorized. One participant thought that an improvement

could be the consideration of cumulative effects outside of the authorization area. Oftentimes, high risk projects receive an authorization whereas medium-to-low risk projects receive a letter of advice, and only the higher risk projects receive a thorough cumulative effects assessment. There is concern that there could be a lot of smaller projects taking place with impacts that are not being cumulatively assessed. As well, this participant would like more guidance on the spatial and temporal scales for assessing cumulative effects.

Table 1. Summary table of changes to the types and formats of information that would improve advisory and decision-making processes of the three programs analyzed. Source: Interviews A1 – C3.

<u>Program</u>	Data	Maps	Analytical Tools	Cumulative Effects Assessments
<i>Marine Planning and Conservation</i>	<ul style="list-style-type: none"> - Socio-economic information - Viewpoints of stakeholders 	<ul style="list-style-type: none"> - Mapping of the fish processing sector 	<ul style="list-style-type: none"> - Integrative analytical tool for determining economic trade-offs between different decisions 	<ul style="list-style-type: none"> - Integrative cumulative effects assessments done for all information and advice given to decision-makers
<i>Aquaculture Management</i>	<ul style="list-style-type: none"> - Improved knowledge of fish pathogens and fish disease - Data with improved spatial and temporal resolution 	<ul style="list-style-type: none"> - Small-scale human use mapping products - Geo-located landings - More detailed layers on existing maps 	<ul style="list-style-type: none"> - Clarity of risk tolerance thresholds - Pre-established risk thresholds - Tools with common and coherent terminology 	N/A
<i>Fish and Fish Habitat Protection Program</i>	<ul style="list-style-type: none"> - Improved knowledge of eelgrass delineation and mapping - More data collection 	N/A	N/A	<ul style="list-style-type: none"> - The consideration of cumulative effects outside of the authorization area - More guidance on spatial and temporal scales for assessments

4.2 Policies and regulations

The advisory and decision-making processes in the Aquatic Ecosystems Sector are guided by legislation (*Oceans Act, Fisheries Act, SARA*) and associated policies, regulations, and frameworks. This section highlights potential improvements to the policies and regulations associated with the three programs studied. Participants were first asked to list the policies and regulations associated with their program, and second, to identify changes to these policies and regulations that would help improve their advisory and decision-making processes. The following three sub-themes, which emerged through the analysis of participant responses, represent potential improvement areas: New or revised policy or regulation, consistent application of existing policy or regulation, and clarification of existing policy or regulation (Figure 4). It is important to note that some participants fall under more than one sub-theme, as they identified more than one issue with the current policies or regulations used by their program.

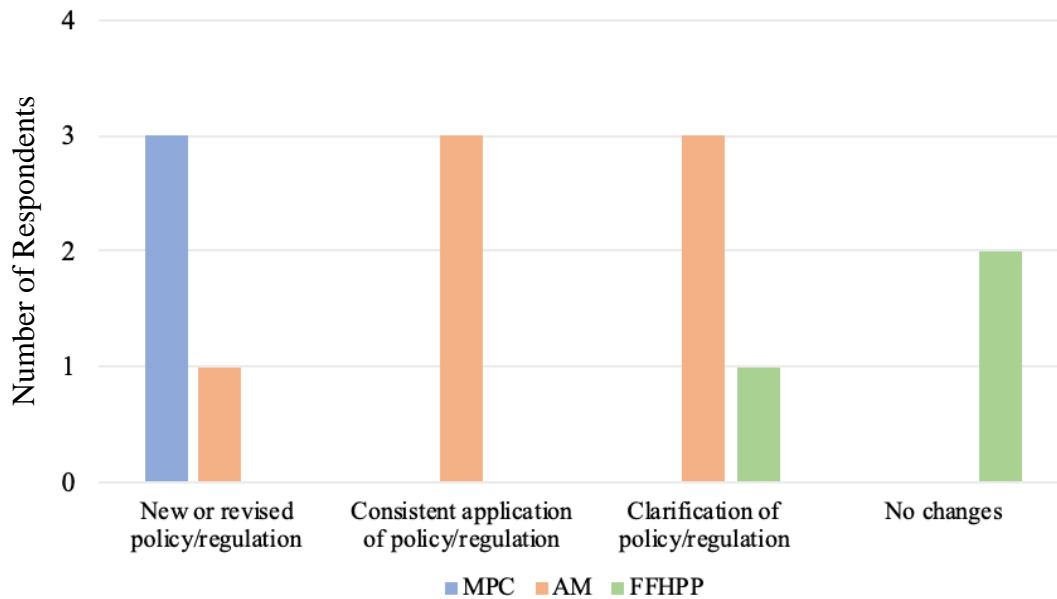


Figure 4. Changes to the policies and regulations that would improve the advisory and decision-making processes of the three programs analyzed. Source: Interviews A1 – C3.

4.2.1 *New or revised policy or regulation*

Four of the nine participants (44.44%) thought that a new or updated policy or regulation for their program would improve the advisory and decision-making process. This was identified as an area of improvement for MPC and Aquaculture Management. For the MSP program, there is only one policy that is directly linked to marine spatial planning and it is old and outdated.

According to one participant from MPC, the policy needs to be updated from the old integrated management framework to a new marine spatial planning framework, particularly by including a spatial element. Furthermore, the terminology and governance elements of this policy need to be updated to reflect the current goals for MSP. Two participants expressed concern over the MSP program due to the lack of policy documents being prepared for the plan. Currently, there is no reference to the term “marine spatial planning” in the *Oceans Act* or in any DFO policy. In one interview, this was referred to as a “policy void” (MPC-A1), whereas another participant stated that it “seems like an oversight” (MPC-A2). Since MSP falls under the *Oceans Act*, it is not mandatory for other federal departments to participate in the development or implementation of the plan. Since provincial departments are autonomous, it is not mandatory that they participate either. Thus, there is no way to secure participation for MSP from parties other than DFO, both federally and provincially. As a way to secure participation for MSP, one participant suggested the development of a “National Oceans Commission” (MPC-A1).

For the MPA program, the protected area sites are established under the *Oceans Act* and have individual regulations attached to them (i.e. Gully Marine Protected Area Regulations, St. Anns Bank Marine Protected Area Regulations). The development of these regulations has been ongoing for the past 15 years. The requirements for the regulations have changed since their inception, resulting in inconsistencies amongst the old and new regulations, particularly in terms

of language and abilities. Additionally, there are no external MPA policy documents that are available to the public. Regarding publicly available information, one participant remarked, “the biggest issue with protected areas is that our policies are out of date. There is nothing on the public record that explains to the public what protected areas are” (MPC-A3). Therefore, there is no way to provide the public with a description of the MPA program or an explanation of the processes and decisions made by the program.

According to one participant in Aquaculture Management, the Aquaculture Activities Regulations (AARs), which were registered in 2015 under subsection 36(5.1) of the *Fisheries Act*, are old and therefore do not allow for technological innovation and innovative processes. Since aquaculture is a highly innovative and dynamic industry, this is a limiting factor.

4.2.2 Consistent application of existing policy or regulation

Three of the nine participants (33.33%) indicated that regional inconsistencies with the way policies or regulations are rolled out hinders program delivery. This is specifically related to Aquaculture Management, where aquaculture policies and regulations that are national in scope are being interpreted differently across regions. This is due to a lack of guidance on how the policies and regulations should be interpreted and operationalized. One participant thought that inconsistencies in the way the AARs are interpreted, along with a lack of guidance from National Headquarters, is the biggest challenge facing the Aquaculture Management program. Part of the inconsistent interpretation of aquaculture policies and regulations lies in the fact that different provinces have different roles in aquaculture management. For example, in British Columbia, DFO is the lease and licensor of aquaculture. In Atlantic Canada, Nova Scotia and New Brunswick are responsible for aquaculture leasing and licensing and DFO holds regulatory responsibilities. All three provinces operate from the same AARs, despite major legislative

differences amongst them. Aquaculture companies typically operate in more than one province or region, which causes further confusion.

Another participant thought that jurisdictional overlaps between the province of Nova Scotia and the federal government is the main challenge facing Aquaculture Management when it comes to decision-making. This participant argued that if a similar process to British Columbia was adopted in the Maritimes Region, it would resolve major issues with jurisdictional overlap. Another participant thought that the Memorandums of Understanding (MOUs) are a limiting factor commenting, “everything that seems to be undecided between the provinces and the federal government is because of ambiguity in the MOU's (AM-B1).” The MOUs were written so long ago that some present realities are not accounted for.

4.2.3 Clarification of existing policy or regulation

Four of the nine participants (44.44%) thought that a policy or regulation used by their program needs further clarification or guidance on its application. This was identified as an issue in Aquaculture Management and FFHPP. One participant mentioned that a lack of “policy advice” (AM-B2) for the AARs leads to the regulations being interpreted differently across regions, as highlighted above. Several changes to the AARs were suggested among participants in Aquaculture Management. For instance, according to one participant, a change to the AARs that would improve the advice is a clarification of what reasonable measures are to reduce detriment of impacts of drugs, pesticides, and biochemical oxygen demanding matter. Another suggestion was in regard to the Introductions and Transfers (I&T) process, specifically, a clarification of the Section 52 and 56 authorization and licensing processes. For another participant in Aquaculture Management, a simplification and clarification of the role of the CSSP within the Aquaculture Management program would improve the advice provided on this file.

Currently, there is an Aquaculture Act being developed and exercises to improve the AARs; however, those may be years down the road.

In FFHPP, the policy for offsetting the death of fish is challenging to interpret and requires further guidance, according to one participant. The Offsetting Policy Guide, which is shared with the proponents when they are developing offsetting plans, often gets misinterpreted as mitigation rather than offsetting. Offsetting in general was identified as a challenge for this program. For instance, one participant remarked,

If a project needs an authorization for death of fish, then how do we offset that? That's something that we struggle with, how do you numerate or provide a number to quantify what you think the death of fish would be and then an appropriate offset for that. It's a tricky one (FFHPP-C3).

Two participants from FFHPP did not suggest any changes to the current policies and regulations for their program. They attributed this to the recent amendments to the *Fisheries Act* and explained that they have not been using the new policies for long enough to comment on potential changes.

Table 2. Summary of changes to policies and regulations that would improve program specific advisory and decision-making processes. Source: Interviews A1 – C3.

<u>Program</u>	New or revised policy/regulation	Consistent application of policy/regulation	Clarification of policy/regulation
<i>Marine Planning and Conservation</i>	<ul style="list-style-type: none"> - New MSP policy is needed - MPA regulations need to be updated, particularly in terms of language and abilities - External MPA policy document is needed 	N/A	N/A
<i>Aquaculture Management</i>	<ul style="list-style-type: none"> - AARs need to be updated to allow for technological innovation 	<ul style="list-style-type: none"> - National aquaculture policies and regulations are being interpreted differently across regions - Lack of guidance from DFO's National Headquarters - Jurisdictional overlaps between provincial and federal government 	<ul style="list-style-type: none"> - Lack of policy advice for the AARs - Clarification of measures to reduce impacts of drugs, pesticides, and biochemical oxygen demanding matter - Clarification of the Section 52 and 56 authorization and licensing processes - Clarification of the role of the CSSP within the Aquaculture Management program
<i>Fish and Fish Habitat Protection Program</i>	N/A	N/A	<ul style="list-style-type: none"> - Guidance on the Offsetting Policy Guide - Clarification of the offsetting process in general

4.3 Program organization

Organizational structures and cultures can influence the movement of information as it relates to the implementation of management approaches (Soomai, 2017). Governance structures and collaboration are two aspects of program organization that can influence how program tasks are carried out. Participants were asked whether the current governance structures, including clarity of roles and responsibilities, support the advisory and decision-making processes. As well, participants were asked whether their processes for collaboration are sufficient and where improvements are needed. Table 3 provides a summary of the influence of program organization on advice and decision-making

4.3.1. Governance structures

Four participants (44.44%) indicated that governance structures are insufficient and significant improvements are needed. Of these four participants, two outlined current work that is being done to improve governance structures. Five participants (55.55%) thought that current governance structures, including clarity of roles and responsibilities, are sufficient.

One participant from MPC explained that they have pieces of governance structures for MSP, but they are generally bilateral in nature. Currently, governance structures are not capable of supporting the development of the plan, but they are in progress. The MSP team is in the process of developing relationships with the provinces, First Nations, Indigenous organizations, and industry in order to strengthen governance and collaboration. For the MPA program, there are governance structures with the province, but according to one participant it is not a “functional [and] operational relationship” (MPC-A3). Oftentimes, discussions with the province are strategically kept at a high level and lack operational aspects, which prevents MPC managers from advancing their objectives. Another participant in MPC explained that the governance

structures are there; however, there is always the potential for multiple conflicting mandates in governance structures to prevent effective ocean management. This is particularly relevant in countries like Canada where there is jurisdictional overlap in the ocean space.

According to one participant in Aquaculture Management, governance structures and clarity of roles and responsibilities are insufficient due to unresolved issues with the AARs. The participant commented,

All of that [governance structures and clarity of roles and responsibilities] is lacking I would say. It's the same thing that we keep saying over and over again. There's not a lot of policy advice accompanying the regulations, with the siting work right now (AM-B1).

Another participant explained that gaps in the CSSP governance model make it challenging to know when to offer advice and what advice to offer; however, there is ongoing governance reform within senior management to address these challenges. This participant would benefit from clarity surrounding their role within regional CSSP efforts.

Participants from FFHPP reported strong governance structures for both environmental assessments and their own regulatory review processes. This was attributed to a “clear hierarchy and decision-making protocol and process” (FFHPP-C1) and the recent modernization of the *Fisheries Act*. Roles and responsibilities, including signing authority, are clear. Strong governance structures in FFHPP result in more streamlined decision-making and more consistent advice. As well, governance structures are being improved through changes to the *Fisheries Act*, such as new codes of practice, which will further strengthen regulatory processes.

4.3.2 Collaboration

Collaboration, both internal and external, is a key activity in the Aquatic Ecosystems Sector. Internally, program staff collaborate with colleagues from other programs or Sectors,

such as DFO Science, Policy and Economics (P&E), or Resource Management. Externally, managers may need to collaborate with the provinces, industries, Indigenous organizations, or academic institutions. Collaboration typically occurs through working groups and committees and can occur through formal or informal processes. During the interviews, the participants all agreed that collaboration is necessary to achieve program objectives. When asked whether the current degree of collaboration is sufficient, four participants (44.44%) thought that collaboration is currently insufficient, whereas five participants (55.55%) thought that collaboration is sufficient. Among all participants, many improvement areas were identified, such as the need for aligning Canadian Science Advice Secretariat (CSAS) timelines and program timelines, increasing information sharing between programs within the Sector, and increasing face-to-face discussions when seeking advice.

Collaboration is necessary to deliver comprehensive MSP. Since the plan is in its early stages of development, the degree of collaboration is currently insufficient with respect to provincial interests, First Nations, and industries. In terms of the MPA program, the degree of collaboration is insufficient due to a number of factors, such as the capacity of other organizations to participate, the frequency at which the program asks for advice from the same organizations, and the way requests for advice are structured. One participant thought that requests for advice are too formal since they often occur through email correspondence, commenting, “the one-on-one discussions don’t happen as much as they probably should to get true advice. If I was given a choice, all things considered, more face-to-face [discussions] post-COVID-19 [pandemic]” (MPC-A3).

The mechanism for external collaboration in Aquaculture Management is the Maritimes Aquaculture Advisory Team (MAT). This team is effective in facilitating collaboration amongst

different sectors and regulators. Strong collaboration amongst different regulators is also the result of the Canadian Council of Fisheries and Aquaculture Ministers (CCFAM), which recognizes the important role of collaboration in supporting the aquaculture sector. Aquaculture Management works collaboratively with the provinces through meetings and proactively sharing information. The positive collaboration with the provinces is the result relationship management, trust building, and a commitment to achieving the mandates of both DFO and the provinces. In terms of collaboration internally, one participant indicated that the CSAS process is time consuming and it can take up to two years to receive advice back. The CSAS office coordinates a scientific peer review process and delivers science advice to DFO. Before Aquaculture Management receives an application from the province or from a proponent, the application must go to the CSAS office. A full CSAS review is required for each application, which one participant described as “excessive” (AM-B1), since some applicants are requesting to develop a new site, whereas others may be requesting to move an existing site. Either way, it’s the same process, which can be time consuming. One participant from FFHPP mentioned that the CSAS process often doesn’t align with project timelines or regulatory timelines, commenting, “we’re legislatively required to make a decision, but it doesn’t always align with the ability to obtain proper advice through the process” (FFHPP-C1).

Collaboration is always required when offering advice on the Whale Sanctuary Project file and the CSSP file. Collaboration on the Whale Sanctuary Project file is sufficient, whereas with the CSSP file there is the potential for more robust collaboration. This is due to the lack of clarity surrounding roles and responsibilities of CSSP within Aquaculture Management. Lastly, one participant from Aquaculture Management indicated that more clarity surrounding Indigenous consultation would improve collaboration.

In FFHPP, collaboration is almost always required, depending on the scale of the project. For low risk projects, collaboration is not always needed. When a *Fisheries Act* authorization is required, internal collaboration takes place. Collaboration is also required when conducting environmental assessments and impact assessments, with DFO Science, the Species at Risk program, or Resource Management. Two participants indicated that collaboration is not always sufficient, due to the timelines that FFHPP operates under. It is often challenging getting science advice from other parts of the department because they receive many requests for advice, and they have limited staff. Any way of streamlining and improving that process would be beneficial. One participant from FFHPP thought that internal collaboration could be improved as they are unsure what type of information other programs have and whether that information could be useful for their processes. For example, this participant would benefit from knowing where existing and proposed protected areas are, commenting,

Maybe there's a proposal to protect an area and I'm just about to issue an authorization for an infill right around the corner or right in the middle of it. That would obviously be a worst-case scenario. but I'm just saying that having that information would be useful (FFHPP-C3).

Table 3. Summary of the influence of program organization on advice and decision-making for each program. Source: Interviews A1 – C3.

<u>Program</u>	Governance Structures	Collaboration
<i>Marine Planning and Conservation</i>	<ul style="list-style-type: none"> - MSP governance structures not currently sufficient, but they are in progress - MPA governance structures with the province are not functional or operational 	<ul style="list-style-type: none"> - Collaboration for MSP is currently insufficient - Collaboration in the MPA program is currently insufficient
<i>Aquaculture Management</i>	<ul style="list-style-type: none"> - Governance structures are insufficient due to the AARs - There are gaps in the CSSP governance model 	<ul style="list-style-type: none"> - Sufficient collaboration externally due to the CCFAM and MAT - Internally, collaboration with CSAS can be improved
<i>Fish and Fish Habitat Protection Program</i>	<ul style="list-style-type: none"> - Governance structures are strong for both environmental assessments and regulatory reviews 	<ul style="list-style-type: none"> - Collaboration is not always sufficient due to strict timelines - Collaboration with other Sectors and programs could be improved

4.4 Program capacity and expertise

When asked whether they have sufficient capacity and expertise to provide the advice requested and to make appropriate decisions, participants responses varied (Figure 5). Four of the nine participants (44.44%) thought that program capacity is sufficient. Two participants (33%) thought that capacity is currently insufficient and that more capacity is needed to improve their programs processes. Three participants (22%) explained that whether capacity is sufficient or not depends on the advice that is needed, as one participant stated, “at times we walk the line of sufficient capacity and expertise” (FFHPP-C2). One of these three participant explained that they have sufficient capacity for one of the files that they are working on, but insufficient capacity for the other file, explaining that they are on “a steep learning curve” (AM-B2).

According to the four participants whose program capacity is sufficient, this is the result of strong staff and the ability to reach out to specialists or experts within DFO or external agencies when necessary. In many cases, the core programs do not have the capacity and expertise required, but they are able to harness it from other areas within DFO or externally. Staff often seek out expertise from subject matter experts, such as experts from DFO Science or Resource Management. The process of seeking out information from within the department, however, is not without its challenges. According to one participant in MPC, the size of DFO, and the fact that multiple programs are frequently asking the same experts for information and advice, often hinders the exchange of information between subject matter experts and program managers. Another participant from FFHPP spoke about the flexibility to reach out to DFO Science or hire casuals to assist with reviews. Expertise within DFO regarding fish passage does not currently exist, so FFHPP staff need to contract someone when a project includes a fish passage facility. The program does not have sufficient capacity at all times, requiring program staff to often reach outside of the program for support. On the other hand, programs with a small staff size struggle with capacity and expertise. This is the case for Aquaculture Management, where one participant indicated that the program has a small amount of staff with high expertise. Areas where additional expertise is needed, include the I&T process (particularly with enhancements) and the CSSP file. The participant working on the CSSP file indicated that more capacity and expertise is needed due to the governance on the CSSP file, which is “sprawling and complicated” (AM-C3). Furthermore, working virtually on this file, due to the COVID-19 pandemic, has been challenging for this participant. Lastly, within Aquaculture Management, extra capacity is needed in the scientific knowledge of genetic and disease interactions for

shellfish. With the small amount of staff in this program, managers are having to prioritize work that deals with the health of fish at the expense of other work.

Overall, of the three programs included in this study, Aquaculture Management is the program that is lacking the most in capacity and expertise. Participants from MPC and FFHPP indicated strong capacity, aside from a few challenges with reaching out to subject matter experts and specialists outside of their programs. To explore this area further, the theme of program capacity is further broken down into the following three sub-themes: timelines, funding, and staffing. Table 4 provides a summary of the influence of these three factors on advice and decision-making for each program.

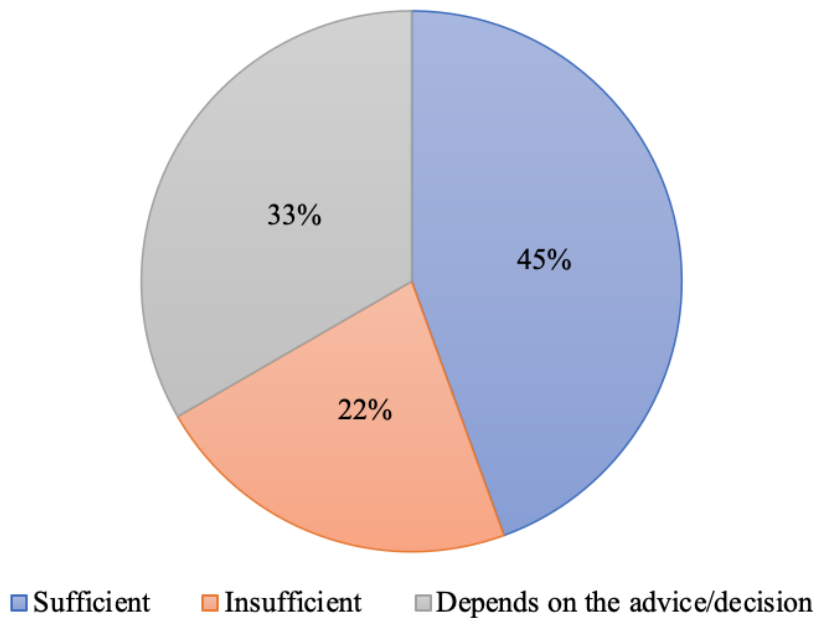


Figure 5. Participants responses to whether they have sufficient capacity and expertise to provide the advice requested and to make appropriate decisions. Source: Interviews A1 – C3.

4.4.1 Timelines

Three of the nine participants (33.33%) thought that the timelines for providing advice or making decisions are too short, whereas five participants (55.55%) indicated that program timelines are sufficient. One participant said that whether the timelines are sufficient or not depends on the task. One participant from MPC expressed concern regarding the five-year timeline to develop a marine spatial plan, commenting, “we started a little bit late, but still, ultimately it will be five years to develop a marine spatial plan, which is tight” (MPC-A1). Another participant from MPC explained that timelines for MPA development and management are sufficient; however, making time for training and skillset development would benefit these processes by improving individual staff capacity. For example, training to improve consultation skills sets and conflict resolution. According to this participant, time is the biggest limiting factor to skillset development, remarking,

For the most part people don't do it [training] because they just don't feel like they have the time. It's a classic problem of high functioning staff. They are really talented, and they work hard, and a lot is demanded of them, but at the same time, there's a lot of skill sets that may not be being developed because of that (MPC-A3).

One participant from Aquaculture Management explained that the timelines given to them by the province of Nova Scotia are not sufficient. There is no timeline for the final advice, but throughout the process there are milestones assigned by the province with associated timelines that are too short to meet. The participant mentioned that this does not cause any issues for the program, as the same level of work is being done regardless of the milestones, but they cannot speak on whether it affects the province. Lastly, one participant from FFHPP said there is not enough time for many of the impact assessment or environmental assessment processes.

Despite this, they recognized that there needs to be a balance between decision-making and the time it takes to gather the necessary information. This participant remarked,

A lot of the timelines are there to provide that balance, but it can be challenging to provide detailed advice in a 30-day window for major projects. With the projects where we're the federal authority, sometimes there might not be sufficient time to really look into it as much as you would like to (FFHPP-C1).

Overall, timelines are sufficient for the majority of participants and do not affect their ability to provide appropriate advice or make decisions; however, longer timelines for certain processes may improve the quality of advice by allowing more information to be gathered and assessed. Furthermore, additional time outside of these processes for training and skillset development would improve individual staff capacity and therefore improve program delivery. As well, a few participants mentioned the ability to stop the clock to wait for critical information or if additional Indigenous consultation is needed.

4.4.2 Funding

Two participants (22.22%) expressed concern over funding, specifically regarding the short-term nature of the funding for MSP. The MSP project received a 5-year funding package, with the plan itself being expected by 2024. Funding was granted to DFO and two other departments; however, funding was not provided to the provinces to participate in MSP. One participant sees the short-term funding for MSP as a threat to the cooperation and participation of the provinces and industries (i.e. the fishing industry). Certain provincial governments or certain sectors may choose to ignore the MSP project, recognizing that if there is no successful outcome after the 5-year funding period, it may cause MSP to “simply go away” (MPC-A2). The participant referred to the lack of support that the provinces and the fishing industry had for the ESSIM Initiative. Under the MSP funding umbrella, funding was provided to support

engagement and collaboration with First Nations; however, one participant indicated that the funding is not sufficient, and that significant long-term capacity funding is required to develop the expertise and knowledge required to participate. Therefore, the capacity of Indigenous organizations, communities, the provinces, and industries to participate in MSP is impacted by funding. One participant remarked, “funding [for MSP] needs to be provided for all, including the provinces in particular, with accountabilities” (MPC-A1).

4.4.3 Staffing

As mentioned previously, staff size has an impact on program capacity, which influences whether program staff need to reach out within DFO or beyond for information and expertise. Furthermore, staff turnover (the act of replacing an employee with another employee) has the ability to impact program continuity and delivery. Three participants (33.33%) identified small staff size or staff turnover as an impediment to their programs processes. One participant pointed out that staff turnover can affect program capacity and having staff who are aware of the history of the program is an important consideration. This participant explained that staff turnover “may not relate specifically to advice or decision-making but having continuity of staff within the program gives added value” (MPC-A2). When people’s roles within the department are constantly changing, it can result in a lack of progress.

One participant from FFHPP explained that staff turnover was an issue in the past, but the program has much more stability with staffing now due to increased capacity for regulatory reviews. Due to how busy the FFHPP program is with regulatory reviews, when a staff member is not in the office for an extended period of time, it can be challenging to backfill that position. Therefore, temporary changes to staffing do have an impact on the program, although

improvements have been made to increase stability. Another participant from FFHPP emphasized the importance of streamlining current processes, commenting,

I think we have pretty decent processes in place, I would say that the thing we need more is we could potentially use possibly more staff to be able to do the work of more streamlined processes and more advisory processes (FFHPP-C2).

Table 4. Summary of the influence of program capacity and expertise on advice and decision-making for each program. Source: Interviews A1 – C3.

<u>Program</u>	<u>Timelines</u>	<u>Funding</u>	<u>Staffing</u>
<i>Marine Planning and Conservation</i>	<ul style="list-style-type: none"> - Timeline to develop MSP is short - Time for training and skillset development is needed 	<ul style="list-style-type: none"> - Short-term funding for MSP is cause of concern - Funding is needed for stakeholders to participate in MSP 	<ul style="list-style-type: none"> - Staff turnover impacts program delivery
<i>Aquaculture Management</i>	<ul style="list-style-type: none"> - Provincial timelines are insufficient 	N/A	<ul style="list-style-type: none"> - Small staff size impacts program delivery
<i>Fish and Fish Habitat Protection Program</i>	<ul style="list-style-type: none"> - Timelines for impact assessments and environment assessments are short 	N/A	<ul style="list-style-type: none"> - More staff would result in more streamlined processes

CHAPTER 5: DISCUSSION

This research documents the influences on advice and decision-making in three key programs in the Aquatic Ecosystems Sector of the DFO Maritimes Region. Problem areas varied across programs; however, there were a few similarities that arose through the analysis. In this chapter, recommendations for improving the advisory and decision-making processes of each program are provided, based on the specific issues that were raised. Secondly, based on similarities across all programs, three overarching recommendations for advancing ICOM in the Maritimes Region are provided. It is unlikely that ICOM will be able to address all of the issue raised by program staff; however, acknowledging these factors is an important step in understanding where ICOM can provide value.

5.1. Program-specific recommendations

5.1.1 Marine Planning and Conservation: Recommendations

For the MPC program, there are concerns regarding the development of MSP, particularly due to the lack of policy documents being prepared for the plan, a potential lack of buy-in from the provinces and other stakeholders, the short-term funding for MSP, and the short timeline to develop a plan. That being said, the plan is still in the early stages of development. Program staff are in the midst of relationship building with stakeholders in order to strengthen both collaboration and governance structures. Considering the short timeline for MSP, the development of an MSP Framework is recommended in order to inform stakeholders and the public about the Plan. Currently, there are no documents outlining the process of MSP, which participants identified as both a limitation and concern. An MSP Framework for the Maritimes Region, which outlines the goals and objectives of MSP, will also be useful for engaging other federal and provincial departments and could improve participation from these groups. As well, a

framework would likely be quicker to produce than a policy; however, an MSP policy could be considered once the plan is completed. As indicated by one participant (MPC-A1), long-term capacity funding for Indigenous organizations and the provinces to participate in MSP will improve collaboration and is therefore recommended, although the decision to allocate funding is not made at the program level.

For the MPA program, the governance structures are there; however, conflicting mandates between the provinces and the federal government can prevent MPA managers from advancing their objectives. Within the MPA program there is a need for improved processes for collaboration and information exchange with other parts of the department. Similar to the MSP program, external organizations sometimes lack the capacity to participate in the MPA program, which could be improved through funding to these groups. As well, it is recommended that requests for advice are restructured to be less formal. As indicated by one participant (MPC-A3), the way requests are currently structured limits collaboration between groups and individuals. As well, the high volume of requests impacts collaboration and information exchange, this could be improved with more streamlined processes for requesting and providing information or more staff to work on these tasks. Staff training and skillset development is recommended to increase staff expertise, facilitate better collaboration, and improve overall program delivery. A long-term recommendation is a publicly available MPA Policy document and updated MPA regulation requirements.

5.1.2 Aquaculture Management: Recommendations

For the Aquaculture Management program, a lack of guidance regarding operation of national aquaculture policies and regulations was identified as a limitation to advice and decision-making. Contributing to this issue is jurisdictional overlaps between provincial and

federal aquaculture regulators, which varies across provinces. Issues with policy advice and jurisdictional overlaps also hinders governance structures and clarity of roles and responsibilities. Analysis of this program revealed a potential misalignment between aquaculture management objectives of the Maritimes Region and those of DFO's National Headquarters. One recommendation is guidance from DFO's National Headquarters on policy interpretation, specifically the AARs. At the program level, communication between the regions may help address issues with interpretation of the AARs. A second recommendation is increasing the staff size in order to address issues regarding capacity, expertise, and timelines. Furthermore, staff training and skillset development may also increase expertise. Despite the challenges mentioned above, the Aquaculture Management program has strong processes for internal and external collaboration, which is necessary considering the number of stakeholders involved in the aquaculture sector. There was a knowledge gap identified in the information needed to conduct risk assessments, which influences the decision whether or not to issue an aquaculture license. The development of clear and well-defined risk tolerance thresholds is recommended to address confusion surrounding risks assessments.

5.1.3 Fish and Fish Habitat Protection Program: Recommendations

Strong advisory and decision-making processes in the FFHPP are attributed to functional governance structures, high program capacity and expertise, and the recent amendments to the *Fisheries Act*. Program staff from the FFHPP would like to see their advisory and decision-making processes streamlined in order to meet deadlines and improve internal collaboration. The limited number of staff members and the high volume of requests that come through this program can be challenging for staff and can inhibit collaboration; therefore, one recommendation for this program is more staff members to manage the volume of requests. In

terms of formats of information, more data collection would help address knowledge gaps. As well, a comprehensive cumulative effects assessment is recommended in order to assess effects outside of the authorization area and the collective effects of low-risk projects. Lastly, the policy for offsetting the death of fish needs to be revised in order to prevent misinterpretation of offsetting and mitigation. The process for offsetting the death of fish needs to be more clearly defined in this policy revision.

5.2. Recommendations for advancing ICOM plans in the Maritimes Region

The first recommendation for advancing ICOM in the Maritimes Region is ensuring the availability of high quality and easily accessible data at a scale and format that is useful for all programs. Participants from each program identified knowledge gaps, data quality, and scale as limiting factors to advice and decision-making. The format of information that was identified as the most useful for program staff was maps that are easily searchable and highly detailed. Integrative maps that incorporate multiple ocean and human uses will be an important tool for future management plans. Current knowledge gaps that were identified by program staff pertain to fish pathogens and fish disease in wild and genetic fish (Aquaculture Management), eelgrass delineation and mapping (FFHPP), the viewpoints of stakeholders (MPC), and socio-economic information (MPC).

The second recommendation for advancing ICOM is an improvement to the current cumulative effects assessments. Multiple participants indicated that the current processes for assessing cumulative effects could be improved. For example, in FFHPP, there is concern that the combined effects of smaller scale projects are not being cumulatively assessed because these projects do not receive an authorization and therefore are not required to undergo a thorough cumulative effects assessment. There should be a process to assess the cumulative effects of all

marine activities within a particular area, rather than each program assessing the impacts of their activities in isolation. As well, program staff would like more guidance on the spatial and temporal scales for assessing cumulative effects. Lastly, one participant (MPC-A2) recommended that cumulative effects assessments should be done for all data before it is given to decision-making authorities, such as the provinces. This will ensure that cumulative effects are being assessed through a DFO framework, if the decision-making authority does not have the capacity or time to conduct an assessment themselves.

The last recommendation is developing strong processes for collaboration both internally and externally. Internally, staff from different programs can increase communication about the type of information and tools that are available within each program. This could be done through informal conversations or sharing workplans. In Aquaculture Management, information is shared proactively with the provinces to maintain a positive working relationship. It is recommended that this type of proactive information sharing is adopted by the MPC program as well, as it may improve collaboration between program staff and stakeholders and help advance the objectives of the MSP and MPA programs. According to the participants, working groups and committees are common and effective mechanisms for collaboration. Improving clarity surrounding roles and responsibilities in each program will also improve collaboration. Face-to-face discussions are recommended as a way to improve internal and external collaboration, although this is challenging during the COVID-19 pandemic. Lastly, aligning the CSAS timelines with program timelines for providing advice is recommended for producing evidence-based advice in a reasonable timeframe.

CHAPTER 6: CONCLUSION

As competition for marine space and resources continues to grow, governing bodies are faced with the difficult task of developing policies and initiatives that advance economic, social, and cultural interests in the marine environment while preserving the natural ecosystems in these regions. Single-sector planning and management approaches often fail to resolve conflicts in the marine environment and rarely address issues of cumulative effects from multiple ocean activities (Ehler, 2018). ICOM has been recognized globally by scholars and governing bodies as a management approach that considers all activities and users within the marine space as well as the interactions between them. As this research outlines, ICOM is aimed at balancing ecosystem conservation with the development of various ocean activities and uses, such as fishing, aquaculture, recreation, tourism, and marine shipping.

This research highlights the advisory and decision-making processes of the Marine Planning and Conservation program, the Aquaculture Management program, and the Fish and Fish Habitat Protection program. Through providing advice to the public, the provinces, other federal departments, ENGOs, industries, and others, program staff from these programs uphold DFO's mandate and role to protect Canada's three oceans and waterways and to provide economic opportunities to Canadians and coastal communities. In addition to providing advice, responsibilities of program staff also include making key decisions in regard to activities in the marine environment. Thus, exploring these processes in detail can provide insights into the shortcomings of the department in upholding its mandate and role through program delivery. As well, this research reveals where program improvements are thought possible, based on staff experience.

This research began with structured interviews with program staff. Through qualitative content analysis of the interview data, the factors influencing advice and decision-making were identified and organized into themes and sub-themes. Lastly, recommendations were provided at the program-level and for broader ICOM in the Maritimes Region. The results from this research show that each program has different strengths and weaknesses in regard to their policies and regulations, program organization, formats of information used, and program capacity and expertise. Many of the challenges identified by participants cannot be solved at the program-level, such as funding, current legislation, and policies. However, having these challenges identified and explored may lead to program improvements in the long-term. This suggests that DFO's processes for developing ocean policies may need to be investigated further.

Based on analysis of these three programs, ensuring the availability of high quality and easily accessible data, developing comprehensive cumulative effects assessments, and improving collaboration internally and externally would be important aspects of ICOM in the future. This research dealt with a small sample size of staff from three programs in the Aquatic Ecosystems Sector. Including participants from all programs would have resulted in a better understanding of the advisory and decision-making processes of this Sector and likely would have revealed new problem areas to be addressed through ICOM. In the future, conducting this research with staff from other regions would provide an opportunity to compare program delivery across Canada, which would also lead to more comprehensive results.

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Appendix I: Ethics Approval Letter

Marine Affairs Program
DALHOUSIE UNIVERSITY

Marine Affairs Program Ethics Review Standing Committee Letter of Approval

July 8, 2020

Dear Catherine,

MAPERSC #: MAP2020-06

Project Title: Decision Analysis for Improved Ocean Management in DFO Maritimes Region

Effective date: July 9, 2020

Expiry date: July 8, 2021

The Marine Affairs Program Ethics Review Standing Committee has reviewed your application for research involving humans and found the proposed research to be in accordance with the Tri-Council Policy Statement on Ethical Conduct for Research Involving Humans. This approval will be in effect until the date indicated above. This approval is subject to the conditions listed below which constitute your on-going responsibilities with respect to the ethical conduct of this research.

Sincerely,

Jerry Bannister, Chair

Appendix II: Consent Form

Project title: Decision Analysis for Improved Ocean Management in DFO Maritimes Region

Lead researchers: Catherine Thompson & Jason Naug

Introduction

We invite you to participate in a research project being conducted by Jason Naug and Catherine Thompson, who is a Master of Marine Management student at Dalhousie University. The Master of Marine Management (MMM) is a 16-month, interdisciplinary degree offered through the Marine Affairs Program in the Faculty of Science at Dalhousie University. It is designed for early- and mid-career professionals in the fields of maritime administration, marine management, and oceans governance. Catherine is assisting Jason Naug in carrying out the Project titled "Decision Analysis for DFO Maritimes Region." Catherine will be using the data collected through desktop research and participant interviews to develop a Graduate Project which will be the capstone of her MMM degree. The Graduate Project will be publishable through the Dalhousie Libraries and the project will be presented to students and faculty in December 2020. The Research Paper will be supervised by Jason Naug from the Aquatic Ecosystems Branch and Jerry Bannister, Acting Director of the Marine Affairs Program. Participation in the research project is voluntary.

The information below tells you about what is involved in the research, what you will be asked to do and about any benefit, risk, inconvenience or discomfort that you might experience. You should discuss any questions you have about this study with Catherine Thompson or Jason Naug. Please ask as many questions as you like.

Purpose and Outline of the Research Study

Program managers at DFO Maritimes Region frequently engage in decision-making processes in addition to providing advice for decisions outside of their program. There are, however, various factors at play that influence the advisory and decision-making processes within the Departments regional programs, such as internal or external regulations and policies, current governance structures, timelines, capacity of the program to deliver advice, the format used to provide advice, and other factors. The purpose of this research project is to identify and analyze these factors in the context of key programs within the Aquatic Ecosystems (AE) branch. This will be accomplished through desktop research, structured interviews with managers and staff in the AE branch, and content analysis of participant responses. The goal of this research project is to provide recommendations for improving decision-making and advisory processes based on staff experience and expertise. Recommendations may support the development of ocean management initiatives, such as marine spatial planning (MSP).

At the end of the summer, research findings will be presented back to the key programs in the AE Branch, including Marine Planning and Conservation, Aquaculture Management, Species at

Risk Management, and Fish and Fish Habitat Protection Program. Based on the utility of this work to the AE Branch, this could be expanded to other key DFO Branches.

For this project you will be asked to participate in one interview via MS Teams. The interview will take 45 minutes to 1 hour. The interview will be conducted by Catherine Thompson and observed by Jason Naug. You will be given the opportunity to ask questions before and after the interview.

This project will be carried out in July and August, with initial interviews with being conducted in July and follow-up interviews (as required) being conducted in August. Beyond August 31st Catherine will be focusing on using the information collected through participant interviews to develop a Research Paper which will be submitted to the Marine Affairs Program in November 2020.

Possible Benefits, Risks and Discomforts

This research will seek to understand the efficiencies to be gained in the process of MSP, which will benefit those involved in this field of work. The risks associated with this study are minimal; there are no known risks for participating in this research beyond being bored or fatigued. The research team will take specific precautions to ensure that the risks associated with loss of privacy remain minimal throughout the project.

How your information will be protected:

Privacy: Your participation in this research will be known only to Catherine Thompson, Jason Naug, and Jerry Bannister.

Confidentiality: The information that you provide to us will be kept confidential. The data you provide will be contained on password protected computers, accessible only by Catherine Thompson, Jason Naug, and Jerry Bannister. In written records, computer records, and/or project findings, job titles may be described and attached to your research information. This may limit confidentiality. Other identifying information (such as your name and contact information) will be securely stored separately from your research information. Interview data and identifying data will be matched using alphanumerical code.

Data retention: Once the study is over, Jerry Bannister will retain data for the period of one year after the receipt of final grades for the course for which the project was completed and disposed after this timeframe.

If You Decide to Stop Participating

You may decide to opt out of the research project on or before August 4th, 2020.

If you choose to opt out, you will not have your information included in the Paper written by Catherine Thompson through Dalhousie University and the Marine Affairs Program. At the end of August, recommendations from the project will be presented to AE Branch Managers and all interested staff members. If you decide to opt out before August 4th, your information will not

be included in the presentation or Research Paper. If you decide to stop participating in the project, you can inform Catherine or Jason.

We will provide you with a description of results, by email, when the study is finished. This research project requires oral consent prior to and after the interview.

Questions

We are happy to talk with you about any questions or concerns you may have about your participation in this research study. Please contact Catherine Thompson (902-476-9591, Catherine.thompson@dfo-mpo-gc.ca) or Jason Naug (at 902-403-0930, Jason.naug@dfo-mpo-gc.ca) at any time with questions, comments, or concerns about the research study.

If you have any ethical concerns about your participation in this research, you may also contact Research Ethics, Dalhousie University at (902) 494-3423, or email: ethics@dal.ca (and reference REB file # 20XX-XXXX).

Appendix III: Interview Script and Questionnaire

Before the interview:

My name is Catherine Thompson and I am a student in the Master of Marine Management degree program at Dalhousie University. This summer I am completing an internship with DFO. Under the supervision of Jason Naug, I am helping conduct a research study on advisory and decision-making processes within key programs in the Aquatic Ecosystems Branch. The purpose of this research is to first characterize the advice and decisions provided by each program, and second, to understand the factors influencing advisory and decision-making processes in order to provide recommendations and support for the development of regional ocean management tools, such as a Marine Spatial Planning (MSP).

Your participation will involve one interview and one potential follow-up interview. A follow-up interview will be scheduled if more than one hour is needed to complete the questionnaire or if you have additional details to add after the first interview. The risks associated with this study are minimal; there are no known risks for participating in this research.

QUESTIONS

Do you have any questions about this study?

Do you agree that your interview may be audio-recorded? Saying no to audio recording will have no effect on the interview. **Yes or No**

Do you agree that you have read the Dalhousie standardized consent form that was sent over email? **Yes or No**

Do you agree that direct quotes from the interview may be used without identifying you? **Yes or No**

Part 1 – Program Overview:

Program managers at DFO Maritimes Region frequently engage in decision-making processes as part of their regulatory responsibilities in addition to providing advice for decisions made outside of their role. This interview will seek to better understand the factors that influence the advisory and decision-making processes that your program engages in. So, the questions regarding advice and decision-making are the same. However, we recognize that these two processes are sometimes difficult to differentiate. I would like to also mention that resulting recommendations from this research are meant to benefit you and your program.

Part 1 – Program Overview:

- Can you provide a brief overview of your program’s activities? Specifically, can you outline the key decisions that fall within the direct mandate for your program and the advisory functions that your program has for supporting other decisions?

Part 2 – Advice:

Phase 1: Description of Advice

- What types of advice do you provide for your program?
- Who is asking for advice?
- What decision is the advice influencing?
- What is the general nature of the advice provided? For example, is the advice part of a formal consultation process?
- What is the typical format of the advice and/or information that you provide? (i.e. letter of advice, briefing note)

Phase 2: Factors Influencing Advice

- What types or formats of information would help improve the advice provided (data, maps, frameworks, analytical tools, etc.)
- What regulations (internal or external) are associated with the advice provided? What (if any) changes to these regulations might help improve the advice provided?
- What policies (internal or external) are associated with the advice provided? What (if any) changes to these policies might help improve the advice provided?
- Do the current governance structures (including clarity of roles and responsibilities) support the advice being provided?
- Do you need to collaborate with others to formulate advice and is the degree of collaboration sufficient?
- Is a conflict resolution process in place or needed with the advisory process?
- Do you have sufficient capacity or expertise to provide the advice requested? Does the recipient of the advice have capacity to use it appropriately in their decision making?
- Are the timelines for providing this advice sufficient? Does the recipient of the advice have sufficient time to use it in their decision making?
- Are there any concerns regarding the communication/transparency of the advice provided related to the audience, messages, methods used?
- How are cumulative effects considered as part of advisory process? If not, can they be?
 - For example, are spatial and temporal interactions considered as part of the advisory process?
- Are there any other factors that I have not mentioned (i.e. funding, bureaucracy, political considerations, or others) that would result in an improved advisory process?

Part 3 – Decision Making:

Phase 1: Description of Decision

- What types of decisions does your program make?

- What is the general nature of the decision made?
- What is the legislative/regulatory basis for the decision?

Phase 2: Factors Influencing Decision

- What types or formats of information would help improve the decision made (data, maps, frameworks, analytical tools, etc.)
- What policies (internal or external) are associated with the decision being made? What changes to these policies might help improve the decision-making process?
- What changes to the relevant legislation/regulations might help improve the decision-making process?
- Do the current governance structures (including clarity of roles and responsibilities) support the decisions being made?
- Do you need to collaborate with others to make this decision and is the degree of collaboration sufficient?
- Is a conflict resolution process in place or needed with the decision-making process?
- Do you have sufficient capacity or expertise to make appropriate decisions? Where could extra capacity be needed?
- Are the timelines for making the decision sufficient? Do others involved have enough time to incorporate your decision into their processes?
- Are there any concerns regarding the communication/transparency of the decision related to the audience, messages, methods used?
- How are cumulative effects considered as part of the decision process? If not, can they be?
 - For example, are spatial or temporal interactions considered part of the decision process?
- Are there any other factors that I have not mentioned (i.e. funding, bureaucracy, political considerations, or others) that would result in an improved decision-making process?

Part 4 – MSP:

- What is your current understanding of MSP?
- How do you see your program interacting with the MSP program?
- Based on your understanding of MSP, does it have the potential to support the decision-making and advisory processes of your program?