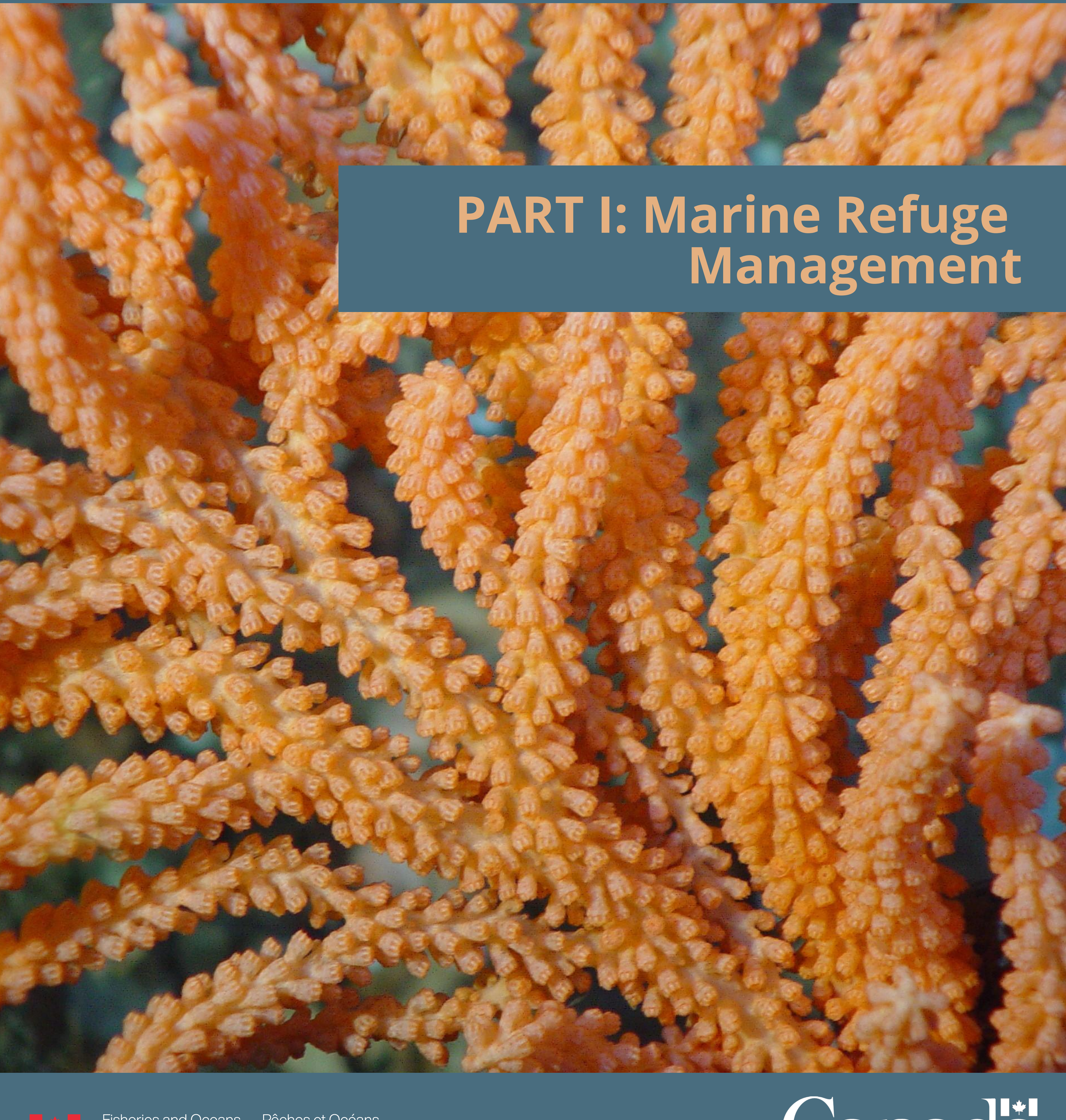
Scotian Shelf - Bay of Fundy Bioregional Marine Refuge Management Plan 2024



PART I: Marine Refuge Management

Fisheries and Oceans Canada
Pêches et Océans Canada

Canada

CONTACT INFORMATION

General Information
Marine Planning and Conservation
Fisheries and Oceans Canada
1 Challenger Drive, PO Box 1006
Dartmouth, NS
Canada
B2Y 4A2
Email: DFO.MARRefuges.MPO@dfo-mpo.gc.ca

Marine Accidents, Spills and Environmental Emergencies
Canadian Coast Guard / Environment and Climate Change Canada
Tel: 1-800-565-1633

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Cover photo: *Primnoa resedaeformis* (Seacorn Coral). Andrew Cogswell, 2009.

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Acronyms

AMREP	Areas of Marine Renewable-Energy Priority
AUV	Autonomous Underwater Vehicle
BCBs	Biodiversity Conservation Benefits
BPRs	Biodiversity Protection Regulations
CBD	Convention on Biological Diversity
CER	Canada Energy Regulator
CNSOPB	Canada-Nova Scotia Offshore Petroleum Board
C&P	Conservation and Protection
CSAS	Canadian Science Advisory Secretariat
DFO	Fisheries and Oceans Canada
DND	Department of National Defense
EEZ	Exclusive Economic Zone
FFHPP	Fish and Fish Habitat Protection Program
FSC	Food, Social, and Ceremonial
IMO	International Maritime Organization
IPCA	Indigenous Protected and Conserved Areas
MARLANT	Canada's Maritime Forces Atlantic
MARLOAs	Maritime Forces Atlantic Operating Areas
MPA	Marine Protected Area
MPC	Marine Planning and Conservation
NRCan	Natural Resources Canada
OECM	Other Effective Area-Based Conservation Measure
ORER	Offshore Renewable Energy Regulations
RM	Resource Management
ROV	Remotely Operated Vehicle
SBA Policy	Policy for Managing the Impacts of Fishing on Sensitive Benthic Areas
SDL	Significant Discovery License
SS-BOF	Scotian Shelf-Bay of Fundy
UNCLOS	United Nations Convention on the Law of the Sea
UNDRIP	United Nations Declaration on the Rights of Indigenous Peoples
VMS	Vessel Monitoring System
WUAs	Works, Undertakings and Activities

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Executive Summary

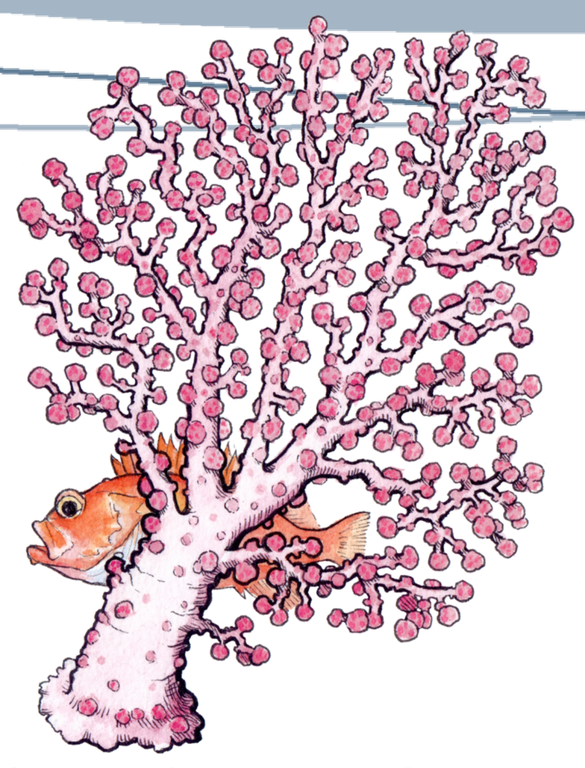
The Scotian Shelf-Bay of Fundy (SS-BOF) Bioregion is home to rich marine life and productive and diverse ecosystems providing food and shelter for a variety of species, including important commercial species. Within the SS-BOF Bioregion there are six marine refuges - area-based fisheries closures established under the *Fisheries Act* found to qualify as Other Effective Area-Based Conservation Measures (OECMs). Marine refuges are recognized as OECMs for providing biodiversity and conservation benefits contributing towards marine conservation targets. The existing marine refuges in the SS-BOF Bioregion prohibit bottom-contacting fishing activities to protect vital benthic ecosystems and species such as cold-water corals and sponges. However, other activities such as oil and gas development, scientific research and monitoring, marine renewable energy, and marine transportation are assessed on a case-by-case basis, and in collaboration with the relevant governing authorities, to ensure that activities are managed in a manner that is consistent with the biodiversity conservation benefits of each site.

The SS-BOF Bioregional Marine Refuge Management Plan is intended to coordinate the management of existing and future marine refuges established according to the *Fisheries Act* and the Government of Canada Guidance for Recognizing Marine Other Effective Area-Based Conservation Measures (2022) by providing guidance and approaches for management to Fisheries and Oceans Canada's (DFO) Maritimes Region, other governing authorities, marine users, and the public. The plan presents an overview of each SS-BOF marine refuge as well as objectives related to conservation; research and monitoring; the social, cultural, and governance dimensions; and climate change. Activities currently occurring or most likely to be proposed in the SS-BOF marine refuges are described along with how additional governance and management actions support the overarching legislative, regulatory, and policy framework.

Management of the marine refuges in the SS-BOF Bioregion is currently led by DFO Maritimes with input from First Nations and Indigenous organizations, federal and provincial government departments, marine industries, environmental non-governmental organizations, and academia. The Marine Refuge Coordination Committee, a multi-sectoral table, is the primary forum for soliciting input from other governing authorities, rights holders, and stakeholders into the management of the sites.

Mi'kmaw content in this document and references to the potential for future co-governance approaches have been drafted in partnership with the Kwilmu'kw Maw-klusuaqn Negotiation Office and other Mi'kmaq organizations.

1.0 Introduction



The Scotian Shelf-Bay of Fundy (SS-BOF) Bioregion is a productive and diverse ecosystem, providing food and shelter for a variety of species including microscopic plankton, habitat forming coral and sponge species, commercially important groundfish and shellfish, and species at risk such as the North Atlantic right whale (DFO, 2014). As a result, the bioregion has a diversity of habitats such as coastal habitats, offshore banks and basins, steep slopes and underwater canyons, and the largely unknown abyssal plain (DFO, 2014). These waters have provided natural resources and sustenance for the Mi'kmaq, Peskotomuhkati, and Wolastoqey (Maliseet), who have longstanding traditional and cultural connections to the marine environment and species. Providing for Indigenous peoples since time immemorial, these waters remain an economically and culturally important resource, including as an important source of food.

Commercial fisheries within the waters of the SS-BOF have been occurring for centuries, starting in the 1500s when Portuguese, Spanish, French and British fishing vessels visited for the summer season groundfish fishery, and subsequently established permanent fishing communities along the coast of Nova Scotia. Today, the waters of the SS-BOF support a diverse array of marine activities, including fishing, shipping, oil and gas, marine renewable energy, aquaculture, telecommunications, defence, and research (DFO, 2014).

Canada's oceans and aquatic ecosystems are under growing pressures from human activities. In 2010, to help address these pressures, Canada committed to the United Nations Convention on Biological Diversity (CBD) Aichi Target 11 to conserve and protect 10% of its coastal and marine waters by 2020. With this target surpassed in 2019, Canada recommitted to conservation and is working to conserve 30% of coastal and marine areas by 2030. The development of a national conservation network is being led by DFO and is a key part of Canada's strategy for conserving marine biodiversity and for reaching its conservation targets. Canada's national conservation network consists of various types of spatial conservation measures, including different types of Marine Protected Areas (MPAs) and other effective area-based conservation measures (OECMs). As defined by the CBD, an OECM is:

> "A geographically defined area other than a protected area which is governed and managed in ways that achieve positive and sustained long-term outcomes for the *in situ* conservation of biodiversity with associated ecosystem functions and services and where applicable, cultural, spiritual, socio-economic, and other locally relevant values."
>
> - CBD, 2018.

OECMs are a category of conservation initiatives that meet specific criteria but can be managed or governed in different ways that provide biodiversity conservation benefits (BCBs) but may or may not have been established primarily for the protection of biodiversity. In 2016, in the absence of international guidance, a DFO Canadian Science Advisory Secretariat (CSAS) process (DFO, 2016a) outlined interim guidance on identifying OECMs in Canadian waters. In November 2018, parties to the CBD adopted voluntary guidance for identifying and managing OECMs, and in 2019, based on recommendations from the Canadian National Advisory Panel on Marine Protected Area Standards (DFO, 2019), the Government of Canada developed minimum protection standards for MPAs and OECMs. DFO reconciled these three processes, and along with operational experience gained since these measures were first implemented, published the "Government of Canada Guidance for Recognizing Marine Other Effective Area-Based Conservation Measures" in December 2022 (DFO, 2022a).

OECM Protection Standard

"All existing and foreseeable activities in an OECM are assessed on a case-by-case basis to ensure that the risks they pose to the biodiversity conservation benefits are effectively avoided or mitigated."

The Guidance for Recognizing Marine Other Effective Area-Based Conservation Measures (DFO, 2022a) interprets the CBD definition and concepts in the Canadian context providing a domestic operational policy framework for recognizing marine OECMs in Canada.

The criteria required for an area-based measure to be recognized as an OECM is described in Annex A. There is potential for different area types to be recognized as OECMs. Examples include:

- Indigenous-led protection or conservation of marine areas
- protected historical sites, such as shipwrecks, that conserve the surrounding marine environment
- application of a *Species at Risk Act* critical habitat prohibition by ministerial order
- marine mammal management areas
- fisheries-area closures, and
- sacred natural sites or important ecological components with high biodiversity value

Primnoa resedaeformis (Seacorn coral). DFO, 2009.

Indigenous involvement and Management of Marine Conservation Areas

It was widely understood that Canada's conservation targets could only be achieved through collaboration amongst government departments, Indigenous peoples, communities, municipalities, and others. Managing and governing conservation areas collaboratively with Indigenous peoples is a practice that is being explored and implemented around the world [1]. There are many different terms that can be used to describe these arrangements, such as cooperative agreements and projects, co-management, and co-governance. The Government of Canada recognizes that these terms can have many definitions and that, in practice, these arrangements will differ from site to site based on the interests and objectives of Indigenous communities, and existing legal or governance frameworks.

In some cases, these new relationships and arrangements may evolve to take the form of an Indigenous Protected and Conserved Area (IPCA). An IPCA can be lands and/or waters where Indigenous governments have the primary role in protecting and conserving ecosystems through Indigenous laws, governance and knowledge systems [2]. Through the *United Nations Declaration on the Rights of Indigenous Peoples Act* Action Plan, the Government of Canada has made a commitment to advance marine IPCAs to support Canada's commitment to reconciliation and marine conservation (Department of Justice Canada, 2023). The enhanced co-management measures afforded through an IPCA partnership can provide additional benefits and a more holistic and inclusive approach to meeting conservation and stewardship objectives and are an important tool for reconciliation.

A marine refuge is an area-based fisheries closure established through the *Fisheries Act* that meets the OECM criteria (DFO, 2022a). Marine refuges are management tools established and managed by DFO to conserve biodiversity and, in some cases, to achieve fisheries management objectives while contributing towards marine conservation targ-

[1] Ban and Frid. 2018. Indigenous peoples' Rights and Marine Protected Areas. Marine Policy 87: 180-185.
[2] Parks Canada. 2018. We rise together: achieving pathway to Canada target 1 through the creation of Indigenous protected and conserved areas in the spirit and practice of reconciliation: the Indigenous Circle of Experts' report and recommendations.

ets. Marine refuges offer targeted protection to species and their habitats from the impacts of fishing. Activities other than fishing are managed in ways that achieve positive and sustained long-term conservation of biodiversity, details of which are discussed further in this plan. These measures help protect important species and their habitats, including unique and significant aggregations of corals and sponges. As of November 2024, 60 area-based fisheries closures have been recognized as marine refuges in Canada, accounting for 5.67% of Canada's 14.66% marine conservation achievement. In the SS-BOF Bioregion, marine refuges make up 13.4% (63 624 km^2) of the bioregion's 14.8% conservation accomplishment.

The Government of Canada recognizes existing Aboriginal and treaty rights in sections 25 and 35 of the *Constitution Act*. The United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), which was endorsed by the Government of Canada in 2016 and implemented in legislation in 2021[3], provides a road map to advance lasting reconciliation with Indigenous peoples. Canada aims to advance reconciliation with Indigenous peoples by recognizing the relationships and ongoing management of their ancestral lands and waters. In the SS-BOF Bioregion, DFO will work with First Nations and Indigenous organizations in the planning, design, and management of marine refuges established pursuant to the *Fisheries Act*, to ensure Indigenous rights, use, and knowledge are recognized and accounted for in the establishment and management of these sites.

Crab on top *Primnoa resedaeformis* (Seacorn Coral). Anna Metaxas, Dalhousie University/ Martha Nizinski, NOAA/ CSSF, 2019.

[3] https://justice.gc.ca/eng/declaration/index.html

1.1 History of OECMs and Marine Refuges in the SS-BOF

DFO has made efforts to conserve biodiversity in the waters off Nova Scotia and in the Bay of Fundy protecting many of the special and sensitive benthic habitats through the establishment of *Fisheries Act* marine refuges. *Fisheries Act* closures for the purpose of conservation, formally known as conservation areas, have been established in the SS-BOF Bioregion since 2002 (Figure 1).

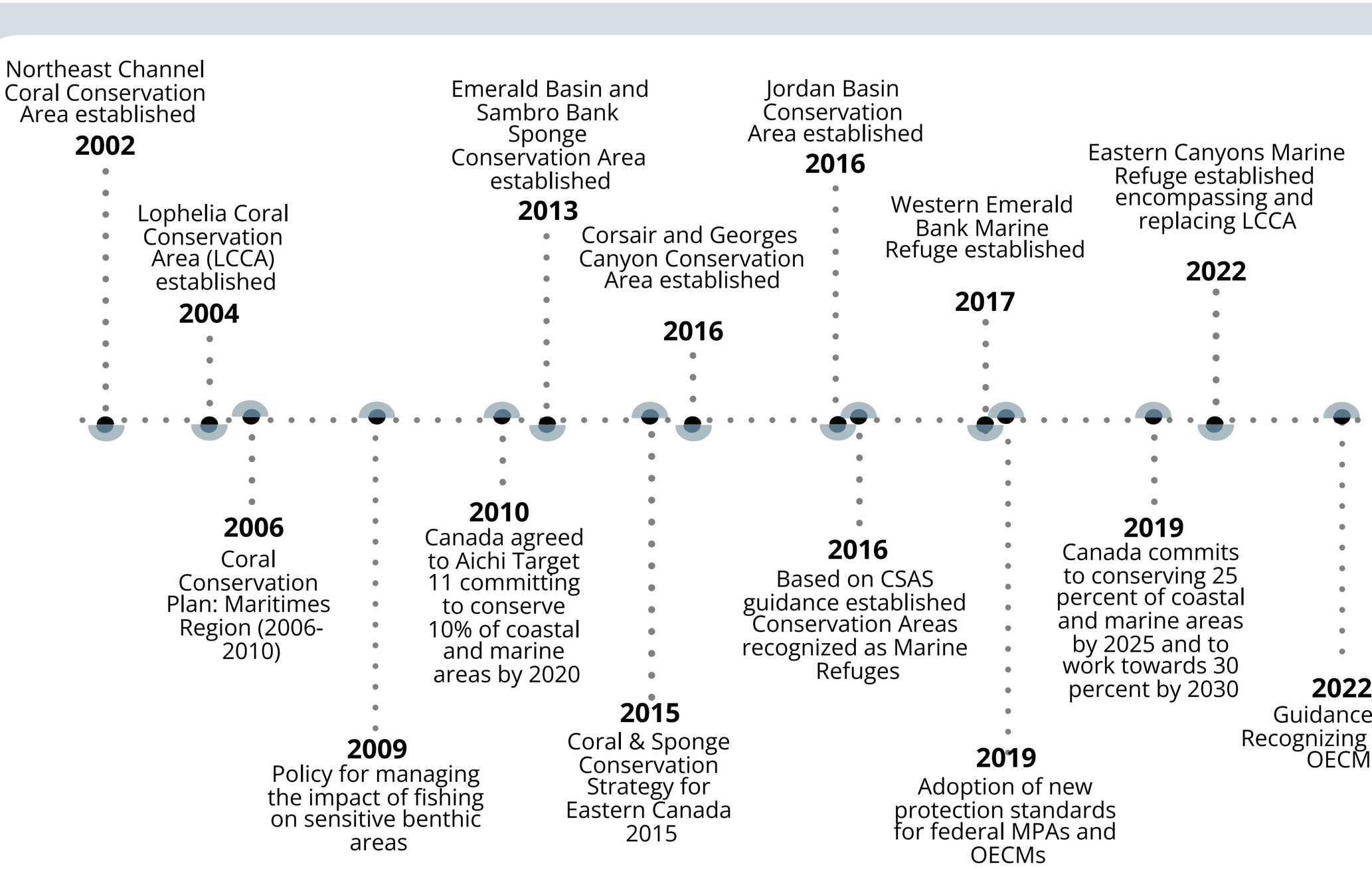


Figure 1. Timeline of *Fisheries Act* marine refuge establishment in the Scotian Shelf-Bay of Fundy Bioregion and national policy development

The Scotian Shelf-Bay of Fundy Bioregional Marine Refuge Management Plan is intended to coordinate the management of existing and future marine refuges established pursuant to the *Fisheries Act* by providing guidance and approaches for management to DFO, other governing authorities, marine users, and the public. In the future, other types of marine OECMs could exist in the SS-BOF Bioregion and they would have their own management system independent of this management plan [4]. As of November 2024, there are six marine refuges in the SS-BOF Bioregion (Figure 2), which provide protection

[4] If an IPCA in the SS-BOF Bioregion received dual designation with a *Fisheries Act* marine refuge, a separate governance structure and management plan would be developed.

to sensitive benthic areas in locations where the primary risk is from commercial bottom-contact fishing gear. All activities proposed in SS-BOF marine refuges will be assessed on a case-by-case basis, therefore the management plan describes a general approach for regulating activities but the results could be different in each case. Detailed information about each site, including history, conservation features, research activities, and management actions can be found in Part II.

A network plan of conservation areas for the SS-BOF Bioregion has been designed [5] to represent the broad range of ecosystems and biodiversity of coastal and offshore waters. The network plan will help guide the selection of new conservation areas, including marine refuges. Existing marine refuges and MPAs (Figure 2) are already part of the network plan, with marine refuges contributing to many of the objectives identified in this systematic planning process (DFO, 2018a).

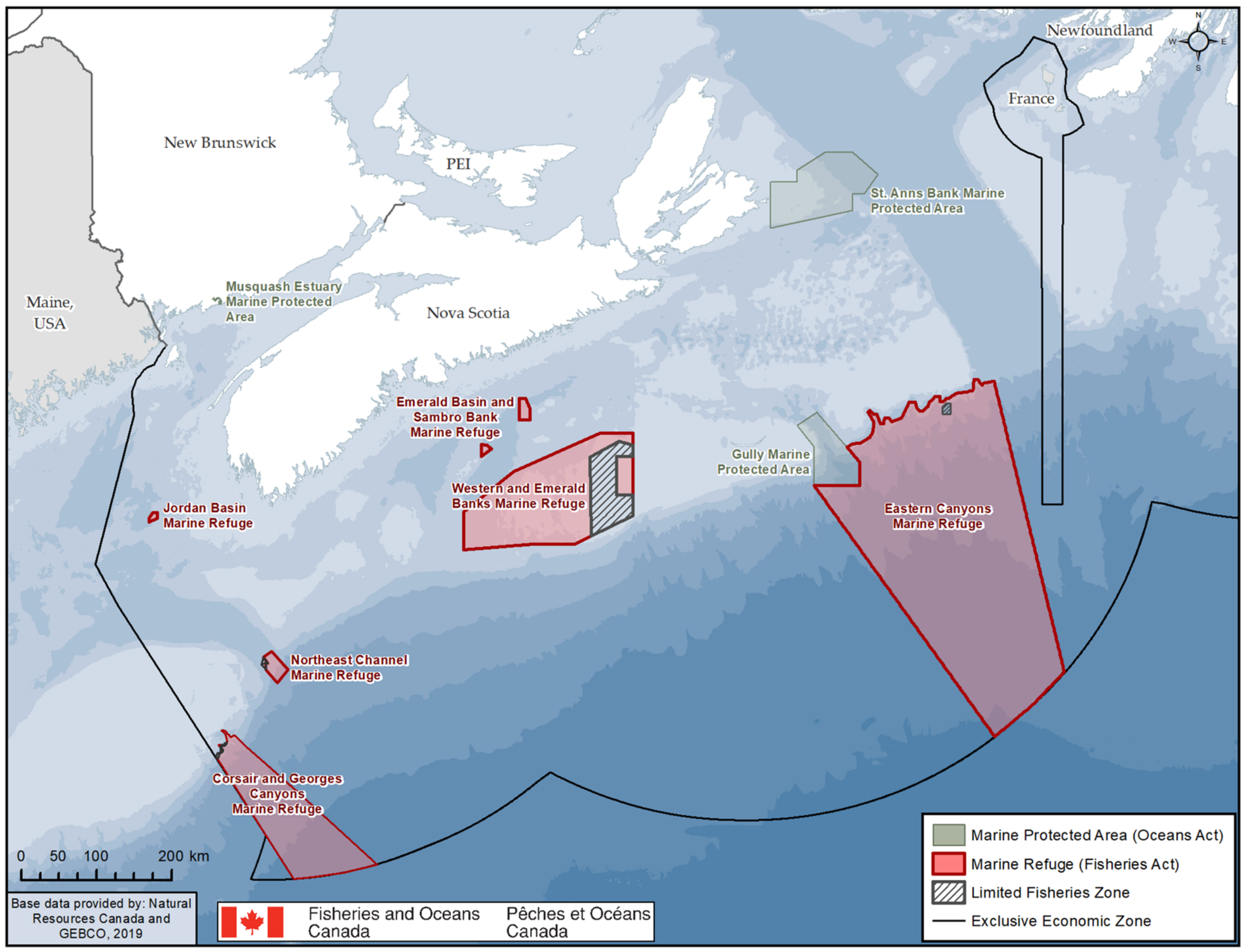


Figure 2. Network of existing conservation areas including Marine Refuges (*Fisheries Act*) and *Oceans Act* Marine Protected Areas in Scotian Shelf-Bay of Fundy Bioregion as of November 2024.

[5] More information about the marine conservation network for the SS-BOF Bioregion can be found here: https://www.dfo-mpo.gc.ca/oceans/networks-reseaux/development-developpement-eng.html

2.0 Goal, Guiding Principles, Objectives and Priority Actions

2.1 Goal

The primary goal of this management plan is to support a coordinated and effective approach between governing authorities, rights holders, and stakeholders for management, conservation, research, monitoring, and stewardship measures to enable the conservation of biodiversity, productivity, and habitats within marine refuges in the SS-BOF Bioregion.

2.2 Guiding Principles

The SS-BOF is within the traditional ancestral and unceded territories of the Mi'kmaq and Wolastoqey (Maliseet) Nations and the Peskotomuhkati Nation at Skutik. DFO strives to continue working with Indigenous peoples in the SS-BOF and looks to incorporate the values and guiding principles of the Mi'kmaq, Wolastoqey (Maliseet) Nations and the Peskotomuhkati Nation at Skutik into the management of marine refuges. The following Mi'kmaq values have been integrated:

- Netukulimk (*neh-doo-goo-limgp*) is the use of the natural bounty provided by the Creator for the self-support and well-being of the individual and the community.
- Etuaptmumk (*eh-doo-ahp-duh-mumk*) (Two-Eyed Seeing) is a balanced respect, appreciation, and consideration for Indigenous and Western knowledge.

Crab, *Primnoa resedaeformis* (Seacorn Coral), and P*aragorgia arborea* (Bubblegum Coral). Anna Metaxas, Dalhousie University/ Martha Nizinski, NOAA/ CSSF, 2019.

Etuaptmumk (Two-Eyed Seeing)

Etuaptmumk is the requisite for the new consciousness needed to enable Integrative Science work, as well as other integrative, transcultural, transdisciplinary, or collaborative work. It adamantly, respectfully, and passionately asks that we bring together our different ways of knowing to motivate people, Indigenous or non-Indigenous alike, to use all our understandings so we can leave the world a better place without compromising the opportunities for our youth (in the sense of seven generations) through our own inactions or actions.

In practicality, Etuaptmumk is about co-learning, co-production of knowledge, and implies collaboration between different knowledge systems. Indigenous knowledge systems in particular are driven by ethics as part of their value system. The Mi'kma'ki language has the phrase Msit no'kmaq; literally translated, it means 'all my relations'. It describes the Mi'kmaw relationship with the natural world, the living and non-living, in the temporal scales of past, present, and future. This underlying belief is associated with a specific set of values, which is used to judge what is important and how to develop a standard of behaviour.

Additionally, the 10 Canadian OECM guiding principles located in the Guidance for Recognizing Marine Other Effective Area-Based Conservation Measures (DFO, 2022a) reflect different components of the CBD voluntary guidance and provides interpretation for the Canadian marine context:

- OECMs are complementary to MPAs
- OECMs contribute to conservation networks
- OECM decision making recognizes, respects, and upholds constitutionally protected Aboriginal and treaty rights
- OECM decision making recognizes Indigenous and local knowledge and practices
- OECM decision making recognizes and takes into account ecological, social, cultural and economic values
- OECM decision making uses best-available knowledge and applies the precautionary approach
- OECM decision making ensures transparency and accountability
- OECM decision making takes into account equity
- OECMs decision making uses an integrated ecosystem approach
- OECM decision making includes evaluation and adaptation

2.3 Objectives and Priorities

Conservation Objectives

Marine refuges in the SS-BOF Bioregion have stated conservation objectives designed to protect species, habitats or other components of the sites' ecosystem to ensure the provision of long-term BCBs. Due to the diversity of marine refuges in the SS-BOF Bioregion, each site has its own conservation objectives and priority actions specific to its ecological features (Table 1). The conservation objectives are directly related to the desired biodiversity outcomes, also known as the BCBs[6], for each site. Additional information about each site can be found in Part II.

Table 1. Conservation objectives and associated priority actions for marine refuges in the SS-BOF Bioregion.

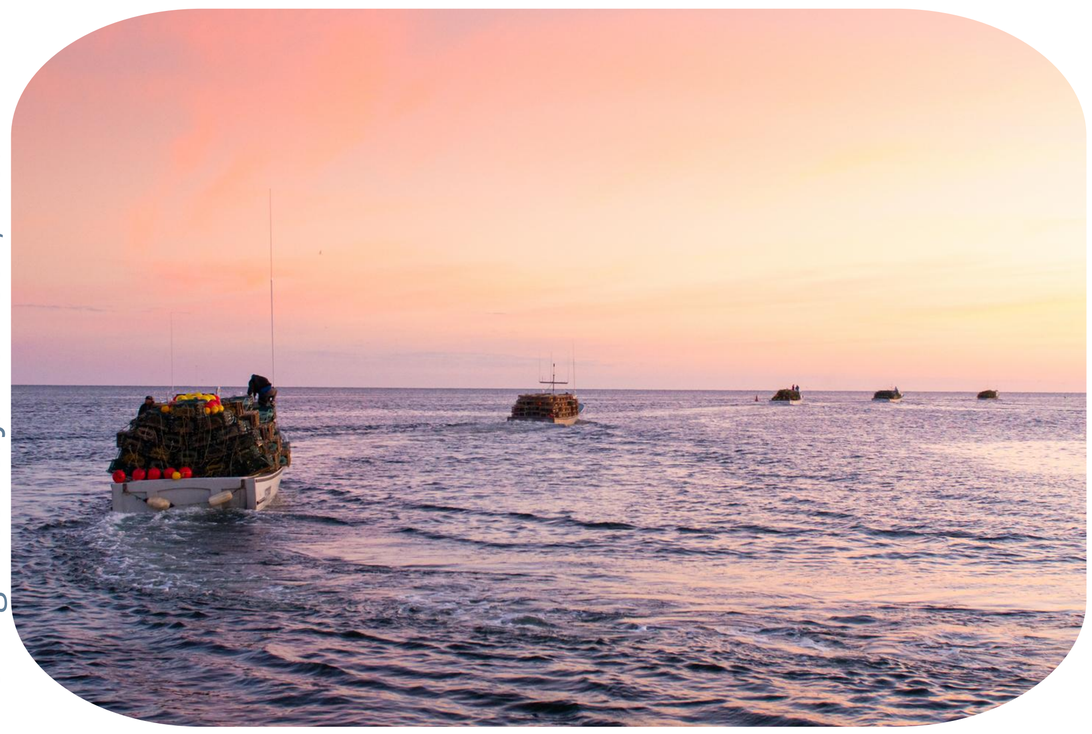
Marine Refuge[7] (Date of Establishment)	**Conservation Objectives**	**Priority Actions**
Northeast Channel Marine Refuge (2002)	1. Protect cold-water corals including significant concentrations of large gorgonian corals (e.g. *Paragorgia arborea* and *Primnoa resedaeformis*). 2. Protect benthic habitats and associated communities.	1. Manage human activities to: • Avoid or mitigate damage to or loss of cold-water corals. • Avoid or mitigate disturbance of benthic habitats and communities.
Emerald Basin and Sambro Bank Marine Refuge (2013)	1. Protect globally unique concentration of *Vazella pourtalesii*, a structure-forming species of glass sponge. 2. Protect benthic habitats and associated communities.	1. Manage human activities to: • Avoid or mitigate damage to or loss of *Vazella pourtalesii.* • Avoid or mitigate disturbance of benthic habitats and communities.
Corsair and Georges Canyons Marine Refuge (2016)	1. Protect cold-water corals including significant concentrations of large gorgonian corals (e.g. *Paragorgia arborea* and *Primnoa resedaeformis).* 2. Protect deep-water habitats (continental slope, continental rise and abyssal plain) and associated benthic communities.	1. Manage human activities to: • Avoid or mitigate damage to or loss of cold-water corals. • Avoid or mitigate disturbance of benthic and deep-water habitats and communities.
Jordan Basin Marine Refuge (2016)	1. Protect cold-water corals (e.g. *Primnoa resedaeformis, Paramuricea sp.* and *Desmophyllum pertusum*) including the diverse bedrock pinnacle feature known as the Rock Garden. 2. Protect benthic habitats and associated communities.	1. Manage human activities to: • Avoid or mitigate damage to or loss of cold-water corals. • Avoid or mitigate disturbance of benthic habitats and communities.

[6] A biodiversity conservation benefit is the net positive change in biodiversity or prevention of its loss, resulting from the governance decisions and management actions within an area.
[7] More information about each marine refuge can be found here: https://www.dfo-mpo.gc.ca/oceans/oecm-amcepz/refuges/index-eng.html

Western and Emerald Banks Marine Refuge (2016)	1. Protect continental shelf habitats and associated benthic and demersal communities. 2. Support productivity objectives for groundfish species of Aboriginal, commercial, and/or recreational importance, particularly North Atlantic Fisheries Organization Division 4VW haddock. 3. Protect benthic habitats that support juvenile and adult haddock and other groundfish species.	1. Manage human activities to: • Avoid or mitigate damage to or loss of groundfish habitat and species, particularly 4VW haddock. • Avoid or mitigate disturbance of continental shelf habitats and communities. 2. Increase understanding of: • The role of the marine refuge as a reference area of low fishing activity for the Bioregion. • What contributions the marine refuge provides to regional productivity and stock assessment. 3. Evaluate, review, and minimize harmful interactions associated with future fish harvest activities.
Eastern Canyons Marine Refuge (2022)	1. Protect cold-water corals including significant concentrations of large gorgonian corals (e.g. *Paragorgia arborea* and *Primnoa resedaeformis*) and *Desmophyllum pertusum* (formally known as *Lophelia pertusa)*. 2. Protect deep-water habitats (continental slope, continental rise and abyssal plain) and associated benthic communities.	1. Manage human activities to: • Avoid or mitigate damage to or loss of cold-water corals. • Avoid or mitigate disturbance of benthic and deep-water habitats and communities.

Social, Cultural, and Governance Objectives and Priority Actions

Social, cultural, and governance objectives are aimed at supporting effective stewardship by promoting and facilitating collaboration and knowledge-sharing within DFO, but also among other federal and provincial governing authorities, rights holders and Indigenous organizations, ocean users, and others with an interest in the bioregion's marine refuges (Table 2). This includes promoting compliance with the closures' prohibited activities and direct actions that advance management objectives and strategies, as well as fostering a greater understanding of marine refuges among ocean users and the public. In addition to these objectives and priority actions relevant to all the bioregion's marine refuges, there are also site-specific management priorities listed in Part II.



Fishing vessels. J. Morrison, n.d.

Table 2. Social, cultural, and governance objectives and associated priority actions for marine refuges in the SS-BOF Bioregion.

Social/Cultural/Governance Objectives	Priority Actions
Ensure that human activities within marine refuges are consistent with conservation objectives to achieve BCBs.	• Promote awareness of marine refuge boundaries with users to support compliance with prohibitions. • Work with DFO Conservation and Protection (C&P) and other relevant authorities to implement surveillance and enforcement measures. • Review and adjust management, as needed, to ensure that allowed activities are consistent with marine refuge conservation objectives.
Establish and maintain cooperative arrangements with relevant governing authorities to meet conservation objectives for the marine refuges and achieve BCBs.	• Collaborate with other relevant governing authorities to ensure that marine refuges are considered in the management of non-fishing activities and to ensure that the Minister of Fisheries, Oceans and the Canadian Coast Guard is satisfied that any risks to the biodiversity conservation benefits have been avoided or mitigated effectively. • Create a multi-sectoral SS-BOF Marine Refuge Coordination Committee with participation from relevant governing authorities (see Section 4.2 Coordination Committee and Collaborative Forums for more information). • Ensure a socially and culturally relevant conflict resolution mechanism is in place.
Engage ocean users, First Nations and Indigenous communities, other relevant governing authorities, researchers, and other interested parties in the management of the SS-BOF marine refuges.	• Increase transparency of management decisions. Encourage participation from relevant rights holders and stakeholders in the multi-sectoral SS-BOF • Marine Refuge Coordination Committee to increase collaboration and information-sharing. • Develop and maintain a comprehensive webpage for each marine refuge as a means of communicating management activities with interested parties. • Provide opportunities for increased participation and representation of federal and provincial departments, First Nations and Indigenous organizations, and stakeholders in the management and monitoring of marine refuges. • Incorporate Indigenous and local knowledge to inform decision-making and support the management and monitoring of marine refuges. • Utilize existing forums to share information about the management of marine refuges.
Lead, participate in, and support public outreach to raise awareness of marine refuges and the features they are designated to protect.	• Develop and provide publicly-accessible information regarding marine refuges, cold-water corals and sponges, and frontier areas to a broad audience (e.g. permanent or temporary exhibits, participating in local events/school programming, and sharing information through social media platforms). • Maintain up to date DFO webpages to educate and meet basic inquiries from the public. • Provide support for the development of educational

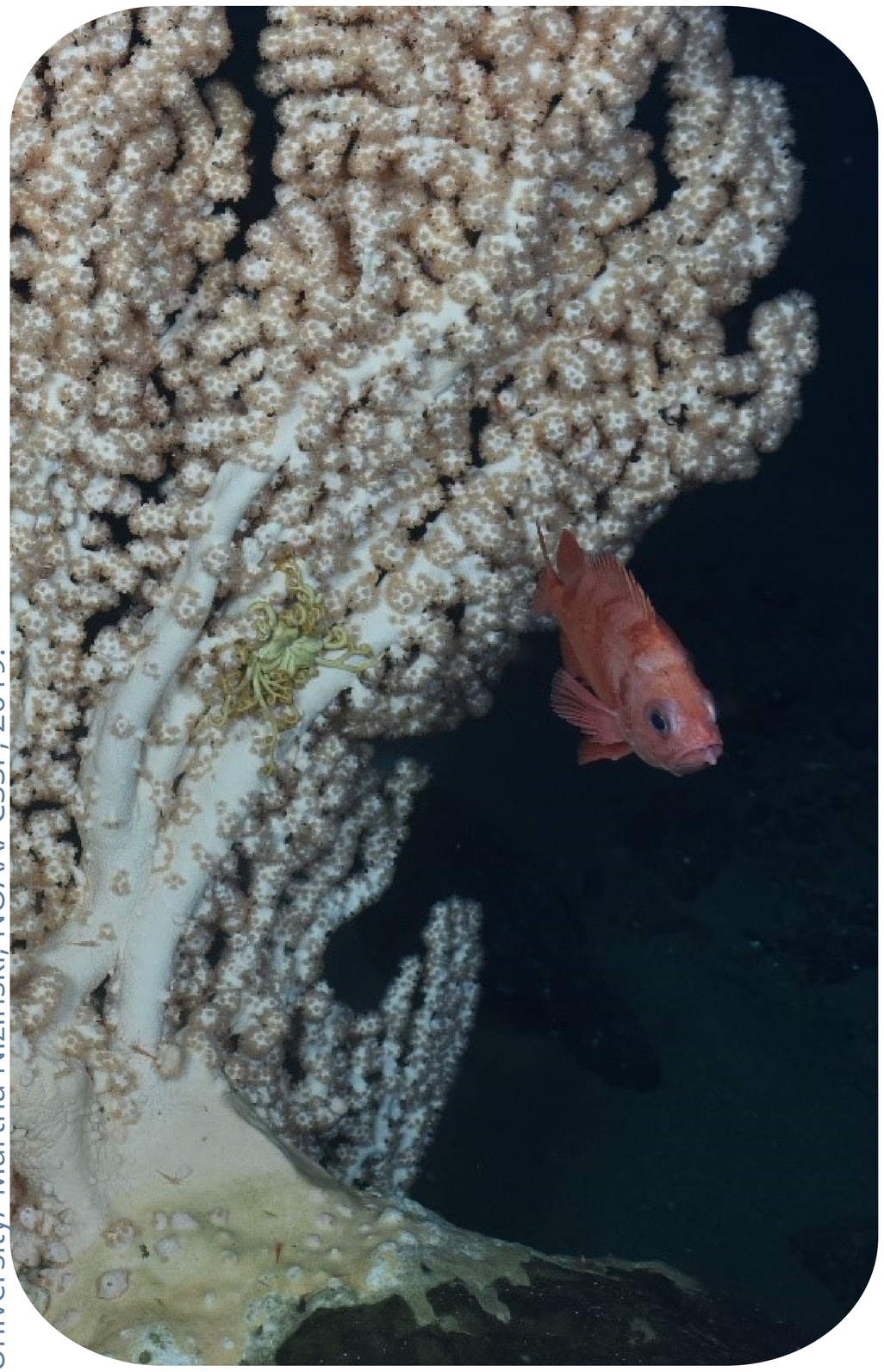
	materials related to marine refuges, cold-water corals and sponges, and frontier areas by ocean literacy experts. • Develop an education and outreach strategy to support consistent and systematic efforts. • Work with First Nations and Indigenous organizations on the development of outreach materials.

Research/Monitoring Objectives and Priority Actions

Research and monitoring activities are necessary to ensure conservation objectives and biodiversity outcomes are achieved. In addition to the following objectives and priority actions relevant to all the bioregion's marine refuges (Table 3), there are also site-specific research priorities listed in Part II.

Table 3. Research/monitoring objectives and associated priority actions for marine refuges in the SS-BOF Bioregion.

Research/Monitoring Objectives	Priority Actions
• Monitor and evaluate the design, management, and effectiveness of the marine refuges to ensure each site is meeting its defined conservation objectives and to support adaptive management. • Research and monitor the status of populations and habitats associated with marine refuges' conservation objectives to ensure biodiversity outcomes are achieved. • Research and monitor ecosystem pressures (i.e., impacts from human activities occurring within or adjacent to marine refuges and the effects of climate change). • Conduct research to increase our understanding of the marine refuges' conservation objectives and biodiversity outcomes. • Monitor and evaluate human dimensions (e.g. social, cultural, economic impacts, etc.) of marine refuges.	• Develop and implement monitoring plan(s) for the bioregion's marine refuges with ecological, social, and governance indicators. • Collaboratively conduct long-term monitoring of the sites with external partners (e.g. academia, industry groups, rights holders and Indigenous organizations, other governing authorities, etc.) • Work with partners in DFO Science, Resource Management, Conservation & Protection, Policy & Economics, and external to DFO to conduct research and evaluations of the marine refuges (see Section 7.1 Evaluating and Reporting for more information). • Conduct peer-reviewed evaluations (e.g. DFO's CSAS process) of marine refuge ecosystem monitoring activities on a consistent basis. • Collaborate with external partners (e.g. federal and provincial governing authorities, rights holders and Indigenous organizations, stakeholders, academia, etc.) through co-designing/co-executing and providing resources to support their research and monitoring efforts.



Paragorgia arborea (Bubblegum Coral) & redfish. Anna Metaxas, Dalhousie University/ Martha Nizinski, NOAA/ CSSF, 2019.

Climate Change Objectives and Priority Actions

Anthropogenic climate change has caused rapid and unprecedented shifts in environmental conditions throughout the global ocean (Morley et al., 2018); including warming ocean temperatures, ocean acidification, oxygen depletion, and sea-level rise (Harley et al., 2006). These changes to the physical environment have led to, and will continue to lead to, changes in biodiversity, species distribution, productivity, connectivity, abundance, and overall ecosystem function (Ocean Protection Council, 2021; Lotze et al., 2019; Wilson et al., 2020). Conservation measures such as marine refuges may increase ecosystem resiliency and buffer some of the impacts associated with global climate change through the protections they provide (Jacquemont et al., 2022; Tittensor et al., 2019). Increasing connectivity, representativity, and protecting sites that may act as potential carbon sinks or sites with higher functional, genetic, and species diversity, are just a few of the ways marine refuges help provide enhanced ecosystem resiliency to the impacts of climate change (Ocean Protection Council, 2021; O'Regan et al., 2021; Snelgrove et al., 2018).

Nevertheless, while spatial protection measures offer certain advantages, they alone will not fully mitigate the biological consequences linked to climate change (Lewis et al., 2023). Warming ocean temperatures projected for the SS-BOF Bioregion will lead to potential changes in habitat and species distribution within marine refuges within the next 20 years under both low and high emission scenarios (Lewis et al., 2023). It is critical that the management of marine refuges in the SS-BOF Bioregion be adaptive in the face of inevitable change (Bryndum-Buchholz et al., 2022; O'Regan et al., 2021). In this sense, resilience to climate change is realized both by increasing an ecosystem's capacity to adapt to changing environmental conditions, through targeted protective measures, and by ensuring that spatial conservation measures continue to provide BCBs even when the biodiversity itself is changing. Both site- and network-level management actions within marine refuges can cont-

ribute to bolstering resilience to climate change. A list of climate change objectives and priority actions can be found in Table 4.

Table 4. Climate objectives and associated priority actions for integrating climate change within the management of marine refuges in the SS - BOF Bioregion.

Climate Change Objectives	Priority Actions
Identify site- and network-scale vulnerabilities to climate change.	1. Increase understanding of: • Ecological and physical baselines • Projected changes in habitat and/or species distributions • Climate vulnerabilities at the species, habitat, and ecosystem level including the greater Gulf of Maine • Current contributions to climate change resiliency 2. Conduct climate vulnerability assessments tailored to site-specific conservation objectives.
Ensure climate change is incorporated into the management of marine refuges.	1. Develop climate resilience-focused priorities for each site. 2. Define clear climate change adaptation strategies at a site- and network-scale. 3. Consider ecosystem and climate change resiliency in the selection of future marine refuges. 4. Increase communication and collaboration related to climate change across government agencies, rights holders, stakeholders, and partners.
Incorporate climate change into the SS-BOF marine refuge monitoring plan(s).	1. Define climate change research and monitoring priorities for each site. 2. Develop long-term climate change monitoring indicators such as key species, habitats, and oceanographic variables. 3. Identify site- and species-specific climate change thresholds for management action.
Adaptively manage marine refuges to respond to climate change related threats and impacts.	1. Apply site- and species-specific climate change indicators and thresholds to regularly evaluate the effectiveness of existing conservation measures and objectives to ensure the long-term provision of biodiversity and conservation benefits. 2. Define and identify potential approaches to facilitate adaptive management of the SS-BOF marine refuges.

3.0 Legislative, Regulatory, and Policy Framework

The following regulations and policies are overarching components of the establishment and management of marine refuges. Due to the variety of activities that currently occur, or have the potential to occur within these sites, Section 5. Management Framework provides information about the general approach to managing types of activities but activities in marine refuges will continue to be assessed on a case-by-case basis to ensure that risks to the BCBs of the area are mitigated effectively.

3.1 Regulations

The *Fisheries Act* is the legislative means by which threats to fish and fish habitat are managed to ensure the sustainability and productivity of Canada's fishery resources, including management of commercial, recreational, Indigenous communal-commercial licences and Indigenous rights-based fisheries. A marine refuge is a fisheries-area closure established by the Minister of Fisheries, Oceans and the Canadian Coast Guard under the *Fisheries Act* that meets OECM criteria. SS-BOF marine refuges are established where fisheries may pose a risk to sensitive, vulnerable, or unique marine areas and/or species. Marine refuges are established through the closure of fisheries via variation orders, conditions of licence, or Biodiversity Protection Regulations (BPRs). For more information regarding the management of commercial fisheries as it pertains to marine refuges, please see Section 5.1. As of November 2024, all marine refuges in the SS-BOF Bioregion have been established via variation orders and then incorporated into license conditions at the next issuance of licenses. License conditions are issued with commercial fishing licenses and describe the "conditions" under which fishing can take place. This includes information about gear, species, bycatch, as well as areas where fishing is and is not permitted to occur under the license. The use of BPRs, as a means of site establishment was introduced in 2019 though amendments to the *Fisheries Act*, have not been pursued to date for the purpose of marine refuge establishment in Canada. At this time, variation orders and/or conditions of licence afford a more efficient and flexible means to establish a marine refuge, allowing for adjustments as necessary without the need to pursue regulatory amendment.

Desmophyllum pertusum & Primnoa resedaeformis (Seacorn Coral). DFO, 2018.

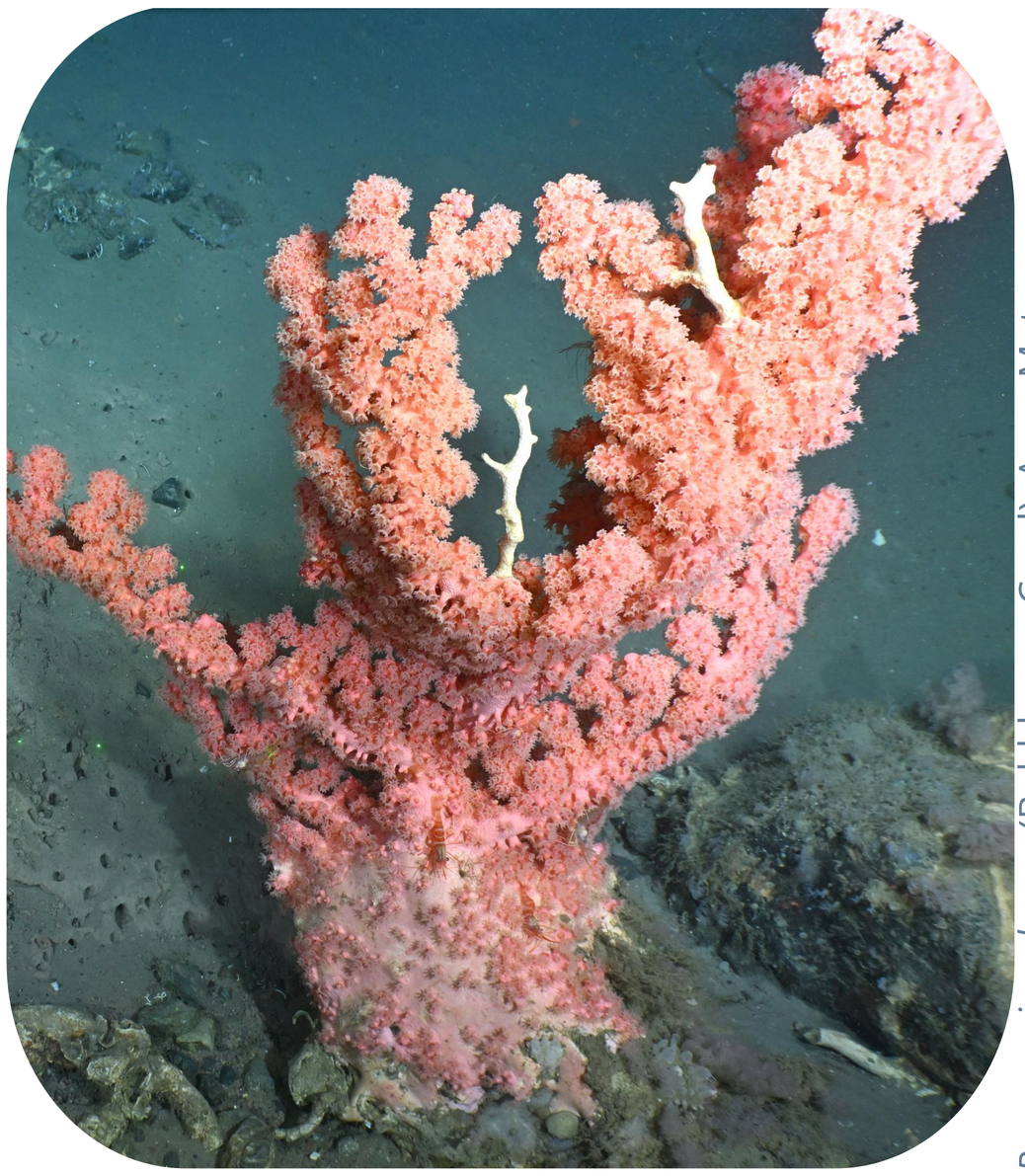
For activities other than fishing, the *Fisheries Act* provides a legal basis for conserving and protecting fish and fish habitat. The Fish and Fish Habitat Protection Program (FFHPP) of DFO is responsible for administering the fish and fish habitat protection provisions of the *Fisheries Act*. The provisions of the *Fisheries Act* include:

- a prohibition against causing the death of fish, by means other than fishing (Section 34.4)
- a prohibition against causing the harmful alteration, disruption, or destruction of fish habitat (Section 35)
- a framework of considerations to guide the Minister's decision-making functions (Section 34.1)

The fish and fish habitat provisions apply across the SS-BOF Bioregion and are applied in the same manner in marine refuges. When applying these provisions, FFHPP employs a risk-based approach to determine the likelihood and severity of potential impacts to fish and fish habitat that could result from a given work, undertaking or activity (WUA). These provisions apply to a variety of activities that do or could occur in marine refuges. If the WUA does not meet the conditions in a code of practice, a request for review is submitted and FFHPP will review the project to determine if: the project will impact an aquatic species at risk; the project could result in the death of fish and the harmful alteration, disruption, or destruction of fish habitat; and, if the project will require an authorization under the *Fisheries Act*.

If death of fish, or the harmful alteration, disruption, or destruction of fish habitat is likely to result from a project, an authorization from the Minister of Fisheries, Oceans and the Canadian Coast Guard as per Paragraph 34.4(2)(b) or 35(2)(b) of the *Fisheries Act Regulations* is required. The authorization includes terms and conditions the proponent must follow to avoid, mitigate, offset (i.e., counterbalance impacts), and monitor the impacts to fish and fish habitat resulting from the project. Failure to abide by these terms and conditions is a contravention of the *Fisheries Act* and may result in fines.

Projects proposed in marine refuges will be assessed based on the level of sensitivity of the features and the dependence of species on the habitat. FFHPP will work with proponents to avoid



Paragorgia arborea (Bubblegum Coral). Anna Metaxas, Dalhousie University/ Martha Nizinski, NOAA/ CSSF, 2024.

and mitigate impacts to site-specific conservation objectives and priority actions. This could include moving projects outside of sensitive habitats or timing activities to avoid sensitive life history stages (e.g. spawning). For a detailed description of the regulatory review process for WUAs under the *Fisheries Act*, please refer to the FFHPP Regulatory Review Process Map.

3.1.1 Indigenous Fisheries

The Government of Canada recognizes existing Aboriginal and treaty rights in sections 25 and 35 of the *Constitution Act*. The United Nations Declaration on the Rights of Indigenous Peoples, which was endorsed by the Government of Canada in 2016 and implemented in legislation in 2021[8] , provides a road map to advance lasting reconciliation with Indigenous peoples. The Supreme Court of Canada has found that where an Aboriginal group has a right to fish for food, social and ceremonial (FSC) purposes, it takes priority, after conservation, over other uses of the resource[9]. The treaty right to fish in pursuit of a moderate livelihood applies to the Mi'kmaq and Wolastoqey (Maliseet) First Nations and the Peskotomuhkati Nation at Skutik in waters off the East Coast of Canada, as the modern day beneficiaries of the Peace and Friendship Treaties of 1760-1761[10]. These treaty rights can only be limited for conservation reasons or other compelling and substantial public objectives[11]. Communal commercial licences issued pursuant to the *Aboriginal Communal Fishing Licenses Regulations* are addressed in SS-BOF marine refuges established pursuant to the *Fisheries Act* in the same manner as non-Indigenous commercial fishing.

3.2 Policies and Guidance

In 2022, the Government of Canada Guidance for Recognizing Marine Other Effective Area-Based Conservation Measures (DFO, 2022a) a science-based, domestic operational policy framework that includes supporting guiding principles and assessment criteria to recognize marine OECMs, such as marine refuges, was released. This Canadian policy is consistent with international guidance regarding OECMs, such as the Convention on Biological Diversity 14/8 decision. The purpose of an OECM is to protect marine biodiversity by providing long-term biodiversity conservation benefits (BCBs). A BCB is the net positive change in biodiversity or prevention of its loss, resulting from the governance deci-

Duva florida. DFO, 2008.

[8] https://justice.gc.ca/eng/declaration/index.html
[9] R. *v.* Sparrow, [1990] 1 S.C.R. 1075
[10] R. *v.* Marshall, [1999] 3 S.C.R. 456
[11]R. *v.* Marshall, [1999] 3 S.C.R. 533

sions and management actions within an area. BCBs are most likely to be directly provided when an OECM has a stated biodiversity conservation objective designed to protect species, habitats, or other components of the OECM's ecosystem. Indirect BCBs may be provided by OECMs that do not have explicit biodiversity conservation objectives. *Fisheries Act* closures, such as marine refuges established to protect coral and sponge concentrations (as in the case with most of the SS-BOF marine refuges), may provide indirect benefits for the species that use this habitat, as well as direct BCBs to the coral and sponge concentrations themselves. Existing or foreseeable activities in federal marine OECMs will continue to be assessed on a case-by-case basis to ensure that the risks to the BCBs have been avoided or mitigated effectively.

Sea star & skate. Anna Metaxas, Dalhousie University/ Martha Nizinski, NOAA/ CSSF, 2024.

Establishment of marine refuges is guided by DFO's Sustainable Fisheries Framework (DFO, 2022b). The Framework is a collection of policies and tools used to uphold conservation, protection, and sustainability of Canada's fishery resources. The policies and tools provide guidance and direction regarding the maintenance of fishery productivity and associated fishery monitoring, as well as managing the impacts of fisheries on forage species, bycatch, and sensitive benthic areas. The Policy for Managing the Impacts of Fishing on Sensitive Benthic Areas (SBA Policy) has been used since 2009 to guide the establishment of many marine refuges in the SS-BOF Bioregion to date (DFO, 2009). The SBA Policy supports the conservation and protection of marine habitat from the impacts of fisheries. It outlines a process for preventing fishing from causing serious or irreversible harm to benthic features that are ecologically and biologically significant with separate processes for historically fished and frontier areas. A frontier area is a marine ecosystem area in deep water (deeper than 2000m) or in the Arctic where there is no history of fishing and little if any information available concerning the benthic features (habitat, communities and species) and the impacts of fishing on these features. An ecological risk assessment framework for cold-water corals and sponge dominated communities is also available (DFO, 2013). Additional policies and tools will be developed and added to the Sustainable Fisheries Framework as required.

In 2015, a Coral and Sponge Conservation Strategy for Eastern Canada (DFO, 2015) was co-developed by the five DFO management regions located in Eastern

Primnoa resedaeformis (Seacorn Coral) & redfish. DFO, 2018

Canada (i.e., Quebec, Maritimes, Newfoundland and Labrador, Central and Arctic, and Gulf); the Strategy is to be reviewed and updated in 2024. All marine refuges in the SS-BOF Bioregion except Western and Emerald Banks Marine Refuge are focused on the protection of coral and sponge habitats; therefore, this Strategy contributes to both marine refuge implementation and management. In the Strategy there are three primary objectives: conservation; management; and research. Targets and actions for each objective are identified and are implemented regionally. The Strategy is not a management plan, rather it guides regional management decisions for the protection of corals and sponges to be made through a collaborative and integrated management approach.

In 2019, the Government of Canada established protection standards[12] to better conserve sensitive and important parts of our oceans. These protection standards are based on the recommendations provided to the Minister of Fisheries, Oceans and the Canadian Coast Guard from the independent National Advisory Panel on Marine Protected Area Standards. The protection standard for OECMs, including marine refuges, states that all activities will continue to be assessed on a case-by-case basis to ensure that the risks to the biodiversity outcomes of the area have been avoided or mitigated effectively. Therefore, risks posed by non-fishing activities in marine refuges are effectively avoided or mitigated through the application of other legal instruments, such as the regulatory review process under the *Fisheries Act*, or integrating marine refuges into existing management processes. A description of how different types of activities are managed in marine refuges is included in Section 5. Management Framework.

Policies that guide establishment of marine refuges and OECMs more broadly continue to evolve; collectively they provide a framework for the establishment and management of existing and future sites as Canada continues its path towards 30% conservation and protection of all lands and waters nation-wide by 2030.

[12] More information on the protection standards can be found here: https://www.dfo-mpo.gc.ca/oceans/conservation/advisorypanel-comiteconseil/index-eng.html

4.0 Roles, Responsibilities, and Coordination

This section describes the various governing authorities and their roles in the SS-BOF Bioregion. It also includes a description of the coordination mechanism to ensure that activities permitted in marine refuges are consistent with the conservation objectives as they will be assessed on a case-by-case basis.

4.1 Governing Authorities

4.1.1 Lead Relevant Governing Authority

Fisheries and Oceans Canada: DFO Maritimes Region is the lead relevant governing authority for marine refuges in the SS-BOF Bioregion with a variety of sectors involved in the ongoing management of these sites. Some of the sectors/programs and their roles are described below.

Conservation and Protection (C&P): C&P promotes and ensures compliance with legislation, regulations, and fishery management measures to achieve the conservation and sustainable use of Canada's aquatic resources and the protection of species at risk, fish habitat, and oceans. This sector's primary responsibilities include surveillance, compliance monitoring, and enforcement of the *Fisheries Act* and related regulations.

Fish and Fish Habitat Protection Program (FFHPP): This program administers project review and ensures conformance with conditions of authorization for development projects taking place in and around fish habitat under the fish and fish habitat protection provisions of the *Fisheries Act*. In the context of marine refuge management, FFHPP is responsible for ensuring that WUAs that could impact fish and fish habitat, that may be proposed within marine refuges, do not contravene the conservation objectives of the sites.

Marine Planning and Conservation (MPC): Marine refuges are co-developed and managed by MPC and Resource Management. The work undertaken by MPC is diverse and includes leading the selection, designation, and management of *Oceans Act* MPAs, marine planning, and coordinating the development of a bioregional conservation network plan. MPC provides overall management coordination for established marine conservation sites and is the lead sector responsible for the implementation of this plan.

Resource Management (RM): Marine refuges are co-developed and managed by MPC and RM. While RM has the lead role during the establishment of a marine refuge, afterwards they maintain an essential role regarding on-going engagement with Indigenous fish harvesters and other members of the fishing industry via issuance of licence conditions, fisheries advisory committees, as well as permitting scientific fishing activities in the sites. Please refer to Section 5.3 Scientific Research and Monitoring for more information.

Science: DFO Science conducts peer-reviewed research on biodiversity and ocean environments of marine refuges, while also promoting collaborative research projects with a range of partners and stakeholders. DFO Science leads the monitoring of marine refuges through conducting field studies, the identification of ecological indicators, and the development, implementation, and reporting on monitoring plans.

4.1.2 Other Relevant Governing Authorities[13]

Canada-Nova Scotia Offshore Petroleum Board (CNSOPB): Responsible for the regulation of oil and gas activities in the Canada-Nova Scotia offshore area (the *Accord Acts, 1988*). In April 2022, Natural Resources Canada and the Nova Scotia Department of Natural Resources and Renewables jointly announced that the CNSOPB's mandate would be expanded to include the regulation of offshore renewable energy development in the Canada-Nova Scotia Offshore Area. To implement this change, the *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act* has been amended federally via Bill C-49 and provincially via Bill 471.

Global Affairs Canada: Administers consent process for marine scientific research when foreign investigators request access to Canadian waters. Global Affairs Canada is the first point of contact for foreign research applications and sends applications to DFO for review. Information on activities proposed in marine refuges are included in the process.

Indigenous Governments: DFO will continue to work with Mi'kmaq and Wolastoqey (Maliseet) Nations, the Peskotomuhkati Nation at Skutik and Indigenous organizations in the planning, design, and management stages of marine refuges established pursuant to the *Fisheries Act*, to ensure Indigenous rights, use, and knowledge are recognized and accounted for in the establishment and management of these sites. DFO is also committed to exploring co-governance of existing or future marine refuges should interest be expressed by the Mi'kmaq, Wolastoqey (Maliseet) or the Peskotomuhkati Nation at Skutik. Co-governance would be a significant step towards lasting reconciliation.

[13]At time of publication, there are no marine refuges in waters adjacent to the Province of New Brunswick. However, should a marine refuge be established the government of New Brunswick and its relevant departments would be engaged with and involved in the ongoing management of those sites as other relevant governing authorities.

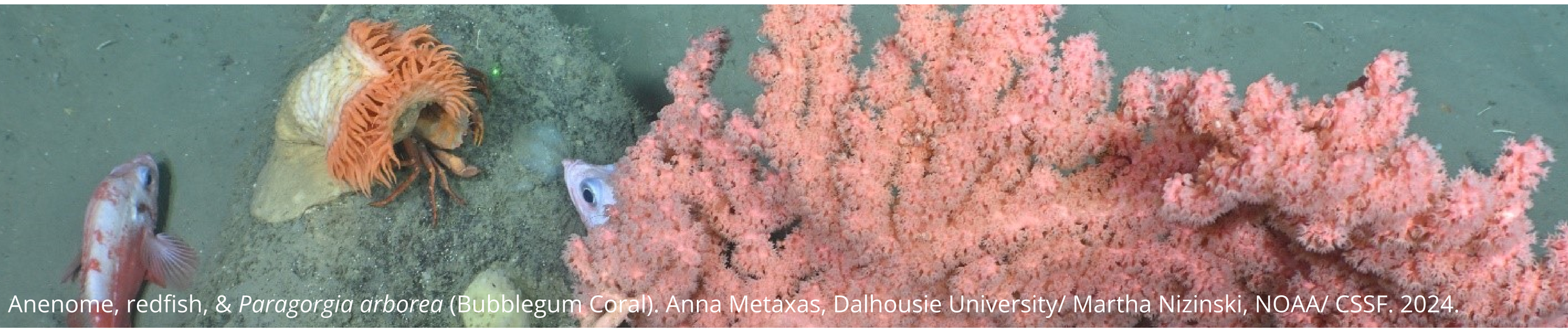
Innovation, Science and Economic Development Canada: Responsible for telecommunications, including licencing for submarine cables (*Telecommunications Act*).

Natural Resources Canada (NRCan): Jointly responsible, with the Nova Scotia Department of Natural Resources and Renewables, for administration of the *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act,* which, amongst other things, establishes the CNSOPB as an independent governing authority on behalf of the federal and provincial government of NS. NRCan also conducts marine geological studies, participates in marine spatial planning activities with DFO, and provides marine hydrocarbon and mineral resource assessments.

Nova Scotia Department of Fisheries and Aquaculture: Responsible for recreational fishing, marine plant harvesting, training and development, licensing of buyers and processors, aquaculture, the Fisheries and Aquaculture Loan Board, and enforcement *(Fisheries and Coastal Resources Act*).

Nova Scotia Department of Natural Resources and Renewables: Jointly responsible, with Natural Resources Canada, for administration of the *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act,* which, amongst other things, establishes the CNSOPB as an independent governing authority on behalf of the Government of Canada and the Government of Nova Scotia. The Nova Scotia Department of Natural Resources and Renewables is responsible for the regulation of marine renewable energy within waters under provincial jurisdiction (*Marine Renewable-energy Act*) and conducts research to ensure the use of mineral and petroleum resources is sustainable and that the ability to use innovative and new technology to support climate change and clean energy programs is possible.

Transport Canada: Responsible for ship safety and ship source pollution prevention for all commercial and fishing vessels (*Canada Shipping Act*) including the administration and enforcement of the *Vessel Pollution and Dangerous Chemicals Regulations* and the *Ballast Water Control and Management Regulations*. Transport Canada also represents Canada at the International Maritime Organization (IMO).



Anenome, redfish, & *Paragorgia arborea* (Bubblegum Coral). Anna Metaxas, Dalhousie University/ Martha Nizinski, NOAA/ CSSF. 2024.

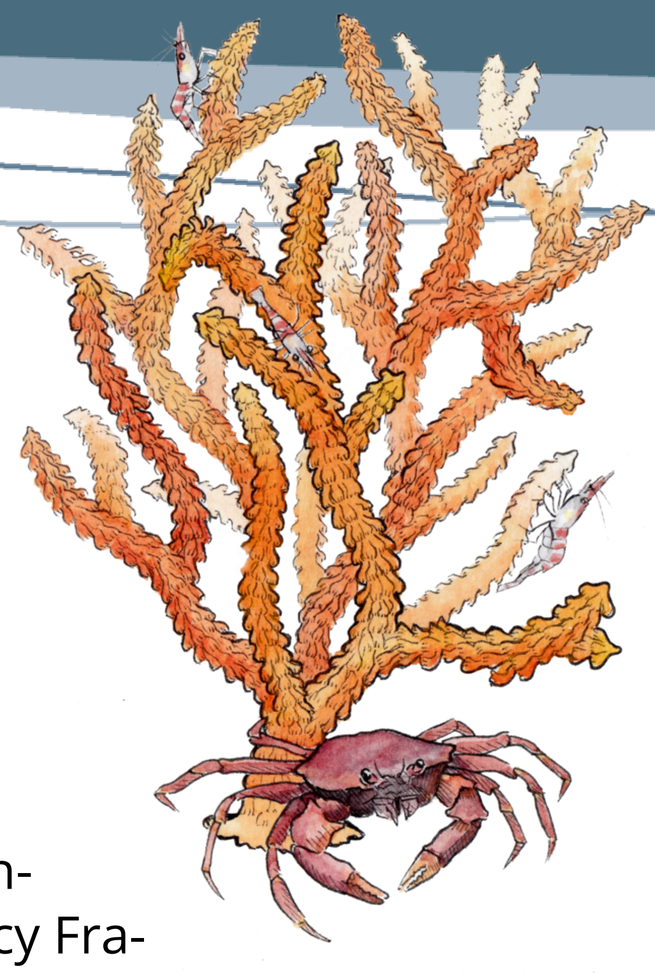
4.2 Coordination Committee and Collaborative Forums

The ongoing participation and involvement of federal and provincial departments, First Nations and Indigenous organizations, industry, academia, and public interests outside of DFO is essential for the protection of the SS-BOF marine refuges. As described in Section 5. Management Framework, a variety of regulatory tools, policies, and management decisions are used in combination to uphold the conservation objectives of marine refuges. To support the collaboration of governing authorities, as well as engagement of rights holders and stakeholders, the Scotian Shelf-Bay of Fundy Marine Refuge Coordination Committee is a multi-sector forum for sharing information and supporting the implementation of this management plan for all current and future marine refuges in this region. The SS-BOF Marine Refuge Coordination Committee consists of representatives from federal and provincial governments, First Nations and Indigenous organizations, industry, environmental organizations, and academia, and is chaired and administered by DFO. The primary activities of the Coordination Committee are:

- Exchange information and views amongst a core group of government and non-government organizations with interests in the SS-BOF Bioregion marine refuges.
- Review the development of management plan components, and associated materials.
- Input into the research/monitoring and management activities of governing authorities, organizations or bodies active in the bioregion's marine refuges.

Additionally, existing bilateral forums with provincial governments, other federal departments, First Nations and Indigenous organizations, and ocean users will be used to support the ongoing management of the marine refuges. For example, existing fishery advisory processes are venues to discuss issues related to marine refuge management and evaluation activities.

Paragorgia resedaeformis (Seacorn Coral). Anna Metaxas, Dalhousie University/ Martha Nizinski, NOAA/ CSSF, 2024.



5.0 Management Framework

This section provides a description of some of the activities currently occurring or most likely to be proposed in the SS-BOF marine refuges, and how additional governance and management actions support the Legislative, Regulatory, and Policy Framework (Section 3). Since marine refuges are area-based fisheries closures under the *Fisheries Act*, activities other than fishing are managed through a combination of regulatory tools and management actions, some of which are under the mandate of governing authorities other than DFO. The management outcomes for most of the following activities are not predetermined and will be determined on a case-by-case basis based on the conservation objectives of the individual marine refuge and the risks associated with the proposed activity.

Note, this section is structured around current and foreseeable potential activities; if another activity were to be proposed, it would still result in review/consideration via the Legislative, Regulatory, and Policy Framework. Currently, SS-BOF marine refuges are located offshore therefore nearshore/coastal activities were not scoped into this section. If new or emerging activities were proposed in a marine refuge or a coastal marine refuge was designated, the OECM protection standard (DFO, 2019) would apply and DFO would work with the relevant governing authorities to ensure that BCBs are not compromised. Additionally, marine spatial planning is being advanced within the SS-BOF Bioregion as an approach to guide the sustainable use of the ocean to achieve shared ecological, economic, cultural, and social objectives (DFO, 2023). Marine spatial plans will consider both economic and conservation aspects; they can identify potential areas for development of new activities (e.g. offshore renewable energy) and existing activities as well as areas that should be avoided or restricted for conservation reasons.

Vazella pourtalesii (Russian Hat Glass Sponge). DFO, 2011.

5.1 Commercial Fisheries

Overview of Activity

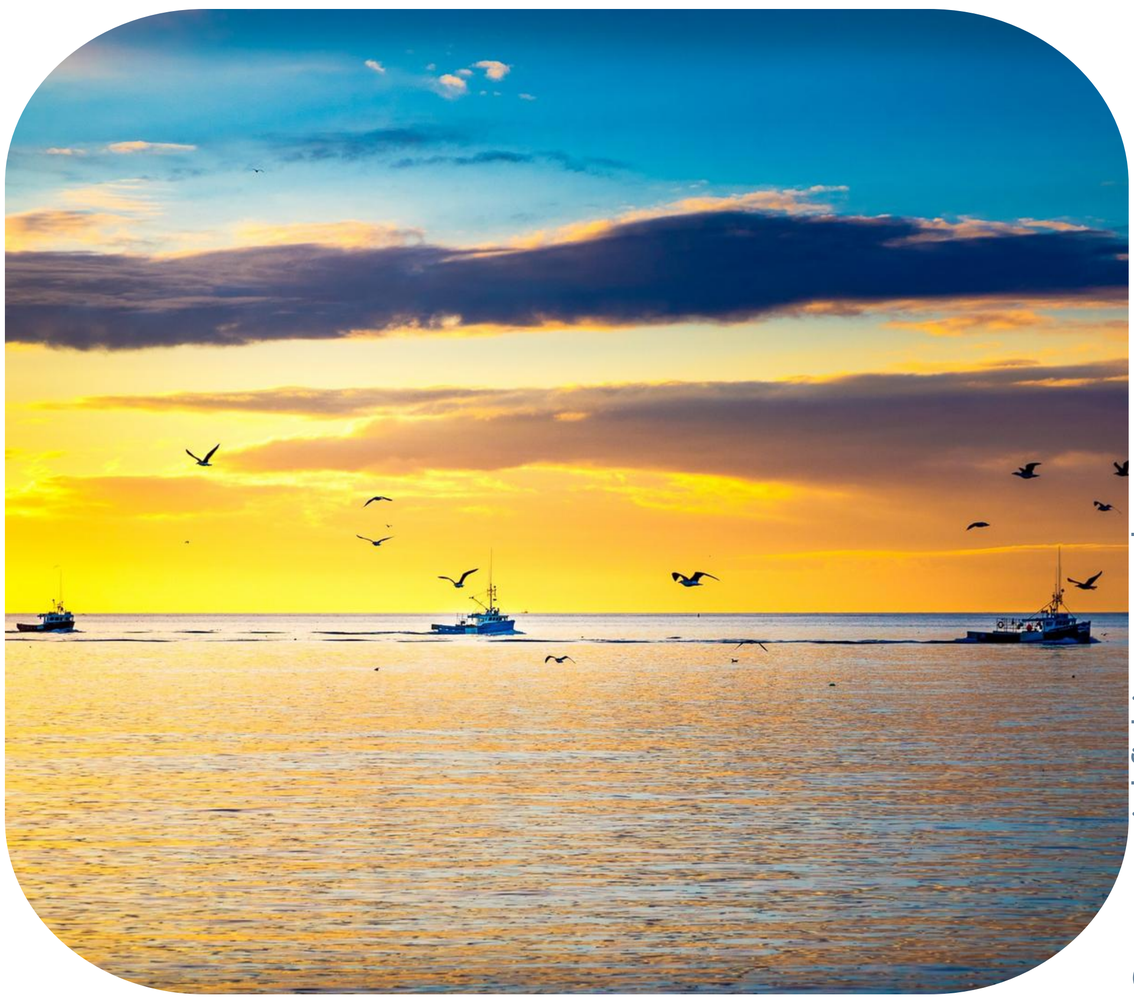
Commercial fishing is categorised as commercial communal, where licenses are issued to Indigenous communities, and commercial (non-Indigenous harvesters). Fishing within the SS-BOF Bioregion holds significant historic and present value, both economically and socially. Bottom-contact fishing gear used in the SS-BOF includes but is not limited to traps/pots, bottom trawls, bottom and mid-water gillnets, seines, bottom handline/jig, drag nets, dredges, rakes, and bottom longline. Other fishing gear used within the bioregion that is not bottom-contacting includes but is not limited to pelagic longline, handline/angling, buoy gear, trolling, some drift gillnets, purse seines, diving, and harpoons/spears. The impacts from fishing gear are largely dependent on the habitat features; the location and scale of the fishery; how the gear is rigged, deployed and retrieved; and, any additional threats facing the feature(s) that is being impacted by the gear (Donaldson et al., 2010).

Management System

Commercial fisheries are managed through a combination of harvest controls including quotas, fishing effort, gear restrictions, fishing seasons, and restricted areas (DFO, 2021a). As outlined in Section 3. Legislative, Regulatory, and Policy Framework, marine refuges are fishery closures pursuant to the *Fisheries Act* that can be implemented through variation orders, conditions of license, and/or BPRs.

Restrictions to specific commercial fishing gear types occurs during the design and establishment of a marine refuge based on the conservation objectives of the site and are enforced by DFO C&P once the site is established. Due to the benthic nature of the conservation objectives for the SS-BOF marine refuges (e.g. corals, sponges, and groundfish habitat) bottom-contact fishing could harm the habitats and species being protected by the conservation measures. As a result, bottom-contact fishing gear including bottom and mid-water gillnet, bottom trawl, bottom handline/jig, Danish or Scottish seine, dredge/dragging, bottom longline, fish traps, and traps/pots are prohibited within the boundaries of existing SS-BOF marine refuges. These restrictions and other site-specific information are available in Part II.

Should additional information such as the distribution of species that are the focus of the conservation objectives or the impacts on the commercial fishing indu-



Commercial fishing vessels.

stry be discovered after the marine refuge is established (e.g. from scientific research or monitoring activities), adaptive management will be pursued. For example, the boundaries of the site can be adjusted to maximize the protection of the conservation objectives after consultation with relevant rights holders and stakeholders.

5.2 Oil and Gas Exploration and Development

Overview of Activity

A variety of activities are necessary to explore for and then produce petroleum offshore. These activities can include but are not limited to seismic surveys, seabed surveys (side-scan sonar, sub-bottom profiling, etc.), and exploratory and production drilling (Oak, 2020). Potential interactions with marine refuge conservation objectives depends on both the stage of the project and the type of equipment/technique used. Bottom disturbance, sedimentation, exposure to chemicals and pollutants (DFO, 2021b), and noise are the primary types of pressures that have the potential to negatively interact with the conservation objectives of marine refuges in this bioregion.

All production fields and related infrastructure on the Scotian Shelf have been decommissioned as of 2020. As of 2024, there are no active Exploration Licenses in the SS-BOF Bioregion, although Significant Discovery Licenses (SDL) are in place, including one which overlaps with the Eastern Canyons Marine Refuge (Figure 3). The SDL was issued in 1990 and currently has no expiration date. The Northeast Channel Marine Refuge and part of the Corsair and Georges Canyons Marine Refuge overlap with the Georges Bank Moratorium Area (the closure has been extended on a 10-year interval since 1988, with the next re-evaluation set for December 31st, 2032).

Paragorgia arborea (Bubblegum coral) & *Primnoa resedaeformis* (Secaorn coral). DFO ,2019.

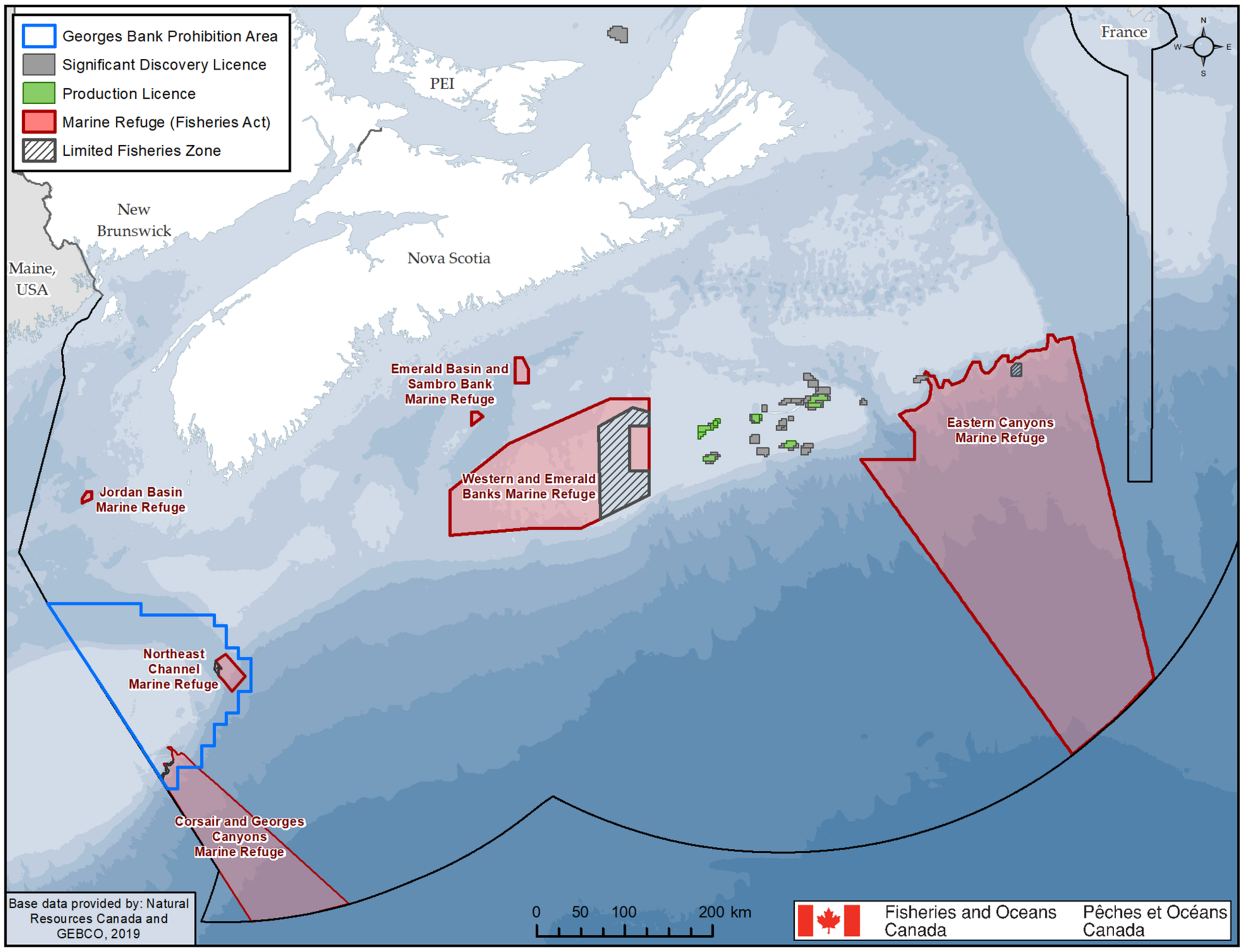


Figure 3. Oil and gas prohibition areas, significant discovery licences, and production licenses, and the Scotian Shelf-Bay of Fundy marine refuges

Management System

The CNSOPB is a joint provincial/federal agency and is the lead governing authority for offshore oil and gas exploration and production activities in the Canada-Nova Scotia offshore area. Under the authority of the *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act* and the *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation (Nova Scotia) Act* (the *Accord Acts, 1988*), the CNSOPB is responsible for administering exploration, development, and production rights of petroleum resources located in the Canada-Nova Scotia offshore area. Any activity related to the exploration or development of oil and gas requires approval from the CNSOPB.

The CNSOPB requires an environmental assessment for all petroleum exploration and development projects that require authorizations under the *Accord Acts*. Strategic Environmental Assessments have also been prepared. Marine refuges are considered "Special Areas" in Strategic Environmental Assessments, federal Impact Assessments, and Accord Act Environmental Assessments conducted for oil and gas activities. As such, they receive additional focus on potential impacts which requires dedicated mitigative measures to be applied within these areas.

DFO and the CNSOPB maintain a Memorandum of Understanding to effectively collaborate and align the roles and responsibilities of both agencies consistent with the *Oceans Act*, *Fisheries Act*, *Species at Risk Act*, and the *Accord Acts*, in support of informed and responsible petroleum development in the Canada-Nova Scotia offshore area. To provide consistency and transparency, an operational guidance document was developed by DFO in collaboration with CNSOPB in 2024 specific to proposed activities in marine refuges. The operational guidance is available in Annex B. Note, the 2019 minimum protection standards state that if there are oil and gas licences issued in a marine refuge, but no extraction is taking place, the overlapping area(s) will continue to count toward Canada's marine conservation target. Once oil and gas extraction begins, the overlap area can no longer count towards the marine conservation target or be part of a marine refuge. Therefore, the guidance is focused on oil and gas exploration and development activities, not production or decommissioning activities.

5.3 Scientific Research and Monitoring

Overview of Activity

Research and monitoring activities in the offshore areas of the SS-BOF Bioregion are primarily conducted by multiple federal departments, academic researchers, and ocean users such as the fishing industry. DFO promotes, funds, and conducts scientific research and monitoring, and identifies monitoring priorities for conservation areas in the region. Both research and monitoring are integral to marine refuge management, as they collectively increase our understanding of these environments, can provide evidence for the effectiveness of management actions, and identify changes in the environment that may require response from DFO. There are a wide range of research and monitoring activities that occur in the SS-BOF, some of which have the potential to negatively interact with the conservation objectives of marine refuges. With the wide variety of projects and methodologies, potential environmental impacts are often variable and dependent on the activity and the ecosystem component of concern.

Management System

Section 52 Licenses

Within Canada, a *Fisheries (General) Regulation* section 52 license (henceforth s.52 license) is required when fishing for experimental, scientific, educational, aquatic invasive species control, or public display purposes. A standardized s.52 application is submitted to the DFO Licensing Unit. DFO RM reviews the application for potential impacts to site-specific conservation objectives and involves other DFO sectors in the review, if necessary. DFO Science is responsible for tracking and validating the applicant's reporting.

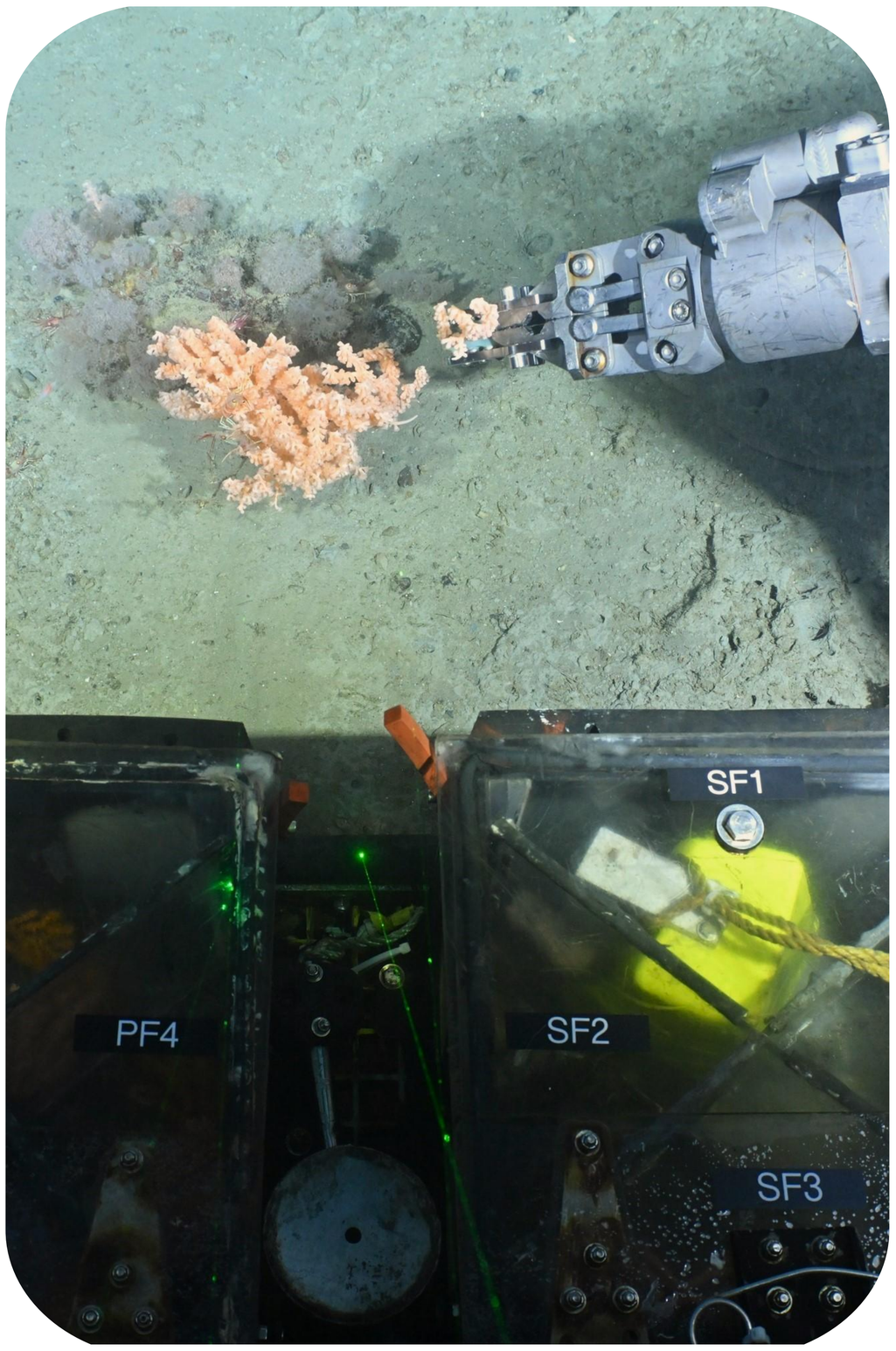
Scientists preparing ROPOS for at-sea sampling. Anna Metaxas, Dalhousie University/ Martha Nizinski, NOAA/ CSSF, 2024.

Foreign Vessel Clearances

Foreign researchers interested in conducting marine scientific research within waters under Canadian jurisdiction must request advanced consent by writing directly to Marine Science Research in accordance with the *United Nations Convention on the Law of the Sea* (UNCLOS). The request is then evaluated for approval under Canada's Foreign Vessel Clearance Request process. DFO reviews incoming research requests as they relate to Departmental mandates for marine science, resource management, and conservation. Reviews related to activities conducted in marine refuges are completed by DFO RM consistent with the approach used to review s.52 applications.

Marine Refuge Activity Plans

For research and monitoring activities not captured by the processes described above, proponents wishing to conduct activities within marine refuges are requested to submit an activity plan or a tracking document to MPC, depending on the types of activities they are proposing. This provides DFO sufficient information to ensure the risks to the conservation objectives are adequately avoided or mitigated. For informational purposes, activity plans submitted to DFO will be shared with the Coordination Committee. Additional information on this process, including templates, is in Annex C.



ROPOS collecting a coral sample. Anna Metaxas, Dalhousie University/ Martha Nizinski, NOAA/ CSSF, 2024.

5.4 Marine Renewable Energy

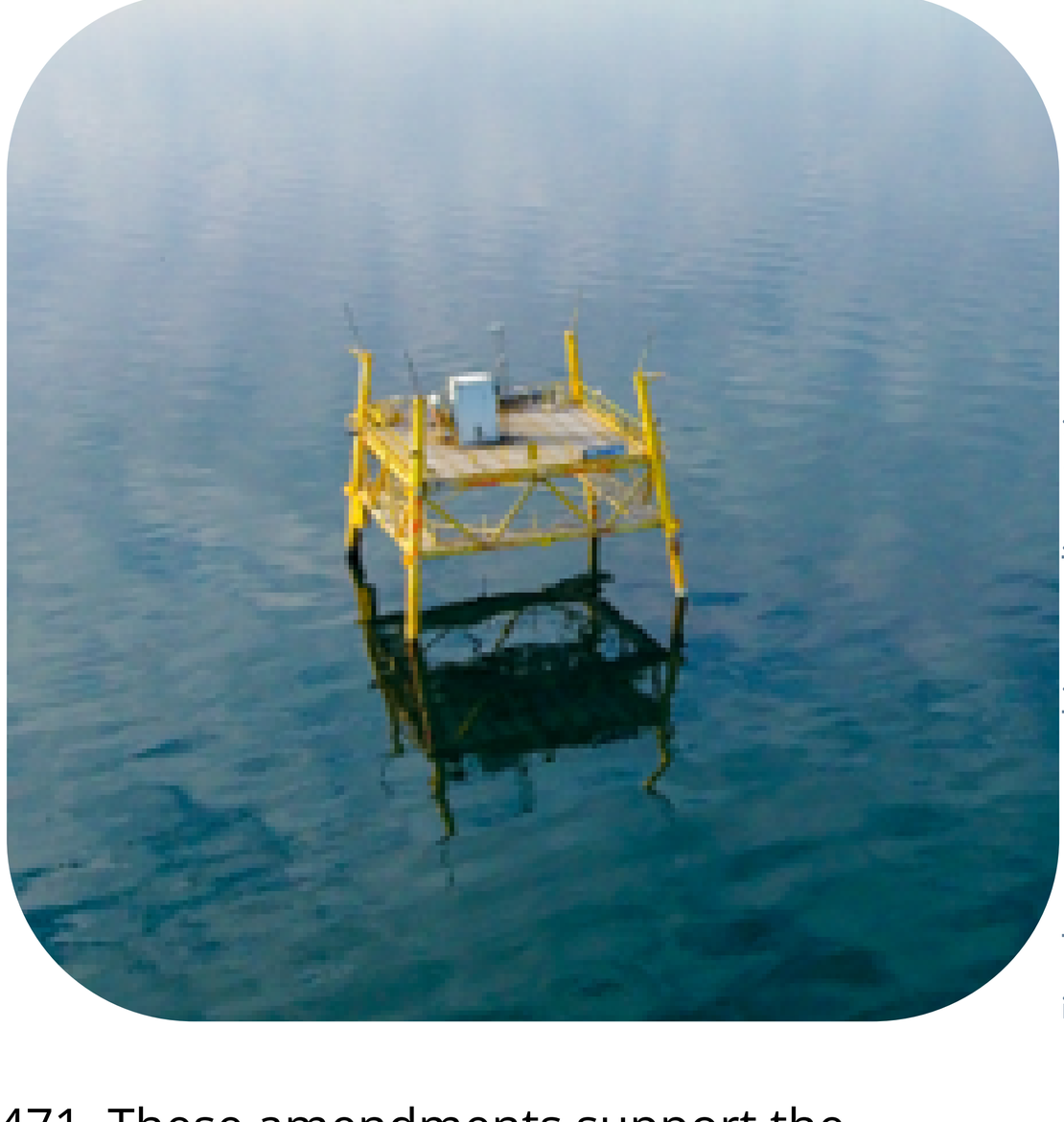
Overview of Activity

Marine renewable energy includes energy generated from wind, wave, and tidal resources in coastal and offshore marine environments. Due to the presence of immense offshore wind resource potential, an emerging area for development in Atlantic Canada is offshore wind energy. Due to the bottom contacting elements often associated with infrastructure development (pile driving, mooring, anchoring, etc.), renewable energy development is likely to negatively interact with the conservation objectives of marine refuges, particularly those in the SS-BOF Bioregion established under the SBA Policy. However, the interactions between renewable energy development and marine refuge conservation objectives will likely vary depending on the stage of the project, the type of equipment/technique used, and the mitigation measures applied.

Management System

The Government of Nova Scotia regulates marine renewable energy resource projects under provincial jurisdiction through the Nova Scotia *Marine Renewable-energy Act*. Under the *Marine Renewable-energy Act* two areas have been established as Areas of Marine Renewable-Energy Priority (AMREP) including the Bras d'Or AMREP and the Fundy AMREP (Figure 4). Currently, there is no overlap between AMREPs and SS-BOF marine refuges.

The Canadian Energy Regulator Act provides NRCan, through the arm of the Canada Energy Regulator (CER), with the legislative authority to regulate offshore renewable energy projects within marine waters under federal jurisdiction. The CER is in the process of developing *Offshore Renewable Energy Regulations* (ORER), that outline safety and environmental protection requirements for offshore renewable energy projects and are expected to be published in 2024 (NRCan, 2020).



Fixed oceanographic sampling station.

The *Canada - Nova Scotia Offshore Petroleum Resources Accord Implementation Act* has been amended federally via Bill C-49 and provincially via Bill 471. These amendments support the establishment of a joint management arrangement and expand the mandate of the CNSOPB to include the regulation of offshore renewable energy in the jointly managed Canada-Nova Scotia Offshore Area.

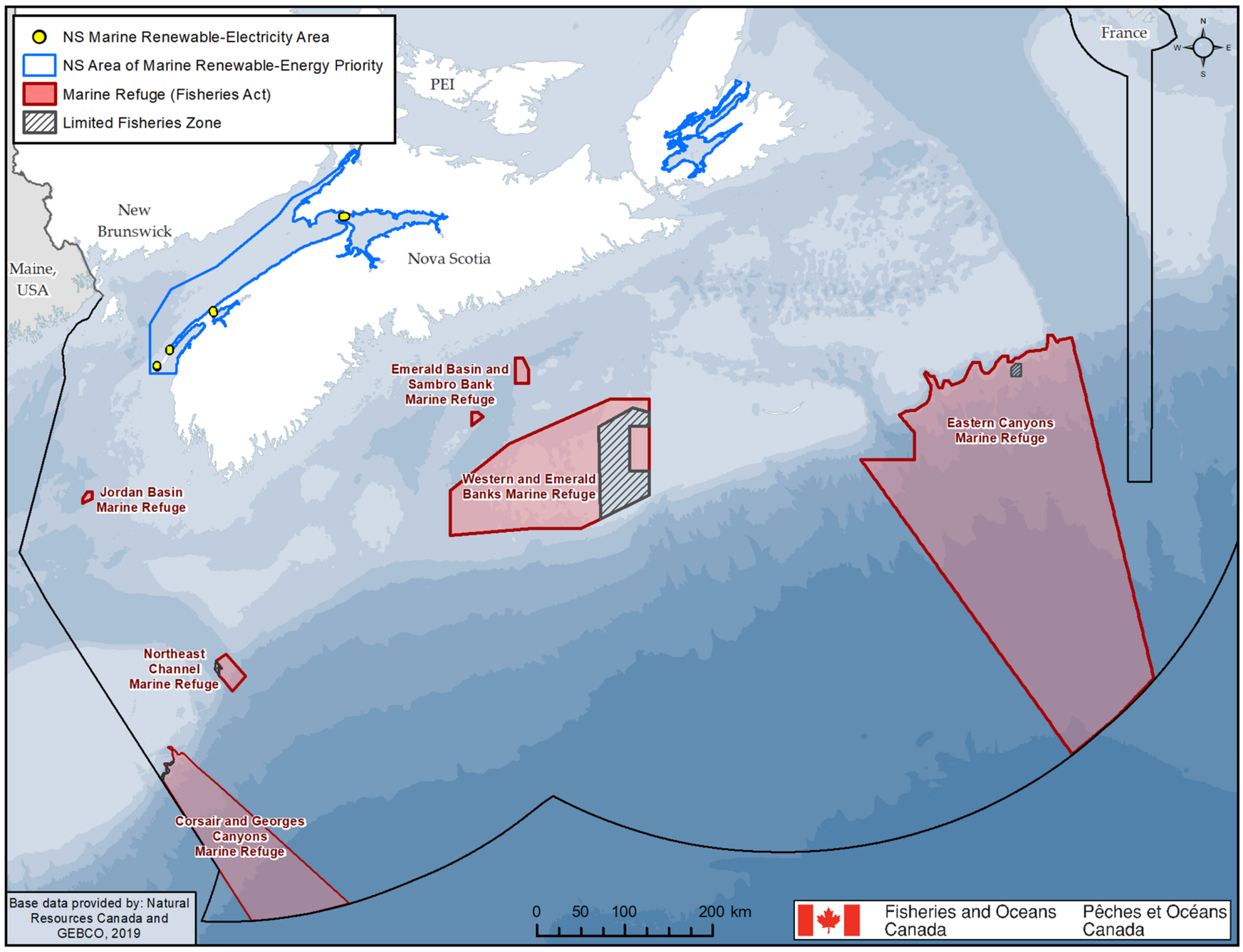


Figure 4. Scotian Shelf-Bay of Fundy marine refuges, NS Areas of Marine Renewable-Energy Priority, and NS Marine Renewable-Electricity Areas.

This mandate expansion will be reflected by a name change to the Canada-Nova Scotia Offshore Energy Regulator (NRCan, 2022). The proposed ORER are intended to serve as the basis for future regulations under the amended *Accord Acts*.

Canada is working to ensure the development of these regulations is coordinated with coastal provinces like Nova Scotia to ensure these regulations can serve as a model in future joint management arrangements for offshore renewable energy projects.

DFO MPC will continue to engage with the Province of Nova Scotia, NRCan, and the CNSOPB on the development and management of marine renewable energy projects to ensure alignment with marine refuge conservation objectives.

5.5 Submarine Cables

Overview of Activity

In the SS-BOF, there are numerous submarine cables that provide different services to Nova Scotian's and international neighbours (Breeze & Horsman, 2005). The two primary purposes of submarine cables are to enable telecommunications and to transfer

electricity. There are two methods of installing submarine cables, surface laying and burial. Surface laying is the process of laying cables directly on the seafloor and is the less intrusive method of installation (Carter et al., 2014). The burial of cables, which is more intrusive, minimizes potential interactions with other ocean users and movement of cables via currents. It involves direct impacts to the seafloor in creating the burial path and in dumping the extracted sediments outside of the work area (Carter, 2010). Though infrequent, the maintenance and repair of submarine cables is sometimes required and may result in similar impacts as the initial installation (Ford-Ramsden & Burnett, 2014). Potential environmental impacts associated with submarine cables are varied, but are largely dependent on the type of cable, installation method, and habitat features along the cable route. When considering the conservation objectives for the SS-BOF marine refuges, bottom disturbance of sensitive benthic organisms is the primary potential impact, although noise is also a concern.

Desmophyllum pertuusum. DFO, 2007.

Management System

Under UNCLOS, foreign states maintain the right to install cables in the exclusive economic zone (EEZ) of coastal states (Article 58.1); however, coastal states may provide input and advice to best protect the marine resources within their EEZ.

In Canada, the *International Submarine Cable Licenses Regulations* of the *Telecommunications Act* apply to the territorial sea (out to 12 nm) of Canada but its jurisdiction does not extend to cables that traverse the adjacent EEZ (12-200 nm). For cable projects solely within Canada's EEZ, permits may be granted under the *Fisheries Act*, *Oceans Act*, *Accord Acts,* and *Species at Risk Act*.

In addition to regulatory aspects, there are also international best management practices to support the installation and routing of submarine cables. For example, the Oslo/Paris Convention for the Protection of the Marine Environment of the North-east Atlantic guidance document outlines best practices (OSPAR Commission, 2012). These guidelines specify that the laying of cables should

avoid MPAs and other ecologically important and sensitive habitat areas (OSPAR Commission, 2012).

In the case of SS-BOF marine refuges, DFO will work with submarine cable proponents to avoid marine refuges to the extent possible. When avoidance is not possible, DFO will work with the proponent to utilize installation and maintenance methods that are minimally invasive and prioritize practices that minimize environmental harm (e.g. minor re-routing to avoid areas of known coral or sponge concentrations).

5.6 Marine Transportation

Overview of Activity

Marine transportation varies among the SS-BOF marine refuges but can include several different vessel types and activities, such as general cargo, bulk carrier, containers, tankers, passengers/cruise ships, fishing vessels, pleasure crafts, science, and military vessels. Activities associated with marine transportation can include but are not limited to vessel movement/presence, mooring and anchorage, and discharge (DFO, 2020a). There are a variety of discharges associated with shipping, including operational discharges (e.g. ballast water, waste disposal, air emissions, sewage/grey water, cargo sweepings and bilge water) and incidental or accidental discharges (e.g. lost cargo, hull fouling, oil and other contaminants). The primary environmental pressures of concern for the SS-BOF marine refuges associated with marine transportation include bottom disturbance, introduction of non-indigenous species, noise, and exposure to contaminants (DFO, 2020a). Note, the pressures associated with marine transportation are applicable to other classes of activities described in Section 5 as marine vessels are used when conducting those activities.

Management System

Marine transportation within the SS-BOF marine refuges is primarily managed by Transport Canada. Transport Canada is responsible for overseeing and regulating navigation, marine pollution, government ports and harbours, and recreational boating, among others. Note, freedom of navigation, a principle of customary international law, limits the ability of Transport Canada to impose regulations regarding the mobility of marine transportation through marine refuges as they are primarily located in Canada's EEZ. The *Canada Shipping Act* is the umbrella legislation that regulates many marine transportation-related activities. Provisions regarding vessel traffic related activities, such as vessel speed, presence, and navigation are regulated through the *Canada Shipping Act* and the regulations that derive from it. The *Canada Marine Act* encompasses regulations for commercial ports overseen by individual authorities and includes provisions for safety and environmental protection.

While there is potential for impacts associated with marine transportation within marine refuges, the potential interaction with conservation objectives is anticipated to be low. For example, due to the offshore locations and depths of current marine refuges in the SS-BOF Bioregion, anchoring is unlikely to occur unless it was a result of a safety of life at sea situation. However, even in these extreme cases, most of the area covered by marine refuges in the region are depths that preclude benthic interaction associated with marine transportation. With regard to the introduction of aquatic invasive species, various regulatory tools are in place to minimize risks associated with marine transportation. For example, the *Vessel Pollution and Dangerous Chemicals Regulations* include requirements for anti-fouling systems for vessels that engage in international voyages and reduces the probability of transfer and establishment of invasive species associated with biofouling.

Sea pen. DFO, 2010

IMO regulations that came into force in 2017 require ballast water treatment systems to be in place aboard all vessels registered to signatory countries that travel internationally by 2024 (IMO, 2017). Treated ballast water, like antifouling systems, will serve to reduce the potential for traffic-based introductions by enforcing international best practices. However, until treatment systems are in place onboard all vessels, ballast water exchange in designated locations will still be the predominant mitigation measure. Canada's *Ballast Water Regulations* state that vessels must exchange ballast in water at least 200 nm from shore where depths reach at least 2,000m or in a designated alternate ballast water exchange area (Transport Canada, 2021) (Figure 5). Three SS-BOF marine refuges overlap with one of these designated alternate ballast water exchange areas including Eastern Canyons Marine Refuge, Corsair and Georges Canyons Marine Refuge, and Northeast Channel Marine Refuge (Figure 5).

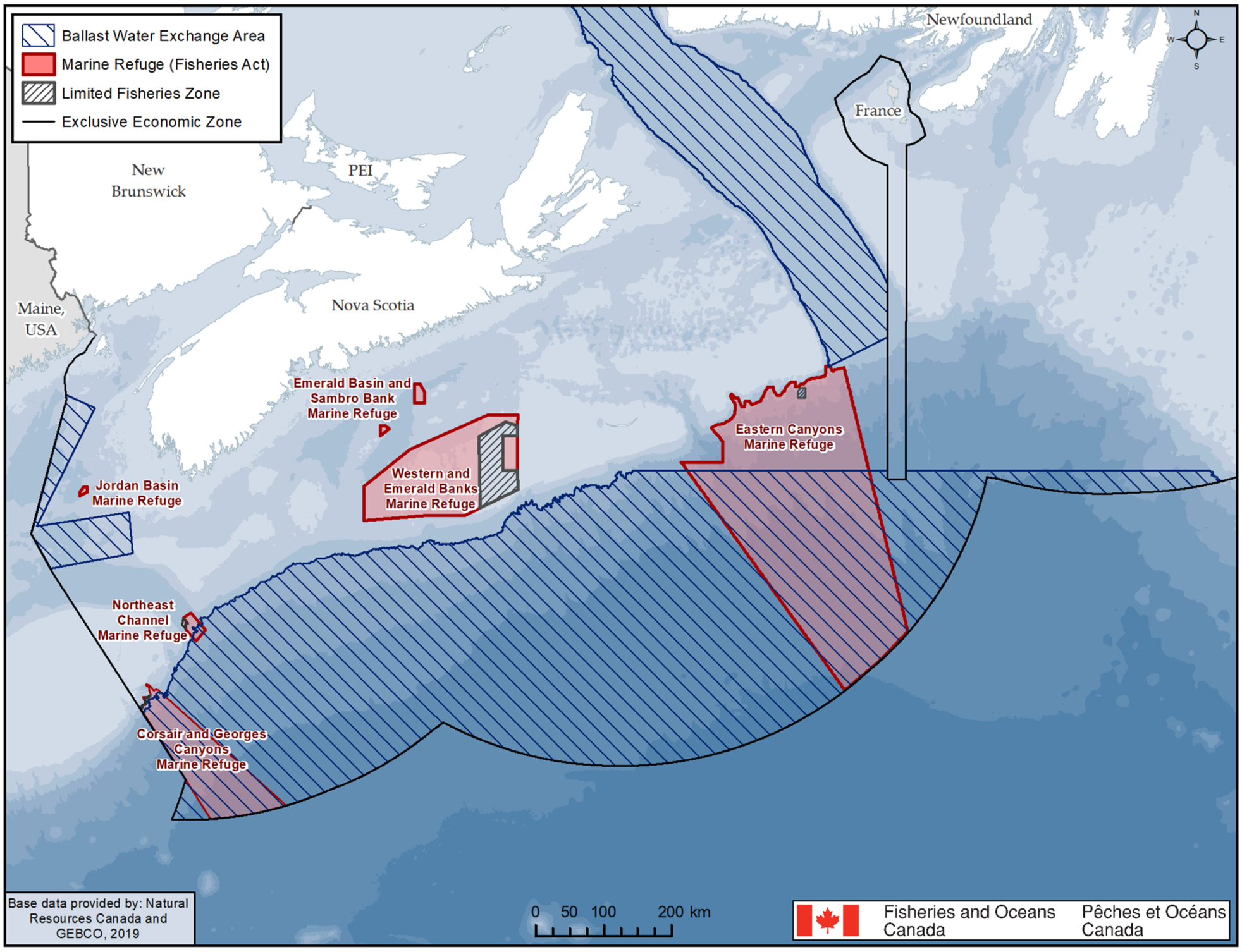


Figure 5. Ballast Water Exchange Areas and Scotian Shelf-Bay of Fundy marine refuges

5.7 Military Activity

Overview of Activity

The Canadian Armed Forces make up the unified military forces of Canada and are inclusive of Canada's Maritime Forces Atlantic (MARLANT). MARLANT engages in a range of operations and activities in the region, including maritime surveillance, sovereignty patrols, training and combat readiness exercises, search and rescue, and providing support to other government departments for law enforcement and environmental protection. The primary ecological pressures of concern for SS-BOF marine refuges associated with marine military operations are ship-source pollutants and accidental discharges, underwater noise, contamination from weapons and equipment, and seabed interactions from moorings, sinking targets, and ordinances.

Military training exercises are restricted to designated exercise areas known as Maritime Forces Atlantic Operating Areas (MARLOAs). Each exercise area is zoned for specific types of activities involving surface, sub-surface, and air training operations. Refer to Figure 6 for specific activity zoning off Nova Scotia. Foreign military vessels may also operate in the regional exercise areas with permissions from MARLANT. MARLOAs overlap with all of the SS-BOF marine refuges except for Jordan Basin Marine Refuge (Figure 6).

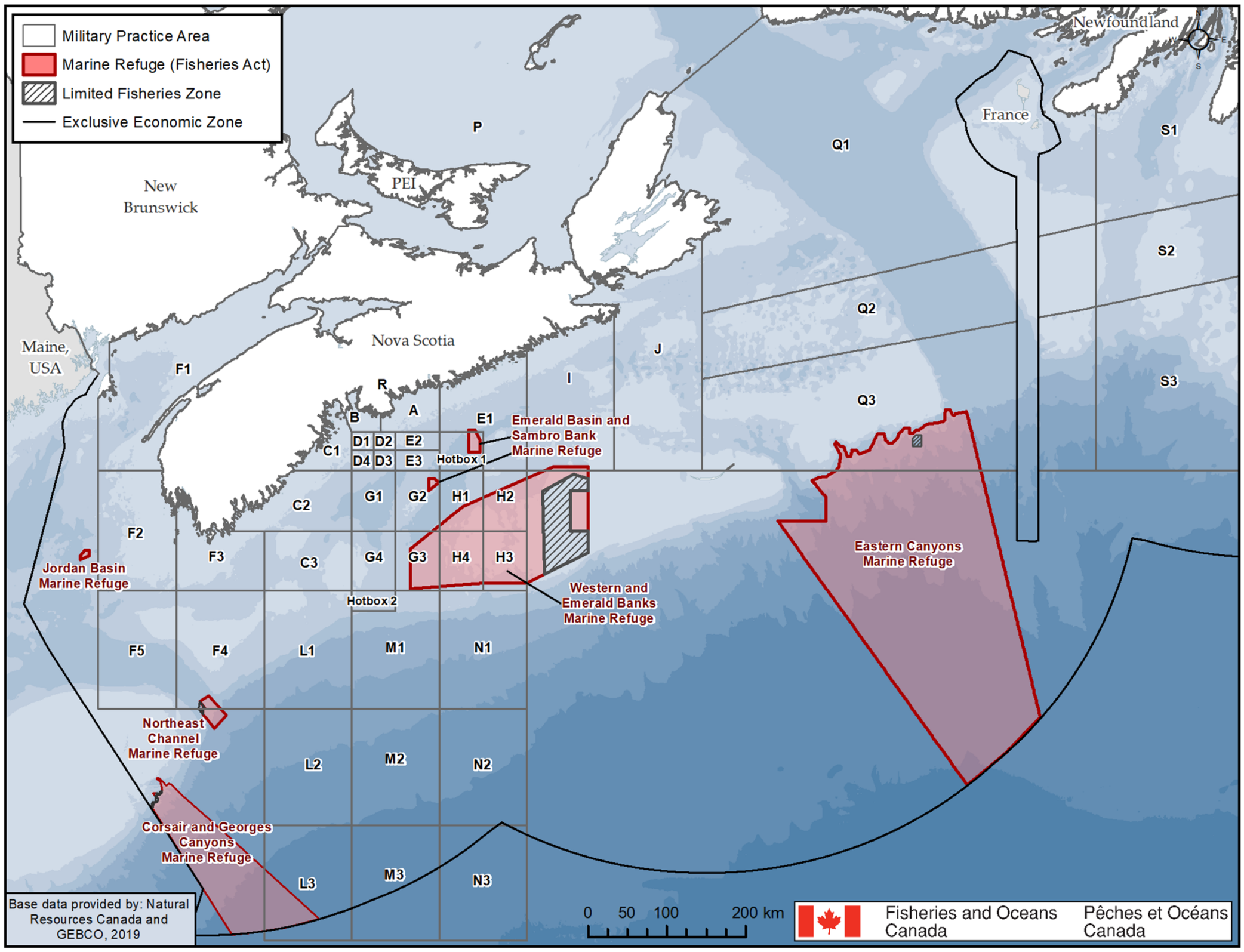
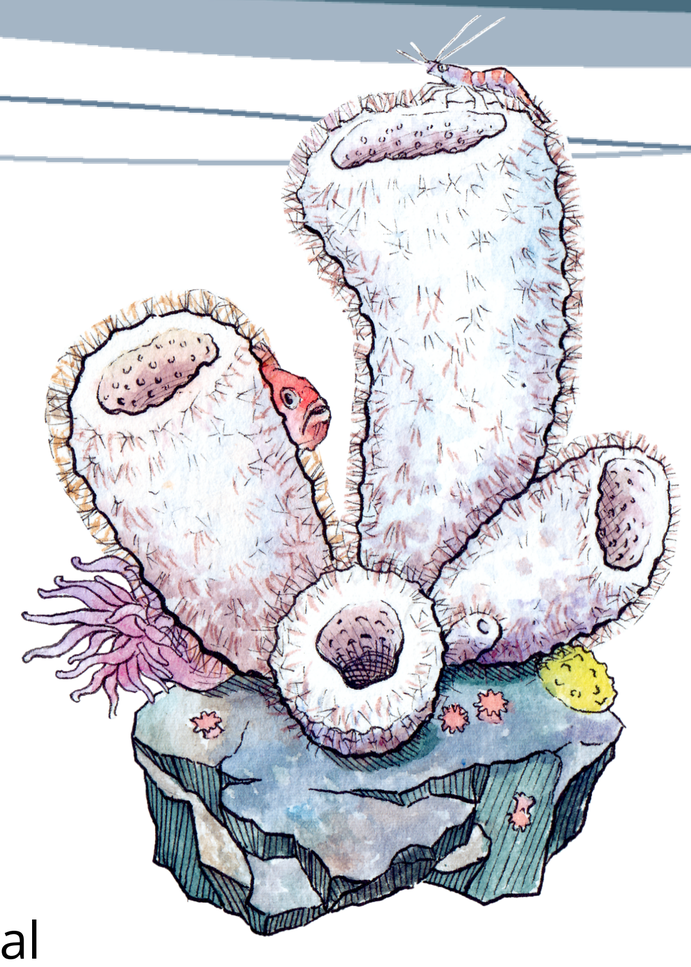


Figure 6. Overlap of Scotian Shelf-Bay of Fundy marine refuges and MARLOAs

Management System

The Department of National Defense (DND) is committed to sustainable management within the MARLOAs and has developed an environmental policy to ensure that military testing, training, and exercises comply with all applicable environmental laws and standards. MARLANT assesses potential effects of marine military activities and implements measures to avoid and mitigate impacts to marine life. Measures implemented in all operations include the avoidance of bottom-contact activity in areas with bottom-contact restrictions such as marine refuges. DND regularly coordinates with DFO to stay informed about avoidance, mitigation, and monitoring measures as well as conservation objectives relating to MPAs, marine refuges, and sensitive species and habitats.

6.0 Surveillance, Compliance and Enforcement



Coordinated surveillance and enforcement is necessary for marine refuges given their remote offshore locations, the variety of ocean uses, and management jurisdictions. Federal departments involved in compliance and enforcement in the EEZ include DFO, Transport Canada, and Environment and Climate Change Canada. Additionally, the CNSOPB ensures compliance verification and enforcement for petroleum related activities, and supports the above noted departments through various regulatory mechanisms.

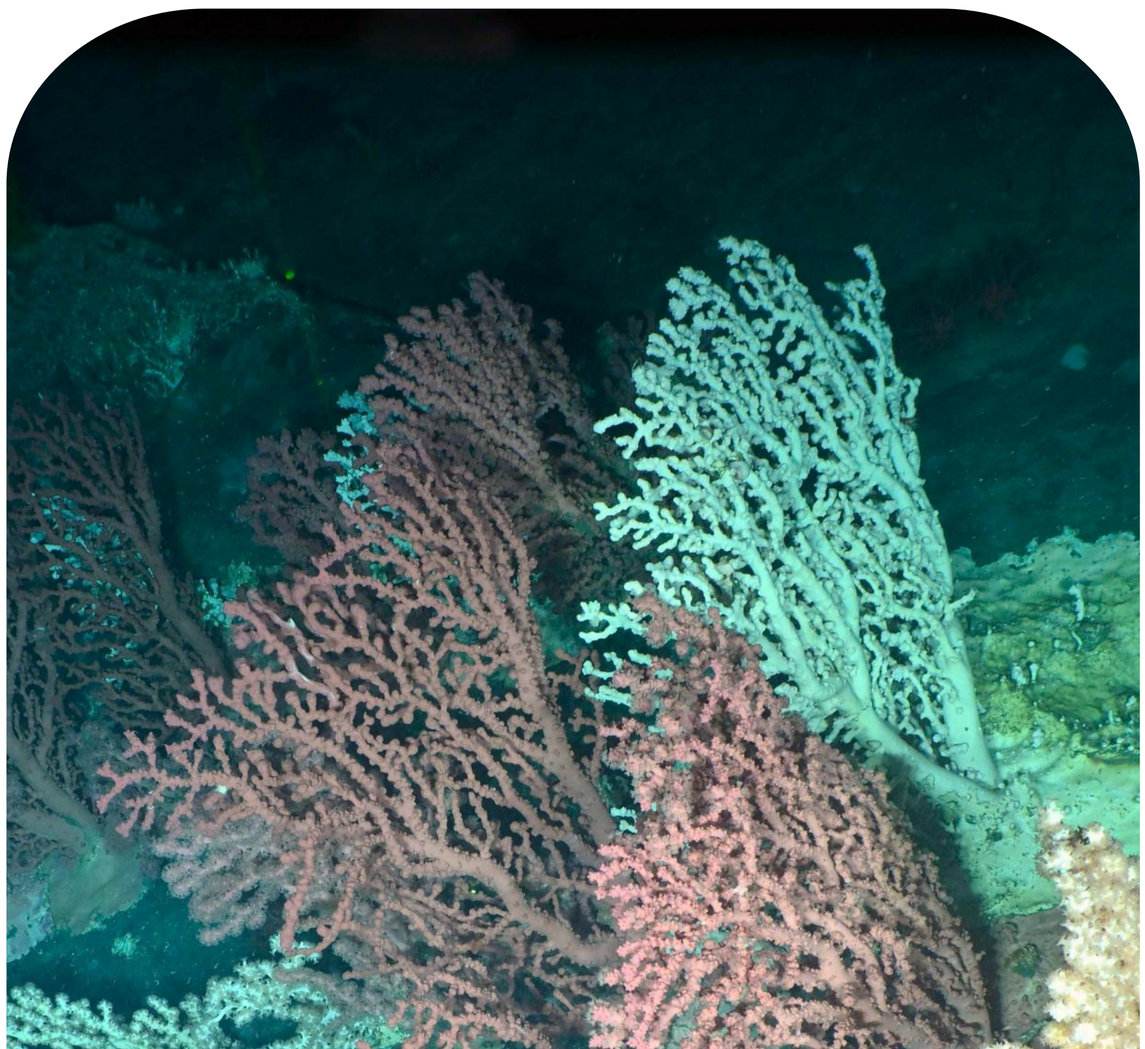
Marine refuge restrictions are enforced through regulatory management and enforcement approaches. This includes promoting compliance with legislation, regulations, and management measures through education and shared stewardship. Compliance awareness and promotion are integral to the continued management of marine refuges. Sharing of information, allowing for stakeholders and site users to remain up to date on regulations and licensing, remains one of DFO's top priorities in marine refuge management. Targeted outreach and education efforts, such as the distribution of information packages or one-on-one discussions, may be employed as needed to increase understanding and encourage compliance amongst specific users or user groups.

Conservation & Protection surveillance plane.

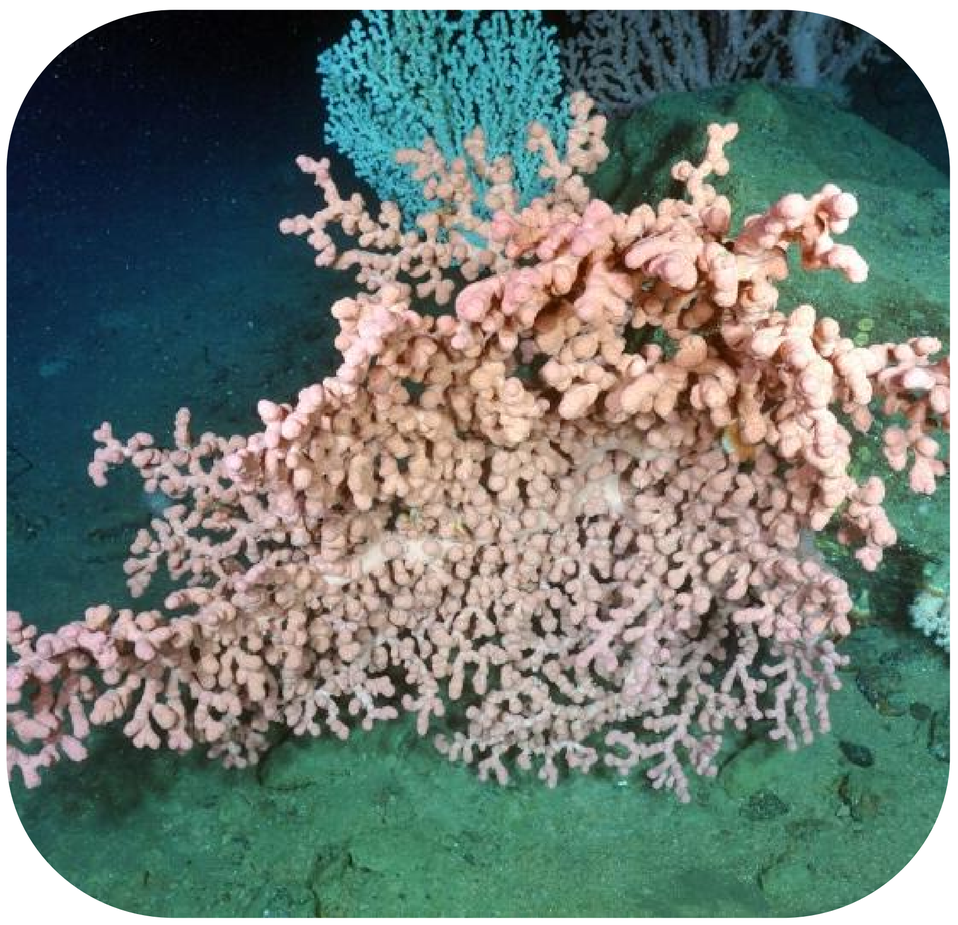
DFO is the lead agency for the enforcement of fishery-related activities in marine refuges. The primary means of surveillance and enforcement in marine refuges is through DFO's C&P program. Fisheries monitoring, surveillance, and audit activities provide the ability to observe marine harvesters' compliance. Incidents of potential non-compliance can be detected through several different activities. These include but are not limited to aerial and vessel patrols, Vessel Monitoring System (VMS) reports, At-Sea Fishery Observer reports, and fisher logbooks. Many

fishing fleets in the DFO Maritimes Region are required to carry an automated VMS unit, which transmits vessel position via satellite and is often the first indication of suspicious activities which can be further investigated. Targeted patrols may occur if suspicious activity or suspected violations are detected in a specific area. The At-Sea Observer program uses third-party companies to monitor and report on activities onboard fishing vessels. Observer data is useful for fisheries compliance monitoring, and for gathering information on catch composition, including by-catch and discards. Aerial surveillance platforms allow for the identification of targets in marine refuges from a great distance for additional follow-up during non-dedicated marine refuge patrols.

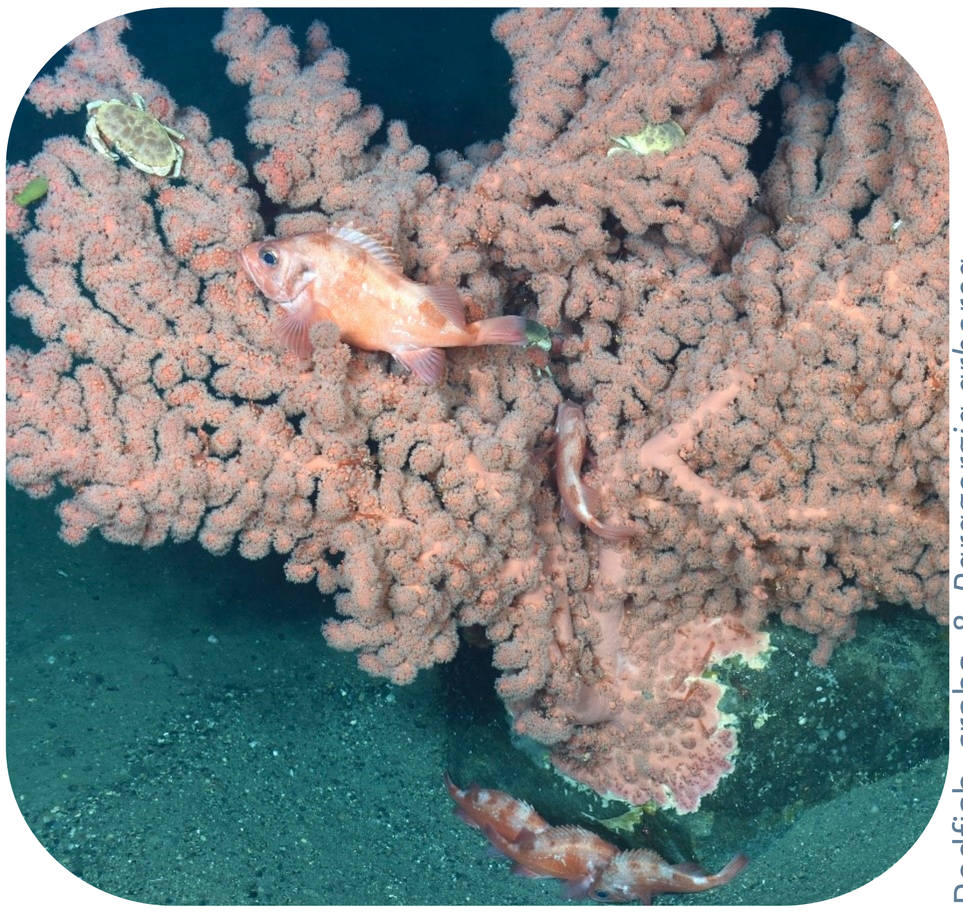
Information is collected and analyzed by C&P to decide whether additional investigation is required to support potential enforcement action. Enforcement actions may include: warnings, seizures, arrests, charges, and/or prosecutions.



Paragorgia arborea (Bubblegum Coral). Anna Metaxas, Dalhousie University/ Martha Nizinski, NOAA/ CSSF, 2024.



Paragorgia arborea (Bubblegum Coral). DFO, 2014.



Redfish, crabs, & *Paragorgia arborea* (Bubblegum Coral). Anna Metaxas, Dalhousie University/ Martha Nizinski, NOAA/ CSSF, 2019.

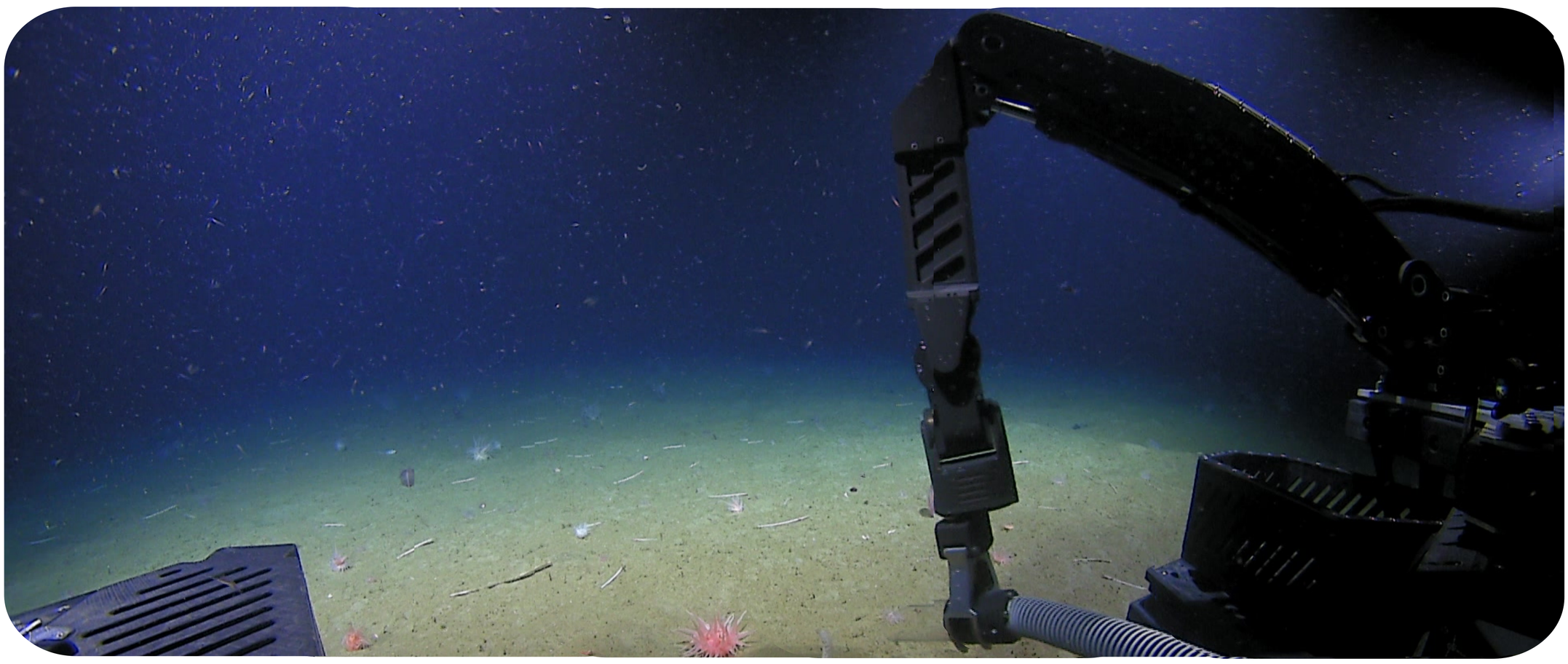
7.0 Evaluation and Reporting

7.1 Management Plan Review

This management plan is intended to guide management of the SS-BOF marine refuges for ten years. A review of progress towards meeting plan objectives will be conducted regularly and DFO will engage with the SS-BOF Marine Refuge Coordination Committee on a regular basis regarding objectives and priority actions. Over this period, changes to legislation, regulations, priorities, commitments, or site information like new science or the designation of new site(s) could necessitate an earlier review and update to the public on particular management issues. This could take the form of companion documents or result in an earlier update of the management plan. The DFO website will be kept up to date and serve as a resource for current information.

7.2 Reporting

Various types of progress reporting efforts that document accomplishments as they relate to the objectives and priorities identified in the plan will be pursued. Reports that provide the findings of ecosystem monitoring programs and management effectiveness will also be published as they are completed, and data will be made publicly available whenever possible. In addition to reporting on the biological and ecological assessments to inform site management, effort will be made to evaluate the related educational and social impacts. Reports, documents, and updates on the SS-BOF marine refuges will be published on the DFO website as they become available.



NOAA Ocean Exploration, 2019.

Glossary

Adaptive management
Adaptive management is an ongoing and iterative process of improving management policies and practices through a cycle of applying new knowledge gained through learning based on monitoring and evaluation, as well as reflecting changes in policies and practices.

Area-Based Measure
Any spatially defined measure implemented to achieve one or more objectives. Not all area-based measures are necessarily MPAs or OECMs, but all MPAs and OECMs are area-based measures.

Biological diversity (Biodiversity)
Biodiversity is the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems. (CBD 1992)

Biodiversity conservation benefit (BCB)
A biodiversity conservation benefit may also be referred to as a biodiversity outcome under the CBD. A BCB is the net positive change in biodiversity or prevention of its loss resulting from the governance decisions and management actions within an area. One or more BCBs can directly result from implementing measures in an area to protect species, habitats, or other components of the ecosystem. Measures implemented for a different purpose may result in indirect BCBs. BCBs contribute to the in situ conservation of biodiversity. The term BCB and its definition are consistent with the 2016 CSAS science advice and the CBD's OECM definition.

Conserved areas
"Conserved areas" include both marine protected areas and areas that satisfy the criteria for "other effective area-based conservation measures." (IUCN Guidance, 2012, 2019)

Cultural and spiritual values
These include recreational, religious, aesthetic, historic, and social values related to tangible and intangible benefits that nature and natural features have for people of different cultures and societies. (IUCN Guidance, 2012, 2019)

Ecosystem
A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit. (CBD 1992)

Ecosystem approach
A strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. (CBD 2004; National Framework for Canada's Network of MPAs, 2011)

Ecosystem functions
An ecosystem function or process is an intrinsic ecosystem characteristic whereby an ecosystem maintains its integrity. Ecosystem functions include decomposition, production, nutrient cycling, and fluxes of nutrients and energy. Ecosystem functions are critical to the proper operation of the ecosystem.

Etuaptmumk
Etuaptmumk (Two-Eyed Seeing) is a balanced respect, appreciation, and consideration for Indigenous and Western knowledge. Two-Eyed seeing is learning to see from one eye with the strengths of Indigenous knowledge and ways of knowing, and from the other eye with the strengths of Western knowledge and ways of knowing and learning to use both eyes together for the benefit of all.

Important habitat
An important habitat is one that has biodiversity conservation value. Important habitats may:

1. be unique and/or rare
2. support climate change adaptation and mitigation, including carbon sequestration
3. provide refuge for species affected by climate change
4. have special importance for the life-cycle of a species
5. have importance for threatened, endangered or declining species and/or habitat
6. be vulnerable, fragile, or slow to recover
7. have comparatively higher biological productivity or diversity
8. be in a highly natural state
9. be listed in conservation network objectives

Important species
Species may be considered important for a variety of resource, ecological, or cultural reasons. Important species include those that are:

1. ecologically significant, including keystone species
2. depleted or rare
3. species of social or cultural importance
4. listed in conservation network objectives

In situ conservation of biodiversity
The conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings, and in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive characteristics. (CBD; Canadian Biodiversity Strategy: Canada's Response to the UN CBD, 1995)

Long term
Long term, relative to the establishment of an area-based measure recognized as an OECM as well as OECM governance and management, means that there is obvious intent (e.g. through legal or regulatory means or through a public commitment) to maintain the compliance with this Guidance and therefore OECM status year-round, with no end date.

Marine Protected Area (MPA)
A clearly defined geographical space recognized, dedicated, and managed through legal or other effective means to achieve the long-term conservation of nature with associated ecosystem services and cultural values. (IUCN Guidance, 2012, 2019; National Framework for Canada's Network of MPAs, 2011)

Marine refuge
A marine refuge is one type of OECM. In the Canadian context, it is a fisheries-area closure established under the *Fisheries Act* that meets the criteria in this Guidance and is recognized as an OECM by the Minister of Fisheries, Oceans and the Canadian Coast Guard.

Netukulimk
Netukulimk is the use of the natural bounty provided by the Creator for the self-support and well-being of the individual and the community. Netukulimk is achieving standards of community nutrition and economic well-being without jeopardizing the integrity, diversity, or productivity of our environment.

OECM governance and management system
The OECM governance and management system is the totality of governance rules and decisions (such as statutes, regulations, licences, permits, or formal agreements) and management actions (such as programs, policies, processes, traditional and cultural practices, and voluntary best practices) that co-exist within a given OECM. These decisions and actions prohibit, limit, allow, or manage activity(ies) in order to ensure that risks to the OECM's BCBs posed by those activities are effectively avoided or mitigated.

Other Effective Area-Based Conservation Measure (OECM)
A geographically defined area other than a Protected Area which is governed and managed in ways that achieve positive and sustained long-term outcomes for the *in-situ* conservation of biodiversity with associated ecosystem functions and services and where applicable, cultural, spiritual, socio–economic, and other locally relevant values. (CBD 2018)

Protected area
A clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values. (IUCN 2008).

Rights Holder
In this management plan, "rights holder" generally refers to Indigenous peoples whose rights are laid out in s.35 of the *Constitution Act*, 1982, and further defined in the *Fisheries Act*, 2019 (ss. 2.3, 2.4), and in other federal statutes.

Under the *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act* and mirror provincial legislation, oil and gas licences may confer some rights to licence holders.

Coastal landowners may possess property rights which may need to be considered according to each candidate OECM's boundary.

Stakeholder
People and organizations who are involved in or affected by an action or policy and can be directly or indirectly included in the decision-making process. Stakeholders may be local [i.e. adjacent to (or within) the OECM] or have an economic, environmental, or social cultural interest and knowledge of the area without physically residing there.

United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP)
UNDRIP is a comprehensive international human rights instrument on the rights of Indigenous peoples around the world. It affirms and sets out a broad range of collective and individual rights that constitute the minimum standards to protect the rights of Indigenous peoples and to contribute to their survival, dignity and well-being.

In Canada, the *UNDRIP Act* received Royal Assent and came into force on June 21, 2021. This Act provides a roadmap for the Government of Canada and Indigenous peoples to work together to implement the Declaration based on lasting reconciliation, healing, and cooperative relations.

Acts of Parliament

Canada Energy Regulator Act, S.C. 2019, c. 28, s. 10: https://laws-lois.justice.gc.ca/eng/acts/c-15.1/index.html

Canada-Newfoundland and Labrador Atlantic Accord Implementation Act, S.C. 1987, c. 3: https://laws-lois.justice.gc.ca/eng/acts/C-7.5/index.html

Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act, S.C. 1988, c. 28: http://laws-lois.justice.gc.ca/eng/acts/C-7.8/

Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation (Nova Scotia) Act, S.N.S. 1987, c. 3: https://nslegislature.ca/sites/default/files/legc/statutes/canada-ns%20offshore%20petroleum.pdf

Canada Shipping Act, S.C. 2001, c. 26: http://laws-lois.justice.gc.ca/eng/acts/c-10.15/

Fisheries Act, R.S.C. 1985, c. F-14: http://laws-lois.justice.gc.ca/eng/acts/F-14/

Fisheries and Coastal Resources Act, S.N.S. 1996, c. 25: https://nslegislature.ca/sites/default/files/legc/statutes/fisheries%20and%20coastal%20resources.pdf

Marine Renewable-energy Act, S.N.S. 2015, c. 32: https://nslegislature.ca/legc/bills/62nd_2nd/3rd_read/b110.htm

Oceans Act, S.C. 1996, c. 31: http://laws-lois.justice.gc.ca/eng/acts/O-2.4

Species at Risk Act, S.C. 2002, c. 29: http://laws-lois.justice.gc.ca/eng/acts/s-15.3/

Telecommunications Act, S.C. 1993, c. 38: https://laws-lois.justice.gc.ca/eng/acts/t-3.4/

United Nations Declaration on the Rights of Indigenous Peoples Act, S.C. 2021, c. 14: https://laws-lois.justice.gc.ca/eng/acts/u-2.2/FullText.html

Regulations

Ballast Water Control and Management Regulations, SOR/2011-237: http://laws-lois.justice.gc.ca/eng/regulations/SOR-2011-237/

International Submarine Cable Licences Regulations, SOR/98-488: https://laws-lois.justice.gc.ca/eng/regulations/SOR-98-488/index.html

Vessel Pollution and Dangerous Chemicals Regulations, SOR/2012-69: https://laws-lois.justice.gc.ca/eng/regulations/sor-2012-69/

References

Bryndum-Buchholz, A., Boerder, K., Stanley, R. R. E., Hurley, I., Boyce, D. G., Dunmall, K. M., Hunter, K. L., Lotze, H. K., Shackell, N. L., Worm, B., & Tittensor, D. P. (2022). A climate-resilient marine conservation network for Canada. Facets, 7(April), 571–590. https://doi.org/10.1139/facets-2021-0122

Breeze, H., & Horsman, T. (2005). The Scotian Shelf: an atlas of human activities. https://waves-vagues.dfo-mpo.gc.ca/library-bibliotheque/321387.pdf
Carter, L. (2010). Submarine cables and the oceans: connecting the world (No. 31). UNEP/Earthprint.

Carter, L., Burnett, D., & Davenport, T. (2014). The relationship between submarine cables and the marine environment. In D. R. Burnett, Beckman, R. & Davenport, T.M. (Eds.), Submarine Cables: The handbook of law and policy. Martinus Nijhoff Publishers.

CBD. (2018). Decision adopted by the Conference of the Parties to the Convention on Biological Diversity. 14/8: Protected areas and other effective area-based conservation measures. https://www.cbd.int/doc/decisions/cop-14/cop-14-dec-08-en.pdf

DFO. (2009). Policy for Managing the Impacts of Fishing on Sensitive Benthic Areas. https://www.dfo-mpo.gc.ca/reports-rapports/regs/sff-cpd/benthi-eng.htm#n9

DFO. (2013). Ecological Risk Assessment Framework (ERAF) for Coldwater Corals and Sponge Dominated Communities. https://www.dfo-mpo.gc.ca/reports-rapports/regs/sff-cpd/risk-ecolo-risque-eng.htm

DFO. (2014). Regional Oceans Plan – Maritimes Region: Background and Program Description. https://waves-vagues.dfo-mpo.gc.ca/library-bibliotheque/365205.pdf

DFO. (2015a). Coral and sponge conservation strategy for Eastern Canada 2015. https://waves-vagues.dfo-mpo.gc.ca/library-bibliotheque/363832.pdf

DFO. (2016a). Guidance on identifying “other effective area-based conservation measures” in Canadian coastal and marine waters. DFO Canadian Science Advisory Secretariat Science Advisory Report, 2016(002), 1-13. https://waves-vagues.dfo-mpo.gc.ca/library-bibliotheque/365364.pdf

DFO. (2018a). Design Strategies for a Network of Marine Protected Areas in the Scotian Shelf Bioregion. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2018/006.

DFO. (2019). National Advisory Panel on Marine Protected Area Standards. https://www.dfo-mpo.gc.ca/oceans/conservation/advisorypanel-comiteconseil/index-eng.html

DFO. (2020a). Science Advice for Pathways Of Effects for Marine Shipping In Canada: Biological and Ecological Effects. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2020/030. https://waves-vagues.dfo-mpo.gc.ca/library-bibliotheque/4090278x.pdf

DFO. (2021a). Commercial Fisheries. https://www.mar.dfo-mpo.gc.ca/mar/en/Commercial-Fisheries

DFO. (2021b). Coral and Sponge Mitigations in Relation to Exploratory Drilling Programs in the Newfoundland and Labrador Region. DFO Canadian Science Advisory Secretariat Science Advisory Report, 2021(028), 1-26. https://waves-vagues.dfo-mpo.gc.ca/library-bibliotheque/4098834x.pdf

DFO. (2022a). Government of Canada Guidance for Recognizing Marine Other Effective Area-Based Conservation Measures. https://www.dfo-mpo.gc.ca/oceans/publications/oecm-amcepz/oecm-guidance-directives-amcez-2022-eng.pdf

DFO. (2022b). Sustainable Fisheries Framework. https://www.dfo-mpo.gc.ca/reports-rapports/regs/sff-cpd/overview-cadre-eng.htm

DFO. (2023). Marine spatial planning. https://www.dfo-mpo.gc.ca/oceans/planning-planification/index-eng.html

Department of Justice Canada. (2023). United Nations Declaration on the Rights of Indigenous Peoples Act Action Plan. United Nations Declaration on the Rights of Indigenous Peoples Act Implementation Secretariat. https://www.justice.gc.ca/eng/declaration/ap-pa/ah/pdf/unda-action-plan-digital-eng.pdf

Donaldson, A., Gabriel, C., Harvey, B. J., and Carolsfeld, J. (2010). Impacts of fishing gears other than bottom trawls, dredges, gillnets and longlines on aquatic biodiversity and vulnerable marine ecosystem. DFO Canadian Science Advisory Secretariat Research Document, 2010(011), v-84. https://waves-vagues.dfo-mpo.gc.ca/library-bibliotheque/340531.pdf

Ford-Ramsden, K., & Burnett, D. (2014). Submarine cable repair and maintenance. In D. R. Burnett, Beckman, R. & Davenport, T.M. (Eds.), Submarine Cables: The handbook of law and policy. Martinus Nijhoff Publishers.

Harley, C. D. G., Hughes, A. R., Hultgren, K. M., Miner, B. G., Sorte, C. J. B., Thornber, C. S., Rodriguez, L. F., Tomanek, L., & Williams, S. L. (2006). The impacts of climate change in coastal marine systems. Ecology Letters, 9(2), 228–241. https://doi.org/10.1111/j.1461-0248.2005.00871.x

International Maritime Organization. (2017). International Convention for the control and management of ships' ballast water and sediments (BWM). https://www.imo.org/en/About/Conventions/Pages/International-Convention-for-the-Control-and-Management-of-Ships%27-Ballast-Water-and-Sediments-(BWM).aspx

Jacquemont, J., Blasiak, R., Le Cam, C., Le Gouellec, M., & Claudet, J. (2022). Ocean conservation boosts climate change mitigation and adaptation. One Earth, 5(10), 1126–1138. https://doi.org/10.1016/j.oneear.2022.09.002

Lewis, S. A., Stortini, C. H., Boyce, D. G., & Stanley, R. R. E. (2023). Climate change , species thermal emergence, and conservation design : a case study in the Canadian Northwest Atlantic. FACETS, 8, 1–16.

Lotze, H. K., Tittensor, D. P., Bryndum-Buchholz, A., Eddy, T. D., Cheung, W. W. L., Galbraith, E. D., Barange, M., Barrier, N., Bianchi, D., Blanchard, J. L., Bopp, L., Büchner, M., Bulman, C. M., Carozza, D. A., Christensen, V., Coll, M., Dunne, J. P., Fulton, E. A., Jennings, S., … Worm, B. (2019). Global ensemble projections reveal trophic amplification of ocean biomass declines with climate change. Proceedings of the National Academy of Sciences of the United States of America, 116(26), 12907–12912. https://doi.org/10.1073/pnas.1900194116

Morley, J. W., Selden, R. L., Latour, R. J., Frölicher, T. L., Seagraves, R. J., & Pinsky, M. L. (2018). Projecting shifts in thermal habitat for 686 species on the North American continental shelf. PLoS ONE, 13(5), 1–28. https://doi.org/10.1371/journal.pone.0196127

Natural Resources Canada. (2020). Discussion Paper - Canada's approach to offshore renewable energy regulations. https://www.rncanengagenrcan.ca/sites/default/files/pictures/participate/orer-paper-accessible-pdf-fip-wm-en.pdf

Natural Resources Canada. (2022). Canada and Nova Scotia announce intent to expand the mandate of offshore energy regime to support the transition to a clean economy and create sustainable jobs. https://www.canada.ca/en/natural-resources-canada/news/2022/04/canada-and-nova-scotia-announce-intent-to-expand-the-mandate-of-offshore-energy-regime-to-support-the-transition-to-a-clean-economy-and-create-sust.html

Oak, T.G. (2020). Oil and gas exploration and production activities in areas with defined benthic conservation objectives: A review of potential impacts and mitigation measures. DFO Canadian Science Advisory Secretariat Research Document, 2020(040), vi - 55 p. https://waves-vagues.dfo-mpo.gc.ca/Library/4092872x.pdf

Ocean Protection Council. (2021). Climate Resilience and California 's Marine Protected Area Network. https://www.opc.ca.gov/webmaster/_media_library/2021/07/Climate-Resilience-and-Californias-MPA-Network-2021_final_ADA_OST.pdf

O'Regan, S. M., Archer, S. K., Friesen, S. K., & Hunter, K. L. (2021). A Global Assessment of Climate Change Adaptation in Marine Protected Area Management Plans. Frontiers in Marine Science, 8, 1–16. https://doi.org/10.3389/fmars.2021.711085

OSPAR Commission. (2012). Guidelines on best environmental practice (BEP) in cable laying and operation. https://www.gc.noaa.gov/documents/2017/12-02e_agreement_cables_guidelines.pdf

Snelgrove, P. V. R., Soetaert, K., Solan, M., Thrush, S., Wei, C. L., Danovaro, R., Fulweiler, R. W., Kitazato, H., Ingole, B., Norkko, A., Parkes, R. J., & Volkenborn, N. (2018). Global Carbon Cycling on a Heterogeneous Seafloor. *Trends in Ecology and Evolution*, *33*(2), 96–105. https://doi.org/10.1016/j.tree.2017.11.004

Tittensor, D. P., Beger, M., Boerder, K., Boyce, D. G., Cavanagh, R. D., Cosandey-Godin, A., Crespo, G. O., Dunn, D. C., Ghiffary, W., Grant, S. M., Hannah, L., Halpin, P. N., Harfoot, M., Heaslip, S. G., Jeffery, N. W., Kingston, N., Lotze, H. K., McGowan, J., McLeod, E., … Worm, B. (2019). Integrating climate adaptation and biodiversity conservation in the global ocean. Science Advances, 5(11), 1–16. https://doi.org/10.1126/sciadv.aay9969

Transport Canada. (2021). List of Canada's designated alternate ballast water exchange areas and fresh waters - TP 13617E (2021). https://tc.canada.ca/sites/default/files/2021-06/tp13617e.pdf

Wilson, K. L., Tittensor, D. P., Worm, B., & Lotze, H. K. (2020). Incorporating climate change adaptation into marine protected area planning. Global Change Biology, 26, 3251–3267. https://doi.org/10.1111/gcb.15094

Annex A: OECM Definition, Criteria & Distinction

OECM Definition: Geographically defined area other than a protected area which is governed and managed in ways that achieve positive and sustained long-term outcomes for the in-situ conservation of biodiversity - Convention on Biological Diversity

OECM Criteria:

A. The area-based measure being considered as a candidate OECM is in place for the long term. Its contribution to marine conservation coverage (i.e. meeting marine conservation targets) can only be included once, either as an OECM or as an MPA).

B. The candidate OECM is a spatially defined area and information on its BCBs is collected.
- **B1.** The boundaries, size, and depth, where necessary, are defined and documented.
- **B2.** Existing or anticipated BCBs within the candidate OECM's ecosystem are identified and documented. At a minimum, these must include:
  1. a benefit for an important species; AND
  2. a benefit for an important habitat; AND
  3. an additional benefit.
- **B3.** The governance decisions and management actions in the area that provide the BCBs are identified and documented.
- **B4.** Information on the ecosystem functions and services in the area is collected and documented.

C. The candidate OECM is governed for the long term by a lead RGA in coordination or co-led with other RGAs.
- **C1**. The RGAs have the jurisdiction to make and enforce long-term decisions with no end date.
- **C2.** The RGAs recognize and respect Aboriginal and treaty rights, and consult rights holders.
- **C3.** The RGAs take into account the views of local communities and stakeholders.
- **C4**. The governance approach is tailored to meet the candidate OECM's distinct needs and context.

D. The candidate OECM is managed for the long term by a lead RGA in coordination or co-led with other RGAs.
- **D1.** These authorities undertake long-term management actions that may be adapted, as necessary, over time.
- **D2.** Rights holders and stakeholders are encouraged to participate in the management actions

E. The candidate OECM is governed and managed in ways that provide BCBs over the long term.
- **E1**. The OECM's governance and management system is adaptive and effectively avoids or mitigates risks from existing and foreseeable activities to the BCBs that the OECM provides.
- **E2.** Monitoring is underway or will take place over time to provide the information to determine the ongoing effectiveness of the governance and management system in providing BCBs.
- **E3.** The OECM governance and management system continues to take into account ecosystem functions and services and other relevant values as it adapts.

Comparisons and distinctions between MPAs and OECMs:

	MPAs	OECMs
Purpose	Prohibitions or management actions specified for an MPA are based on the MPA's stated conservation objectives.	OECMs may be established for a variety of reasons (does not have to be conservation) but are managed in ways that provide BCBs over the long term.
Establishment / Recognition	An MPA is established, and its status is always achieved using a single MPA law (e.g. the *Oceans Act*).	An OECM's status is a policy-based status that is granted to an area-based measure that is established under law. *__OECMs are__ not established, they are **recognized.**
Protection Standards	New federal MPAs will prohibit: • Oil & Gas exploration and exploitation • Mining • Dumping • Bottom Trawling	All existing and foreseeable activities in an OECM are assessed on a case- by-case basis to ensure that the risks they pose to the BCBs are effectively avoided or mitigated.

Annex B: Operational Guidance with respect to Oil and Gas Activities in Marine Refuges on the Scotian Shelf

The following is operational guidance for proposed oil and gas exploration, development and production activities that overlap with *Fisheries Act* marine refuges in the Scotian Shelf. The Canada-Nova Scotia Offshore Petroleum Board (CNSOPB) is a joint provincial/federal agency and is the lead regulator for offshore oil and gas exploration and production activities. The CNSOPB is responsible for administering exploration, development and production rights of petroleum resources located offshore Nova Scotia. Fisheries and Oceans Canada (DFO) also has regulatory authority related to offshore oil and gas activities under the *Fisheries Act* and *Species at Risk Act* if they result in prohibited effects to fish, fish habitat, and/or aquatic species at risk. Because of this, DFO and the CNSOPB have a history of collaboration, especially regarding the management of activities in conservation areas, such as *Oceans Act* marine protected areas and *Fisheries Act* marine refuges. This collaboration is further supported through a Memorandum of Understanding and joint annual work plan maintained by both entities (See: https://www.cnsopb.ns.ca/regulatory-framework/legislation-and-regulatory-instruments).

In 2019, the Government of Canada adopted protection standards for marine protected areas (MPAs) and other effective area-based conservation measures (OECMs), including marine refuges. Regarding the marine refuges, the protection standards state:

> The protection standard for other effective area-based conservation measures, including marine refuges, assesses all activities on a case-by-case basis. Some activities will be allowed if they are consistent with the conservation objectives of a specific area. Before any proposed activity can take place, the Minister of Fisheries, Oceans and the Canadian Coast Guard will need to be satisfied that any risks to the area have been avoided or mitigated effectively.
>
> Going forward, if there are oil and gas licences or permits authorized in a marine refuge but no extraction is taking place, the overlap area will continue to count toward our marine conservation target. Once oil and gas extraction begins, the overlap area will no longer count toward our target.

In addition to the release of the protection standards, the Government of Canada has committed to conserving 30% by 2030. To support these commitments, a conservation network process is currently underway in the SS-BOF Bioregion. This document is intended to provide clarity and guidance for both regulators and activity proponents on how best to work together in light of these updates to the management of marine refuges and the future expansion of conservation areas on the Scotian Shelf.

This guidance, developed by DFO in collaboration with the CNSOPB, is in addition to existing CNSOPB and DFO guidelines, regulations and procedures. Therefore, adherence to the Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment, Offshore Waste Treatment Guidelines (NEB et al. 2010), *Nova Scotia Offshore Drilling and Production Regulations* (and associated guidelines), Offshore Chemical Selection Guidelines (NEB et al. 2009), and Environmental Protection Plan Guidelines (C-NLOPB et al. 2011) is expected. Spatially and seasonally appropriate mitigation measures identified in relevant Strategic Environmental Assessments (SEAs) also apply. SEAs are published on the CNSOPB's website.

Oil and Gas Activities Plan in Marine Refuges

If an oil and gas exploration, development or production activity is proposed in a marine refuge on the Scotian Shelf, the activity proponent must develop a plan in consultation with DFO and the CNSOPB to ensure that the proposed activities are consistent with the conservation objectives of the site. The Minister of Fisheries, Oceans and the Canadian Coast Guard will evaluate the plan to determine if the risks to the conservation objectives of the site are avoided and/or adequately mitigated. To support this determination, the plan should include:

- A detailed description of the proposed activity
- The potential post-mitigation effects of the activity with respect to the conservation objectives for the area
- The mitigation measures that are planned to limit impacts of the activity on the site objectives
- The follow-up and/or monitoring activities that will be used to determine the effectiveness of those measures and a schedule for sharing the results with CNSOPB and DFO
- The frequency with which updates concerning the implementation of the mitigation measures and the results of monitoring activities will be provided to DFO and CNSOPB

The Oil and Gas Activities Plan in Marine Refuges will be submitted to DFO and CNSOPB at the same time as the activity authorization application is submitted to the CNSOPB. DFO will provide a written a response to the proponent within 60 days of the plan being submitted.

Recommended Mitigation Measures for Marine Refuges

To support the development of the plan, Table 1 contains a variety of recommended mitigation measures based on category of activity and conservation area. Note, the following is based on best available knowledge at the time of writing, therefore Table 5 will be updated as the understanding of oil and gas activity interactions with ecosystem components continues to evolve. Additionally, it is recommended that activity proponents contact DFO and the CNSOPB early in their planning to identify regulatory requirements and obtain the latest spatial conservation measure information.

The following mitigation measures are organized by marine refuge and were compiled from Strategic Environmental Assessments (SEAs), project-specific Environmental Assessments (EAs), Impact Assessments (IAs) and DFO Canadian Science Advisory Secretariat (CSAS) documents.

Table 5. Mitigation measures for seismic and seabed surveys, and exploratory drilling in each of the six SS-BOF marine refuges.

Marine Refuge	Seismic and Seabed Mitigation Measures	Exploratory Drilling Mitigation Measures

Corsair and Georges Canyons Marine Refuge
 	
Located along the Canada-United States border, this site contains several habitat-forming species of cold-water corals. The Georges Bank Moratorium prohibits oil and gas exploration and drilling. First introduced in 1988, the moratorium is reassessed every 10 years and is currently in effect until December 31st 2032. The Georges Bank moratorium area overlaps with part of this site.
	• Conduct site-specific surveys in previously un-surveyed areas, and in areas where coral and sponge species are present or are predicted to be present. This should include collecting information on currents, turbidity, and sediment (rates and samples).
	• Conduct pre-drilling ROV transect surveys using underwater video to characterize the benthic community and habitats and to determine presence/absence of corals, sponges, or other sensitive features. Visual data and acoustic data (bathymetry and backscatter) should be collected at high enough resolution to identify corals and sponges.
	  • Recommendations for visual survey data collection and analysis are:
	  • Video altitude of 1-2 m, maximum vessel speed of 0.5 knots
	  • Collect data on abundance, density, spatial distribution and condition of corals and sponges encountered to the functional group taxonomic level
	  • All video and associated log reports should be provided to DFO
	• All video data should be reviewed by a qualified individual and information regarding concentrations of corals and sponges should be shared with DFO Science.
		• If possible, avoid this area during drilling activities. Spatial avoidance is the best mitigation option for concentrations of corals and sponges.
		• Should drilling be considered within the marine refuge, a zero discharge (e.g. skip and ship) of separated drill cuttings should be used to collect and dispose separated drill cuttings on-shore. If this is not possible:
		  • Drilling discharge dispersion models/zones of influence (1.5 mm probable no-effects threshold (PNET)) predictions should be used to determine a necessary buffer size [14] around Significant Benthic Areas
		  • Conduct follow-up monitoring including a post-drilling ROV survey to inform and verify the extent of sediment deposition.
		• Consider and evaluate technologies that may reduce the quantity of generated solids when drilling in areas with sensitive benthic species (e.g. slimhole well design, reduced number of sections or drilling without barite/bentonite by using heavy brine and cellulose).

[14] A Significant Benthic Area is a regional habitat that contains sponges (Porifera), large and small gorgonian corals (Alyconacea) and/or sea pens (Pennatuloidia) as a dominant and defining feature. These areas were delineated by DFO Science for the Scotian Shelf in the following publication: Delineation of Significant Areas of Coldwater Corals and Sponge-Dominated Communities in Canada's Atlantic and Eastern Arctic Marine Waters and their Overlap with Fishing Activity (dfo-mpo.gc.ca)

	• Avoid intrusive seabed surveys (surveys that would interact with the benthos) in Significant Benthic Areas[15].	

Eastern Canyons Marine Refuge
 	
Established June 8 2022, this large marine refuge contains significant areas of large gorgonian coral concentrations, the only known living *Desmophyllum pertusum* (formally known as *Lophelia pertusa*) coral reef in Canada's Atlantic waters, and deep-water frontier area. Additionally, the Eastern Canyons Marine Refuge overlaps with critical habitat and important habitat for Northern Bottlenose Whales. Eastern Canyons also shares a boundary with the Gully Marine Protected Area.
	• Conduct site-specific surveys in previously un-surveyed areas, and in areas where coral and sponge species are present or are predicted to be present. This should include collecting information on currents, turbidity, and sediment (rates and samples).
	• Conduct pre-drilling ROV transect surveys using underwater video to characterize the benthic community and habitats and to determine presence/absence of corals, sponges, or other sensitive features. Visual data and acoustic data (bathymetry and backscatter) should be collected at high enough resolution to identify corals and sponges.
	  • Recommendations for visual survey data collection and analysis are:
	  • Video altitude of 1-2 m, maximum vessel speed of 0.5 knots
	  • Collect data on abundance, density, spatial distribution and condition of corals and sponges encountered to the functional group taxonomic level
	  • All video and associated log reports should be provided to DFO
	  • All video data should be reviewed by a qualified individual and information regarding concentrations of corals and sponges should be shared with DFO Science.
	• Avoid intrusive seabed surveys (surveys that would interact with the benthos) in Significant Benthic Areas.
		• Avoid this area during drilling activities. Spatial avoidance is the best mitigation option for concentrations of corals and sponges.
		• Should drilling be considered within the marine refuge, a zero discharge (e.g. skip and ship) of separated drill cuttings should be used to collect and dispose separated drill cuttings on-shore. If this is not possible:
		  • Drilling discharge dispersion models/zones of influence (1.5 mm probable no-effects threshold (PNET)) predictions should be used to determine a necessary buffer size[1] around Significant Benthic Areas
		  • Conduct follow-up monitoring including a post-drilling ROV survey to inform and verify the extent of sediment deposition.
		• Consider and evaluate technologies that may reduce the quantity of generated solids when drilling in areas with sensitive benthic species (e.g. slimhole well design, reduced number of sections or drilling without barite/bentonite by using heavy brine and cellulose).

[15] As recommended by DFO Science, minimum setback for any discharge points and/or surface infrastructure should be 2 km from any sensitive benthic species or habitats: https://publications.gc.ca/collections/collection_2020/mpo-dfo/fs70-5/Fs70-5-2020-040-eng.pdf

Emerald Basin and Sambro Bank Marine Refuge
 	
Emerald Basin and Sambro Bank Marine Refuge is focused on the conservation of globally significant concentrations of *Vazella pourtalesii*, a species of glass sponge.
	• Avoid intrusive seabed surveys (surveys that would interact with the benthos) within the sites.	• Avoid these areas during drilling activities. Spatial avoidance is the best mitigation option for concentrations of corals and sponges.
		• Should drilling be considered near the marine refuge, a zero discharge (e.g. skip and ship) of separated drill cuttings should be used to collect and dispose separated drill cuttings on-shore. If this is not possible:
		  • Drilling discharge dispersion models/zones of influence (1.5 mm probable no-effects threshold (PNET)) predictions should be used to determine a necessary buffer size around marine refuge
		  • Conduct follow-up monitoring including a post-drilling ROV survey to inform and verify the extent of sediment deposition.

Jordan Basin Marine Refuge This site contains dense aggregations of corals including seacorn coral (*Primnoa resedaeformis*) and other benthic invertebrates.	• Avoid intrusive seabed surveys (surveys that would interact with the benthos) within the site.	• Avoid this area during drilling activities. Spatial avoidance is the best mitigation option for concentrations of corals and sponges. • Should drilling be considered near the marine refuge, a zero discharge (e.g. skip and ship) of separated drill cuttings technique should be used to collect and dispose separated drill cuttings on-shore. If this is not possible: • Drilling discharge dispersion models/zones of influence (1.5 mm probable no-effects threshold (PNET)) predictions should be used to determine a necessary buffer size around marine refuge • Conduct follow-up monitoring including a post-drilling ROV survey to inform and verify the extent of sediment deposition.

Northeast Channel Marine Refuge
 	
This site contains dense aggregations of large and small gorgonian corals. The Georges Bank Moratorium prohibits oil and gas exploration and drilling and fully overlaps with this site. First introduced in 1988, the moratorium is reassessed every 10 years and is currently in effect until December 31st 2032.
 	
Note, this site is contained in the Fundian Channel-Browns Bank Area of Interest for potential *Oceans Act* MPA designation. An overlapping *Oceans Act* designation would take precedent and would result in the MPA protection standards being applied to the area in the future.
	• Avoid intrusive seabed surveys (surveys that would interact with the benthos) within the site.	• Avoid this area during drilling activities. Spatial avoidance is the best mitigation option for concentrations of corals and sponges.
		• Should drilling be considered near the marine refuge, a zero discharge (Skip and Ship) of separated drill cuttings technique should be used to collect and dispose separated drill cuttings on-shore. If this is not possible:
		  • Drilling discharge dispersion models/zones of influence (1.5 mm probable no-effects threshold (PNET)) predictions should be used to determine a necessary buffer size around marine refuge
		  • Conduct follow-up monitoring including a post-drilling ROV survey to inform and verify the extent of sediment deposition.

Western and Emerald Banks Marine Refuge
 	
Western and Emerald Banks Marine Refuge contains a significant spawning and nursery ground for haddock as well as other economically important groundfish species.
	• Schedule surveys to avoid or minimize interaction with haddock spawning.
	• Conduct project-specific underwater sound modelling to inform the analysis of effects of underwater sound and potential seismic programs on spawning groundfish, eggs and larval stages. Monitoring should also be conducted.
	• Conduct pre-drilling ROV transect surveys using underwater video to characterize the benthic community and habitats and to determine presence/absence of corals, sponges, or other sensitive features. Visual data and acoustic data (bathymetry and backscatter) should be collected at high enough resolution to identify corals and sponges.
	  • Recommendations for visual survey data collection and analysis are:
		• If possible, avoid this area during drilling activities. Spatial avoidance is the best mitigation option for concentrations of corals and sponges. However, given that portions of this marine refuge do not contain concentrations of corals and sponges, exploration activities may be feasible with mitigation consistent with measures described below.
		• Should drilling be considered within the marine refuge, a zero discharge (e.g. skip and ship) of separated drill cuttings should be used to collect and dispose separated drill cuttings on-shore. If this is not possible:
		  • Drilling discharge dispersion models/zones of influence (1.5 mm probable no-effects threshold (PNET)) predictions should be used to determine a necessary buffer

	• Video altitude of 1-2m, maximum vessel speed of 0.5 knots • Collect data on abundance, density, spatial distribution and condition of corals and sponges encountered to the functional group taxonomic level • All video and associated log reports should be provided to DFO • All video data should be reviewed by a qualified individual and information regarding concentrations of corals and sponges should be shared with DFO Science. • Avoid intrusive seabed surveys (surveys that would interact with the benthos) in Significant Benthic Areas.	size[17] around Significant Benthic Areas • Conduct follow-up monitoring including a post-drilling ROV survey to inform and verify the extent of sediment deposition • Consider and evaluate technologies that may reduce the quantity of generated solids when drilling in areas with sensitive benthic species (e.g. slimhole well design, reduced number of sections or drilling without barite/bentonite by using heavy brine and cellulose).

[17] As recommended by DFO Science, minimum setback for any discharge points and/or surface infrastructure should be 2 km from any sensitive benthic species or habitats: https://publications.gc.ca/collections/collection_2020/mpo-dfo/fs70-5/Fs70-5-2020-040-eng.pdf

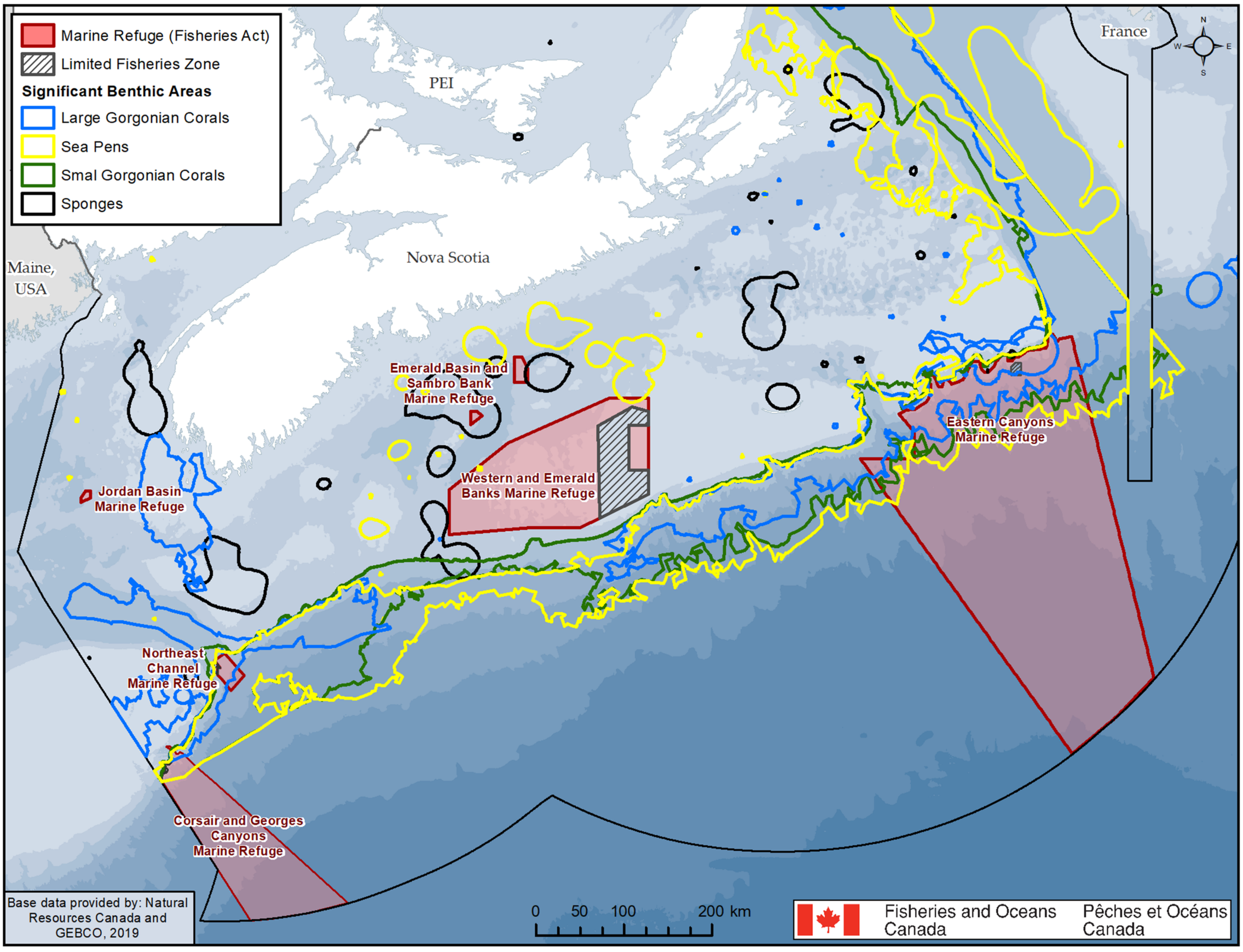


Figure 7. Scotian Shelf-Bay of Fundy *Fisheries Act* marine refuges and Significant Benthic Areas delineated by DFO Science (DFO 2017).

Annex C: Scotian Shelf-Bay of Fundy Marine Refuge Activity Review Flowchart and Templates

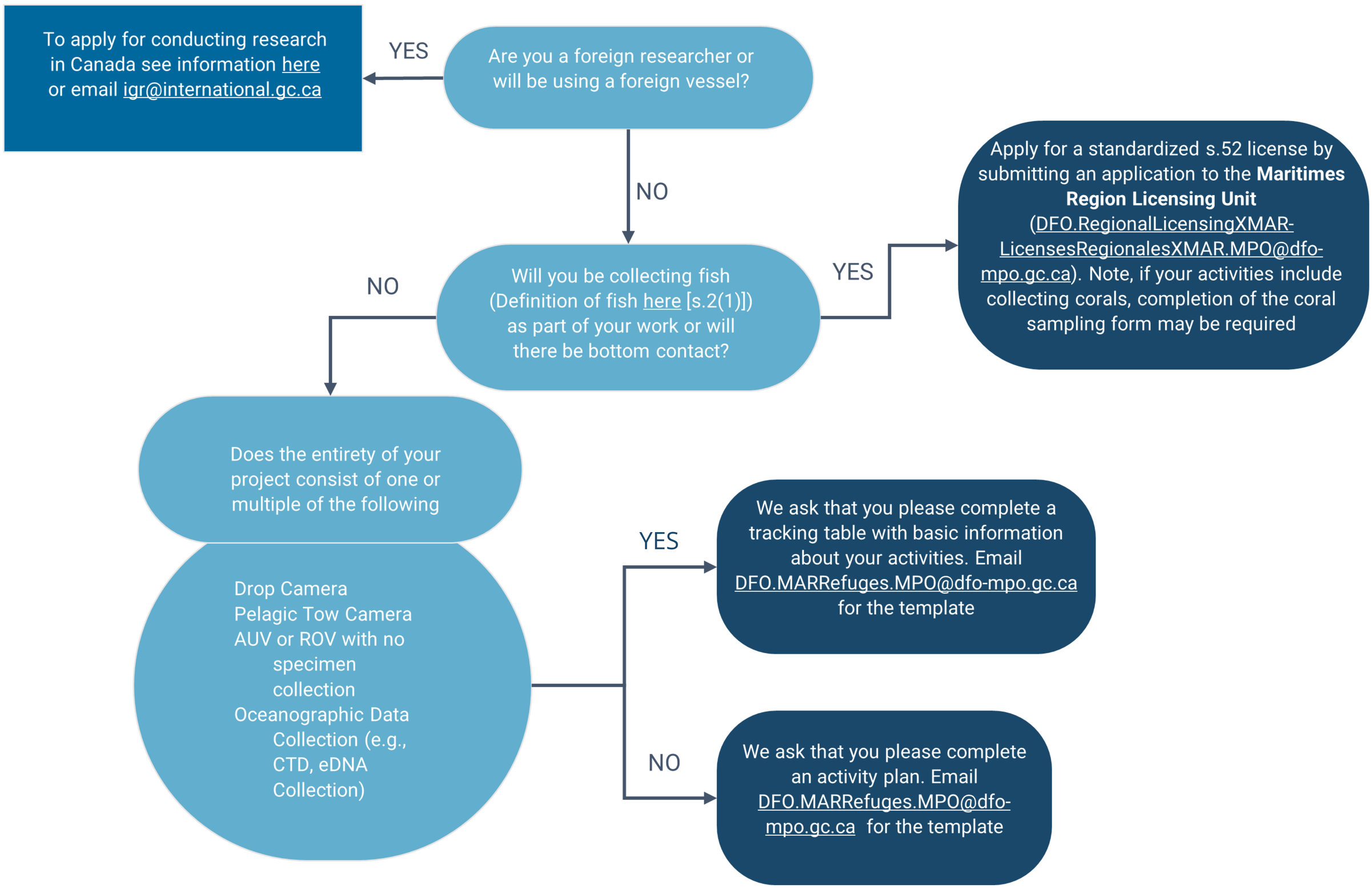


Figure 8. SS-BOF marine refuge activity flowchart.

MARITIMES TRACKING TABLE FOR RESEARCH/MONITORING ACTIVITIES IN MARINE REFUGES

Marine refuges are *Fisheries Act* closures that meet other effective area-based conservation measure (OECM) criteria. The protection standard for federal OECMs, including marine refuges, states that existing or foreseeable activities in federal marine OECMs will continue to be assessed on a case-by-case basis to ensure that the risks to the biodiversity conservation benefits have been avoided or mitigated effectively. The following list of research/monitoring activities are considered nil to low risk for the conservation objectives of the region's marine refuges.

Exemption List:

- Drop camera
- Pelagic tow camera
- AUV or ROV with no specimen collection
- Oceanographic data collection (e.g. CTD)
- eDNA collection
- Marine mammal and seabird research (with no benthic interaction)

If all of your proposed research/monitoring activities are captured in the exemption list, please complete the Tracking Table below and submit it to DFO.MARRefuges.MPO@dfo-mpo.gc.ca. If all of your research/monitoring activities are not captured, please complete an Activity Plan and submit it for review. We would also like to emphasize that the following Tracking Table does not satisfy the requirements of the *Species at Risk Act,* the *Oceans Act*, or the *Fisheries Act*, nor does it substitute for any permits or licences required under those statutes. It is your responsibility to ensure any necessary authorizations are acquired prior to undertaking any activity.

Tracking Table:

Box 1: Contact Information	
Name:	
Title/Organization:	
Phone No:	
Email Address:	
Vessel Name/Registration No:	

Box 2: Description of Activities	
List of activities to be carried out:	
Dates for carrying out activities within each marine refuge:	
Authorization and/or permits (if applicable):	
Brief description of each activity (e.g. purpose, proposed location, etc.):	

MARITIMES MARINE REFUGE ACTIVITY PLAN SUBMISSION FORM

Note: If your proposed activities includes scientific fishing (including sampling corals and/or sponges) then a s.52 permit is required, not an activity plan. Please contact DFO.RegionalLicensingXMAR-LicensesRegionalesXMAR.MPO@dfo-mpo.gc.ca for the application form.imp

Box 1: Basic Activity Information	
Date of Application:	Project Title:
Proponent Contact (Name, Job Title):	Proponents Organization Name:
Proponent's Address:	Telephone: Fax: E-mail:
Research Vessel (Name and Type):	Number of crew and number of researchers:
Captain or Pilot's Name and Address:	Telephone: Fax: E-mail:
Is this a multi-year application? ☐ Yes ☐ No If yes, what timespan is covered by this application?	

Box 2: Timing and Duration within marine refuge(s)

Provide the dates that the proposed activities would occur in marine refuge(s). A date range is acceptable (e.g. July 7-11 2021). Describe how long the activities will be conducted (e.g. hours/days that activity will be conducted over).

Box 3: Location within marine refuge(s)

Provide the locations (longitude and latitude) where each proposed activity will take place, including alternate stations. A map depicting the geographical coordinates of proposed activities (e.g. sampling stations, equipment deployments, and survey tracks) should be provided.

Box 4: Purpose of Activity

Provide a description of the activities proposed and the overall objective of these activities.

Box 5: Description of Research/Monitoring Activities

Provide a description of the proposed research and/or monitoring activities that will take place. Examples of information to include are: type(s) of organisms, species and/or habitat(s) that will be observed, studied, modified and/or impacted; method(s), protocol(s) or technique(s) that will be used to for data collection; and, list of gear/equipment being deployed and description of deployment.

****Note, if your proposed activities includes scientific fishing (including sampling corals and/or sponges) then a s.52 permit is required, not an activity plan. Please contact DFO.RegionalLicensingXMAR-LicensesRegionalesXMAR.MPO@dfo-mpo.gc.ca for the application form.*

Box 6: Potential Impacts

Provide a likelihood of interaction with the marine refuges' conservation objectives (yes/no) and indicate the expected level of impact (low, medium or high) with justifications. The following should be considered for determining the expected level of impact: time scale involved (short and/or long term effects); spatial scale involved; habitat effects; direct effects on individual organisms, community, or population level effects; indirect effects on other species and their populations; and, risk of unintentional removals.

Box 7: Avoidance, Monitoring, and Mitigation Measures

Describe measures to be taken to monitor, avoid, minimize or mitigate environmental effects.

Box 8: List of Other Required Authorizations

List other permits, licenses, authorizations or consents required to conduct the proposed activities and whether or not these have been applied for and obtained.

Coral Sampling Form *Note: This form should only need to be filled out if coral sampling is part of the proposed activities*
Outline the overall objectives of this activity and the research question to be answered
Describe how research will be integral or beneficial to the continued survival or increased health of coral species/populations
Describe how the suggested research will provide new knowledge or fill existing data gaps specific to coral species on the Scotian Shelf
Describe the sampling method that will be used (e.g. vehicle type and associated precision tool attachment) and describe how these tools operate during sampling, e.g. how removals will be achieved. Note: Mobile/towed gear such as trawling is not an acceptable sampling method for corals
Provide number of samples (including length) or whole colonies to be collected. Provide quantitative and statistical justification for this requirement
Describe proposed sampling species rarity/abundance
Describe population health and indicate density ☐ Low density ☐ High density ☐ Unknown
Describe expected regeneration time of proposed sampling species ☐ <10 Years ☐ 10-25 Years ☐ 25-100 Years ☐ >100 Years ☐ Unknown

Indicate how sampling methodology aligns with marine refuge conservation objectives e.g. snipping tool used to avoid as much harm as possible to an animal
Describe the mitigation measures that will be used to avoid or minimize identified impacts to the coral species and population, e.g. at-sea observation guidance.