OBJECTIVES OF MARINE CONSERVATION MEASURES AND THEIR USE IN STRATEGIC MARINE SPATIAL PLANNING IN CANADA

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ABSTRACT

With increasing use of and dependence on the ocean, conflict between human uses and between human use and a healthy marine environment are certain. To address this, efforts to develop ecosystem based management that recognize the intersections between marine life and human uses, including the process of marine spatial planning, have emerged prominently. The Government of Canada has committed to delivering marine spatial plans and has a mandate to enact conservation via the *Oceans Act*. Currently, Canada has over 100 laws and regulations that pertain to marine conservation, with diverse objectives that could be considered when developing marine spatial planning. Through qualitative document analysis, this research analyzes the existing suite of marine conservation regulatory tools to determine how marine spatial planning might strategically employ tools to achieve particular objectives. This study identified seven distinct conservation objectives that broadly prioritize human activities, ecosystems, and species, and determined which objectives could be achieved within each Canadian planning region using existing regulatory tools. This study provides insight on how marine spatial planning might enhance marine conservation outcomes in the current regulatory framework, ensuring that marine spatial plans prioritize marine ecosystems and employ fit-for-purpose conservation tools, supporting the blue economy and long-term ocean sustainability in Canada.

Key words: marine spatial planning, marine conservation, ecosystem based management, marine protected area, marine law, qualitative methods.

LIST OF ACRONYMS

COSEWIC - Committee on the Status of Endangered Wildlife in Canada

DFO - Fisheries and Oceans Canada

EBM - Ecosystem Based Management

EEZ - Exclusive Economic Zone

EGSL - The Estuary and Gulf of St. Lawrence

GOSLIM - The Gulf of St. Lawrence Integrated Management Plan

MPA - Marine Protected Area

MSP - Marine Spatial Planning

OECM - Other Effective Area Based Conservation Measure

CHAPTER 1 - INTRODUCTION

1.1 - Background

The ocean is our most valuable resource, possessing the ability to support wildlife, maintain weather patterns, buffer the impacts of climate change, and perform numerous ecosystem services (Harris et al., 2022). Humans alone rely on the ocean for traditional resources, cultural values, food, and as a source of income through marine industries such as fishing, aquaculture, transportation, tourism, among others (Gosnell et al., 2020). As this resource use continues to grow, greater pressure is placed on marine ecosystems to meet this growing demand (Wang et al., 2022). This growing demand has increased the dependency between humans and marine ecosystems and created the narrative that the ocean contains infinite resources and space for human growth (Strickland-Munro et al., 2015; Blake et al., 2017; Lubchenco & Gaines, 2019). To address these varying ocean needs, ocean management efforts have traditionally operated in siloed management structures that solely focus on a single species or industrial sector (Douvere, 2008). While this management style may be more efficient initially, it often fails to be effective as no species nor industrial sector exists in isolation (Stelzenmüller et al., 2013; Douvere, 2008). As a result, management efforts have often failed in their duty to protect marine environments, diminishing their state and productivity, in addition to impacting the humans who rely on these marine resources every day (Gosnell et al., 2020). These impacts are expected to worsen with time as marine industrial growth continues unchecked with unprecedented demands for ocean space, materials, and food, thus

increasing conflict between human usage and the marine environment, contributing to rising threats on the health of the ocean (Jouffray et al., 2020).

One solution commonly promoted to address these concerns is through the creation of marine protected areas (MPAs). MPAs are spatially defined areas, managed for the purpose of achieving specific conservation goals within an ecosystem (Claudet et al., 2022). These goals typically include efforts to protect specific species, habitats, and/or unique bioregions (Roberts et al., 2005). They are one of the most powerful tools available for managers to counteract the degradation of marine habitats and over-exploitation of marine resources (Agardy et al., 2011). Several countries have created MPAs in part due to their international commitments to achieve Aichi Target 11: to protect 10% of coastal and marine areas by 2020 (Kirkman et al., 2019; Convention on Biological Diversity, n.d.). However, despite their promise, MPAs can prove to be ineffective, particularly when their funding is limited, creating paper parks where there is a lack of political will to drive the project, if they fail to properly restrict extractive activities accordingly, and when the proposed conservation objectives fail to align with local values and needs thus encountering resistance (Claudet et al., 2022; Agardy et al., 2011; Devillers et al., 2015; Gill et al., 2017). Studies have shown that MPAs offer the most benefit when they are either highly or fully protected areas, improving biodiversity conservation, climate resilience, and water quality in addition to minimizing the impacts on exploited species (Grorud-Colvert et al., 2021). Overall, while their benefits are important, it is well accepted that MPAs are only one type of management tool for ocean sustainability that requires specific conditions to confer benefits, and that to be truly effective they should be combined with other management approaches to fully support the marine environment

(Agardy et al., 2011; Reimer et al., 2021). When these concerns are combined with the increasing, unsustainable use of the ocean, it becomes clear that other solutions are required, that are logistically sustainable, practical, and consider all elements of the marine environment.

Given these concerns, greater emphasis has been placed on the need to develop a more holistic approach to management and use the full suite of management tools for conservation across all sectoral siloes. One possible approach is through the use of ecosystem based management (EBM), that recognizes the intersection of various users of the marine space in addition to marine life. Unlike the traditional siloed management structures, EBM is a placed-based process, focusing on the specifics of a particular marine ecosystem, attempting to decipher and outline all connected elements, including humans (Santos et al., 2014). EBM incorporates the human dimension into ecosystems, resulting in management practices that consider the ecological, social, and economical features of an ecosystem and how they may interact with one another (Gosnell et al., 2020). Reviews have suggested that EBM is the best mechanism for ensuring the long-term sustainability of marine ecosystems and their goods and services (Katsanevakis et al., 2011); however, EBM in isolation is ineffective. Rather, for EBM to function best, management efforts should include a spatial component (Gosnell et al., 2020). When considering marine environments, one potential spatial approach that could be used to implement EBM is marine spatial planning (MSP) (Ehler, 2019).

MSP as defined by Ehler (2019) is the: "*management of the distribution of human activities in space and time in and around seas and oceans to achieve ecological, economic, and societal objectives and outcomes*". Despite being a relatively new concept,

created within the last few decades, MSP has evolved and gained considerable importance globally (Ehler, 2021). As of 2022, more than 75 countries have undertaken MSP initiatives, covering 17% of the total surface area of the exclusive economic zones (EEZ) around the world (Wang et al., 2022; Ehler, 2021). This number is expected to increase to at least 30% of EEZs by 2030 (Wang et al., 2022). The uptake of MSP is largely driven by its clear manner to implement EBM and integration of knowledge from different industrial sectors, experts, and locals to create effective plans on how to best use and manage the designated marine space (Douvere, 2008). The process of MSP is a tangible method for achieving EBM and provides a framework that is successfully able to integrate the management of multiple human activities (Collie et al., 2013). Rather than current siloed management structures, MSP intentionally focuses on uniting and integrating multiple objectives and sectors.

Unlike MPAs that focus solely on marine conservation, MSP considers conservation alongside various economic sectors and social uses of the designated area (Ehler, 2021). Given this structure, the MSP process is considered to be an inclusive, transparent, and adaptive management process committed to future planning (Ehler, 2021). Significant effort is placed on including various stakeholders in planning discussions, and in doing so, is thought to reduce conflicts among marine users in addition to reducing conflict between the environment and its users (Ehler, 2021; Ehler, 2008). Most importantly, MSP can be used to ensure that conservation is at the core of marine management decisions and encourages management efforts to focus on marine ecosystems as a whole rather than individual sites or species (Ehler, 2008).

1.2 - Marine Spatial Planning in Canada

Canada, the northernmost country in North America, has the longest coastline in the world, bordered by the Pacific, Arctic, and Atlantic Oceans. These three ocean basins support a wide range of aquatic plants, animals, and habitats that encourage close linkages between humans and the sea (Government of Canada, 2020a). Given its prominence, the ocean plays a critical role in the livelihoods of Canadians as a source of food and income, due to the natural services it provides, and its cultural and spiritual connections (Government of Canada, 2020a). Currently, there are more than seven million Canadians living in coastal communities and, as such, effective stewardship is increasingly becoming a priority to ensure the sustainable use of the ocean and its resources (Government of Canada, 2022).

Given its importance, the Government of Canada, has committed to developing, improving, and maintaining regulations that protect the marine environment while providing economic benefits (Government of Canada, 2022). Regulatory tools are used as instruments, often implemented, and enforced by the government, to achieve policy objectives, by providing rules identifying what is considered permissible and impermissible activities regarding the ocean and human activities (Government of Canada, 2007). For example, the *Oceans Act* (1996) is a critical regulatory tool that outlines Canada's commitment to conserve, protect, and develop the oceans sustainably. Through this Act, the federal agency Fisheries and Oceans Canada (DFO), has implemented several conservation measures including advancing integrated oceans management, developing networks of conservation areas, and establishing MPAs and other effective area based conservation measures (OECM) (Government of Canada,

2021b). As of 2022, the majority of DFO's initiatives for marine conservation has been through the establishment of MPAs and OECMs, seeking to meet their commitment in 2010 to Aichi Target 11. Since 2010, this commitment has evolved from 10% protected marine areas to 25% by 2025 and 30% by 2030 (Government of Canada, 2022).

However, given the state of our oceans, DFO has been seeking additional strategies for integrated oceans management, including the implementation of marine spatial plans to create jobs and opportunities while still advancing conservation objectives. DFO plans to build upon these previously established initiatives in collaboration with various jurisdictions and Indigenous partners (Government of Canada, 2021b). Currently, DFO is committed to delivering marine spatial plans in five areas by 2024; however, no plans have been implemented yet (Government of Canada, 2021a). Thus far, the work has begun to introduce MSP in five bioregions, including the Pacific North, Pacific South, Scotian Shelf, Newfoundland & Labrador Shelves, and the Estuary and Gulf of St. Lawrence bioregion (Government of Canada, 2021b). These bioregions are ecologically defined areas that represent similar oceanographic, bathymetric, and ecological characteristics, covering Canada's oceans and Great Lakes (Government of Canada, 2011, Figure 1).

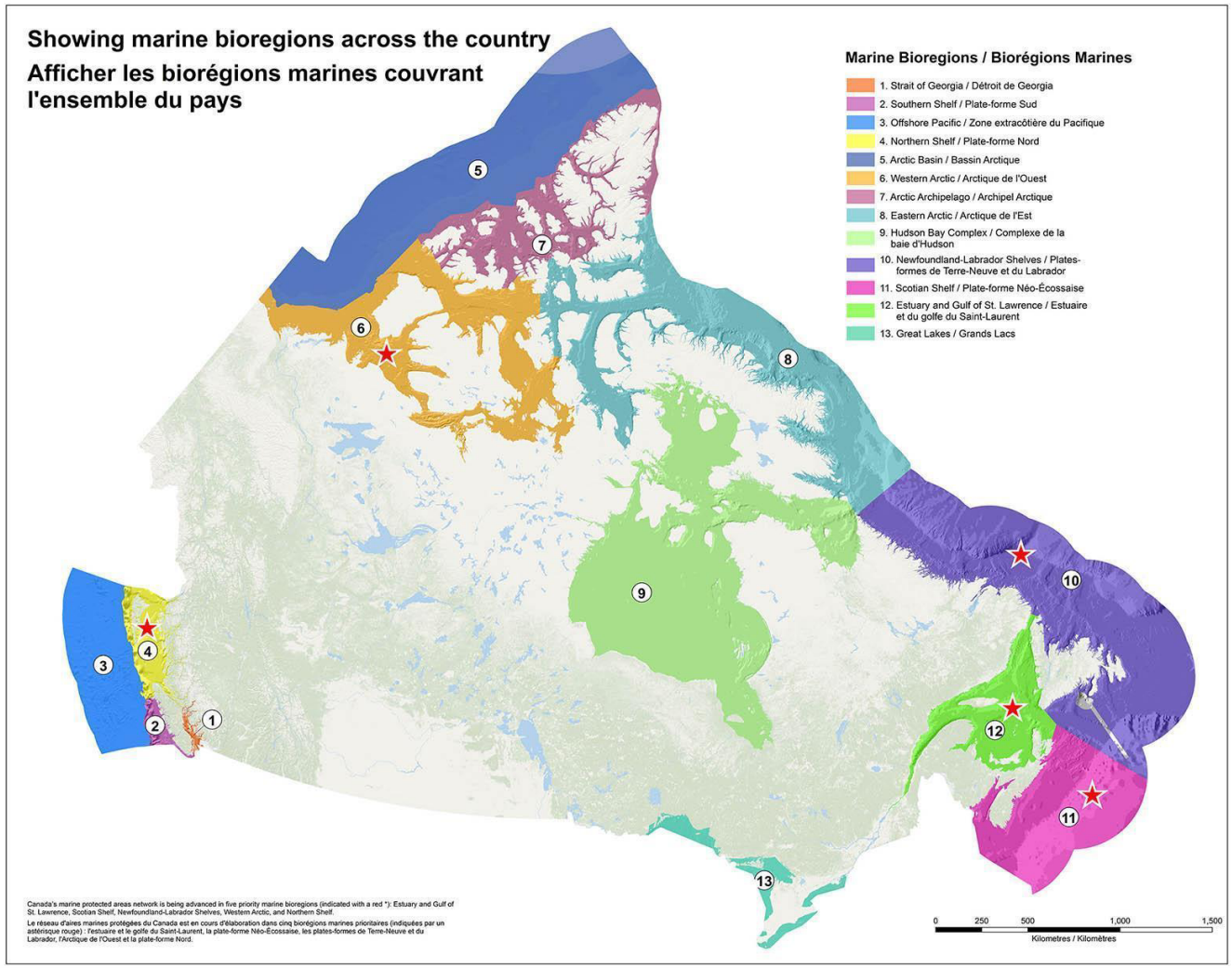

Figure 1 – Map of the Fisheries and Oceans Canada bioregions. Bioregion 2 – Southern Shelf, 4 – Northern Shelf, 10 – Newfoundland-Labrador Shelves, 11 – Scotian Shelf, and 12 – Estuary and Gulf of St. Lawrence are in the process of pursuing marine spatial planning. Red stars are inapplicable in this context. Sourced from the Government of Canada (2018).

1.3 - Understanding the Canadian Regulatory Tools for Conservation in Marine Spatial Planning

Given that successful marine spatial plans build upon existing frameworks and regulatory tools, with increased efforts to undertake MSP in Canada, it is valuable to understand what tools are available (Agardy et al., 2011). Specifically, it is important to understand the existing marine conservation tools and their objectives, to then determine how MSP might strategically employ them to ensure that conservation is embedded within plans. Currently, the Canadian government has several federal and provincial regulatory tools, beyond and including the *Oceans Act* (1996), that specifically pertain to marine conservation. Each of these regulatory tools address different conservation objectives and reflect varying governing bodies. Since these regulatory tools are sourced from various jurisdictions and regions, they may fail to meet their designated conservation objectives as they operate in isolation within a complex ecosystem. With MSP, marine managers have the opportunity to see the full suite of regulatory tools and their conservation objectives to understand what's available, what the gaps are within individual tools, and what the potential benefits are of the conservation tools when overlaid.

This research seeks to analyze the existing suite of ocean conservation regulatory tools to identify what tools we have available for marine conservation and to determine what conservation objectives we can expect to achieve given the current regulatory framework. Overall, well executed marine spatial plans, through prioritizing marine ecosystems and strategic use of regulatory conservation tools, can support the blue economy and assist in the long-term sustainability of Canadian oceans (Ehler, 2008).

1.4 - Graduate Project Overview

The subsequent chapters within this document will outline the specifics of this research project. Chapter 2 discusses the methods of how the project was conducted. Chapter 3 presents the results of the study through the usage of figures and tables. Chapter 4 analyzes the results, attempting to understand why results were seen. Additionally, this chapter provides an overview of the significance of the research and proposes next steps to expand upon the work. Finally, Chapter 5, provides a summary and conclusion to wrap up the project.

CHAPTER 2 - METHODS

2.1 - Regulatory Tool Document Analysis

Regulatory tools were identified from an inventory of legislative and regulatory tools created internally in 2019 by DFO. This inventory includes all regulatory tools affecting marine and coastal environments, and can be sorted by jurisdiction, administrative region, and designated activity (e.g., fisheries, aquaculture, conservation, telecommunications, energy, etc.). For this study, all regulatory tools categorized as a conservation activity were selected to determine conservation objectives across conservation tools (see Appendix 1). Regulatory tools were qualitatively analyzed using a combination of inductive and deductive qualitative coding in NVivo 12 software, undergoing multiple rounds of coding, to label and categorize passages of text based on similarities (Skjott Linneberg & Korsgaard, 2019; Fereday & Muir-Cochrane, 2006). This analysis coded all conservation-focused regulatory tools to identify their primary conservation objectives, how objectives are expected to be reached, whether they contain a spatial component, and whether the tool references other Canadian regulatory tools beyond those that are conservation focused. Additional regulatory documents were reviewed as necessary, including conservation regulatory tools created after 2019 (e.g. *Wildlife Conservation Areas Act - Wildlife Management Areas Regulations*) and regulations from which the conservation objective could not be identified using the primary regulation document alone (e.g. *Basin Head Marine Protected Area: 2014 Operational Management Plan* supplemented the *Basin Head Marine Protected Area Regulations*).

Given the complexity of the analyzed regulatory tools, multiple iterations of document analysis were conducted to confirm the identified themes. Following this, regulatory tools within each theme were reviewed to ensure that all designated tools reflected the same overarching theme. For example, reviewing all the regulatory tools under the habitat protection theme to ensure that they all do seek to protect marine habitats. Conservation objectives were subsequently defined based on context and content from the analyzed regulatory tools and supported by the academic literature.

Data, including identified conservation objectives, were analyzed nationally and within DFO bioregions (Figure 4) currently pursuing MSP to demonstrate the distribution of conservation objectives and to understand the potential for various jurisdictions to achieve these objectives. These bioregions include the Estuary and Gulf of St. Lawrence, Newfoundland-Labrador Shelves, Pacific North Coast, Pacific South Coast, and the Scotian Shelf (Government of Canada, 2021b).

2.2 - Case Study Selection

The Estuary and Gulf of St. Lawrence (EGSL) was selected as a case study to demonstrate how conservation is currently pursued within a DFO bioregion via existing regulatory tools. The EGSL is composed of multiple DFO administrative regions (Gulf, Maritimes, Newfoundland and Labrador, and Quebec) and provinces including, New Brunswick, Newfoundland and Labrador, Nova Scotia, Prince Edward Island, and Quebec, within a shared planning region (Fisheries and Oceans Canada, 2013). The EGSL region is home to several ecologically significant species of varying population status under the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and is classified as a diverse, highly productive ecosystem (Fisheries and Oceans

Canada, 2013). Additionally, the EGSL is managing new and urgent conservation issues, such as the increasing presence of the critically endangered North Atlantic right whale (*Eubalaena glacialis*) within the Gulf of St. Lawrence (Simard et al., 2019), requiring immediate management action. Given the overlapping jurisdictions, ecological significance, and emerging issues, this area would likely benefit from a bioregional approach to conservation that employs the full suite of regulatory tools to achieve multiple and diverse conservation objectives. Therefore, the EGSL region was selected as a case study to apply the themes of conservation objectives derived from the document analysis. This analysis aims to demonstrate the overlap and possible integration of various tools within the bioregion to showcase the diversity of tools available for particular conservation objectives.

The case study analysis was conducted by filtering the results from the document analysis to include only conservation objectives relevant to EGSL jurisdictions. This includes federal and provincial regulatory tools from New Brunswick, Newfoundland and Labrador, Nova Scotia, Prince Edward Island, and Quebec. Conservation objectives were subsequently analyzed in the context of an existing integrated management initiative within the EGSL, the Gulf of St. Lawrence Integrated Management Plan (GOSLIM). GOSLIM outlines key management themes (Table 1) that acknowledge the interactions between ecosystems and human activities and suggests a practical approach and framework to manage these activities with ecosystem protection in mind. In this study, the conservation objectives were applied to the GOSLIM management themes to determine which objectives GOSLIM might expect to meet. Applicable regulatory tools were then analyzed to determine which could be applied to assist in meeting the

management themes, categorized by their ability to apply spatial boundaries. This analysis aims to determine the tools that are currently available to the EGSL bioregion to meet conservation management goals.

Table 1 – Key management themes as outlined by Fisheries and Oceans Canada and other Federal and Provincial departments within the Gulf of St. Lawrence Integrated Management Plan (Fisheries and Oceans Canada, 2013).

Management Theme Outlined By	Management Theme
Fisheries and Oceans Canada	Vulnerability of groundfish and benthic invertebrates to biomass removal (e.g., fishing) and physical alteration of habitats (e.g., consequences of fishing gear)
	Vulnerability of pelagic fish to biomass removal (e.g., fishing)
	Vulnerability of marine mammals to noise, entanglement, ship-strikes, and contaminants (e.g., marine transportation)
	Vulnerability of marine plants (i.e., Eelgrass) to habitat alteration caused by invasive species, contaminants, and nutrient input (e.g., coastal and land-based activities)
	Vulnerability of corals and sponges to biomass removal (e.g., fishing activities affecting the seafloor)
Other Federal and Provincial Departments	Vulnerability of marine and colonial birds
	Vulnerability of marine and coastal environments with high levels of nutrients and sediment
	Vulnerability of species at risk

CHAPTER 3 - RESULTS

3.1 – Conservation Objectives

Through document analysis, including multiple rounds of qualitative coding, seven distinct conservation objectives (Figure 2) were identified as major themes across the regulatory tools in Canada. Conservation objectives were subsequently defined from these themes, based on coded passages of text from the analyzed tool documents (Table 2). These seven objectives can be generally categorized as conservation relating to human activities (access to nature, fisheries management), ecosystems (biological diversity & productivity, ecological integrity, habitat protection), and species (species at risk, species & habitats of interest).

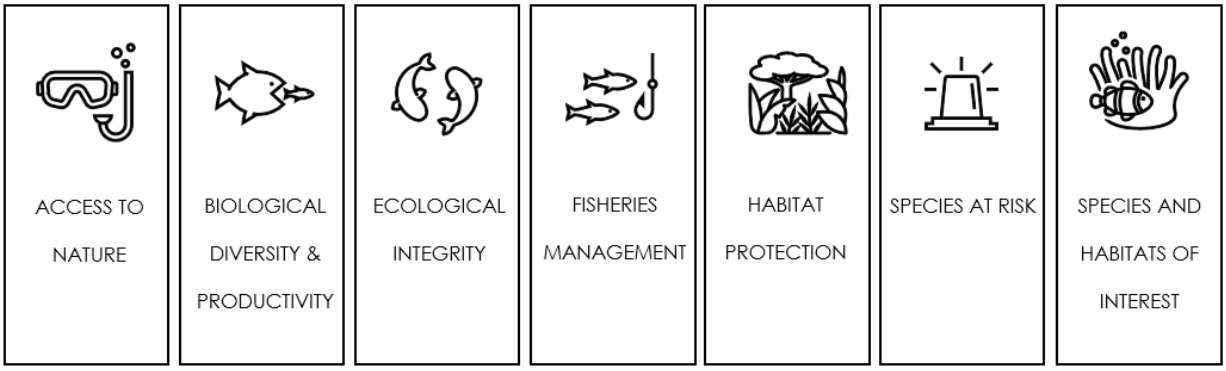

Figure 2 – Conservation objectives identified through the document analysis of Canadian conservation centric regulatory tools.

Conservation objectives pertaining to human activities within the marine space include access to nature and fisheries management. Access to nature conservation objectives were classified as regulatory tools containing conservation efforts for the primary purpose of human use and enjoyment. For example, within the *Canada National*

Parks Act (2000) the following quote was used to classify the act as one with an access to nature conservation objective: "*marine conservation areas are established in accordance with this Act for the purpose of protecting and conserving representative marine areas for the benefit, education and enjoyment of the people of Canada and the world*". Alternatively, the fisheries management conservation objectives are regulatory tools that encourage conservation efforts for the sustainability of the commercial and/or recreational fisheries industry. For example, the *Eastport Marine Protected Area Management Plan* (2013) states that "*the impetus for the development of an MPA was the protection and sustainable fishery of the local American Lobster population. The MPAs afford protection to the Eastport lobster population and the habitats on which it relies*".

Three conservation objectives are considered ecosystem focused, including biological diversity & productivity, ecological integrity, and habitat protection. Regulatory tools were classified as containing a biological diversity & productivity conservation objective when specific efforts were made to improve or maintain their state within the ecosystem. For example, the *Musquash Estuary Marine Protected Area Management Plan* (2017) states that their "*objectives are to ensure no unacceptable reduction or human-caused modification to: A. Productivity so that each component (primary, community, population) is functioning in the ecosystem (e.g., by maintaining the abundance and health of harvested species); B. Biodiversity by maintaining the diversity of individual species, communities, and populations within the different ecotypes".* Regulatory tools that prioritized the support of self-sustaining ecosystems that require minimal to no human intervention were classified as having an ecological integrity

conservation objective. This includes the *Canada National Marine Conservation Areas Act* (2002) which emphasizes that "*the protection of natural, self-regulating marine ecosystems is important for the maintenance of biological diversity*". Finally, the conservation objectives classified as habitat protection are regulatory tools either designed to protect habitats or those that restrict actions that damage habitats. For example, one purpose of the *Fisheries Act* (1985) is for the "*the conservation and protection of fish and fish habitat, including by preventing pollution*".

The remaining objectives pertained to the conservation of species including species at risk and species, and their habitats, of particular interest. The former is exemplified within the *Species at Risk Act* (2002) which states that "*the purposes of this Act are to prevent wildlife species from being extirpated or becoming extinct, to provide for the recovery of wildlife species that are extirpated, endangered or threatened as a result of human activity, and to manage species of special concern to prevent them from becoming endangered or threatened*". In contrast, objectives for species & habitats of interest identified a particular species or habitat requiring conservation management. For example, "*the purpose of this MPA is to conserve and protect a unique form of Irish moss (Chondrus crispus) that may exist only within the boundaries of Basin Head" (Basin Head Marine Protected Area: 2014 Operational Management Plan, 2016).*

Table 2 – Definitions of conservation objectives identified through the document analysis of Canadian conservation centric regulatory tools.

Conservation Objective	Definition
Access to Nature 	Regulatory tools in place to conserve local ecosystems to provide citizens with a natural representation of the region. This can provide citizens with opportunities to enjoy nature, fish, and exercise traditional Indigenous practices (*Canada National Marine Conservation Areas Act*, 2002).
Biological Diversity & Productivity 	Regulatory tools in place to support increased biodiversity (variety of genes, species, and/or ecosystems) and/or the productivity (the production of organic matter) of an ecosystem (Rands et al., 2010; Sigman & Hain, 2012).
Ecological Integrity 	Regulatory tools in place to leave ecosystems undisturbed by humans to allow for self-sustaining natural ecological processes. Evolution can naturally occur within the ecosystem and biodiversity is maintained (*Oceans Act*, 1996).
Fisheries Management 	Regulatory tools in place to protect the stock and health of aquatic species used for commercial and recreational fisheries. These regulations can help support the economic development of fisheries in Canada (Wilson & McCay, 2001).
Habitat Protection 	Regulatory tools in place to conserve the habitat of a particular species or ecosystem. These habitats can be essential for the survival and/or recovery of a particular species (Government of Canada, 2016).
Species at Risk 	Regulatory tools in place to conserve any species at risk including those classified as threatened, vulnerable, special concern, and endangered (Schnobb, 2022).
Species & Habitats of Interest 	Regulatory tools in place to conserve unique, rare, and/or endemic species that are of social and cultural importance. This definition also encompasses regulatory tools in place to protect unique habitats that can sustain these unique, rare, and/or endemic species (*Wilderness and Ecological Reserves Act*, 1990).

The most common conservation objectives (Figure 3) were habitat protection (31% of regulatory tools), biological diversity & productivity (17% of regulatory tools), and species at risk (17% of regulatory tools). These conservation objectives can be classified as ecosystem or species focused objectives, making up 53% of all regulatory tools analyzed. Most regulatory tools contained a spatial component (52.9%) or possessed the ability to implement a spatial component (29.4%) and are thus highly applicable for use in MSP.

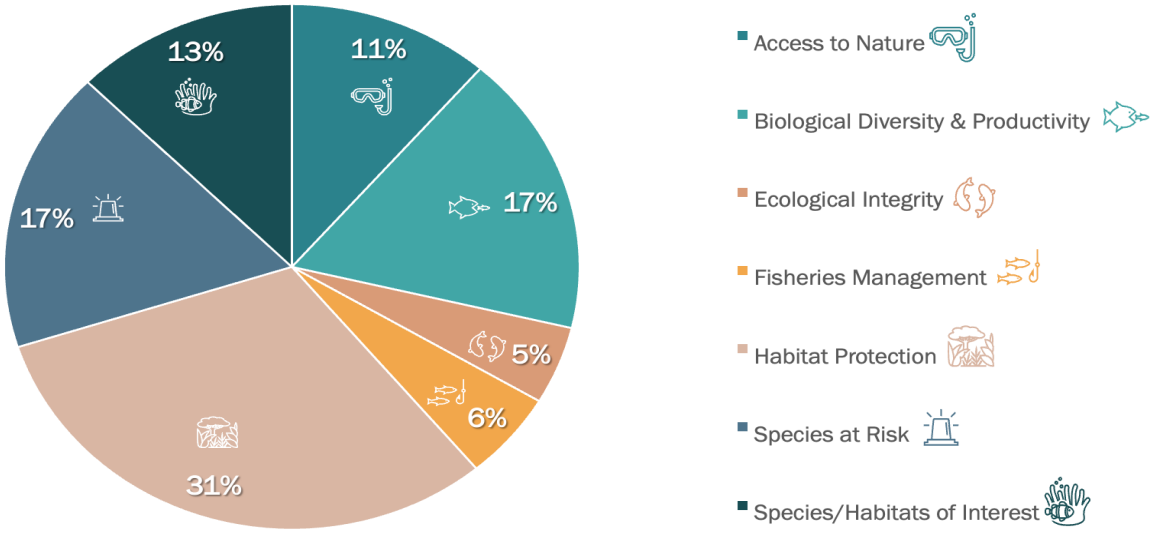

Figure 3 – Distribution of conservation objectives across Canada. Conservation objectives are defined in Table 1.

3.2 – Distribution of Conservation Objectives Across Jurisdictions

Conservation priorities varied across federal and provincial jurisdictions in Canada, though habitat protection appeared commonly across jurisdictions (Figure 4). Conservation objectives also varied across DFO bioregions, and each bioregion differed in the total number of regulatory tools available for conservation (Figure 5).

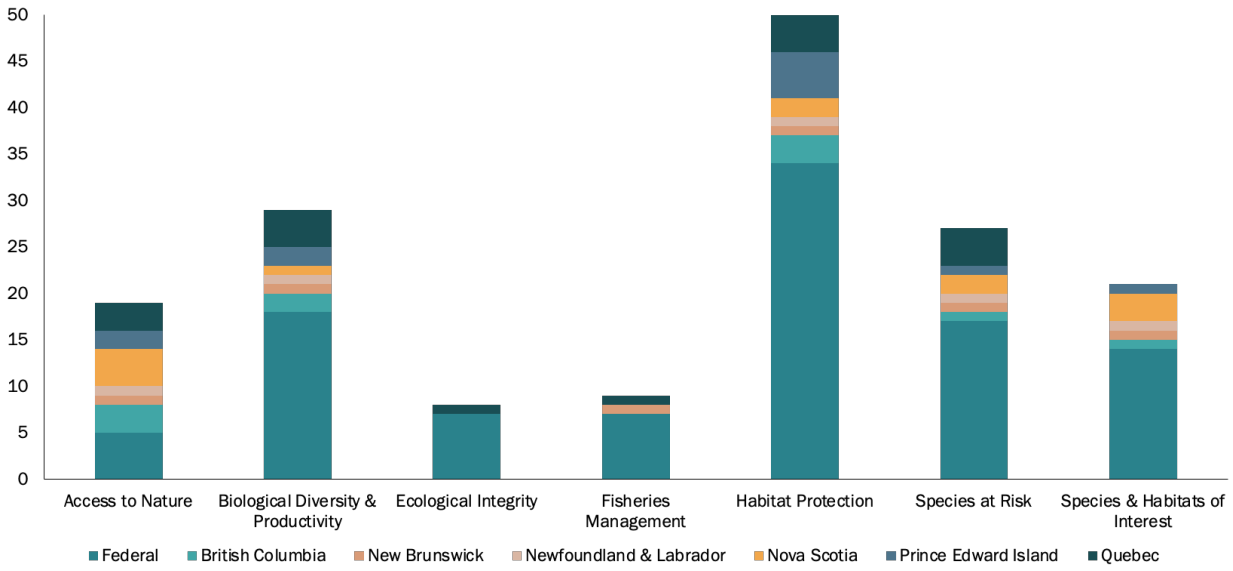

Figure 4 – Distribution of conservation objectives across Federal and Provincial jurisdictions in Canada. Conservation objectives are defined in Table 1.

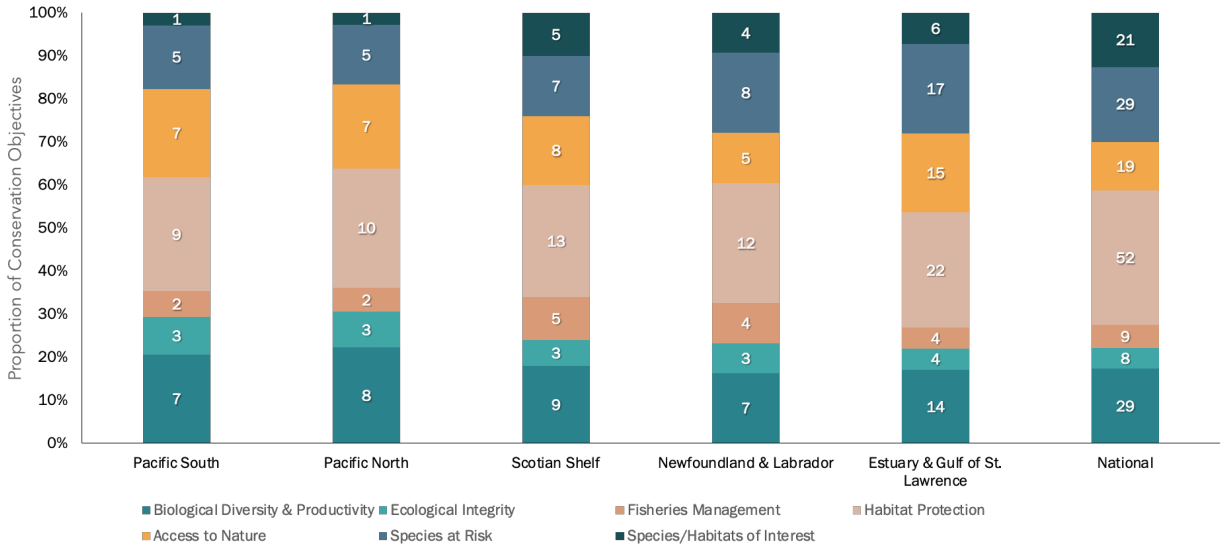

Figure 5 – Proportion of conservation objectives across Fisheries and Oceans Canada bioregions pursuing marine spatial planning. Data labels within columns indicate the total number of regulatory tools available for each conservation objective within bioregions.

3.3 – Suggested Mechanisms to Achieve Conservation Objectives

Five mechanisms for achieving conservation objectives were identified from the analyzed regulatory tools (Table 3). The two most common mechanisms were the (1) restriction or (2) the exception of specific activities (Figure 6 & Figure 7). Most restrictions aimed to prevent habitat destruction and pollution, while the primary exceptions for activities were related to science and research and human safety. Some activities overlapped in both being restricted and excepted, including hunting, fishing, and trapping and oil and gas activities, depending on the tool.

Table 3 – Observed mechanisms for achieving objectives within Canadian regulatory tools. Mechanisms are sorted from most commonly mentioned to least commonly mentioned.

Mechanism	Definition of Mechanism	Number of Mentions
Restriction of activities	Outlined activities that cannot be conducted within a designated area.	92
Exceptions to activities	Activities that are permitted within a designated area, often with explicit instructions on the exact manner the activity can be conducted.	82
Declaring status	Declaring the status of a natural area as protected, therefore providing added protective measures.	19
Repair or mitigate damage	Management efforts to repair previous damage or mitigate predicted damage.	6
Conservation management	Specific management efforts outlined within regulatory tools for the conservation of a specific species and/or habitat.	5

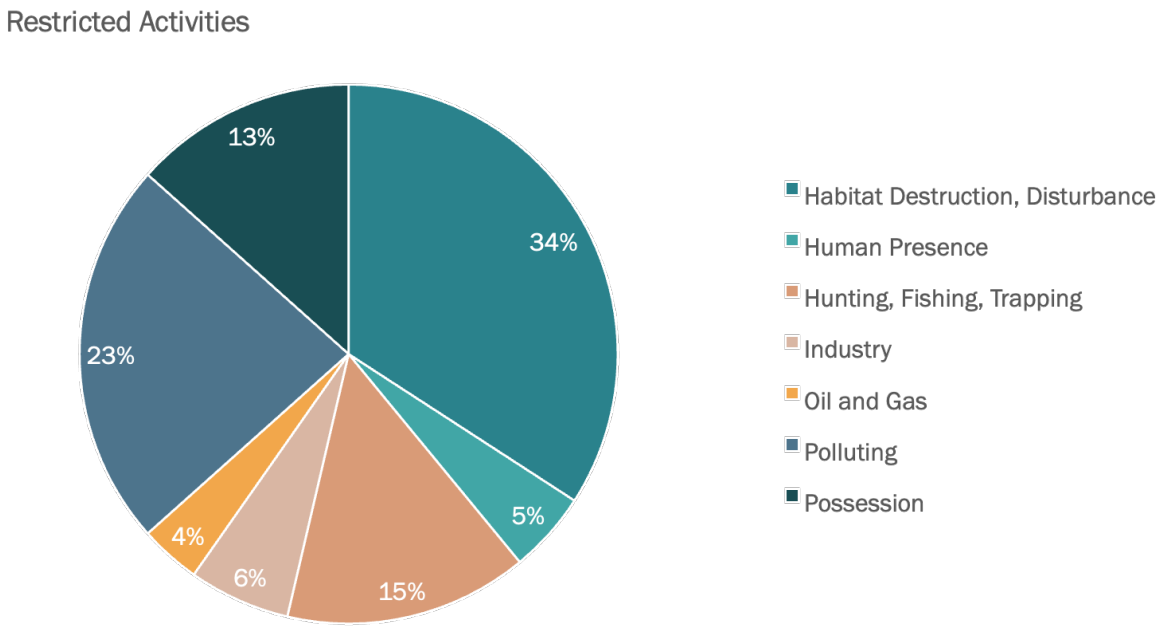

Figure 6 – Distribution of restricted activities in conservation centric regulatory tools to achieve conservation objectives in Canada.

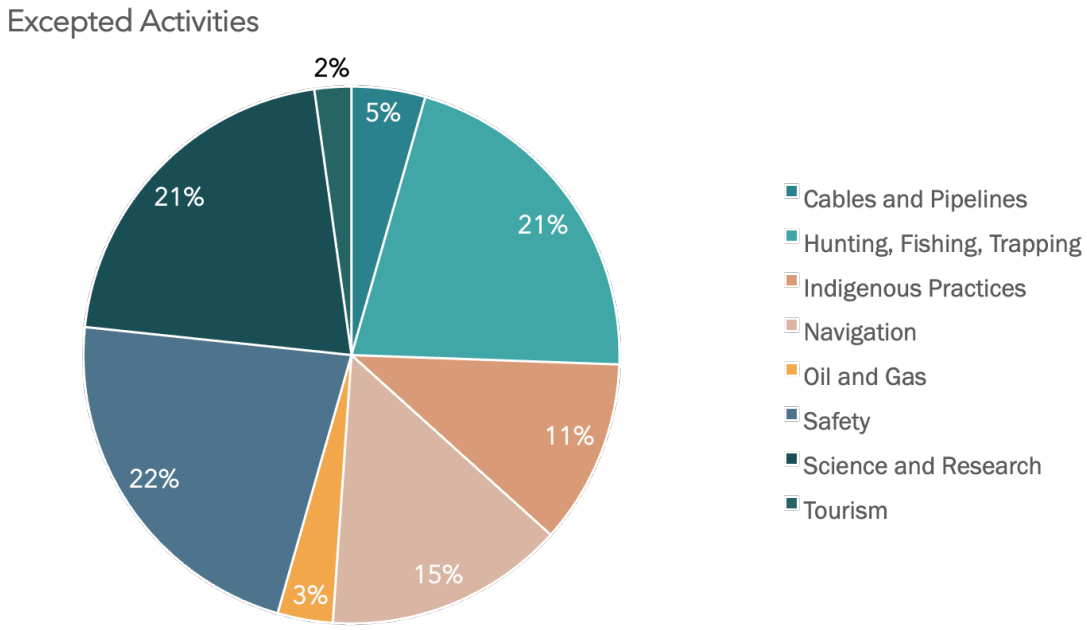

Figure 7 – Distribution of exceptions to activities in conservation centric regulatory tools to achieve conservation objectives in Canada.

3.4 - Related Acts

This study revealed 151 additional regulatory tools referenced within the analyzed documents. The most frequently observed regulatory tools include the *Oceans Act* (17), *Fisheries Act* (15), *Mackenzie Valley Resource Management Act* (14), *Tla'amin Final Agreement Act* (13), *Criminal Code* (11), T*ax Administration Act* (11), and the *Constitution Act, 1982* (10).

3.5 - Case Study: The Estuary and Gulf of St. Lawrence

The results of the case study analysis indicate that four of the seven conservation objectives identified in this study can be observed within the GOSLIM management themes (Table 4). These include biological diversity & productivity, habitat protection, species at risk, and species & habitats of interest. Despite containing two management themes addressing the vulnerability of fish (groundfish and benthic invertebrates and pelagic fish), these do not align with the fisheries management conservation objective as defined in this study, since their conservation efforts are not for the purpose of the fishery. Rather, the purpose for this GOSLIM management theme is to protect the designated species from overfishing and habitat destruction (Fisheries and Oceans Canada, 2013). Therefore, these two management themes align with only three conservation objectives (Table 4).

Table 4 – List of management themes outlined within the Gulf of St. Lawrence Integrated Management Plan in relation to the conservation objective they can expect to meet.

Management Theme	**Conservation Objective**						
	Access to nature 	Biological Diversity & Productivity 	Ecological Integrity 	Fisheries Management 	Habitat Protection 	Species at Risk 	Species & Habitats of Interest 
Groundfish and benthic invertebrates		✓			✓		✓
Pelagic fish		✓			✓		✓
Marine mammals		✓			✓		✓
Marine plants		✓			✓		✓
Corals and sponges		✓			✓		✓
Marine and colonial birds		✓			✓		✓
Marine and coastal environments		✓			✓		
Species at risk		✓				✓	

Each GOSLIM management theme has up to 16 applicable regulatory tools that could be used to meet their objective (see Appendix 2). Regulatory tools used various implementation mechanisms, including those with a spatial component (8), the potential for a spatial component (10), and no spatial component (11). Together, 62% of the regulatory tools applicable to GOSLIM management themes either have spatial components or could employ them and are therefore very applicable to be incorporated within future marine spatial plans.

Applicable regulatory tools, based on their conservation objectives as described here, per individual GOSLIM management themes were also identified (see Appendix 2). For example, the vulnerability of species at risk management theme has three general (i.e., no spatial component) regulatory tools (*List of Plant and Wildlife Species likely to be Designated as Threatened or Vulnerable, List of Wildlife Species at Risk (referral back to COSEWIC) Order, Regulation Respecting Threatened or Vulnerable Wildlife Species and their Habitats*), five regulatory tools with a spatial component (*Banc-des-Américains Marine Protected Area Regulations, Critical Habitat of the Copper Redhorse (Moxostoma hubbsi) Order, Critical Habitat of the Northern Wolffish (Anarhichas denticulatus) Order, Critical Habitat of the Spotted Wolffish (Anarhichas minor), Critical Habitat of the Striped Bass (Morone saxatilis),* and seven regulatory tools with the potential to implement a spatial component *(Act Respecting Threatened or Vulnerable Species, Canada Wildlife Act, Natural Areas Protection Act, Oceans Act, Protected Natural Areas Act, Species at Risk Act, Wilderness and Ecological Reserves Act).*

CHAPTER 4 - DISCUSSION

4.1 - Conservation Objectives

Results of this study indicate that in Canada the protection of marine ecosystems are prioritized first among ocean conservation regulatory tools (53% of regulatory tools), followed by specific species (30% of regulatory tools), and finally for human activities (17% of regulatory tools). Habitat protection was found to be the most prominent objective across tools, with approximately one third of the analyzed tools highlighting its importance. These results align with Canada's marine conservation efforts that have primarily been based on their commitment to protect 10% of coastal and marine areas by 2010 to meet Aichi Target 11 under the United Nations Convention on Biological Diversity (Government of Canada, 2022). By 2019, Canada surpassed this target and has since been working to increase protection of marine habitats, with targets of 25% protected by 2025 and 30% by 2030 (Government of Canada, 2022). Based on results of this study, these targets are likely achievable using existing regulatory tools with objectives in habitat protection, species at risk, species & habitats of interest, among others.

Similar conservation objective trends can be observed when assessing specific federal and provincial jurisdictions. Habitat protection was found to be the most common objective across all jurisdictions, followed by biological diversity & productivity, and species at risk (Figure 4). As such, these three conservation objectives may reflect Canada's current priorities in marine conservation. Across all conservation objectives, the federal jurisdiction has the greatest number of regulatory tools available, apart from access to nature. For this objective, provinces may prioritize citizens' access to marine areas in their province via regulatory tools, reflecting where provinces have jurisdiction

along the coast, inland from the ordinary low-water mark (East Coast Environmental Law, 2010).

The analysis of DFO bioregions highlight the vast differences in the total number of regulatory tools available to practitioners in each region (Figure 5). Results indicate that the EGSL possesses the greatest number of regulatory tools available, with 82 tools having the ability to support marine conservation efforts, in comparison to the Pacific South bioregion that comprises the fewest tools with 34. The latter bioregion is composed of a relatively small portion of the marine space that is adjacent to British Columbia, much smaller than the EGSL bioregion that is composed of five provinces (Government of Canada, 2018; Fisheries and Oceans Canada, 2013). This begs the question: does the number of regulatory tools available make a difference in what a bioregion can accomplish for marine conservation? With more regulatory tools in the EGSL, this region may hold more potential to meet each of the conservation objectives identified in this study. While this is a strength, it may also simultaneously increase the complexity of marine management. Studies have shown that transboundary marine spatial plans must overcome potential differences in governance structures, priorities, objectives, and incompatible administrative systems (Jay et al., 2016). Despite occurring within the same country, management efforts within the EGSL will have to overcome a multitude of jurisdictional boundaries and priorities for marine conservation, and marine spaces in general. For example, action on climate change may be of greater importance for the Province of Prince Edward Island than other provinces bordering the EGSL, as it is more likely to be impacted by climate impacts as evidenced recently by Hurricane Fiona, which devastated communities and ecosystems in Prince Edward Island (Mercer, 2022; Kovacs

et al., 2017). Given this complexity, there is a greater need to focus on collaborative governance in the EGSL that prioritizes consensus-oriented decision making to encompass the diversity of ocean priorities (Ansell & Gash, 2008).

4.2 - Conservation Mechanisms

Results of this study indicate that the primary mechanisms for achieving conservation objectives in Canada are through the restriction or exception of certain activities within a designated area. The two most prominent restrictions are those pertaining to habitat destruction and disturbance and those that inhibit pollution. These restrictions align with the prominence of the habitat protection conservation objective across regulatory tools. The primary causes of habitat destruction in aquatic environments are through bottom trawling, coastal development, and the contamination of the water quality through point and nonpoint source pollution resulting in nutrient enrichment and oxygen depleted “dead zones” (Laurance, 2010). Through emphasizing the restriction of activities that can cause habitat destruction, these regulatory tools can succeed in protecting valuable and vulnerable environments.

The primary exceptions to activities include human safety and promoting science and research. Given that the top priority of the Government of Canada is “*to protect the safety and security of Canadians*”, it is clear why human safety at sea is a frequent exception to regulations that may hinder safety (Government of Canada, 2021d). With these exceptions, individuals have the flexibility at sea to enter restricted areas such as MPAs in the case of emergencies and required safety measures. Science and research is also commonly an exception to regulations, which is important to determine the effectiveness of current management strategies, outline the needs for management, and

adapt management as required (Doi & Takahara, 2016). Through the exception of science and research activities within regulatory tools, there is opportunity to learn and adapt tools to best meet their conservation objectives.

This study also revealed overlap among activities that are considered exceptions and restrictions. Fishing, hunting, and trapping, in addition to oil and gas activities, were considered both exceptions and restrictions in different regulatory tools. Within the fishing industry there are multiple fishing methods using various gear types, some of which are more destructive than others such as bottom trawling (Church, 2011). These differences are reflected in restrictions and exceptions to regulations. For example, in the *Banc-des-Américains MPA* (2019), only fishing by longline, handline, angling, or traps are permitted. Oil and gas as an exception was only mentioned a few times, primarily within the *Tarium Niryutait MPA* (2010) which permits exploratory drilling and geophysical operations. The observed overlap between exceptions and restrictions in this study likely reflects local contexts and objectives of conservation measures. However, since 2019, the Government of Canada has modified their MPA standards to better protect and conserve these vulnerable environments through the prohibition of bottom trawling, oil and gas activities, dumping, and mining in all new MPAs (Government of Canada, 2019). Given these changes, there may be fewer overlaps between restrictions and exceptions of activities in conservation regulatory tools in the future.

Similarly, traditional Indigenous practices are only explicitly considered as an exception in 10 of the 71 regulatory tools analyzed, though this may change as Canada implements the *United Nations Declaration on the Rights of Indigenous Peoples Act* (2022). This Act has multiple articles that state that Indigenous Peoples have the right to

access traditionally owned or occupied resources, waters, and coastal seas, promoting the sustainability of traditional Indigenous practices (*United Nations Declaration on the Rights of Indigenous Peoples Act,* 2022). As new regulatory tools emerge in Canada, these articles may be better reflected as exceptions to regulations in future conservation tools, including MPAs.

4.3 - Additional Regulatory Tools

Among the 151 additional regulatory tools referenced in the analyzed documents, seven were mentioned ten or more times. Of these, two regulatory tools were part of the original study sample, including the *Oceans Act* and the *Fisheries Act*. This suggests that there is interconnectedness among regulatory tools, used either to enforce existing legislation, such as the *Criminal Code,* or be employed to create new regulatory tools, such as the *Oceans Act* used to create MPAs and OECMs. These results demonstrate that regulatory tools in Canada do not operate in isolation, rather, they can be linked to support each other. Further, the social dimension, particularly as it relates to enforcement, can be clearly seen within conservation regulatory tools given frequent references to the *Criminal Code, Tax Administration Act,* and the *Constitution Act, 1982*. References to the *Criminal Code,* the federal law that outlines most criminal offences in Canada (Government of Canada, 2021c), is among the top five most mentioned regulatory tools in this study. Suggesting that mechanisms exist to enforce and uphold the regulatory tools designed for conservation. These findings highlight the need for future research that investigates regulatory tools beyond those explicitly aimed at conservation to understand the full suite of regulatory tools that may support conservation efforts in Canada.

4.4 - Estuary and Gulf of St. Lawrence Case Study

GOSLIM management themes reflected four conservation objectives of regulatory tools analyzed in this study, including species at risk, species & habitats of interest, habitat protection, and biological diversity & productivity (Table 4). GOSLIM focuses on ecosystems and species, more so than human activities, which aligns with its objective to recognize ongoing human activities in the area, determine their impacts on the environment, and design management strategies to mitigate these impacts (Fisheries and Oceans Canada, 2013). Given that marine ecosystem resilience is declining due to human influence, it is essential that marine conservation is prioritized to prevent biodiversity loss, protect marine environments, and allow for regular ecosystem function (Broderick, 2015; Jacob et al., 2020). Since long-term economic prosperity cannot occur without healthy and productive ecosystems, GOSLIM provides an integrated framework to achieve ecological and economic goals (Fisheries and Oceans Canada, 2013). In doing so, we can ensure the long term sustainable development and use of aquatic ecosystems (Jacob et al., 2020).

Given the diversity of jurisdictions, activities, communities, and priorities in this region, MSP may better coordinate across these and ease the implementation of GOSLIM. As GOSLIM aims to protect the Gulf of St. Lawrence through the integration of management (Fisheries and Oceans Canada, 2013), MSP can help to capture the full suite of regulatory tools for conservation available to practitioners. There are several tools available within the EGSL that either have a spatial component or possess the ability to employ one, and as such there are many opportunities in the EGSL for conservation to be embedded within MSP (see Appendix 2). In creating a holistic plan that encompasses

the human and environmental components of the bioregion, as desired by GOSLIM, managers can create an integrated, sustainable marine spatial plan that is underpinned by conservation.

4.5 – Research Significance

MSP provides a mechanism for nations who aim to balance the economic, social, and environmental dimensions of the ocean and ocean uses; however, it has often struggled to achieve this idealized version (Zuercher et al., 2022; Santos et al., 2021). The novel research presented here demonstrates the complexity of introducing MSP within a large nation where there are various jurisdictions and, at times, conflicting priorities, while highlighting the utility, multiplicity, and synergy of existing regulatory tools for conservation. Since MSP should ideally emerge from pre-existing marine management tools and frameworks (Agardy et al., 2011), it is important that managers understand the full suite of tools available for achieving particular objectives, including conservation objectives.

This research demonstrates conservation objectives across diverse regulatory tools, including and beyond MPAs and OECMs. Many countries rely solely on MPAs to address marine conservation concerns, and in some cases create paper parks to achieve targets without conferring conservation benefits (Devillers et al., 2015). By employing MPAs to deliver quantity over quality, the reason for protecting the area in the first place may be lost (Claudet et al., 2022). Furthermore, singularly investing in MPAs, expecting them to perform exceptionally and meet marine conservation goals, is unsustainable and impractical (Agardy et al., 2011). With MSP, practitioners can address some of the shortcomings of MPAs and, rather than relying exclusively on MPAs to solve all problems,

MSP can be used to complement MPAs and provide additional conservation measures (Santos et al., 2019). MSP can bring alternative mechanisms together and make use of the diversity of conservation measures that already exist. By understanding what tools are available for conservation, practitioners can envision what can successfully and realistically be achieved with a marine spatial plan. Through the analysis of conservation based regulatory tools, this study demonstrates how MSP can inform the strategic use of the full suite of conservation tools.

Apart from this, this study is valuable by providing an opportunity to prioritize conservation within marine spatial plans. MSP originated as a mechanism to support marine conservation efforts (Agardy, 2010); however, in recent years, the focus has shifted to place greater emphasis on economic development and enhancing blue growth (Trouillet & Jay, 2021). This is clear within the European Union MSP Directive, which emphasizes maritime economic development for blue growth, highlighting the various marine industries, but rarely mentioning environmental sustainability (European Commission, 2022; Santos et al., 2021). This shift is concerning given the dire state of the ocean and the urgent need for intervention especially with increasing maritime industrial growth (Jouffray et al., 2020). To ensure that MSP achieves its promise as a process that can simultaneously deliver environmental, economic, and social objectives (Ehler, 2019), it is essential that MSP discussions embed marine conservation as an enabling condition for sustainable marine industries.

Additionally, while the regulatory tools analyzed were conservation centric, most were not exclusively focused on conservation. As such, through their implementation, conservation can be prioritized alongside economic priorities such as industrial growth

and a sustainable blue economy. For example, the *Fisheries Act* (1985), a federal regulatory tool used to regulate fishing in Canada, is very supportive of enhancing the fishing industry sustainably. By starting with a conservation lens, MSP can protect the environment as originally intended, while simultaneously supporting blue growth.

Finally, this work was conducted to inform MSP efforts in Canada, where four regional plans are to be delivered by 2024. This study demonstrates what tools are available for conservation, what conservation objectives can be expected to be achieved, and what mechanisms are used by the regulatory tools to achieve their objectives. This work was supplemented with an analysis of tools' ability to employ a spatial component, thus their potential utility for MSP. Establishing clear objectives is a critical step in the MSP process (Collie et al., 2013), as objectives inform the remaining planning tasks (Gleason et al., 2010; Sievanen et al., 2011). This research described seven distinct conservation objectives that may be prioritized in MSP to ensure conservation remains central to planning and, ultimately, ocean sustainability. This study proactively assesses which regulatory tools can be used to meet these conservation objectives and whether they include a spatial component, informing the strategic use of existing tools in MSP in Canada.

4.6 – Limitations and Future Work

This research was scoped to exclusively focus on ocean regulatory tools that address conservation activities. The selected scope ensured that results would be most useful for practitioners, while contributing to the academic literature, and prioritized conservation to determine how conservation measures could fit within MSP in Canada. While this research identified conservation objectives that can be applied throughout

Canada and to future studies on MSP, an expansion of this scope to include all regulatory tools affecting Canada's marine environment may add to these results.

The results from this study demonstrate overlap in various regulatory tools and clearly indicate that certain tools may bolster results given their prominence in references. For example, the *Mackenzie Valley Resource Management Act* (1998) was mentioned 14 times within the analyzed documents, though it was not analyzed to contribute to the identified conservation objectives due to the scope of this study. By analyzing all regulatory tools, a better understanding of how conservation may fit into other regulated activities, such as marine transportation or energy which are not reflected here, may be gained. Furthermore, this research may be expanded to include an analysis of existing programs and initiatives from DFO that affect marine conservation but are not regulatory tools. For example, in 2016 the *Oceans Protection Plan* was launched by Transport Canada, which seeks to "*preserve and restore marine ecosystems vulnerable to increased marine shipping and development*" (Government of Canada, 2020b). The *Oceans Protection Plan* is used to protect marine mammals and ecosystems and has been used to create new initiatives such as the Whales Initiative that seeks to address the primary threats to the endangered Southern Resident killer whale (Government of Canada, 2020b; Government of Canada, 2022). Canada has several mechanisms for marine conservation that exist outside of the conservation regulatory tools analyzed here. By expanding this research to include all regulatory tools, programs, and initiatives, MSP can better capture the full suite of mechanisms for advancing conservation in Canada.

Furthermore, this research conducted a case study analysis for the EGSL bioregion, demonstrating the applicability of the conservation objectives identified in this

research for planning in a particular area. Future studies might expand on this analysis to consider all bioregions, especially those currently committed to MSP, to better understand how MSP might employ regulatory tools for conservation across Canada's three coasts. Other integrated management plans delivered for Canada's large ocean management areas, of which GOSLIM is one example, could also be similarly analyzed to ensure past work on integrated management is captured in ongoing MSP. This could provide an overview of what conservation measures are prioritized within each bioregion and combined with the results from this study, can create a clear vision for what each bioregion can expect to achieve in conservation using existing regulatory tools.

As MSP is growing internationally, with more countries creating marine spatial plans every year (Ehler, 2021), this study could be expanded to analyze how the identified conservation objectives are included in marine spatial plans from other nations. Further, international analysis may add new conservation objectives that are not present in the Canadian regulatory context, but may be important, possibly providing support for future conservation regulatory tools. In particular, analyzing marine spatial plans that have been in place for several years may identify conservation objectives prioritized in other nations and, more generally, how conservation is embedded within international plans. As Canada works to develop marine spatial plans, it is prudent to learn from other countries to ensure that the implemented plans are most effective.

CHAPTER 6 - CONCLUSIONS

This research sought to analyze the existing suite of marine conservation regulatory tools to determine mechanisms available for conservation within Canada, a nation in the process of pursuing MSP and a Blue Economy Strategy. It uses qualitative document analysis on existing conservation regulatory tools and recommends an approach to MSP that is underpinned by conservation. The use of qualitative analyses such as this study place a critical lens on existing regulatory measures, providing a more complete understanding of the tools in the management toolbox. The results from the study identified seven unique conservation objectives within Canada's existing regulatory framework in Canada. These include access to nature, biological diversity & productivity, ecological integrity, fisheries management, habitat protection, species at risk, and species & habitats of interest. Among these, habitat protection was the most prominent conservation objective, occurring in 31% of marine conservation regulatory tools. Findings highlight two mechanisms for achieving conservation objectives: through the restriction (e.g., habitat destruction, fishing, human presence, etc.) and exception (e.g., science and research, tourism, Indigenous practices, etc.) of activities. The case study on the EGSL bioregion demonstrates the applicability of these results within an existing management plan, identifying regulatory tools that can be used by EGSL managers to achieve proposed management themes within an existing program, in addition to future initiatives such as MSP. Through the analysis of Canadian conservation regulatory tools, this study provides insight into how existing tools may be used to strategically deliver conservation outcomes.

This research contributes to a growing body of literature on MSP as it relates to conservation, describing how conservation may be embedded within marine spatial plans through the use of existing tools. This is particularly important in large nations such as Canada, where there are numerous jurisdictions and diverse conservation priorities. This study demonstrates the value of considering management tools including and beyond MPAs and OECMs to support marine conservation. It highlights the interconnectedness among existing regulatory tools, demonstrating that marine conservation can be achieved across multiple mechanisms when employed strategically. By understanding this interconnectedness, it may be easier for managers to employ holistic methods such as MSP as linkages already exist to support conservation.

Given the deteriorating state of the global ocean, it is essential that conservation be prioritized in planning and management to protect marine ecosystems and ensure that humans can continue to sustainably use marine resources and ecosystem services. By prioritizing conservation through the strategic use of existing regulatory tools, based on their conservation objectives, the blue economy can be supported via MSP in the near-term while ensuring health and sustainability of the ocean in the long-term.

APPENDIX

Appendix 1 – List of Canadian regulatory analyzed sourced from the Legislative and Regulatory Tools Inventory created in 2019 by Fisheries and Oceans Canada. Bolded regulatory tools did not meet the assessment criteria and were thus excluded from the final study sample.

Jurisdiction	Act	Year
Quebec	*Act Respecting the Conservation and Development of Wildlife*	2002
Quebec	*Act Respecting the Saguenay-St. Lawrence Marine Park*	1990
Quebec	*Act Respecting Threatened or Vulnerable Species*	1989
Federal	*Anguniaqvia niqiqyuam Marine Protected Areas Regulations*	2016
Federal	*Banc-des-Américains Marine Protected Area Regulations*	2019
Federal	*Basin Head Marine Protected Area Regulations*	2005
Federal	*Basin Head Marine Protected Area: 2014 Operational Management Plan*	2016
Federal	*Bowie Seamount Marine Protected Area Regulations*	2008
Federal	*Canada National Marine Conservation Areas Act*	2002
Federal	*Canada National Parks Act*	2000
Federal	*Canada Wildlife Act*	1985
Nova Scotia	*An Act Respecting Conservation Easements*	2001
Federal	*Order Designating the Tuvaijuittuq Marine Protected Area*	2019
Federal	*Eastport Marine Protected Areas Regulations*	2005
Federal	*Eastport Marine Protected Areas Management Plan*	2013
British Columbia	*Ecological Reserve Act*	1996
Federal	*Endeavour Hydrothermal Vents Marine Protected Area Regulations*	2003
Federal	*Endeavour Hydrothermal Vents Marine Protected Area Management Plan*	2010
New Brunswick	*Fish and Wildlife Act*	1980
Federal	*Fisheries Act*	1985
Federal	*Gilbert Bay Marine Protected Area Regulations*	2005
Federal	*Gilbert Bay Marine Protected Area Management Plan*	2013
Federal	*Gully Marine Protected Area Regulations*	2004

Jurisdiction	Act	Year
Federal	*Hecate Strait and Queen Charlotte Sound Glass Sponge Reefs Marine Protected Areas Regulations*	2017
Federal	***Labrador Inuit Land Claims Agreement Act***	**2005**
Federal	*Laurentian Channel Marine Protected Area Regulations*	2019
New Brunswick	***Marshland Infrastructure Maintenance Act***	2013
Federal	*Migratory Birds Convention Act, 1994*	1994
Federal	*Musquash Estuary Marine Protected Area Regulations*	2006
Federal	*Musquash Estuary A Management Plan for the Marine Protected Area and Administered Intertidal Area*	2017
Quebec	*Natural Heritage Conservation Act*	2002
Federal	***Nunavik Inuit Land Claims Agreement Act***	**2008**
Federal	*Ocean's Act*	1996
British Columbia	*Park Act*	1996
British Columbia	*Protected Areas of British Columbia Act*	2000
New Brunswick	*Protected Natural Areas Act*	2003
Nova Scotia	*Provincial Parks Act*	1989
British Columbia	*Riparian Areas Protection Act*	1997
Federal	*Sanguenay-St. Lawrence Marine Park Act*	1997
Federal	*SGaan Kinghlas-Bowie Seamount Marine Protected Area Management Plan Gin Siige Tl'a Da,aan Kinggangs Gin K'aalaagangs*	2019
Nova Scotia	*Special Places Protection Act*	1989
Federal	*Species at Risk Act*	2002
Federal	*St. Anns Bank Marine Protected Area Regulations*	2017
Federal	*Tarium Niryutait Marine Protected Areas Regulations*	2010
Federal	*Tarium Niryutait Marine Protected Areas Management Plan*	2013
Federal	*Territorial Lands Act*	1985
Federal	*The Gully Marine Protected Area Management Plan Oceans and Coastal Management Division Second Edition, 2017*	2017

Jurisdiction	Act	Year
Newfoundland and Labrador	*Wilderness and Ecological Reserves Act*	1990
Nova Scotia	*Wildlife Act*	1989
Prince Edward Island	*Wildlife Conservation Act*	1993

Appendix 2 – Analysis of the Gulf of St. Lawrence Integrated Management Plan management themes in relation to their conservation objectives, with examples of applicable regulatory tools to meet the proposed management theme. Applicable regulatory tools are divided based on whether they contain a spatial component, no spatial component, or have the potential to employ a spatial component using the regulatory tool.

Management Theme	Relevant Conservation Objectives	Examples of Applicable Regulatory Tools
Vulnerability of groundfish and benthic invertebrates to biomass removal (e.g., fishing) and physical alteration of habitats (e.g., consequences of fishing gear)	 Biological diversity & productivity  Habitat protection  Species & habitats of interest	General (No Spatial Component) ● *Act Respecting the Conservation and Development of Wildlife* ● *Fisheries Act* ● *Wildlife Conservation Act* With Spatial Component ● *Banc-des-Américains Marine Protected Area Regulations* ● *Basin Head Marine Protected Area Regulations* ● *Basin Head Marine Protected Area: 2014 Operational Management Plan* Potential for Spatial Component ● *Act Respecting Threatened or Vulnerable Species* ● *Canada National Marine Conservation Areas Act* ● *Natural Areas Protection Act* ● *Oceans Act* ● *Protected Natural Areas Act* ● *Provincial Parks Act* ● *Wilderness and Ecological Reserves Act* ● *Wildlife Act*

Management Theme	Relevant Conservation Objectives	Examples of Applicable Regulatory Tools
Vulnerability of pelagic fish to biomass removal (e.g., fishing)	 Biological diversity & productivity  Habitat protection  Species & habitats of interest	General (No Spatial Component) ● *Act Respecting the Conservation and Development of Wildlife* ● *Fisheries Act* ● *Wildlife Conservation Act* With Spatial Component ● Banc-des-Américains Marine Protected Area Regulations ● Basin Head Marine Protected Area Regulations ● Basin Head Marine Protected Area: 2014 Operational Management Plan Potential for Spatial Component ● *Act Respecting Threatened or Vulnerable Species* ● *Canada National Marine Conservation Areas Act* ● *Natural Areas Protection Act* ● *Oceans Act* ● *Protected Natural Areas Act* ● *Provincial Parks Act* ● *Wilderness and Ecological Reserves Act* ● *Wildlife Act*
Vulnerability of marine mammals to noise, entanglement, ship-strikes and contaminants (e.g., marine transportation)	 Biological diversity & productivity	General (No Spatial Component) ● *Act Respecting the Conservation and Development of Wildlife* ● *Fisheries Act* ● *Wildlife Conservation Act*

Management Theme	Relevant Conservation Objectives	Examples of Applicable Regulatory Tools
Vulnerability of marine mammals to noise, entanglement, ship-strikes and contaminants (e.g., marine transportation)	 Biological diversity & productivity  Habitat protection  Species & habitats of interest	With Spatial Component ● *Banc-des-Américains Marine Protected Area Regulations* ● *Basin Head Marine Protected Area Regulations* ● *Basin Head Marine Protected Area: 2014 Operational Management Plan* Potential for Spatial Component ● *Act Respecting Threatened or Vulnerable Species* ● *Canada National Marine Conservation Areas Act* ● *Natural Areas Protection Act* ● *Oceans Act* ● *Protected Natural Areas Act* ● *Provincial Parks Act* ● *Wilderness and Ecological Reserves Act*
Vulnerability of marine plants (i.e., Eelgrass) to habitat alteration caused by invasive species, contaminants and nutrient input (e.g., coastal and land-based activities)	 Biological diversity & productivity  Habitat protection  Species & habitats of interest	General (No Spatial Component) ● *Act Respecting the Conservation and Development of Wildlife* ● *Environment Quality Act* ● *Fisheries Act* ● *Wildlife Conservation Act* With Spatial Component ● *Banc-des-Américains Marine Protected Area Regulations* ● *Basin Head Marine Protected Area Regulations* ● *Basin Head Marine Protected Area: 2014 Operational Management Plan*

Management Theme	Relevant Conservation Objectives	Examples of Applicable Regulatory Tools
Vulnerability of marine plants (i.e., Eelgrass) to habitat alteration caused by invasive species, contaminants and nutrient input (e.g., coastal and land-based activities)	 Biological diversity & productivity  Habitat protection  Species & habitats of interest	Potential for Spatial Component ● *Act Respecting Threatened or Vulnerable Species* ● *Canada National Marine Conservation Areas Act* ● *Natural Areas Protection Act* ● *Oceans Act* ● *Protected Natural Areas Act* ● *Provincial Parks Act* ● *Wilderness and Ecological Reserves Act*
Vulnerability of corals and sponges to biomass removal (e.g., fishing activities affecting the seafloor)	 Biological diversity & productivity  Habitat protection  Species & habitats of interest	General (No Spatial Component) ● *Act Respecting the Conservation and Development of Wildlife* With Spatial Component ● *Banc-des-Américains Marine Protected Area Regulations* Potential for Spatial Component ● *Act Respecting Threatened or Vulnerable Species* ● *Canada National Marine Conservation Areas Act* ● *Natural Areas Protection Act* ● *Oceans Act* ● *Protected Natural Areas Act* ● *Provincial Parks Act* ● *Wilderness and Ecological Reserves Act*

Management Theme	Relevant Conservation Objectives	Examples of Applicable Regulatory Tools
Vulnerability of marine and colonial birds	 Biological diversity & productivity  Habitat protection  Species & habitats of interest	General (No Spatial Component) ● *Act Respecting the Conservation and Development of Wildlife* ● *Migratory Birds Convention Act, 1994* ● *Migratory Birds Regulations, 2022* ● *Wildlife Conservation Act* With Spatial Component ● *Basin Head Marine Protected Area Regulations* ● *Basin Head Marine Protected Area: 2014 Operational Management Plan* Potential for Spatial Component ● *Act Respecting Threatened or Vulnerable Species* ● *Canada National Marine Conservation Areas Act* ● *Natural Areas Protection Act* ● *Protected Natural Areas Act* ● *Provincial Parks Act* ● *Wilderness and Ecological Reserves Act* ● *Wildlife Act*
Vulnerability of marine and coastal environments with high levels of nutrients and sediment	 Biological diversity & productivity	General (No Spatial Component) ● *Environment Quality Act* ● *Environmental Protection Act* ● *Fisheries Act* ● *Water Act* ● *Wildlife Conservation Act*

Management Theme	Relevant Conservation Objectives	Examples of Applicable Regulatory Tools
Vulnerability of marine and coastal environments with high levels of nutrients and sediment	 Biological diversity & productivity  Habitat protection	With Spatial Component ● *Basin Head Marine Protected Area Regulations* ● *Basin Head Marine Protected Area: 2014 Operational Management Plan* Potential for Spatial Component ● *Canada National Marine Conservation Areas Act* ● *Canada Wildlife Act* ● *Oceans Act* ● *Protected Natural Areas Act* ● *Species at Risk Act*
Vulnerability of species at risk	 Biological diversity & productivity  Species at risk	General (No Spatial Component) ● *Act Respecting the Conservation and Development of Wildlife* ● *List of Plant and Wildlife Species likely to be Designated as Threatened or Vulnerable* ● *List of Wildlife Species at Risk (referral back to COSEWIC) Order* ● *Regulation Respecting Threatened or Vulnerable Wildlife Species and their Habitats* With Spatial Component ● *Banc-des-Américains Marine Protected Area Regulations* ● *Critical Habitat of the Copper Redhorse (Moxostoma hubbsi) Order* ● *Critical Habitat of the Northern Wolffish (Anarhichas denticulatus) Order* ● *Critical Habitat of the Spotted Wolffish (Anarhichas minor)*

Management Theme	Relevant Conservation Objectives	Examples of Applicable Regulatory Tools
Vulnerability of species at risk	 Biological diversity & productivity  Species at risk	With Spatial Component ● *Critical Habitat of the Striped Bass (Morone saxatilis)* Potential for Spatial Component ● *Act Respecting Threatened or Vulnerable Species* ● *Canada Wildlife Act* ● *Natural Areas Protection Act* ● *Oceans Act* ● *Protected Natural Areas Act* ● *Species at Risk Act* ● *Wilderness and Ecological Reserves Act*

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