

Charting Future Ocean Law And Policy Directions; Examining Canada's Tools For Marine
Protection Through Two Pacific Coast Case Studies

By

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Abstract

Much of Canada's identity has been shaped by the important socio-cultural, economic, and recreational opportunities offered by its three oceans. However, continual growth in these areas are increasing pressure placed on ocean spaces through environmental degradation, and climate change which may threaten future sustainable growth, and the biodiversity and ecological integrity of marine ecosystems. The government of Canada has stated the goal of conserving 25% of its ocean estate by 2025, and 30% by 2030. Using two case studies from Canada's Pacific Ocean, Robson Bight (Michael Bigg) Ecological Reserve (RBMBER) and Swiftsure Bank, this paper reviews Canada's area-based protection laws and policies. The paper begins with an introduction to the case studies, and the limited protection tools in place at each. This is followed by an analysis of existing area-based protection policies, and possible future application of some within the areas of RBMBER and Swiftsure Bank. Lastly, this paper outlines future ocean policy and law directions which would indirectly benefit both case studies, and directly benefit Canada in meeting its goals to conserve ocean resources beyond 2030.

Key Words: marine conservation policy, marine protected area, Aichi Target 11, conservation planning, marine governance

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Abbreviations

B.C.	British Columbia
CBD	Convention on Biological Diversity
CESD	Commission of the Environment and Sustainable Development
CWS	Canada Wildlife Service
DFO	Fisheries and Oceans Canada
EBM	Ecosystem-Based Management
ECCC	Environment and Climate Change Canada
ESA	Ecologically Significant Area
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for the Conservation of Nature
IUCN-WCPA	International Union for the Conservation of Nature - World Commission on Protected Areas
MMR	Marine Mammal Regulations
MPA	Marine Protected Area
MBS	Migratory Bird Sanctuary
NMCA	National Marine Conservation Area
nMPA	Marine Protected Area Network
NRKW	Northern Resident Killer Whale
NWA	National Wildlife Area
OECM	Other Effective Area-Based Conservation Measure
RBMBER	Robson Bight (Michael Bigg) Ecological Reserve
RKW	Resident Killer Whale
SARA	<i>Species at Risk Act</i>
SRKW	Southern Resident Killer Whale

Chapter 1: Introduction

1.1 My Story

"PFUSSHHFFFF!" I sit up, head almost hitting the top of the tent as I am awakened by the sound of a humpback whale cruising the shore close to camp. It is the early morning, but I am awake now. Unzipping my tent to catch a glimpse of the solo traveler, I whisper "hello" to the nesting pair of bald eagles perched, awaiting the sunrise. The morning's soft light of the rising sun is starting to illuminate the mountains on Vancouver Island, across Johnstone Strait from where I lay. This would be my second of three summers involved with both federal government and non-profit initiatives studying cetaceans on the west coast of Canada. Uprooted from Ontario and transported into the world of whales, the conservation effort to keep them from extirpation, and where my intrigue in species-at-risk and governmental laws and policies began.

Those three summers were spent around whales and protected areas. On the water and from land, I spent months watching whales come and go. I also observed how policy and law decisions can both hinder and help conservation efforts.

I have been surrounded by Killer and Humpback Whales in both areas, feeling incredibly small as we floated along, observing in awe. I have watched Killer Whales hunt, seemingly effortlessly for both salmon and seals. I observed flocks of sea birds that would take months to count, stood still, opened my tent to numerous passing bears and wolves, and watched rivers stocked with migrating salmon. For someone from southern Ontario, the abundance of wildlife has always felt like a dream. Yet what I observe does not match stories I have read or those told by people who have lived in these areas their entire lives.

A local resident of the Broughton Archipelago recalling his childhood, and what life before him would have been like stated, "It's pretty sad, when you think about it, what this country used to be like. I've seen a fair bit of it, but before I was born even..., it must have been pretty phenomenal around here for fish. Canneries booming away in Knight Inlet, Kingcome, Alert Bay, Bones Bay. Kingcome used to have a run of a couple million pinks and 20,000

chinook... now it's got nothing, 68 fish..." (Morton & Proctor, 1998, p. 197). He continued describing the decline of salmon, something I knew but couldn't see.

In response to the low numbers of returning salmon, fisheries closed in many areas...Traditional fishing grounds were barren and who is to blame? Loggers were damming streams preventing salmon from going upstream, and clear-cut logging was killing eggs on the spawning beds. Salmon eggs incubating in gravel need a constant flow of water to survive, and when a hillside is clear cut, the soil washes downhill with each rainfall, clogging the little spaces between the pebbles and smothering the eggs. Clear cutting also warms river water, which is deadly to the cool-water loving salmon. Pesticides were flowing into creeks, poisoning juvenile fish. Relentless increasing fishing pressure meaning fewer and fewer salmon were returning to these damaged rivers decreasing survival (Morton & Proctor, 1998, p. 118).

Scientists have noted changes in animal behaviour, shifts in distribution, and animal presence in areas where they were counted on (Kleisner et al., 2017; Pinsky et al., 2020). A Living Blue Planet Report published by the World Wildlife Fund estimates that between 1970 and 2012, marine wildlife populations declined by 49%, with many species having declined further since (Duarte et al., 2020).

This paper looks at the various area-based protection measures Canada has at its disposal to combat the trend of declining marine biodiversity. The two case studies described below are from my experiences at Robson Bight (Michael Bigg) Ecological Reserve (RBMBER) in Johnstone Strait, and Swiftsure Bank, located at the western entrance to the Juan de Fuca Strait (Figure 1).

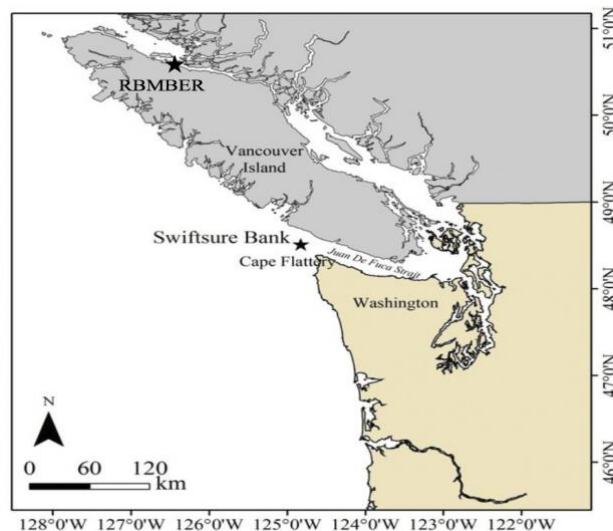


Figure 1: Map of southern British Columbia showing the locations of the RBMBER and Swiftsure Bank

These sites are used to highlight Canada’s suite of ocean protection tools, and possible future directions and applications of these laws and policies. Case Study One was conducted in RBMBER, located on north eastern Vancouver Island. My days there were spent on West Cracroft Island directly across from the reserve (Figure 2). An observation platform at an elevation of 50 meters allowed us to collect data on daily vessel traffic and Northern Resident Killer Whales that frequent the reserve. Case Study Two involved the area of Swiftsure Bank, which is located off the west coast of Vancouver Island. To study this area, I lived at Carmanah Point Light Station and from atop the lighthouse, I tracked vessel and cetacean movement through the area of Swiftsure Bank.

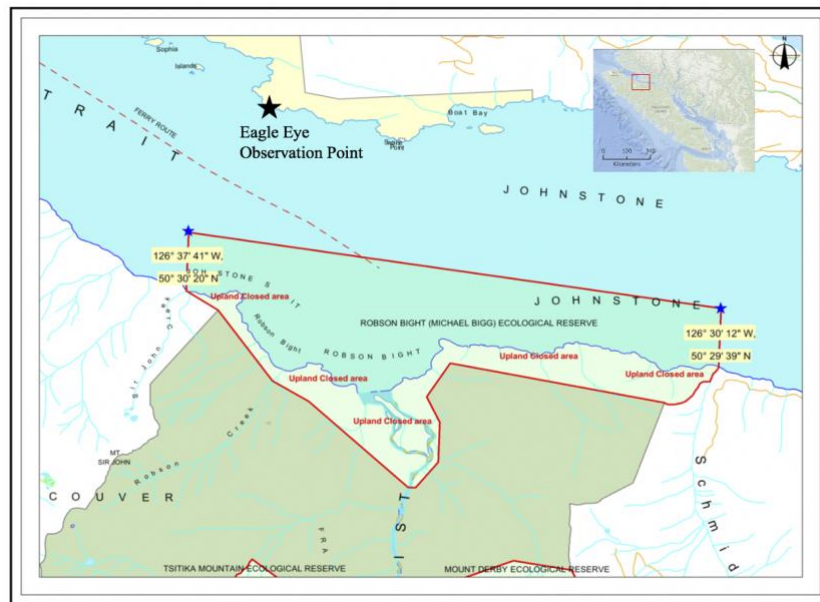


Figure 2: Map of RBMBER boundaries and location of the Eagle Eye observation point. (Credit: Cetus Research and Conservation Society)

By using these case studies I aim to chart future directions for Canadian ocean protection and give the reader a glimpse into how enchanting, powerful and fragile these ocean ecosystems are.

1.2 Canada’s Ocean Laws and Policies in A Global Context

Healthy marine and coastal environments are crucial for maintaining life on earth. Without the oxygen production, climate regulation and other essential services, life would not exist. In Canada, marine ecosystems provide habitat for species, provide food for humans,

contribute to socio-economic health (Hutchings et al., 2020) and have long been a source of cultural and traditional significance to Indigenous Peoples.

Despite their necessity, ocean ecosystems are continuously being modified by anthropogenic stressors, including, climate change, habitat and biodiversity loss, pollution, coastal degradation, and changes in trophic structure (Morton & Proctor, 1998; Schram et al., 2019). Estimates have suggested that over 60% of global "fishery stocks have already collapsed or are overexploited, and an additional one-third are fully exploited" (Allendorf et al., 2014).

Impacts from anthropogenic climate change affect the functioning and composition of marine ecosystems in every ocean across the globe. Warming ocean waters are causing marine heatwaves, ocean acidification, deoxygenation and salinity changes. Warming waters are also impacting species' spatial distributions, changes to trophic level composition, and altering species phenology (Cheung et al., 2009; Poloczanska et al., 2016). Impacts caused by climate change are real challenges and influence how decision-makers view, conserve and protect a changing seascape through protected areas and other conservation measures (Balbar et al., 2020).

In 2012, an Expert Panel established by the Royal Society of Canada (Royal Society of Canada Expert Panel, 2012) reported its findings on Canada's ability to protect and conserve marine biodiversity when faced with impacts from aquaculture, fisheries, and climate change. The panel concluded that Canada faces significant hurdles in dealing with the mounting pressures from human related activities (Hutchings et al., 2019). Less than one in three major fish stocks (29.4%) are considered 'healthy' (Oceana Canada, 2019). Indigenous knowledge and the development of co-governance mechanisms have yet to be fully developed and recognized. Further, reports from the Intergovernmental Panel on Climate Change (IPCC) continue to urge "prioritizing timely, ambitious, and coordinated action to address unprecedented and enduring changes in the ocean" (IPCC, 2019).

Increasing pressures on ocean ecosystems, have highlighted the need for effective conservation and protection of marine species and ecosystems (Agardy et al., 2003; Smith & Metaxas, 2018; Worm et al., 2006). Of the many approaches and tools that have been utilized to protect and conserve marine environments, area-based marine protected areas (MPAs) and

networks of marine protected areas (nMPA) are becoming globally recognized as an effective marine management tool (Lester et al., 2009; Schram et al., 2019). MPAs are being used throughout the world in efforts to combat species and habitat loss, ensure the sustainable use of marine resources, and protect marine environments (Agardy et al., 2003; Klein et al., 2015). Often used to achieve multiple objectives, including socio-economic priorities (Watson et al., 2014), the most common primary objective is the conservation of marine biodiversity to combat exploitation and other human related activities and threats (Edgar et al., 2014). From preventing further population decline of the Northern Bottlenose Whale (*Hyperoodon amphillatus*) off Nova Scotia, to coral reef protection in Australia and South East Asia, MPAs are present in almost every country in the world (Deguignet et al., 2017; Giffin et al., 2020; O'Brien & Whitehead, 2013; Speed et al., 2018). Effectively managed MPAs are a proven tool for marine and coastal conservation (Edgar et al., 2014).

The definition of MPAs is constantly evolving and includes a range of governance regimes and management approaches, including Indigenous protected areas, marine sanctuaries or parks, protected watersheds, and fisheries closures, among many other measures, all of which can be defined by their governance approach, level of protection and primary conservation objectives (Dudley et al., 2017). There is a diverse range MPAs, which are typically referred to using varying designations (e.g. National Park or National Conservation Area). Areas sharing the same designations within countries or administrative divisions will have similar management regulations and conservation objectives. Protected area designations often vary considerably across countries and regions, and can be grouped into three distinct, generic groups: national designations (those created by a country), regional designations (created by regional processes), and international designations (created pursuant to international conventions) such as World Heritage Sites (Deguignet et al., 2017). The leading international authority on protected areas, the International Union for the Conservation of Nature - World Commission on Protected Areas (IUCN-WCPA) defines protected areas as “...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, 2015).

Up until the early 2000s, MPA designations across the globe was low, with less than 0.1% of the ocean protected for most of the 20th century (Sala et al., 2018). Since then, the percentage of ocean protected area designation has increased to 7.7% (Marine Conservation Institute, 2021; Marine Protection Atlas, 2022.; Sala et al., 2018). The uptick in MPA designations may be attributed to ambitious goals set out by the Convention on Biological Diversity (CBD) to achieve a global MPA target. In 2010, Canada along with other international parties to the CBD, agreed on the CBD Strategic Plan for Biodiversity (2011-2020), a framework of goals and targets known as the Aichi Targets (CBD, 2010). Specifically, Aichi Target 11 set a target to achieve “17% of terrestrial and inland water areas and 10% of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascape”, by 2020 (CBD, 2010).

Pressures on marine ecosystems are increasing (Agardy et al., 2003), often creating cumulative pressures which conventional sectoral approaches to ocean management cannot address. MPAs are not a panacea, and should be viewed as only part of the solution to restoring ocean health. MPAs are typically designated to support a single societal value (i.e. conservation) or sector (i.e. fisheries). Further, MPAs themselves are incapable of addressing the entire breadth of existing and emerging threats to ocean ecosystems. Most notably, threats deriving from land and those associated with global climate change, nor can they address all management and socio-economic management objectives (Halpern et al., 2015). This has led to more ‘holistic’ and integrated strategies for ocean management, where the growing range of ocean uses and human activities are addressed through ecosystem-based management (EBM) approaches.

While there is little consensus on the definition of EBM (Alexander et al., 2018; Curtin & Pallezo, 2010), there are aspects and concepts that are generally agreed upon: an integrated management approach which includes both the ecology of species, and the human context of an area (social, cultural, economic), defined goals and objectives including sustaining ecosystem health, and ensuring resilience to disturbances. The concept of EBM is now widely considered

the most promising management approach for balancing sustainable human development and biodiversity protection. Various international strategies and conventions have promoted the EBM approach and the inclusion of ecosystem services in decision-making (Langhans et al., 2019; Ruckelshaus et al., 2008; Sander, 2018), which are now slowly being incorporated into Canada's various ocean laws and policies.

1.3 The Management Problem

Canada's identity and history has been shaped by the socio-cultural, economic, and recreational opportunities its three oceans offer, however, continual growth in these areas are increasing pressures through environmental degradation, and ecosystem change and may threaten future biodiversity and ecological integrity of ocean ecosystems. To combat the rising decline of biodiversity loss, and pressure of human activities on ocean ecosystems, the government of Canada has stated the goal of conserving 25% of its ocean estate by 2025, and 30% by 2030. Canada does have the area-based protection measures necessary to protect and conserve its oceans for the long-term, but will need to implement the entire suite of protection tools and consider all legal options to do so.

This paper contains of three main components. The first is an introduction to the two case studies in Canadian Pacific waters (RBMBER and Swiftsure Bank), and the limited protection tools in place at each site. The second component analyses the suite of existing Canadian area-based protection tools that are available to increase protections at each case study location and help Canada obtain its marine conservation target commitments. The third component charts future ocean policy and law directions which would indirectly benefit the areas identified in both case studies, and directly benefit Canada in meeting its goals to conserve ocean resources beyond 2030.

1.4 Canada's Ocean Protection Commitments

The use of MPAs as an effective tool for ocean conservation has been well established (Edgar et al., 2014; Sala et al., 2018), with the majority of ocean states committing to marine

conservation initiatives. The Federal Government of Canada, through the Department of Fisheries and Oceans (DFO), recognizes marine and ocean areas as being ‘an integral part of Canada’s identity as a nation’ (Bailey et al., 2016; Schram et al., 2019). Canada’s commitment to marine biodiversity protection is reflected through various national targets and international agreements.

Canada’s international commitments include;

- a) the United Nations 1992 *Convention on Biological Diversity* (CBD), specifically Article 8a which states “Each Contracting Party shall, as far as possible and as appropriate, establish a system of protected areas or areas where special measures need to be taken to conserve biological diversity.” (CBD, 1992, p. 6);
- b) The CBD and the CBD’s 2004 Program of Work on Protected Areas, which committed to establishing MPA networks which consisted of an ecosystem approach by 2012, and most recently;
- c) The 2010 Conference of the Parties to the CBD commitment of a global target of protecting “at least... 10% of coastal and marine areas” by 2020 as stated in the Aichi Targets (CBD, 2013).

The commitment to achieve the Aichi targets can be viewed as a priority through their mention in mandate letters from the Prime Minister of Canada to the Ministers of Fisheries and Oceans, and the Canadian Coast Guard, and Environment and Climate Change Canada (Office of the Prime Minister, 2019). Canada surpassed its 10% goal by conserving 13.81% by 2019 (Government of Canada, 2019d) and in 2021 announced new a new target of conserving 25% of Canada’s oceans by 2025 with the goal to preserve 30% by 3030 (Fisheries and Oceans Canada, 2021).

1.5 Introduction to Federal Ocean Law in Canada

Canada released its first Oceans Strategy in 1987 in an attempt to unify Canadian ocean policy (Environment Canada, 1987). It took another 10 years before Canada’s *Oceans Act* eventually came into force in 1997 (Oceans Act, 1996). At the time, the Act was considered

"...the most significant and hopeful development in Canadian coastal and ocean management..." (Ricketts & Harrison, 2007). The Act was a model for other nations to follow and provided a framework for integrated ocean management, ecosystem-based management, and the implementation of marine protected areas (Haward et al., 2003; Ricketts & Harrison, 2007). In order to implement the *Oceans Act*, the Canadian government took two main actions. First was the development of Canada's Ocean Strategy, released in 2002, followed by Canada's Ocean Action Plan, released in 2005. Secondly, the government created a separate Oceans Branch of Fisheries and Oceans Canada (DFO) to be the lead agency to facilitate the implementation of the Oceans Strategy (Jessen, 2011). Commitments of the Ocean Strategy include DFO working collaboratively with other agencies and government levels, sharing responsibility for common objectives, and engaging Canadians in ocean-related decisions. All commitments are guided by three principles: sustainable development, integrated management, and the precautionary approach (Hewson et al., 2020).

Progress towards protecting marine areas in Canada's jurisdiction has been slow compared to progress protecting terrestrial areas. The *Oceans Act* assigns the Minister of DFO the responsibility to "lead and coordinate development and implementation of a national system (network) of marine protected areas" (MPAs) (*Oceans Act*, 2019a). However, since being enacted, progress in developing marine protected areas has been slow. By 2015, only 0.9% of Canada's ocean was protected within area-based measures, significantly less than 10.6% of Canada's protected terrestrial area (Environment and Climate Change Canada, 2016). The majority of protected ocean area is part of coastal parks. This separation follows international patterns, with many countries protecting terrestrial areas at a much greater rate than marine areas (Hewson et al., 2020). In 2015 a new Liberal government was elected to replace a Conservative government in Parliament, and with it a greater emphasis on environmental protection. A new mandate letter was issued to the Minister of Fisheries and Oceans Canada and included a promise to protect 5% of Canada's ocean by 2017 and 10% by 2020 (*Minister of Fisheries, Oceans and the Canadian Coast Guard Mandate Letter*, 2015). This promise was met and exceeded, with the government of Canada protecting 13.81% of the

ocean by August 2019. In doing so, a new target was set in October 2019 to protect 25% by 2025 with the goal of "working towards 30% by 2030" (Government of Canada, 2019e).

1.6 Structure of Ocean Management in Canada

Within Canada's three oceans, Pacific, Atlantic, and Arctic, the Federal government has broad jurisdiction regarding administering most of Canada's protected areas. Three organizations within Canada's federal government are primarily responsible for the implementation of marine protected areas (MPAs): Parks Canada, Environment and Climate Change Canada (ECCC), including the Canadian Wildlife Service (CWS), and Fisheries and Oceans Canada (DFO) (Environment and Climate Change Canada, 2016). The development of MPAs between the three organizations is linked through a Federal MPA strategy, coordinated by DFO (Canada, 2005).

Outside of the three primary organizations, various other federal departments are involved and influence MPA development. For instance, Transport Canada regulates shipping and its impacts on ocean environments. Natural Resources Canada is responsible for ensuring the sustainable development of Canada's natural resources, including the regulation of offshore oil and gas development. The Canadian Energy Regulator, formerly known as the National Energy Board, plays a role by assessing the impacts of energy developments on species at risk and fish and fish habitat. Crown-Indigenous Relations & Northern Affairs Canada is also responsible for the relationship between Canada and Indigenous governments (Hewson et al., 2020).

While having broad jurisdiction within Canada's oceans, the Federal government also coordinates with other levels of government to manage various other marine resources, such as aquaculture.

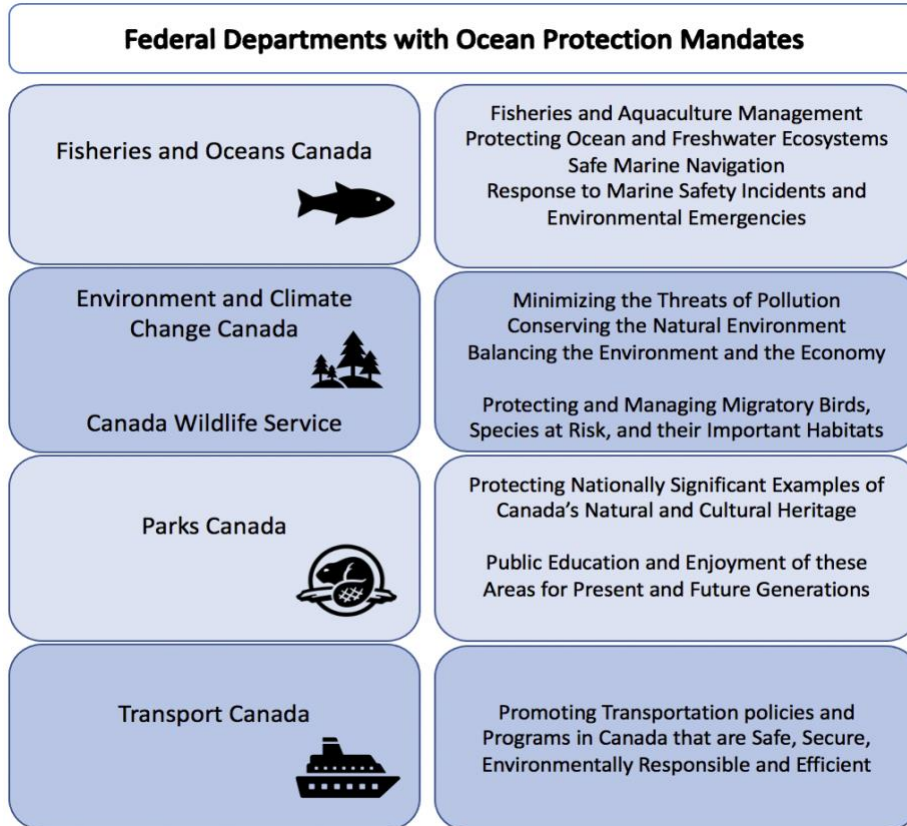


Figure 3: Canadian Federal departments with mandates for ocean protection.

Chapter 2: Getting to Know The Two Case Studies; Robson Bight (Michael Bigg) Ecological Reserve and Swiftsure Bank

Two case studies were chosen to highlight areas that have been identified as sites requiring long-term protection. This chapter offers a glimpse into the ecosystems of both RBMBER and Swiftsure Bank, and introduces the current protections in place.

The RBMBER is located on the north eastern coast of Vancouver Island. The reserve comprises of an upland area which is provincially protected by BC Parks, which has no legal authority to protect the marine component. Instead, the marine component, under Federal jurisdiction, relies on a voluntary no-entry request to protect the estuary and culturally important Killer Whale rubbing beaches. RBMBER has a long history of protection by BC Parks with inconsistent protection in the way of Federal fishery closures for its marine component.

The second case study is in the area of Swiftsure Bank, located at the western entrance to Juan de Fuca Strait. The location is part of the Southern Resident Killer Whale (SRKW)'s legally protected critical habitat and is an area of high intensity occurrence for the population. A number of interim protections have been established in the area, including voluntary vessel slow-down areas, and a prohibited entry interim sanctuary zone established through both Transport Canada and Fisheries and Oceans Canada.

2.1 Case Study 1: Robson Bight (Michael Bigg) Ecological Reserve, British Columbia, Canada; A small reserve with a history of quasi-protections.

Nestled in the rich evergreen forest of northern Vancouver Island, where the Tsitika River flows into the water of Johnstone Strait sits Robson Bight (Figure 4). The Bight is part of a protected area known as Robson Bight Michael Bigg Ecological Reserve (RBMBER) and known for its once abundant salmon runs and where a unique behaviour of beach rubbing occurs inside and outside the reserve boundaries by a population of killer whales (Duffus & Dearden, 1992). Located on northern Vancouver Island, approximately 11km southeast from Telegraph Cove and 30km from Alert Bay, the RBMBER is a place of immense beauty and rich biodiversity, with a vast array of marine wildlife, including Humpback Whales, Pacific-White-Sided Dolphins, Dall's Porpoise, stellar sea lions, and Resident Killer Whales. Named after

Michael Bigg, the pioneer of modern Killer Whale research, the RBMBER was established by B.C. Parks in 1982 to protect vital marine mammal habitat, and specifically, to create a sanctuary for Northern Resident Killer Whales (NRKW) (BC Parks, 1992).

B.C Parks selected the ecological reserve at Robson Bight for two primary reasons. The first was “to preserve representative and special natural ecosystems, plant and animal species, features, and phenomena” (BC Parks, 2003). The second, to prevent disturbances to whales, and provide a sanctuary for killer whales that rely on the area to forage and feed on salmon, their primary prey, mate, socialize, and engage in complex social activities, including beach rubbing. This activity has been documented since the 1970s (Ford et al., 2000). The function of beach rubbing behaviour is unknown, it may have assist in parasite removal, or play an essential part in the social culture of the NRKW population (Rendell & Whitehead, 2001; Riesch et al., 2012).

Covering more than 1,700 hectares, RBMBER comprises both terrestrial and marine components. The terrestrial component prevents human activities from approaching the rubbing beaches and disturbing whales by prohibiting access to the beaches. In contrast, the marine component asks boaters to voluntarily abide by the reserve boundaries and avoid travelling through the reserve. The Department of Fisheries and Oceans (DFO) has jurisdiction over marine affairs and resources in Canada. As such, DFO has established various fishery closures, pursuant under the *Fisheries Act*, including the current closure to commercial Fraser River Chinook Salmon fishery (Fishery Notice, 2022); however, DFO has previously permitted commercial fishing activities within the boundaries of RBMBER. The result is a management framework where B.C. Parks can prohibit access to the rubbing beaches and the reserve’s terrestrial component (beaches and seabed). However, the reserve must rely on requests for voluntary compliance of the no-entry marine component. Voluntary compliance of vessels to not enter the reserve boundaries are made by the BC Parks Marine Warden Program. Since 2005, the program has been contracted out to Cetus Research and Conservation Society (Cetus) to continue the program and protect the reserve; however, the boundaries of the reserve remain “highly permeable” (Duffus & Dearden, 1992; Trites et al., 2007). Cetus warden vessels patrol the reserve boundaries and offer educational opportunities to recreational boaters about

the reserve and marine life in the area. From a cliff overlooking the reserve, across Johnstone Strait, Cetus researchers and volunteers monitor and record vessel activity and Killer Whale presence.

Johnstone Strait falls within the bounds of the NRKW population's critical habitat, identified in the Recovery Strategy for the Northern and Southern Resident Killer Whales (*Orcinus orca*) in Canada (Fisheries and Oceans Canada, 2018) and is legally protected from destruction under the *Species at Risk Act* (SARA).

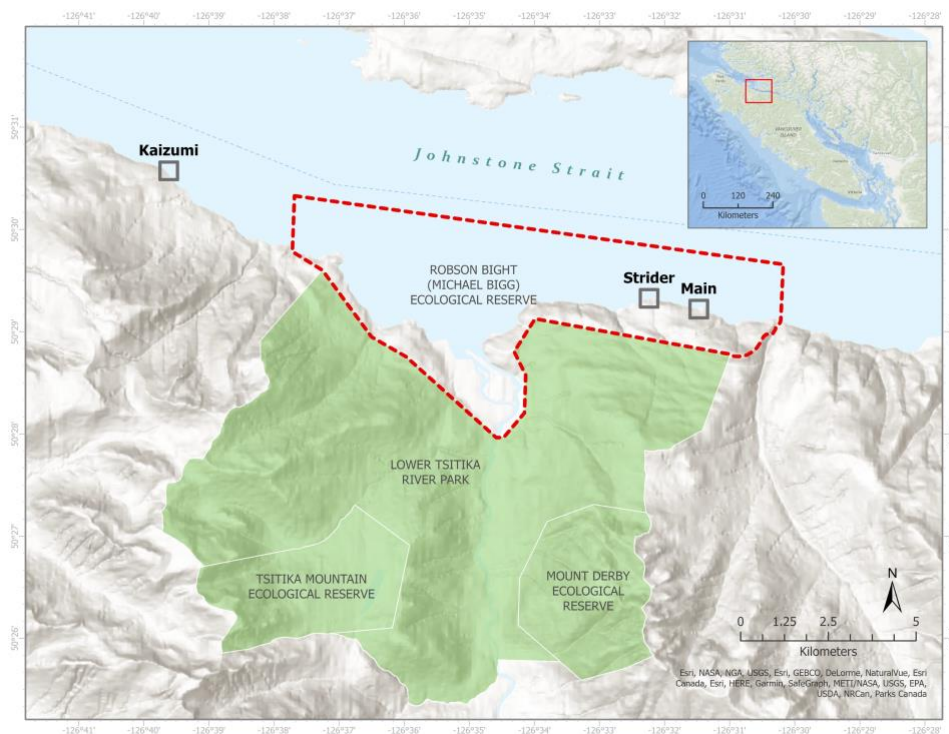


Figure 4: Map of Robson Bight (Michael Bigg) Ecological Reserve. (Credit: Leah Fulton)

When looking at the RBMBER as an example of a protected area in Canada, there are concepts that should be acknowledged and addressed moving forward if further protections are given to the reserve, or to learn from RBMBER and applied to other protected areas. Those being jurisdictional complexity, and potential for changing abiotic conditions to thwart protections.

Consequences of protection measures in areas of jurisdictional complexity and overlap, as overlapping jurisdictions at RBMBER result in a mismatch of protections. The terrestrial component of RBMBER is meant to prevent people from approaching the rubbing beaches and

disturbing whales by prohibiting activities and people from the beaches. In contrast, the marine component is a voluntary no-entry, and relies on vessel operators to abide by the reserve boundaries and avoid travelling through the reserve.

Vessel traffic through the reserve still occurs, and has been found to disrupt Killer Whale behaviour (Houghton et al., 2015). While the RBMBER has been under recent Federal fishery closures, commercial fishing has historically been permitted within the reserve boundaries. During a four-year study period, Trites et al. (2007) monitored the summer movements of killer whales and vessels within RBMBER. They found that most vessels moving through the reserve were commercial fishery vessels (76-87%), while recreational and sailing vessels attributed 9-17% of all vessel activity. However, vessel activity within the reserve can disrupt rubbing behaviour, resting, and feeding behaviour without adequate marine protections and has previously injured whales.

Vessel traffic disturbance is an ongoing topic of research and management, as it is one of the most tractable factors that can be addressed in the short term (Williams et al., 2015). Marine vessels can disrupt natural behaviours from close approaches to whales and disrupt the underwater acoustic environment, affecting the short-term behaviour and disrupting the ability of killer whales to forage and feed (Houghton et al., 2015; Hoyt, 2012; Williams et al., 2014). Williams et al. (2015) also found that silent vessels, such as kayaks, can elicit similar avoidance behaviours in Southern and Northern Resident Killer Whales as shown to vessels that produce an acoustic signature. These findings echo results from previous studies in Bottlenose Dolphins, which showed that vessel behaviour, not vessel type, was the primary factor influencing avoidance behaviour responses (Lusseau, 2006; Pirotta et al., 2015). Regardless of the vessel type, any disruption of whale activity can have detrimental consequences to whales' social and energetic intake.

RBMBER can be considered quasi-protected with its provincially protected terrestrial component, and a voluntary no-entry marine component. The overlap that exists between provincial and federal jurisdiction may be limiting the reserves ability to meet its conservation objectives to provide a sanctuary for NRKWs.

Beyond jurisdictional overlap, the reality of changing abiotic conditions may result in diminishing protections, or an inability to achieve or maintain the conservation objectives of a given protected areas. At RBMBER, there is an ongoing concern, beginning with the establishment of the RBMBER, surrounding forestry practices at Schmidt Creek (**Error! Reference source not found.**) and the potential for increased sediment supply to affect the composition of rubbing beaches and the behaviour of NRKWs (Harper, 1995). Northern Resident Killer Whales rub on two beaches inside the Robson Bight Michael Bigg Ecological Reserve and one situated outside the reserve boundaries. Rubbing occurs on Main and Strider Beach, located inside the reserve boundaries, and Kaizumi, located 7.5 km northwest of the Tsitika River. While rubbing behaviour occurs in other locations, rubbing behaviour is most frequent in the area of RBMBER (Williams et al., 2009).

In response to concerns surrounding forestry practices and any detrimental side effects to rubbing beaches, research has been conducted to characterize sediment textures, sediment structure, and the profile of the Main rubbing beach and beaches at the mouth of Schmidt Creek (Millard, 2003). The Main rubbing beach was found to be comprised of sandy gravel similar to the beaches closer to Schmidt Creek and indicated that longshore sediment transport delivered sediment to Main rubbing beach from Schmidt Creek. While the sediment was similar, Main rubbing beach had a well-sorted appearance due to wave sorting processes (Millard, 2003).

More recently, concerns have been raised by Killer Whale biologists regarding sediment composition and texture at Main rubbing beach. Additionally, local NGOs, citizens, and Killer Whale biologists have observed and noted NRKWs switching rubbing behaviour to predominately use Strider and Kaizumi rubbing beaches. Rubbing at Strider has been noted before, yet this behaviour has been more focused at Strider and Kaizumi in recent years than Main. While Strider rubbing beach is within the RBMBER boundaries and its foreshore protected, Kaizumi is not.

In 2017, BC Parks requested a resurvey of the beaches to determine any changes occurring and to what extent. Beach characteristics were found to be similar to moderately well-sorted pebbles. However, extensive erosion had occurred on Main rubbing beach since

2000, when the last survey was conducted. The pebble layer at Main, which whales use to rub, was nearly non-existent, reduced in spatial extent and thickness. In a similar survey, Harper (1995) concluded that an increase in sediment supply may not change beach sediment composition, as beaches are created through complex processes, not solely limited to sediment transport and wave action. As the rubbing behaviour of NRKW's seems to be shifting to areas outside the RBMBER. Kaizumi rubbing beach is a well-known and highly frequented campsite for sea kayakers. There is concern surrounding human activities at Kaizumi disrupting rubbing behaviour and, more broadly, the ability for NRKW's to participate in culturally significant behaviour in the area of the RBMBER.

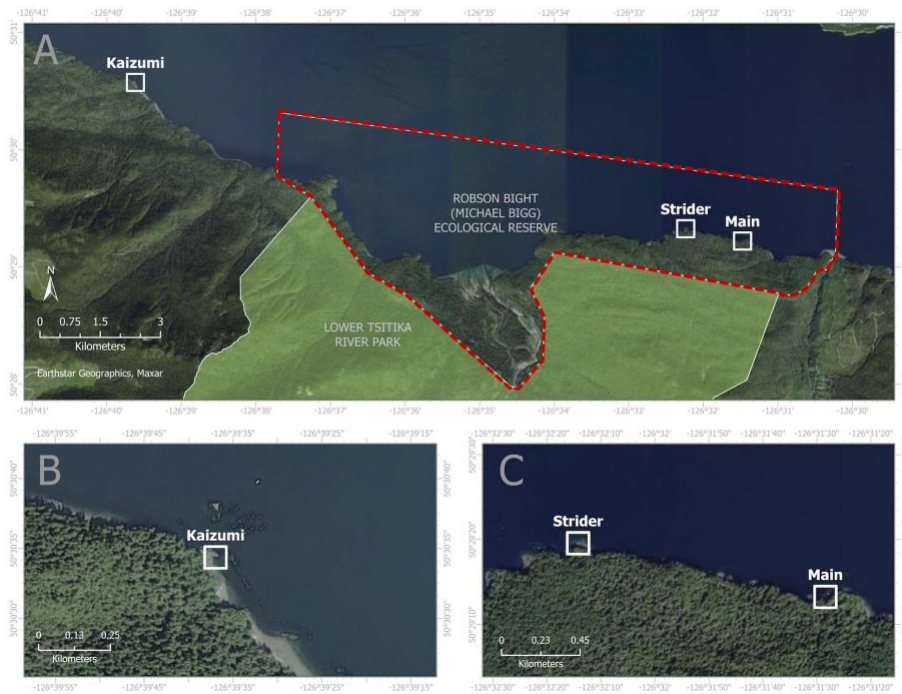


Figure 5: Map of Rubbing Beaches in the area of RBMBER. (Map Credit: Leah Fulton)

In the area of RBMBER, apart from the educational opportunities offered by the Cetus Warden vessels, there is little monitoring and enforcement. The terrestrial portion of the RBMBER is under the B.C. *Ecological Reserves Act*, whereas DFO has jurisdiction over the marine portion and can restrict commercial fishing activities through Fishery Closures under the *Fisheries Act*. The habitat for which killer whales rely on the area of Johnstone Strait and RBMBER, designated as ‘critical habitat,’ falls under the *Species-at-Risk Act*. The *Fisheries Act* designates powers to Fisheries officers to distribute citations for any offence under the Act,

while Both the *Ecological Reserves Act* and SARA allow for charges to be laid under the Acts but rely on summary convictions in the courts. This timely process relies on documented evidence which is hard to obtain when monitoring of protected areas is limited.

2.2 Case Study 2: Swiftsure Bank, British Columbia Canada; An area of recent rolling protection measures.

Located 15 nautical miles offshore on the southwest coast of Vancouver Island, just outside the western entrance to the Juan de Fuca Strait, lies Swiftsure Bank. The area is characterized by a submarine bank rising 100 meters above the ocean floor, positioned in the outflow of Juan de Fuca Strait, creating nutrient-rich waters and attracting krill, herring, pilchard, and other smaller fish. Larger fish and wildlife congregate to these waters, including Halibut, Red Snapper, migrating pacific salmon from both British Columbia and the United States, as well as porpoises, sea lions, seabirds, Humpback Whales, and Killer Whales. The abundance of wildlife attracts commercial and recreational fishers and whale and wildlife viewing vessels from both Canada and the United States.

Swiftsure Bank overlaps shipping lanes in both Canadian and United States waters. Both countries have acknowledged the potential harm and disturbance to whales and marine life caused by underwater noise and recognized the need to take measures reduce noise generated by vessels. In 2014, the Vancouver Port Authority launched the Enhancing Cetacean Habitat and Observation Program (ECHO Program) in coordination with government agencies, Indigenous communities, marine transportation industries representatives, environmental groups, and scientists. The program's aim is to better understand and reduce the cumulative effects of shipping on whales in the coastal waters of southern British Columbia (ECHO Program, 2017). Studies have shown that reducing vessel speeds is an effective mechanism to reduce vessel noise both at the source, and in nearby habitats (Williams et al., 2021).

SRKWs are listed as endangered under both the *Species at Risk Act* in Canada, and the *Endangered Species Act* in the United States. In 2018, the Recovery Strategy was amended to identify additional areas of critical habitat for Southern and Northern Resident Killer Whale populations, including the area of Swiftsure Bank, which has been identified as an important

foraging area for SRKWs (Fisheries and Oceans, 2018). The presence of SRKW in the area aligns with migratory patterns of pacific salmon, namely Chinook Salmon (*Oncorhynchus tshawytscha*), returning to the Fraser River and rivers in Washington, United States, from May to August, and Coho Salmon (*Oncorhynchus kisutch*), returning in September. SRKWs are listed as endangered under Canada's *Species at Risk Act* and the *Endangered Species Act* in the United States. As of July 1, 2021, the population has declined to 74 individuals (Centre for Whale Research, 2021). Both countries have continually emphasized developing and implementing measures to address factors contributing to their decline, including underwater vessel noise. SRKWs primarily rely on salmon as their preferred prey. A lack of salmon abundance is a significant threat to SRKW recovery. To minimize some pressure on salmon stocks, DFO introduced salmon fishery closures in 2021 (Government of Canada, 2021). Between July and October 2021, both commercial and recreational fisheries were closed in Swiftsure Bank's area to help protect SWKW and salmon forage around Swiftsure Bank.

In 2019 through 2021 (at the time of writing only a survey for public opinion had been made public for 2022 measures), the Minister of Transport Canada, in coordination with the ministers of DFO and ECCC issued interim Orders to protect SRKW in British Columbia. Orders established interim sanctuary zones (Figure 6), under s. 10.1 of *The Canada Shipping Act*, and have relied on the Federal government's regulatory powers under ss. 35.1(1)(k) and 136(1)(f). Each year, the orders have established measures for five-month periods in the Georgia, Haro, and Juan de Fuca Straits, and waters off southwest Vancouver Island in areas of Swiftsure Bank (ECHO Program, 2017).

Additionally, in 2021, the ECHO program issued a voluntary slow down request from June 1, 2021 to November 30, 2021. During that period, large commercial vessels transiting outbound (outbound lane is in Canadian waters) through Swiftsure Bank were asked to voluntarily slow down to 14.5 knots for vehicle carriers, cruise ships, and container vessels, and 11 knots for bulkers, tankers and government vessels. For 2021, the program had an 81% participation rate, and reduced the underwater sound intensity by approximately 40% (Port of Vancouver, 2020).

Swiftsure Bank is a highly productive area with overlapping and sometimes competing interests for wildlife and anthropogenic activities, making it an intriguing case study for the future of Canadian ocean protection initiatives.

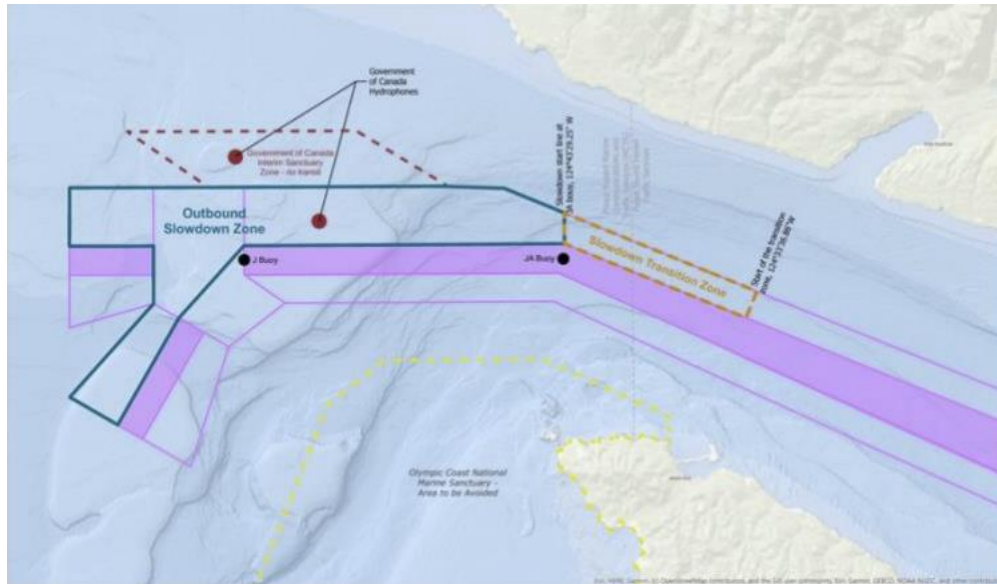


Figure 6: Map of 2020 Swiftsure Bank voluntary vessel slowdown trial area. ISZ outlined in dotted red, Inbound slowdown area highlighted in pink (Source: Vancouver Fraser Port Authority)

As mentioned previously, both case studies, the RBMBER and Swiftsure Bank offer examples of the need to incorporate and evaluate education and enforcement monitoring when establishing new protected areas. In the waters of southern Vancouver Island, data associated with vessel compliance towards SRKW regulations, voluntary compliance recommendations, and incidents between vessels and SRKWs are tracked by Straitwatch, a monitoring and educational program of Cetus. They also collect data on days where enforcement vessels are present in an area with SRKWs. Educational programs can be attributed to a decrease in vessels approaching SRKWs within 400 meters, however, there are still numerous incidents involving non-compliant vessels. Between 2018-2020, the highest non-compliance incidents occurred at a rate of 14.06 incidents per hour, with 2020 involving 12.56 incidents per hour. During monitoring when SRKWs were present with a Straitwatch vessel, DFO enforcement was present less than 1% of the time between 2018-2020. In comparison,

while in U.S. waters, a Washington Department of Fish and Wildlife vessel was present between 19-25% of the time, depending on the year (Cetus, 2020).

Even the best education programs are sometimes not enough to control and prevent human activities from affecting conservation efforts. There are times when citations and immediate enforcement powers are needed. There are, however, trade-offs in terms of protected areas and specifically protected areas, with the primary objective being the protection of cetacean species.

Chapter 3: Canada's Legal Tools for Ecosystem and Species Protection

This chapter introduces, and analyses various federal laws and policies that can be used for the protection of ecosystems, species, and marine and coastal environments. Some measures, as discussed above have been implemented in the areas of RBMBER and Swiftsure Bank, while others offer options for measures to increase the level of protections in both.

Oceans Act Marine Protected Areas

Oceans Act, SC 1996, Fisheries and Oceans Canada

Marine protected areas (MPAs) are legislative tools administered by DFO under the *Oceans Act*, which entered into force on January 1, 1997 (*Oceans Act*, 2019a). The Act details Canada's jurisdiction over marine and ocean areas, provides tools to spatially protect marine areas, and creates a framework for integrated ocean management through the collaboration between various levels of government and government agencies. When enacted in 1997, the *Oceans Act* became the first law in the world to manage a country's jurisdictional ocean space. It signaled Canada's intention to be a leader in ocean policy (Jessen, 2011).

An *Oceans Act* MPA can be established in any part of Canada's jurisdictional ocean: internal waters, territorial sea (12nm) or exclusive economic zone (EEZ) (200nm) (*Oceans Act*, 2019a), but does not allow for MPAs to be established in areas past the 200nm zone on extended continental shelves. The designation of an *Oceans Act* MPA can be to conserve or protect fish, marine mammals and their habitats, endangered or threatened species and their habitats, unique habitats, areas of high biodiversity or biological productivity, maintaining ecological integrity, and any other marine resource or habitat as deemed necessary to fulfil the mandate of the competent Minister (*Oceans Act*, 2019a, s.35(1)).

In 2019, Bill C-55 amended the *Oceans Act* by adding provisions that introduce the precautionary principle, strengthen enforcement, fines and punishment provisions, and allow for the creation of interim MPAs (Bill C-55, 2019). The establishment of interim MPAs pursuant to ministerial orders are valid for five years while freezing the footprint of existing activities in these areas while the processes of consultations and formal designations of an entire *Oceans Act* MPA take place (*Oceans Act*, 2019a s.35(1)). Since Bill C-55 was enacted, the interim MPA

order has been used just once to designate the Tuvaijuittuq interim MPA (Government of Canada, 2019).

There are five main steps in the process of designating an area as an Oceans Act MPA:

- Selecting an area of interest (AOI);
- Conducting an ecological and socio-economic assessment of the potential area;
- Using the available science, traditional, and local knowledge to propose MPA designs and regulations conducted through consultations with the affected and interested parties;
- Drafting regulations and publishing the designated MPA in the Canada Gazette Part II; and
- Finalizing an adaptive MPA management framework, including conservation objectives, management plan, monitoring plan, compliance, enforcement, public education and outreach (Government of Canada, 2019b)

Within each MPA, zones can designate areas where specific activities may be allowed. Activities can be prohibited for the management, conservation or protection of fishery resources. Any activity that does not fall onto the list of allowed activities or disturbs, damages, destroys, or removes protected ecosystem components is therefore prohibited (Oceans Act, 2019a s.35.1(2)).

There are currently 14 protected areas designated as *Oceans Act* marine protected areas (Government of Canada, 2019f).

Strengths

Canada's *Oceans Act* has four major strengths that stand out ; a faster time to establishment than other mechanisms, the creation of interim MPAs at the Minister's discretion, the power to create networks of MPAs and boundaries created by regulation rather than statute.

The establishment of *Oceans Act* MPAs in Canada takes an average of seven years to designate (Hewson et al., 2020; Schram et al., 2019). While this is a lengthy amount of time and discussed later, seven years is still faster than many other federal marine protection tools,

including National Marine Conservation Areas and National Marine Wildlife Areas. With the amendments to the Act in 2019, interim MPA orders offer immediate protection for up to five years (Government of Canada, 2018). These amendments also allow for the creation of emergency MPAs, which grant the competent Minister, with approval from cabinet, to designate emergency MPAs in cases where marine resources or habitat is likely to be at risk. Emergency orders are valid for 90 and renewable, with no legislated limit to the number of repeats or length of time their powers can be used (Government of Canada, 2018; Hewson et al., 2020).

Another strength of *Oceans Act* MPAs is the authority granted to the competent Minister to develop and implement a system or network of MPAs (*Oceans Act*, 2019 s.35(2)). There are currently several plans in progress across for a network of MPAs in multiple marine regions, including the Northern Shelf Bioregion in British Columbia (Watson et al., 2021). Implementing an nMPA can lead to more comprehensive and effective marine protection (Government of Canada, 2017; Meehan et al., 2020).

Additionally, the boundaries of an *Oceans Act* MPA are easier to be altered when compared to other marine area-based protection measures. *Oceans Act* MPA boundaries are designated by regulation rather than statute, which is both a strength and a potential weakness (*Oceans Act*, 2019b).

Weaknesses

Conversely, the *Oceans Act* has three main weaknesses; a lack of baseline protections, protection standards that only apply to newly established MPAs, and no requirement for the creation of management plans.

A significant weakness of *Oceans Act* MPAs is the lack of baseline protections for all established MPAs. Regulations under the Act have a standard prohibition on activities that damage, disturb, destroy, or remove any living marine organism or its habitat; however, no definitions are provided for any of the above. Further, each regulation lists exceptions and activities that are allowed to violate this prohibition, which may result in harmful industrial activities within the boundaries of many MPAs. For example the Bowie Seamount MPA

prohibits any person from disturbing, damaging or destroying, or removing from the area, any living marine organism or any part of its habitat or carrying out activities such as dumping in the area. However, exemptions include commercial and recreational fishing activities in accordance with the *Fisheries Act*, and vessel activity in accordance with the *Canada Shipping Act* (Bowie Seamount MPA Regulations, 2017).

The absence of a protection standard baseline can lengthen the consultation and development process with industry and stakeholders, prolonging protections (Hewson et al., 2020; M. S. Watson & Hewson, 2018).

In 2019, DFO introduced protection standards within all new MPAs that will prohibit oil and gas activities, mining, dumping, and bottom trawl fishing (when deemed to be incompatible with the objectives) (Government of Canada, 2019a; Hewson et al., 2020), but these standards only apply to new MPAs and exclude those which have already been designated. These new standards are only written in policy statements and have yet to be enshrined into law. DFO has indicated that *Oceans Act* MPA management plans will be on a rolling review based on when they come up for renewal. When MPA management plans are up for renewal, DFO will ask for voluntary relinquishment of oil and gas leases. In scenarios where this is not successful, the given MPA will not count towards Canada's marine protected area targets (Day et al., 2019).

Lastly, *Oceans Act* MPAs lacks a statutory requirement to develop a management plan, nor is there a timeline to develop a management plan for a designated MPA. The competent Minister typically develops a plan for each MPA, allowing for a more meaningful consultation process; however, the lack of requirement can prolong the process of fully protecting marine areas. For example, in 2008, the SGaan Kinghlas management authorities noted the marine area management plan would be developed within two years; however, the MPA management plan and designation process was completed seven years later (Council of the Haida Nation, 2019).

Fisheries Act Measures

Fisheries Act, RSC 1985, Fisheries and Oceans Canada

The *Fisheries Act* is Canada's principle piece of federal legislation permitting the government the authority to manage and regulate fisheries, fish, and fish habitat within

Canadian waters. Since first coming into force in 1868, the Act has gone through 18 amendments, the latest in 2019 restoring many lost protections from 2013.

There are a number of area-based measures that fall under the purview of the Federal *Fisheries Act* that are useful for protecting marine ecosystems and biodiversity, and in achieving Canada's marine conservation targets. The three main measures, traditional fisheries closures and newer provisions, Ecologically Significant Areas (ESAs) and 'Other Effective Area-based Conservation measures' (OECMs) are discussed below.

Fisheries Closures

Fisheries closures are designed and have been the traditional measures to protect specific stocks, or portions of fish stocks from harvest. Powers granted pursuant to the Act permit the Minister of Fisheries and Oceans to specify variation orders (VO) that outline fishing seasons and areas, as well as license conditions (LC) which can relate to gear, fishing restrictions, vessel type, information reporting and vessel monitoring (Hiltz et al., 2018). Variation orders and license conditions are commonly implemented on a yearly or seasonal basis (Day et al., 2019; Fisheries Act, 2019). Specific fisheries closures are laid out through regional regulations pursuant to provisions in the Fisheries Act, and apply to specific regions or industries. For example, the British Columbia fisheries are governed by the Pacific Fishery Regulations, 1993, which lays out the multitude of species-specific fisheries closures.

While fisheries closures are intended for specific species and may have spatial prohibitions, they generally do not qualify as a protected area or count towards Canada's protected area targets. More recently, fisheries closures that are intended to be long-term and meet specific criteria can be recognized as an 'other effective area-based conservation measures' and contribute to Canada's marine targets.

Strengths

The main strengths of fisheries closures is the ability for quick implementation and their adaptability.

Fisheries closures are designed to be implemented quickly. Closures are issued at the discretion of the Regional General in response to management needs of the region's stocks. This ability allows for timely protections to be put in place and established faster than any other federally protected area designation (Hewson et al., 2020).

Due to closures being in response to a given management need of a specific species, compared to other federal protected area designation, fisheries closures are far easier to implement and adjust to changing needs. The ease and swiftness of implementation can potentially allow for creating a network of closure areas, establishing effective species-level protection and management.

Weaknesses

The glaring weakness of fisheries closures is that they only apply to fishing activities and do not have the power to prohibit or even limit non-fishing activities on their own. For this to occur, "layering" of designations between federal measures and designations of other government levels would need to occur. Due to fishery closures being species-specific, they cannot address the same breadth of conservation issues as addresses by other federally designated marine protected area measures, and do not require the creation of a management plan.

Further, fisheries closures lack the permanence of other federally designated protected areas because they are established through an order made by the Regional Director of Fisheries and Oceans. While other federally protected areas are entrenched in legislation or regulations, making them difficult to adjust or revoke. Fisheries closures are a highly discretionary management measure that can be changed or withdrawn at any time.

Ecologically Significant Areas

Section 35.2(2) of the *Fisheries Act* is the enabling provision that sets out the statutory authority to establish 'Ecologically Significant Areas (ESA), which can be established to manage fish and fish habitat that is deemed sensitive, highly productive, rare or unique in accordance with management objectives that are established for their conservation and protection

(Fisheries Act, 2019, s.35.2(2)). The provision also sets out the authority to administer regulations, and management objectives for the conservation and protection of fish and fish habitat, while describing the types of activities and undertakings that would require a ministerial review. To date, this tool has not been used to protect fish or fish habitat.

Strengths and Weaknesses

The 2019 modernization of the *Fisheries Act* strengthens ESA provisions; however, the provision is not broadly protective, with a concentration on required restoration at the discretion of the Minister of DFO. There is currently no regulatory framework for their establishment. Provisions include the increased ability to restore degraded habitat and stronger provisions related to prohibited activities within ESAs (Government of Canada, 2019c).

Other Effective Area-Based Conservation Measures (OECMs)

The application of Other Effective Area-Based Conservation Measures (OECMs) stems from the CBD's 20 Biodiversity Targets (Aichi Targets), specifically, strategic goal C, Target 11. OECMs were adopted in the decision by CBD on OECM guidance (IUCN, 2019) to describe protected coastal and ocean areas, that are not in the form of a marine protected area. Target 11 requires biodiversity conservation to be based on measures of ecological integrity resulting from an ecosystem approach to management .

In 2017, DFO created a 'marine refuge' designation under the *Fisheries Act* and declared them OECMs to meet Canada's CBD Aichi Target commitments (Fisheries and Oceans Canada, 2017a). Marine refuges are essentially long-term fisheries closures established through ministerial regulations, license conditions and variation orders and authorized by the competent Minister.

Fisheries and Oceans originally developed the marine refuge program to aid in their national and international commitments of protecting 10% of the ocean by 2020 and are now viewed as a priority tool to meet Canada's further ocean protection commitments (Schram et al., 2019). Marine refuges now make up the majority of protected areas that count towards these targets and are viewed as an effective area-based conservation measures as they have

similar protection mechanisms to regulate human activity as *Ocean Act* MPAs (Ladell, 2017), and because of their ability to be implemented far more quickly than other protected areas such as *Oceans Act* MPAs or NMCAAs.

Marine refuges can be established in an ocean area governed by Fisheries and Oceans to conserve and improve the present biodiversity of an area (Fisheries Act, 2019). In order to protect biodiversity, marine refuges can regulate fishing activities such as specific fishing gear or practices that have the potential to threaten a species or stock the area was established to protect. In accordance with DFO's operational guidance for the identification of OECMs, marine refuges must meet the following criteria: 1) have a clearly defined geographic location 2) incorporate conservation or stock management objectives 3) presence of 'ecological components of interest,' namely a habitat critical to conservation and a regionally important species that uses that habitat 4) Long-term duration of implementation, including entrenchment in legislation or regulation 5) No human activities that are incompatible with conserving the ecological component of interest may occur or be foreseeable with the area (Ladell, 2017).

Strengths and Weaknesses

As mentioned above, marine refuges may be established and have the potential to be implemented faster than MPAs or NMCAAs due to their establishment through fishery license conditions (LC) and variation orders (VO). By not being entrenched in legislation, marine refuges may be highly adaptable, with boundaries capable of being updated with new scientific understanding about the area or species being protected.

To date, all OECMs in Canada have been established through LC or VO. Both LC and VO offer limited long-term protection and rarely take into account an area's biodiversity. OECMs do have the potential to be established with stronger provisions under the *Fisheries Act*. Section 43.3(1) of the *Fisheries Act* permits the Minister of DFO to make regulations for the purposes of conservation and the protection of marine biodiversity, with no stated time period for regulations to be in force. This provision has yet to be used by DFO but offers stronger protections than current mechanisms to establish OECMs.

The major weakness of marine refuges is their ability to only restrict fishing activities. To mitigate other potential threats to marine areas, DFO must rely on other regulatory tools. For example, within a fisheries closure known as the Northeast Newfoundland Slope Marine refuge, the Canada-Newfoundland and Labrador Offshore Petroleum Board recently introduced proposed oil and gas leases. DFO had been counting this refuge in their ocean-protected area target goals (CBC News, 2018). However, due to the Fisheries Act having no jurisdiction over oil and gas, there is no reason for the Offshore Petroleum Board to consider the existence of the marine refuge.

Further, marine refuges also lack the permanence of other legislated marine protected areas. In order to be considered and count towards Canada's conservation targets, marine refuges must be in place for a minimum of 25 years. However, this timeline is yet to be entrenched in law (MacKinnon et al., 2015).

The entire breadth of the strengths and weaknesses of OECMs is expanded on further in more detail in Chapter 4.

National Marine Conservation Areas and Reserves

Canada National Marine Conservation Areas Act, SC 2002, Parks Canada

The *Canada National Marine Conservation Areas Act* was passed in 2002 to establish a national system of marine protected areas that would be representative of the 29 marine regions in Canada's Atlantic, Arctic, and Pacific Oceans and the Great Lakes (Canada National Marine Conservation Areas Act, 2019). The Act has a dual mandate of protected areas and the sustainable use of resources within the marine areas (Canada National Marine Conservation Areas Act, 2019a, s.4(3)). National marine conservation areas and reserves (NMCAs) can be designated within Canada's internal waters, territorial sea or exclusive economic zone. Parks Canada will prioritize the establishment of NMCAs within underrepresented marine regions. Similar to NMCAs, national marine conservation area reserves (NMCARs) are created when areas of interest are subject to Indigenous title that has been recognized by the federal government and accepted for negotiation but not yet settled (Canada National Marine

Conservation Areas Act, 2019a, s.4(2)). When areas are designated and established, NMCAs and NMCARs are treated the same way under the *CNMCA Act* (Hewson et al., 2020).

Under the Act, the federal government must complete a final management plan for an NMCA within five years of its designation (Canada National Marine Conservation Areas Act, 2019a, s.9). Despite this requirement, there are no penalties for missing this five-year deadline. Management plans include zoning, defined by regulations to designate different levels of protection throughout an NMCA (Canada National Marine Conservation Areas Act, 2019a, s. 4(4)). Based on the objectives of each zone, activities are permitted and managed to limit conflicts between stakeholders and between NMCA objectives and activities.

Currently, Parks Canada is in the process of updating the NMCA Policy, which currently dates back to 1994, before the CNMCA Act came into force. Currently under review are goals to better protect and conserve marine biodiversity. Goals for NMCAs and NMCARs include: ensuring that all uses are ecologically sustainable, creating greater support and recognition of Indigenous rights, collaborative planning and management, and improved educational opportunities and visitor experiences (Parks Canada, 2019).

NMCAs and NMCARs can be applied to lakes, wetlands, estuaries, islands, and coastal and ocean areas to protect and conserve the seabed, subsoil, and underlying water column (Canada National Marine Conservation Areas Act, 2019). Currently, there are five NMCAs in Canada, two being located in the Great Lakes, and three located in marine waters, Saguenay-St. Lawrence Marine Park, Tallurutiup Imanga National Marine Conservation Area, and the Gwaii Haanas National Park Reserve, National Marine Conservation Area Reserve and Haida Heritage Site. Several other sites having been proposed and are at various stages in the establishment process.

Strengths

The CNMCA Act has three main strengths; a strong baseline of protections, the ability to regulate fishing and shipping activities pursuant to regulatory powers under the act, and specific management actions to be carried out within management plans.

The main strength of the CNMCA Act is the specific prohibitions and provisions which create a strong baseline of protections for all NMCAs. These include prohibiting the exploration or exploitation of hydrocarbons, minerals, aggregates, or any other inorganic matter, within all NMCAs (Canada National Marine Conservation Areas Act, 2019a, s.13). No substance can be disposed of within an NMCA unless authorized by permit, which has strict conditions attached. Further, every NMCA must include at least one zone that "fully protects special features or sensitive elements of ecosystems" (Canada National Marine Conservation Areas Act, 2019a, s.4(4)), which is the only such requirement in Canadian federal marine law (Hewson et al., 2020). These baseline protections apply to the water column and seabed within all NMCAs. DFO has recently announced protection standards that prohibit mining, dumping, oil and gas activities, and bottom trawl fishing, which apply to all future NMCAs (Government of Canada, 2019a).

The Act allows the federal government to make and enforce regulations within all NMCAs. However, regulations that restrict fishing and shipping activities must be made on the recommendation of the Minister of DFO and Transport respectively. Once enacted, these regulations are upheld over other regulations adopted under other acts, including both the Fisheries Act and the Canadian Shipping Act (Canada National Marine Conservation Areas Act, 2019, s.16(5); Hewson et al., 2020).

The Act also outlines specific ways in which NMCAs are managed and used according to a sustainability principle of intergenerational equity. The principle states, "... meets the needs of present and future generations" and without compromising the structure and function of the ecosystems, including the submerged lands and water column, with which they are associated" (Branch, 2019b, s.4(3)).

Weaknesses

There are four main weaknesses to highlight of the CNMCA Act; a longer time to establishment, slow development of fishing and shipping regulations, the need for clear title over NMCA lands, and weaker protections as a result of ambiguous wording.

Requirements under the *CNMCA Act* provide parliamentary oversight. At the same time, detailed assessments and stakeholder consultations allow for increased democratic accountability. They also create longer times for establishment compared to *Oceans Act* MPAs (Hewson et al., 2020). It is widely accepted that protected areas need to go through a rigorous assessment and consultation period as is required by the Act. These processes may also make NMCAs more costly to implement than many other ocean protection measures (Branch, 2019b; Hewson et al., 2020).

While the *CNMCA Act* regulates fishing and shipping within NMCAs, there is limited guidance on how these regulations would protect the environment. The Act requires ecosystem management principles and the precautionary principle to be primary considerations within all management plans (Branch, 2019b, s.9(3)). Since the Act came into force in 2002, there has been little movement in the way of fishing or shipping regulation development, with neither being addressed in a management plan (Hewson et al., 2020).

Another weakness is the requirement that Parks Canada has clear federal title in the territorial sea and internal waters before establishing a NMCA as set out under section 5.2.a (Canada National Marine Conservation Areas Act, 2019, s.5.2(a)). Requiring title over the seabed may pose jurisdictional complexity and limit the ability for Parks Canada to establish NMCA without the coordination of federal departments and differing government levels.

The CNMA Act is implemented through Parks Canada, and while this is the same department that operates the National Park system, NMCAs are different. National Parks are intended to protect ecosystems in a state essentially unaltered by human activity. The focus of NMCAs is on environmental sustainability, including the sustainable use of resources (Parks Canada Agency, 2021). The wording of sustainable use allows for more flexibility in regulations and offers weaker standards than marine protection. In a 2019 NMCA discussion paper outlining potential new regulations, Parks Canada noted several intensive and potentially harmful uses within NMCA zones, including aquaculture and renewable energy tenues. These can negatively impact the benefits of marine area protection (Parks Canada, 2019).

National Parks and National Park Reserves with Marine Components Canada National Parks Act, *SC 2000, Parks Canada*

National Parks are the oldest type of protected area and were initially established to protect terrestrial areas. The first was Rocky Mountain Park in 1887 (Lothian, 1977). With the continual creation of National Parks, some of their boundaries have extended into marine waters adjacent to park lands. Examples of this are British Columbia's Gulf Islands National Park Reserve which covers 26 km² of marine areas (Finkelstein, 2014), and the Pacific Rim National Park Reserve.

National Parks are established for the benefit, education, and enjoyment of all Canadians. Unlike conditions under the *CNMCA Act*, the protection of ecosystems is not an intended purpose in the Canada National Parks Act. However, the Act does require that parks are to be used and maintained, so areas are 'unimpaired' for the continued enjoyment of future generations (Branch, 2019c, s.4(1); Hewson et al., 2020).

The process of implementing and designating a national park reserve is similar to that of an NMCA. It requires the federal government to present a report detailing the process and results of consultations and assessments and a relevant management plan to Parliament for approval by the relevant standing committee.

Strengths

The main strength of the Canada National Parks Act is its requirement for the maintenance and restoration of ecological integrity to be the Minister's top priority (Canada National Parks Act, 2019). Ecological integrity is defined under the Act as "a condition that is determined to be characteristic of its natural region and likely to persist, including abiotic components and the composition and abundance of native species and biological communities, rates of change and supporting processes" (Canada National Parks Act, 2019). The strength lies in placing meaningful protection of the environment as a top management priority for any park or park reserve. However, there are conflicting views on the meaning of this requirement under the Act, with the issue having been previously litigated (discussed below).

Another strength of the *Canada National Parks Act*, similar to the *CNMCA Act*, is the regulation of commercial fishing activities within national parks, enforced by the National Parks Canada Fishing Regulations (Canada National Parks Act, 2019; National Parks of Canada, 2018).

Weaknesses

The main weakness of the *Canada National Parks Act* is the importance placed on sustaining ecological integrity. This importance has not stood up to legal challenges, as courts have found the duty to maintain ecological integrity in national parks to be not as strong as the wording may seem. The Canadian Parks and Wilderness Society (CPAWS) challenged the approval from Parks Canada for a road to be constructed through Wood Buffalo National Park. One of the grounds brought by CPAWS was that the Minister had failed to make the 'maintenance or restoration of the park's ecological integrity its priority upon its approval. The federal court ultimately disagreed. It was decided that the maintenance of ecological integrity be one of several priorities that Parks Canada needs to consider in managing National Parks (*Canadian Parks and Wilderness Society (Appellant) v. Sheila Copps, Minister of Canadian Heritage and The Thebacha Road Society (Respondents)*, 2003; Hewson et al., 2020).

National Wildlife Areas

Canada Wildlife Act, RSC 1985, Canadian Wildlife Service, Environment and Climate Change Canada

The *Canada Wildlife Act*, enacted in 1973, allows for protected areas for wildlife and habitat. Under the Act, National Wildlife Areas (NWAs) are created with the purpose of researching, interpreting, and conserving wildlife within the areas (Branch, 2017, s.9(1)). The Canada Wildlife Service (CWS) is a division of Environment and Climate Change Canada (ECCC), which was established with the primary objective to protect migratory birds and species at risk (Burnett, 2003), with other objectives including protecting rare and unusual habitat areas or areas with a high potential for restoration (Burnett, 2003; Hewson et al., 2020). There are currently 55 NWAs in Canada, with 13 encompassing marine areas. The majority of NWAs occur

on land; however, section 4.1(1) allows for NWA to be established in all Canadian waters (Canada Wildlife Act, 2017, s.4.1(1)).

Scott Islands was the first designated marine NWA in 2018. The area was given its own set of regulations titled the Scott Islands Protected Marine Area Regulations. These regulations are more akin to *Oceans Act* MPAs than other NWAs (Hewson et al., 2020). Creating regulations for marine NWAs similar to *Oceans Act* MPAs may be a workaround for the limited jurisdiction granted to ECCC under the Canada Wildlife Act, which defines "public lands" as Canada's inland waters and territorial sea. Canada's EEZ is not included within this definition. However, powers granted to the ECCC in the Canada Wildlife Act enable the department to create NWAs anywhere, including the EEZ, and empowers ECCC to set measures to conserve wildlife in these areas (Branch, 2017, s.4(1)).

Strengths

The Wildlife Area Regulations, which apply to all NWAs (excluding Scott Islands marine NWA), prohibit several activities. However, as is the case with many conservation measures, the Minister may issue permits for such activities if they do not interfere with the conservation of wildlife. Prohibited activities include; hunting and fishing, causing damage, destruction, or removal of plants, swimming, carrying on any commercial or industrial activity, disturbance or removal of any soil, sand, gravel, or other material, and dumping or depositing any rubbish, waste material, or substance (Wildlife Area Regulations, 2020). Similar to *Oceans Act* MPAs and NMCA, DFO has announced protection standards that prohibit bottom trawl fishing, dumping, mining, and oil and gas activities that apply to all future marine NWAs and marine components of NWAs.

Weaknesses

Reports from the Commissioner of the Environment and Sustainable Development (CESD) in 2008 and 2013 indicated several gaps in the management of NWAs. For instance, ECCC identified threats to NWAs; however, there was no assessment or collection of information as to whether these threats were improving or deteriorating. The CESD also found

that most NWAAs were missing up-to-date management plans and that they were allocating insufficient human and financial resources needed to enforce and maintain designated NWAAs (Office of the Auditor General of Canada, 2013).

Migratory Bird Sanctuaries

Migratory Birds Convention Act, 1994, Canada Wildlife Service, ECCC

First enacted in 1917, the *Migratory Birds Convention Act* was Canada's first law with the primary objective to protect wildlife through the use of protected areas. The early designations of Migratory Bird Sanctuaries were implemented to protect birds, nests, and eggs from threats including: killing, harm, and harassment (Jensen, 2018). It was not until 1974, that Migratory Bird Sanctuaries protected bird habitat when the *M Migratory Bird Sanctuary Regulations* were amended to include section 10 to regulate activities within sanctuaries that are deemed harmful to migratory birds and their habitat (Migratory Bird Sanctuary Regulations, 2006).

Overall, migratory bird sanctuaries make up a small contribution to marine conservation in Canada, with small patches of coastal and marine bird habitat which is predominantly donated by private landowners (Hewson et al., 2020).

Strengths

The main strength of the *Migratory Birds Convention Act* is the ability to create migratory bird sanctuaries on private, provincial, federal lands or ocean, and anywhere is Canada's EEZ. Additionally, the recently announced protection standards by DFO which prohibit bottom trawl fishing, dumping, mining and oil and gas activities will apply to all marine portions of future Migratory Bird Sanctuaries (Migratory Bird Sanctuary Regulations, 2006).

Weaknesses

MBS offer strong protections by prohibiting anything that harms migratory birds, however, there is little evidence to suggest migratory bird habitat is as protected, as blanket protections on potentially harmful activities are rarely imposed (Hewson et al., 2020).

For any activity that may harm migratory birds, or their habitat requires a permit from ECCC, with conditions to protect migratory birds, eggs, and habitat. This permitting system allows ECCC to regulate activities, but offers the ability for discretion when granting permits for activities. The minister of ECCC is only required to prohibit activities that ‘in the opinion of the minister are necessary’ as protective conditions (Migratory Bird Sanctuary Regulations, 2006).

It appears that ECCC considers NWA under the *Canada Wildlife Act* to be its primary tool for protection habitat in Canada, while MBS are considered less relevant.

Species at Risk Critical Habitat Designation

Species at Risk Act, SC 2002, Environment and Climate Change Canada; Fisheries and Oceans Canada

The purpose of Canada’s *Species at Risk Act* (SARA) is the prevent species from becoming extinct or extirpated, while providing for the recovery of species that become extirpated, endangered or, threatened. As a federal statute, SARA can be applied to all federal lands, internal waters, territorial sea, EEZ, migratory birds and aquatic species. SARA is often considered a ‘last-ditch’ attempt to prevent a species from extinction because, due to its application, a species may have initially received protections under other laws (e.g., *Fisheries Act*) but continue to face an increased likelihood of extinction (Brillant, 2019).

The Act established the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), an independent advisory panel to the Ministry of Environment and Climate Change, and responsible for the identification of designatable units (DUs) within species and the designation of conservation statuses of these DUs.

If a species and/or DU is listed under Schedule 1 of the Act, ‘List of Wildlife Species at Risk’, several protections are activated. Most notably, it becomes illegal to harm, harass, capture, or kill the listed species (*Species at Risk Act*, 2002 s.32), it also becomes illegal to damage or destroy their ‘residences’ (*Species at Risk Act*, 2002 s.33), and critical habitats (*Species at Risk Act*, 2002 s.58). The listing of a species under Schedule 1 will occur if, a) The minister of the Environment is of the opinion that there is an imminent threat to the survival of

the species, based on the COSEWIC assessment or their own information, or b) If the federal Cabinet accepts the Minister's recommendation to list the species.

Critical habitat designations are defined as "habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species' critical habitat in the recovery strategy or In an action plan for the species" (Species at Risk Act, 2002, s.2). For aquatic species at risk critical habitat is defined as, "spawning grounds and nursery, rearing, food supply, migration and any other areas on which aquatic species depend directly or indirectly in order to carry out their life processes, or areas where aquatic species formerly occurred and have the potential to be reintroduced" (Species at Risk Act, 2002, s.2(1)). Designations of critical habitat are applied when a species is listed as Endangered, Threatened, or Extirpated under Schedule 1 of SARA and only when identified in a species' recovery strategy or action plan.

Once a species is listed in Schedule 1 as endangered, threatened, or extirpated, and the competent Minister decides to restore populations, the Minister is required to develop a species recovery strategy. Included in the recovery strategy is the identification of the species' critical habitat to the best extent possible using the best available information. In addition, the competent Minister must also publish one or more action plans based on the recovery strategy.

Critical habitat must be legally protected within 180 days of the competent Minister publishing the final recovery strategy or action plan, either by issuing an Order or ministerial statement. Regulations may also be enacted to protect critical habitats.

SARA also provides the power for *emergency protection orders*, separate from the critical habitat designation process. These orders are for species facing 'imminent threats to its survival or recovery'. This tool has only been used twice since SARA was enacted for the Western Chorus Frog and Greater Sage-Grouse, and was only used after litigation was initiated against the Canadian federal government. In 2018, after recommendations made to the Minister DFO and ECCC, the federal cabinet declines issuing emergency orders to protect the Southern Resident Killer (SRKW) population. Shortly after however; the federal government issued numerous measures to protect the SRKW population (Fisheries and Oceans, 2018).

Strengths

The main strength of critical habitat designations under SARA is the legal framework in place. For all listed as threatened, endangered, or extirpated it is a legislative requirement that critical habitat is identified within the recovery strategy or action plan. There are also mandatory timelines to identify critical habitat, although there are gaps in the process that will be discussed below.

Under SARA it is a federal offence to destroy any part of the described critical habitat for any species listed as threatened, endangered, or extirpated unless permitted. Additionally, critical habitat includes availability of prey, water quality, and the acoustic environment. This means that within critical habitat, anthropogenic noise levels cannot interfere with a species' ability to perform life functions.

Weaknesses

There are many limitations to Canada's *Species at Risk Act* that have been written about extensively (Bird & Hodges, 2017; Brillant, 2019; A. Mooers et al., 2017). Common themes include bias in listing of species, gaps in required timelines, and failures to meet statutory timelines. There has been a failure to list species that are economically, socially, or culturally significant (Bird & Hodges, 2017), a failure to meet mandatory deadlines to designate critical habitat, and a failure to enforce SARA infractions (Ferreira et al., 2019; Hewson et al., 2020).

The listing of species at risk is a lengthy process, in some cases several years, in which the species receives no protection. The process can halt once the Minister of ECCC receives a COSEWIC report as there is no legislated timeline for the Minister to send a recommendation to federal cabinet ((Hewson et al., 2020). The stalling of listing processes may be intentional for political reasons as analyses have shown commercially important fish species are less likely to be listed under SARA (Dorey & Walker, 2018; Hutchings & Festa-Bianchet, 2009; A. Ø. Mooers et al., 2007). (McDevitt-Irwin et al., 2015) showed that once COSEWIC assessed a fish species to be at risk, there was considerable delays in decisions by the federal government to protect the species. Among the conclusions of the study, the authors suggested that SARA and Canada's *Fisheries Act* is failing to meet their conservation efforts to protect marine fish populations.

There are well documented delays once a species is listed with governments failing to meet required deadlines for listing habitats for protection. As there are no penalties for such delays, court proceedings have been the main motivator for governments to complete recovery strategies, action plans, and critical habitat designations (McDevitt-Irwin et al., 2015). Canadian courts have repeatedly identified “an enormous systemic problem” with ECCC and DFO, as many listed species were yet to have recovery strategies (Hewson et al., 2020).

Further delays occur even once a species is listed, while there are timelines for publishing a recovery strategy there are no mandatory timelines for action plans to be published. This results in significant delays for the species to receive protections, and appears to be biased towards marine species. The CESD has stated previously that DFO has frequently failed to protect endangered and threatened marine species (O. of the A. G. of C. Government of Canada, 2018).

Measures under the Canada Shipping Act

Canada Shipping Act, 2001, Canada Shipping Act.

The *Canada Shipping Act, 2001*, is the primary statute for marine shipping and navigation within Canadian waters. One of its primary objectives is to “protect the marine environment from damage due to navigation and shipping activities.” . To do this, the Act allows for the use of various regulatory mechanisms, including tools to spatially protect marine areas. The Act also contains a legal framework for marine pollution prevention, however; this is not within the scope of this research paper.

There are multiple sections of the *Canada Shipping Act* that allow the government to make regulations pertaining to spatially protecting the marine environment:

- **Section 10.1:** allows the Minister of Transport to make an interim order which brings into force any regulatory power under the *Canada Shipping Act* that pertains to marine safety or protecting the marine environment. These orders have been used by the Minister in conjunction with powers under sections 35.1 and 136 to protect the critical endangered Southern Resident Killer Whale population.
- **Section 35.1:** outlines the regulatory powers offered to the Minister of Transport to protect the marine environment.

- **Section 120(1):** empowers the Minister of Transport to establish regulations for vessel safety. Regulations can include, setting of compulsory and recommended routes, and regulating marine vessel traffic to protect marine areas.
- **Section 136(1)(f):** allows the Minister of Transport to regulate or prohibit navigation, anchoring, mooring, or berthing of vessels for the purpose of promoting safe and efficient navigation, and protecting the public interest and the environment. These powers have previously been used before and as noted above, were relied on this order to establish protections for the Southern Resident Killer Whale population.

Under section 136(1)(f) are the *Vessel Operation Regulations*, which grant the Minister of Transport the power to enact spatial restrictions on non-commercial vessels within Canada's jurisdiction. Restrictions can include, no-go zones for all vessels, areas prohibited to motorized vessels, speed reduced areas, and areas which prohibit specified activities such as water skiing (Baird et al., 2005).

There are also various voluntary measures that may be issued to protect marine areas, including voluntary slow-down areas, or areas to be avoided. These measures are not legally binding, however; as discussed in more detail below, they appear to have a high degree of compliance in areas of Swiftsure Bank, British Columbia.

Strengths

As Canada's only Act regulating shipping and navigation, regulatory powers and tools are one of the only ways marine areas can be protected, or effects minimized from vessel traffic and activities. The regulatory tools and powers are also broad and comprehensive which give the Minister of Transport the ability to protect marine areas from shipping and navigation impacts.

Weaknesses

While the *Canada Shipping Act* has broad regulatory powers over Canadian vessels in their Canada's jurisdiction, the ability to regulate foreign vessels is much more limited beyond the territorial sea. Under international law, foreign vessels have the ability and freedom of navigation anywhere within a coastal states' EEZ (between 12-200 nm offshore). While

instances where changes to navigation routes exist, governments are typically reluctant to interfere with where foreign vessels choose to navigate.

As mentioned above, there are numerous regulatory powers under the *Canada Shipping Act*, however; they are seldom used, with Transport Canada appearing to prefer the use of voluntary measures. When action is taken they are typically through regulations, orders or departmental policy (Hewson et al., 2020), meaning that these measures are highly discretionary, and may not be long-term designations. This can be a concern with the changing of governments over-time.

Marine Mammal Regulations

SOR/93-56, Fisheries Act

Under the Fisheries Act, the Marine Mammal Regulations (MMR) set laws to protect marine mammals against threats in Canadian waters, including prey accessibility, acoustic and physical disturbances, and contaminants. Under the MMR, no person shall approach a marine mammal to or attempt to (Marine Mammal Regulations, 2018):

- (a) feed it;
- (b) swim with it or interact with it;
- (c) move it or entice or cause it to move from the immediate vicinity in which it is found;
- (d) separate it from members of its group or go-between it and a calf;
- (e) trap it or its group between a vessel and the shore or between a vessel and one or more other vessels; or
- (f) tag or mark it.

Exceptions are allowed through the issuing of a permit.

Regulations also set approach distances to govern vessels in Canadian waters. For the majority of marine mammals, the approach distance is 100m for all whales, dolphins and porpoises, 200m for whale, dolphin, and porpoise species with calves or in a resting position, 200m for all Killer Whales in British Columbia, and 400m for Belugas in the St. Lawrence Estuary.

In 2019, interim orders issued under the Canada Shipping Act required vessels to keep a 400m distance from all Killer Whales in SRKW habitat. The interim order issued for 2020 and 2021 extended the 400m distance and made it applicable throughout the year.

Strengths

The MMR was strengthened by amendments introduced in 2018, which defined the regulations prohibiting the disturbance of a marine mammal and added a mechanism to all DFO to permit beneficial activities such as scientific research. Furthermore, being paced within the Fisheries Act, the MMR are enforceable and subject to citations by DFO Conservation and Protection fishery officers, rather than a conviction on indictment through court procedures, which is the course of action under Canada's other marine protection laws and policies. The first conviction under the amended MMR was ruled upon in July 2018 when the court delivered a guilty verdict for approaching a Humpback Whale at a distance closer than 100m.

Weaknesses

While the amended MMR defines activities that can disturb marine mammals, it is difficult to consider the cumulative effects of repetitive exposure to interactions with human activities. There are existing regional guidelines for approaching and viewing marine wildlife, such as in the St. Lawrence seaway to protect Blue Whales, and in areas off the west coast of British Columbia to ease pressures on SRKW (F. and O. C. Government of Canada, 2021; Parks Canada, 2017).

Chapter 4: Charting Future Directions for Canada's Ocean Protection

While the previous chapters have explored Canada's ocean protection laws and policies through the lens of two case studies, the following takes a broader look at possible future ocean law and policy directions. These include provisions within existing policies which to date have not been fully implemented, amendments of current policies, and future policies, which if created, will aid Canada in not only meeting its conservation goals but the ability to adequately protect ecosystems, and livelihoods well beyond 2030.

4.1 Creating a Framework to Guide Integrated Ocean Management

Canada's leading ocean protection policy, the *Oceans Act* has been instrumental in shaping the framework for how Canada sets out conserving ocean spaces, while sustainably using ocean resources. To date however, the *Oceans Act* and key policies have yet to be fully implemented. Integrated management is lacking as Canada moves towards 30% of the ocean protected by 2030, leading to an uncoordinated, piece meal strategy to implement an integrated approach to ocean conservation.

When policies and management objectives are not well integrated, uptake and establishment of marine conservation initiatives can be slow and policies may not offer the desired protections. Research has emphasized how sectorized and uncoordinated policies do more to hinder complex problems than advance their resolution (Howlett et al., 2017; Ruckelshaus et al., 2008; Sander, 2018). Barriers hindering Canada's ability to integrate ocean protection policies include inadequate intergovernmental cooperation and collaboration, absence of senior level political leadership, insufficient financial and staff capacity, and misalignment of policies within and between levels of government (Diggon et al., 2020; Sander, 2018). Integration can occur horizontally, across the same government level, and vertically, across varying government levels and institutions. Better vertical integration of environmental policy and management is a key goal of the U.N. Sustainability Goals and Canada's marine conservation targets.

Canada's *Oceans Act* calls for Canada's national ocean strategy to be based on principles including integrated management of activities in estuaries, coastal waters and marine waters under Canadian jurisdiction (*Oceans Act*, 1996, s.30(b)). Currently, Canada has prioritized five areas for integrated management planning; Scotian Shelf, Atlantic coast and Bay of Fundy, Pacific North Coast, Beaufort Sea, Placentia Bay/ Grand Banks, Gulf of St. Lawrence, with the Pacific North Coast Integrated Management Area (PNCIMA) being the furthest along in the process. The PNCIMA plan is an agreement, creating a framework for federal-provincial-First Nations' collaboration for conservation and management of the planning area. The plan describes broad planning goals and strategies, with a commitment to integrated, ecosystem-based adaptive management of marine activities and resources in the area.

While Canada has identified key areas to implement an integrated management approach, little progress has been made on a national strategy and large ocean areas are still void of an integrated planning framework to guide conservation planning and management.

Many protection measures such as those within the *NMCA Act*, and *Canada Wildlife Act* require coordination between various governmental departments to regulate activities within the protected area boundaries, such as fishing and shipping regulations. A national framework for integrated management as outlined in section 31 of the *Oceans Act* would remove barriers limiting these regulations from being included in management plans and allow for a more coordinated pursuit of achieving 30% of Canada's ocean being protected by 2030.

Moving forward, Canada should modernize its national ocean strategy to focus on integrated management and call for marine spatial planning (MSP). Similar to integrated management, MSP considers the range of human activities existing and foreseeable for a given marine area, to incorporate all cultural, social, economic and environmental considerations in order to manage ocean resources sustainably (Gissi et al., 2019). Additionally, the *Oceans Act* could be amended to include a requirement to include MSP in all integrated management plans and strategies.

By focusing on intersectoral management and coordination, rather than sector-by-sector, Canada's ocean estate can become managed more holistically, with better structures for stakeholder engagement, conflict resolution and more transparent exchange of information.

4.2 Lessening the Reliance on OECMs to Meet 2030 Targets

Canada successfully met its 2020 commitment of conserving 10 percent of its coastal and marine waters outlined under Aichi Target 11. When Canada initially signed on as a signatory to the Aichi Targets, instead of adopting the 20 Aichi Targets, similar to many of the parties to the CBD, Canada developed its own suite of 19 goals and targets to meet its commitment. Canada took Aichi Target 11 and made it Canada Target 1 but omitted several vital elements. The original Aichi Target 11 prescribed target pertaining to both coverage area, and areas of habitat significance and ecological integrity. Canada discarded much of the target and created a goal focused solely on coverage targets. Doing so failed to acknowledge the science-based significance of "biodiversity", "representative," "well-connected systems," and "integrated into the wider land-and seascape" of the original target, instead pushing for protected area quantity over quality (CBD, 2010).

Further, the criteria within the framework for marine refuges depart from DFO's scientific advice, which recommends a broader suite of criteria for marine refuges, including size and protection level (i.e. partial or full) and ecological connectivity. DFO scientists recommended that "it is important to consider the full suite of characteristics and factors when determining whether [an area-based management measure] is providing biodiversity conservation benefits" and that area-based management measures "should [...] not solely [be evaluated] for their ability to maintain a population, species, or community in a state for human use" (Lemieux et al., 2019).

The majority of Canada's 10 percent of protected marine areas came in 2017 due to a DFO declaration of 59 marine refuges. While some of DFO's marine refuges have conservation value, many do not meet the standard or are consistent with IUCN guidance which states that OECMs should provide long-term benefits to ecosystems, not just to specific species or habitats. DFO's marine refuge designation goes against IUCN guidance, recognizing that "Measures will lose their conservation status if a activities in the area is incompatible with biodiversity conservation, and if the impacts of this new activity are not mitigated" (Ladell, 2017). Highlighting that the establishment of marine refuges as OECMs are not long-term biodiversity conservation measures. A recent analysis found that 60% of Canada's marine

refuges do not meet international guidance standards for highly protected areas, and 26% of Canada's marine refuges fail to meet DFO's guidance for the areas (Aten & Fuller, 2019).

To date, there is little guidance on how OECMs differentiate from fisheries closures. While OECMs can be implemented by regulation, however, to date, all OECMs to date have been established through LC and VO mechanisms. Little attention has been given to section 43.3 (1) of the *Fisheries Act* which more broadly protects than sections 35.2(2) and 9.1, which permits the Minister of DFO to make regulations pertaining to fisheries conservation for a duration of 45 days. Section 43.3 permits the Minister to make regulations for purposes of conservation and the protection of marine biodiversity. This provision offers much broader protection than provisions that have traditionally been used to protect and conserve marine fisheries.

Committing to the use and development of marine refuges to meet Canada's international agreements may undermine Canada's ability to conserve and protect its marine biodiversity. As marine refuges are established under the *Fisheries Act*, they cannot prohibit activities other than those associated to fisheries. Canada could renew its commitment to international targets by being part of the post-2020 agenda and renewing its focus on expanding its MPA network, with the majority being fully protected and adhering to advice from the conservation science community and its own internal scientists. Instead of focusing on minimum protections, MPA network development should focus on connectivity and representativity, providing more significant long-term conservation outcomes.

4.3 Amending the *Species at Risk Act* to offer Adequate, Timely Protections

The passage of Canada's *Species at Risk Act* was met with great promise and potential, yet the years since it came into force have shown its many failures in protecting species at risk. Despite COSEWIC continually communicating their advice to the government, the listing process drastically slowed after 2010 (Mooers et al., 2017). The development timeline of recovery strategies and action plans has been lengthy, and the listing process has been described as biased against marine species, especially those of commercial and social importance (Bird & Hodges, 2017).

For SARA to be implemented as initially promised, many amendments will need to be made. Adding provisions of accountability and closing listing loopholes that allow COSEWIC files to sit with the competent Minister, delaying the listing process is a critical amendment. An option would be automatic listing provisions with guaranteed protections after a specified timeframe. Setting clear timelines for developing recovery strategies and action plans can make for a more straightforward and more transparent process. There is also the option to subject all recovery strategies and action plans to independent review (Hutchings et al., 2020; A. Mooers et al., 2017).

Actions plans for species recovery are critical and move government action from intention to clear management measures. Strengthening the implementation of action plans is critical when ensuring SARA improves to Act as intended. Section 55 of SARA requires the competent Minister to monitor and report on the implementation progress of action plans in meeting their ecological and socio-economic objectives every five years after the plan comes into effect (Koubrak et al., 2021). Action plan implementation could be improved in various ways, including the removal of federal departments from the review process by having an independent body assess an action plan's performance, shortening the review timeline from five years to either two or three; and adding the requirement of subsequent reviews on a rolling basis to add accountability to the Act (Canadian Science Advisory Secretariat, 2014; Hutchings et al., 2020; Koubrak et al., 2021).

As mentioned previously, amendments concerning climate change impacts will be critical for Canadian ocean protection laws and policies, including adding climate change provisions in recovery planning (Koubrak et al., 2021; McClure et al., 2013). SARA may be amended to require climate change and its impacts such as acidity and warming to be considered in recovery plans and a requirement for species distribution modelling to address the potential shifts in species range (Becker et al., 2019).

Further, improving the identification and protection of critical habitat under SARA should also be considered. Adding provisions to allow for citations to be delivered at the time of habitat disturbance would improve critical habitat protections. Currently, there is no mechanism for a citation under SARA. Amendments could specify specific incidents, defining

the destruction of critical habitat instead of relying on a broad prohibition (Koubrak et al., 2021).

Further, to improve the implementation of SARA, the impacts of cumulative effects should be acknowledged when issuing permits within the designated critical habitat to understand how new activities may affect the species of concern.

4.4 Climate Change: The Missing Piece in Canada's Ocean Protection Plan

Impacts from anthropogenic climate change affect the functioning and composition of marine ecosystems in every ocean across the globe. Impacts include shifting species' spatial distributions to higher latitudes or depths, resulting in species potentially moving outside of protected areas, to fit their biological needs, changes in trophic level composition, and altered phenology (Cheung et al., 2009; Poloczanska et al., 2016). Impacts caused by climate change are real challenges and influence how decision-makers view, conserve and protect a changing seascape through protected areas and other conservation measures (Balbar et al., 2020). MPAs and MPA networks offer little resistance to climate change; however, they are one of only a few tools managers can use to address the broad-scale issues associated with climate change (Gaines et al., 2010). To continue to see benefits afforded by MPAs, climate change adaptation strategies should be incorporated into Canada's policy agendas and all MPA planning, design, and management initiatives.

Currently, Canada is in the process of developing a National Adaptation Strategy (Government of Canada, 2021), however current documents have little in the way of climate change adaptation in the context of Canada's marine ecosystems despite being committed to finalizing the plan by 2023.

While a climate change adaptation strategy is needed, Canada is lagging behind in terms of strategies to deal with the impacts of climate change. Beyond a national strategy, Canada could implement and require climate change strategies for all Federal departments and sectors. The 2021 mandate letter from the Prime Minister to the Minister of DFO calls for the modernization of the *Oceans Act* to explicitly consider climate change impacts on marine ecosystems and species (Office of the Prime Minister, 2021). Further, Canada's various area-

based protection tools should be updated to have a greater focus on climate change. For example, a provision could be added to SARA requiring climate change effects to be considered in recovery strategies and action plans. Provisions requiring a focus on climate change could draw from the *Guidance for Treatment of Climate Change in NMFS Endangered Species Act* (Tortorici, 2016), which clarifies climate change impacts on species at risk. Furthermore, regulations could require the latest scientific evidence and climate change projections to guide management strategies and action plans.

While a focus on climate change should be incorporated into Canada's various ocean protection policies, Canada would benefit from a guiding document addressing climate change in all areas, from coastal infrastructure to ocean ecosystem protection and conservation. The development of a national climate change strategy could draw from the United States' experience assessing climate change's current and future impacts (Liebesman et al., 2009).

Climate change is the biggest threat our planet faces, and a major challenge when attempting to conserve ocean spaces. If Canada is to meet its international commitments and protect its ocean estate, while sustaining ocean resources, climate change and its associated effects will need to be embedded into all policies and MPA management plans.

Chapter 5: Conclusions

Using the RBMBER and Swiftsure Bank case studies, the paper highlighted two areas in need of further protection, and lessons learned from each which need to be accounted for in future MPA management. In doing so, I analysed Canada's area-based tools for marine conservation from DFO, Parks Canada, ECCC, and Transport Canada and looked at future actions the Canadian government should take to meet its international conservation commitments and adequately conserve and protection ocean areas.

However, these case studies also shed light on the limitations of ad-hoc policies, MPA management and the short-comings of policy implementation that have constrained Canada's progress in marine conservation. Many policies have failed to be implemented to their full capacity, SARA continues to fail in protecting marine species, Canada has decided to favour OECMs over permanent measures at their disposal, and policies have yet to acknowledge the severity of climate change.

Despite these shortcomings, Canada has the necessary tools to implement long-term, fully protected, and coordinated marine protection. In the case study of Swiftsure Bank, Canada has shown to implement measures in an attempt halt the further decline of the SRKW population with the introduction of interim sanctuary zones and slow-down areas. The introduction of protection standards is a huge step forward in coordinating marine protection across governmental departments. Further Canada has, but has yet to take advantage of provisions to implement a national strategy through integrated, ecosystem-based management. Canada should move swiftly to implement these provisions while including legislative and regulatory provisions regarding climate change impacts and how they will be considered in the on-going management of MPAs. Further, developing a national climate change strategy will aid in how impacts are to be considered in MPA management.

In conclusion, while Canada's tool box of area-based ocean protection laws and policies are equipped to protect its ocean estate, many gaps still persist. These need to be addressed and improved for Canada to adequately protect and sustain Canada's three oceans for generations to come.

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