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CANADA



REDUCING IMPACTS FROM SHIPPING IN MARINE PROTECTED AREAS: A TOOLKIT FOR CANADA

QUICK REFERENCE GUIDE

INTRODUCTION

MANAGEMENT CHALLENGE

Marine protected areas (MPAs) are one of the key mechanisms to provide strong protection for marine biodiversity. Managing risks and impacts from human activities in these areas is critical.

In Canada today, many MPAs do not adequately consider or mitigate impacts from shipping, in part because many stakeholders require a better understanding of the complex legal and regulatory environment that exists for shipping in Canada, and in part because the body of science regarding shipping impacts on the marine environment continues to expand.



TOOLKIT AIM

The aim of the Toolkit is to improve the collective understanding of the impacts from shipping in MPAs and of the tools available to reduce those impacts in Canada.

TOOLKIT AUDIENCE

The audience for this Toolkit includes MPA practitioners and shipping experts from across sectors, including from governments, environmental NGOs and industry, as well as others with an interest in reducing impacts from shipping in MPAs.

TOOLKIT SCOPE

- All Canadian marine waters, from the coastline to the 200 nautical mile (NM) limit of the Exclusive Economic Zone.
- Special focus on federally designated MPAs created under the *Oceans Act*, the *Canada National Marine Conservation Areas Act* and the *Canada Wildlife Act*.

USING THE TOOLKIT

TOOLKIT COMPONENTS

The Toolkit has four components:



- Series of peer-reviewed literature synthesis reports about shipping impacts on the marine environment.
 - *The Impacts of Shipping on Marine Birds*
 - *The Impacts of Shipping on Benthic Habitats*
 - *Shipping Through Sea Ice: Impacts on Marine Habitats and Best Practices*
 - *Mitigating Shipping Impacts on Cetaceans in Canada: Lessons Learned and Best Practices*



- Overview of the legal and regulatory framework, including MPA law, domestic and international shipping law and domestic complementary law with potential for managing shipping in MPAs.
 - *Navigating the Law: Reducing Shipping Impacts in Marine Protected Areas*
 - *Shipping in Marine Protected Areas Toolkit Workshop: Summary Report*



- Study evaluating the challenges and opportunities for monitoring shipping activity in MPAs and ensuring compliance with shipping-related management measures.
 - *Reducing Impacts from Shipping in MPAs: Evaluating Tools for Monitoring and Compliance*



- Case study analyses of three MPAs in Canada, each applying other Toolkit components and an analysis of vessel traffic data.
 - *Reducing Impacts from Shipping in St. Anns Bank MPA: Atlantic Case Study*
 - *Reducing Impacts from Shipping in Scott Islands marine National Wildlife Area: Pacific Case Study*
 - *Reducing Impacts from Shipping in Tallurutiup Imanga National Marine Conservation Area: Arctic Case Study*

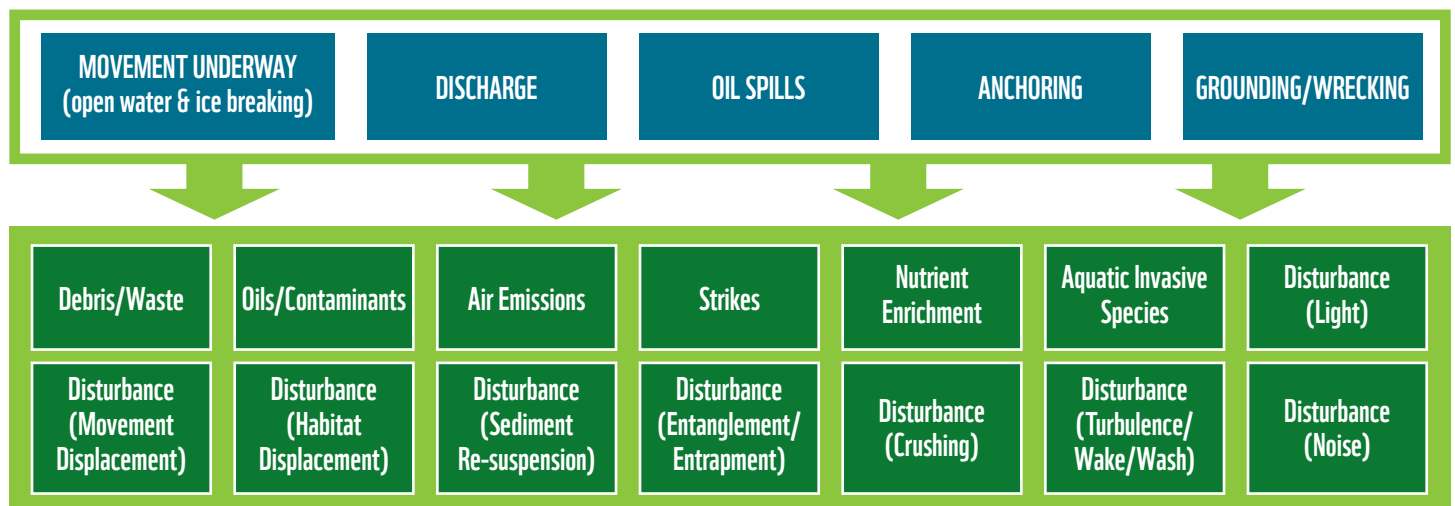
PURPOSE OF THIS GUIDE

This guide highlights key information from various Toolkit components and is intended to be a quick reference for practitioners. Please consult the full Toolkit for greater detail.

UNDERSTANDING IMPACTS FROM SHIPPING

OVERVIEW

There are many shipping activities that result in stress on the marine environment.



In this section, impacts are highlighted under four themes.

MARINE BIRDS

- Oil spills and operational leaks can lead to bird feathers becoming coated in oil. This may poison birds, impact their foraging and reproductive successes, hinder their ability to fly and keep warm and make them more vulnerable to predators.
- The presence of ship traffic can disturb marine birds and cause them to fly away (known as flushing), resulting in reduced foraging and resting and unnecessary use of energy.
- Underwater noise from ship traffic may impact marine birds' ability to find prey underwater and communicate with other birds. The full effects of underwater noise are largely unknown.
- Light from passing ships may attract marine birds or disorient them, which can impact their navigation to important habitats.

BENTHIC HABITATS

- Ship anchors can cause physical damage that results in the reduction of habitat complexity and requires years for recovery. The impacts of physical damage on individual cold-water coral and sponges is expected to range from decades to centuries.
- Ship anchors can re-suspend sediment and organic matter in the water, which can smother marine animals and reduce the amount of light that plants need to grow and obtain food. Smothering of glass sponges by sediment can cause clogging of sponge feeding tissues and arrest pumping and filtration.
- Wrecked ships, or ships that contact the ocean floor, can crush or displace marine plants and animals. This may leave room for invasive and opportunistic species to take over the area.
- Oil spills and operational discharges can poison or suffocate marine plants and animals.
- Blackwater and greywater discharge can lead to algal blooms and contamination of shellfish, and make species like corals less resilient.

WHALES

- Vessel strikes are a recognized cause of mortality for whales worldwide and pose a real risk to many species found in Canadian waters. All vessel types can collide with whales, but larger vessels travelling at higher speed have a higher likelihood of the collision resulting in mortality or other severe impacts.
- Vessel noise can alter whales' daily activities, including foraging, surfacing, resting, avoiding predators, communicating, socializing, mating and nurturing calves, among others, and ultimately, can lead to fewer offspring and a higher mortality rate.
- Harmful materials may be discharged into the water and air, accidentally or intentionally, as part of daily operations by vessels, resulting in degradation of the critical habitat of whales.

ICE HABITATS

- Shipping through sea ice (known as icebreaking) can cause animals to flee the area because of increased noise. Some animals may avoid an area for several days after fleeing.
- Icebreaking can form channels if the ice does not refreeze quickly, and some seals may use these channels to give birth along the edges. If other ships use the same channel, adult seals and pups become vulnerable to ship strikes. Other marine mammals confuse the channels for the sea edge. If the channel refreezes, these mammals can become trapped under the sea ice and, in some cases, can die.
- Icebreaking can destroy or fragment important ice habitats. This has the largest impact on seals, especially seal pups that may become displaced from their birth site or separated from their mothers.

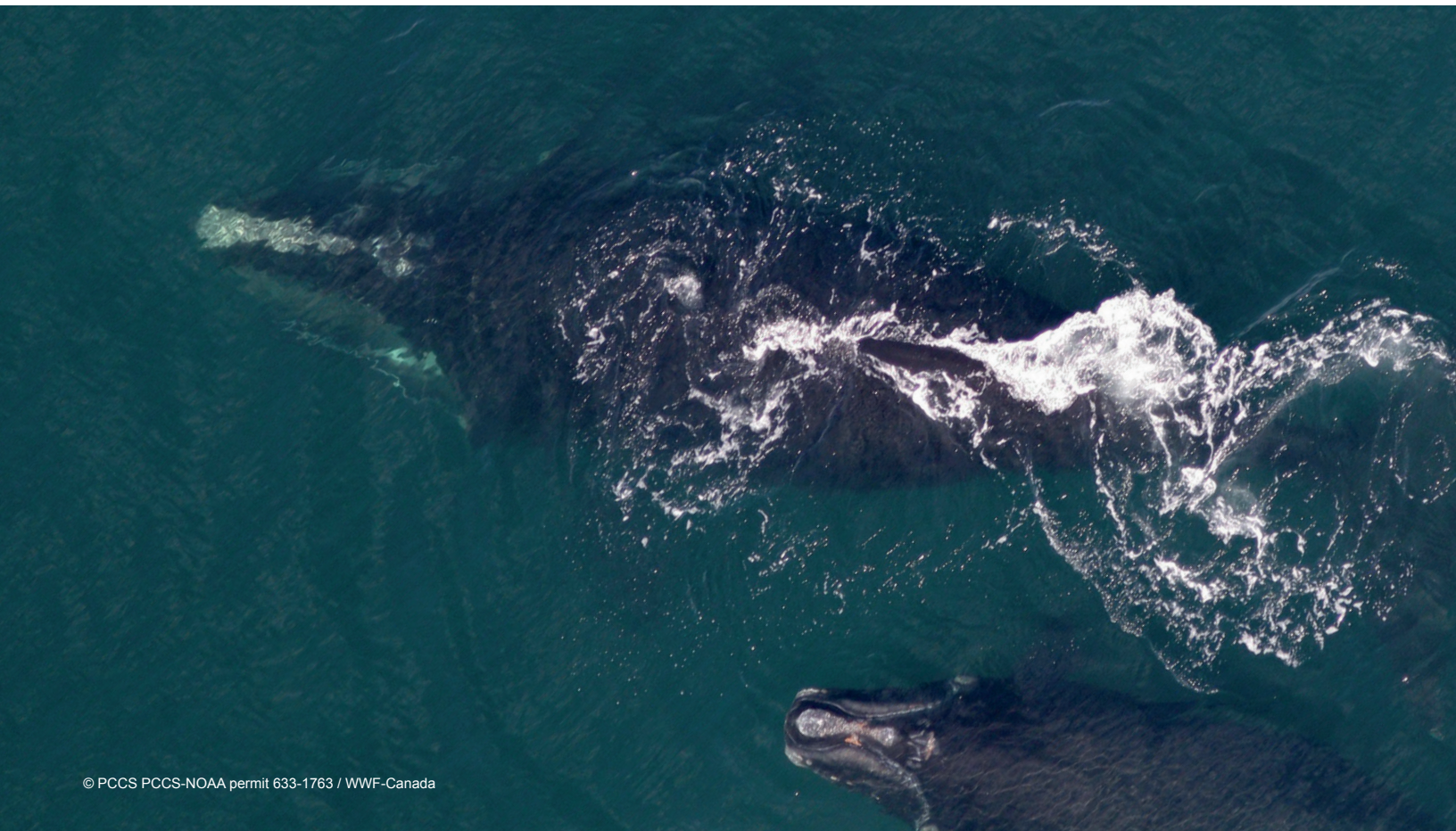


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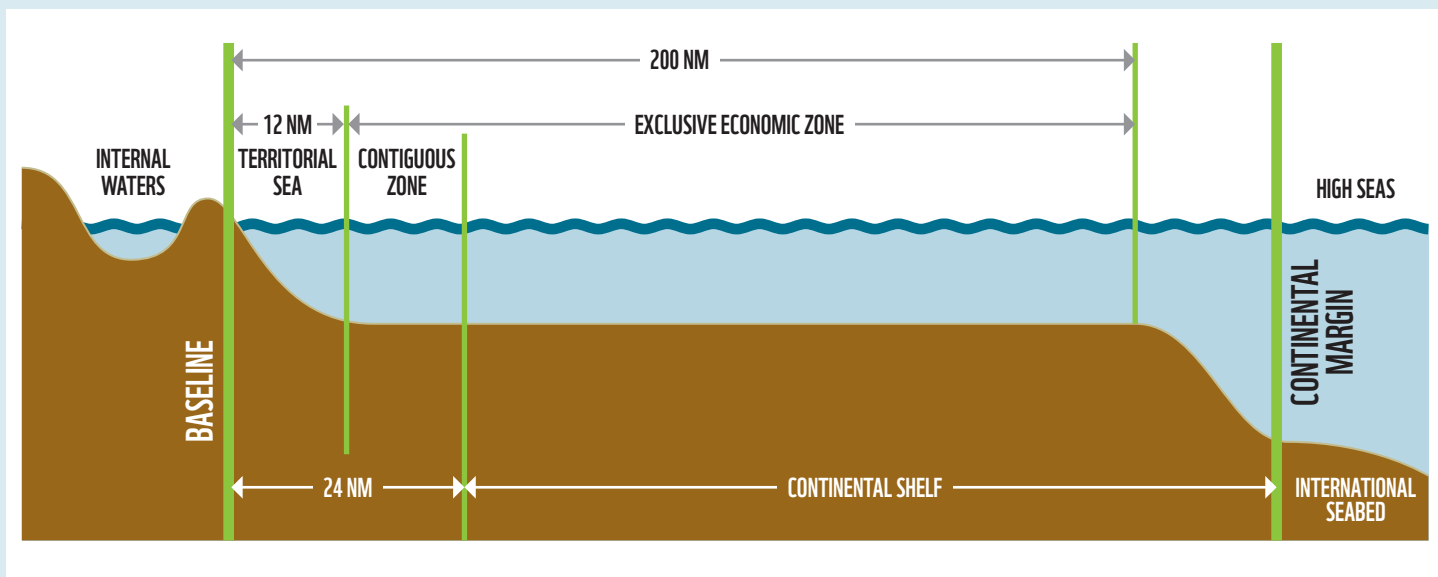
NAVIGATING THE LAW

MARITIME ZONES

The United Nations Convention on the Law of the Sea (UNCLOS), to which Canada is a signatory, divides the ocean into seven maritime zones. Coastal states' rights and responsibilities vary within these zones, with the underlying principle being that a coastal state exercises less control over the ocean the farther one moves away from land. The seven maritime zones are as follows:



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- **Internal waters** are the waters that lie to the landward side of the baseline, which is the low waterline along the coast.¹ Harbours, coves and historic bays are all considered internal waters.² Canada has full sovereignty over these waters, the air space above and the seabed and subsoil below the water column.
- The **territorial sea** is the water that extends from the baseline out to a maximum of 12NM offshore. Canada has full sovereignty over these waters, the air space above and the bed and subsoil below the water column, subject to the right of innocent passage by foreign states.³
- The **contiguous zone** is the marine area between 12NM and 24NM offshore. This area is part of the Exclusive Economic Zone (see below), but Canada has the additional power to enforce federal laws related to immigration, customs, fiscal and sanitary law. This power relates particularly to the outward and inward movement of ships.⁴
- The **Exclusive Economic Zone (EEZ)** is the marine area beyond 12NM up to a maximum of 200NM offshore. Canada has sovereign rights over renewable and non-renewable resources within the EEZ, including the water column, seabed and subsoil. This allows Canada to explore, exploit, conserve and manage these resources.
- The **continental shelf** is the seabed and subsoil up to a maximum of 250NM from the baseline to the outer edge of the continental margin where it extends beyond 200NM. Canada has applied to the International Seabed Authority for this extended continental shelf.
- The **high seas** are the areas of the sea that are beyond 200NM and the limits of national jurisdiction. The High Seas are open to all states and are governed by international convention.
- The **international seabed** is the seabed, ocean floor and subsoil beyond the limits of national jurisdiction. This area is governed by the International Seabed Authority.

¹ Baselines refer to the low tide-water mark along the coast of a state. They are also drawn around bays, islands and water between headlands, traditionally referred to as water *inter fauces terrae*, or "within the jaws of the land."

² Donald Rothwell and Tim Stephens "The International Law of the Sea" (Hart Publishing, 2010) ["Rothwell"] at 23, 48, 54.

³ *United Nations Convention on the Law of the Sea*, 10 December 1982, 1833 UNTS 396 article 234 ["UNCLOS"] at articles 2, 17. See also Rothwell at 58.

⁴ Rothwell at 78, 80.

Canada's maritime zones and its rights and responsibilities within each zone are incorporated into Canadian law through the *Oceans Act*.⁵ The geographic locations of most of Canada's maritime zones have been settled and are laid out in the *Territorial Sea Geographical Coordinates (Area 7) Order* under the *Oceans Act*.⁶ There are still contested claims in parts of the Arctic and to an extended continental shelf.

Coastal states have a general duty to protect the marine environment, as set out in articles 192 and 193 of UNCLOS.⁷ Like all coastal states, Canada has special jurisdiction with respect to prevention, reduction and control of vessel-source pollution within the EEZ. Under UNCLOS, Canada also has special jurisdiction in the Arctic.⁸

Foreign States have the freedom of navigation within the high seas and within a coastal state's EEZ, and it is understood as the right of all nations to navigate freely on the open ocean, thereby allowing for free trade and commerce across the oceans. However, it is not an absolute right and must be balanced against other rights and duties within the ocean.⁹



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5 See *Oceans Act*, SC 1996, c. 31 [*Oceans Act*] ss 7, 10, 12, 13.

6 *Territorial Sea Geographical Coordinates (Area 7) Order*, SOR/85-872.

7 See UNCLOS, article 192: "States have the obligation to protect and preserve the marine environment. Art." and article 193: "States have the *sovereign right to exploit their natural resources pursuant to their environmental policies and in accordance with their duty to protect and preserve the marine environment.*" (emphasis added).

8 *United Nations Convention on the Law of the Sea*, 10 December 1982, 1833 UNTS 396 article 234 [UNCLOS]. UNCLOS, article 234.

9 Rothwell at 205.

CANADIAN LEGAL AND INTERNATIONAL FRAMEWORK

Canada has a suite of marine protection laws, as well as select laws affecting commercial shipping, that can be used to address impacts from shipping in MPAs. Under international law, there are additional tools for managing shipping impacts. Each of the laws in Table 1 below is discussed in detail in the *Navigating the Law* report of the Toolkit, including relevant regulations and descriptions of existing measures to reduce impacts in designated federal MPAs in Canada.

Table 1. Canadian and international laws pertaining to shipping in MPAs.

Canadian marine protection laws	Select Canadian laws affecting commercial shipping	International laws
Oceans Act	Canada Shipping Act	United Nations Convention on the Law of the Sea (UNCLOS)
Canada National Marine Conservation Areas Act	Pilotage Act	International Convention for the Prevention of Pollution from Ships (MARPOL)
Canada Wildlife Act	Canadian Environmental Protection Act	International Convention for the Safety of Life at Sea (SOLAS)
	Arctic Waters Pollution Prevention Act	



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TOOLS FOR REDUCING IMPACTS FROM SHIPPING

For easy reference, Table 2 summarizes the legal tools available to reduce impacts from shipping in MPAs in Canada, organized by stressor. This table is also found in Appendix A of *Navigating the Law*. Active tools are those currently in use in Canada, while potential tools could be used in the future.

Table 2. Legal tools for reducing impacts from shipping in MPAs, by stressor.

Ship Stressor	Zone	Law	Mechanisms/ Tools	Commentary
General Mitigation	IW, TS, CZ, EEZ	<i>Oceans Act</i> s. 41(1)	Notice to Mariners	Potential tool: The Canadian Coast Guard provides the Notice to Mariners (NOTMAR). These notices can provide voluntary guidance for vessels operating in MPAs and can include voluntary speed reductions. These notices can also be used to provide additional and important information to vessels navigating near or through MPAs.
General Mitigation	IW, TS, CZ, EEZ (varies)	<i>Canada Shipping Act</i> s. 10.1(1)	Interim Ministerial Orders	Active tool: The minister can make an interim order that puts into force any of the regulatory powers available under the CSA for up to one year. Cabinet can extend the order for two additional years or make the order into a regulation.
General Mitigation	IW, TS, CZ, EEZ (varies)	<i>Canada Shipping Act</i> s. 35.1	Regulations for Protection of the Marine Environment	Potential tool: The minister can create regulations to protect the environment, including measures for procedures and practices for ships, management of shipping and navigation, compulsory and recommended routeing and prohibiting and restricting the operation, navigation, anchoring, mooring or berthing of vessels in MPAs.
General Mitigation	IW, TS, CZ*, EEZ* (Only Canadian Vessels*)	<i>Canada Shipping Act</i> s. 120(1)(k)	Regulations pertaining to Vessel Safety	Potential tool: The minister can make regulations to protect shore areas or environmentally sensitive areas, to regulate or prohibit cargo and to prevent collisions in Canadian waters or the EEZ.
General Mitigation	IW, TS, CZ, EEZ* (*geographic scope is unclear)	<i>Canada Shipping Act</i> s. 136(1)(f)	Regulation related to navigation services	Potential tool: The minister can regulate or prohibit navigation, anchoring, mooring or berthing of vessels for the purpose of safe and efficient navigation. The regulation must be in the interest of the public and the environment.
General Mitigation	IW, TS, CZ, EEZ (in Arctic waters)	<i>Arctic Waters Pollution Prevention Act</i> s. 12(1)	Shipping standards for shipping safety control zones	Potential tool: The minister can create more stringent standards for ships to meet in shipping safety control zones in which there are MPAs; failure to meet those standards would prohibit their entry.
General Mitigation	IW, TS, EEZ, Arctic Waters	<i>Canada Shipping Act, Oceans Act</i> s. 41.	Regulations related to aids to navigation	Potential tool: Allows the creation of aids to navigation that would mark sensitive areas for the benefit of ships and pilots.
General Mitigation	TS, CZ, EEZ	SOLAS with guidance from IMO	Ships' routeing measure	Potential tool: Ship routeing measures can be designated under SOLAS and can include measures designed to reduce or eliminate ships passing through MPAs.

Table 2. Legal tools for reducing impacts from shipping in MPAs, by stressor (continued).

Ship Stressor	Zone	Law	Mechanisms/ Tools	Commentary
General Mitigation	TS, CZ, EEZ	SOLAS with guidance from IMO	Area to be Avoided	Potential tool: A routeing measure to create an area, including one with important environmental features, to be avoided completely by all ships, or classes of ships.
General Mitigation	TS, CZ, EEZ	<i>IMO Resolution A.982(24)</i>	Particularly Sensitive Sea Area	Potential tool: Designation of a PSSA occurs through the IMO. Once the designation is approved for an area needing special protection because of recognized ecological, socio-economic or scientific attributes, a coastal state may create additional mechanisms to protect the area, such as routeing systems and additional discharge restrictions.
Benthic Disturbance: Anchorage	IW, TS, CZ, EEZ	CSA – <i>Anchorage Regulations</i> ss. 2, 3	Restriction or prohibition on anchorage	Potential tool: This regulation, created under the CSA, prohibits anchorage in areas that are included by the minister in the schedule. MPAs can be added to the schedule.
Acoustic Disturbance	TS, CZ, EEZ	<i>IMO Guides for the Reduction of Underwater Noise from Commercial Shipping to Address Adverse Impacts on Marine Life</i>	Adoption of guidelines	Potential tool: The voluntary measures set out in the guidelines might be adopted into MPA regulations or under the CSA, whether as voluntary or mandatory measures within MPAs.
Acoustic Disturbance	TS, CZ, EEZ	International Maritime Organization	Particularly Sensitive Sea Area	Potential tool: The IMO recognizes noise broadly as pollution, and a PSSA could protect MPAs where species are especially vulnerable to commercial shipping.
Discharge: Dangerous Chemicals	IW, TS, CZ, EEZ	CSA: <i>Vessel Pollution and Dangerous Chemicals Regulations</i>	Prohibition on discharges	Potential tool: Prohibition of discharges in MPAs, but this would require an amendment to the regulations to create the prohibition for MPAs.
Discharge: Noxious Substances	TS, CZ, EEZ	MARPOL; <i>Canada Shipping Act</i>	Special Area designation	Potential tool: Area designated under MARPOL Annex II to address impacts of noxious substances (as defined under that treaty and in CSA).
Discharge: Pollutants	IW, TS, CZ, EEZ	<i>Canada Shipping Act</i> , ss. 175.1 and 189	Vessel Routeing	Potential tool: Minister has the power to reroute vessels that are carrying, discharging or at risk of discharging a pollutant, or to require vessels to follow specific routes. This could include rerouting in or around MPAs.
Discharge: Garbage	TS, CZ, EEZ	MARPOL; <i>Canada Shipping Act</i>	Special Area designation	Potential tool: Area designated under MARPOL Annex V to address garbage.
Discharge: Ballast Water	IW, TS, CZ, EEZ	CSA: <i>Ballast Water Control and Management Regulations</i>	Prohibition or restriction on ballast water exchange	<p>Potential tool: Removal of all ballast water exchange areas from existing or future MPAs.</p> <p>Potential tool: Require minimum distances for ballast water exchange or exchange zones from MPAs.</p> <p>Active tool: Minimum depth for allowances of ballast water exchange within or near MPAs (see Bowie Seamount MPA).</p>

Table 2. Legal tools for reducing impacts from shipping in MPAs, by stressor (continued).

Ship Stressor	Zone	Law	Mechanisms/ Tools	Commentary
Discharge: Greywater	IW, TS, CZ, EEZ*	CSA: <i>Vessel Pollution and Dangerous Chemicals Regulations</i> s. 131.1(4)	Prohibition on greywater release	Active Tool: Create full prohibition on greywater discharge. The <i>Banc-des-Américains MPA Regulations</i> prohibits the release of greywater. *Does not apply in “Arctic Waters”
Discharge: Sewage	TS, CZ	CSA: <i>Vessel Pollution and Dangerous Chemicals Regulations</i> s. 131.1, Schedule 2 (Designated Sewage Areas)	Designated sewage area	Potential tool: Designation of current or future MPAs as Designated Sewage Areas to require higher standards (of coliform rates) for sewage that is discharged in those MPAs. There is currently a complete prohibition on sewage discharge in internal waters.
Discharge: Sewage	TS, CZ	CSA: <i>Vessel Pollution and Dangerous Chemicals Regulations</i> s. 131.1	Prohibition on sewage discharge	Potential tool: An amendment to the regulation would allow for a complete prohibition of sewage discharge in MPAs. There is currently a complete prohibition on sewage discharge in internal waters.
Discharge: Sewage	TS, CZ, EEZ	MARPOL; <i>Canada Shipping Act</i>	Special Area designation	Potential tool: Area designated under MARPOL Annex IV to address discharges of sewage (as defined under that treaty and in CSA).
Discharge: Disposals	IW, TS, CZ, EEZ	<i>Oceans Act</i> ; <i>CEPA: Disposal at Sea Permit Application Regulations</i>	Prohibition on disposal at sea in MPAs	Potential tool: The minister must consider sensitive areas before issuing disposal permits. A prohibition on disposal at sea could prevent disposal in MPAs.
Air Emissions: Sulphur	TS, CZ, EEZ	MARPOL; <i>Canada Shipping Act</i>	Emission Control Area	Potential tool: Area designated under MARPOL Annex VI that establishes a cap on the allowable sulfur content in ship’s fuel.



MONITORING AND COMPLIANCE

Measures to reduce impacts from shipping in MPAs are meaningless if not accompanied by a strong monitoring and compliance regime. There are many tools available in Canada. The strengths and weaknesses of each of these tools is discussed in detail in the report *Evaluating Tools for Monitoring and Compliance*.

Table 3. Monitoring tools for shipping in MPAs in Canada.

Monitoring tools	Description
AIS (Automatic Identification System) and S-AIS (Satellite Automatic Identification System)	<ul style="list-style-type: none"> • Positional and other information near-continuously broadcast in real time; • Widely used in Canada to promote safe navigation and collision avoidance; • Not mandatory for all vessels.
LRIT (Long Range Identification and Tracking)	<ul style="list-style-type: none"> • Positional information broadcast at minimum of six-hour intervals; • Mandatory for Canadian vessels under the Canada Shipping Act and internationally by the International Maritime Organization; • Information is only transmitted to the ship's flag state.
Aerial surveys	<ul style="list-style-type: none"> • Conducted using the National Aerial Surveillance Program through Transport Canada; • Uses remote sensing equipment to conduct pollution prevention patrols, detecting and documenting oil spills and other pollutants.
Radar	<ul style="list-style-type: none"> • Used to capture information about the location, direction and speed of a vessel in real time; • Commonly used tool to monitor vessels >20m in length; • Range of detection is often limited to 50NM.
Satellite imagery	<ul style="list-style-type: none"> • Can detect a wide range of vessels depending on the resolution used, with the extra-fine resolution being able to detect vessels of 5m in length; • Used for multiple purposes, including maritime surveillance, vessel traffic monitoring, environmental monitoring and disaster management.
Cameras	<ul style="list-style-type: none"> • Often used in narrow channels, “choke points” or in areas where there is an identified concern or interest within a specific portion of the MPA; • Do not have a wide enough angle to capture large portions of an MPA and have limited capabilities in adverse weather conditions and at night.
Acoustic recording	<ul style="list-style-type: none"> • Uses hydrophones to capture sound recordings of vessels transiting the area to deduce the speed of transit and monitor ship noise attributed to various activities; • Acoustic monitoring is underway in Canada and is a possible approach to monitoring vessel traffic within MPAs.
Marine guardianship program	<ul style="list-style-type: none"> • Direct observation of shipping activity, commonly led by Indigenous Peoples; • Geared toward coastal MPAs that are near communities.

Table 3. Monitoring tools for shipping in MPAs in Canada (continued).

Monitoring tools	Description
Infrared cameras	<ul style="list-style-type: none"> • Same general characteristics as regular cameras (above); • Can detect activity in areas with low visibility, but adverse weather limits range of detection.
Smart buoys	<ul style="list-style-type: none"> • Autonomous buoys that can be moored in the ocean to outline the perimeter of an area of interest; • Detect vessels within the area, transmit signals via satellite or towers and send alerts directly to ships with information specific to the area; • Not yet used in Canada.
Designated patrol officers	<ul style="list-style-type: none"> • Responsible for conducting in-person surveillance as well as conducting appropriate follow-up and enforcement; • No designated patrol officers actively monitor federally designated MPAs by water or by air in Canada.



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For more information about this report or
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