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Overview of Ocean Noise Regulation in Canada

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Anthropogenic sound in the marine environment is an issue that is likely to increase in significance over the next few decades, which could have both short- and long-term negative consequences for marine animals. The uncontrolled introduction of increasing noise is likely to add significant further stress to already-stressed oceanic biota. Protecting marine life from this growing threat will require more effective control of the activities producing sound which depends on a combination of greater understanding of the impacts and also increased awareness of the issue by decision makers both nationally and regionally to implement adequate regulatory and management measures.

Convention on Biological Diversity. Scientific Synthesis on the Impacts of Underwater Noise on Marine and Coastal Biodiversity and Habitats. CBD/CBD/SBSTTA/16/INF/12.Montreal, Canada. 2012

This Backgrounder provides an overview of federal ocean noise regulation in Canada, with a primary focus on shipping noise.

Ocean noise is a complex environmental threat. It is difficult to regulate as unlike other pollutants, it is invisible and odourless. The harm it can cause is highly variable depending on a number of environmental factors, the susceptibility of species to harm, and the qualities of the noise.

The two main ways to control underwater noise are to cut down on the noise caused by human activity, such as making ships quieter, and to keep noisy activities away from vulnerable species altogether or at certain times or in certain places, known as spatio-temporal restrictions. [i]

The focus of this Backgrounder is on national regulation in Canada, though underwater noise is best dealt with by international regulations, as both oceans and noise recognize no borders. Two prominent examples are highlighted below from many international and regional legal instruments that could apply to regulate underwater noise.

International Examples

Internationally, there are no comprehensive global rules on underwater noise. The International Maritime Organization (IMO), the UN agency that governs the world's maritime shipping, has been developing draft *Guidelines for Minimizing Underwater Noise from Commercial Ships,* for the past five years. [ii] The Guidelines are voluntary, and focus on vessel quieting technology. As the name implies, these IMO Guidelines are not binding on Canada or any IMO Member States. International treaties or Conventions

developed by the IMO apply in Canada only when the obligations are incorporated into Canadian legislation.

Regionally, the European Union's Marine Strategy Framework Directive (MSFD) is the most developed legal response to ocean noise to date.[iii] The MSFD commits the EU Member States to take the necessary measures to achieve or maintain good environmental status within the marine environment by the year 2020 at the latest. Good Environmental Status is defined by eleven high level descriptors including biological diversity, fish population, eutrophication, contaminants, and litter. Descriptor number 11 states that "...Introduction of energy, including underwater noise, is at levels that do not adversely affect the marine environment."

Canadian Federal Laws

There are currently no comprehensive federal laws or standards to regulate ocean noise in Canada; however, through Fisheries and Oceans Canada (DFO) and the Department of National Defence (DND), Canada has specific guidelines for mitigating ocean noise impacts produced by underwater seismic surveys and sonar. Both sets of Guidelines could be strengthened.

The sections below discuss a number of laws that are now or could in future be used to regulate ocean noise impacts, arranged first by activity, and second, by species and habitat.

Regulating Activities that Produce Harmful Underwater Noise

Shipping

Reducing the overall noise output from marine vessels is likely to have demonstrable positive outcomes for marine animals' acoustic communication, navigation, foraging efficiency, predator avoidance capabilities and noise induced stress.[iv]

Noise from shipping is pervasive throughout the marine environment, and ambient or background noise levels have been rising in recent decades due to increases in shipping traffic and tonnage.[v] Standard ship operations produce underwater noise. Ships can be designed to emit less noise through methods such as construction, design, equipment and manning (CDEM) standards such as ship quieting technology; routing measures such as IMO Areas to Be Avoided; and operational measures such as speed limits.

The *Canada Shipping Act* is the main law that governs marine transportation and applies to Canadian vessels operating in all waters and to all foreign vessels operating in Canadian waters (from canoes and kayaks to cruise ships and tankers).[vi] The law gives the government broad powers to "protect the marine environment from damage due to navigation and shipping activities."[vii] Canadian vessels could be required, for example, to use low noise-producing propellers and engines.[viii] In this way, vessel emission of ocean

noise could be reduced, and would help achieve the *Canada Shipping Act's* objective of protecting the marine environment from damage due to shipping activities. Another section of the law allows Cabinet to make regulations to control noise emissions from pleasure craft engines.[ix]

Ports also have legal powers to control ship activities under the *Canada Marine Act* and impose "green shipping" requirements above and beyond federal shipping law requirements on ships that enter their waters, subject to a few limitations.[x]

Seismic Surveys

Seismic sound is produced by seismic surveys, which use air guns, or air source arrays, to gather information about geological structures beneath the surface of the earth, using sound waves to "see" into the Earth's rocks. Seismic surveys are typically conducted in marine environments for oil and gas or mining exploration or scientific research purposes. This is one activity for which specific guidelines exist. DFO's Statement *of Canadian Practice: Mitigation of Seismic Sound in the Marine Environment (Seismic Statement)* applies, unless otherwise noted, to all seismic activities that use an air source array.[xi]

Military Sonar and other Military Sound Producing Activities

DND has a Maritime Command Order establishing *Marine Mammal Mitigation Procedures* (MMMP) to "give direction and implement standards of practice when conducting Exercises-Operations that involve the use of Underwater Sound Generating Systems that may pose a pervasive disturbance, harassment or injury risk to marine mammals," and includes guidance for non-sonar activities such as weapons firings when in the area of Maritime Marine Mammals."[xii] The MMMP standards of practice which include mitigation avoidance zones, pre-exercise planning, pre-exercise start procedures, ramp-up procedures, exercise operating procedures are not legally binding.

Underwater Construction

Canada's approach to mitigating ocean noise produced by underwater construction activities such as dredging and pile driving in the Pacific Region are similar to those for seismic air guns.[xiii] Measures to mitigate construction noise will typically be applied when an underwater construction project may disturb a marine species, or as a condition of an environmental assessment.

Regulating Projects through Environmental Assessments

Proposed projects with the potential for negative environmental impacts may undergo environmental assessment (EA).

The *Canadian Environmental Assessment Act*[xiv] *(CEAA)* is the principal piece of federal legislation by which the environmental effects of human undertakings are assessed. Ocean noise has been assessed as an environmental effect of projects conducted in marine environments that have undergone an environmental assessment under *CEAA.*

If a proponent cannot mitigate the significant adverse environmental effects from project-related activities that produce underwater ocean noise, the project may be denied approval, or postponed. An example of an EA in the Pacific that resulted in a project postponement is the Batholiths Project, which was put on hold due to uncertain potential effects from airguns used in seismic technology on marine mammals listed in Canada's *Species at Risk Act* (SARA).[xv]

Regulators can also impose conditions on project approval to mitigate noise impacts. Mitigation measures imposed in this manner are variable and are not imposed by regulation. An example of a project currently undergoing an environmental assessment and National Energy Board hearing, combined into a Joint Review Panel (JRP) is the Enbridge Northern Gateway (ENG) project, which would add at least 220 tankers, or 440 transits, to Douglas Channel each year. Enbridge proposes to use a Marine Mammal Protection Plan with a variety of mitigation measures to manage underwater noise, e.g., vessel speed restrictions, construction and decommissioning of support vessels, and low noise propulsion. DFO Science stated in its review of the ENG project that: "It is not possible at this time for DFO Science to determine acceptable noise thresholds in the [area] in the absence of additional modeling and in-field measurements." [xvi] Most recently, the JRP issued a total of 199 conditions should the ENG project be approved, with a number of these related to underwater noise impacts. These potential conditions could form part of any approval. However, ENG will not own or operate the tankers that call at the marine terminal. The JRP will issue its final report and recommendations on this Project by the end of December 2013.

Laws to Protect Species and Habitats from Harmful Levels of Ocean Noise

According to experts, mitigation and management of anthropogenic noise through the use of spatio-temporal restrictions of activities, or separating noise events and activities from biologically important areas or concentrations of cetaceans, is the most practical and straightforward approach to reduce effects on marine animals.[xvii]

There are examples where these restrictions have been used in other countries. Spain imposed a moratorium on the use of sonar around the Canary Islands due to beaked whale stranding episodes. Oil and gas exploration is not allowed and seasonal restrictions exist for vessel traffic in the marine mammal protection zone in the Great Australian Bight.

Species Laws

Underwater noise reduction or minimization at the national level in North America has tended to be through species protection laws, such as the US *Marine Mammal Protection Act*.

In Canada, if there is proof that ocean noise harms or disturbs species listed under Schedule 1 of SARA,[xviii] the federal endangered species law, then this Act provides some responses. The Act prohibits, provided certain criteria are met, the destruction of any part of the critical habitat of "any listed endangered species or of any listed threatened species — or of any listed extirpated species if a recovery strategy has recommended the reintroduction of the species into the wild in Canada." The case *David Suzuki Foundation v. Canada (Department of Fisheries and Oceans)*[xix] confirmed that the acoustic quality of killer whale critical habitat was an aspect of critical habitat that must be legally protected.

The federal *Fisheries Act*[xx] could be used to regulate ocean noise through prohibitions on destroying fish other than by fishing, and through habitat protection provisions (though the impact of new regulations under an amended *Fisheries Act* are still uncertain). The Act defines "fish" to include marine animals and "fish habitat" as the "spawning grounds and nursery, rearing, food supply and migration areas on which fish depend directly or indirectly in order to carry out their life processes." These sections enable ocean noise to be regulated if it can be shown to destroy the species or harmfully alter, disrupt or destroy its habitat (or cause serious harm to fish, when the new habitat section of the *Fisheries Act* comes into force).

The *Marine Mammal Regulations*, enacted under the *Fisheries Act*, prohibit the "disturbance" of marine mammals by any means other than fishing.[xxi] The "Be Whale Wise Guidelines" have also been developed to minimize the impact of whale watching boats on whales.[xxii] Non-compliance may lead to prosecution.

Protected Areas Laws

Marine protected areas may provide the strongest form of protection from harmful noise impacts in the ocean. Several laws govern marine protected areas in Canada: under the *Oceans Act,*[xxiii] Cabinet can designate MPAs, prescribe zones in the MPAs, and prohibit activities within MPAs. Assuming ocean noise can be shown to negatively impact the health of marine environments, therefore contravening the purpose of MPAs (the conservation and protection of marine environments), then activities which produce ocean noise can be prohibited or regulated in MPAs.

Examples in Canada of federal MPAs that have controlled noisy activities through zoning restrictions include the St Lawrence Estuary MPA and The Gully MPA, both in Atlantic Canada.

Like MPAs, marine conservation areas established under the *Canada National Marine Conservation Areas Act*[xxiv] enable regulation of ocean noise by prohibiting activities that disrupt the health of marine ecosystems within their boundaries. A third form of federal marine protected area is a marine National Wildlife Area, which may also be used to protect against harmful underwater noise.[xxv]

An Option for Comprehensive National Regulation

One option for regulation is to set criteria for noise exposure that should not be exceeded. The federal *Oceans Act* could be used for this purpose through its Marine Environmental Quality guidelines provisions. DFO is "moving towards a more target-based program that focus on the development of standards and guidelines to improve or maintain Marine Environmental Quality." [xxvi] A starting point would be adopting an overarching goal akin to the ocean noise indicator as used by the EU's Marine Framework Strategy Directive: that the introduction of energy, including ocean noise, into Canadian waters does not adversely affect the marine environment.

Accounting for the cumulative and combined effects of repeated exposure to sounds from different sources is important in considering new ways to regulate noise in Canada.

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[i] "To date mitigation measures for underwater noise fall into two main categories: noise control at source and spatio-temporal restrictions of noise producing activities." Convention on Biological Diversity. Scientific Synthesis on the Impacts of Underwater Noise on Marine and Coastal Biodiversity and Habitats**.**CBD/CBD/SBSTTA/16/INF/12.Montreal, Canada. at page 52. 2012.

[ii] PROVISIONS FOR REDUCTION OF NOISE FROM COMMERICAL SHIPPING AND ITS ADVERSE IMPACTS ON MARINE LIFE, Report of the Correspondence Group, Submitted by the United States, DE 56/17, 12 December 2012, was submitted to the IMO's Design and Equipment Subcommittee in March 2012. There are other IMO procedures and tools that can be used to minimize shipping noise. For example, the IMO's Guidelines for the Designation of Special Areas and the Identification of Particularly Sensitive Sea Areas identify shipping noise as a pollutant that can adversely affect the marine environment and living resources of the sea. Canada has no PSSAs at present.

[iii] "Pollution" is broadly defined in the Directive to specifically include "human-induced marine underwater noise" (Article 3(8)). Moreover, the qualitative descriptors for demonstrating a "good environmental status" for the purposes of the Directive, listed in Annex I, specifically includes underwater noise, while the indicative list of pressures upon the marine environment, listed in Annex III, also includes this source of disturbance, citing "shipping, underwater acoustic equipment" as particular examples.

Two suggested indicators for noise measures for Good Environmental Status have been proposed by a Task Group as follows:

11.1. Distribution in time and place of loud, low and mid frequency impulsive sounds

— Proportion of days and their distribution within a calendar year over areas of a determined surface, as well as their spatial distribution, in which anthropogenic sound sources exceed levels that are likely to entail significant impact on marine animals measured as Sound Exposure Level (in dB re 1ìPa 2 .s) or as peak sound pressure level (in dB re 1ìPa peak) at one metre, measured over the frequency band 10 Hz to 10 kHz (11.1.1)

11.2. Continuous low frequency sound

— Trends in the ambient noise level within the 1/3 octave bands 63 and 125 Hz (centre frequency) (re 1ìÑa RMS; average noise level in these octave bands over a year) measured by observation stations and/or with the use of models if appropriate (11.2.1).

Tasker, M. Amundin, M. Andre, A. D. Hawkins, W. Lang, T. Merck, A. Scholik- Schlomer, J. Teilman, F. Thomsen, S. Werner, and M. Zakharia, "Marine Strategy Framework Directive: Task Group 11 Report: Underwater noise and other forms of energy," European Commission and International Council for the Exploration of the Sea, Luxembourg, 2010. http://www.ices.dk/projects/MSFD/TG11final.pdf

[iv] Convention on Biological Diversity. Scientific Synthesis on the Impacts of Underwater Noise on Marine and Coastal Biodiversity and Habitats**.**CBD/CBD/SBSTTA/16/INF/12.Montreal, Canada. 93pp., 2012.at pg. 55

[v] Merchant, N.D., et al. Assessing sound exposure from shipping in coastal waters using a single hydrophone and Automatic Identification System (AIS) data. Mar. Pollut. Bull. (2012), http://dx.doi.org/10.1016/j.marpolbul.2012.05.004

[vi] Transport Canada, Frequently Asked Questions http://www.tc.gc.ca/eng/marinesafety/rsqa-csa2001-faq-2037.htm

[vii] *Canada Shipping Act*, 2001, SC 2001, c 26, s 6(c).

[viii] Pursuant to s.190 of the *Canada Shipping Act,* the Governor in Council may, on the recommendation of the Minister of Transport, make regulations respecting the protection of the marine environment. This includes the power to make regulations under s.190 (1) (h) "respecting the design, construction, manufacture and maintenance of vessels or classes of vessels."

[ix] Section 207(2)(b) of the *Canada Shipping Act*

[x] *Canada Marine Act*, (S.C. 1998, c. 10) sections 56 and 58

[xi] Department of Fisheries and Oceans. Statement of Canadian Practice: Mitigation of Seismic Sound in the Marine Environment, at: Date Modified: 2010-07-09.

[xii] Maritime Command Order: Marine Mammal Mitigation Procedures (MMMP), MARCORD 46-13, Volume 3A, date of review April 2008. Provided by Lieutenant Diane Larose from Navy Public Affairs.

[xiii] Ford J.K.B., Rambeau A.L., Abernethy R.M., Boogaards M.D., Nichol L.M., and Spaven L.D.2009. An Assessment of the Potential for Recovery of Humpback Whales off the Pacific Coast of Canada. DFO Can. Sci. Advis. Sec. Res. Doc. 2009/015.

[xiv] *Canadian Environmental Assessment Act* 2012, S.C.2012, c. 19, s. 52.

[xv] See Ecojustice, Batholiths Backgrounder. A batholith is a large volume of previously molten rock, which has solidified and through erosion is now visible at the surface. In 2007, a planned scientific expedition using a seismic ship and the use of an array of 36 airguns that would be fired into the water every 20-60 seconds. was proposed for Douglas, Burke and Dean Channels to learn more about batholiths When a draft Environmental Assessment report (EA) found no significant environmental impact from the testing, the Living Oceans Society commissioned an independent review of the draft EA which found that the sounds could be 235 dB, and could penetrate up to 50 km into the sea floor. The review predicted that whales and dolphins would be at risk of hearing damage if they were within 1,000-3,500 m of the array, as they would be exposed to 180 dB.

[xvi] Canadian Science Advisory Secretariat, Science Response 2012/028 Science response to information requests submitted to the Enbridge northern gateway project environmental impact assessment hearings respecting ship strike risk and acoustic disturbance from shipping to whales.

[xvii] Convention on Biological Diversity. Scientific Synthesis on the Impacts of Underwater Noise on Marine and Coastal Biodiversity and Habitats**.**CBD/CBD/SBSTTA/16/INF/12.Montreal, Canada. 2012. at pg 86. Weilgart, L. S. "The impacts of anthropogenic ocean noise on cetaceans and implications for management." *Canadian Journal of Zoology* 85.11 (2007): 1091-1116. At pg 1108: "The precautionary approach increases the chances of being able to contain an environmental problem before irreversible damage is done. As such, reducing overall noise levels (the 'acoustic footprint'') in the marine environment should be a priority. Secondly, distancing noise events from biologically important areas or concentrations of cetaceans should be pursued. These two mitigation measures will probably go furthest in protecting cetaceans from anthropogenic noise."

[xviii] *Species at Risk Act*, SC 2002, c 29.

[xix] *David Suzuki Foundation v. Canada (Fisheries and Oceans)*, 2010 FC 1233 (CanLII), confirmed on appeal, 2012 FCA 40 (CanLII) .

[xx] *Fisheries Act*, RSC 1985, c F-14.

[xxi] *Marine Mammal Regulations,* SOR/93-56, s. 7.

[xxii] DFO, NMFS, The Pacific Whale Watch Association. "Be Whale Wise - Marine Wildlife Guidelines for Boaters, Paddlers and Viewers. "

[xxiii] *Oceans Act*, SC 1996, c 31, s.35.

[xxiv] *Canada National Marine Conservation Areas Act*, SC 2002, c 18.

[xxv] *Canada Wildlife Act* (R.S.C. 1985, c. W-9).

[xxvi] Heather Danielson & Mike Stoneman, "Canada's Approach to Oceans Management & Current Status on Ocean Noise Initiatives", Presentation delivered at the WWF-Canada Ocean Noise in Canada's Pacific Workshop, 1 February 2012.