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Managing Disposal at Sea Indicator

Data Sources and Methods

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Canada

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1. Introduction

This report is released under the Canadian Environmental Sustainability Indicators (CESI) initiative. Each indicator reported under CESI has an associated "data sources and methods" report to provide technical detail and other background to facilitate interpretation of each indicator or allow others to conduct further analysis using the CESI data and methods as a starting point.

This report addresses the underlying methods and data for the Managing Disposal at Sea indicator as published on the CESI website (www.ec.gc.ca/indicateurs-indicators/).

2. Managing Disposal at Sea Indicator

Canada is a maritime nation. Surrounded by the Arctic, Atlantic and Pacific Oceans, Canada's coastline at 243 790 km is the longest in the world and has a vital interest in preserving a healthy marine environment. Regular dredging of ports, harbours and waterways is necessary to keep them open and safe. The Managing Disposal at Sea indicator provides information about whether the permit assessment process is able to sustainably manage Canada's marine disposal sites. The indicator reports yearly percentages of monitoring events triggering management action for Canada's disposal at sea sites from 1999-2008. Management actions are undertaken if conditions at the site are found to have the potential to harm the environment or human health.

Disposal at sea is the deliberate discarding of approved material from a ship, an aircraft, platforms or other structures at sea. In Canada, the material discarded is primarily dredged material, fish and excavation waste. Without a permit, it is illegal to dispose of anything at sea. Canada protects its marine environment by regulating disposal at sea through a permit system under the Canadian Environmental Protection Act, 1999. This permit system also allows Canada to meet its obligations on preventing marine pollution by disposal at sea, as set out in the London Convention 1972 (Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter) and the 1996 Protocol to the London Convention. Each year in Canada, between two and four million tonnes of material are disposed of at sea, about 90% of which is dredged sediment from estuarine or marine sources or excavated inorganic material from land based sources (Environment Canada, 2010).

Prior to the issuance of a permit, an assessment is conducted to ensure disposal at sea is the environmentally-preferred option and that the disposal will not harm human health or the marine environment. To ensure no harm is being done, monitoring is conducted at a number of disposal sites each year in relation to impact hypotheses generated during permit review. If conditions at the disposal site are found to be negatively affecting the marine environment, a change in how waste is managed at the site, called a management action, may be necessary. Examples of management actions include changing how the site is managed, changing the site boundaries, or even closure of the site. Management action may also be taken based on conditions that do not relate directly to environmental sustainability. For example, physical monitoring may show a site is filling up and reaching its capacity to hold material. Further use of the site could lead to navigational hazards if the overlying water becomes too shallow and therefore the site could be closed.

3. How the measure was calculated

To calculate the indicator, the number of disposal sites requiring management action in a year was divided by the total number of sites studied that year. This calculation was performed for all years between 1999 and 2008. The Disposal at Sea program at Environment Canada has an annual target of 85% of sites not requiring management action. This target demonstrates ocean disposal sites are being used sustainably and impacts on the sites are as predicted.
uses.

4. Data source(s)

Environment Canada conducts monitoring activities in conjunction with researchers from other departments with an interest in ocean sciences such as Fisheries and Oceans Canada and Natural Resources Canada. Monitoring a disposal at sea site involves an assessment of its physical, chemical and biological characteristics. Physical monitoring relates to the collection of information necessary to establish the area of deposition and to document evidence of sediment transport. Chemical monitoring assesses the presence of persistent, toxic or bioaccumulative contaminants in sediments. Biological monitoring assesses the degree of disturbance at disposal sites through biological testing in the laboratory and benthic community surveys.

Following monitoring, if chemicals in sediments are below the Lower Action Levels defined in the *Disposal at Sea Regulations* (*Canadian Environmental Protection Act 1999*) and pass all biological tests, no management action is required. When results from chemical or biological tests are a cause of concern, the first step requires verifying compliance with criteria defined in the terms of the permit. The second step involves further site characterization to identify management actions. The Marine Protection Programs Section of Environment Canada produces an annual report outlining monitoring activities at each of the disposal sites (Environment Canada, 1999-2008). These documents contain full details about the monitoring projects and any resulting management action.

4.1 Station Selection and Spatial Coverage

To calculate the indicator, all stations monitored from 1999, the year the monitoring program began, to 2008, the last year with available data, were used. The number of sites monitored, site selection and the monitoring itself follow monitoring guidelines developed to help ensure monitoring studies can detect issues at disposal sites (Environment Canada, 1998). These selection criteria resulted in the selection of between 3 to 20 sites depending on the year with the average number of monitored stations being 9.5 (Table 1). Disposal sites not monitored were not included in the analysis as they were not part of the indicator requirements. The indicator only monitors the percentage of monitoring events triggering management actions.

Table 1: Monitoring of disposal at sea sites per year and per region (Environment Canada, 1999-2008)

Year	Region	Number of sites monitored	Number of sites requiring management action	Total number of sites monitored
1999	Atlantic Quebec Pacific and Yukon	1 1 1	1	3
2000	Atlantic Quebec Pacific and Yukon	1 2 1	1	4
2001	Atlantic Quebec Pacific and Yukon	2 5 4		11
2002	Atlantic Quebec Prairie and Northern	3 1 3		7
2003	Atlantic Quebec Pacific and Yukon	3 5 6		14
2004	Atlantic Quebec Pacific and Yukon	2 6 4		12
2005	Atlantic Quebec Prairie and Northern Pacific and Yukon	1 1 1 9	1	12
2006	Atlantic Quebec Prairie and Northern	2 3 1		6
2007	Atlantic Quebec Prairie and Northern Pacific and Yukon	6 9 4 1		20
2008	Atlantic Quebec	2 4		6

4.2 Data Quality and Completeness

Full details of the monitoring projects and management action taken as a result are published annually (Environment Canada, 1999-2008). Disposal at Sea figures and results were generated by staff in the Marine Protection Program and the Information and Indicators Divisions of Environment Canada.

The data used in this report were subject to quality assurance and quality control procedures to ensure that they adhere to Environment Canada's and partners' data requirements. Supporting

national guidelines (Environment Canada, 1998a), two technical guidance documents were produced on physical monitoring (Environment Canada, 1998b) and on chemical and biological monitoring (Environment Canada, 1994) to ensure quality assurance and quality control.

4.3 Timeliness

There is a time lag of two years between 2008, the last year reported, and the publication of this indicator. This time lag is due to the time required to perform the monitoring, compile the data at the national level, analyse, review and report the data.

5. Caveats and Limitations

5.1 Varying Sample Sizes

Disposal sites are monitored on a representative basis; not all disposal sites used each year are monitored. Some years have far fewer sites monitored than others, which can skew percentages. Since the program began, three management actions have been required, one each in 1999, 2000, and 2005. When converted to percentages, the annual variance in sample sizes translates to 66% of sites in 1999 required no management action compared to 92% in 2005.

6. References

Environment Canada. 1999-2008. Annual Compendia of Monitoring Activities at Disposal at Sea Sites Reports. Individual Annual Compendia available at: http://www.ec.gc.ca/iem-das/default.asp?lang=En&n=F25958B2-1

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