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Data Sources and Methods for the Shellfish Growing Area Quality Indicator

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Canada

1 Introduction

The Shellfish Growing Area Quality Indicator is part of the Canadian Environmental Sustainability Indicators (CESI) (http://www.ec.gc.ca/indicateurs-indicators/default.asp?lang=En) program, which provides data and information to track Canada's performance on key environmental sustainability issues.

2 Description and rationale of the Shellfish Growing Area Quality indicator

2.1 Description

CESI reports on Environment Canada's classification of Canadian bivalve molluscan shellfish growing areas as a measure of the impacts of human activity on marine water quality

2.2 Rationale

Bivalve molluscan shellfish include oysters, clams, geoduck clams, mussels, scallops and cockles. As a group, they are filter feeders taking in food from the water flowing over their growing area. As a result, they accumulate chemicals, bacteria and viruses as well as naturally occurring toxins from the surrounding waters. Environment Canada monitors water quality in shellfish growing areas for the purpose of classifying these waters based on their suitability for shellfish harvesting for human consumption. Upon completion of a water survey, shellfish growing areas are assigned to one of five classifications: approved; conditionally approved; restricted; conditionally restricted; and prohibited.[1]

Classifications are based on fecal coliform bacteria concentration in the waters within shellfish growing areas. These bacteria, found in human and animal wastes, enter marine waters from land-based pollution sources such as municipal wastewater treatment plants, industrial facilities, poorly maintained septic systems, surface runoff from agricultural areas and sea-based sources such as discharge from boats and wildlife. High levels of fecal coliform contamination also suggest waterborne pathogens may be present at high enough levels to cause illness in humans who consume shellfish from these contaminated waters.

Environment Canada conducts microbiological testing of waters in shellfish growing areas under the Canadian Shellfish Sanitation Program (CSSP), a program led by the Canadian Food Inspection Agency (CFIA) in partnership with Environment Canada and Fisheries and Oceans Canada. Under the CSSP , Environment Canada makes recommendations to its CSSP partners about the classification of shellfish growing areas based on water quality testing and shoreline investigations of actual and potential pollution sources. The classification provides a measure of the overall quality of the marine waters in the shellfish growing areas.

3 Data

3.1 Data source

Data for this indicator come from Environment Canada's Marine Water Quality Monitoring Program which monitors the water in shellfish growing areas. The results of this monitoring form the basis for assigning and maintaining the classification of an area as suitable for shellfish harvest.

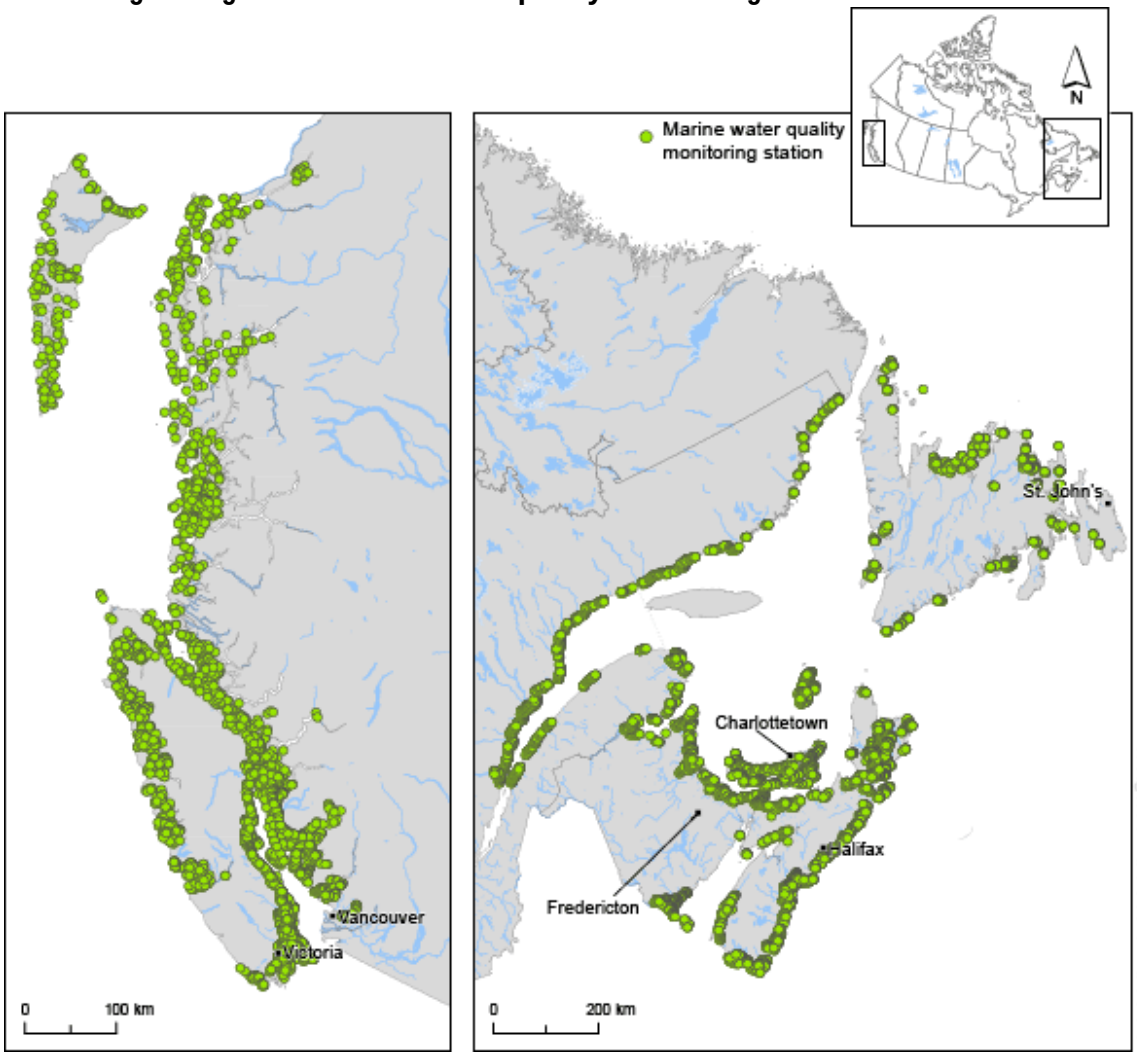
[1] See Methods section of this document for classification definitions

3.2 Spatial coverage

CSSP focuses its classification efforts on three coasts:

- Atlantic (Newfoundland and Labrador, Prince Edward Island, Nova Scotia, and New Brunswick),
- Quebec (North Shore of the St. Lawrence, Magdalen Islands, Lower St. Lawrence, Gaspésie and Charlevoix regions), and
- Pacific (Vancouver Island, Central and North coasts, and Queen Charlotte Islands).

Shellfish growing area marine water quality monitoring stations



Source: Environment Canada (2011) Marine Water Quality Monitoring Program. (http://www.ec.gc.ca/marine/)

3.3 Temporal coverage

Surveys of shellfish growing areas are conducted annually because the CSSP requires five samples be collected each year at every monitoring station. Classifications are fully re-evaluated every three years.

3.4 Data completeness

Initial classifications of shellfish growing areas are determined through comprehensive surveys consisting of a shoreline sanitary investigation, bacteriological testing of at least 15 samples per monitoring station, and the analysis of hydrologic and meteorological factors that may influence the distribution of pollutants through the growing area. Based on the results of these surveys, investigations and analyses, a shellfish growing area may be assigned to one of five classifications.

4 Methods

This indicator reports on shellfish growing area classified as approved or conditionally approved for harvesting on the Atlantic, Quebec, and Pacific coasts.

Shellfish growing areas are classified according to the following definitions[2]:

- Approved: The area is not contaminated with fecal material, pathogenic micro-organisms, poisonous or deleterious substances to the extent that consumption of the shellfish might be hazardous. The median or geometric mean concentration of fecal coliform in the water does not exceed 14/100 mL.
- Conditionally Approved: The shellfish area meets the approved classification criteria for a predictable period. These shellfish areas are subject to intermittent pollution caused by releases or discharges from wastewater treatment and collection systems, seasonal populations, nonpoint-source pollution or boating activity.
- Restricted: Harvesting of shellfish is not permitted in the area, except by licence issued under Management of Contaminated Fisheries Regulations, due to contamination by faecal material, pathogenic micro-organisms, poisonous or deleterious substances to the extent that consumption of the shellfish might be hazardous.
- Conditionally Restricted: The shellfish area meets, at a minimum, the restricted classification criteria for a predictable period. These shellfish areas are subject to intermittent pollution caused by releases or discharges from wastewater treatment and collection systems, seasonal populations, nonpoint-source pollution or boating activity.
- Prohibited: Shellfish are not to be harvested from prohibited areas for any purpose, with the exception of specially licensed harvesting for seed, spat, bait and for scientific purposes, all of which may be collected under special license.

5 Caveats and limitations

- In 2009, shellfish growing areas in Quebec were recalculated using geographic information system (GIS) technology to improve the accuracy of area measurement. This method change means classified areas for Quebec prior to 2009 cannot be compared to those after 2009.)
- While Environment Canada assesses shellfish growing areas to determine levels of contamination, these classifications do not reflect whether shellfish harvesting is authorized at a particular location. The status of shellfish harvesting is determined by Fisheries and Oceans Canada with advice from Environment Canada and CFIA. For more

[2] Adapted from Chapter 2 of the Canadian Shellfish Sanitation Program - Manual of Operations (2011) Retrieved on 9 November, 2011. Available from: http://www.inspection.gc.ca/english/fssa/fispoi/man/cssppccsm/cssppccsme.shtml.

information on the status of shellfish growing areas, see Fisheries and Oceans Canada's Fishery Openings and Closures website (http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/oc-of-eng.htm).

- This indicator only looks at measured concentrations and potential for microbiological contamination in shellfish growing area waters and does not account for chemical or biotoxin contamination. For more information on chemicals, biotoxins and marine water quality, see CFIA's Control of Marine Biotoxins (http://www.inspection.gc.ca/english/fssa/fispoi/man/cssppccsm/chap11e.shtml) and Action Levels and Tolerances for Poisonous and Deleterious Substances (http://www.inspection.gc.ca/english/fssa/fispoi/man/cssppccsm/append2e.shtml).
- Areas may be classified as prohibited due to several factors even if routine monitoring indicates the bacteriological water quality meets higher standards. These factors include buffer zones around intermittent and potential pollution sources, wharves and changes to program policy that increase buffer zones for greater food safety protection.
- In the Pacific region, annual data are compiled from computer-generated area polygons in regional GISs. The degree of precision depends on the base-map resolution and theaccuracy of the coordinates used to delineate boundaries. Classification boundaries are continuously being modified due to classification changes and refinements in the creation or modification of the area polygons. Numeric totals are variable and small changes in the annually reported area size are insignificant. This caveat applies particularly to the approved area classification and, to a lesser extent, restricted/conditionally restricted areas as they are defined by legal boundary descriptions.
- Updating of the classification of shellfish growing areas on the Pacific coast was begun in 2010; as a result, the 2010 data may not be comparable to those of previous years.

6 References and further reading

Environment Canada (2009) Marine Water Quality Monitoring. Retrieved on 9 November, 2011. Available from: http://www.ec.gc.ca/marine/default.asp?lang=En&n=F2648EE6-1

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