

Geological Survey of Canada / Commission géologique du Canada

FIGURE 2.
Sensitivity of the coasts of Canada to sea-level rise

J. Shaw, R.B. Taylor, D.L. Forbes, M.-H. Ruz, and S. Solomon
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 Scale 1 : 6 750 000

0 200 400 600 800 1000
 Kilometres

Digital base map from Canadian Hydrographic Service Map M-270.

This figure shows the sensitivity of the coastlines of Canada to an accelerated rise in sea level due to global warming. The increase could amount to 0.65 m by the end of the next century (Houghton et al., 1990). Here, sensitivity means the degree to which a coastline may experience physical changes due to sea-level rise. These could include, for example, erosion, inundation, increased frequency of overtopping and overwashing, beach migration, and coastal dune destabilization. The figure depicts spatial variation of a sensitivity index, a modified version of the coastal vulnerability index of Gornitz (1990), which is obtained by manipulating scores of 1 to 5 attributed to each of seven variables: relief, geology, coastal landform, sea-level tendency, shoreline displacement, tidal range, and wave height. Data were obtained for each of 2899 NTS sheets at a scale of 1:50 000.

Sensitivity Index scores range from 0.8 to 56.7, with a modal value of 4.2. They are grouped into three categories: low (0 - 4.9), moderate (5.0 - 14.9), and high (≥15.0). Two major regions of high sensitivity are identified: (1) Maritime Canada (parts of the coasts of Nova Scotia, Prince Edward Island, and New Brunswick) and (2) parts of the Beaufort Sea coast. Small areas of high sensitivity occur in Quebec, Newfoundland, and British Columbia. The scores are not equated with specific effects; they merely indicate in a relative sense the degree of change to be expected. Furthermore, at this scale the data are highly generalized, and there is no accounting for very small areas of high sensitivity (cf. photograph D).

The bulletin describes the potential impacts of sea-level change, using the coastal environments of Owens (1977a) as a framework. The emphasis is on the range of processes which occur today on Canadian coasts and which would be intensified if sea-level rise were to occur.

The present rate of sea-level change is shown at selected tide-gauge stations, one of the seven factors used for calculating the sensitivity index. Accelerated sea-level rise would be superimposed on these existing trends. Photographs A to L illustrate the diversity of Canadian coasts and the wide range of impacts that might be expected.

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COASTAL ENVIRONMENTS OF CANADA

Owens (1977a) classified the coasts of Canada into distinct coastal environments on the basis of "the physical processes that act on the shoreline and on the geology and relief of the coastal zone". These environments are used as a framework for discussion in the text.

- ATLANTIC COAST**
- 1 Labrador and outer Newfoundland
 - 2 Western Newfoundland and northern gulf
 - 3 St. Lawrence estuary
 - 4 Southern Gulf of St. Lawrence
 - 5 Atlantic Nova Scotia
 - 6 Bay of Fundy
 - 7 Sable Island

- PACIFIC COAST**
- 1 Fraser River Delta
 - 2 Queen Charlotte Strait and Strait of Georgia
 - 3 Juan de Fuca Strait
 - 4 Outer coast
 - 5 Queen Charlotte Sound and Hecate Strait
 - 6 East Graham Island

- ARCTIC COAST**
- 1 Frobisher Bay, Ungava Bay, and Hudson Strait
 - 2a/b Hudson Bay and James Bay
 - 3 Fjord coasts
 - 4 Jones Sound, Lancaster Sound, and Prince Regent Inlet
 - 5 West Ellesmere Island and Axel Heiberg Island
 - 6 Arctic Ice Shelf
 - 7 Arctic Coastal Plain
 - 8 Ria coast
 - 9 Southern Arctic Archipelago and mainland
 - 10 Liverpool Bay and Tuktoyaktuk Peninsula
 - 11 Mackenzie Delta
 - 12 Yukon



* Box outline colours correspond to coastal environments as shown on map

