INSTITUTE OF OCEAN SCIENCES

Canada's newest oceanographic institute, the Institute of Ocean Sciences (IOS), is situated on the Pacific coast near Victoria, British Columbia. Its broad mandate includes the study of lakes and rivers, coastlines and oceans. Like the Bedford Institute of Oceanography, it is a regional centre and co-ordination point for the ocean research activities of several government departments. Serving as home base for hydrographers and specialists in marine sciences, IOS is involved in several long-term international experiments including the investigation of marine pollution, ocean circulation and the ways in which the oceans affect the earth's weather and climate.

CHAMPLAIN CENTRE FOR MARINE SCIENCE AND SURVEYS

One important set of studies carried out at the Champlain Centre for Marine Science and Surveys in Quebec is in the area of pollution control. Now under study is the distribution of mercury and cancer-causing hydrocarbons in the ecosystems of the Saguenay Fjord and the Gulf of St. Lawrence. Among native species, the blue mussel has been singled out for careful study. It is a particularly useful "tip-off" species for the state of pollution in marine waters.

Other studies are concerned with the substantial increase in hydroelectric development projects on major Quebec waterways. In response to the mega-projects either completed or planned for James, Hudson and Ungava Bays, as well as for the northern Gulf of St. Lawrence, oceanographers are intensifying research on the impact of man-made changes to the freshwater run-off on the marine environment.

The centre is also determining the impacts, if any, of heavy liquified natural gas tanker traffic on the waters off Quebec's coastline. Assessments are now being made of possible sites for terminals.

Hydrography in Quebec is also conducted from this institute.

TSUNAMIS

Tsunamis are particularly terrifying waves. Triggered by quakes on the ocean floor, they race silently across the ocean, several hundred kilometres long, but only a metre or so high, travelling as fast as jet airliners, but invisible from ships and aircraft. Only when close to shore, where the shallow bottom forces them upward, do the tsunamis rear to full height, sometimes as high as ten metres. Arriving with stupendous force and without warning, they have taken heavy tolls on life throughout history. They are more prevalent in the Pacific than anywhere else.

Canadian research on the tsunami phenomenon is aimed at improving early warning capabilities. Canada is one of 25 member countries engaged in co-ordinated tsunami research. Information is gathered from outposts throughout the world and relayed to threatened areas when tsunamis are detected. Since 1948, when an early warning system was established in Honolulu, the cost in lives has been greatly reduced.

Canada has pioneered an automatic telephone "early warning system" for tsunamis.

BAY OF FUNDY STUDIES

In response to the proposed damming of a river mouth for a tidal power project on the Bay of Fundy, scientists at the Marine Ecology Laboratory of the Bedford Institute of Oceanography have developed a mathematical computer model of the dam's effects. With this, they can predict the ecological and tidal impacts of building a real dam. The effects of such a dam would be as far-reaching as the influence of Fundy tides themselves — which range from the Bay of Fundy and the Gulf of Maine as far south as the city of Boston, USA.

In such a mammoth and potentially dangerous project, mathematical modelling gives planners a good idea of what to expect at relatively small expense. For instance, the computer can predict disastrous tidal backlashes that may occur when the volume of an entire river is thrown back on itself.

In supporting studies, scientists are investigating the potential impacts on neighbouring wildlife habitats in low-lying areas.

Information generated by these studies, and from other sources in government and industry, is continuously channelled into a central bank of information, called MEDS (for Marine Environmental Data System). MEDS is a fully computerized bank from which scientists, engineers and others can get answers to their questions about the oceans.

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