

runs along the entire west coast of the Canadian Arctic Archipelago from Banks Island to Greenland. Major channels between the islands have flat floors at about the same depth as the shelf. A few local irregularities may be the result of glacial action. The only deep indentation is one sinuous canyon that heads off Robeson Channel at the northeastern end, close to Greenland. Submerged sides of the channels of the archipelago, and slopes from the islands' western shores are marked in many places by a series of steps.

1.2.4 Islands

Canada's largest islands are in the North in the Canadian Arctic Archipelago. The northern group extends from the islands in James Bay to Ellesmere Island which reaches 83°07'N.

The largest on the West Coast are Vancouver Island and the Queen Charlotte Islands, but the coastal waters are studded with many small rocky islands. The largest off the East Coast are the Island of Newfoundland, Prince Edward Island, Cape Breton Island, Grand Manan and Campobello islands of New Brunswick and Anticosti Island and the Îles de la Madeleine of Quebec.

Notable islands of the inland waters include Manitoulin Island, in Lake Huron, the so-called Thirty Thousand Islands of Georgian Bay and the Thousand Islands in the outlet from Lake Ontario into the St. Lawrence River.

The areas of principal islands by region are given in Table 1.7.

1.2.5 Surveying and mapping

The surveys and mapping branch of the federal energy, mines and resources department (EMR) is Canada's national mapping agency. The branch provides the precise geodetic survey framework for all federal mapping and produces topographic maps, aeronautical charts, the *National atlas of Canada* and related thematic maps and base maps of various scales for specialized uses to provide geological, aeromagnetic, electoral and land-use information. The mapping of Canada has been completed at the scale of 0.4 cm to 1.0 km (1:250,000). All of the settled areas and many regions of northern development, amounting to slightly more than half of the country, have also been mapped at a larger scale of 2.0 cm to 1.0 km (1:50,000). All major cities and their suburbs are covered in 690 maps at the scale of 4.0 cm to 1.0 km (1:25,000). Photomaps derived from air photographs cover some of the areas mapped at the two largest scales.

A legal surveys division of EMR is responsible for the technical management of legal surveys of land under federal jurisdiction, such as the northern territories, national parks, Indian reserves and offshore areas and for the custody of the related land survey information. The division is implementing a property mapping system which will form the base

for a multipurpose land information system for Indian lands. It executes surveys on behalf of administering departments, collaborates in the demarcation and maintenance of provincial and territorial boundaries and verifies descriptions of electoral districts.

A geographical research division provides geographical information and cartographic advice to other federal programs. This division produces the *Canada gazetteer atlas* and aeronautical charts and related air information required for regulation, safety and development of Canadian civilian and military aviation. A national geographical names data base provides information on the status, origin and location of the names of 350,000 geographical features and places in Canada.

An international boundary commission maintains a well-defined boundary line between Canada and the United States and regulates all works, such as buildings, pipelines and roads crossing or near the line.

Maps, aeronautical charts and air information publications may be purchased, as well as reproductions of federal aerial photography from a national air photo library and colour transparencies of selected LANDSAT satellite scenes of the landmass.

A permanent committee on geographical names establishes federal policy for the treatment of geographical names. Its secretariat advises on the origin and use of names and geographical terminology. The committee of 20 members, representing both federal and provincial jurisdictions, recognizes the right of each province to make decisions on names in its own area.

1.3 Geology

According to global plate tectonics, now generally accepted, the outermost layer or shell of the earth, the crust, is composed of about 15 major plates floating like rafts on a plastic layer or sea of denser rock. The continents are not fixed permanently but move about at rates of a few centimetres a year, sometimes in polar regions, sometimes in equatorial regions. Where plates break and separate, seafloor spreading takes place and magma in the form of red-hot lava comes to the surface along the suture. The greatest mountain system on earth, which lies at the bottom of the sea as mid-ocean ridges extending continuously throughout all the world's oceans, was formed in this way. Submarine vents on seafloor spreading centres belch hot mineral-laden fluids, and have important implications for the origin of mineral deposits. Where plates collide and are consumed by the inner earth, deep ocean trenches, volcanoes and spectacular mountain belts are formed. These discoveries in the earth sciences in the last 20 years have had a dramatic impact on the interpretation and understanding of the geology of Canada.