

Bathymetry is the measurement of the depth at various places in the ocean. It significantly influences physical oceanographic processes, and, in turn, the biology and ecology of the marine ecosystem.¹ A selection of Natural Resource Map bathymetric contours (1:250,000) are shown in the accompanying map to provide a general overview of the bathymetry of PNCIMA, quantifying the underlying bathymetric image used throughout the atlas. The delineation of ecoregions conducted by the Province of BC, though not presented in detail in this atlas, provides a useful overview of the bathymetry of PNCIMA.

Along the coastline, PNCIMA consists predominantly of fjords carved into the granitic Coast Mountains. Shores tend to be rocky and steep with beaches restricted to sheltered areas adjacent to estuaries. The outer coastal areas are exposed to the open ocean, but sheltered areas occur behind islands and reefs, and the intersecting straits and channels provide a wide variety of exposures and habitats.¹ Within the northern shelf ecoregion of the Pacific, a distinctive geological feature is the shallow water area of Hecate Strait located between Haida Gwaii and the mainland coast.²

Johnstone Strait in the south is characterised by narrow constricted channels, while the adjoining Queen Charlotte Strait is a predominantly shallow (20 to 200m), high relief³ area with deeper fjords. The continental slope forming the western edge of PNCIMA is a steep, sloping shelf. Dixon Entrance in the north is an across-shelf trough with depths mostly less than 300m, surrounded by low-lying coastal plains, the Hecate Depression. The north coast fjords along the eastern (landward) edge of PNCIMA are deep (200 to 1,000m), narrow fjords cutting into high coastal relief. In the centre, Hecate Strait is very shallow, while Queen Charlotte Sound is a wide, deep shelf characterized by several large banks and inter-bank channels. A portion of the Vancouver Island shelf, the narrow gently sloping shelf north of the Brooks Peninsula, is also within PNCIMA.⁴

Johnstone Strait, Dixon Entrance and the north coast fjords generally consist of an equal mix of shallow and deep areas.

The remaining shelf areas are dominated by shallow (20 to 200m) depths with lesser amounts of deeper (200 to 1,000m) and photic (penetrable by light) (0 to 20m) depths. The north coast fjords are much deeper than the adjacent Hecate Strait and Queen Charlotte Sound. Hecate Strait and Queen Charlotte Strait have the greatest variation in relief with more than 50 percent of their areas consisting of high relief. Queen Charlotte Sound, north coast fjords, Vancouver Island shelf and the Strait of Georgia have ten to 20 percent high relief areas. The remaining ecoregions have less than ten percent high relief areas.⁴

It is difficult to define maximum depth for PNCIMA, as the boundary is identified by the base of the continental slope, which is established as the line where the slope gradient becomes less than 2.7 percent, rather than by depth contour.² The PNCIMA boundary is therefore displayed to provide a context of the range of bathymetry.

The offshore ecoregion borders PNCIMA to the west of the base of the continental slope,² and is comprised of the subarctic Pacific and transitional Pacific ecoregions. The area includes abyssal plain, continental rise and a seamount chain oriented NW/SE, among other features. Though generally deeper than the base of the continental slope, the offshore area does include features such as seamounts that rise above the abyssal plain.

Material presented is drawn from the following literature reviews, which include primary references:

- 1 Johannessen, D.I., Macdonald, J.S., Harris, K.A. and Ross, P.S. 2007. Marine environmental quality in the Pacific North Coast Integrated Management Area (PNCIMA), British Columbia, Canada: A summary of contaminant sources, types and risks. Can. Tech. Rep. Fish. Aquat. Sci. 2716: xi + 53 p.
- 2 Powles, H., Vendette, V., Siron, R. and O'Boyle, B. 2004. Proceedings of the Canadian Marine Ecosystems Workshop. DFO Can. Sci. Advis. Sec. Proceed. Ser. 2004/016
- 3 Relief is generally defined as the difference in elevation between the high and low points of a surface; changes in terrain, elevations or depressions in the land.
- 4 Howes, D.E., Zacharias M.A. and Harper, J.R. 1997. British Columbia marine ecological classification: marine ecoregions and ecounits. Resources Inventory Committee, Province of BC. <http://www.ilmb.gov.bc.ca/risc/pubs/coastal/marine/index.htm> (Accessed January 2011).

Photo: Mueller



Depth influences physical and biological processes in the ocean

