Energy, Mines and Resources Canada
Énergie, Mines et Ressources Canada

GEOLOGICAL SURVEY OF CANADA
COMMISSION GÉOLOGIQUE DU CANADA

NEARSHORE SURFICIAL GEOLOGY, HEAVY MINERALS AND GEOCHEMISTRY - NORTHERN JUAN DE FUCA STRAIT

C. E. Kilby*, B. D. Bornhold and J. V. Barrie

Nearshore surficial sediments, their heavy mineral content and Ti concentrations were mapped from shore to 100 m water depth between Sooke Bay and San Juan Point along northern Juan de Fuca Strait. Within the study area analyses from 150 offshore samples were utilised along with 382 km of high-resolution acoustic surveys. An additional 61 beach and river samples were used in the study of heavy mineral and Ti concentrations. Heavy mineral analysis were performed on the sand fraction of selected samples.

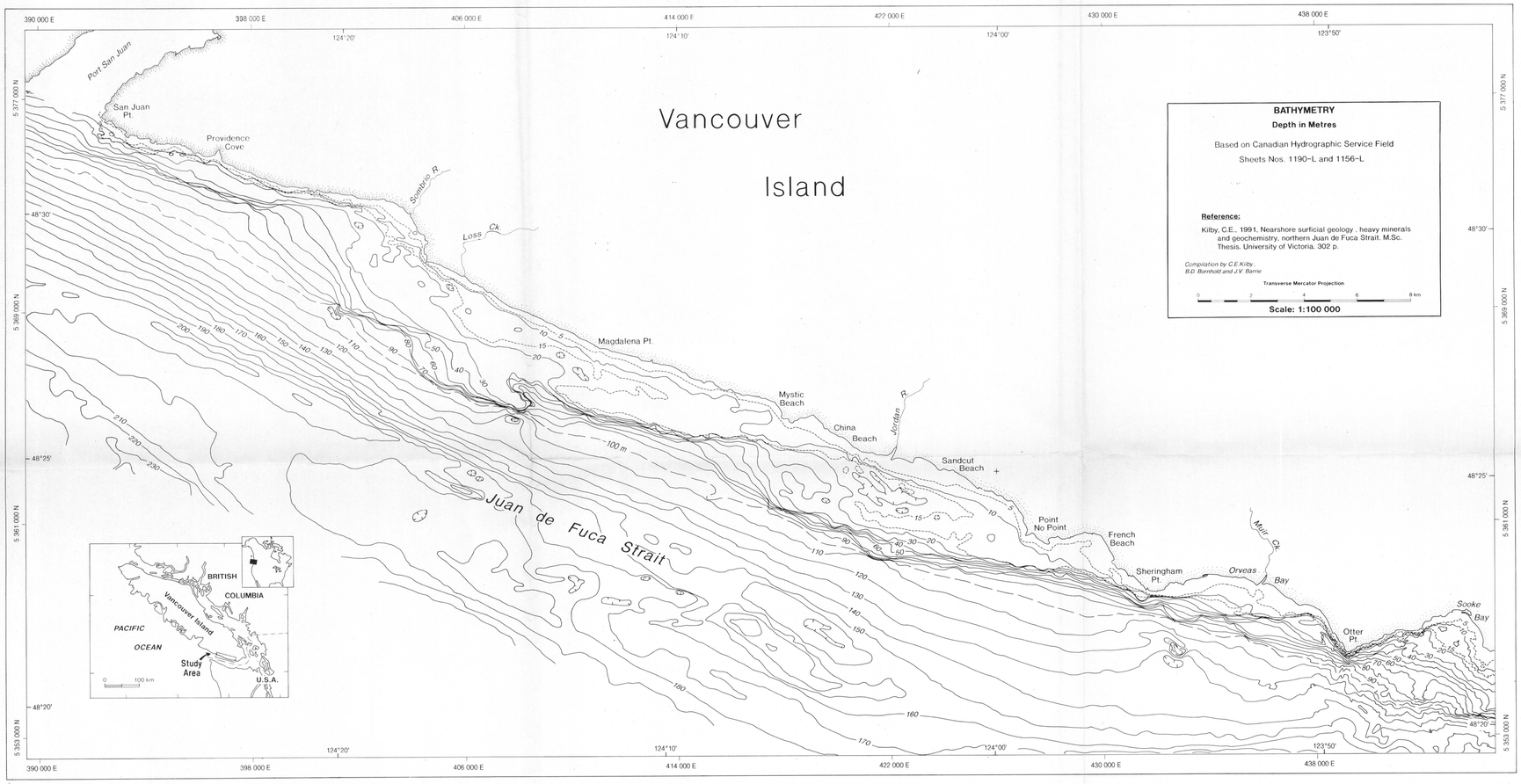
Seabed surface samples reveal sediments which are texturally and mineralogically immature. A series of shallow (above 30 m depth) nearshore terraces are covered with a thin veneer (few metres or less) of relict glacial gravel and boulders along with fine to medium sand. Below 80 m depth a muddy veneer covers a sediment wedge which thickens towards the centre of the strait. Recent sediments are derived from reworked underlying and adjacent glacial material and terrigenous lithologies. Sediments are winnowed and reworked into bedforms such as flow-transverse dunes and oscillation ripples.

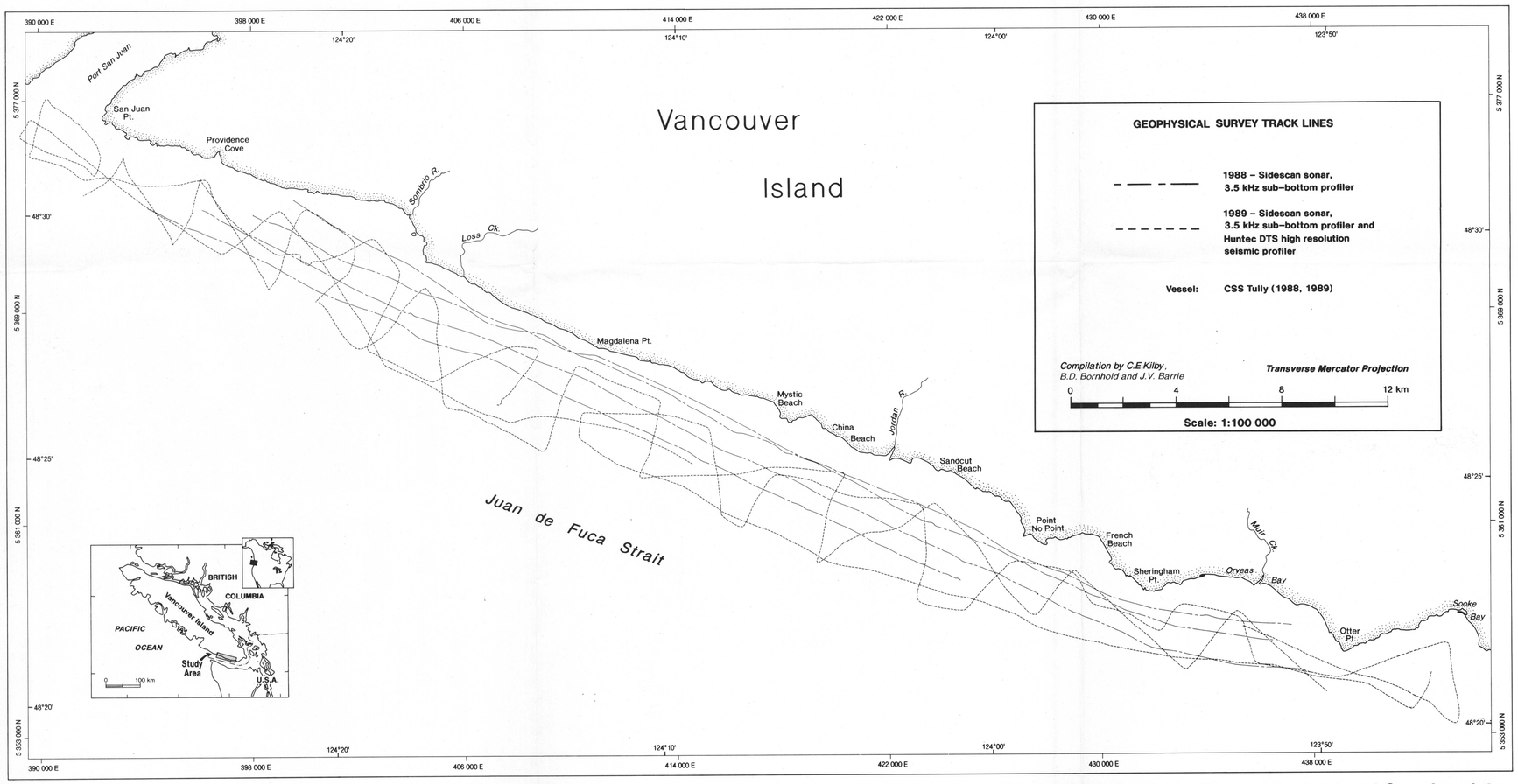
Heavy minerals averaging 7% are found in the sand fraction of the sediments. They consist primarily of amphiboles (hornblende), epidote and lithic fragments. Magnetite/ilmenite are the predominant opaque minerals. Ti shows background levels along Sandcut Beach extending to at least 800 m from shore. Source of this concentration is believed to be from mine tailings dumped at, and below tide-water along the coast to the west.

The maps are based on work towards a M.Sc. by the first author:

Kilby, C.E. (1991) Nearshore Surficial Geology, Heavy minerals and Geochemistry, Northern Juan de Fuca Strait. Unpublished M.Sc. Thesis, University of Victoria, Victoria , British Columbia, 302 pp.

* Centre for Earth and Ocean Sciences, University of Victoria, Victoria B.C., V8W 3P6





Copies of this map may be obtained from Island Blue Print Co. Ltd.: 905 Fort Street, Victoria, B.C. V8V 3K3

Nearshore Surficial Geology, Heavy Minerals and Geochemistry – Northern Juan de Fuca Strait

Open File 2523 Sheet 1 of 3

Canada