

A Summary of U.S. Geological Survey Marine Geologic
Studies on the Inner Shelf of the Chukchi Sea, Alaska
1975 and 1981

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This report is preliminary and has not
been reviewed for conformity with Geological Survey
editorial standards and stratigraphic nomenclature.

Any use of trade names is for descriptive
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The U.S.G.S. vessel R/V KARLUK made reconnaissance geologic surveys of the inner shelf of the Chukchi Sea, Alaska, in the summers of 1975 and 1981. The areas covered by these surveys include parts of lease sale 85, Barrow Arch, and lease sale 86, Hope Basin (Figure 1). In addition to the nearshore surveys using the R/V KARLUK, the U.S.G.S. has conducted surveys of the offshore parts of the Chukchi Sea using larger vessels. The areas surveyed by those larger vessels slightly overlap the areas surveyed by the KARLUK. In this report we outline the scope of our KARLUK-based field efforts on the inner shelf of the Chukchi Sea, describe the equipment used, and give information on the location and availability of the data.

Our primary goal on both the 1975 and 1981 cruises was to determine, at a reconnaissance level, the geologic character of the seafloor on the inner shelf of the Chukchi Sea. We obtained geophysical data along 1174 km of trackline, took 42 sediment grab samples, and made underwater television observations at 17 sites. The tracklines are shown in Figures 2-5, and sediment sample and TV observation locations are shown in Figures 5-7. The area covered in most detail was between Barrow and Wainwright, especially the area adjacent to Peard Bay. Elsewhere, targets of opportunity were surveyed as weather conditions permitted during our travel along the coast. Strong winds and high waves hampered operations on some days and resulted in poor-quality records. Ice conditions limited operations as far south as Wainwright during 1975 and in the vicinity of Barrow during 1981. Geophysical data and samples were obtained within the bays and lagoons at times when weather conditions did not permit work on the open shelf.

Navigational control was based partly on a Del Norte trisponder system, partly on radar, and, at the seaward ends of some lines, on dead reckoning. The probable uncertainty in position ranges from 100-200 m nearshore to as

much as 2 km under dead reckoning at the seaward end of one line.

Bathymetry was recorded on a Raytheon RTT 1000 dry paper recorder using either a hull-mounted 200 kHz transducer with an 8° beam width or a towed 200 kHz transducer with a 4° beam width (narrow beam) as well as a Simrad dry paper recorder using a hull-mounted 3.8 kHz transducer. All records were corrected for the draft of the vessel or tow depth. A 7 kHz transducer was used in conjunction with the RTT 1000 or EPC Model 1400 recorder to obtain seismic data on subbottom reflectors up to 10 m below sea floor. Deeper-penetration high-resolution seismic data were recorded on an EPC Model 1400 recorder using 1/4 second sweep and firing rate with a 200 Joule EG&G Model 234 Uniboom as a sound source. The signal was filtered to approximately 400-1200 kHz.

Side-scan sonar records were taken using a Model 259-3 EG&G wet paper system and a Model 272 sonar fish with a 105 kHz, 1/10 second pulse at a 20° beam angle depression.

TV observations were made using a Hydro-Products underwater video television camera in conjunction with a Model AV-3650 Sony magnetic tape recorder.

Temperature, salinity, conductivity, and light transmission measurements were taken sporadically along some tracklines. The location of these measurements are recorded in the ship's log.

Data acquired consist of approximately 797 km of trackline bathymetry along with 812 km of 7 kHz subbottom profiles, 823 km of side-scan sonar records, and 678 km of Uniboom seismic reflection records. The data are in the form of 16 rolls of bathymetry, 24 rolls of side-scan sonar, 18 rolls of Uniboom records, 7 rolls of Simrad fathometer records, 6 rolls of magnetic tape containing the TV observations, 20 field maps and three ship's logs. The

ship's log contains important information on systems in use on each line, system settings (scale, filters), navigational data used in plotting positions, severity of ice and weather conditions, course-holding problems, and unique observations or system difficulties.

Copies of the data are available on microfilm through the National Geophysical Data Center, NOAA/EDIS/NGDC, Code D64, 325 Broadway, Boulder, CO 80303. Telephone: (303) 497-6338. The microfilm contains copies of the geophysical records, the ship's log and a computer print-out of digitized way points. The print-out of these way points would allow for reproduction of tracklines at any scale: the tracklines can be correlated with the geophysical records through time points. Original records are archived at the U.S. Geological Survey, Deer Creek Facility, 3475 Deer Creek Road, Palo Alto, California 94304.

The data presented here are currently being studied by the authors as part of a study of the nearshore Chukchi Sea. The authors may be contacted for a bibliography of publications using the above data.

ACKNOWLEDGMENT

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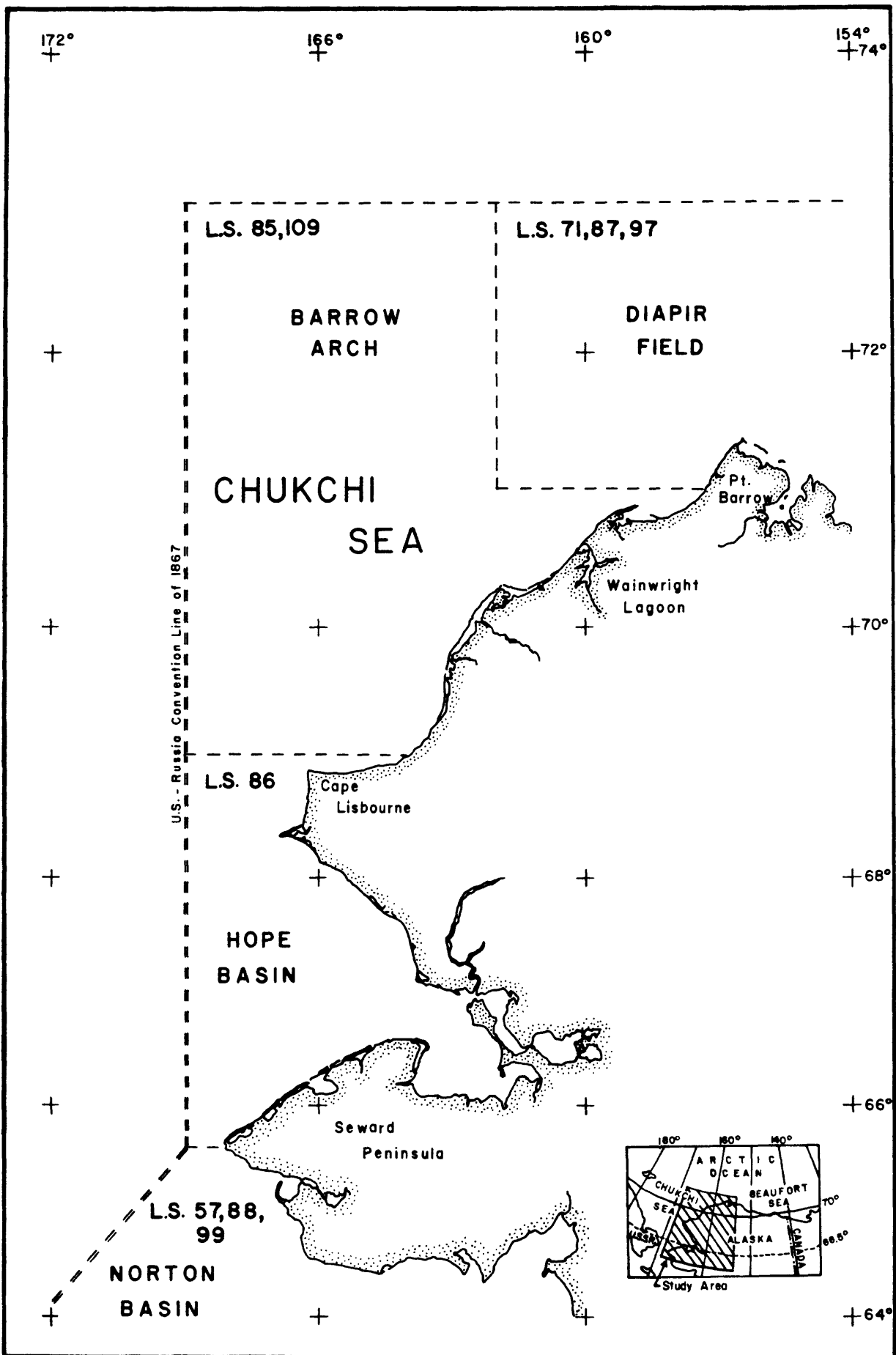


Figure 1: Proposed Lease Sale areas off north-western Alaska, (as of 3/1/82).

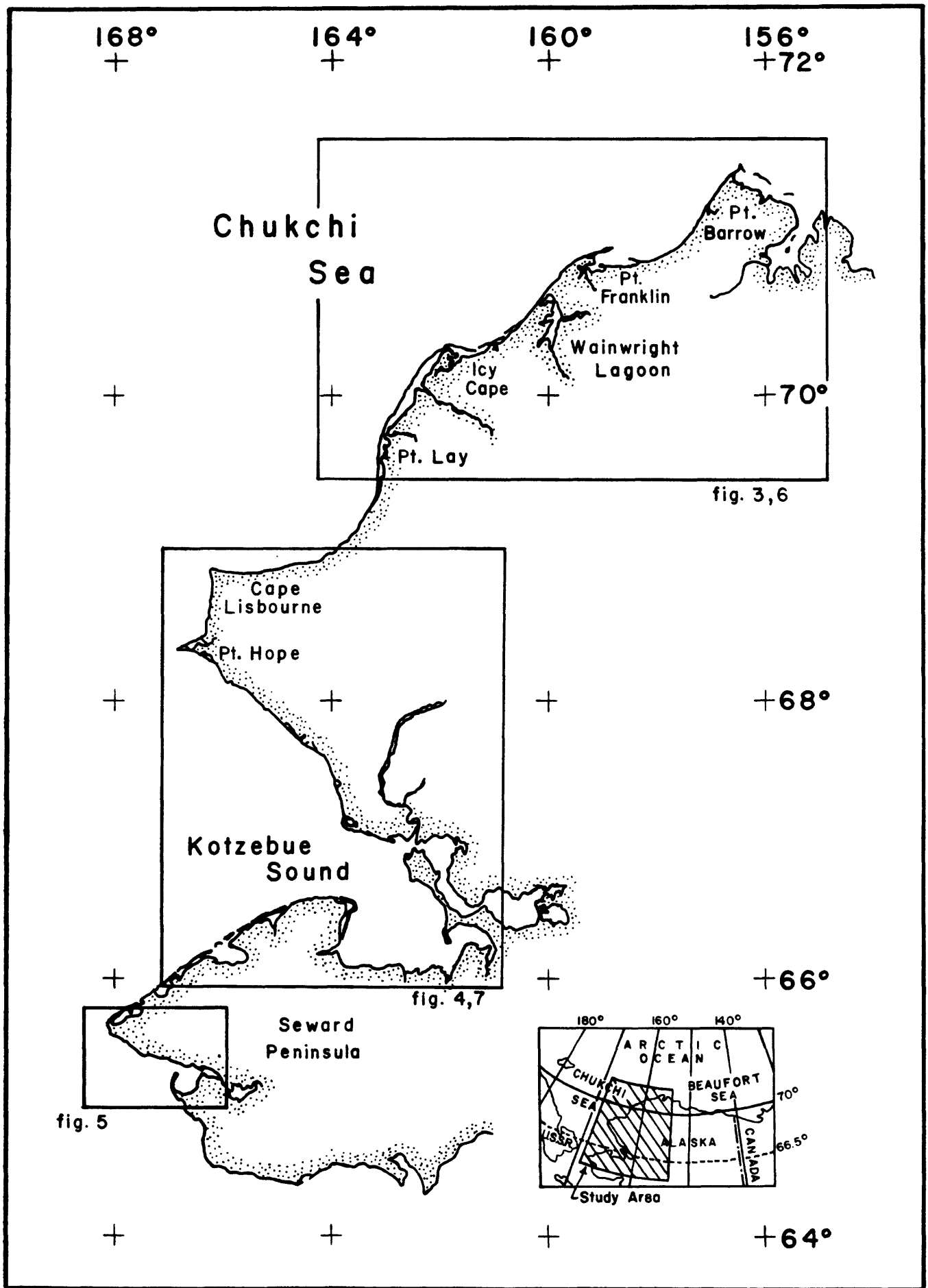


Figure 2: Location diagram for Figures 3-7.

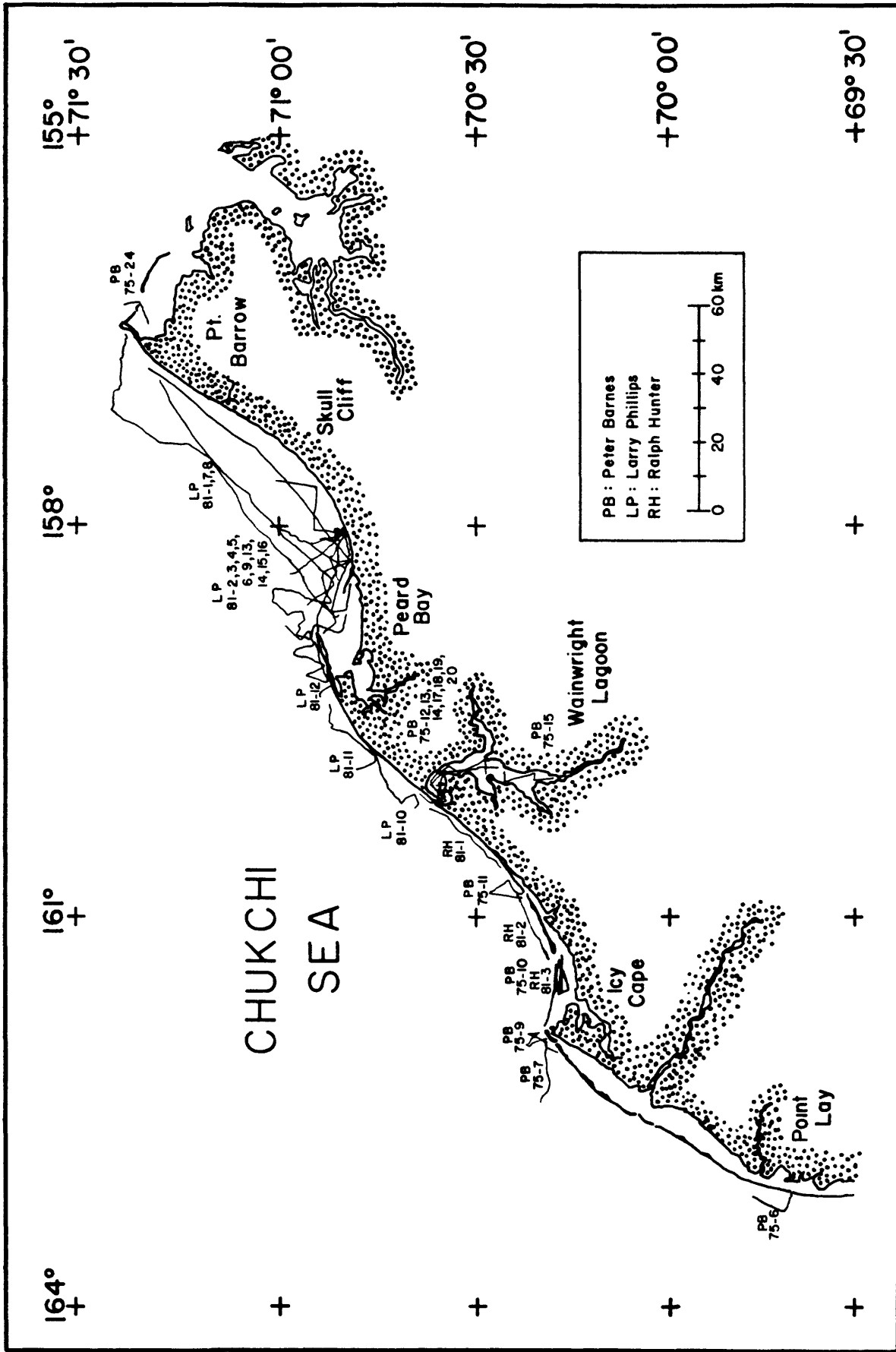


Figure 3: Trackline distribution from Pt. Barrow to Pt. Lay.

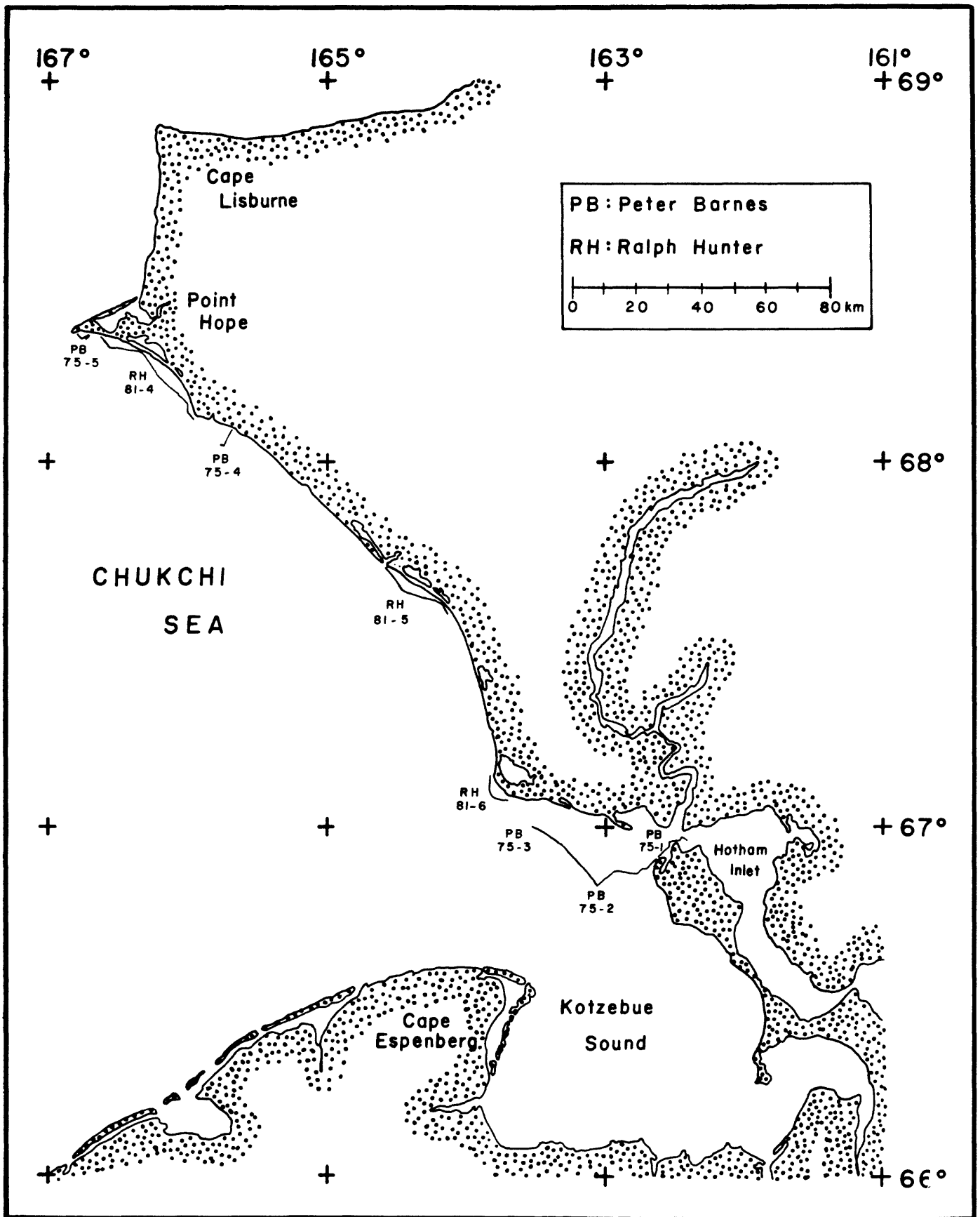


Figure 4: Trackline distribution from Pt. Hope to Kotzebue Sound.

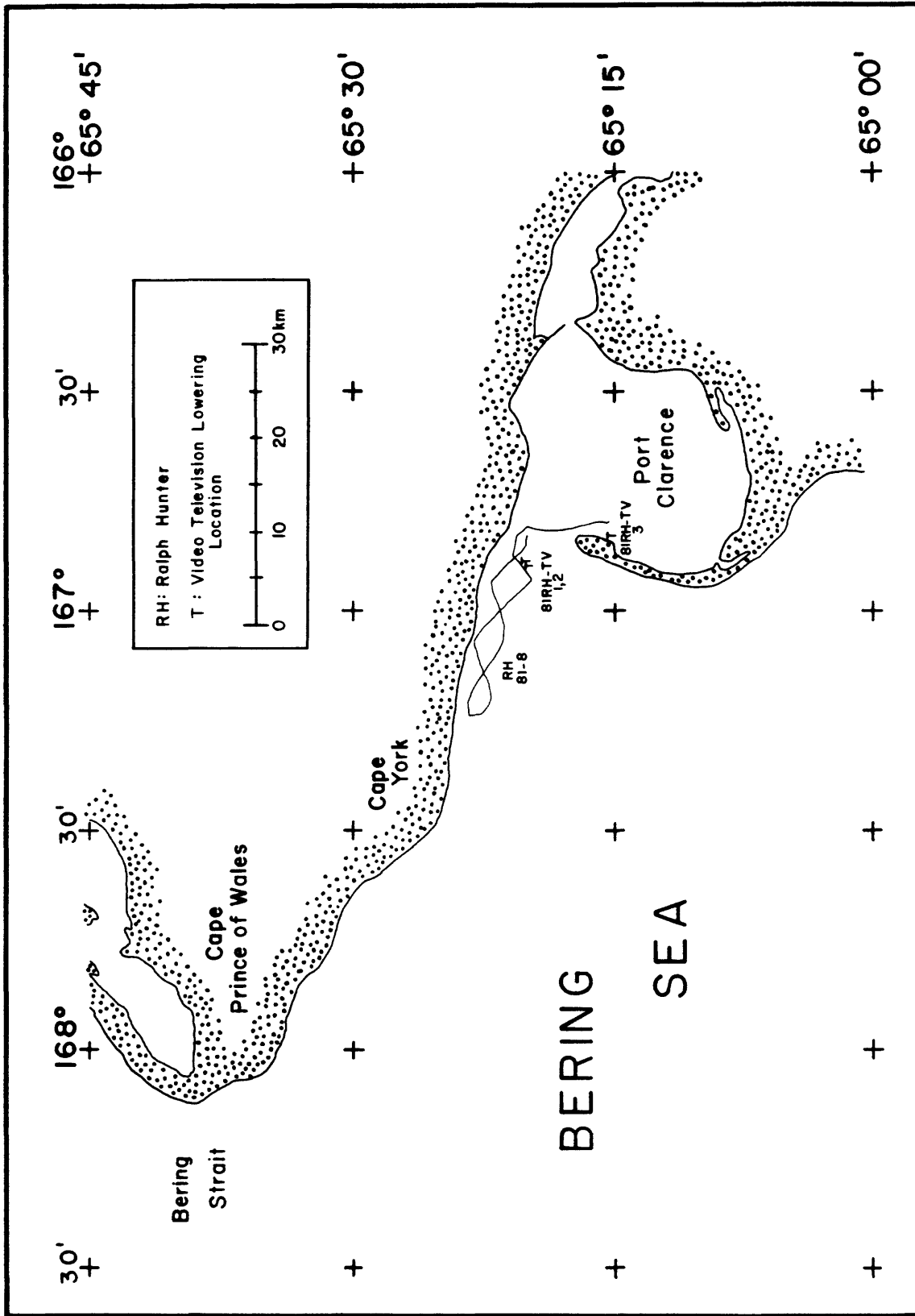


Figure 5: Trackline distribution and TV observation locations in the Port Clarence area.

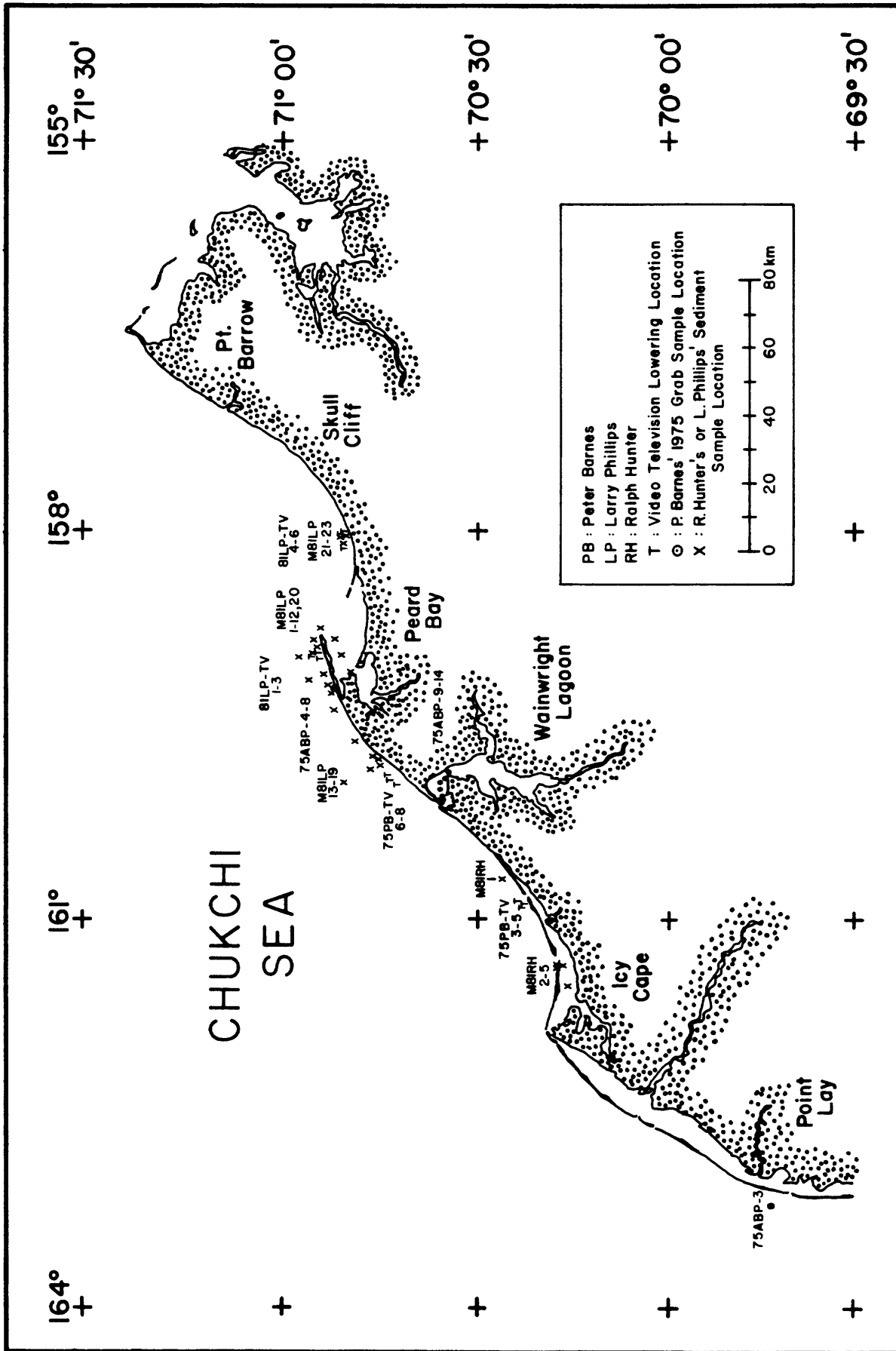


Figure 6: Sediment sample and TV observation locations from Pt. Barrow to Pt. Lay.

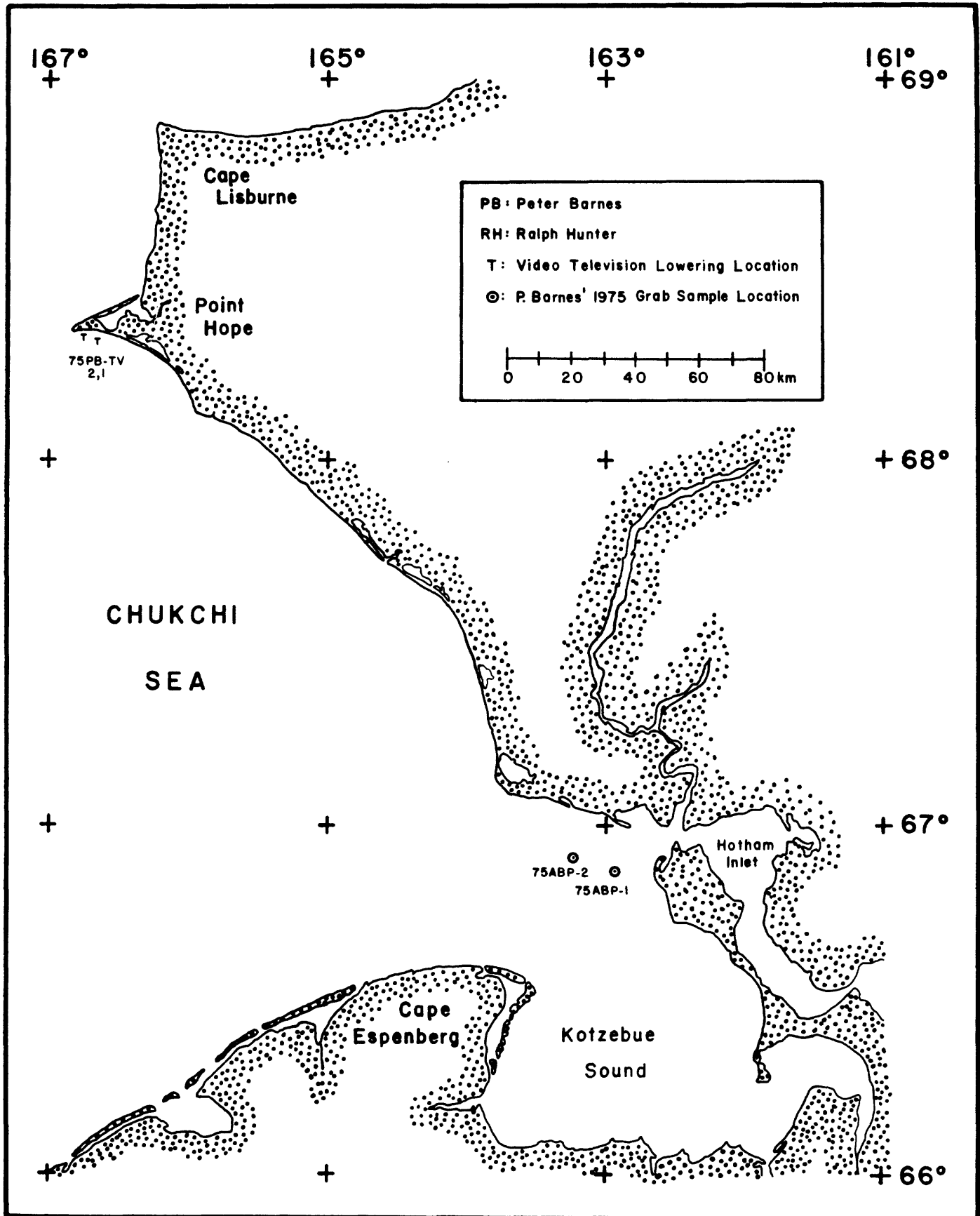


Figure 7: Sediment sample and TV observation locations from Pt. Hope to Kotzebue Sound.