Northwest and Alaska Fisheries Center Processed Report*

SEASONAL DISTRIBUTION AND RELATIVE ABUNDANCE OF MARINE MAMMALS IN THE GULF OF ALASKA

by

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Howard W. Braham
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and

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U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Marine Mammal Division
7600 Sand Point Way N.E.
Seattle, Washington 98115

October 1976

*This report does not constitute a publication and is for information only. All data herein are to be considered provisional.

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Submitted as part of the Final Report
for Contract number R7120806
OUTER CONTINENTAL SHELF ENVIRONMENTAL ASSESSMENT PROGRAM
Sponsored by
U.S. Department of the Interior
Bureau of Land Management

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*Marine Mammal Division, National Marine Fisheries Service, NOAA, 7600 Sand Point Way NE, Seattle, WA 98115

ERRATA/ADDITIONS

Seasonal Distribution and Abundance of Marine Mammals in the Gulf of Alaska

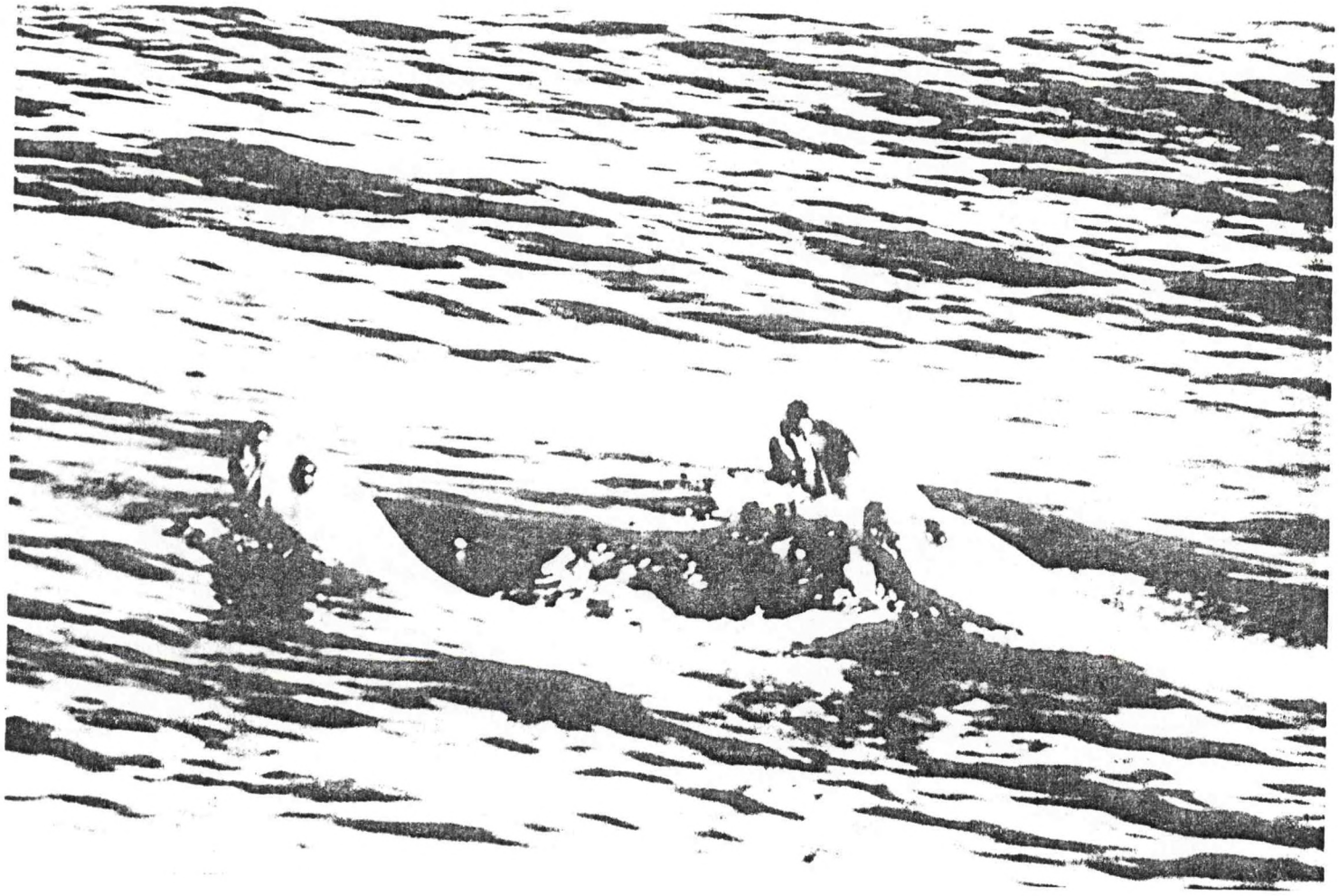
1. Page 11, paragraph 2, line 7 -- our present estimation of stock reduction by 1909 is 300,000 (Nat. Mar. Fish. Serv., 1976).

2. Page 25, paragraph 3, line 3 -- the pre-exploitation population probably did not exceed 15,000 animals (Henderson, 1975. Man and whales in Scammon's Lagoon. Dawson's Book Shop, Los Angeles, Calif. 313 p.).

3. Page 33, paragraph 4, line 3 -- should read "...they appear as residents..." rather than "...they appear regularly..." Also, the population estimate is now placed at 500 animals in Cook Inlet (ADF&G, 1973 cited from U.S. Departments of Commerce and Interior 1976 Draft Environmental Impact Statement - "Consideration of a waiver of the moratorium and return of management of certain marine mammals to the State of Alaska." Vol. I.)

4. Page 39, paragraph 6, line 5 -- "impacted" should be changed to "affected."

5. Page 41, Table 5 -- the maximum population estimate for beluga whales is 500.



Northern sea lions, Eumetopius jubatus, June 1976.

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ACKNOWLEDGEMENTS

The collection of sighting data by Marsha Caunt and KennethRaedeke of the Marine Mammal Division while aboard NOAA ships was greatly appreciated. Nancy Severinghaus has done the very important task of annotating hundreds of published and unpublished documents. Ethel Todd, also of the Marine Mammal Division, assisted in editing and typing the manuscript.

Donald Calkins, Kenneth Pitcher and Karl Schneider of the Anchorage Office, Alaska Department of Fish and Game, provided us with unpublished sightings and suggestions as to species distribution and abundance. Marine Mammal Officers of the Platforms of Opportunity Program (NOAA) aboard NOAA ships also provided sighting data.

INTRODUCTION

This document is the result of a contract with the Environmental Research Laboratory, NOAA, Boulder, Colorado, to summarize existing knowledge and to collect research data on the seasonal occurrence of marine mammals in the Gulf of Alaska. The contract is part of the Outer Continental Shelf Environmental Assessment Program (OCSEAP) funded by the Bureau of Land Management, Department of the Interior.

The pelagic and coastal waters over the Outer Continental Shelf of the Gulf of Alaska are expected to be important areas for oil-gas research and tanker traffic. Within or near the Gulf, major oil-lease sites exist: (1) Aleutian Shelf, (2) Kodiak Shelf, (3) Northeast Gulf of Alaska, and (4) Lower Cook Inlet. Our OCSEAP research unit number 68 deals with the first three. This report is a comprehensive final report of sightings from pelagic observations in the Northeast Gulf and Kodiak Shelf area specifically covering the period of the terms of the contract, 1 July 1975 to 1 October 1976. Data collected by Marine Mammal Division personnel since 1958 have also been included in this report. During FY 77, we will concentrate our survey efforts under research unit number 68 along the coast and pelagic waters from Kodiak Island west to the Aleutian Shelf lease site located southwest of Umnak Island, in the eastern Aleutian Islands. Data obtained from the Northeast Gulf and Kodiak Island areas during FY 77 will be included in the Final RU68 report as an addendum to allow updating of the Gulf of Alaska research effort.

Coastal areas near oil-lease sites represent localized habitats for breeding marine mammals such as the northern sea lion, Eumetopius jubatus, and seasonally migrating animals, e.g., the California gray whale, Eschrichtius robustus. The objectives of this project were to provide a better understanding of the relative seasonal distribution and abundance of all marine mammals in the Gulf of Alaska. These objectives are accomplished by integrating sighting records taken aboard NOAA ships and chartered vessels working in the Gulf, historical sealing and whaling records, and distribution and abundance estimates from the literature.

While we are reporting sighting data from throughout the Gulf, our specific objectives were to provide information on coastal and pelagic marine mammal occurrences from the northeast coast of the Gulf (i.e., from approximately Yakutat Bay) to Kodiak Island. Under subcontract to the National Marine Fisheries Service, NWAFC, the Alaska Department of Fish and Game, Game Division, completed two reports in 1975 on distribution and abundance of marine mammals along the coast of the Gulf of Alaska (Calkins et al., 1975) and in Prince William Sound

(Pitcher, 1975). Data presented in this report reflect observations made offshore. Cooperative efforts have been maintained with Gulf of Alaska OCSEAP research units 229 (biology of the harbor seal), 240 (abundance and distribution of the sea otter), and 243 (ecology of the northern sea lion) in order to assure area coverage continuity. This report does not cover sea otters, nor coastal activities of sea lions and harbor seals.

Sighting records from inexperienced persons are often unreliable. Even under ideal environmental conditions, such as those in Figures 1-4, the identification of marine mammals at sea is very difficult. For that reason a much larger data base exists than could be reported here. Many recordings of data collected over the past several years could not be used as "proof" of specific sightings. We report here only those data that we are reasonably sure are accurate species identifications. Questionable data were rejected.

We relied heavily on previously published accounts for distribution and abundance projections. Discussion of historical information has, for convenience sake, been included in the "Species Distribution" section rather than reviewed separately in the "Introduction." Because commercial and aboriginal sealing and whaling can be useful in understanding historical distribution and abundance, we have discussed them separately. As part of our objectives, we have attempted to annotate all published accounts on marine mammals in the Gulf. Because of the comprehensive nature of such a task, we are providing only part of that bibliography. A complete annotated bibliography for the Gulf will be included with the bibliography that is being compiled for the Bering, Chukchi, and Beaufort Seas.

STUDY AREA

The study area for this portion of our research in the Gulf of Alaska included the pelagic waters from Lat. 52°N., north to the Alaska coast, from Long. 130°W. on the east to 155°W on the west; excluding Cook Inlet and Prince William Sound. Those areas of principal responsibility included the northeast and northwest Gulf (Kodiak Island region) over the Continental Shelf. Defined by the 100 fathom (182.9 m) contour (Fig. 5), the Continental Shelf extends from approximately 10 km off Yakatak Bay in the northeast Gulf, some 100 km from the entrance to Prince William Sound in the northern Gulf and to 200 km off Kodiak Island.

In the Gulf proper, surface currents flow west to east along the southern edge of the study area towards the coast of Southeastern Alaska. Near the Subarctic Current Divergence, the Alaska Current flows north over the Continental Shelf towards the northeast Gulf and then west along the coast past Kodiak

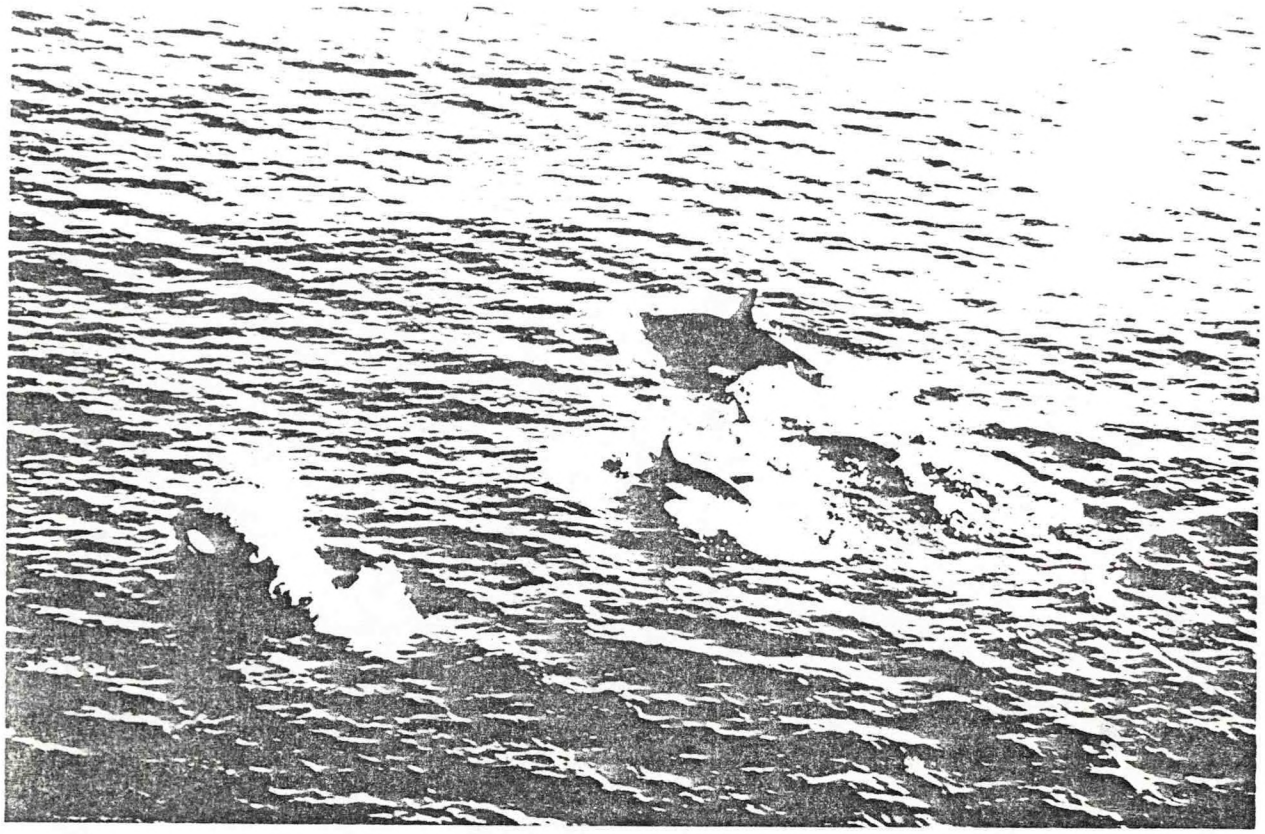

Figure 1. Killer whales, Orcinus orca, over Fairweather Grounds, April 1976 (Photo by Ens. Wenker, NOAA Corps).

Figure 2. Dall porpoise, Phocoenoides dalli, August 1976.

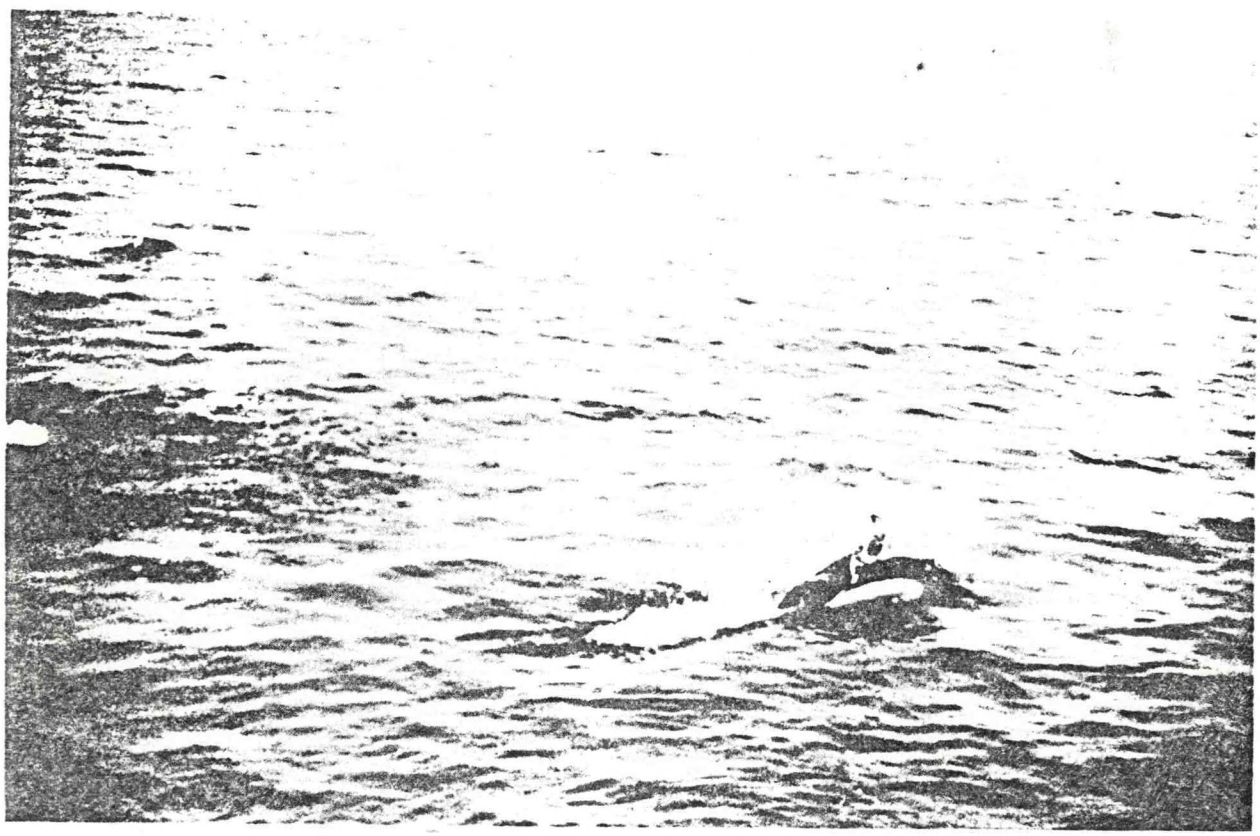

Figure 3. Northern fur seals, Callorhinus ursinus, resting at surface, July 1973.

Figure 4. Sei whale, Balaenoptera borealis, June 1976.

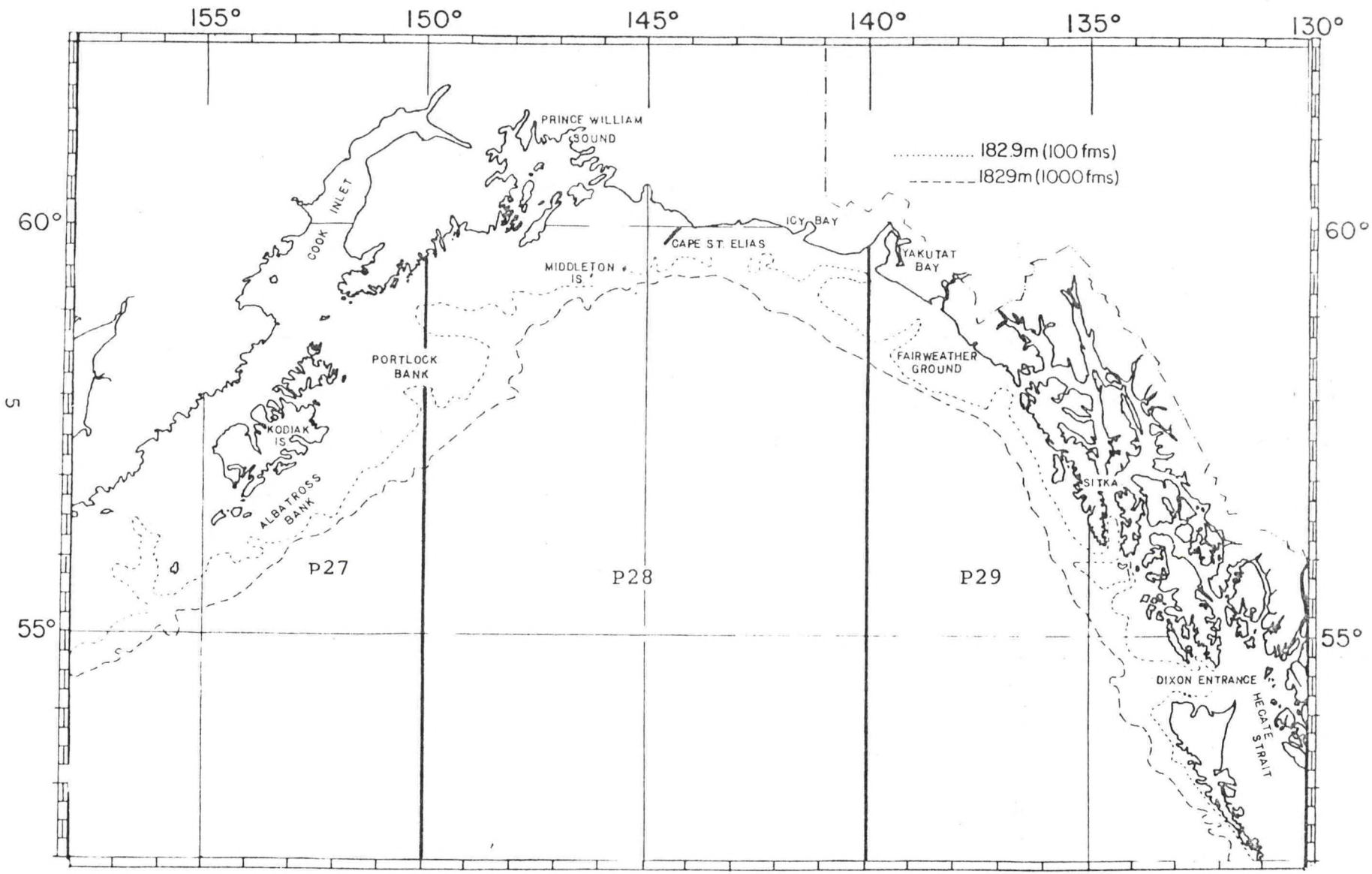

Figure 5.--Gulf of Alaska study area where Marine Mammal Division personnel have been collecting sighting data since 1958 on the distribution and numbers of marine mammals. P27, P28, and P29 represent arbitrary whaling statistic research areas. The outer Continental Shelf is delineated by the 100 fathom (182.9 m) line.

Island, the Alaska Peninsula, and the Aleutian Islands (Ingraham et al., 1976). The current flows at approximately 0.3 knots (0.2 mph) near-shore, increasing to about 1.0-2.0 knots (0.6-1.3 mph) offshore over the Continental Shelf.

Mean surface temperatures 60 km (100 miles) offshore Kodiak Island range from 7°-12°C in the summer and 2°-4°C in the winter (Favorite et al., 1976). Summer offshore temperatures in the northeast Gulf area are 10°-16°C, and winter temperatures 5°-7°C (Dodimead et al., 1963; Favorite et al., 1976). Surface air temperature differentials in the Gulf seldom exceed 0.5°-1.0°C, with an increase gradient closer to shore (Dodimead et al., 1963).

Prominent near-shore shoal areas over the Continental Shelf are Fairweather Ground in the northeast Gulf, Middleton Platform in the northern Gulf, both at depths of 30 to 100 fathoms and Portlock and Albatross Banks near Kodiak Island. Many seamounts occur within the central portion of the study area near Lat. 56°N.

MATERIALS AND METHODS

Data collected came from essentially three sources: (1) Marine Mammal Division personnel trained under this OCSEAP project and stationed aboard NOAA and OCSEAP chartered ships from November 1975 through June 1976; (2) Marine Mammal Division pelagic fur seal researchers working in the Gulf of Alaska from 1958 to 1968; and (3) from NOAA ship's officers and crew members trained by one of us (R.W.M.) in the identification of marine mammals under the Platforms of Opportunity Program (POP). Personnel aboard the U.S. Coast Guard ice breaker POLAR STAR also contributed sightings. Vessel cruises since 1958, for which we are reporting data, are summarized in Table 1.

Data collection generally came as sightings of opportunity; that is, no systematic or analytical procedures were used to standardize the sampling or the routes taken by the ships (i.e., random or systematic transects were not drawn for our experimental needs). Sightings were recorded as encountered, as with NOAA ship's officers, or during watches when a concerted effort was maintained to observe and record all animals encountered, as with Marine Mammal Division personnel. When practical, ship's trackline position, time, weather, and animal behavior (e.g., direction of travel, group composition, etc.) were recorded on a periodic and regular basis. In this way, a qualitative estimate of observation effort could be made, thus of some value in evaluating distribution projections. No quantitative estimates of abundance can be made using these methods; with the exception of pelagic fur seal data collected prior to 1975.

Table 1.--List of ship cruises, 1958-76, from which marine mammal sighting data were used. Data came from Marine Mammal Division (MMD) personnel during pelagic fur seal (PFS), OCSEAP (OCS) related research, and from Platform of Opportunity Program (POP) sightings during NOAA Fleet or OCSEAP charter ship cruises. "Dates" are the approximate cruise periods; "Location" refers to the general area where the survey or activity took place; NW-northwest Gulf (west of Long. 150°W),NE-northeast Gulf (Long. 130°W, north of Lat. 59°N),SE-southeast Gulf (south of Lat. 59°N, east of Long. 140°W), and Cent-central Gulf (Long. 140°-150°W, south of Lat. 59°N).

Dates	Ship/vessel	Location	Survey
23 Feb. - 11 June 1958	Lindy (C)*	SE, Cent., NE	PFS (MMD)
11 May - 1 June 1958	Trinity (C)	NE	"
3 Mar. - 2 June 1960	Tacoma (C)	SE, Cent., NW	"
21 Apr. - 25 Aug. 1960	Windward (C)	SE, Cent., NE, NW	"
6 Feb. - 5 Mar. 1961	Harmony (C)	SE	"
5 May - 20 Sept.1962	Tacoma (C)	SE, Cent.	"
October 1962	Harmony (C)	Cent., NW	"
24 June - 11 Sept.1963	Harmony (C)	Cent., NW	"
June 1964	Harmony (C)	SE	"
18 May - 24 Aug. 1968	New St. Joseph (C)	Cent., NW	"
21 Mar. - 19 Apr. 1974	Fairweather (N)	SE	POP
8 May - 24 Aug. 1974	Fairweather (N)	Cent.	"

Table 1.--Continued

Dates	Ship/vessel	Location	Survey
28 Jan. - 5 Mar. 1975	Oceanographer (N)	Cent.	POP
5 Mar. -15 Aug. 1975	MacArthur (N)	Cent., SE	"
3 Apr. -13 July 1975	Oregon (N)	Cent.	"
22 Apr. -26 Aug. 1975	Rainier (N)	Cent.	"
28 Apr. - 9 June 1975	Townsend Cromwell (N)	Cent.	"
6 May -22 Oct. 1975	Davidson (N)	Cent., SE	"
9 May -23 June 1975	Discoverer (N)	SE, NE	"
31 May -10 Aug. 1975	RV Tordenskjold (C)	Cent.	"
5 Aug. - 5 Dec. 1975	Discoverer (N)	NE, SE	OCS/POP
7 Apr. -30 Apr. 1976	Discoverer (N)	Cent.	OCS/POP
29 Apr. -22 June 1976	Polar Star (G)	NE, Cent.	POP
6 June -25 June 1976	Surveyor (N)	Cent., NE	OCS (MMD)
8 June -22 June 1976	Miller Freeman (N)	Cent.	OCS (MMD)

*(N)-NOAA; (C)-Charter; (G)-Coast Guard.

Sighting records were transferred onto a computerized format for archiving, plotting, and analysis. The data management procedures that were performed are outlined in Figure 6.

Presentation of the results include sighting data, tabulated by species in chronological order (Appendix Tables A-1 to A-17). Plots of sightings were made by species by month in the survey area using a 1:4,860,700 scale Mercator projection (Appendix Figures A-1 to A-119).

Northern fur seal data have been presented on a density per hour effort basis in a manner previously reported on (Marine Mammal Biological Laboratory, 1970). All other sightings are plotted as raw data values only (Appendix A).

COMMERCIAL AND ABORIGINAL FUR SEAL HUNTING

Coastal Indians, Aleuts, and Eskimos took the northern fur seal whenever and wherever the seals entered their hunting areas. In the Gulf of Alaska, the Tlingit hunted off the seaward sides of Chichagof, Baranof, and Kruzof Islands and in the bays on their westward sides which are regularly frequented by fur seals in pursuit of herring schools. The impact of subsistence hunting on the fur seal was negligible.

Pelagic commercial sealing began in the 1870's and continued until 1911. Most of the pelagic sealers were American, Canadian, or Japanese nationals. Between 1868 and 1909 almost a million skins were taken at sea (Riley, 1967). After 1897, it was unlawful for American citizens to engage in pelagic sealing and after the North Pacific Fur Seal Convention of 1911 took effect, all pelagic sealing was outlawed.

Pelagic sealing was carried out on several "sealing grounds" in the North Pacific and Bering Seas, with catch statistics being pooled under several broad geographic areas. The northwest coast sealing ground area extended from California to the Pacific side of the Alaska Peninsula (Townsend, 1896; 1899). It is possible to obtain distribution information on fur seals in the Gulf of Alaska by examining individual logbook records listing daily positions and catches. For example, the Schooner MARY ELLEN hunted off Southeast Alaska 22-31 May 1885 taking 117 seals, best daily catch 48, and from 1-9 June 1885 in the Gulf of Alaska taking 78 seals, best daily catch 38. The total catch for this vessel from California to the Bering Sea in 1885 was 2,304. In 1886, the MARY ELLEN hunting in the Gulf off the Continental Shelf in deep water took 334 seals, best daily catch 151, from 1-3 June; and 838 seals, best daily catch 197, from 6-23 June. The MARY ELLEN total catch in 1886 was 4,295.

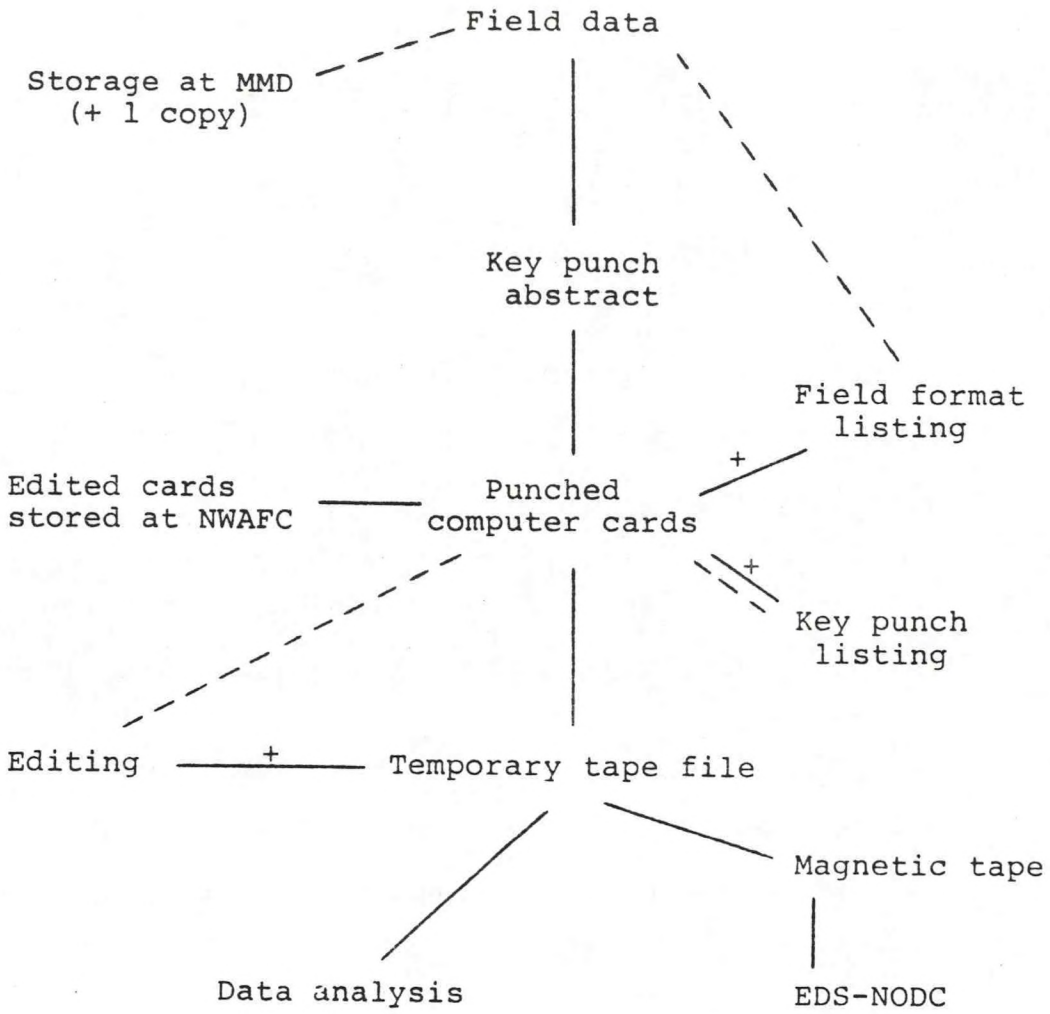

Figure 6. Data management quality control procedures during data acquisition and processing for OCSEAP research activities; -----verified or corrected; + program required step. NWAFC - Northwest and Alaska Fisheries Center; MMD - Marine Mammal Division; EDS-NODC - Environmental Data Service-National Oceanographic Data Center.

Townsend (1899) prepared a map of the North Pacific and Bering Sea showing the position of one day's sealing, coded by month. The map was based on log records of 123 vessels engaged in pelagic sealing from 1883 to 1897, and was used to demonstrate the seasonal movements of the fleet. The map indicates that sealing in the Gulf was carried out both on the Continental Shelf and in deep water. Sealing began in March and extended through May off Southeastern Alaska and north and west to Middleton Island, and in June off Kodiak Island on Portlock and Albatross Banks. Sealers called the entire eastern Gulf area, between Sitka and Middleton Island, "Fairweather Grounds."

Alexander (1953), writing in 1892, stated that 10 years before only a few vessels were engaged in pelagic sealing, but that in 1892 the fleet had increased to 125. Riley (1967) indicated that pelagic sealing peaked in 1894 when 61,838 seals were reported taken. During the period 1890-1908, the pelagic catch exceeded the Pribilof Island land catch each year. The Pribilof Islands population was reduced to about 200,000 animals by 1909 (Roppel and Davey, 1965). American and Canadian vessels hunted seals in the Gulf of Alaska from about 1880 to 1911.

A provision in the 1911 Convention allowed for an aboriginal take of fur seals, if taken in the traditional way without fire-arms. Indians took seals off Washington, British Columbia, and Southeast Alaska. The Convention restricted certain aboriginal privileges by prohibiting the killing of fur seals within the 3-mile limit in the waters of Alaska (Bower and Aller, 1915).

Ball (in Bower, 1925) described the method used by Tlinkit sealers in the spring of 1923. That year nine parties, five men each, engaged in pelagic sealing. The preferred sealing area was described as a zone about 40 miles long by 15 miles wide, located about 5 miles outside the 100 f curve off Sitka Sound. Kenyon (1955) described a seal hunt and hunting methods used in 1951. This was the last year any significant number of seals were taken off Sitka in the traditional manner.

Catch data for Southeastern Alaska aboriginal sealing are presented in Table 2. Fur seal distribution using pelagic fur seal catch data are summarized for the species under the "Species Distribution" section.

COMMERCIAL WHALING IN THE GULF OF ALASKA

Russian and English traders became active in Alaska and along the west coast of North America following the voyages of Vitus Bering, 1741, and James Cook, 1776-1780. The sea otter (Enhydra lutris) and later the northern fur seal (Callorhinus ursinus) were primary targets. American whalers came into the

Table 2.--Aboriginal take of fur seals off Sitka, Alaska, 1917-1955*

Year	Male	Female	Fetal	Total	Months	Year	Male	Female	Total	Months
1917	2			2	May	1937	19	97	116	Feb-May
1918						1938	2	90	92	Apr-May
1919						1939	1	30	31	Apr-May
1920						1940	12	24	36	Apr-May
1921				199	May-June	1941				
1922	409	116	1	526	May-June	1942				
1923	408	145	73	533	Mar-June	1943				
1924	8			8		1944	1	15	16	
1925	189	50	40	279		1945	30	9	39	
1926	36	3	1	40		1946	22	333	355	
1927	336	158	49	543		1947	1	24	25	
1928	457	220	96	773		1948	29	173	202	
1929	582	291	122	995	Apr-June	1949				
1930	29	31	25	85	May	1950		41	41	
1931	5	14	2	21	May	1951		188	189	
1932	25	45	8	78	Mar-June	1952				
1933	20	43		63	May-June	1953				
1934	3	8		11	Apr-May	1954				
1935	26	33		59	May	1955			2	
1936	4	7		11	Apr					

*Male-female-fetal columns do not always add up to each year's total as some seals were not sexed.

Note: Data from U.S. Fish and Wildlife Service annual reports on Alaska Fisheries and Fur Seal Industries, 1917-55.

Gulf in the early 1800's pursuing the right whale (Balaena glacialis) on the "Kodiak Grounds," and then moved into the Bering Sea in the mid-1800's in pursuit of the bowhead whale (Balaena mysticetus).

The stocks of commercially valuable marine mammals, i.e., fur seal, sea otter, right whale, bowhead whale, and Pacific walrus (Odobenus rosmarus) were greatly reduced during the 19th century and early years of the 20th century. Right whale stocks became so low they were no longer hunted commercially.

Since 1900, whaling was carried out from United States shore stations at Bay Center, Grays Harbor, Washington (Scheffer and Slipp, 1948), and from Tyee, Whale Bay, Akutan Island and Port Hobron, Alaska. From 1919 through 1929 blue (Balaenoptera musculus), fin (B. physalus), humpback (Megaptera novaeangliae), and sperm (Physeter macrocephalus) whales comprised most of the U.S. shore station catches (Kellogg, 1931). With one exception, there has been no commercial fishery for the large whales in the eastern North Pacific by United States nationals since World War II.

The United States prohibited U.S. nationals from engaging in commercial whaling and the importation into the United States of whale products after December 1971. The Marine Mammal Protection Act of 1972 and the Endangered Species Act of 1973 have increased these restrictions. Whale stock assessment and regulation are presently under oversight responsibility by the International Whaling Commission.

Commercial whaling has been carried out by Japanese and Soviet whaling fleets in the North Pacific Ocean and the Bering Sea since the early 1930's. Aside from shore stations in the western Pacific, the first pelagic whaling fleet in the North Pacific was that of the Soviet factoryship ALEUT beginning in 1934. The Japanese began pelagic whaling in the western North Pacific near Bonin Island in 1946 (Committee on Whaling Statistics, 1948). The Japanese began pelagic whaling near the Aleutian Islands and Bering Sea in 1952. The Soviets began to whale around the Aleutian Islands in 1957. By 1955, the stocks of commercially valuable whales in the Okhotsk Sea and the Commander Islands-Kamchatka Peninsula region had been reduced (Berzin and Rovnin, 1966).

Nishiwaki (1966a) states that the Japanese fleets operated near the Aleutian Islands from the end of May until early September. Soviet fleets whale in the same area at the same time of the year. Both Soviet and Japanese fleets actively whaled from the Aleutian Islands eastward into the Gulf of Alaska.

Table 3 lists 1965-75 catch data by species and area for Japanese and Russian whaling fleets working in the Gulf of Alaska.

Rice (1963) states that the stocks of baleen whales in the Southern Hemisphere continued to decline this century, as predicted by biologists, and that when whaling was found to no longer be profitable some fleets were expected to increase their activities in the North Pacific. North Pacific catches exceeded that of the Antarctic in 1967; and during the 1969-70 season catches were doubled. The USSR operated four whaling fleets in the North Pacific (including the Gulf) from 1963 to 1967; three from 1968 to 1969; and two from 1970 to 1975. The Japanese have operated three fleets since 1963. Since 1965, catches and catch effort of preferred cetaceans (fin, sei, and sperm whales) have been steadily declining (Figure 7). A preliminary analysis of data displayed in Table 3 indicates that greater numbers of these whales have been harvested in the central portion of the Gulf, i.e., area P28. It would not appear that harvest effort is substantially different between areas; however, this assumption cannot be verified. It has been inferred that the preferred whaling grounds are at the edges of sector P28, i.e., Northeast Gulf and off Kodiak Island, because more whales are expected to occur here than in other areas of the Gulf (Nasu, 1966). Harvest records and recent sighting data support the conclusion that for the commercially valuable large cetaceans, the areas in the Gulf over and adjacent to the Continental Shelf from Southeast Alaska to Kodiak Island and west along the Alaska Peninsula and Aleutian Islands chain represent important temporal and spatial locations for species distribution; especially related to feeding (Nemoto and Kasuya, 1965).

Pooled Japanese and Russian harvest data by area, P27 (Western Gulf), P28 (Central Gulf), and P29 (Eastern Gulf) (Table 3) indicate: (using Friedman Rank Sums, general alternatives, two-way layout distribution-free test; Hollander and Wolfe, 1973).

1. More fin whales are taken in P28>P27>P29, while more sperm whales are taken in P29>P27>P28 (α level of significance = 0.001).
2. Sei whales are taken in equal numbers by area ($\alpha = 0.250$).
3. In P27 and P29 sperm>sei>fin whales are taken ($\alpha = 0.006$); but no significant difference in the number of whales taken in P28 occurs ($\alpha = 0.570$).
4. More whales are taken in P28 than in either P27 or P29 ($\alpha = 0.001$).

We cannot be sure that whaling effort and frequency of occurrence are comparable by species, or that whaling effort was equal between the three areas of the Gulf. If these two assumptions are accepted, it would appear that greater numbers of large

Table 3.--Total number of pelagic catches of fin (Balaenoptera physalus), sei (B. borealis), and sperm (Physeter macrocephalus) whales by Japanese and Russian whaling fleets in three International Whaling Commission designated harvest areas (P27, P28, and P29) in the Gulf of Alaska, 1965-75. Area P27 is from Long. 150°W, west to Long. 160°W; P28 from Long. 140°W to Long. 150°W; and P29 from Long. 130°W, west to Long. 140°W (see Figure 5). Bryde's whales (B. edeni) are included in sei whale takes; blue (B. musculus) and humpback (Megaptera novaeangliae) whales have been protected under international agreement since 1966; mink whales (B. acutorostrata) in the Gulf are not harvested by the Russians, and only two have been taken by the Japanese (1971); (n) represents the number of sample years of available data. No distinction was made as to missing data or negative whaling activity. Both nations have greatly reduced their harvest effort since the 1967-68 season.

Harvest area	Fin whale		Sei whale		Sperm whale	
	Japan	Russia	Japan	Russia	Japan	Russia
P27 (n)	477(8)	106(3)	645(7)	67(3)	909(9)	593(3)
Total	583		712		1,502	
P28(n)	1,069(11)	301(4)	1,421(10)	235(6)	1,116(11)	1,528(6)
Total	1,370		1,656		2,644	
P29(n)	276(6)	174(5)	160(6)	152(4)	482(8)	1,011(5)
Total	450		312		1,493	

Note: Data for 1965-75 were taken from Japanese and Soviet catch statistics forwarded to the International Whaling Commission.

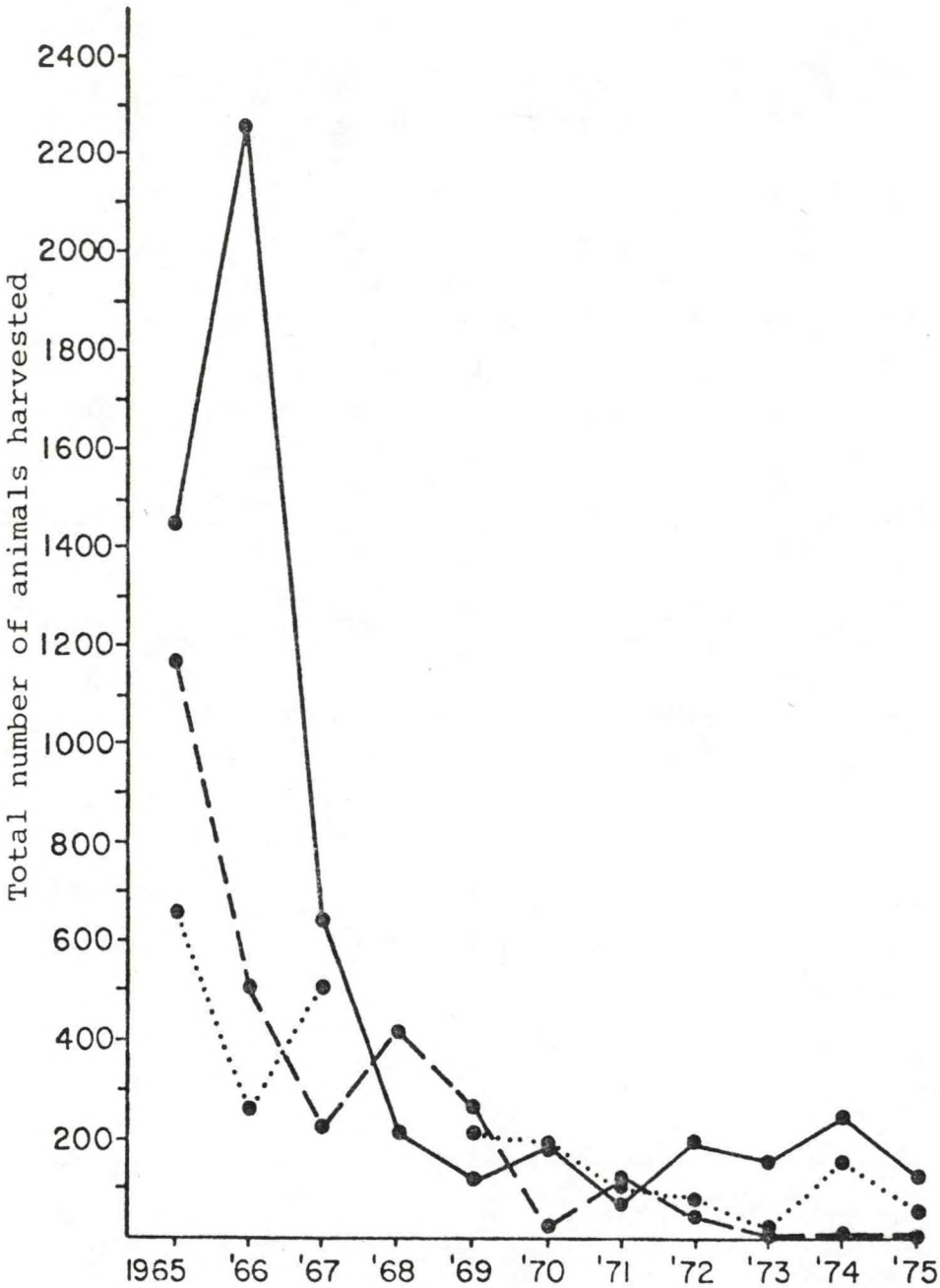

Figure 7. Annual change in pooled Japanese and Russian whale catch data for fin, sei and sperm whales in three International Whaling Commission statistical regions of the Gulf of Alaska: P27-western Gulf(---), P28-central Gulf(——) and P29-eastern Gulf(···).

cetaceans, e.g., fin, sei, and sperm whales, might be expected to occur in the north central portion of the Gulf than in the eastern or western Gulf. Japanese and Russian whaling fleets are known to frequent specific areas in the Pacific Ocean where the probability of catching certain species of whales is greater (M. Tillman, pers. comm.). It must be emphasized that these conclusions are preliminary, requiring a larger data base if we are to increase our statistical precision.

SPECIES DISTRIBUTION

NORTHERN FUR SEAL (Callorhinus ursinus)

Northern fur seals are found in the Gulf of Alaska throughout all months of the year (North Pacific Fur Seal Commission, 1962). Peak numbers of seals occur from March to June. Townsend's (1899) chart graphically presents the monthly distribution of seals in the North Pacific Ocean as indicated by pelagic sealing records. The sealers went to and hunted in the areas where they could expect to find the most seals. Sealing began in December and January off the coast of California and as the seals moved northward the sealers followed, hunting off Southeastern Alaska in March, and moving northwestward generally following the Continental Shelf, arriving off Kodiak Is. in May and June.

Kenyon and Wilke (1953) and Wilke and Kenyon (1954) summarize the extent of our knowledge of seasonal North Pacific fur seal distribution up to 1952. Taylor, Fujinaga, and Wilke (1955) describe the first cruise by research biologists in search of pelagic fur seals in the Gulf of Alaska. Two vessels sailed north and westward from Dixon Entrance to Sitka, across Fairweather Grounds to the northeastern gulf, and southwestly to Kodiak from 6 June to 3 July 1952. They found a few seals south of Cape St. Elias, but most were encountered on Portlock Bank in the present Gulf of Alaska-Kodiak proposed lease area. They collected 388 seals; 128 males of which only 3 were older than 4 years, and 260 females of which 178 were older than 4 years.

With the signing of the Interim Convention on Conservation of North Pacific Fur Seals on 9 February 1957, and entered into on 14 October 1957, the United States, Canada, Japan, and the Soviet Union were each required to carry out research on land and at sea on fur seals. As a result, U.S. and Canadian scientists have made periodic surveys and collections of fur seals in the Gulf of Alaska. Data gathered during these voyages form the basis for the following description of northern fur seal movements.

Seals seen per hour of observation during U.S. pelagic fur seal voyages in the eastern and western Gulf of Alaska are shown by month and year in Table A-2 and Figures A-1 through A-20. Seals seen by NOAA ships' marine mammal officers, or Marine Mammal Division observers are shown by month in Figures A-33 through A-41.

The fur seal population reaches its lowest point of the year in the Gulf during August, September, and October. On 19 August 1968 five seals were sighted off Chirikof Island; on 20 August, eight seals were seen near Albatross Bank, and while on a 3-day crossing between Kodiak and Sitka only one seal was seen (MMBL, 1970) (Figures A-11 and A-20). Three seals were sighted by observers aboard NOAA ships in August (Figure 39). No sighting records exist for September, and no fur seal research vessels have operated in the Gulf of Alaska during September. We have one sighting reported from a NOAA ship in October (Figure 40). One fur seal research vessel crossed the Gulf without sighting fur seals in 1962.

We have no sighting records in the Gulf of Alaska in November as no fur seal research vessel or NOAA ship has operated in the Gulf in November. Migrating seals arrived and increased in numbers off the Washington coast in November and December 1967 (MMBL, 1970). It is reasonable to expect that the same pattern is followed in the Gulf of Alaska, despite the westward flowing Alaska Gyre in the northern Gulf. We have two sightings from a NOAA ship in the Gulf in December (Figure 41). Wilke and Kenyon (1954) state that seals appear in the inlets of southeastern Alaska beginning in early December. On 3 December 1965, the Canadian research ship G. B. REED with Canadian and U.S. fur seal biologists aboard departed Unalaska Island bound for Kodiak. Six fur seals were seen during the voyage, two of which were in Sitkinak Strait near Kodiak. On 7 December the ship departed Kodiak and made a direct crossing south of the Continental Shelf to Sitka. The crossing was made under excellent conditions; no fur seals were seen (Pike et al., 1966).

We have no January sightings, however, no research vessels have operated in the Gulf during this month. Wilke collected 107 fur seals in January 1951 near Sitka (Taylor et al., 1955); all were females 4 years old or older. Kenyon and Wilke (1953), citing a letter from the U.S. Coast Guard, state that the seals are widely dispersed at sea in January but that the greatest numbers are found along the Alaska coast from Sitka south.

Our lack of records for the period September through January in the Gulf of Alaska is the result of few or no ship surveys in the area and the fact that sea conditions at this time are generally extremeley poor for viewing seals.

In February 1958, U.S. researchers found seals concentrated in Sitka Sound and a short distance offshore (Figure A-1). During the February 1958 cruise, 63 seals were collected including 22 yearlings, 12 were males and 10 were females, and 41 females all over 10 years of age except one 4-year-old and one 5-year-old. An examination of stomach contents determined that herring was the principal prey species consumed (Wilke et al., 1954). Seals range throughout the Gulf in February, occasionally entering protected waters after herring schools. A group of mostly adult females winter in northern Hecate Strait and Dixon Entrance each year (Pike et al., 1961). Recent February sightings from NOAA ships are shown in Figure 34.

U.S. research vessels operated off southeastern Alaska in March 1958, 1960, and 1961, working mostly off Sitka (Figures A-2 to A-4). Severe sea conditions generally restricted movement of vessels offshore. Seals collected during these voyages were generally taken in Sitka Sound or inshore and were mainly adult females. The major prey species by abundance found in fur seal stomachs were herring, following by squid and capelin.

U.S. research vessels operated in the Gulf of Alaska in April 1958 and 1960 (Figures A-5, A-6, and A-12). Seals were found in most areas surveyed; adult females comprised a major part of the collections, and adult males were seen and collected in the offshore areas. It is of interest that Alexander (1953) writing in 1892 said that a larger portion of the seals found north of Cross Sound and east of Middleton Island were males. While this may not be the case in late spring when major movements of adult females through the area occurs, adult males are encountered south of Cross Sound and is thus a major wintering area for adult males. Concentrations of seals have been encountered on the Fairweather Grounds, off Cape St. Elias, and on Portlock and Albatross Banks off Kodiak in April. Recent April sightings from NOAA ships are shown in Figure 35.

U.S. research vessels have operated in the Gulf of Alaska in May 1958, 1962, and 1968 (Figures A-7 to A-9 and A-13 to A-16). Fur seals are found throughout the Gulf in May and concentrations have been encountered far at sea in the middle of the gulf. However, seals are most abundant along the edge of the Continental Shelf and on the banks off Kodiak where large schools of capelin and sand lance are frequently found at this season. The fur seal population is probably larger in the Gulf of Alaska in May than in other months, closely followed by April and June. Most adult males have moved out of the Gulf by early May bound for the Pribilof Islands. Seventy percent of a sample of 232 seals collected on Portlock Bank in 1960 were females 10 years old or older. The males in the collection were all 5 years old or

younger (NPFC, 1962). These older, mostly pregnant females were en route to the Pribilof Islands where the pupping season peaks the first week of July. Recent May sightings from NOAA ships are shown in Figure 36.

U.S. research vessels have operated in the Gulf of Alaska during the month of June in 1952, 1958, 1960, and 1968 (Figures A-10 and A-17 to A-19). Canadian research vessels have operated in the Gulf during the month of June in 1959, 1962, 1963, and 1968 (Pike et al., 1959; 1962; 1963; 1968). Much of our information on fur seal distribution in June is taken from the Canadian reports. Recent June sightings from NOAA ships are shown in Figure 37.

Seals are still found in localized concentrations throughout the Gulf in June. In 1952, the greatest concentration was found on Portlock Bank (Taylor et al., 1955). Of 388 seals taken, only 15.2% were older than 10 years. The 1952 expedition and several in subsequent years cruised Shelikof Strait without sighting fur seals. It is concluded that few if any seals use this strait in spring migration.

Canadian expeditions have regularly found concentrations of fur seals near Middleton Island (Pike et al., 1958; 1968) and on Portlock Bank (Pike et al., 1962; 1963; 1968). During the first 2 weeks in June 1963, adult females over 10 years of age predominated in the catch on Portlock Bank. In late June 1968, also on Portlock Bank, 142 seals were taken with 32% of the catch males age 2-4 years, 11% females age 2-3 years, and 57% females older than 3 years.

No U.S. research vessels have operated in the Gulf in July. Canadian research vessels have operated in the Gulf during the month of July in 1958 and 1963 (Pike et al., 1958; 1963; NPFSC, 1962). In 1958, the Canadians operated in the Gulf from 19 to 24 July. Their vessel cruised west from Cape Spencer on 19 July and located a concentration of seals on Portlock Bank on 21 July. Of 36 seals taken, no males were older than 2 years and no females were older than 6 years. During the first two weeks of July 1963, a Canadian vessel collected 20 seals on Portlock Bank mostly immature males and females. Pregnant female seals almost entirely disappear from the Gulf by mid-July, the remaining seals being immatures of both sexes. Recent July sightings from NOAA ships are shown in Figure 38.

In summary, northern fur seals are present in the waters of the Gulf of Alaska throughout the year, with fluctuations in numbers, age, and sex. They are found in all parts of the Gulf from the inside waters of Southeastern Alaska, Prince William Sound,

and Kodiak Island to the offshore waters in mid-Gulf. In August, September, and October, most seals encountered are immature yearling males and females, few in number and widely dispersed. In November, adult males and females should begin to appear in the Gulf. Although we have no sighting records, we can infer this because of the known occurrence of seals in adjoining areas. In December, adults begin to appear along the Continental Shelf in the Gulf, and in past years have been reported from the inside waters of Southeastern Alaska. By January, the yearlings born six months previously occur along the Continental Shelf from the eastern Gulf of Alaska south to Washington. Although data are lacking, adult males are probably on the Gulf wintering grounds in maximum numbers. Adult females are in certain areas of the Gulf as apparent semi-residents, but in other areas they seem to appear for a short time and then move on. Yearlings appear to be moving southward in January and, depending on the severity of offshore sea conditions, may sometimes appear in considerable numbers in the protected waters of southeastern Alaska and British Columbia.

Seal movements in the Gulf of Alaska in February and March are similar to those described for the month of January, however, the first northward movements of adult females from southern waters probably occur in late March. In April, adult males start their movement westward towards the Bering Sea and the influx of adult females from the south, where they have wintered off the Washington, Oregon, and California coasts, begins in earnest.

During the month of May the Gulf population is at its highest point. Some adult males are still present, although the older animals are already on or soon will arrive at the Pribilof Islands. The major movement of adult females (mostly pregnant) through the Gulf occurs in May. Young animals of both sexes are also present but in small numbers.

The fur seal population of the Gulf undergoes a great change in June. The older males are essentially gone. The last of the older pregnant females continue on their way towards the Pribilof Islands where the peak of the pupping season occurs the first week in July. Immature males and females form a higher proportion of the population in the Gulf in June. In July, the last of the pregnant females (mostly young animals in their first pregnancy) move on west, and the population in the Gulf is comprised almost entirely of immatures of both sexes.

The entire Continental Shelf area of the Gulf of Alaska, including the northeast and Kodiak lease sites, is a critical habitat for fur seals. The greatest numbers of animals will pass

through these areas from April through June. The least critical period for fur seals in the Gulf occurs in August through October when their numbers are lowest.

Major prey species taken by fur seals are capelin, sand lance, Alaska pollock, and off the Continental Shelf, squids of the family Gonatidae.

The Pribilof Islands northern fur seal population is estimated to contain 1,300,000 to 1,600,000 animals; the non-Pribilof population is estimated to be 452,000. Thus, the world population estimate is at least 1,752,000. It is also estimated that at least 96% of the seals found in migration off the western coast of North America are of Pribilof origin, less than 4% are of Asian origin, and that probably less than 10% of the seals found wintering off the coast of Japan and in the western North Pacific are of Pribilof origin (NMFS, 1976). Using these population estimates and percentages and rounding to the nearest thousand, it appears that about 565,000 seals winter in the western North Pacific Ocean and 1,189,000 in the eastern North Pacific Ocean. Based on pelagic fur seal research carried on by the National Marine Fisheries Service since 1952 and from historical records, a significant portion of the more than one million fur seals may pass through the waters of the Gulf of Alaska at some time during their annual migrations to and from the Pribilof Islands.

NORTHERN (STELLER) SEA LION (Eumetopias jubatus)

The northern sea lion ranges over the Continental Shelf and slope of the Gulf of Alaska throughout most of the year. Inshore movements, and the location of rookeries and hauling grounds used by sea lions are described in two RU#68 subcontract studies by Calkins et al. (1975) for the Gulf of Alaska and by Pitcher (1975) for Prince William Sound.

Major breeding and pupping rookeries and hauling areas are found in the northeastern Gulf from Cape St. Elias to Pt. Elrington adjacent to the northeast Gulf lease site (Pitcher, 1975). In the Barren Island group near the entrance to Cook Inlet, Sugarloaf Island supports one of the largest rookeries in the northern Gulf (Calkins et al., 1975). Marmot Island, off Afognak Island, equals the Sugarloaf Island population and Cape Barnabas and Two-headed Island on and near Sitkalidak Island also support large numbers of sea lions (Calkins et al., 1975). The Kodiak lease area lies adjacent to Marmot Island and to lesser hauling areas between Afognak and the Trinity Islands.

Northern sea lions observed from pelagic fur seal vessels and by marine mammal officers and Marine Mammal Division observers aboard NOAA ships are summarized by month in Table A-1 and Figures A-21 through A-32.

Generally speaking, sea lions found in the offshore areas are more apt to be mature, with slightly more males present than females. From the examination of monthly sightings of sea lions as indicated in Figures A-21 through A-32 it appears that more sea lions are at sea during April, May, June, and August than during other months; however, this may be misleading, an artifact of sampling, as sighting effort was greater during these months. Fewer animals are at sea during June and July, because most adults are on the breeding rookeries and hauling areas, and during midwinter (Pitcher, 1975). Calkins et al. (1975) estimate that between Cape Spencer in the eastern Gulf and Scotch Cape at the entrance to the Bering Sea, the minimum number of sea lions present is 95,825.

Sea lions from these major breeding and hauling areas will normally move from 5 to 15 miles offshore in large groups to feed, or when found farther offshore they occur singly or in groups of 2 to 12 (Fiscus and Baines, 1966). One of us (C.F.) collected six sea lions feeding on natural prey items (i.e., not following fishing vessels) offshore in the Gulf of Alaska (Fiscus and Baines, 1966). Rockfish, sculpins, lampfish, herring, flatfish (not halibut), sand lance, capelin, and salmon were identified from their stomachs. A report on damage caused by sea lions to the Japanese sablefish industrystates that high damage is experienced off Baranof and Chichagof Islands, and from Kayak Island in the northeastern Gulf westward to the Aleutian Islands (North Pacific Longline Gillnet Association, 1976). The studies of Calkins and Pitcher (RU 243) will provide new and needed data on feeding forays and prey species of sea lions in the Gulf of Alaska.

HARBOR SEAL (Phoca vitulina richardii)

The harbor seal in the Gulf of Alaska is essentially an inshore species. Its habitat, distribution, numbers, and feeding habits are thoroughly covered by Calkins et al. (1975) for the Gulf of Alaska and by Pitcher (1975) for Prince William Sound.

Single animals do venture out over the Continental Shelf at times, and sightings of this species from pelagic fur seal research vessels and NOAA ships are summarized in Table A-3 and Figures A-42 through A-49. Most sightings were made on Portlock and Albatross Banks off Kodiak Island.

CALIFORNIA SEA LION (Zalophus californianus)

The California sea lion normally ranges north into southern British Columbia waters in winter (Bigg, 1973), but is not known to frequent the Gulf of Alaska. We have no records from the Gulf of Alaska; however, an adult male was photographed at Pt. Elrington, Elrington Island, Prince William Sound on 27 June 1973 (K. Schneider, Alaska Dept. Fish and Game, pers. comm.). Schneider's account constitutes the first record of this species from Alaska.

NORTHERN ELEPHANT SEAL (Mirounga angustirostris)

The northern elephant seal seldom frequents the Gulf of Alaska. Four sighting records from the Gulf and Southeast Alaska exist. An adult male was found dead on a beach near Kassan, Prince of Wales Island (Willet, 1943). An immature male was found dead on Middleton Island in late April 1975 (D. Calkins, Alaska Dept. Fish and Game, pers. comm.). A live adult male was sighted on 5 May 1962, in Lat. 56°04'N, Long. 134°31'W, 7 miles southeast of Cape Ommaney, Baronof Island (C. Fiscus, pers. observ.). A second sighting from the NOAA ship TOWNSEND CROMWELL was made 29 May 1975 in Lat. 59°21'N, Long. 145°51'W, about 17 miles southeast of Middleton Island (Table A-4).

The elephant seal population has recovered from a low of less than 100 animals in the 1890's to an estimated 30,000+ animals (Peterson and LeBoeuf, 1969), reoccupying its known breeding range from central California to Baja California, Mexico (Kenyon, 1965; Radford et al., 1965).

CALIFORNIA GRAY WHALE (Eschrichtius robustus)

In January and February gray whales breed and calve in lagoons along the coast of Baja California, Mexico, migrate north to the Bering and Chukchi Seas to feed from May through October, then return to Lower California in winter (Rice and Wolman, 1971). The migration route between Mexico and British Columbia is well established (Pike, 1962; Rice, 1965; Rice and Wolman, 1971; Leatherwood, 1974); however, little data exist concerning distribution and migratory pathways from British Columbia to the Chukchi Sea. Gray whales generally travel within 3 km of the shore while along the California coast (Rice and Wolman, 1971) and are believed to identify shore landmarks while migrating north (Pike, 1962). If they continue to migrate close to shore they may pass through oil lease sites in the northeast Gulf of Alaska and near Kodiak Island.

There is no evidence of gray whales crossing the open ocean or swimming far from land while migrating into or out of the Gulf of Alaska. Data collected to date by the Marine Mammal Division for the Gulf of Alaska are minimal; however, there is an indication that gray whales do occur along the northern coast of the Gulf in the near-shore environment (Table A-5 and Figures A-51 and A-52). Calkins (pers. comm.) reports observing 35 gray whales north and east of Kodiak Island from 12 to 23 April 1976. Wilke and Fiscus (1961) report sighting gray whales near Kodiak Island in May. Survey ships used to collect these data, e.g., pelagic fur seal vessels and NOAA ships, generally avoid near-shore shallow waters, thus reducing sighting opportunities.

Although data are limited, by extrapolating from behavioral and distribution information taken from studies in California and Alaska (Ichihara, 1958; Maher, 1960; Wilke and Fiscus, 1961; Pike, 1962; Rice and Wolman, 1971), the route of migration through the Gulf can be predicted. That is, gray whales might be expected to occur along the entire north coast of the Gulf from March through November, with peak occurrences in the north-east Gulf and Kodiak Island from April through May, and again in November and December. Additional sighting data collected by personnel from the U.S. Fish and Wildlife Service and the Alaska Department of Fish and Game should help to clarify this hypothesis.

Prior to the 1960's, very little quantitative population data existed on the gray whale. It was estimated that 30,000 animals existed between 1853 and 1856 (Scammon, 1874). Whaling activity during the last half of the 19th century brought the species to near extinction. No reliable population data exist for the first half of the 20th century. Recent population abundance estimates have varied greatly between researchers. Hubbs and Hubbs (1967), using aerial surveys, estimated the wintering Baja population at 3,000 for the period 1952-64. Gilmore (1960) placed the population at 7,500 animals. From data collected on the southern migration along California, Adams (1968) made an estimate of 18,300 animals. Zimushko (1970) censusing gray whales in the Bering and Chukchi Seas, using aerial survey, estimated the population at 4,800 animals. The most comprehensive counts to date are those of Rice and Wolman (1971) who place the population at 11,000 animals.

Although it is difficult to be precise about the number of gray whales that frequent the northeast Gulf and near Kodiak Island, a large fraction of the population may be assumed to spend part of their time within the Gulf of Alaska lease sites. Most gray whales probably migrate through the lease sites, however, "resident" individuals are found all along the West Coast, including Alaska (Pike, 1962; Rice and Wolman, 1971; authors, pers. obser.).

Peak periods of gray whale abundance at, for example, Yankee Point, California (collected in December and January), may have corresponding periods of peak activity throughout the Gulf some weeks earlier in the season. Peak activity in the Gulf may be approximated from data collected in California using: (1) 200 animals per 10 hours of observation time passing Yankee Point (peak counts from the 1968-69 survey; Rice and Wolman, 1971), (2) a nighttime population sighting adjustment coefficient of 2.4 (Rice and Wolman, 1971), and (3) estimating that gray whales migrate at speeds of 4 to 5 knots when traveling south, or about 100 nautical miles (nmi) per day (Pike, 1962; Rice and Wolman, 1971). Using these parameters, and assuming gray whales migrate south along the northern coast of the Gulf (we have no data to the contrary), we might expect that as many as 5,000 whales could pass the Kodiak Island region around 15-20 December. As described below, these temporal estimates are supported by Pike (1962):

Direction of migration	Sample location	Approximate time of year
North	Dixon Entrance	Early May
North	Kodiak Island	Mid-May
South	Kodiak Island	Mid-December
South	Dixon Entrance	Late December

We assume gray whale migration behavior is similar in the Gulf to that observed along the coasts of Washington, Oregon, and California, but this assumption needs to be tested.

An estimate of the maximum number of animals reaching the northeast Gulf and Kodiak Island areas in the spring is more difficult to make at this time because less data exist on the numbers of animals seen migrating north from Lower California. As a general rule, newly impregnated females leave Baja California in late February before adult males which follow in early March. Anestrous females leave in early March, and immatures of both sexes begin leaving in mid- to late-March (Rice and Wolman, 1971). It is assumed that this relationship holds true in Alaska and that pregnant females would be the first to enter the Gulf lease sites in the spring. Recent sightings by Marine Mammal Division aerial survey crew members in the Bering Sea (RU67) indicate that adults with young of the year may migrate later in the season, and that the above age-sex temporal migration scheme may be biased, as suggested by Rice and Wolman (1971). Preliminary data from RU67 indicate that smaller adults (immatures?) are the first to move into the Bering Sea in the spring.

MINKE WHALE (Balaenoptera acutorostrata)

Minke or little-piked whales, range from the Chukchi Sea to the equator, and frequent near-shore habitats on the Continental Shelf and shelf slope (Nishiwaki, 1966b). The greatest concentration of Pacific minke whales, during the winter season, occurs near the Channel Islands off southern California. During the summer months minke whales are found in abundance in the Gulf of Alaska (Rice, 1974). Numerous sightings exist for minke whales on Portlock and Albatross Banks and in Prince William Sound during the month of May; and in Kachemak Bay during August. Sighting records over the shelf from February through November are summarized in Table A-6 and Figures A-53 through A-61.

Pacific minke whales might distribute themselves similarly to their Atlantic counterparts which are thought to segregate by age, with older animals ranging farther north during the summer season (Fraser, 1953; Schwartz, 1962; Sergeant, 1963; Jonsgard, 1951); and by sex, with females usually found feeding in coastal waters and males in offshore waters during migration to the northeastern Atlantic (Jonsgard, 1966). Minke whales are known to feed upon small schooling fishes (Omura and Sakiura, 1956) and thus they might be expected to frequent areas of high productivity such as Fairweather Ground, and Portlock or Albatross Banks.

Extensive harvest data generally are not available for minke whales in the North Pacific, and little is known about abundance or seasonal distribution of this species in the Gulf. They have never been exploited in the Gulf. No abundance estimates can be made at this time.

SEI WHALE (Balaenoptera borealis)

Table A-7 and Figures A-62 through A-64 summarize our sighting records on sei whales from 1958 to 1976. The seasonal ranges of the sei whale include summer feeding activities in the North Pacific and Gulf of Alaska, and a poorly understood winter range off the west coast of North America. In the southeastern North Pacific during the winter they are sparsely scattered from Point Piedras Blancas, California, to the vicinity of the Islas Revillagigedo, Baja California, Mexico (Rice, 1974). The largest known concentration of this species in the Gulf of Alaska is during the summer season in the area near and just east of Portlock Bank (Nemoto and Kasuya, 1965; Berzin and Rovnin, 1966; Nishiwaki, 1966a).

The original population of sei whale stocks in the North Pacific has been estimated at 40-42,000 animals (Ohsumi et al., 1971; Tillman, 1975). Stocks have been reduced by commercial whaling pressure to a present (1974) estimated population of 8,600 animals (Tillman, 1976).

Sei whales feed almost exclusively on copepods (Calanus cristatus and C. plumchrus) in the Gulf, and fish, euphausiids, and Calanus pacificus in the North Pacific (Nemoto and Kasuya, 1965; Kawamura, 1973). Euphausiids are also the principal food items of the right whale (Balaena glacialis) (Omura, 1974); consequently, sei whales might occur in the central and eastern Gulf of Alaska as indicated by Townsend's (1935) plots for right whales.

FIN WHALE (Balaenoptera physalus)

The location and number of fin whales sighted by NOAA and NMFS personnel by month since 1958 are summarized in Table A-8 and Figures A-65 through A-70. Calkins (pers. comm.) reports sighting 10 fin whales off Afognak Island (NW Gulf) on 22 April 1976. This sighting is not shown on our charts (Fig. 66).

The Gulf of Alaska represents a significant portion of the summer feeding range of North Pacific stocks of fin whales (Nasu, 1966). The largest concentrations in the Gulf from June to August occur from Long. 144°W to 150°W and from Lat. 56°N to 59°N, including part of Portlock Bank (Nemoto and Kasuya, 1965; Nishiwaki, 1966b). Fin whales begin to migrate south in September to their wintering grounds from Baja California, Mexico to northern California; probably extending well offshore. This area may overlap with the summer range of some portions of the fin whale population which extends as far south as Southern California (Rice, 1974). Fin whales do not migrate along a narrow corridor such as is typical of migrating gray whales, however, their migration routes are not well defined (Nishiwaki, 1966a).

The original population of fin whales for the North Pacific has been estimated at 44,000 animals (Ohsumi and Wada, 1974). Commercial whaling activities reduced this original stock to approximately 16,000 animals (ibid). Rice (1974) has estimated the population of harvestable animals summering in the eastern North Pacific to be approximately 9,000. Few quantitative population data exist to adequately assess present distribution and abundance in the Gulf.

BLUE WHALE (Balaenoptera musculus)

The number of blue whales sighted by month and by location, reported by NOAA and NMFS personnel since 1958, are summarized in Table A-9 and Figures A-71 and A-72.

A large portion of the North Pacific blue whale stock is found from the equator to Baja California, Mexico, in October and then again from February to June. In Alaskan waters they are seen from late June until late August (Rice, 1974). Three major concentrations of blue whales have been identified in the northern summer range; the eastern Gulf of Alaska from Long. 130°W to 140°W; south of the eastern Aleutian Islands from Long. 160°W to 180°W; and from the far western Aleutian Islands to the Kamchatka Peninsula (Rice, 1974). Japanese tagging experiments have shown that these are not discrete subpopulations, and that animals will move from one area to another in both a westerly and easterly direction (Ivashin and Rovnin, 1967).

The pre-whaling population of blue whales in the North Pacific has been estimated to be from 4,900 (Wada, 1975) to 6,000 (Rice, 1974). The Pacific stock has been reduced by commercial whaling to an estimated 1,600 animals (Wada, 1973). In 1966, blue whales in the North Pacific were placed under complete protection from commercial whaling by International Whaling Commission member nations. Since 1966 there has apparently been no significant recovery of the stock as has been in part the case with the humpback whale (Megaptera novaeangliae) (Tillman, 1975).

HUMPBACK WHALE (Megaptera novaeangliae)

The number of humpback whales seen by month and by location, reported by NOAA and NMFS personnel since 1958, are summarized in Table A-10 and Figures A-73 through A-79.

Humpback whales frequent three main regions in the Gulf of Alaska from April through December: (1) south of Kodiak Island, Albatross and Portlock Banks; (2) Montague Strait-Prince William Sound area; and (3) the inland waters of Southeastern Alaska, Stephen's Passage, and Frederick Sound. Humpbacks begin migrating south from Alaskan waters during late December for winter calving grounds in warmer waters off the coast of Mexico and perhaps among Pacific Islands such as the Hawaiian Archipelago. The majority of animals remain on the wintering grounds until late February and early March at which time they will begin returning to the summer feeding grounds in the Gulf of Alaska.

The pre-whaling population estimate of humpback whales in the North Pacific was thought to have been several thousand (Tillman, 1975); their numbers were considerably reduced between 1962 and 1965. In 1966, the International Whaling Commission placed the North Pacific humpback whale stock under complete protection from commercial whaling by member nations. Since 1966 this stock has been reported to be increasing with a total present population for the North Pacific estimated at 1,400 animals (Wada, 1975). Personnel of the Cetacean Task group at the Marine Mammal Division, NMFS, estimate that the population in the Gulf of Alaska is about 60 animals (Rice, pers. comm.).

NORTH PACIFIC WHITESIDE DOLPHIN (Lagenorhynchus obliquidens)

The North Pacific whiteside dolphin has been sighted from Valdez, Alaska to Baja California, Mexico (Scheffer, 1950a; Miller and Kellogg, 1955; Pike, 1956; Daugherty, 1965; Nishiwaki, 1966a) showing a preference for coastal temperate waters of the North Pacific Ocean. Nishiwaki (1966a:32) describes it as "one of the most abundant species," presumably comparing it to all porpoises of the North Pacific. At least 1,000 were reported by Pike (1959) in a single sighting 25 miles northwest of Queen Charlotte Island (Lat. 53°34'N, Long. 133°40'W) on 16 June 1959, and according to National Marine Fisheries Service reports, approximately 2,000 were seen in one pod in Lat. 57°34'N, Long. 140°33'W on 21 May 1968. Fifty-five other sightings were recorded between 1958 and 1975 (Table A-11 and Figures A-80 through A-83).

Based on 30 recorded observations prior to the NMFS studies, Pike (1956:11) described L. obliquidens as "probably common along the west coast of North America." Sleptsov (1955) makes a taxonomical differentiation between L. obliquidens and L. ognevi, the latter inhabiting the western half of the North Pacific, and L. ognevi was reported to have been "encountered constantly" in the Okhotsk Sea. Rice (in press) lists only L. obliquidens from the North Pacific Ocean.

KILLER WHALE (Orcinus orca)

Killer whales are thought to be present in the Gulf of Alaska during all months of the year, preferring shallow areas on the Continental Shelf (Jonsgard and Lyshoel, 1970). It is believed they generally stay within 200 miles of shore. Monthly sightings of Orcinus indicate that they are most frequent

between Kodiak Island and Prince William Sound, although our sample size during other months is small (Table A-13 and Figures A-84 through A-91). Group sizes of up to 10 individuals are common, although groups of over 100 individuals have been reported. During a 1-day census on 27 July 1971, 62 animals were recorded in Southeastern Alaska (Bigg, 1972). Five hundred animals were recorded on 24 April 1973, 24 miles northeast of Middleton Island (J. H. Branson, NMFS, Enforcement Division, pers. comm.). Despite numerous sighting records no population estimates are available for this species in the Gulf.

Pike and MacAskie (1969) suggest that the British Columbia population of killer whales is probably resident. Little seasonal variation in population size was noted by Pike and MacAskie from logbook records for the period 1959-64. Despite the large accumulation of records, many of which contain details of size and sex composition of groups and direction of travel, it was not possible to determine any orderly pattern of movement or migration. Local or seasonal movements may be related to food supply (Mitchell, 1975).

Killer whales exhibit a high degree of group hunting, particularly when feeding on marine mammals. A small pod of killer whales was observed attacking and killing a minke whale on 29 April 1976, at approximately Lat. 58°22'N, Long. 138°21'W (Marsha Caunt, Marine Mammal Division observer). They are known to also feed on fish, cephalopods, and birds (Nishiwaki and Handa, 1958). According to Nishiwaki and Handa older killer whales feed on marine mammals. Young animals are believed to feed mainly on fish and cephalopods. Sergeant and Fisher (1957) believe movements of Orcinus off Eastern Canada are associated with migrations of rorquals and seals.

It is not known what effect fish migrations in the Gulf of Alaska have upon killer whale distribution, however, "they do seem to follow fish stocks during [fish] migrations, moving in [coastal areas] with the fish, moving out when they leave" (M. Bigg quoted in Davis, 1974). It is believed that spawning salmon are an important food item in Puget Sound during the summer, but no data are available to support this assumption (Rice, 1968). Jonsgard and Lyshoel (1970) conclude that the distribution and migration of killer whales in the northeast North Atlantic seem to be dependent upon the distribution and migration of herring. In the stomach of a killer whale taken near Kodiak Island on 20 May 1960, a 23-pound halibut was found (Rice, 1968). Distribution and abundance of Orcinus in the Kodiak Island and Northeast Gulf lease sites may thus be seasonally dependent upon food availability and density.

HARBOR PORPOISE (Phocoena phocoena)

The harbor porpoise is a boreal-temperate zone species (Gaskin et al., 1974) found along much of the North Pacific coast between Point Barrow, Alaska (Hall and Bee, 1954), and central California (Daugherty, 1965; Nishiwaki, 1966a; Gaskin et al., 1974) or as far south as Mexico (Pike, 1956). In the Gulf of Alaska our data show 280 sightings made during 6 years of irregular observations between 1958 and 1976 (Table A-14 and Figures A-92 through A-100). Sightings were made throughout the year, especially in the near-shore areas of the Northeast Gulf; and, in May south of Kodiak Island on Albatross and Portlock Banks (Figure 96). Scheffer (1972) estimated the total population in the Gulf of Alaska to be about 1,000. This value seems too small considering the number of incidental sightings made throughout the Gulf.

P. phocoena is common in bays, estuaries, and tidal channels where it is exposed to encounters with man. Scheffer (1972) reports this species as being of no commercial interest in the North Pacific. An ad hoc group at the 1975 conference for the Advisory Committee on Marine Resources Research described P. phocoena as being heavily harvested elsewhere; and that its population status is in urgent need of assessment (Anonymous, 1976).

DALL PORPOISE (Phocoenoides dalli)

Dall porpoises are distributed between their southern limit near Northern Baja California, Mexico, and their northern limit either near the Aleutian Islands (Pike, 1956; Daugherty, 1965), opposite Cape Navarin (Lat. 62°N, Long. 179°E) (Nishiwaki, 1966a), or as far north as the Chukchi Sea (Sleptsov, 1961). The species was originally identified near the Aleutian Islands by William H. Dall in 1873 (True, 1885). Reports of other specimens have been collected from around the Gulf of Alaska by True (1889), Miller (1929; 1930), Ulmer (1943), and Benson and Groody (1942). Nichols (1926; 1950) noted frequent sightings all along the east side of the Gulf of Alaska. He identified P. dalli as far as 350 miles southeast of Kodiak Island (Lat. 53°36'N, Long. 145°37'W). The farthest from land Scheffer (1949) reported sightings was 60 miles east of Kodiak Island and 50 miles south of Yakataga Island. Seventy-two observations including 350 individuals indicated a strong preference by this species for wide straits and where ocean currents merge (Scheffer, 1949). Cowan (1944) also comments on the preference of P. dalli for channels between islands. Sightings by the authors around the Aleutian Islands confirm these observations.

Three populations of Phocoenoides are recognized in the North Pacific and adjacent seas (Kasuya, 1976). Of these, only one inhabits the waters east of Long. 170°E. This population, as with others near Japan, is probably migratory in north-south directions.

Cowan and Guiguet (1965:261) describe P. dalli as, "the most abundant porpoise north of Vancouver Island." Scheffer (1972) estimated the total population in the Gulf of Alaska at 2,000, although he had earlier published an account (1950) of several thousand porpoises, probably P. dalli, in a single pod between Seward and Cape Spencer on 26 October 1949. Southeast Alaska is attributed to having the greatest abundance of P. dalli in the North Pacific (Cowan, 1944; Scheffer, 1949), although Benson (1946) believes this to be biased by the greater number of observers in the area. In our data, 508 sightings were made between 1958 and 1976 (Table A-15 and Figures A-101 through A-110). Most sightings during this 18-year period took place during April, May, and June (Figures A-104 through A-106), with a general shift from east (April) to west (May) and south (June). P. dalli may be the most common cetacean ranging from the Northeast Gulf to Kodiak Island.

The Japanese high seas gillnet salmon fishery kills more than 10,000 animals annually (Mizue and Yoshida, 1965; Mizue et al., 1966), but they rarely operate their vessels east of Long. 175°W. Their influence on Gulf of Alaska populations is probably only indirect, or may affect only long-distance migrating animals. Scheffer (1972) reports no commercial interest in P. dalli in the Gulf of Alaska. The Advisory Committee on Marine Resources Research (Anonymous, 1976) classified P. dalli as a heavily fished species for which there is an urgent need of a population assessment.

BELUGA OR WHITE WHALE (Delphinapterus leucas)

The beluga whale has been reported to be the most numerous and widely distributed cetacean in the Arctic (Yablokov and Bel'kovich, 1967). In the Gulf of Alaska they appear ~~regularly~~ as residents in Cook Inlet with population estimates ranging from 150 to 400 (Klinkhart, 1966; Sergeant and Brodie, 1975). Between May 1974 and September 1975, 621 sightings were recorded for Cook Inlet (Table A-16 and Figures A-111 through A-115) mostly during July and August. It has been assumed the species does not go south or east of Cook Inlet along the Alaska coast (Osgood, 1904), but Scheffer and Slipp (1948) reported a single sighting near Crab Point, Washington. The only documented sighting of D. leucas in the Gulf, outside of Cook Inlet, was made by

Donald Calkins, Alaska Department of Fish and Game (pers. comm.) in Yakatat Bay on 31 May 1976. Twenty-one white adults and five gray subadults were observed. It may be that competition with more modern species of Delphinidae prevents D. leucas from expanding its range to more optimal feeding habitats to the south, as suggested for Atlantic stocks by Sergeant and Brodie (1975).

Migratory patterns of D. leucas along the coast of Alaska are essentially unknown (Kleinenberg et al., 1964; Klinkhart, 1966), although their appearance seems to be closely related to the activities of their prey species, especially smelt, salmon smolts, and Arctic cod (Brooks, 1955; Kleinenberg et al., 1964; Klinkhart, 1966; Yablokov and Bel'kovich, 1967; and others). Beluga, or belukha, whales are usually associated with shallow bays or estuaries or large rivers (Vladykov, 1944) often where water temperatures are relatively warm (Sergeant and Brodie, 1975) and turbid. Their surface feeding preferences (Brooks, 1955) and sensitivity to human activity during the calving season (Sergeant and Brodie, 1975) make this species especially vulnerable to developments along the Continental Shelf. As described by Kleinenberg et al. (1964) and Yablokov and Bel'kovich (1967), D. leucas is a harvested species. The Cook Inlet population was harvested once in 1930 when 100 animals were netted in the Beluga River; no animals returned to that area, and the venture was subsequently abandoned (Klinkhart, 1966).

SPERM WHALE (Physeter macrocephalus)

From May 1958 to November 1975, 43 sperm whale sightings were made by NOAA and NMFS personnel in the Gulf (Table A-17 and Figures A-116 through A-119).

Whaling explorations from 1959 to 1963 have established that the largest concentration of sperm whales occurs in the northeast Pacific rather than off Asia. One of the more northern concentrations is believed to be in the area of Lat. 52°N, Long. 148°W (Berzin, 1971). Sperm whales occur frequently along the southern edge of the study area from Long. 130°W to 150°W generally evenly distributed (Berzin, 1971).

Male sperm whales occur in the Gulf of Alaska during the summer months, but seldom during the winter. Females and young males are generally not seen above Lat. 50°N, which coincides in that area with the 10° isotherm (Berzin and Rovnin, 1966; Nishiwaki, 1967). Females and young males are reportedly seen in the eastern Aleutian Islands as early as early March with most arriving in April (Berzin, 1971). "The bulk of the males

occur from Kodiak Island west along the Aleutian Arc up to the Komandorski Islands" (Berzin, 1971:160); and, concentrate east of Portlock Bank to about Long. 146°W (Nishiwaki, 1966b). Male concentrations occur south of Kodiak Island (Berzin, 1971).

The North Pacific population of male sperm whales is estimated to be about 90,000 animals (D. Rice, pers. comm.). An estimate of the total population (males and females) has been placed at 150,000 animals (Nishiwaki, 1966b). It is not known what proportion of the population enters the Gulf.

Those sperm whales thought to frequent the area near Kodiak Island and east are believed to migrate from the eastern Aleutian Islands, while others migrating north proceed into the Bering Sea, though the straits of the Aleutian Islands, along the Continental Shelf slope (Berzin, 1971). Males may be more likely to occur in areas of high cephalopod productivity on the Continental Shelf or along the slope earlier in the year than females. Not until June, as waters warm and schools of squid increase, do nutrition requirements of female sperm whales improve (Tarasevich, 1965).

SHORT-FINNED PILOT WHALE (Globicephala macrorhynchus)

Short-finned pilot whales travel in groups of a few to perhaps several hundred animals. Though they may be found close to shore at any time of the year, they are generally near shore in the early spring when they follow the migration of squid, their primary food. The remainder of the year they are primarily offshore animals. Though no long distance migration has been described, populations may shift north in the summer and south in the winter in response to changes in water temperature (Leatherwood et al., 1972). No population estimates are available. We have no data from NOAA and NMFS records.

Pilot whales are known from Alaskan waters on the basis of only a few published records. A specimen, reported as G. scammonii, was taken near Kanatak on the Alaska Peninsula in September 1937 (Orr, 1951). Four pilot whales were sighted in the Gulf of Alaska by the MV FORT ROSS in August 1957 in Lat. 54°48'N, Long. 143°47'W, about 400 miles west of Dixon Entrance (Pike and MacAskie, 1969)

GRAY GRAMPUS OR RISSO'S DOLPHIN (Grampus griseus)

There are no documented sightings of Grampus griseus from the study area. Our researchers located three G. griseus at 1338 hours on 3 March 1976 (Lat. 49°50'N, Long. 128°30'W). This sighting is believed to be the northernmost sighting ever recorded at that time of year (Rice, pers. comm.). These animals were seen moving north.

Nishiwaki (1966a) describes G. griseus as being intolerant of temperatures below 7.5°C; sustained exposure to water cooler than 5°C would likely be lethal. The Gulf of Alaska surface temperatures are consistenly below 5°C in the winter, and though the Gulf temperatures range between 10° and 18°C in the summer (Favorite et al., 1976), this may still be a limiting factor. According to Pike (1956), Grampus are widely distributed in the Northern and Southern Hemispheres. Guiguet and Pike (1965), Stroud (1968), and Hatler (1971) document several sightings north of the California coasts but none north of Lat. 50°N.

NORTHERN RIGHT WHALE DOLPHIN (Lissodelphis borealis)

The northern right whale dolphin is generally confined to temperate waters between Lat. 30°N and 50°N (Leatherwood and Walker, 1975), although Scammon (1874), Pike (1956), and Daugherty (1965) report sightings as far north as the Bering Sea; the latter two authors probably referring to Scammon's report. Nishiwaki's study (1966b) of catch data from Japanese fishing boats also reports that L. borealis occurs in the Bering Sea.

L. borealis seem to prefer temperate waters of approximately 15°C, and since Gulf of Alaska surface waters are well below that in the winter and range from 10° to 18°C in the summer (Favorite et al., 1976) they might be expected only as summer visitants with "uncertain northern limits" (Scheffer, 1972:201). Leatherwood and Walker (1975), in summarizing 207 sightings, estimate the total population in the North Pacific at greater than 10,000 animals with "pods" ranging from 1 to 2,000; averaging 110 animals. Scheffer (1950b) estimated 5,320 dolphins, perhaps L. borealis, in a single sighting in Lat. 43°07'N, Long. 139°03'W on 13 July 1949. This would indeed be a remarkable sighting if the true total for the North Pacific population is only two times the number seen at a single place.

Leatherwood and Walker (1975) describe the range of L. borealis as largely unknown in the open Pacific though the species probably occurs across the North Pacific crescent.

None were noted between 1958 and 1976 (our data). Although the lack of a dorsal fin and its slender contours make L. borealis readily identifiable, the rarity of its sightings may bias casual observations towards more expected species.

RIGHT WHALE (Balaena glacialis)

Right whales, in spite of complete protection by international agreement since 1937, are still so rare as to be classified as an endangered species under the terms of the U.S. Endangered Species Act. Current estimates place the right whale population for the North Pacific at about 150-200 animals (Wada, 1973; 1975).

Nineteenth century whaling records (Townsend, 1935) show that approximately 40% of 2,118 right whales (n = 1,017) harvested in the North Pacific were taken in the Gulf of Alaska. Recent sightings in the Gulf have been reported by Japanese and Soviet whale catcher and scouting boats (Omura et al., 1969; Klumov, 1962). Catches include one right whale taken accidentally by Canadian shore whalers near Vancouver Island in 1951 (Pike, 1962), and three whales taken by Japan on Albatross Bank near Kodiak Island in 1961 for research under permit by the International Whaling Commission. No verifiable right whale sightings in the Gulf have been reported by NOAA personnel engaged in the Platforms of Opportunity Program for 1975-76. Sightings have been made south and east of Kodiak Island from May to September in recent years (D. Rice, pers. comm.). Both International Whaling Commission records and Townsend's data indicate that right whales occur in the Gulf from May through September with the majority being found in the central and eastern portions of the Gulf.

Available information suggests that right whales feed primarily upon copepods in the North Pacific (Tomilin, 1957) and copepods and euphasiids in the Gulf (Omura, 1974), which are commonly found in the upper (photic) layer of the water column.

GIANT BOTTLENOSE WHALE (Berardius bairdi)

The giant bottlenose whale is endemic to the North Pacific, ranging from St. Matthew Island in the Bering Sea through the Gulf of Alaska and south to Southern California (Rice, 1974). Seasonal movements of this species are poorly understood, however, migrations of Berardius in the western Pacific tend to coincide with the seasonal occurrence of the squid Todorades pacificus,

and other cephalopods (Gonatus spp.) (Nishimura, 1970). Whaling records off Japan indicate a greater abundance of B. bairdi in waters deeper than the 1000m contour of the Continental Shelf (Nishiwaki and Oguro, 1971).

The predominance of males in catches off the west coast and off Japan suggests a partial geographical segregation of the sexes (Rice, 1974). Studies of Berardius off Japan have shown that pairing takes place between late November and early May, the peak of the breeding season occurring in February (Nishiwaki, 1972). Calves are born in December (Omura et al., 1955). Similar periods for breeding and calving are assumed to hold true for the eastern North Pacific and the Gulf of Alaska. We have no data, however, on distribution and abundance in the Gulf.

B. bairdi feeds primarily on squids and ground fishes which frequent the Continental Shelf (Nishiwaki, 1972), but also consumes deep sea fishes when available (Nishiwaki and Oguro, 1971). In addition, the stomachs of some specimens have contained benthic animals such as ascidians, sea cucumbers, starfishes, and crabs (Nishiwaki, 1972).

BERING SEA BEAKED WHALE (Mesoplodon stejnegeri)

The known range of M. stejnegeri, a subarctic species, is believed to extend from Akita Beach, Japan, north to the Commander and Pribilof Islands in the Bering Sea through the Gulf of Alaska south to Yaquina Bay, Oregon (Moore, 1963a). The distribution of this species is based upon rare strandings and sightings such as a floating carcass examined off Cape Edgecumbe in the Gulf of Alaska (Fiscus et al., 1969). Although very little is known about the distribution and the abundance of these whales, it is possible that they principally inhabit the deeper waters of the Continental Shelf as has been suggested for the Atlantic species M. bidens (Moore, 1966).

We have collected no sighting data on M. stejnegeri in the Gulf.

GOOSE BEAKED WHALE (Ziphius cavirostris)

The goose beaked whale (Cuvier's beaked whale) is found in all oceans (Scheffer and Rice, 1963), except from Arctic and Antarctic waters (Moore, 1963b). Z. cavirostris is probably more abundant than other beaked whales in the eastern North Pacific (Leatherwood et al., 1972), as strandings are not

uncommon (Mitchell, 1968). Population trends and migrational patters are unknown. Estimates of abundance are not available. We have collected no sighting data on Z. cavirostris from the Gulf of Alaska.

Ziphius is considered to be a pelagic species (Moore, 1963b) often taken in deep waters (Nishiwaki and Oguro, 1972) where it is believed to travel in groups averaging 30-40 animals. Old males are often solitary (Mitchell, 1968).

These deep diving whales feed mainly on squid; with fish, sea cucumbers, crabs, and star fish also included in their diet (Mitchell and Houck, 1967; Nishiwaki and Oguro, 1972).

SUMMARY

Our understanding of marine mammal distribution and abundance in the Gulf of Alaska study area is not complete. A comprehensive overview of the expected frequency of occurrence of all species by month is summarized in Table 4. Most marine mammals occur in the Gulf throughout the year. Unfortunately, few reliable data exist for the winter months. Some species do not frequent near-shore environs; and are not well represented because of inadequate sampling.

Population projections in the Gulf are admittedly unrefined, but are believed to be the best available estimates. Knowing where marine mammals feed, what type of food resources they consume, and the general region of the Gulf they are most likely to be found can help us to evaluate which species might be impacted by certain types of oil-related perturbations. These parameters plus preliminary population estimates have been summarized in Table 5. Missing data in the table reflect our lack of knowledge.

The direct impact of oil on individual species of marine mammals is as yet unclear. Sea otters and fur seals would probably be greatly affected because oiling of their pelage would destroy thermal insulation, essential for proper temperature control. Animals directly impacted by oil are expected to die; however, quantitative documentation is lacking. Surface filter feeding cetaceans, such as right whales (Watkins and Schevill, 1976), might also be directly impacted by oil fouling baleen plates.

Consideration of how certain marine mammals are to be ~~impacted~~ affected requires an independent analysis of temporal and spatial trends at specific sites where animals are likely to be found; such as: Portlock and Albatross Banks, Fairweather Ground, and Middleton Shelf. Local "systems" related studies are expected

Table 4.--Checklist of marine mammals by month of the year in pelagic waters of the Gulf of Alaska (Lat. 52°N, Long. 131°W to Long. 155°W) excluding Cook Inlet and Prince William Sound; and sea otters. Projections were made from data collected from (1) Marine Mammal Division's Outer Continental Shelf Environmental Assessment Program, 1975-76; (2) Platforms of Opportunity Program (NOAA), 1974-76; (3) pelagic fur seal research, 1958-68; and (4) historical records summarized from the literature. O=species present, +=greatest frequency; -=not known or expected to occur; blank=no data available.

Marine mammal species	Months of the year											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
N. fur seal	0	0	0	+	+	+	0	0	0	0	0	0
N. sea lion		0	0	+	+	0	0	0	+	0	0	
Harbor seal		0	0	0	+	0		0	0	0		
Gray whale	0			0	+	0					0	+
Minke whale		0	0	0	+	+	0	0	0		+	
Sei whale	-	-		+	+	+	0	0				-
Fin whale	-	-	0	+	+	+	0	0		0		-
Blue whale	-	-	-		0	+	0	0			-	-
Humpback whale	-	-	0	+	+	+	0	+		0		-
N. Pacific white-side dolphin		0		0	+	+					0	
Killer whale	0	0	+	+	+	+	+	+	0	0	0	0
Harbor porpoise		0	0	0	+	+	0	0	0	0	0	
Dall porpoise		0	0	+	+	+	0		0	0	0	0
Beluga					0							
Sperm whale	-	-	-		+	+			0		0	-
Pilot whale								0				
Gray grampus	-	-	-	-						-	-	-
Right whale	-	-			0	0	0	0	0			-
N. right whale dolphin	-	-	-	-						-	-	-
Giant bottlenose whale												
Bering Sea beaked whale												
Goose-beaked whale												

Table 5.--Summary of population size estimates of marine mammals and regions of the Gulf where individual species are most likely to frequent. General food resources and vertical zone of the ocean where animals feed are also included. NE=no estimate available.

Marine mammal species	Approximate population size[1/]	Region of the gulf[2/]	Principal food type	Feeding strata[3/]
N. fur seal	1,189,000 (NP)	OS	fish	MW
N. sea lion	100,000 (NP)	C	fish	S,MW
Harbor seal	100,000?(GA)	C	fish	S,MW
Gray whale	11,000 (W)	C	amphipods	B,S
Minke whale	NE	C,OS	fish, copepods	S
Sei whale	8,600 (NP)	OS	copepods	S
Fin whale	9-16,000 (NP)	OS	euphasiids copepods	S
Blue whale	1,600 (NP)	O	euphasiids	MW
Humpback whale	1,400 (NP) 60 (GA)	C	euphasiids, fish	S
N. Pacific white-side dolphin	NE	C	fish	MW
Killer whale	NE	C	fish, cephalopods pinnipeds	S
Harbor porpoise	1,000+(GA)	C	fish	S
Dall porpoise	2,000+(GA)	C,OS	fish	S
Beluga	150-400 (CI)	C	fish	S
Sperm whale	150,000 (NP)	O	cephalopods fish	B,MW
Pilot whale	NE	OS	cephalopods fish	
Grampus	NE	OS		
Right whale	200 (NP)	OS	copepods euphasiids	S
N.right whale dolphin	10,000+(NP)	OS		
Giant bottlenose whale	NE	O,OS	fish cephalopods	B,MW
Bering Sea beaked whale	NE	O,OS		
Goose-beaked whale	NE	O,OS	cephalopods fish	

1/ Cook Inlet (CI), Gulf of Alaska (GA), eastern N. Pacific (NP), and World (W) population(s).

2/ Coastal (C), offshore (OS--continental shelf), oceanic (O-shelf slope and ocean floor).

3/ Surface (S-photic zone), mid-water (MW), benthic (B-ocean floor).

to prove cost effective. Many different marine mammal species occur together in time, thus increasing the chances of obtaining multi-species information at one location. Studies on local petroleum related problems, similar to those described by Isakson et al. (1975), might prove to be important if we are to gain a better understanding of the relationship between energy development and marine mammals.

Data presented in this report represent a preliminary synthesis of most of the sighting information sent to us to date. We anticipate more data will become available from the study area as OCSEAP research continues. New information will be added to our ongoing RU68 project as it is received.

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APPENDIX A

Figures A-1 to A-120

Tables A-1 to A-17

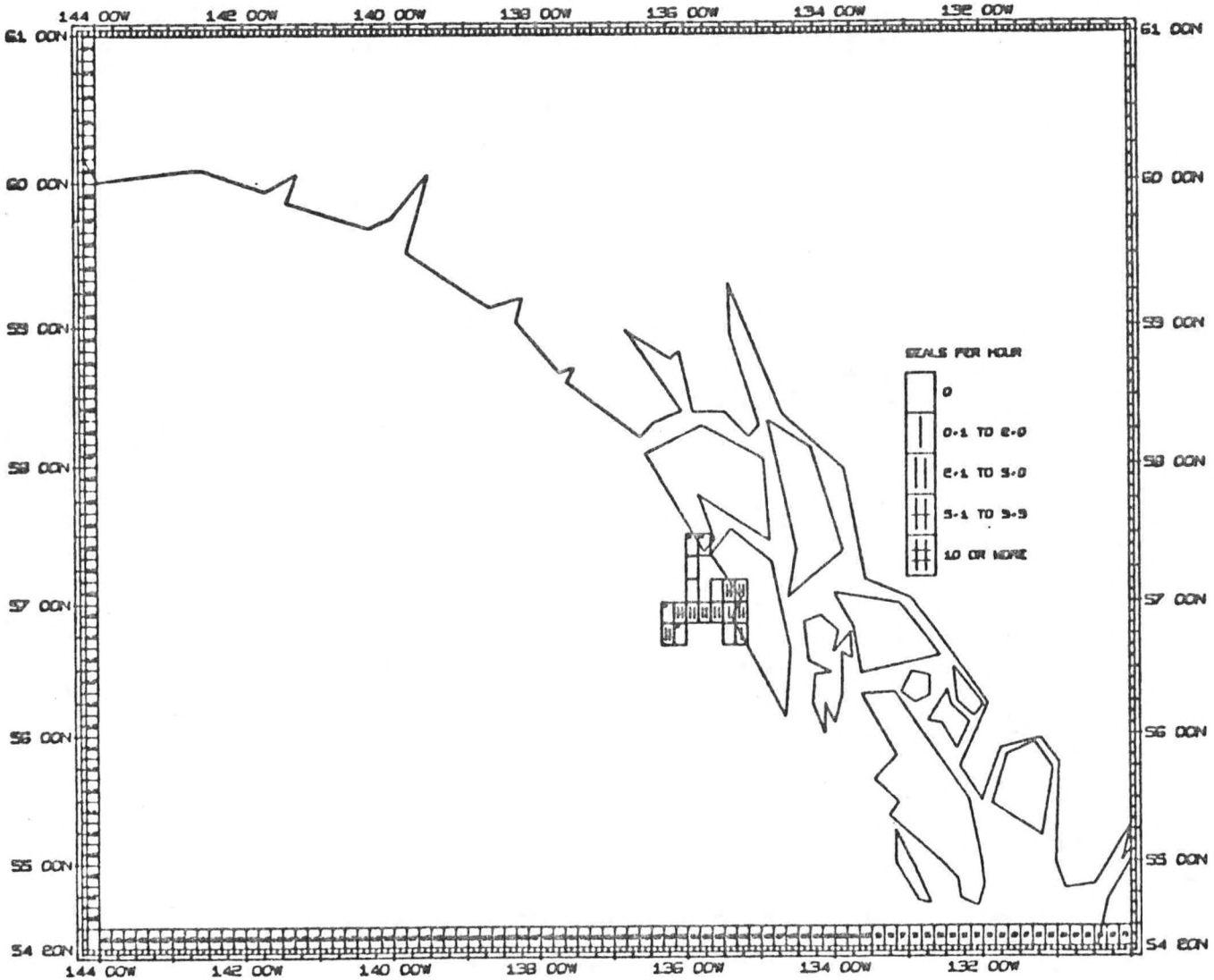

Figure A-1 -- Number of seals seen per hour of effort in each areal unit occupied by a research vessel in February 1958, in the Gulf of Alaska (Eastern Gulf). The sides of each unit measure 10 minutes of latitude by 10 minutes of longitude. Units occupied for less than 0.5 hour are marked "x."

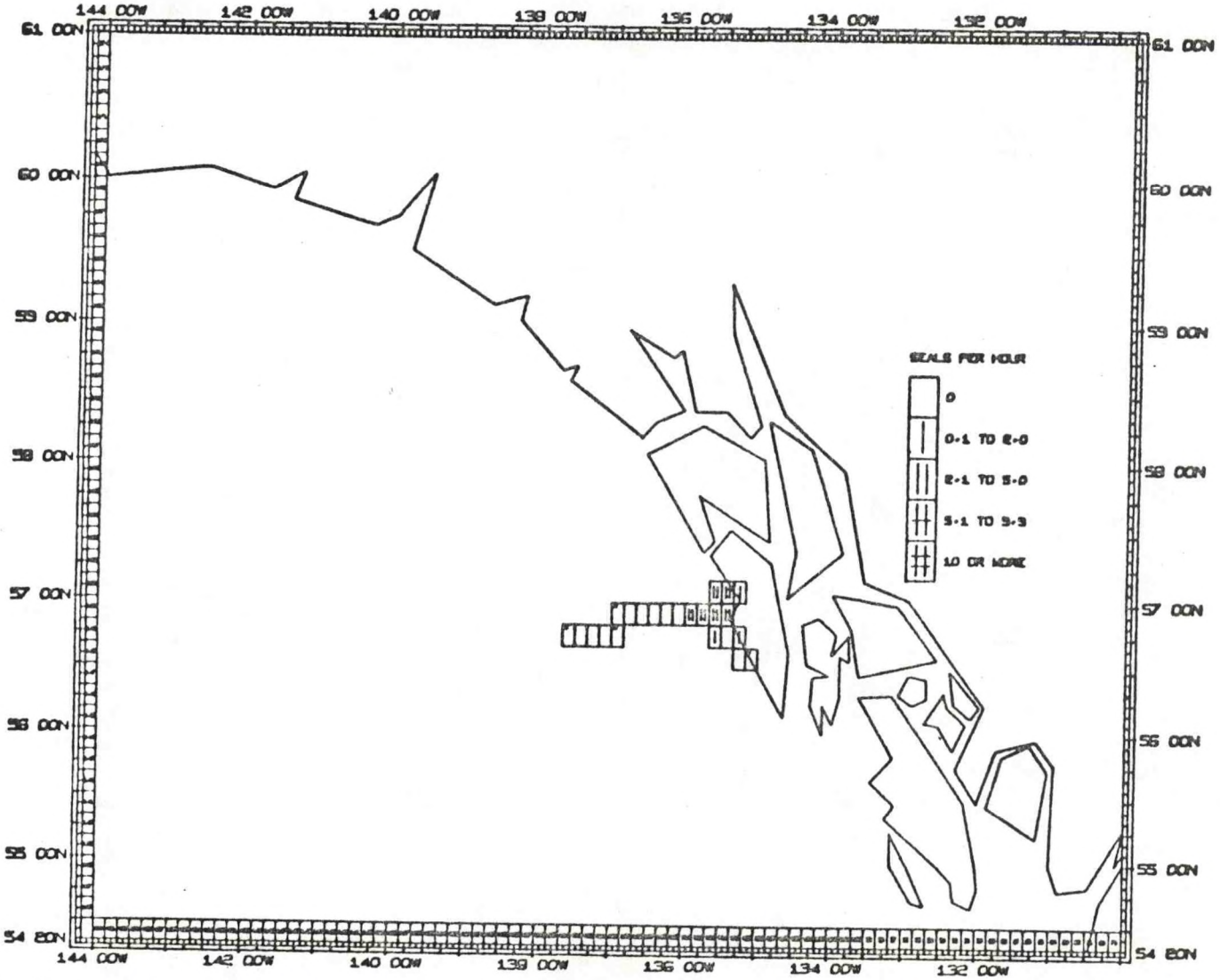

Figure A-2 -- Number of seals seen per hour of effort in each areal unit occupied by a research vessel in March 1958, in the Gulf of Alaska (Eastern Gulf). The sides of each unit measure 10 minutes of latitude by 10 minutes of longitude. Units occupied for less than 0.5 hour are marked "x."

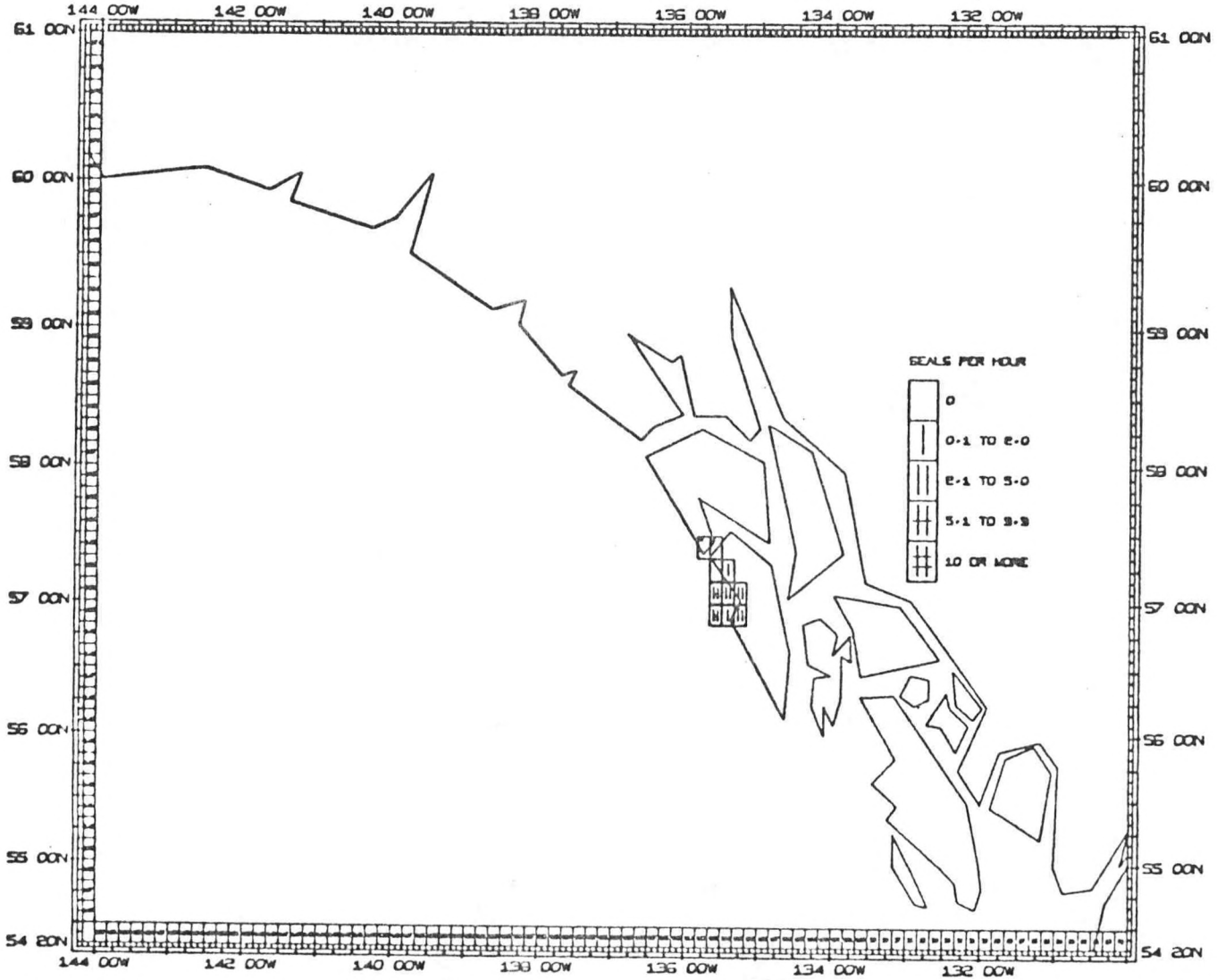

Figure A-3 -- Number of seals seen per hour of effort in each areal unit occupied by a research vessel in March 1960, in the Gulf of Alaska (Eastern Gulf). The sides of each unit measure 10 minutes of latitude by 10 minutes of longitude. Units occupied for less than 0.5 hour are marked "x."

Figure A-4 -- Number of seals seen per hour of effort in each areal unit occupied by a research vessel in March 1961, in the Gulf of Alaska (Eastern Gulf). The sides of each unit measure 10 minutes of latitude by 10 minutes of longitude. Units occupied for less than 0.5 hour are marked "x."

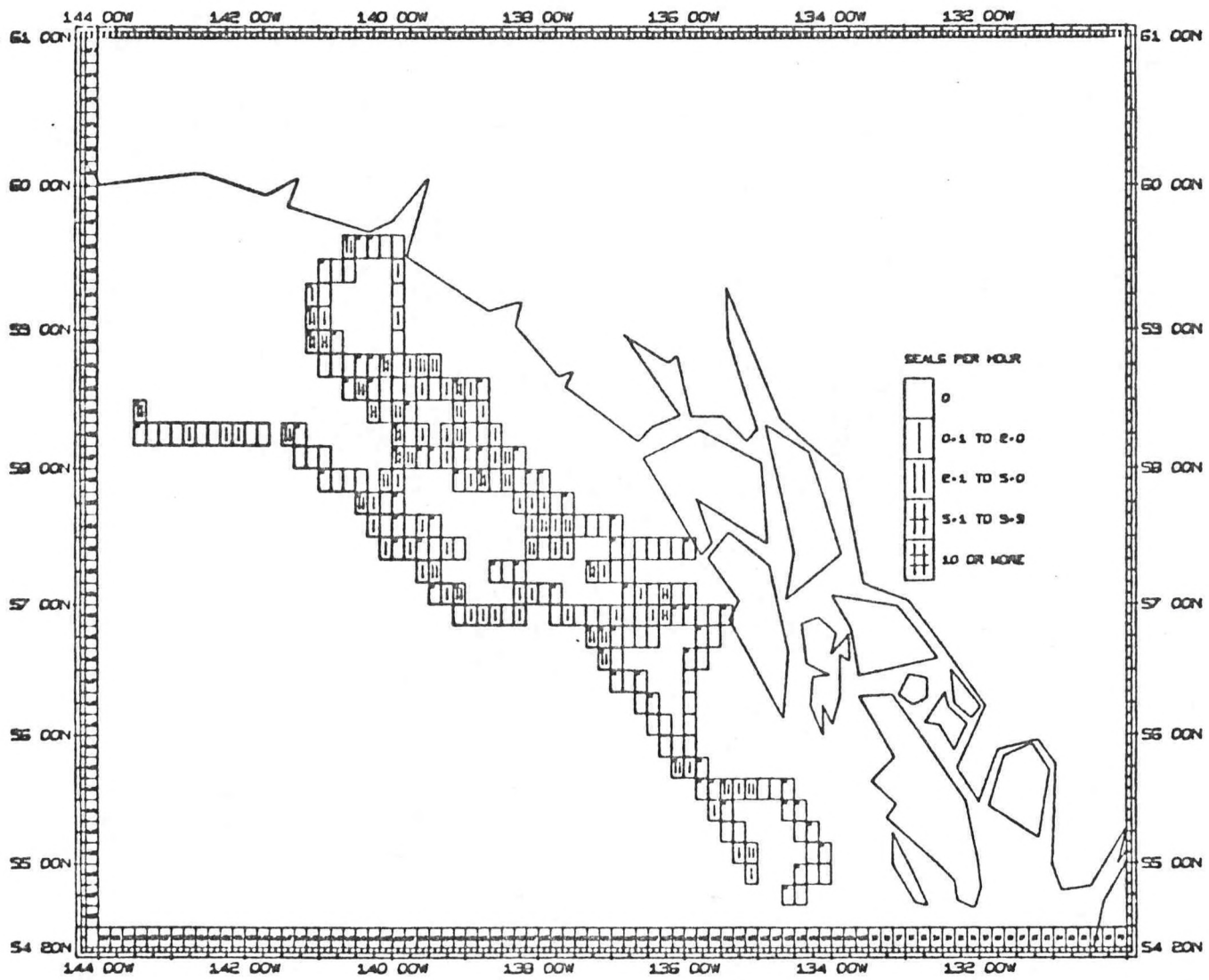

Figure A-5 -- Number of seals seen per hour of effort in each areal unit occupied by a research vessel in April 1958, in the Gulf of Alaska (Eastern Gulf). The sides of each unit measure 10 minutes of latitude by 10 minutes of longitude. Units occupied for less than 0.5 hour are marked "x."

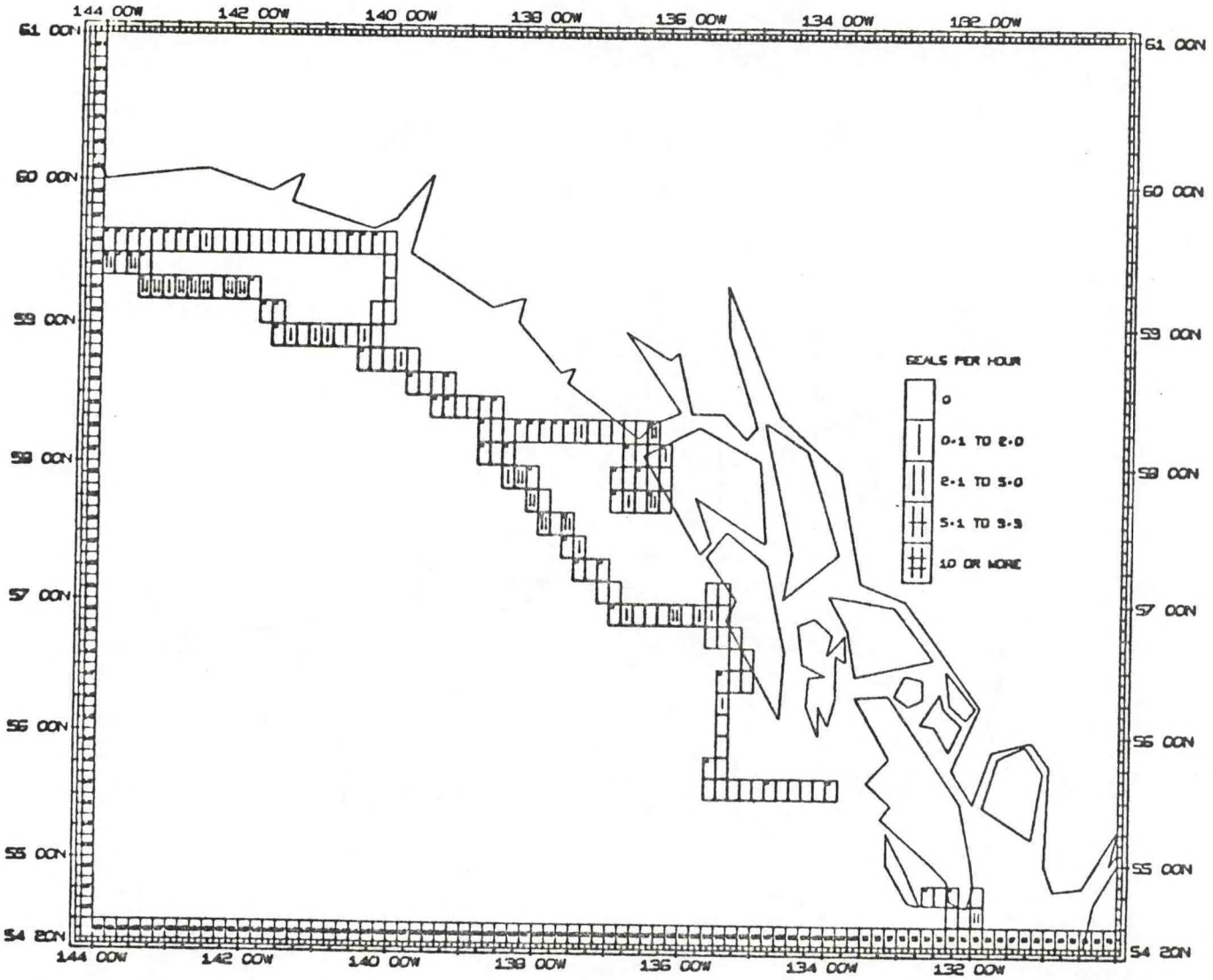

Figure A-6 -- Number of seals seen per hour of effort in each areal unit occupied by a research vessel in April 1960, in the Gulf of Alaska (Eastern Gulf). The sides of each unit measure 10 minutes of latitude by 10 minutes of longitude. Units occupied for less than 0.5 hour are marked "x."

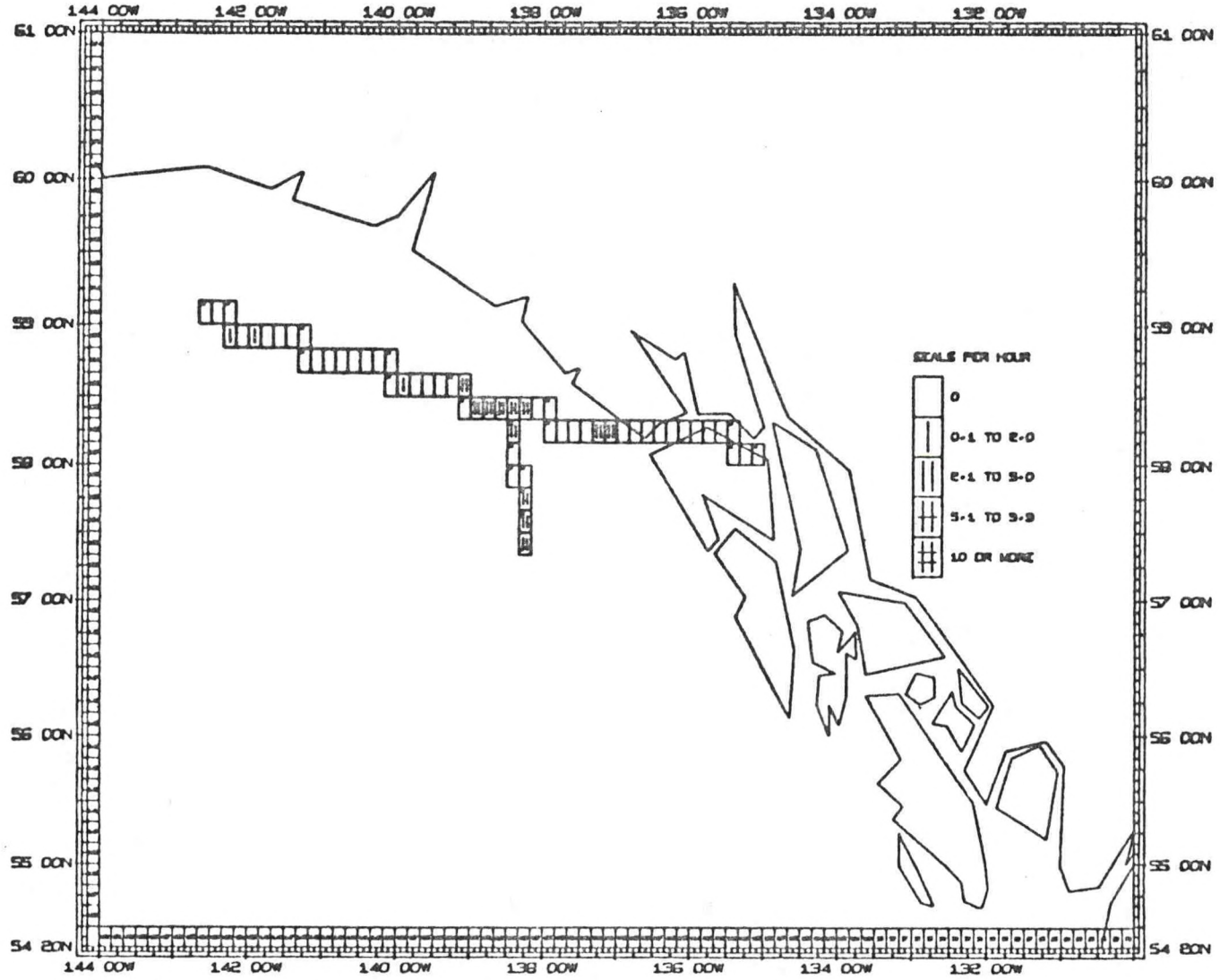

Figure A-7 -- Number of seals seen per hour of effort in each areal unit occupied by a research vessel in May 1958, in the Gulf of Alaska (Eastern Gulf). The sides of each unit measure 10 minutes of latitude by 10 minutes of longitude. Units occupied for less than 0.5 hour are marked "x."

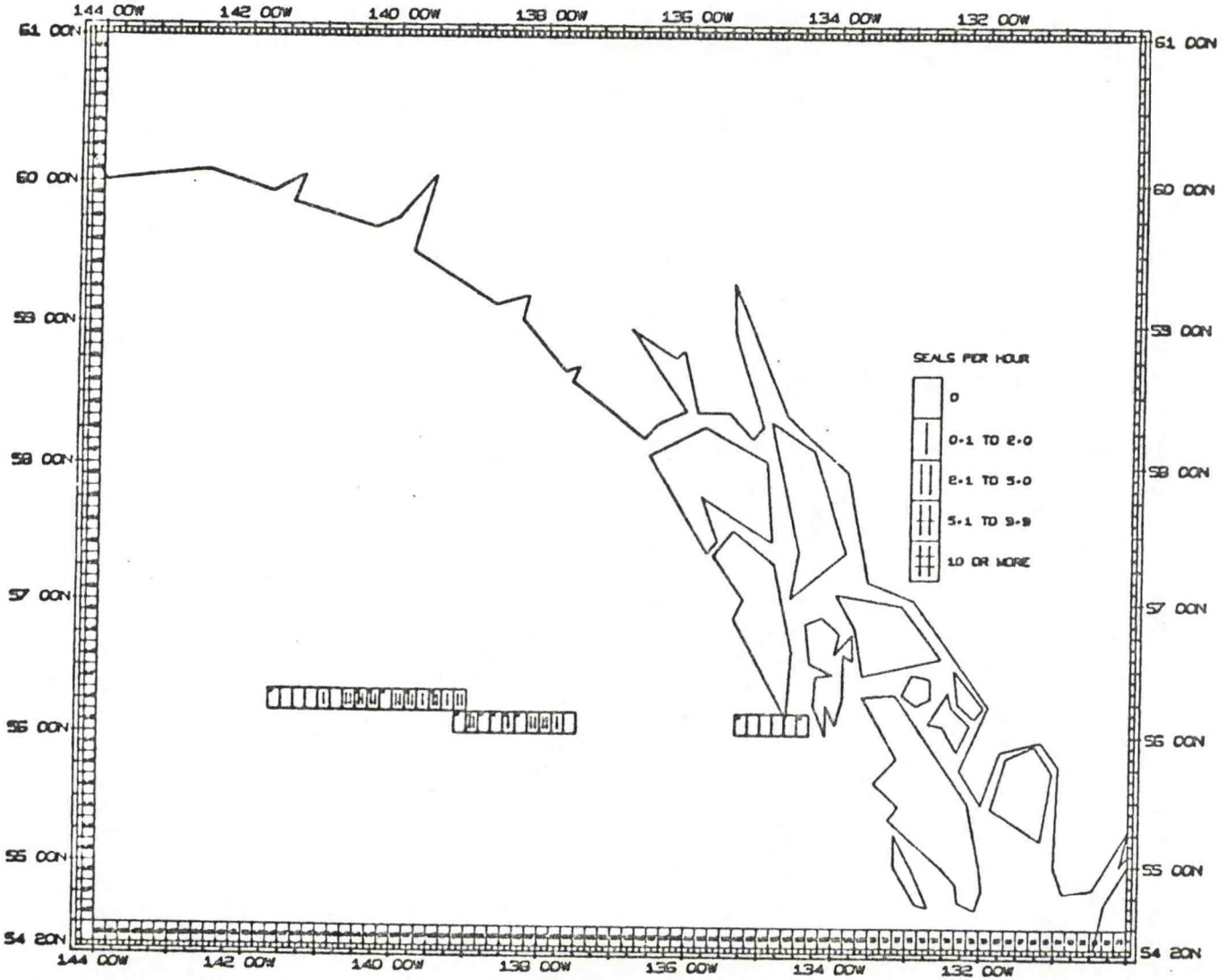

Figure A-8 -- Number of seals seen per hour of effort in each areal unit occupied by a research vessel in May 1962, in the Gulf of Alaska (Eastern Gulf). The sides of each unit measure 10 minutes of latitude by 10 minutes of longitude. Units occupied for less than 0.5 hour are marked "x."

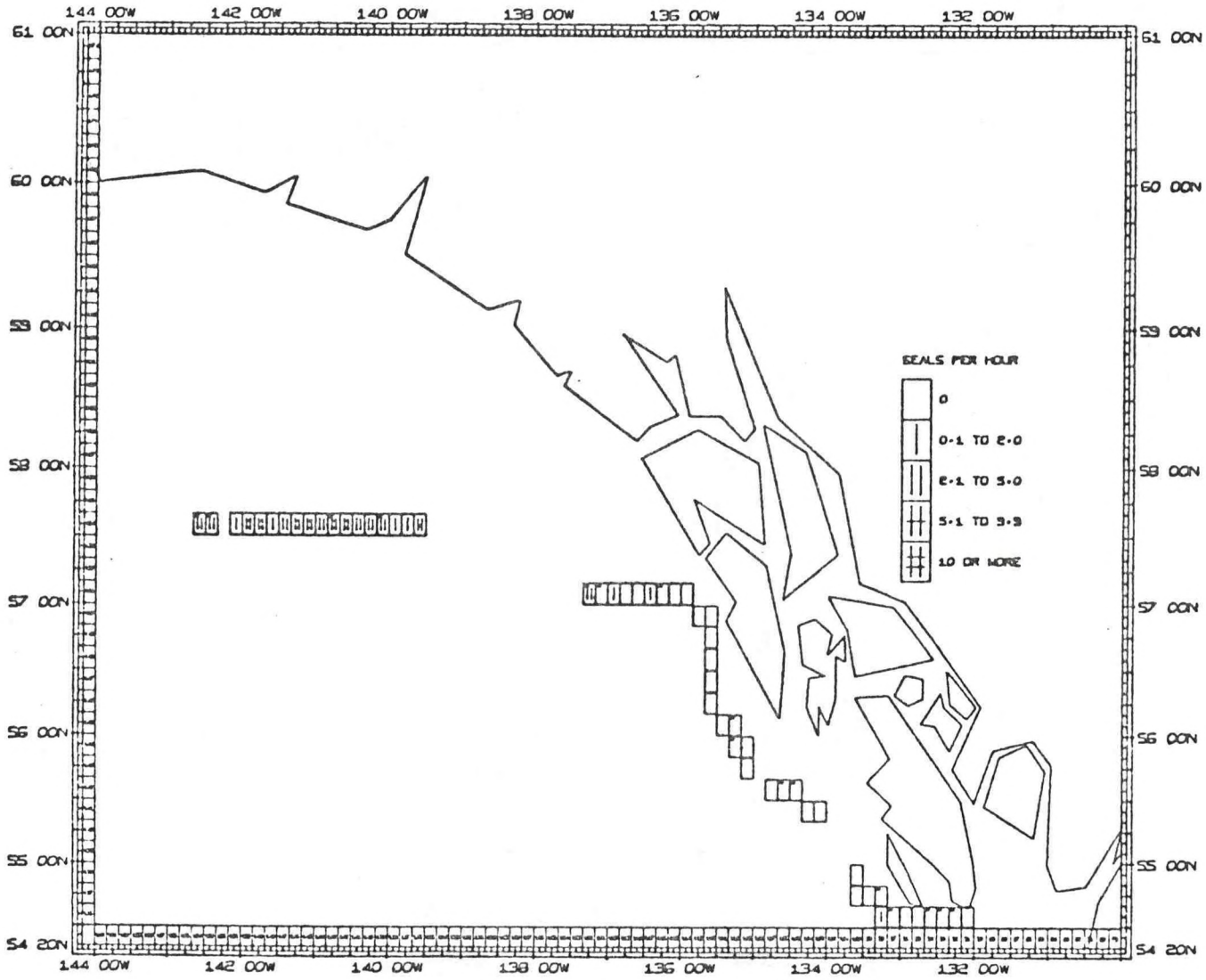

Figure A-9 -- Number of seals seen per hour of effort in each areal unit occupied by a research vessel in May 1968, in the Gulf of Alaska (Eastern Gulf). The sides of each unit measure 10 minutes of latitude by 10 minutes of longitude. Units occupied for less than 0.5 hour are marked "x."

Figure A-10 -- Number of seals seen per hour of effort in each areal unit occupied by a research vessel in June 1960, in the Gulf of Alaska (Eastern Gulf). The sides of each unit measure 10 minutes of latitude by 10 minutes of longitude. Units occupied for less than 0.5 hour are marked "x."

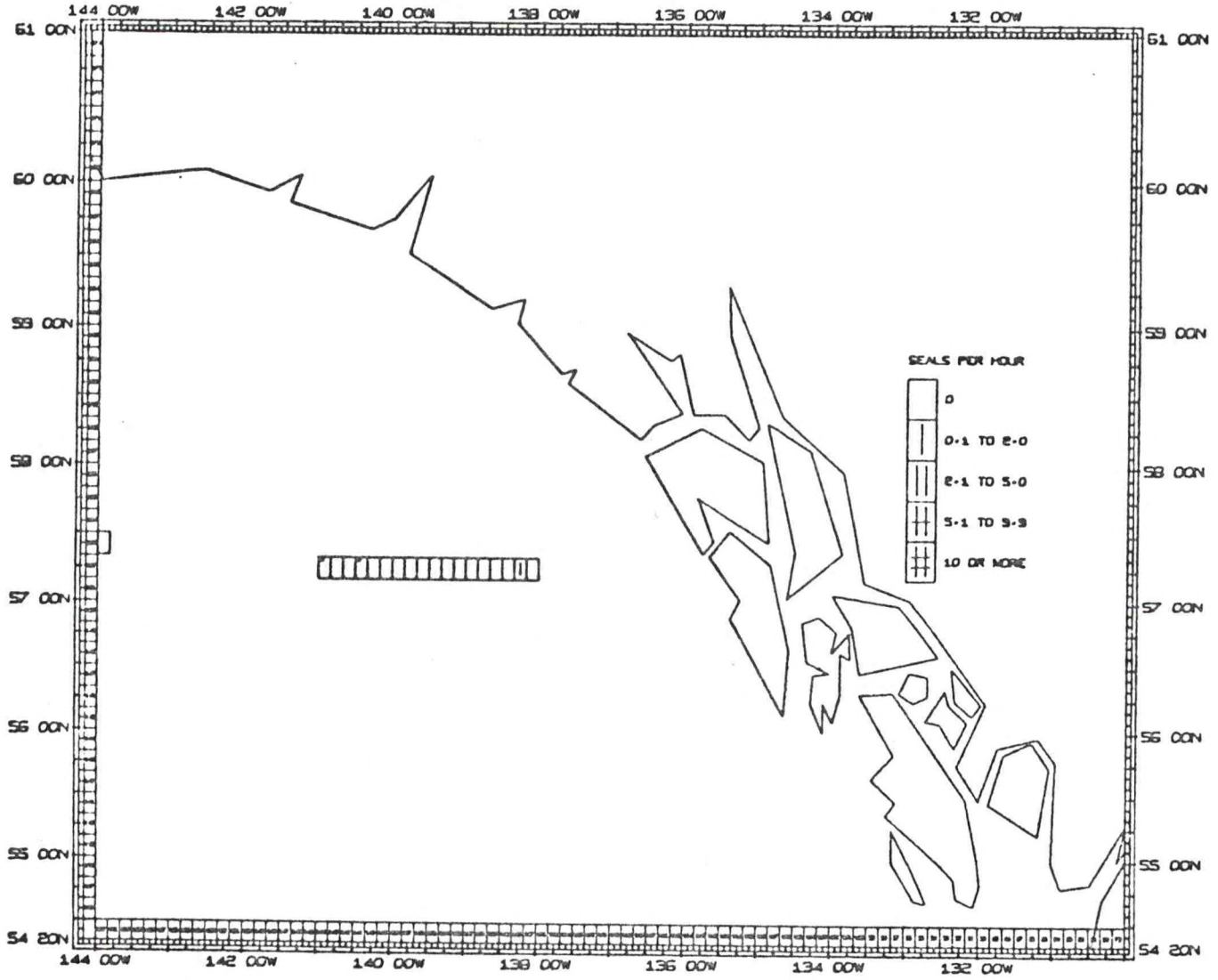

Figure A-11 -- Number of seals seen per hour of effort in each areal unit occupied by a research vessel in August 1968, in the Gulf of Alaska (Eastern Gulf). The sides of each unit measure 10 minutes of latitude by 10 minutes of longitude. Units occupied for less than 0.5 hour are marked "x."

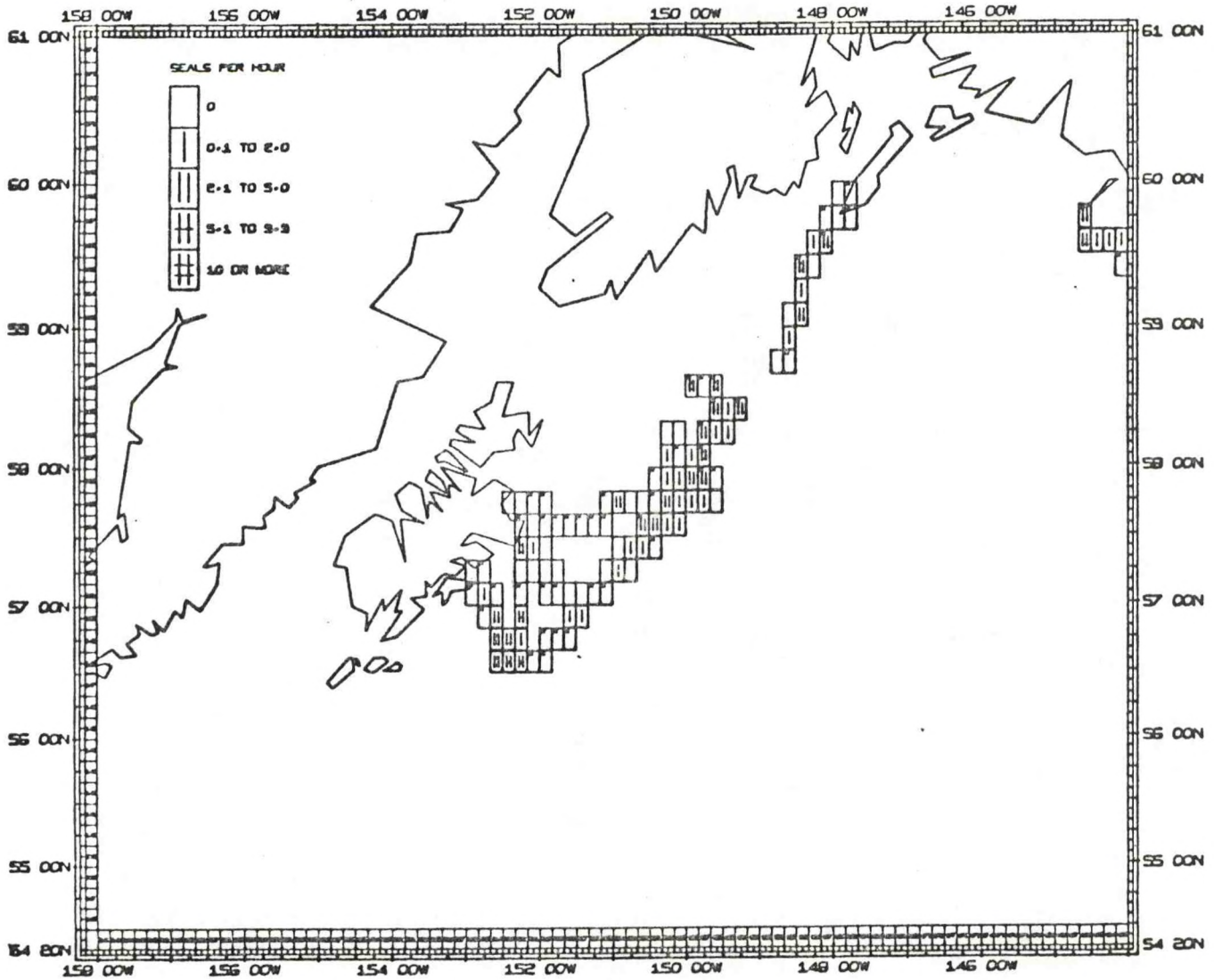

Figure A-12 -- Number of seals seen per hour of effort in each areal unit occupied by a research vessel in April 1960, in the Gulf of Alaska (Western Gulf). The sides of each unit measure 10 minutes of latitude by 10 minutes of longitude. Units occupied for less than 0.5 hour are marked "x."

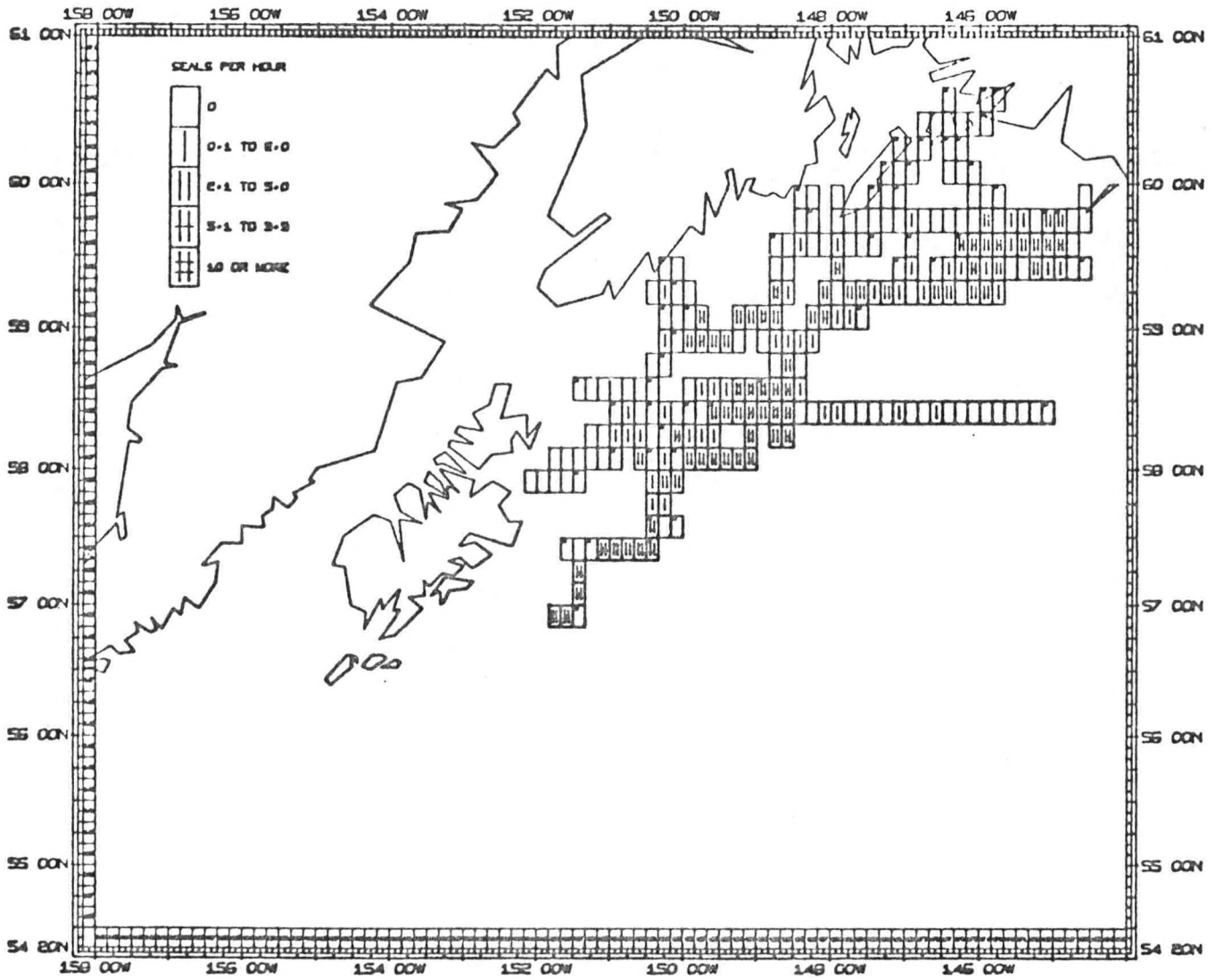

Figure A-13 -- Number of seals seen per hour of effort in each areal unit occupied by a research vessel in May 1958, in the Gulf of Alaska (Western Gulf). The sides of each unit measure 10 minutes of latitude by 10 minutes of longitude. Units occupied for less than 0.5 hour are marked "x."

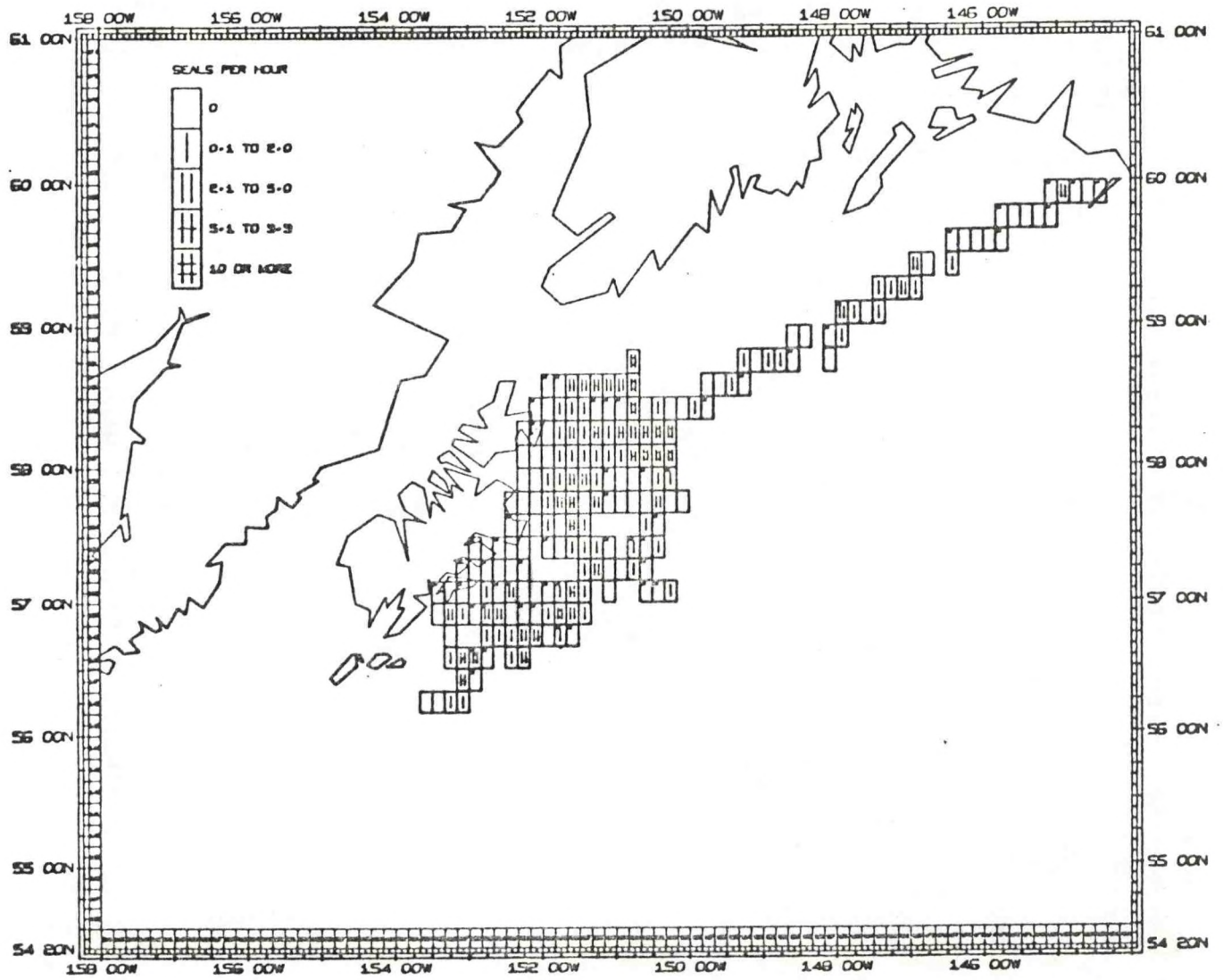

Figure A-14 -- Number of seals seen per hour of effort in each areal unit occupied by a research vessel in may 1960, in the Gulf of Alaska (Western Gulf). The sides of each unit measure 10 minutes of latitude by 10 minutes of longitude. Units occupied for less than 0.5 hour are marked "x."

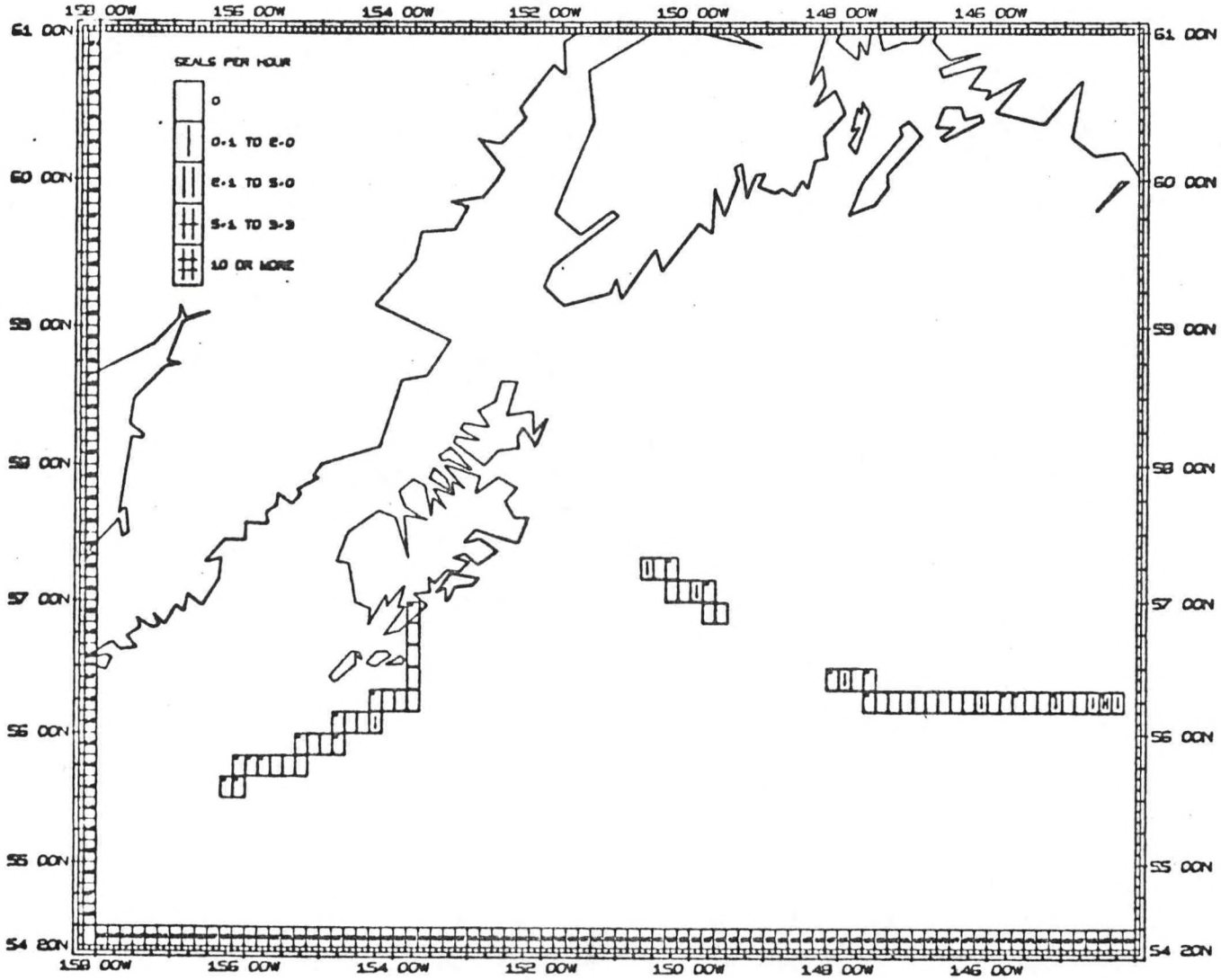

Figure A-15 -- Number of seals seen per hour of effort in each areal unit occupied by a research vessel in May 1962, in the Gulf of Alaska (Western Gulf). The sides of each unit measure 10 mintues of latitude by 10 minutes of longitude. Units occupied for less than 0.5 hour are marked "x."

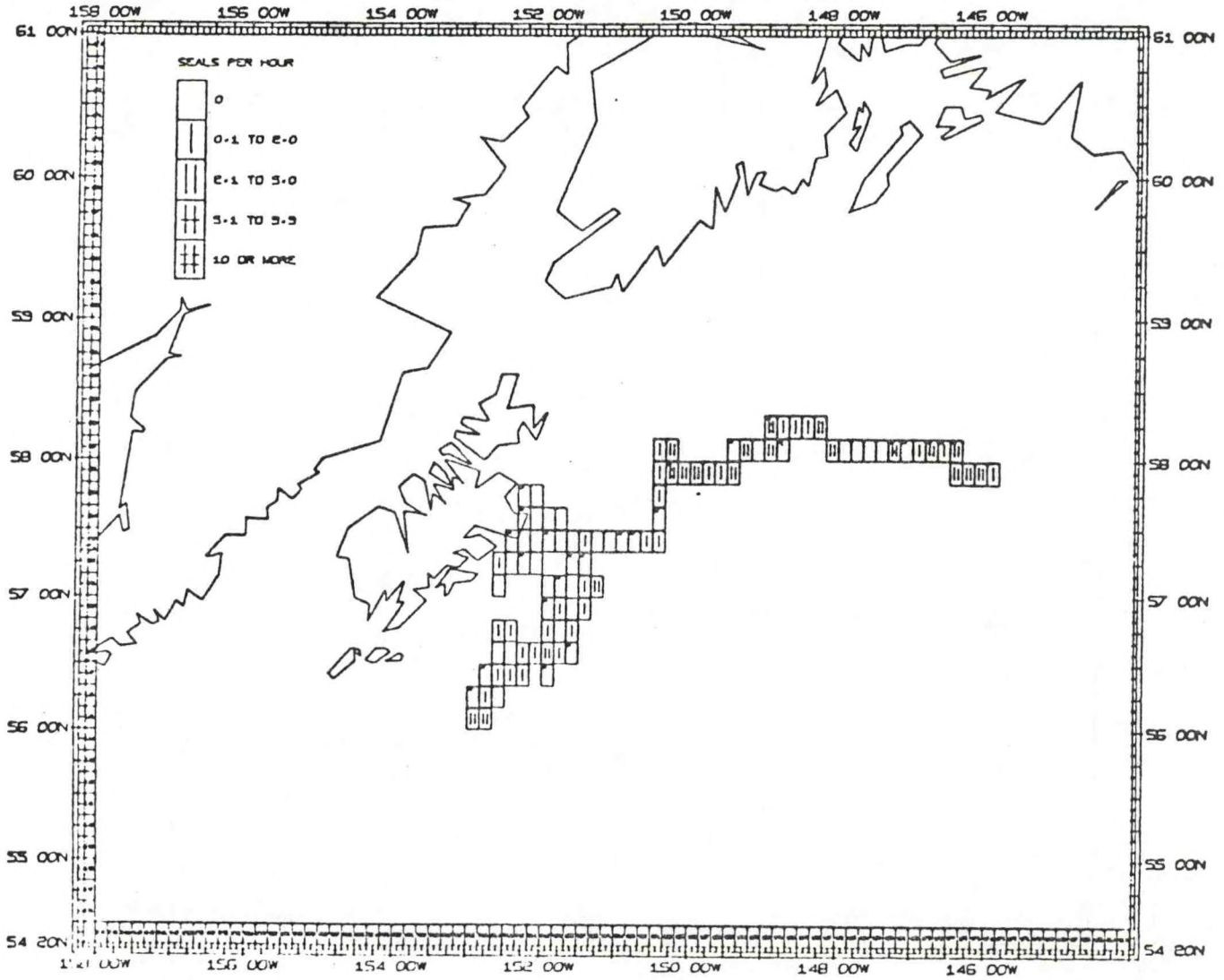

Figure A-16 -- Number of seals seen per hour of effort in each areal unit occupied by a research vessel in May 1968, in the Gulf of Alaska (Western Gulf). The sides of each unit measure 10 minutes of latitude by 10 minutes of longitude. Units occupied for less than 0.5 hour are marked "x."

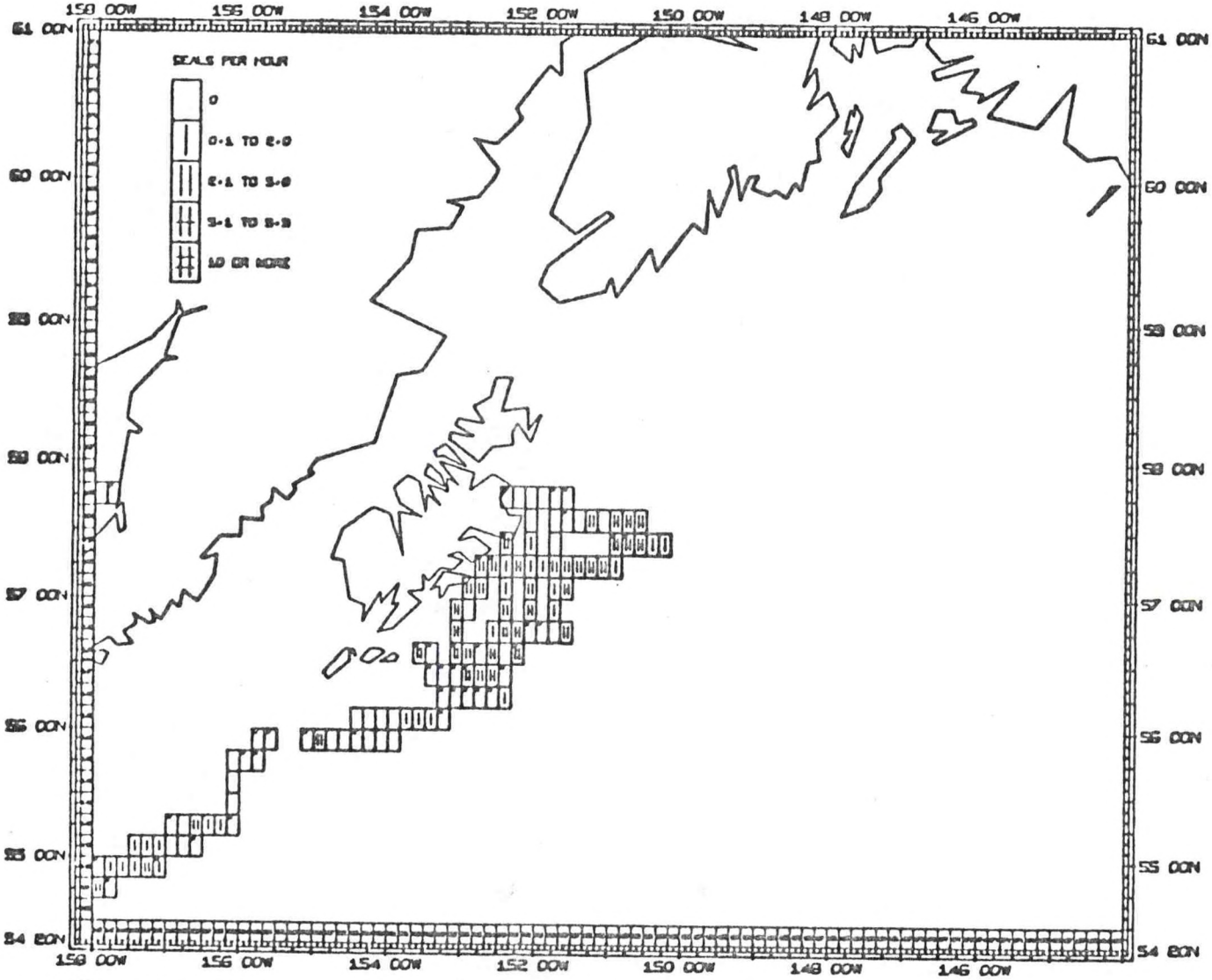

Figure A-17 -- Number of seals seen per hour of effort in each area unit occupied by a research vessel in June 1958, in the Gulf of Alaska (Western Gulf). The sides of each unit measure 10 minutes of latitude by 10 minutes of longitude. Units occupied for less than 0.5 hour are marked "x."

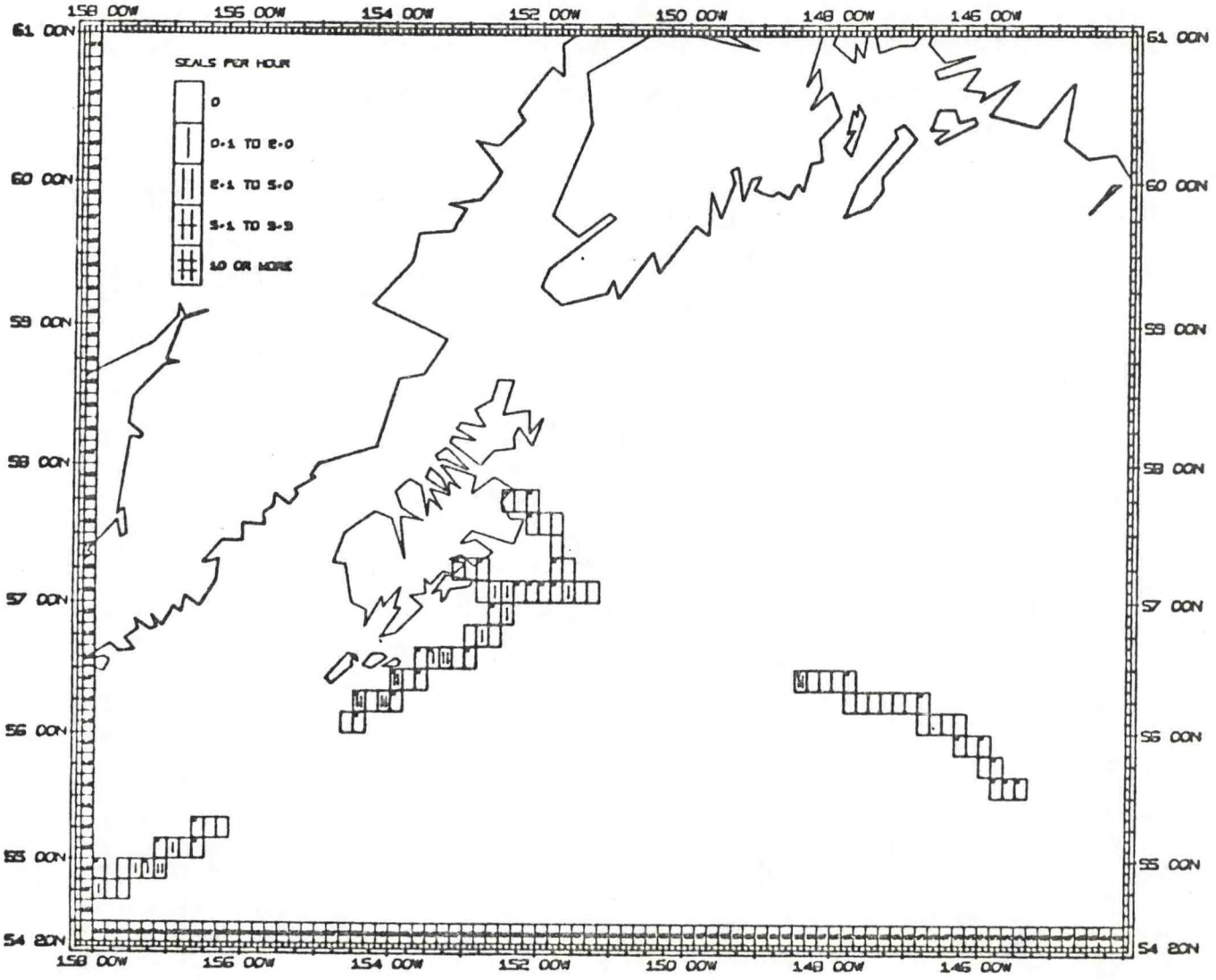

Figure A-18 -- Number of seals seen per hour of effort in each areal unit occupied by a research vessel in June 1960, in the Gulf of Alaska (Western Gulf). The sides of each unit measure 10 minutes of latitude by 10 minutes of longitude. Units occupied for less than 0.5 hour are marked "x."

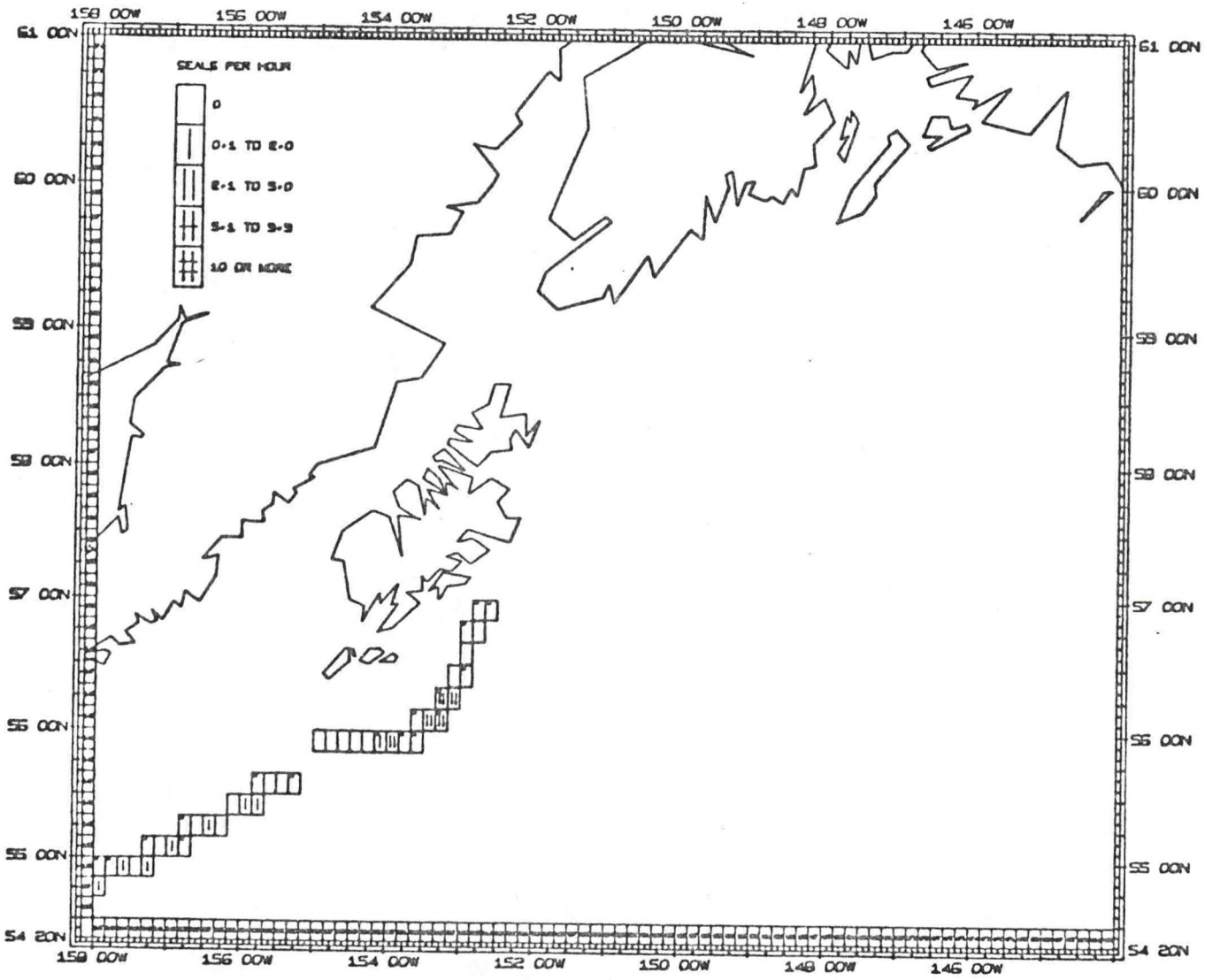

Figure A-19 -- Number of seals seen per hour of effort in each areal unit occupied by a research vessel in June 1968, in the Gulf of Alaska (Western Gulf). The sides of each unit measure 10 minutes of latitude by 10 minutes of longitude. Units occupied for less than 0.5 hour are marked "x."

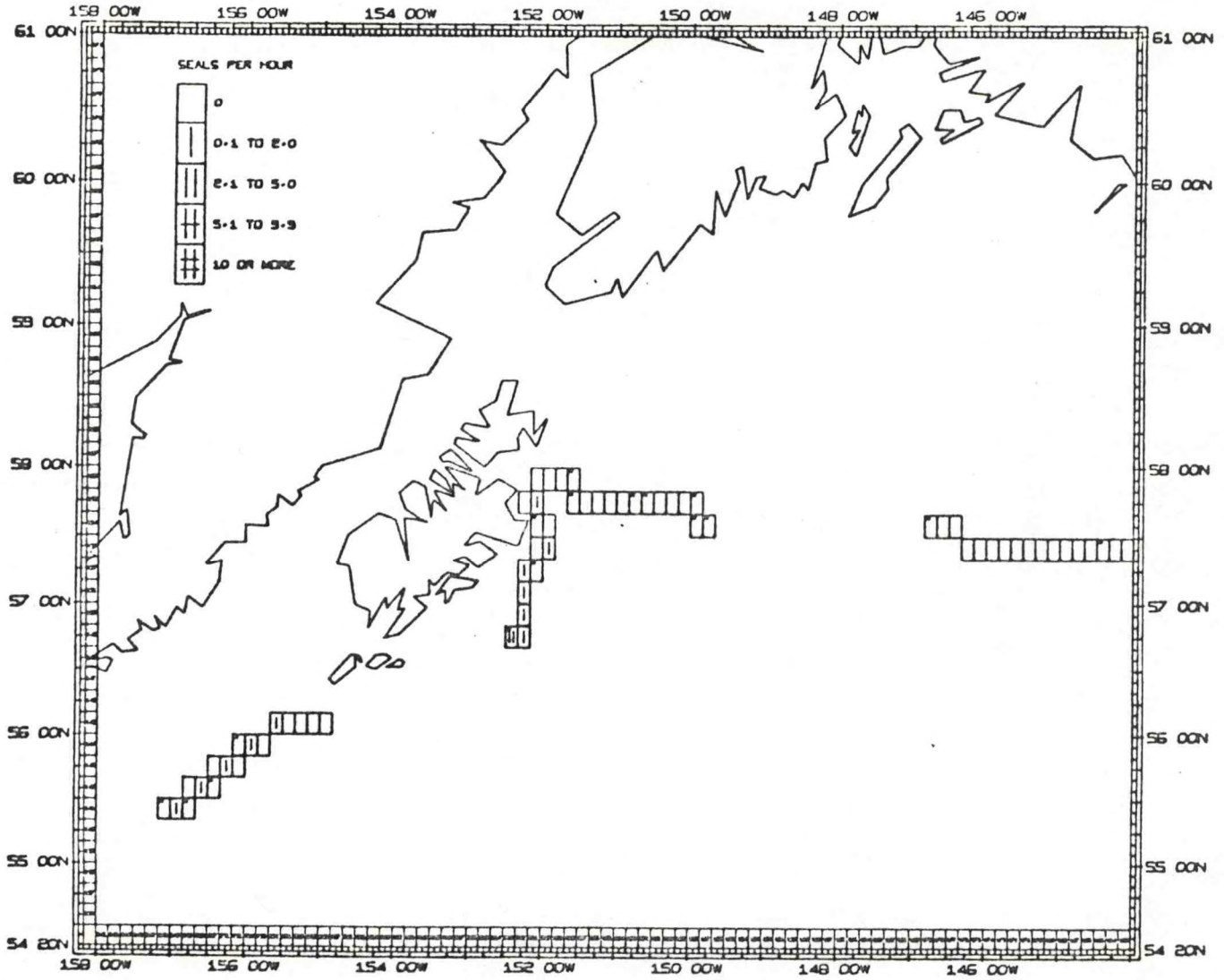

Figure A-20 -- Number of seals seen per hour of effort in each areal unit occupied by a research vessel in August 1968, in the Gulf of Alaska (Western Gulf). The sides of each unit measure 10 minutes of latitude by 10 minutes of longitude. Units occupied for less than 0.5 hour are marked "x."

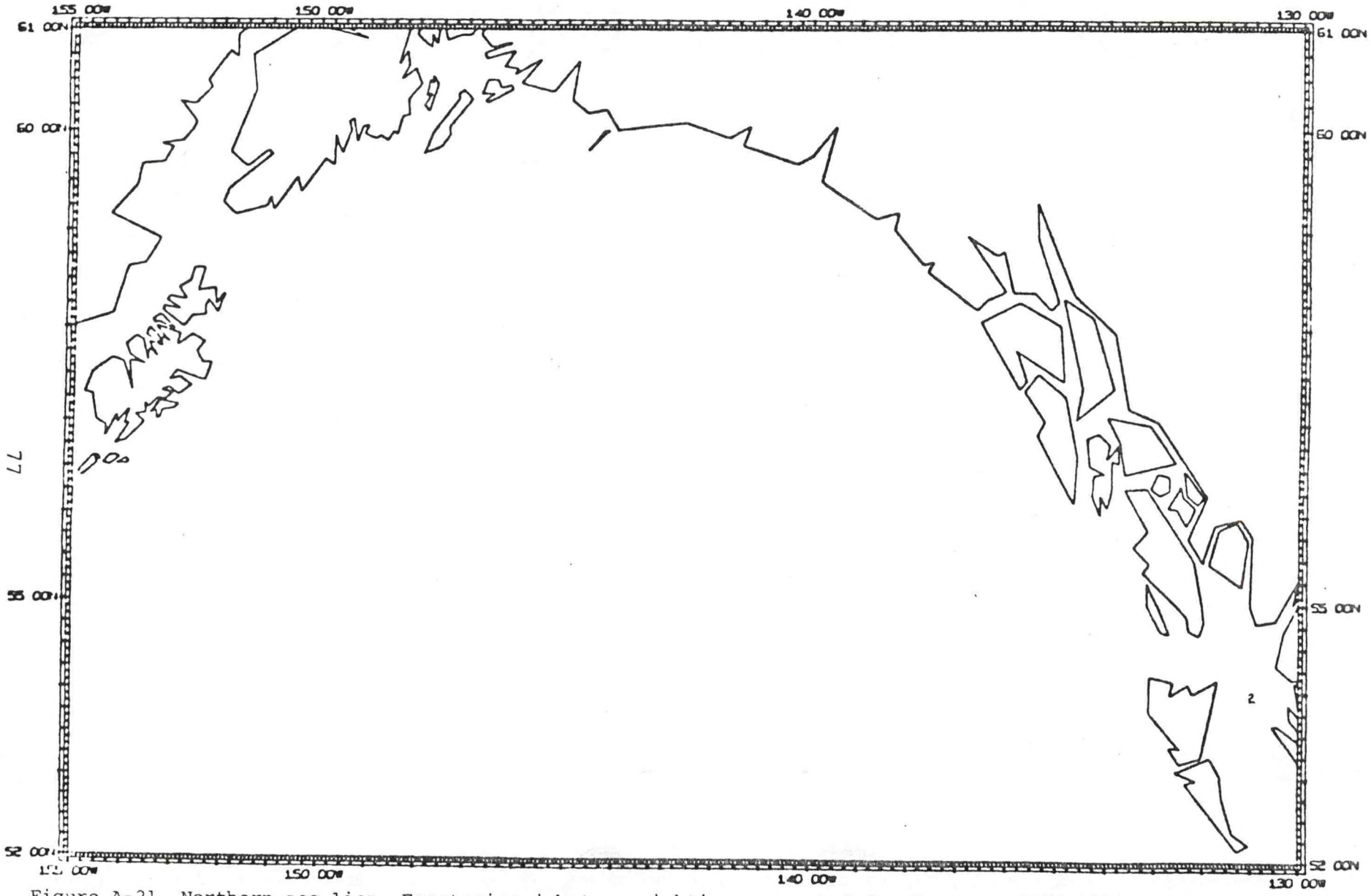

Figure A-21. Northern sea lion, Eumetopias jubatus, sightings reported for January, 1958-1976.

Figure A-22. Northern sea lion, Eumetopias jubatus, sightings reported for February, 1958-1976.

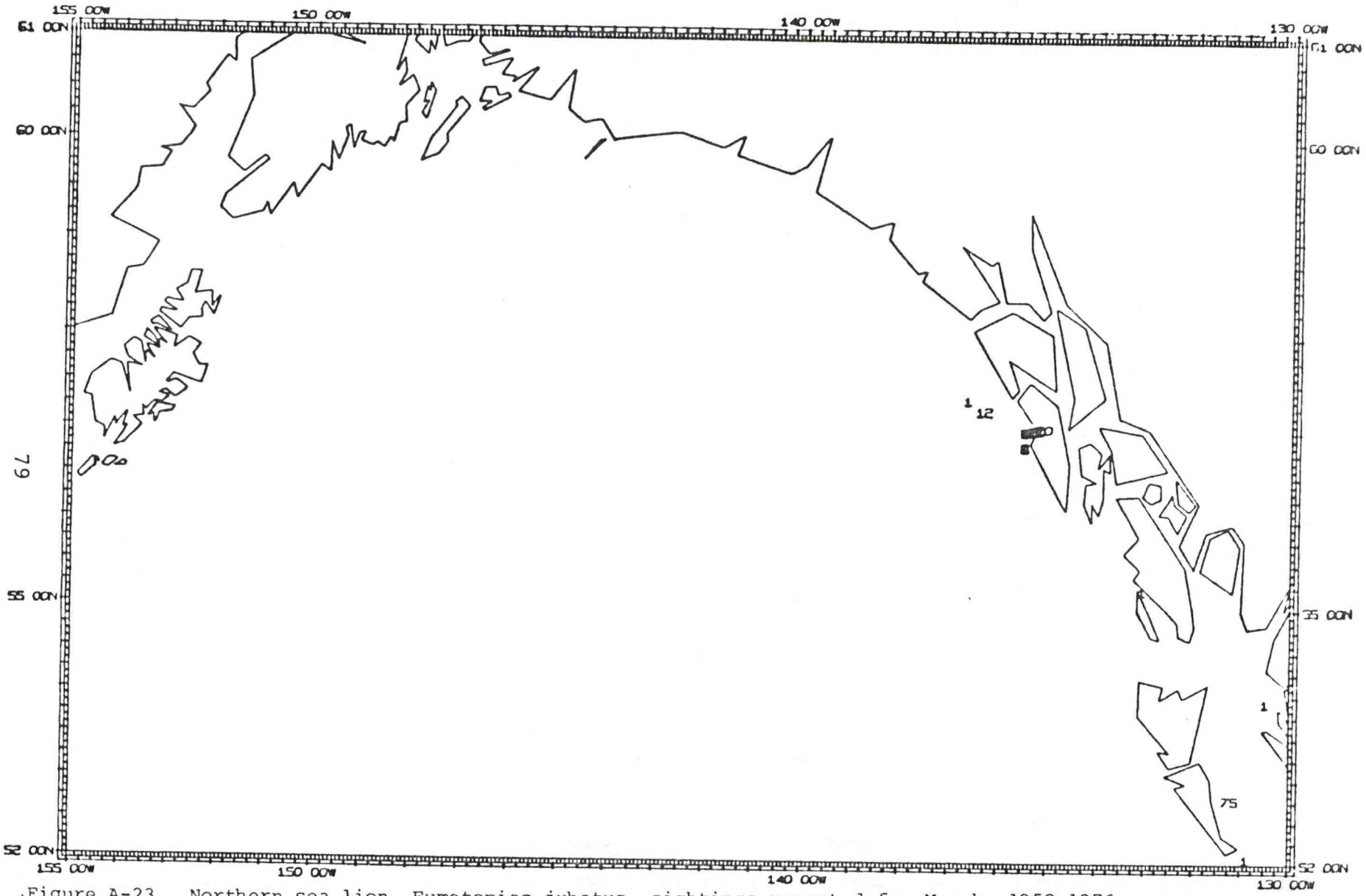

Figure A-23. Northern sea lion, Eumetopias jubatus, sightings reported for March, 1958-1976.

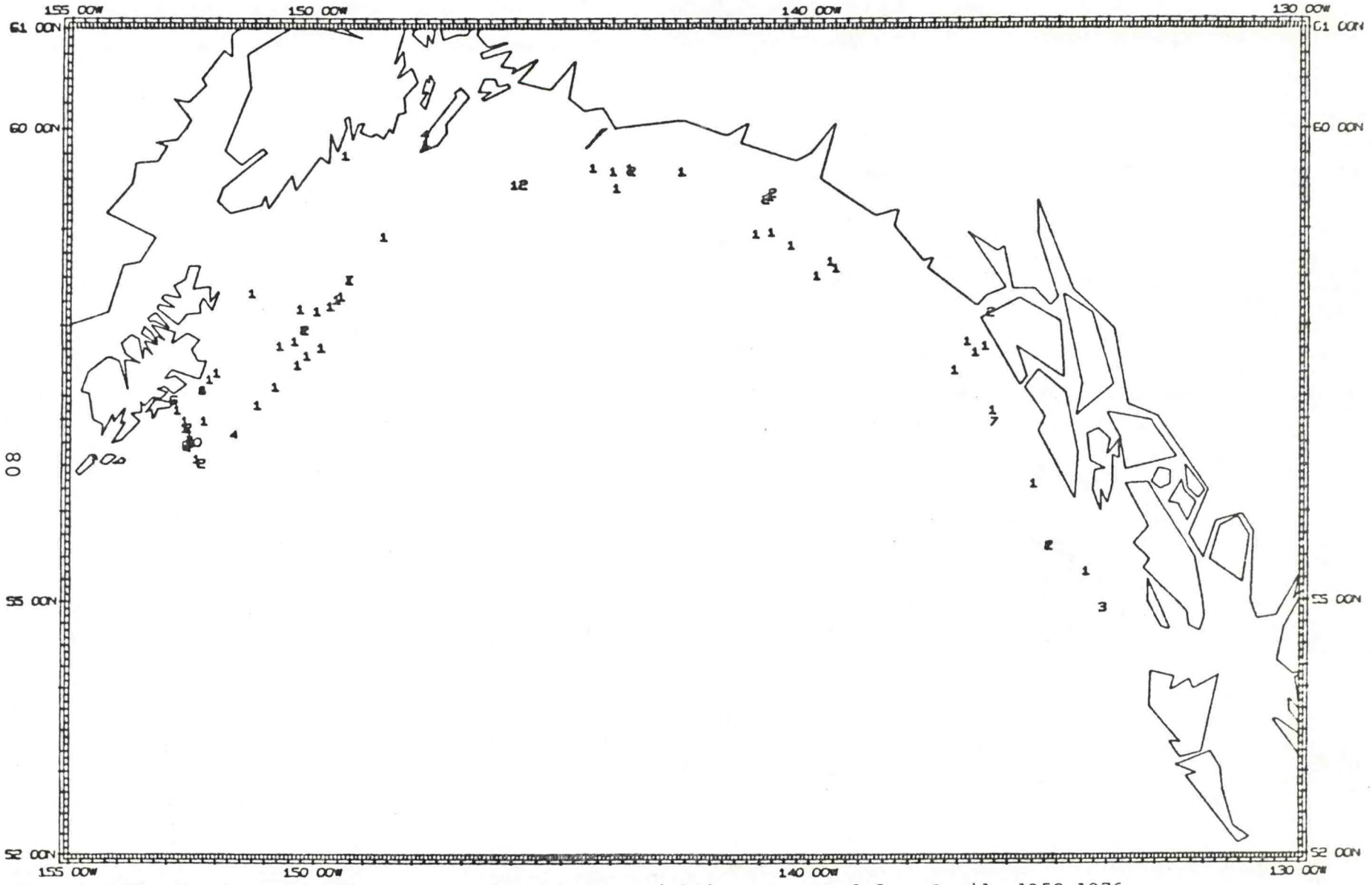

Figure A-24. Northern sea lion, Eumetopias jubatus, sightings reported for April, 1958-1976.

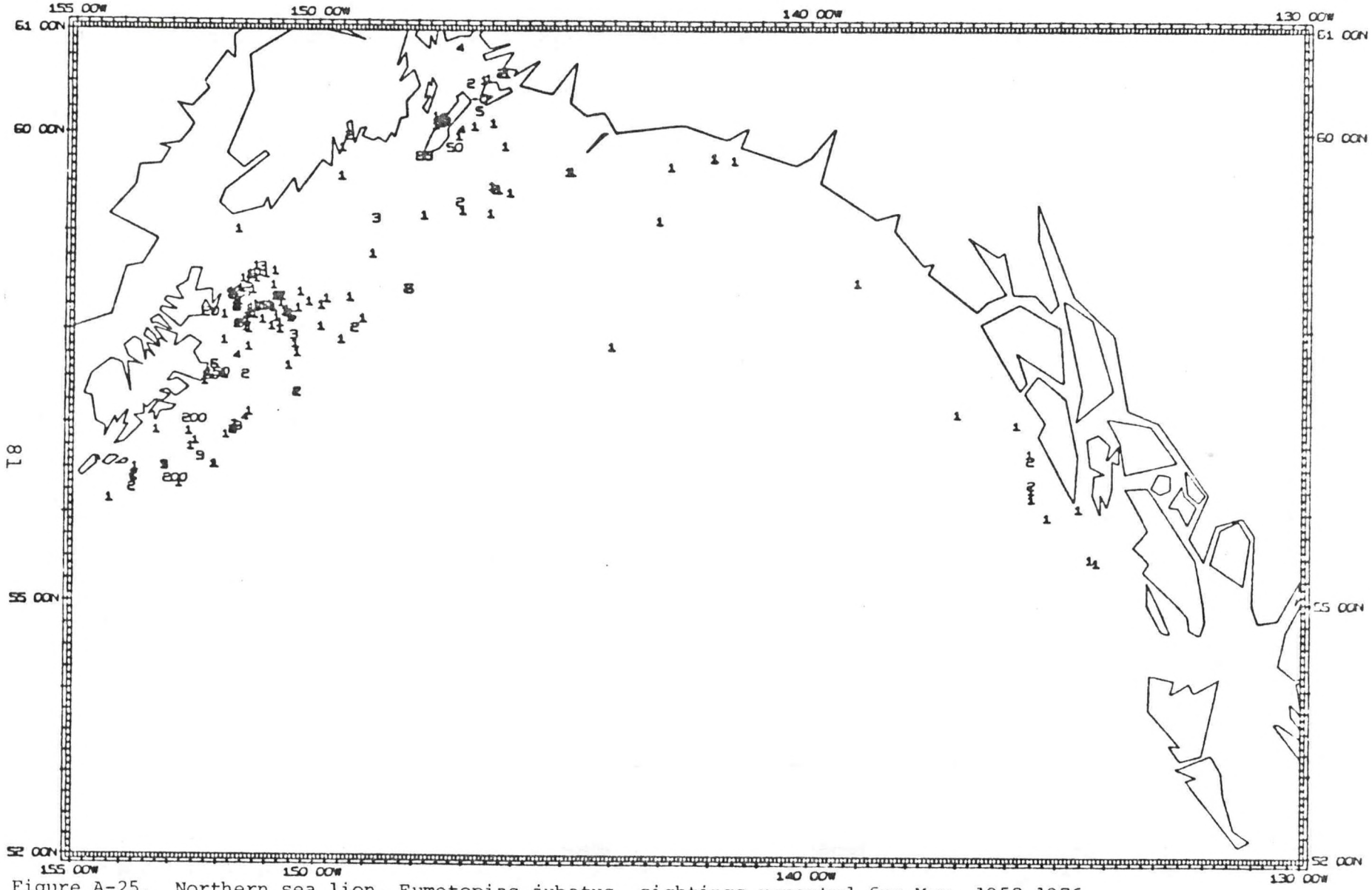

Figure A-25. Northern sea lion, Eumetopias jubatus, sightings reported for May, 1958-1976.

Figure A-26. Northern sea lion, Eumetopias jubatus, sightings reported for June, 1958-1976.

Figure A-27. Northern sea lion, Eumetopias jubatus, sightings reported for July, 1958-1976.

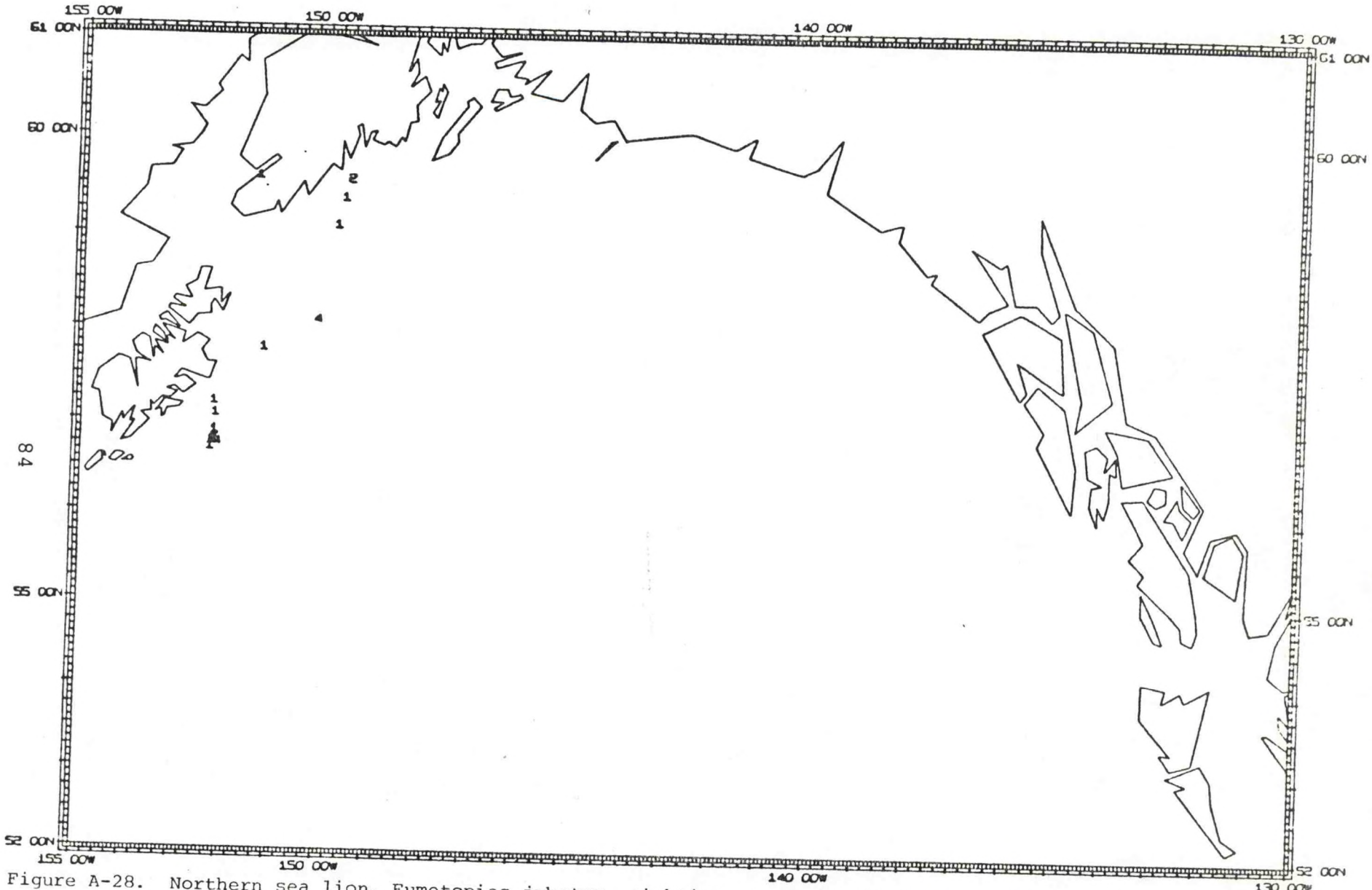

Figure A-28. Northern sea lion, Eumetopias jubatus, sightings reported for August, 1958-1976.

Figure A-29. Northern sea lion, Eumetopias jubatus, sightings reported for September, 1958-1976.

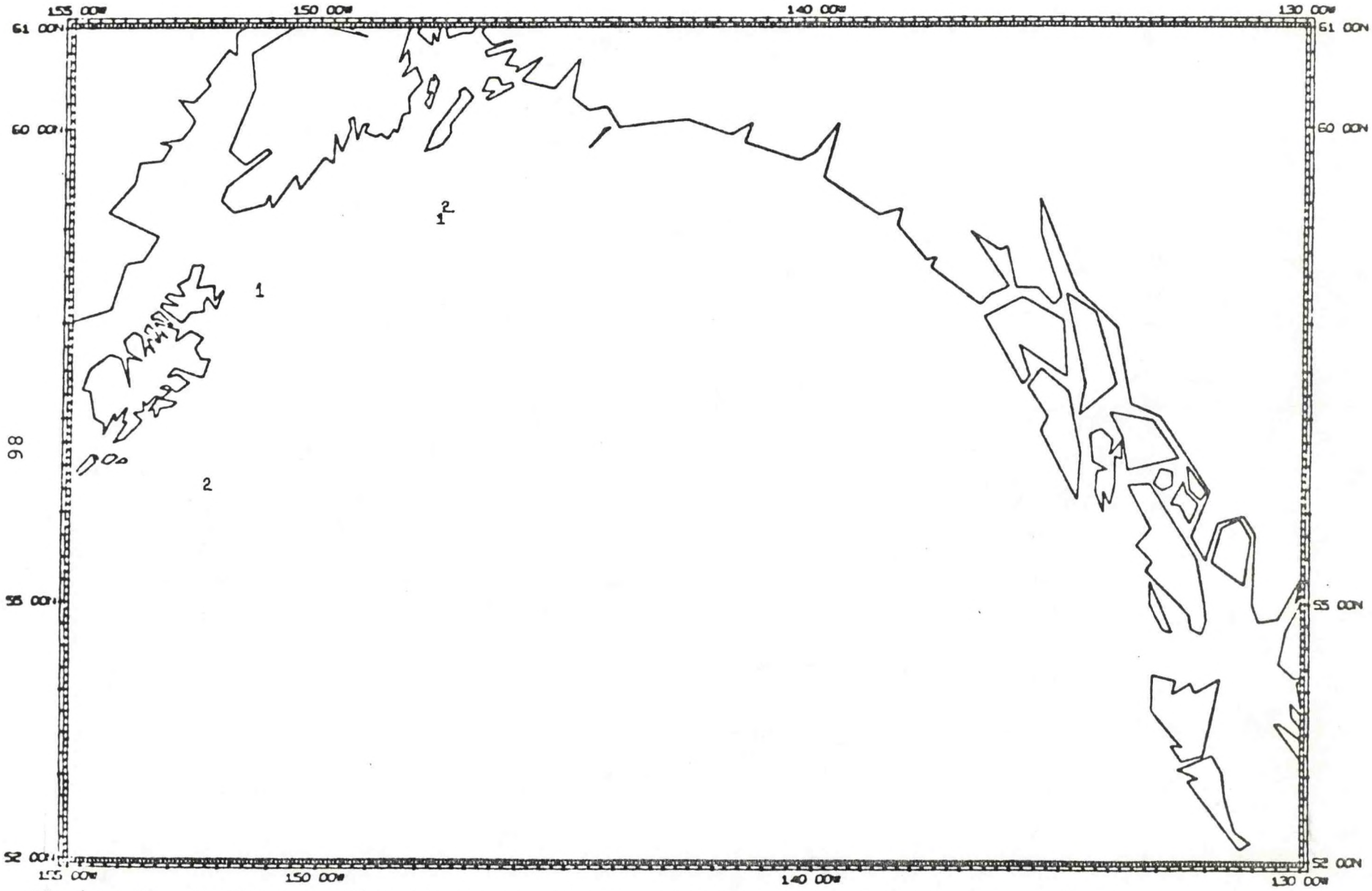

Figure A-30. Northern sea lion, Eumetopias jubatus, sightings reported for October, 1958-1976.

Figure A-31. Northern sea lion, Eumetopias jubatus, sightings reported for November, 1958-1976.

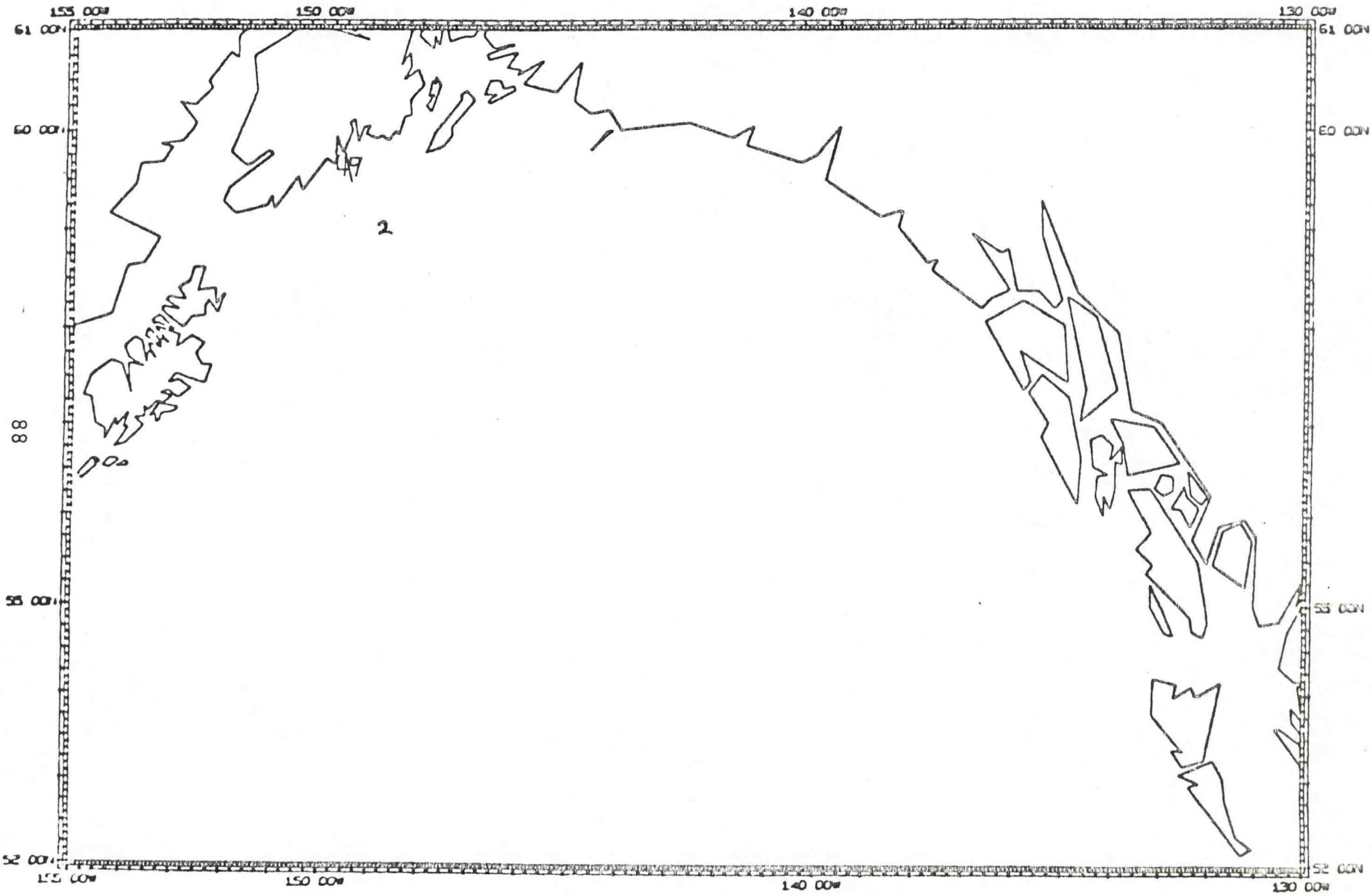

Figure A-32. Northern sea lion, Eumetopias jubatus, sightings reported for December, 1958-1976.

Figure A-33. Northern fur seal, Callorhinus ursinus, sightings reported for January, 1958-1976.

Figure A-34. Northern fur seal, Callorhinus ursinus, sightings reported for February, 1958-1976.

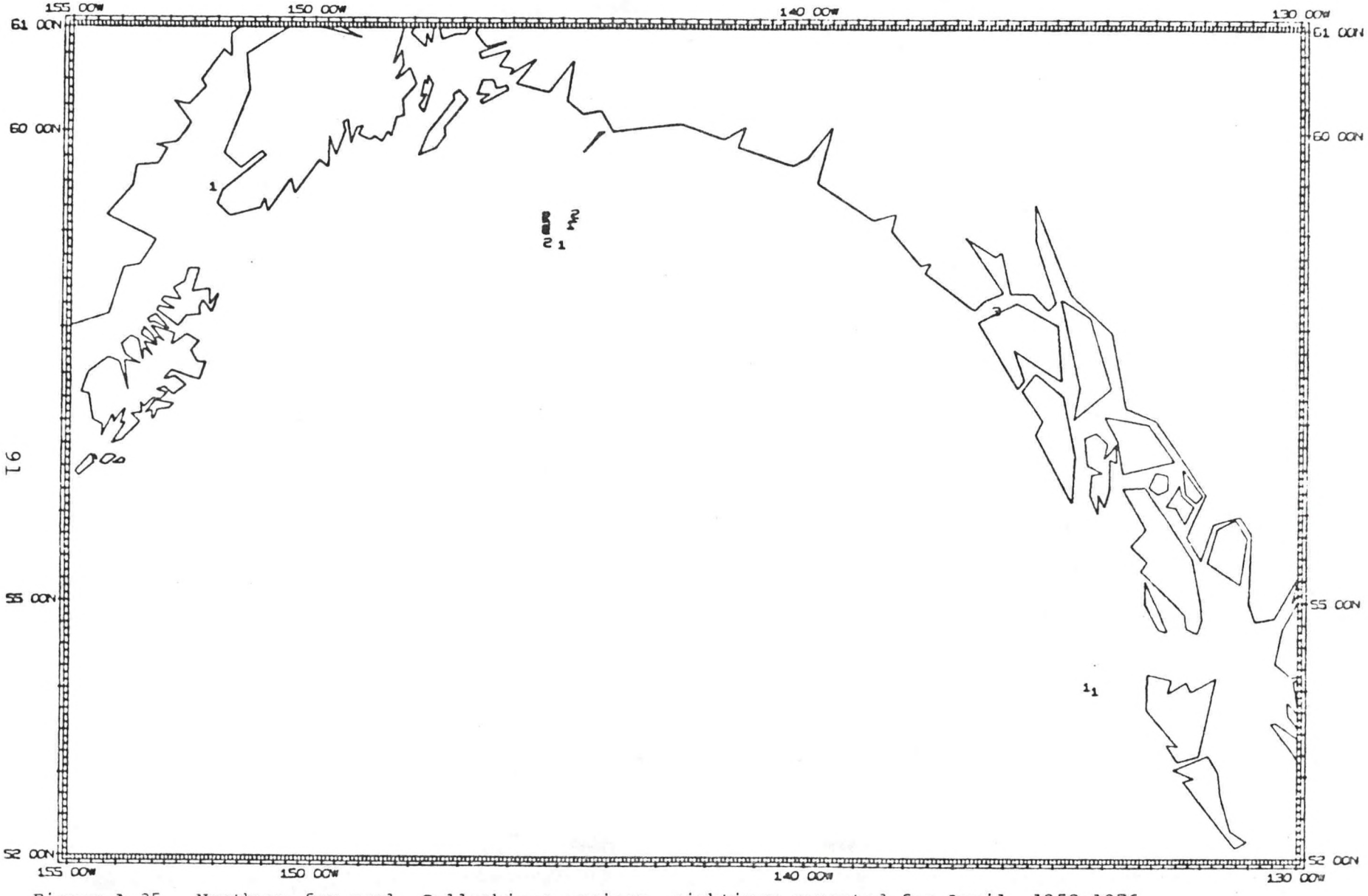

Figure A-35. Northern fur seal, Callorhinus ursinus, sightings reported for April, 1958-1976.

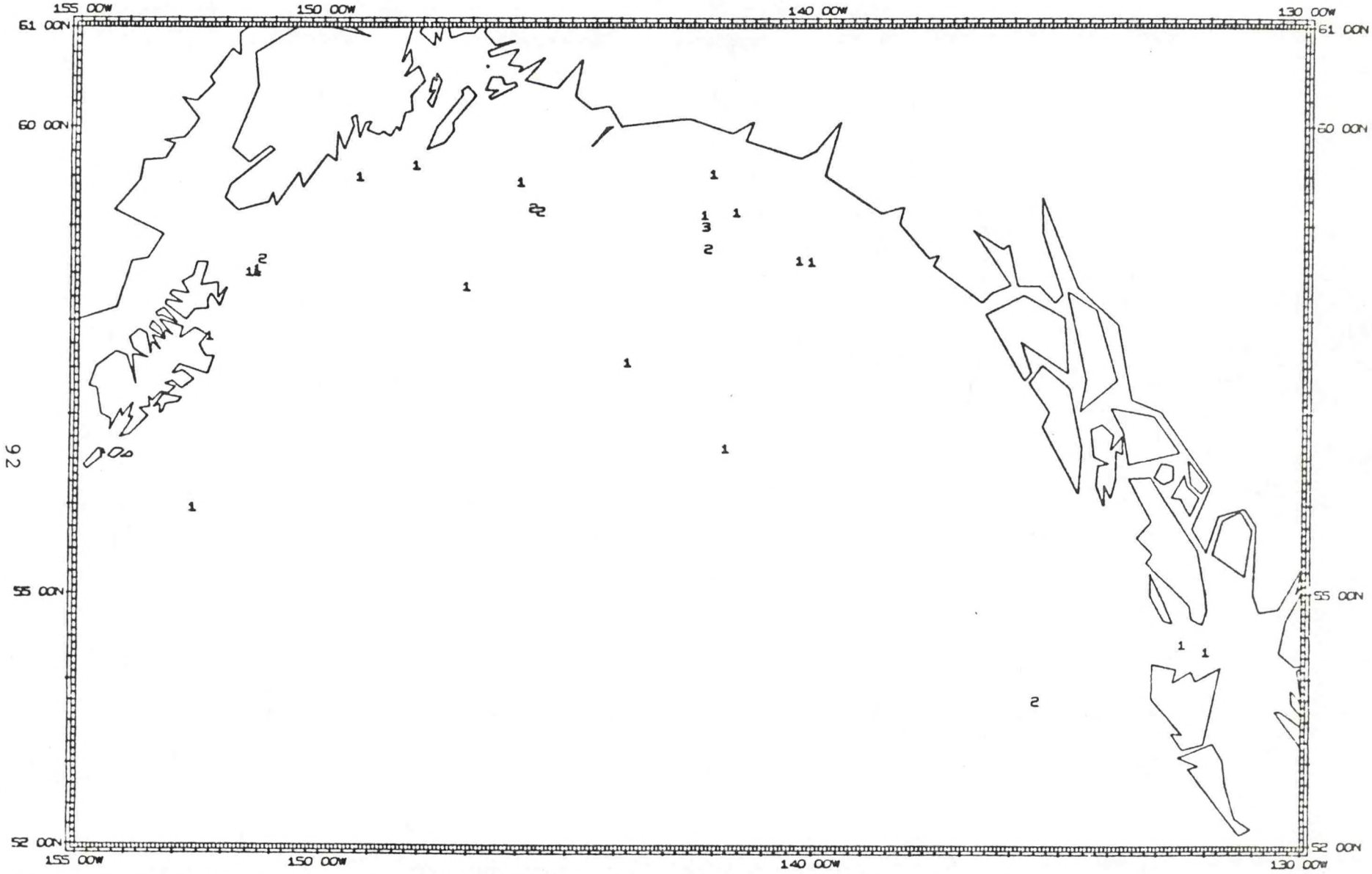

Figure A-36. Northern fur seal, Callorhinus ursinus, sightings reported for May, 1958-1976.

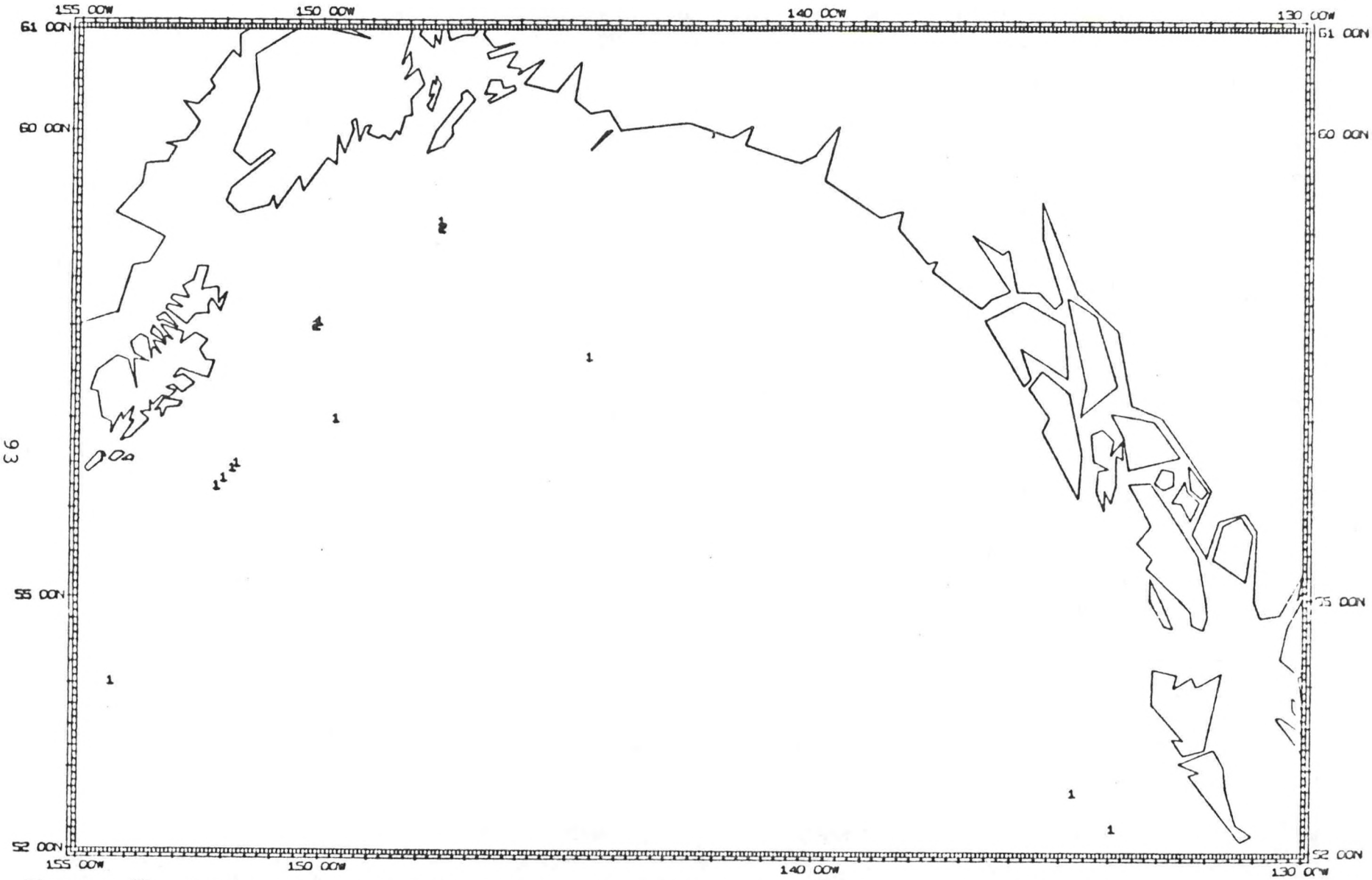

Figure A-37. Northern fur seal, Callorhinus ursinus, sightings reported for June, 1958-1976.

Figure A-38. Northern fur seal, Callorhinus ursinus, sightings reported for July, 1958-1976.

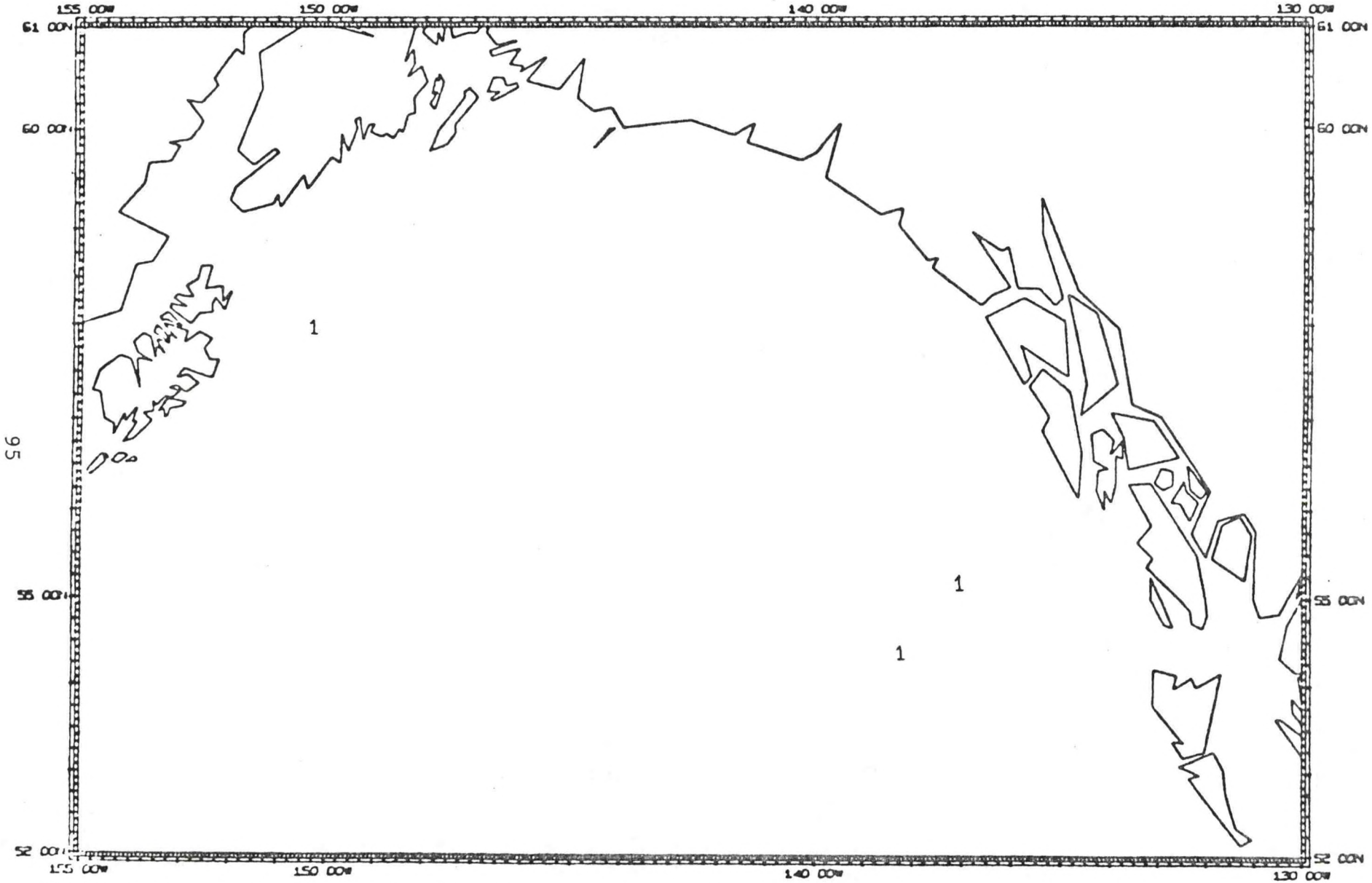

Figure A-39. Northern fur seal, Callorhinus ursinus, sightings reported for August, 1958-1976.

Figure A-40. Northern fur seal, Callorhinus ursinus, sightings reported for October, 1958-1976.

Figure A-41. Northern fur seal, Callorhinus ursinus, sightings reported for December, 1958-1976.

Figure A-42. Harbor seal, Phoca vitulina, sightings reported for February, 1958-1976.

Figure A-43. Harbor seal, Phoca vitulina, sightings reported for March, 1958-1976.

Figure A-44. Harbor seal, Phoca vitulina, sightings reported for April, 1958-1976.

Figure A-45. Harbor seal, Phoca vitulina, sightings reported for May, 1958-1976.

Figure A-46. Harbor seal, Phoca vitulina, sightings reported for June, 1958-1976.

Figure A-47. Harbor seal, Phoca vitulina, sightings reported for August, 1958-1976.

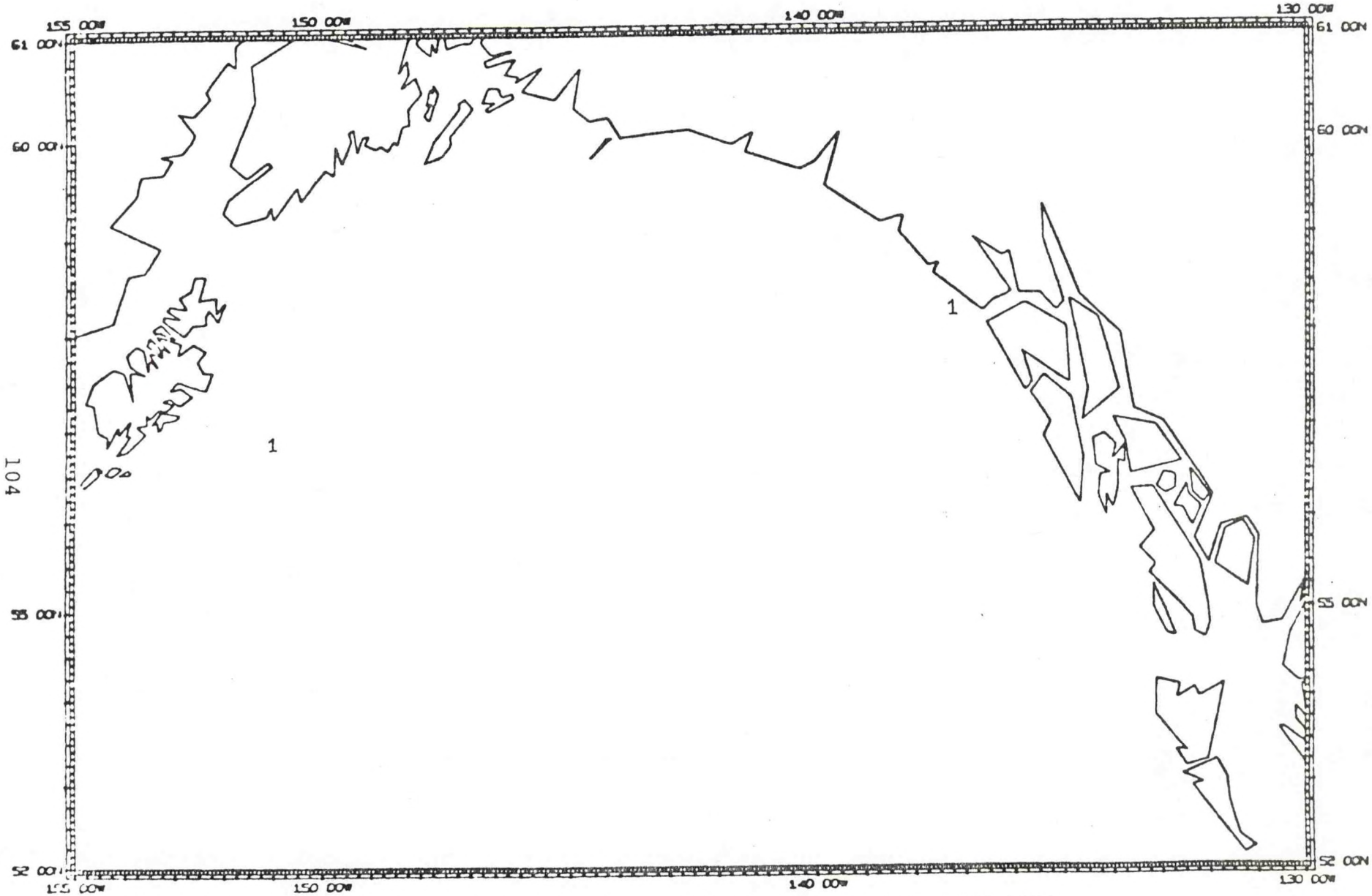

Figure A-48. Harbor seal, Phoca vitulina, sightings reported for September, 1958-1976.

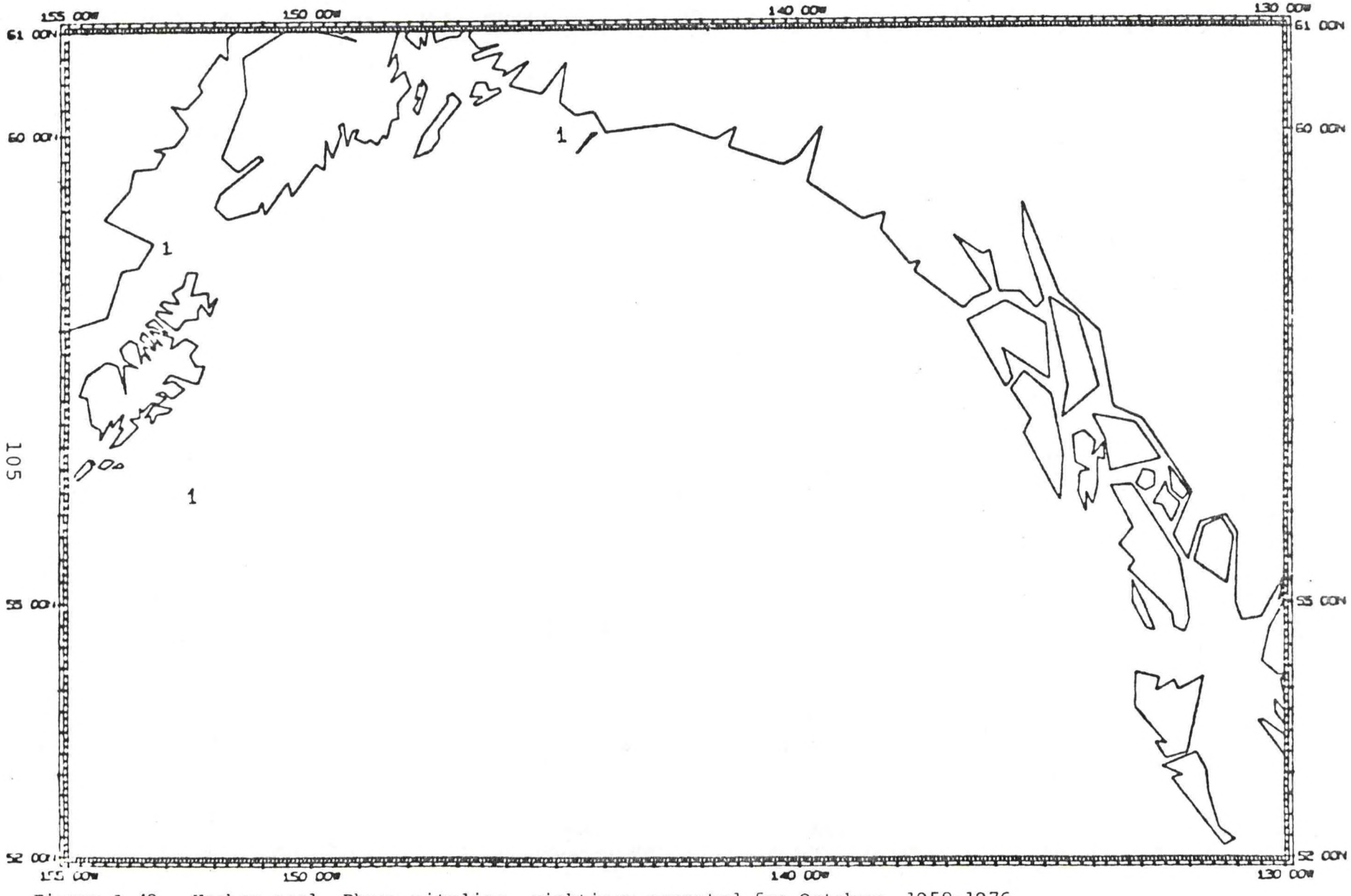

Figure A-49. Harbor seal, Phoca vitulina, sightings reported for October, 1958-1976.

Figure A-50. Northern elephant seal, Mirounga angustirostris, sightings reported for May, 1958-1976.

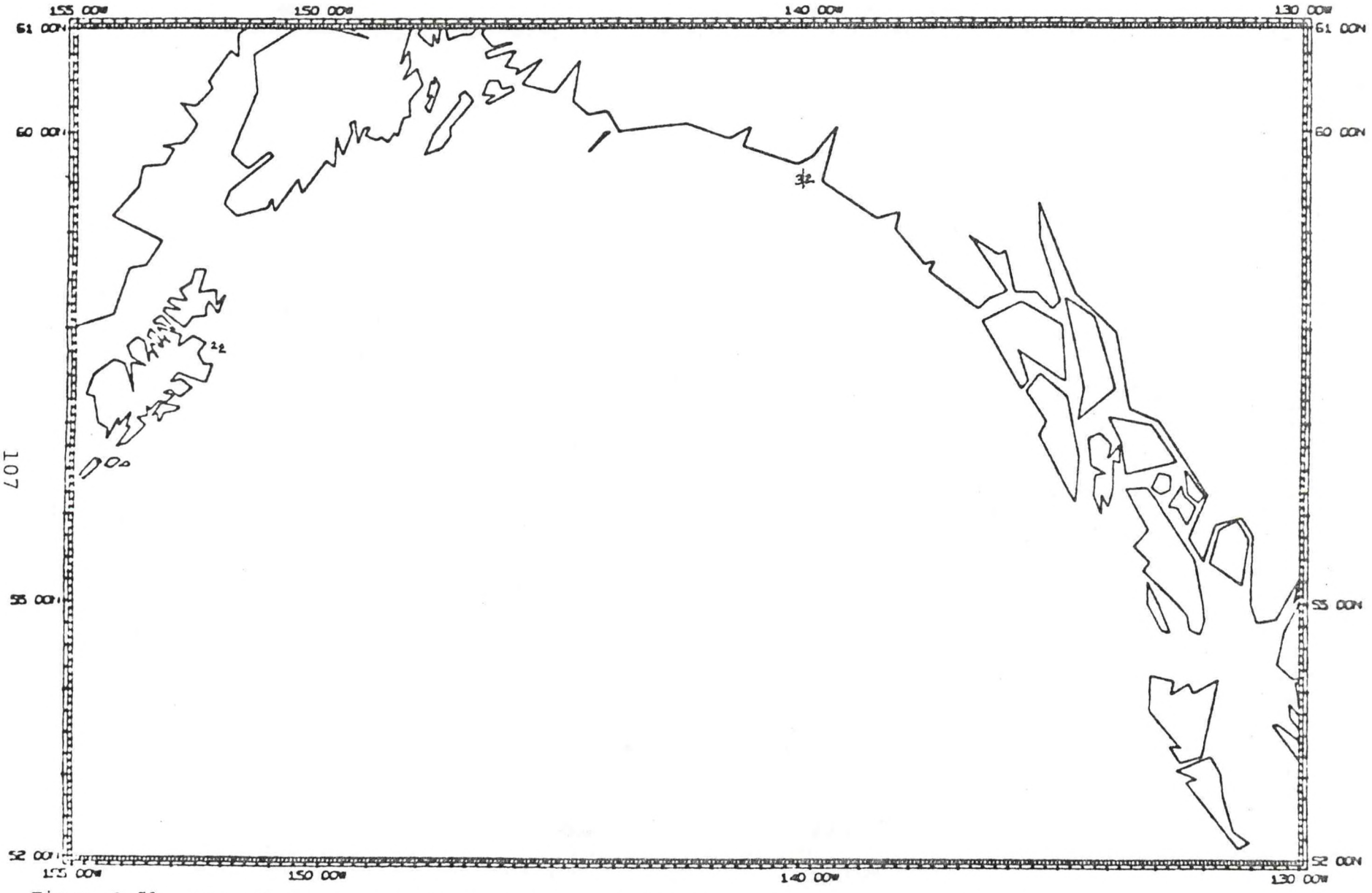

Figure A-51. Gray whale, Eschrichtius robustus, sightings reported for April, 1958-1976.

Figure A-52. Gray whale, Eschrichtius robustus, sightings reported for May, 1958-1976.

Figure A-53. Minke whale, Balaenoptera acutorostrata, sightings reported for February, 1958-1976.

Figure A-54. Minke whale, Balaenoptera acutorostrata, sightings reported for March, 1958-1976.

Figure A-55. Minke whale, Balaenoptera acutorostrata, sightings reported for April, 1958-1976.

Figure A-56. Minke whale, Balaenoptera acutorostrata, sightings reported for May, 1958-1976.

Figure A-57. Minke whale, Balaenoptera acutorostrata, sightings reported for June, 1958-1976.

Figure A-58. Minke whale, Balaenoptera acutorostrata, sightings reported for July, 1958-1976.

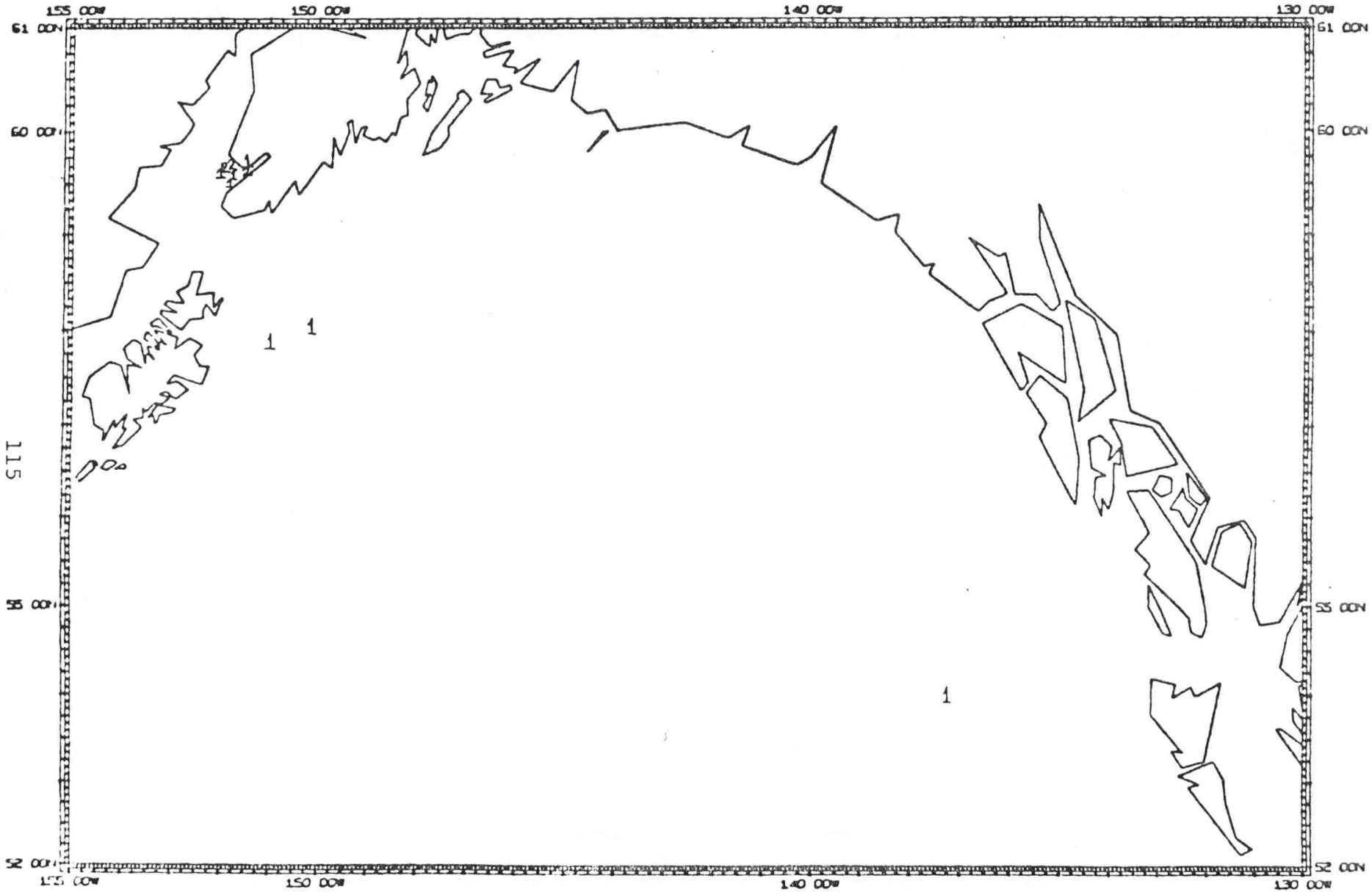

Figure A-59. Minke whale, Balaenoptera acutorostrata, sightings reported for August, 1958-1976.

Figure A-60. Minke whale, Balaenoptera acutorostrata, sightings reported for September, 1958-1976.

Figure A-51. Minke whale, Balaenoptera acutorostrata, sightings reported for November, 1958-1976.

Figure A-62. Sei whale, Balaenoptera borealis, sightings reported for April, 1958-1976.

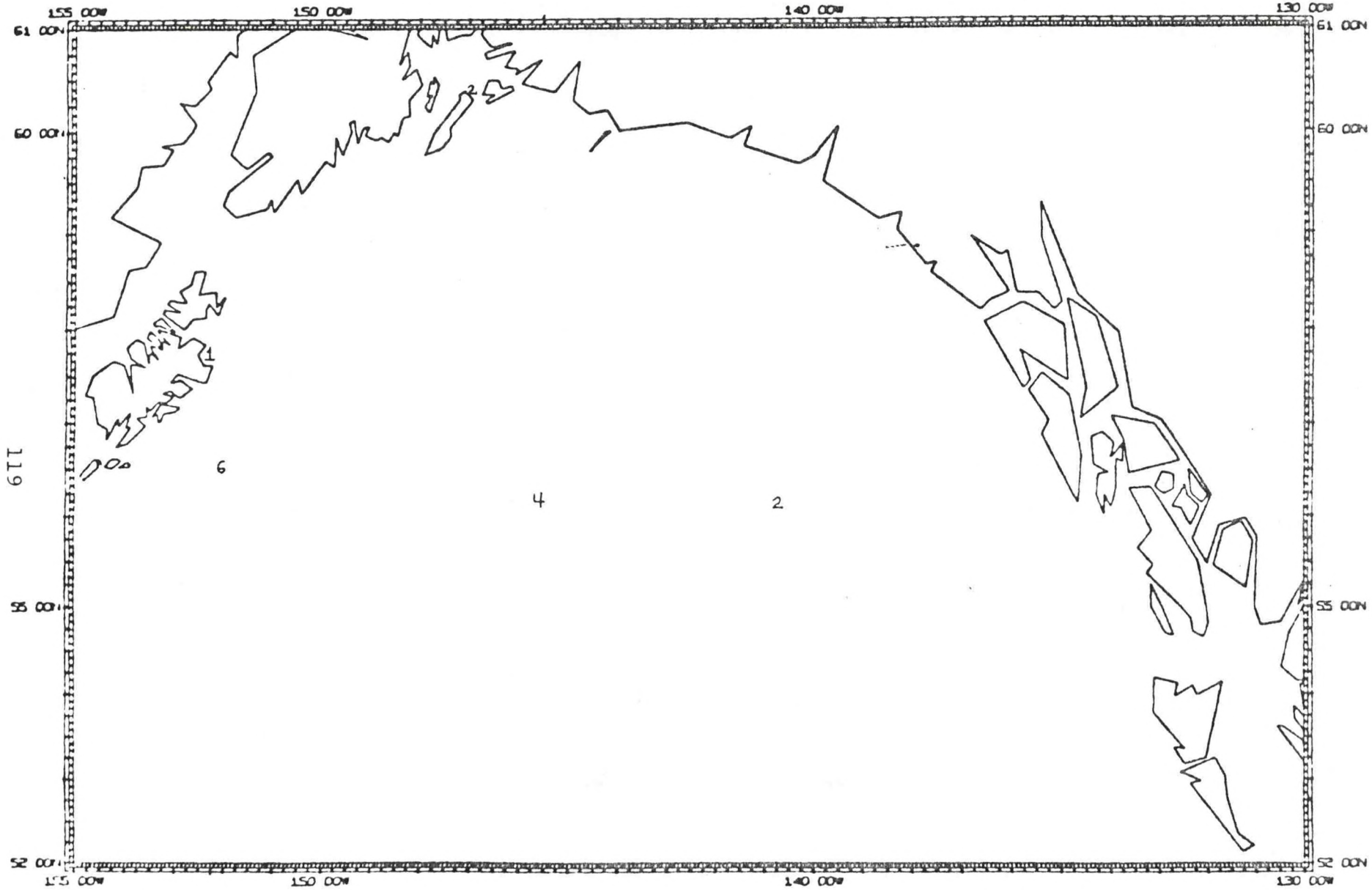

Figure A-63. Sei whale, Balaenoptera borealis, sightings reported for May, 1958-1976.

Figure A-64. Sei whale, Balaenoptera borealis, sightings reported for June, 1958-1976.

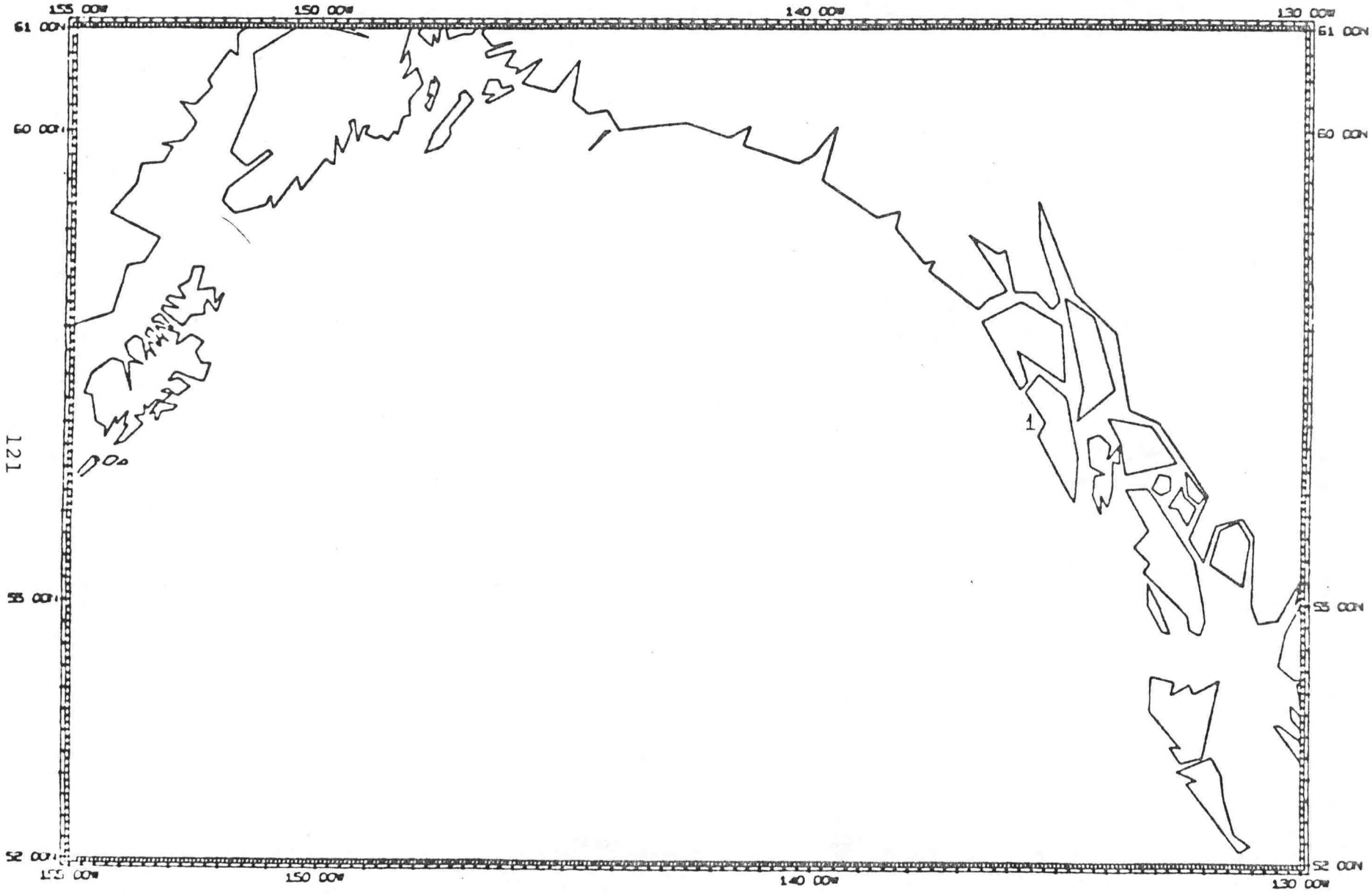

Figure A-65. Fin whale, Balaenoptera physalus, sightings reported for March, 1958-1976.

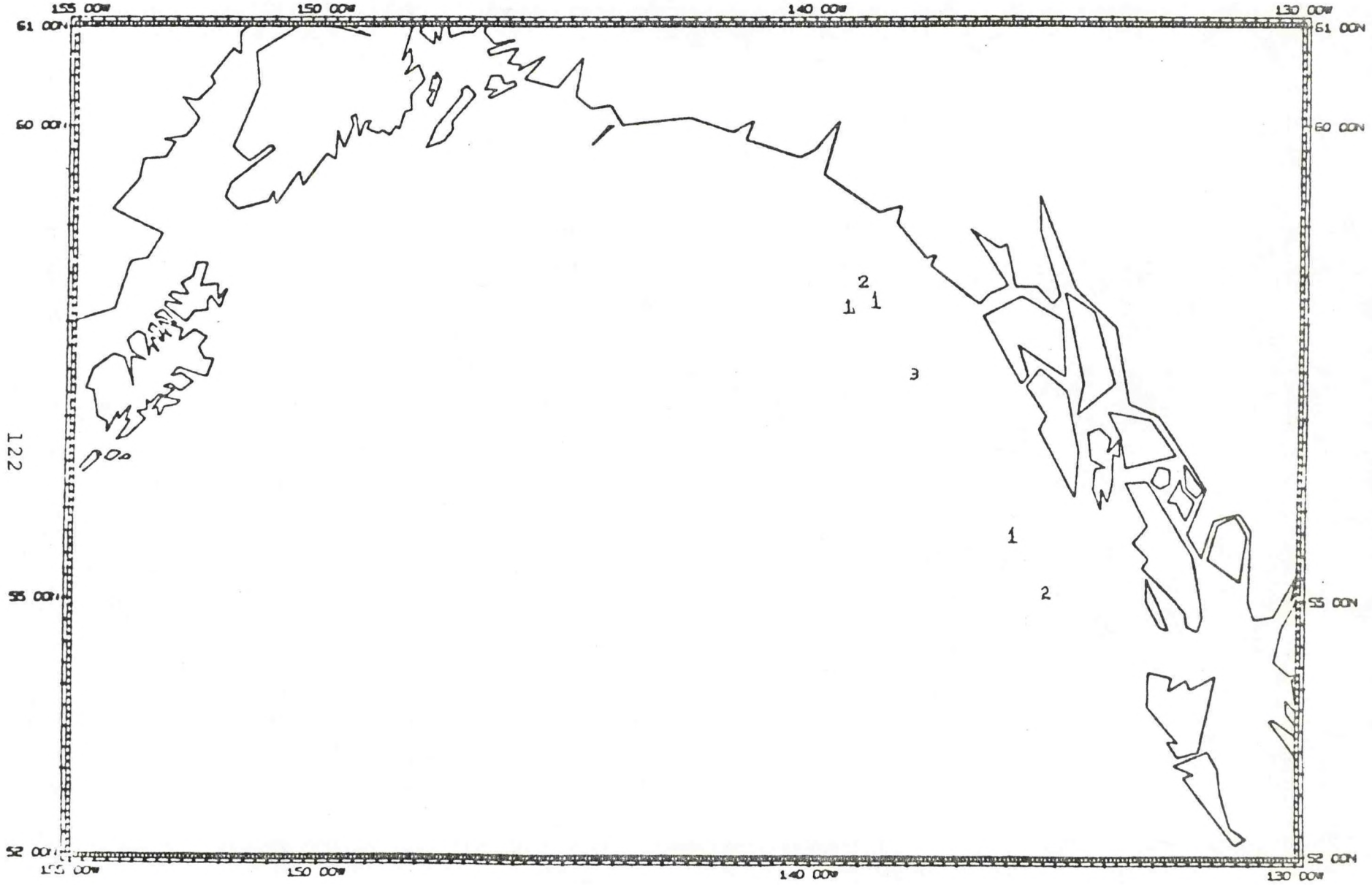

Figure A-66. Fin whale, Balaenoptera physalus, sightings reported for April, 1958-1976.

Figure A-67. Fin whale, Balaenoptera physalus, sightings reported for May, 1958-1976.

Figure A-68. Fin whale, Balaenoptera physalus, sightings reported for June, 1958-1976.

Figure A-69. Fin whale, Balaenoptera physalus, sightings reported for July, 1958-1976.

Figure A-70. Fin whale, Balaenoptera physalus, sightings reported for October, 1958-1976.

Figure A-71. Blue whale, Balaenoptera musculus, sightings reported for May, 1958-1976.

Figure A-72. Blue whale, Balaenoptera musculus, sightings reported for June, 1958-1976.

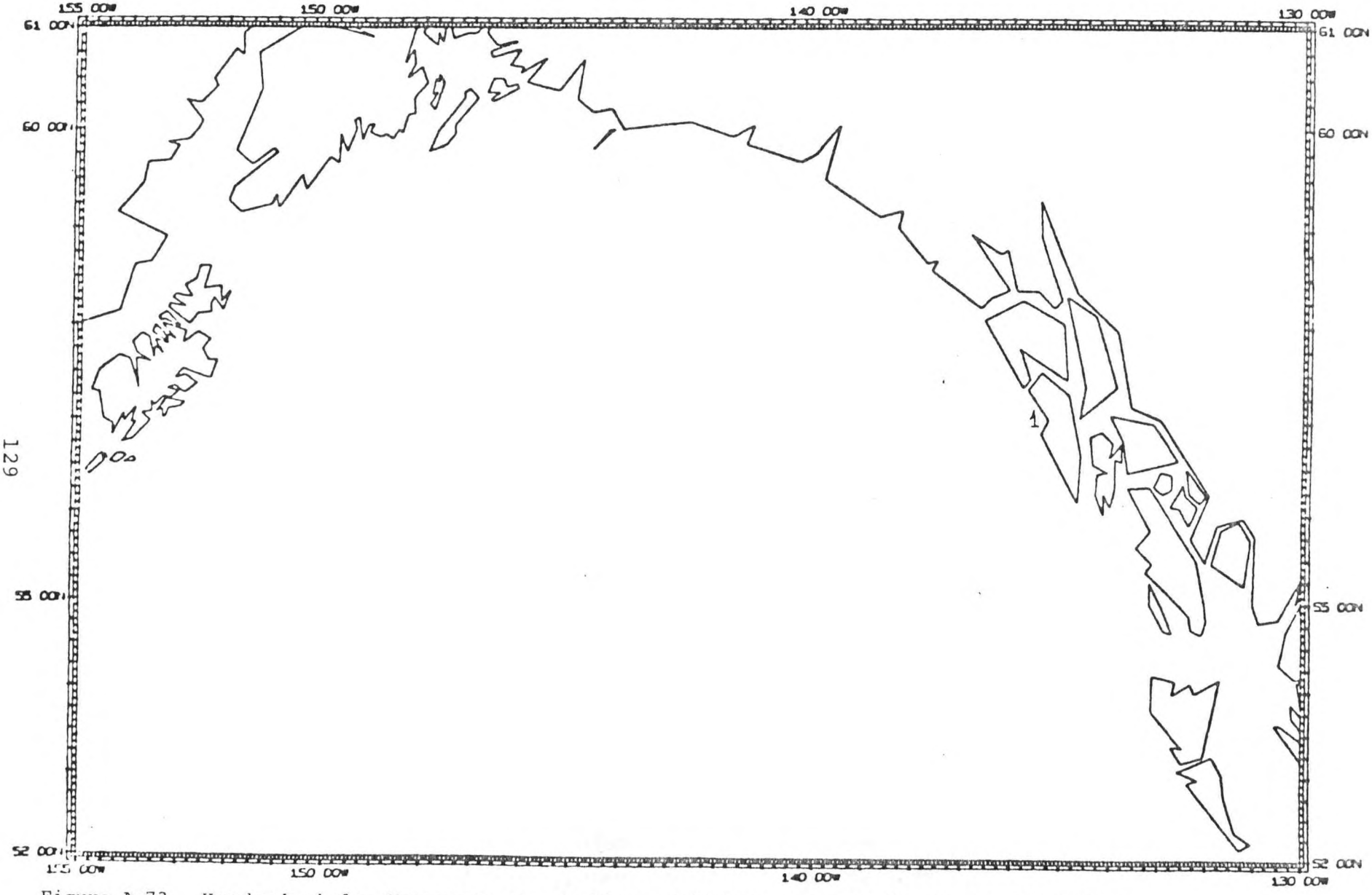

Figure A-73. Humpback whale, Megaptera novaengliae, sightings reported for March, 1958-1976.

Figure A-74. Humpback whale, Megaptera novaengliae, sightings reported for April, 1958-1976.

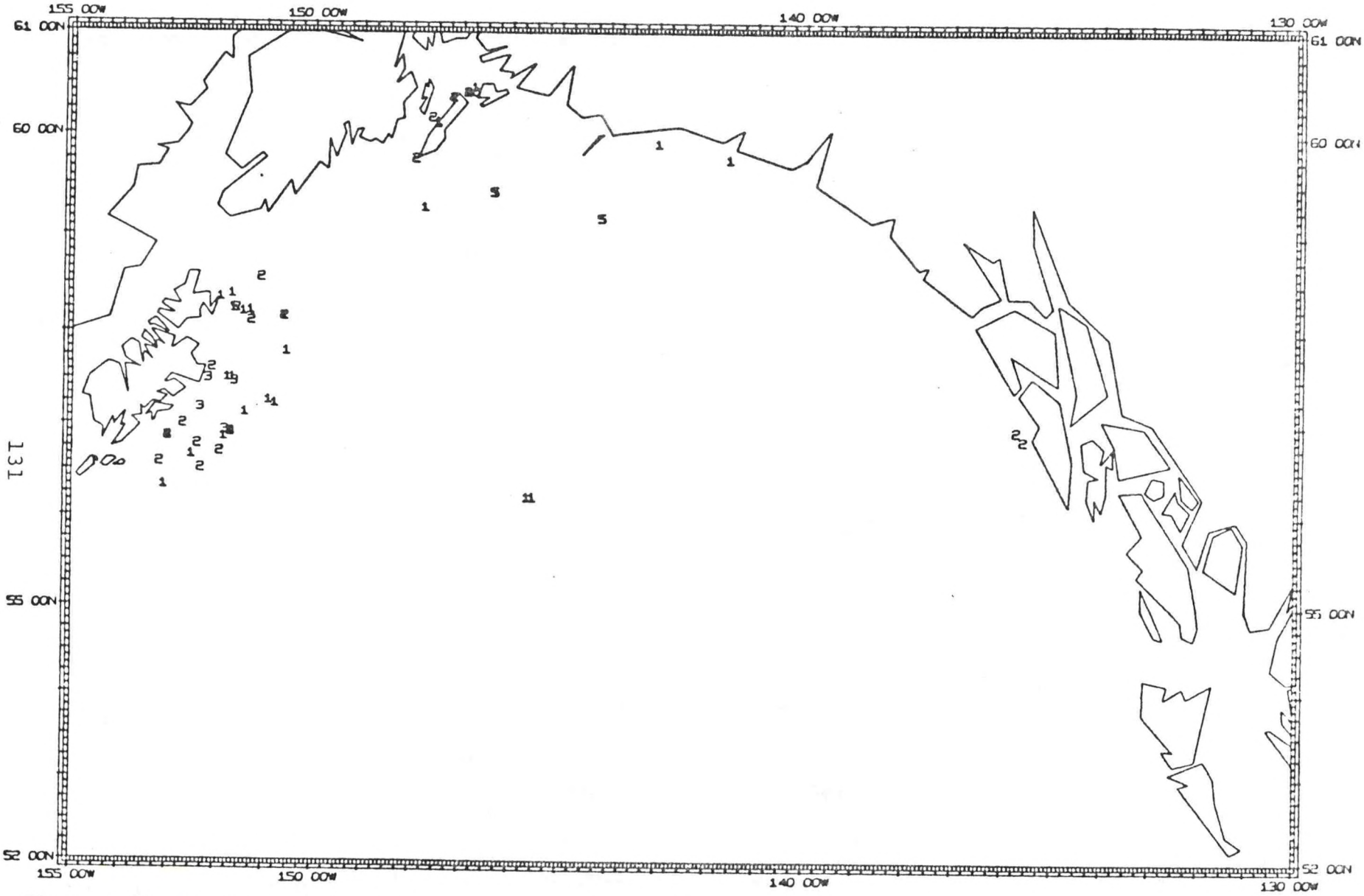

Figure A-75. Humpback whale, Megaptera novaengliae, sightings reported for May, 1958-1976.

Figure A-76. Humpback whale, Megaptera novaengliae, sightings reported for June, 1958-1976.

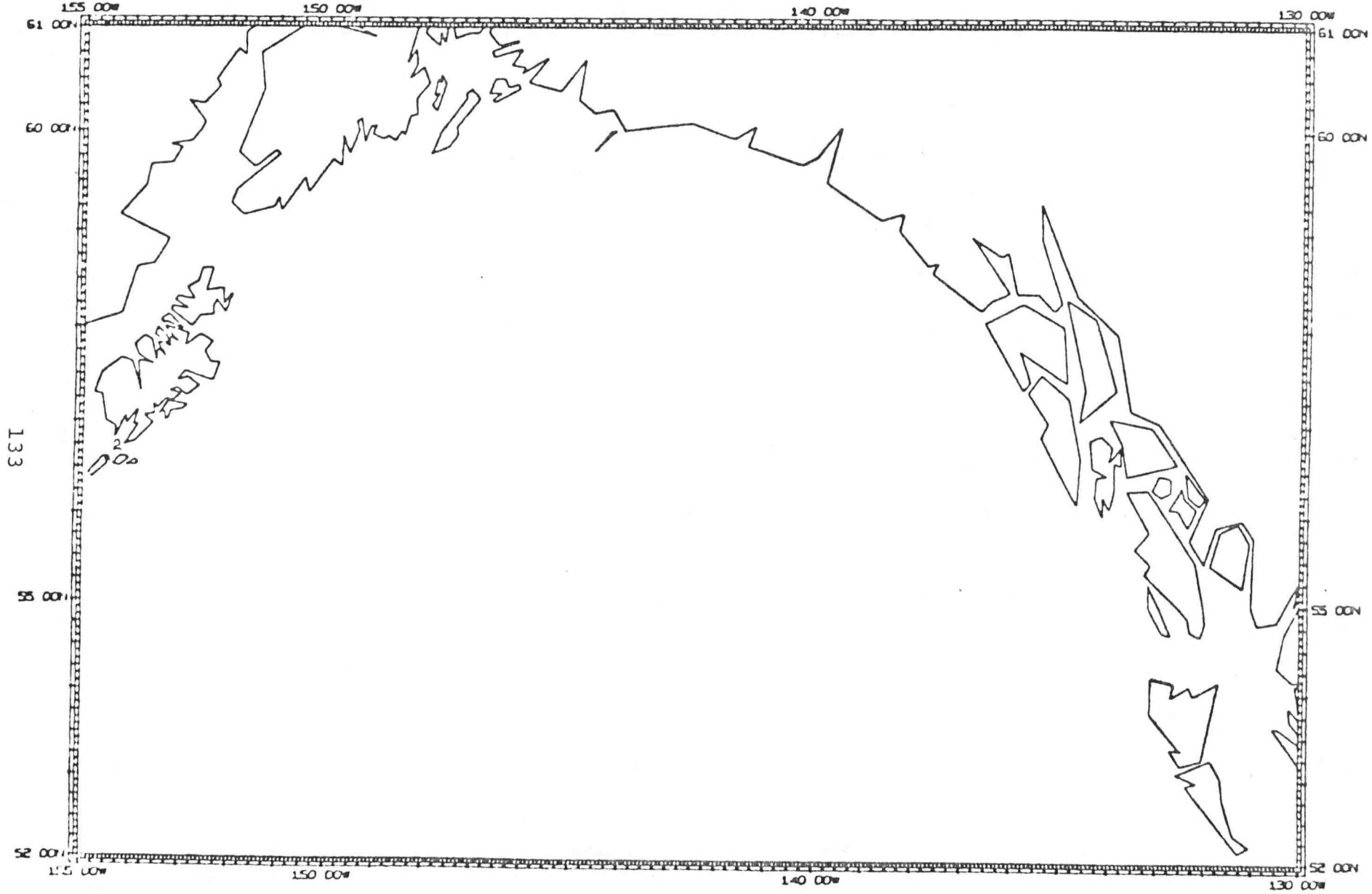

Figure A-77. Humpback whale, Megaptera novaengliae, sightings reported for July, 1958-1976.

Figure A-78. Humpback whale, Megaptera novaengliae, sightings reported for August, 1958-1976.

Figure A-79. Humpback whale, Megaptera novaengliae, sightings reported for October, 1958-1976.

Figure A-80. North Pacific Whiteside Dolphin, Lagenorhynchus obliquidens, sightings reported for February, 1958-1976.

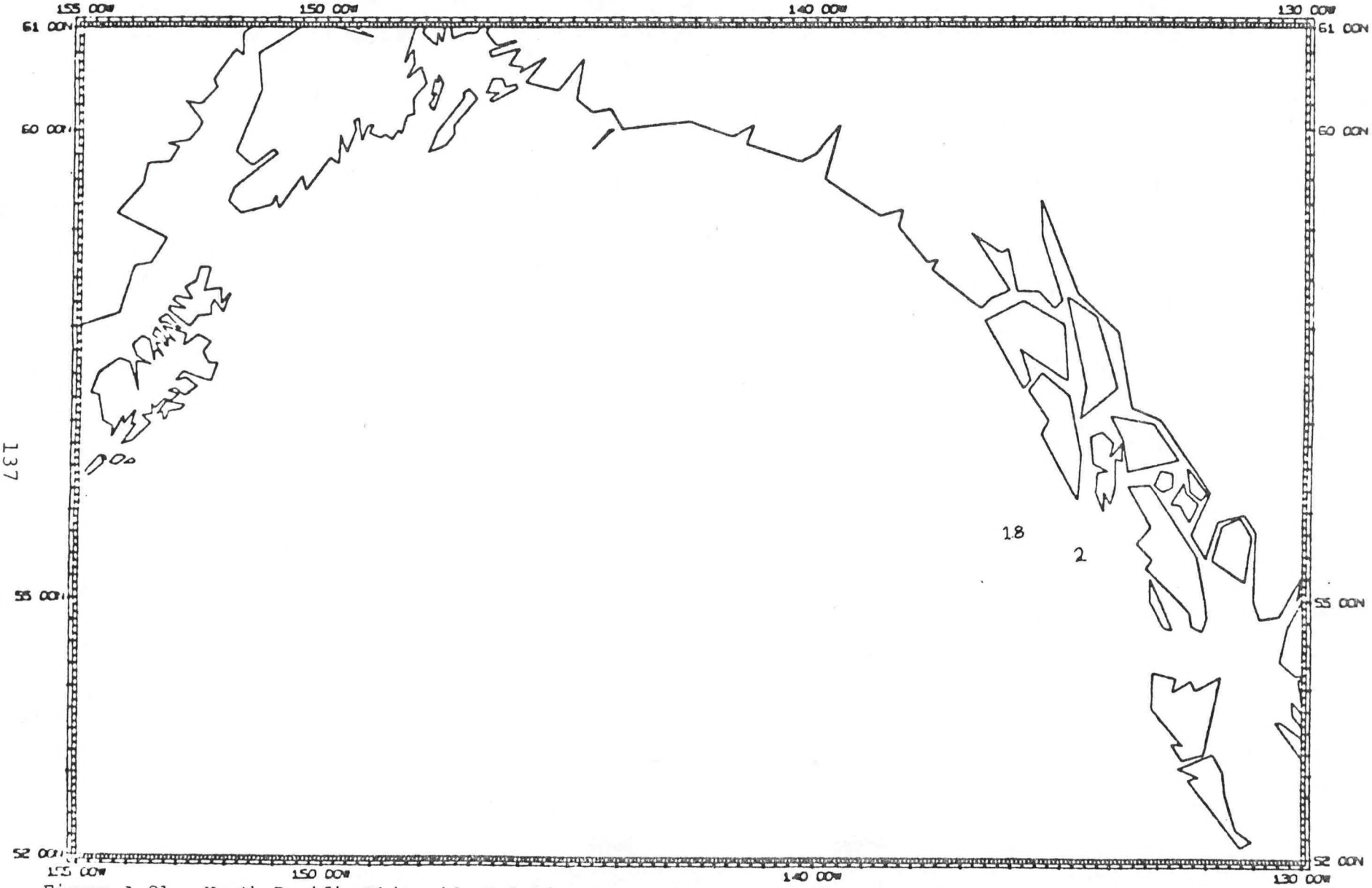

Figure A-81. North Pacific Whiteside Dolphin, Lagenorhynchus obliquidens, sightings reported for April, 1958-1976.

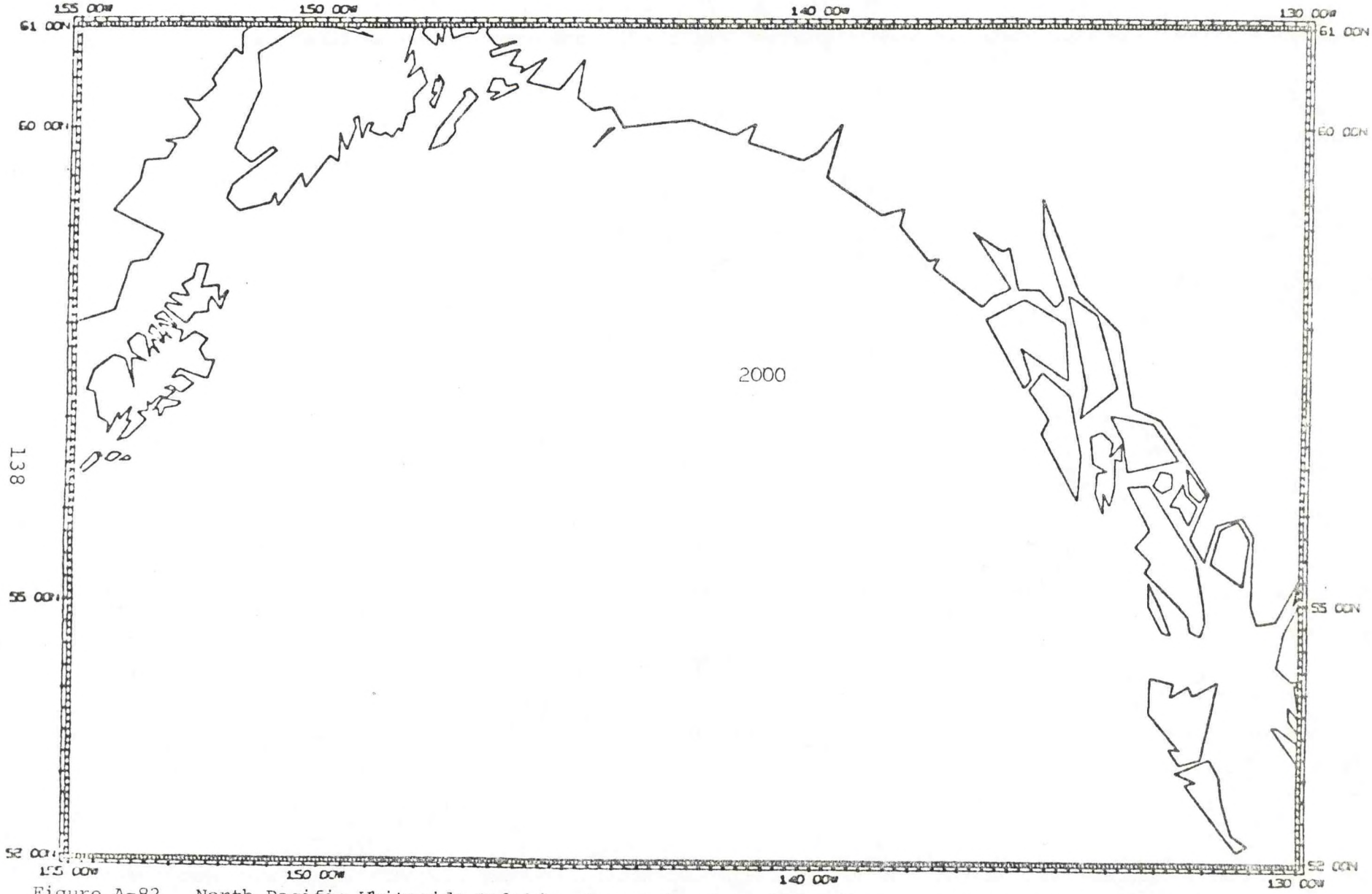

Figure A-82. North Pacific Whiteside Dolphin, Lagenorhynchus obliquidens, sightings reported for May, 1958-1976.

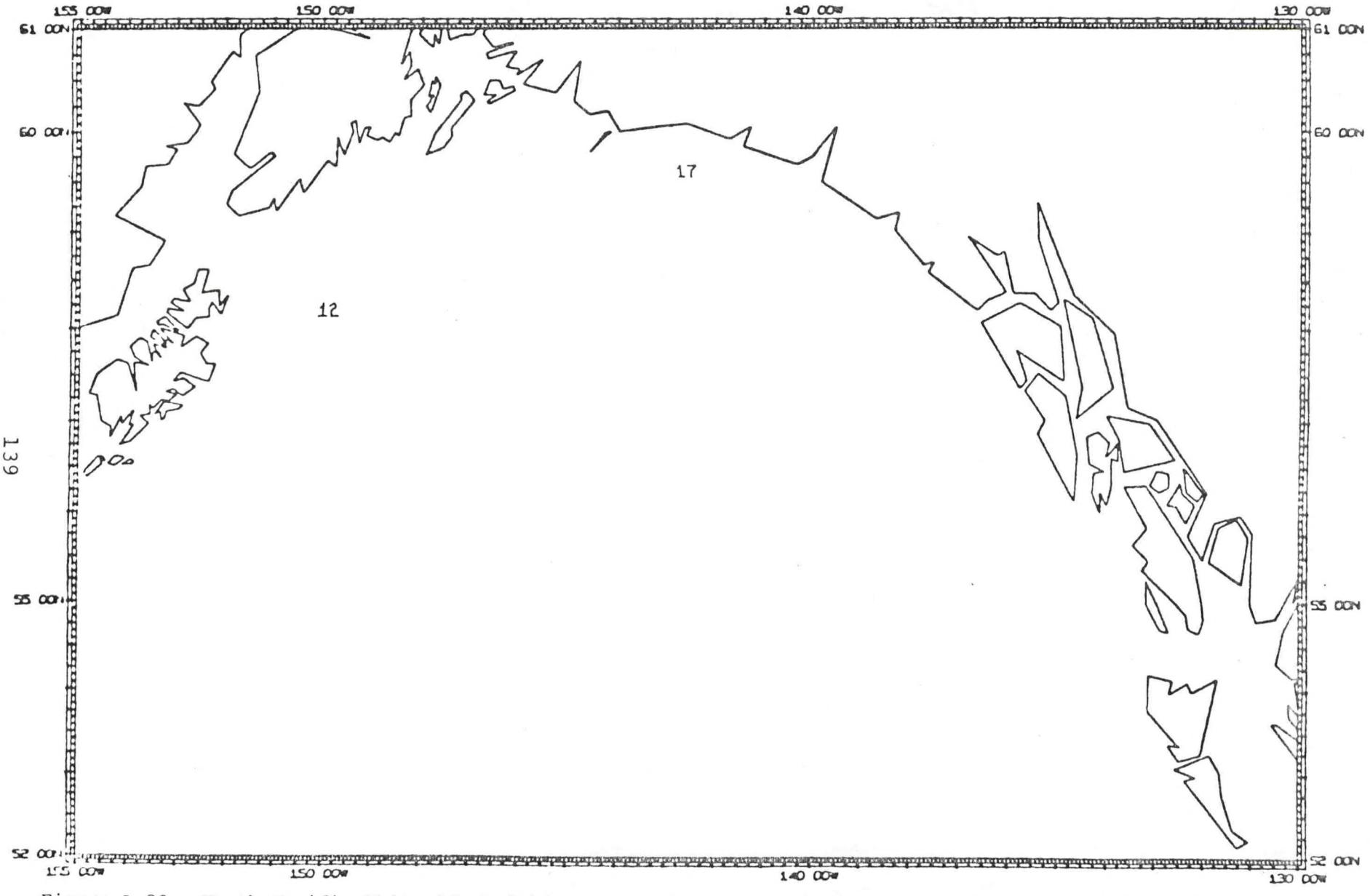

Figure A-83. North Pacific Whiteside Dolphin, Lagenorhynchus obliquidens, sightings reported for November, 1958-1976.

Figure A-84. Killer whale, Orcinus orca, sightings reported for January, 1958-1976.

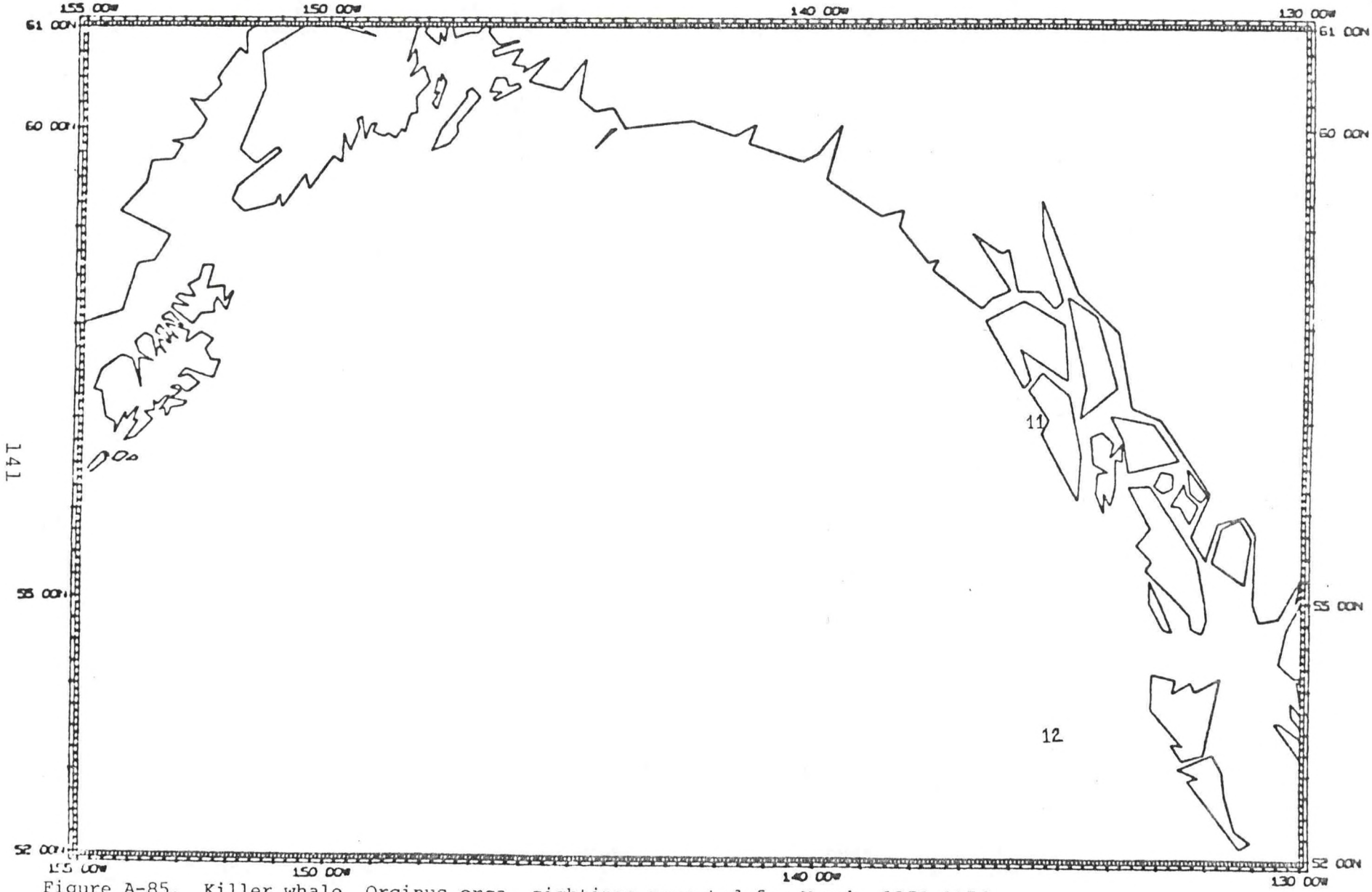

Figure A-85. Killer whale, Orcinus orca, sightings reported for March, 1958-1976.

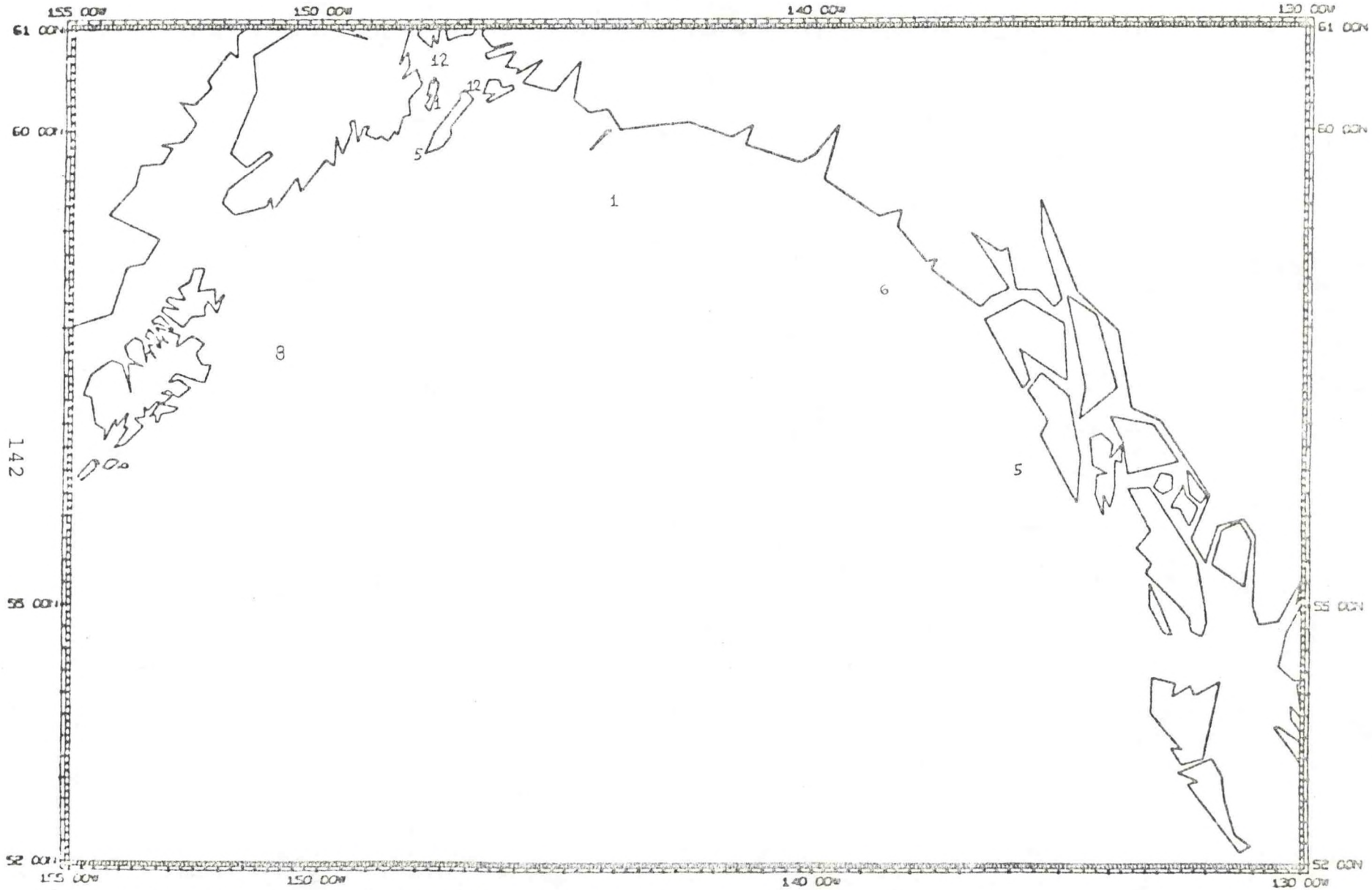

Figure A-86. Killer whale Orcinus orca, sightings reported for April, 1958-1976.

Figure A-87. Killer whale, Orcinus orca, sightings reported for May, 1958-1976.

Figure A-88. Killer whale, Orcinus orca, sightings reported for June, 1958-1976.

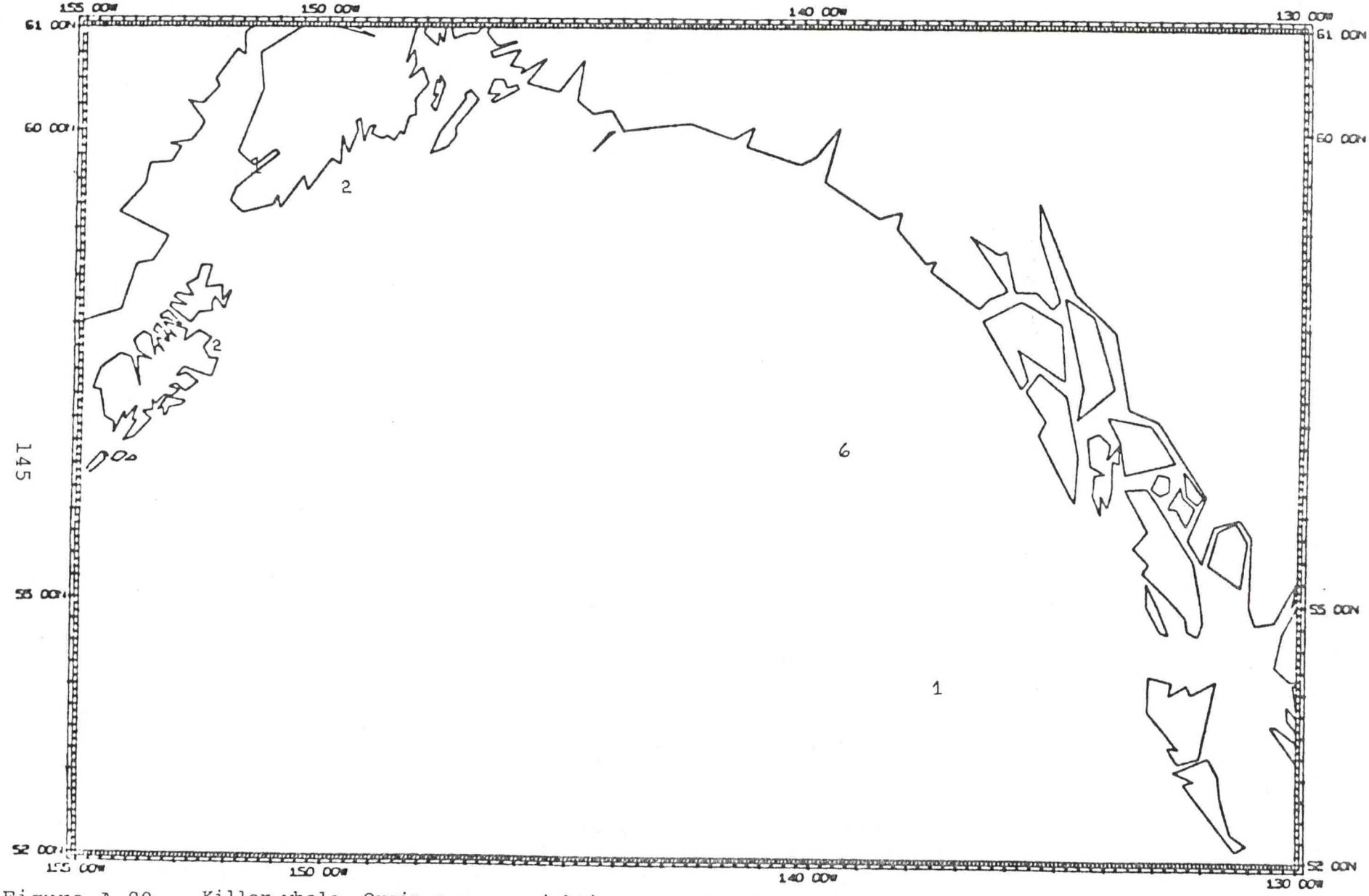

Figure A-89. Killer whale, Orcinus orca, sightings reported for August, 1958-1976.

Figure A-90. Killer whale, Orcinus orca, sightings reported for September, 1958-1976.

Figure A-91. Killer whale, Orcinus orca, sightings reported for October, 1958-1976.

Figure A-92. Harbor porpoise, Phocoena phocoena, sightings reported for February, 1958-1976.

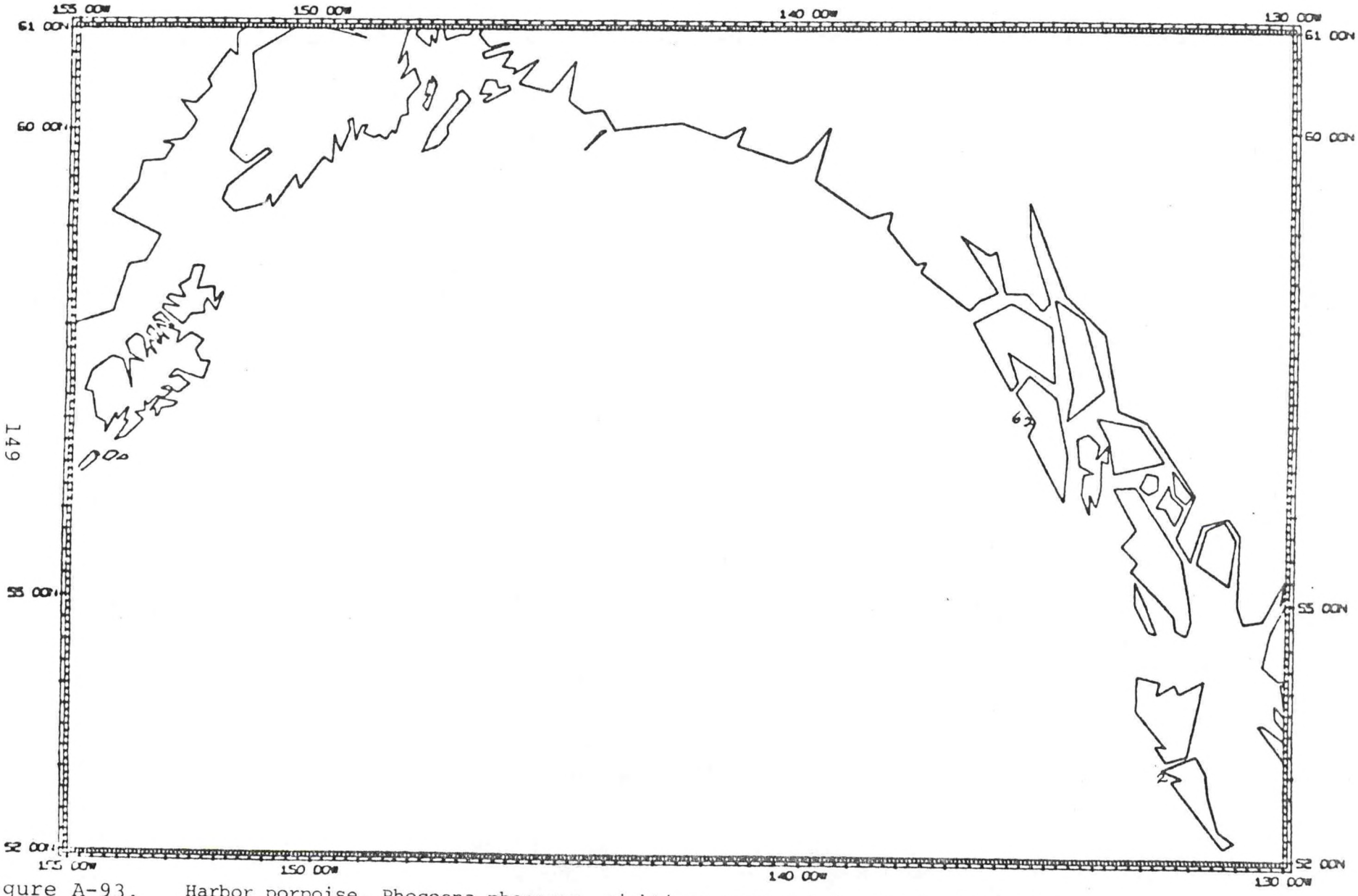

Figure A-93. Harbor porpoise, Phocoena phocoena, sightings reported for March, 1958-1976.

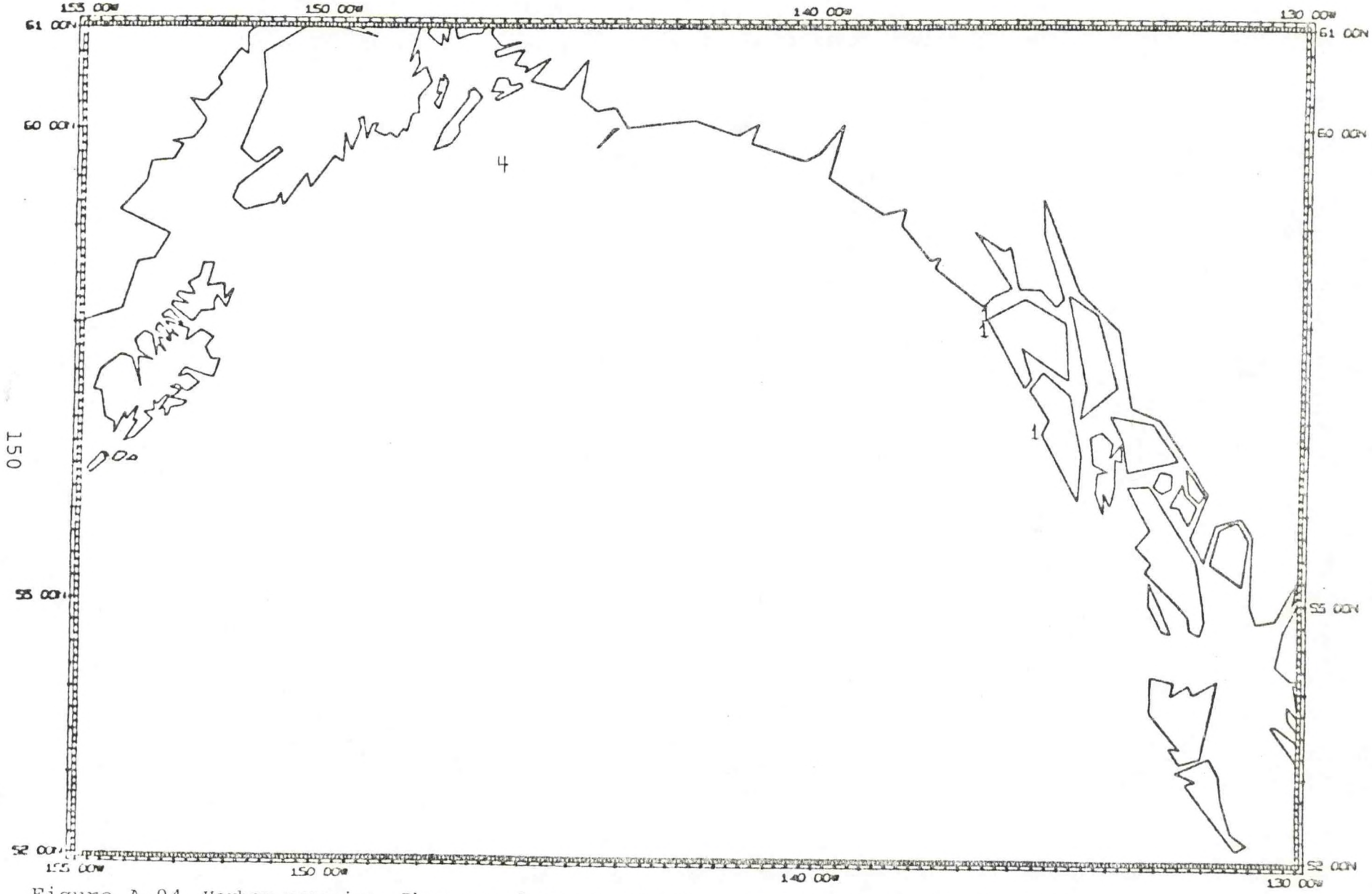

Figure A-94. Harbor porpoise, Phocoena phocoena, sightings reported for April, 1958-1976.

Figure A-95. Harbor porpoise, Phocoena phocoena, sightings reported for May, 1958-1976.

Figure A-96. Harbor porpoise, Phocoena phocoena, sightings reported for June, 1958-1976.

Figure A-97. Harbor porpoise, Phocoena phocoena, sightings reported for August, 1958-1976.

Figure A-98. Harbor porpoise, Phocoena phocoena, sightings reported for September, 1958-1976.

Figure A-99. Harbor porpoise, Phocoena phocoena, sightings reported for October, 1958-1976.

Figure A-100. Harbor porpoise, Phocoena phocoena, sightings reported for November, 1958-1976.

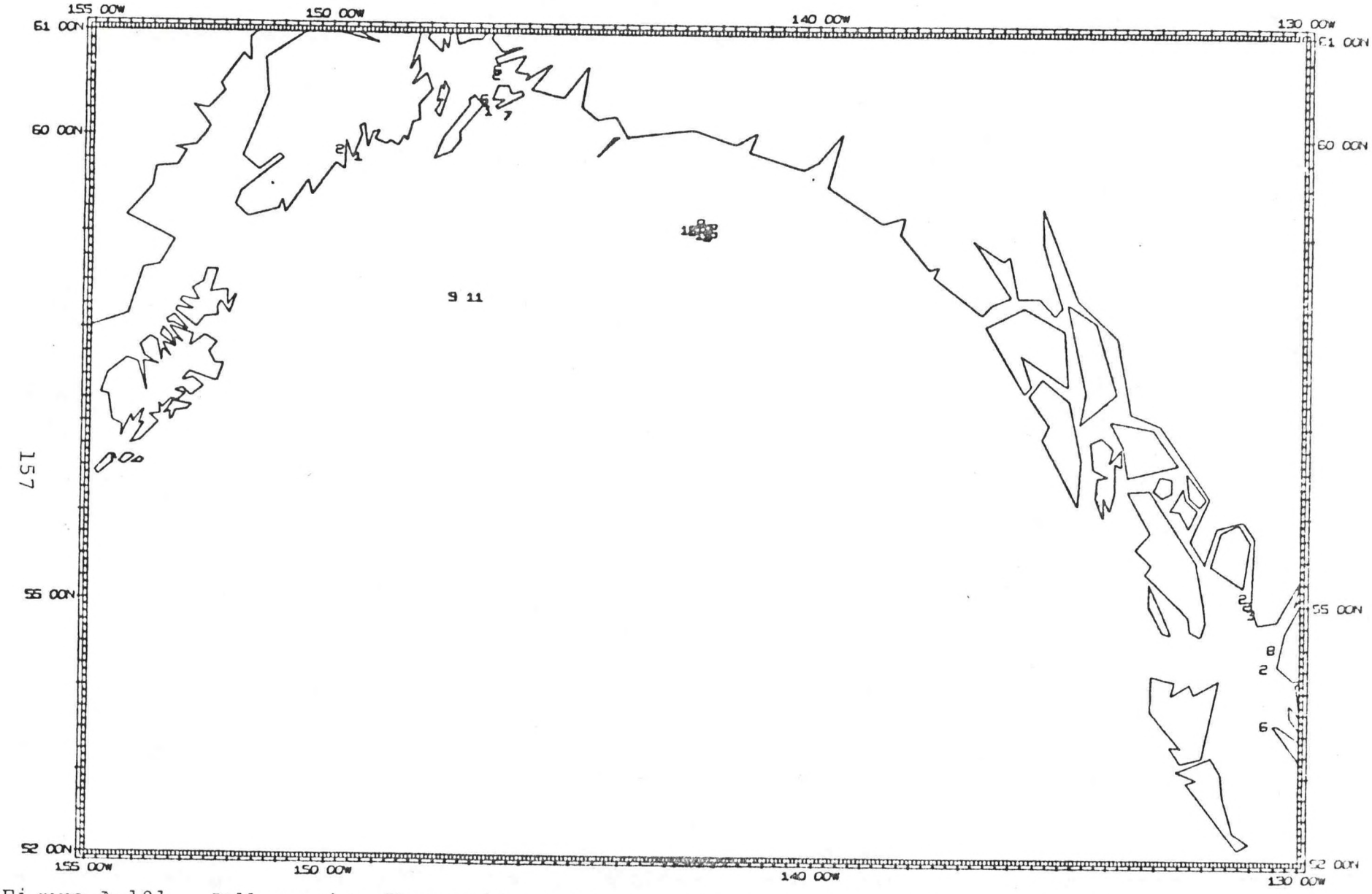

Figure A-101. Dall porpoise, Phocoenoides dalli, sightings reported for February, 1958-1976.

Figure A-102. Dall porpoise, Phocoenoides dalli, sightings reported for March, 1958-1976.

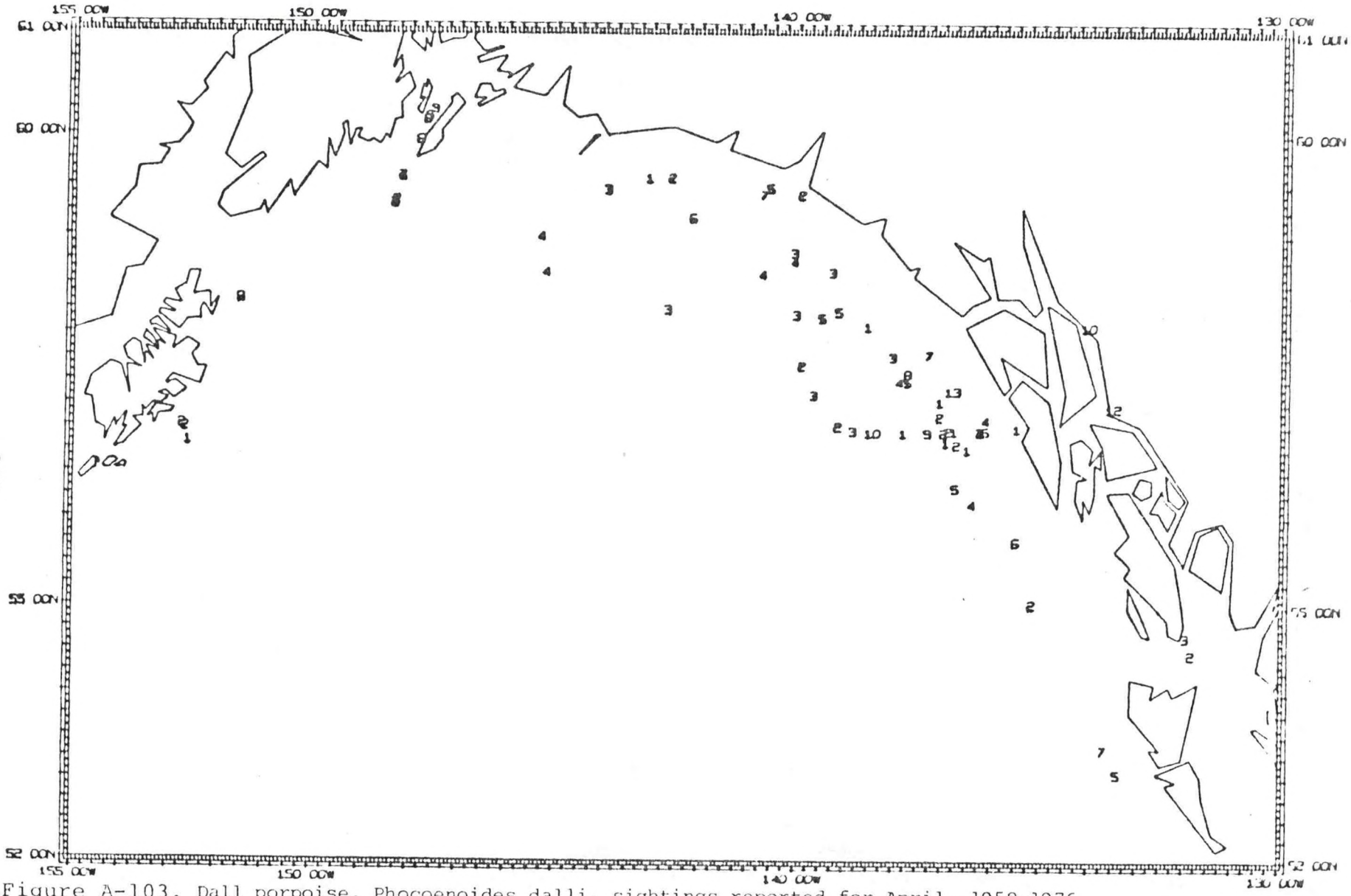

Figure A-103. Dall porpoise, Phocoenoides dalli, sightings reported for April, 1958-1976.

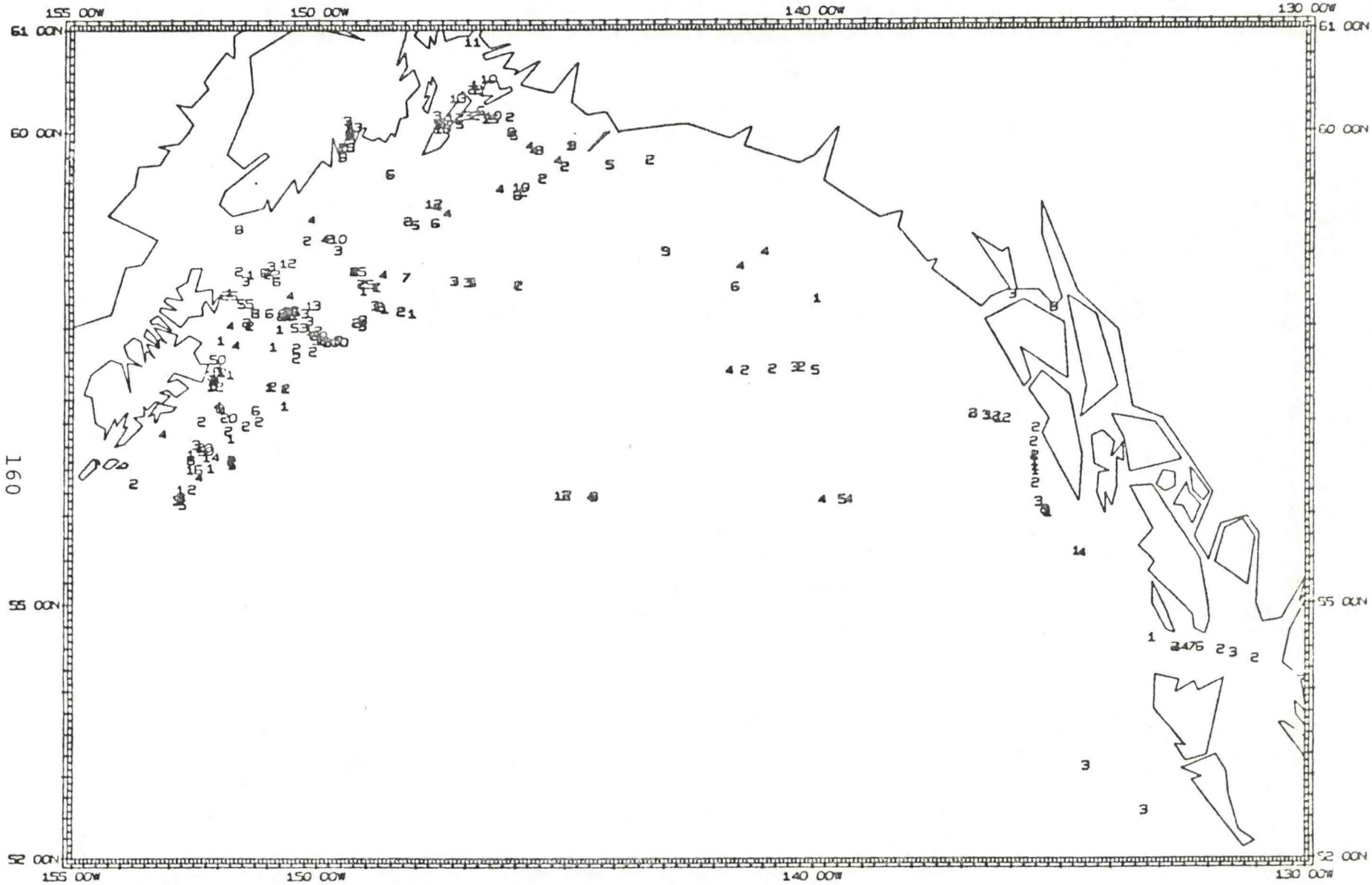

Figure A-104.Dall porpoise, Phocoenoides dalli, sightings reported for May, 1958-1976.

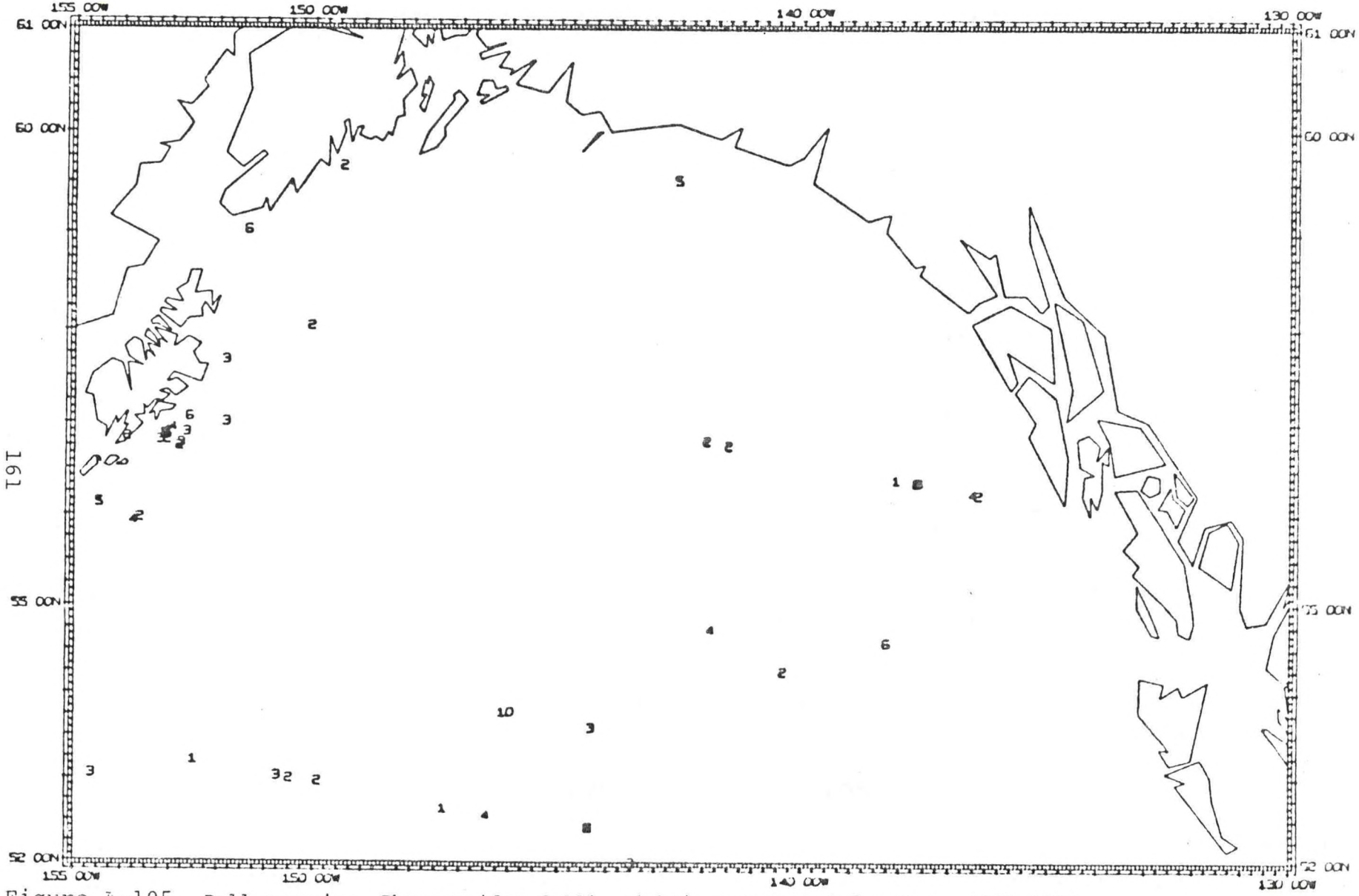

Figure A-105. Dall porpoise, Phocoenoides dalli, sightings reported for June, 1958-1976.

Figure A-106. Dall porpoise, Phocoenoides dalli, sightings reported for July, 1958-1976.

Figure A-107. Dall porpoise, Phocoenoides dalli, sightings reported for September, 1958-1976.

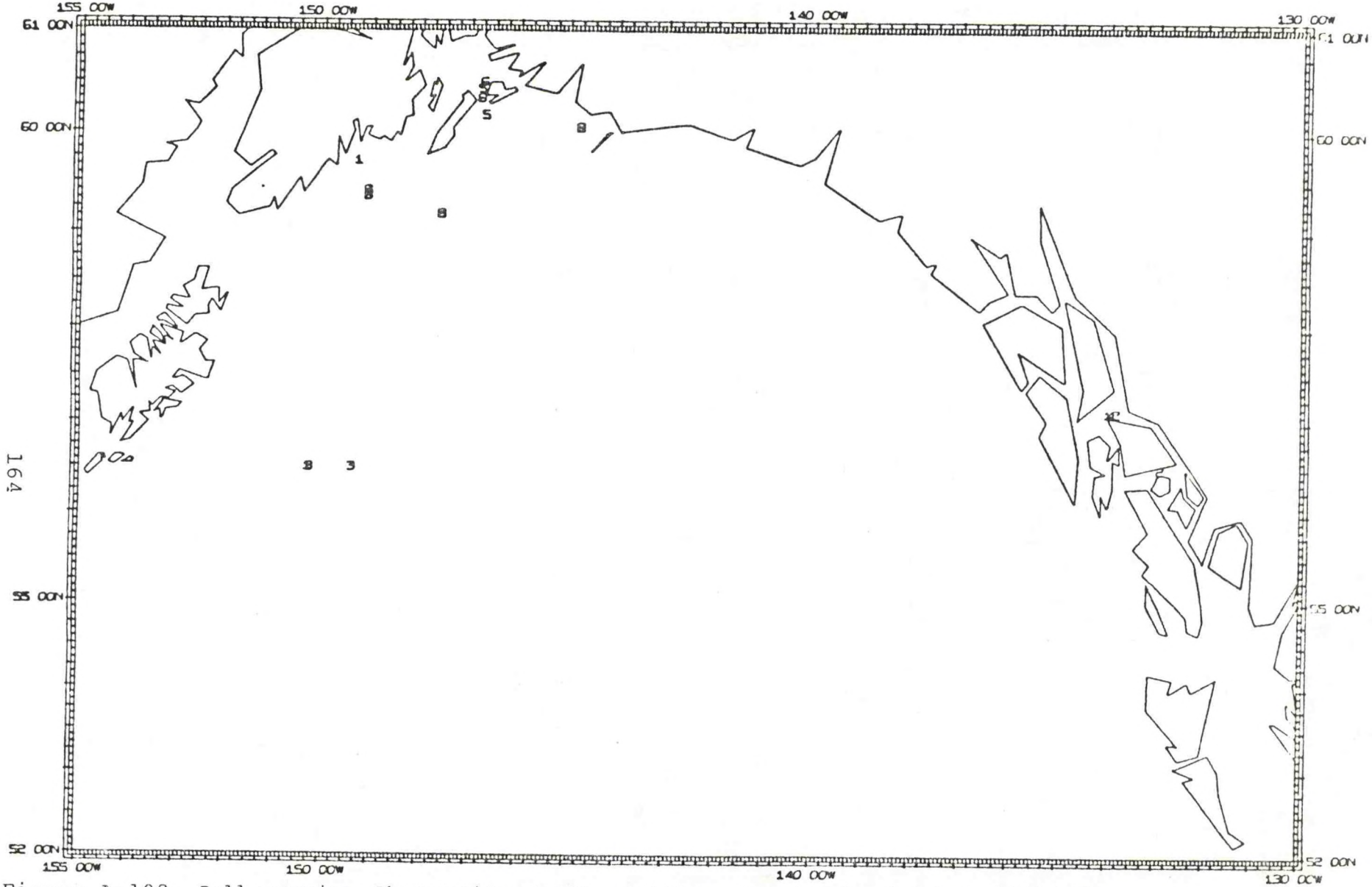

Figure A-108. Dall porpoise, Phocoenoides dalli, sightings reported for October, 1958-1976.

Figure A-109. Dall porpoise, Phocoenoides dalli, sightings reported for November, 1958-1976.

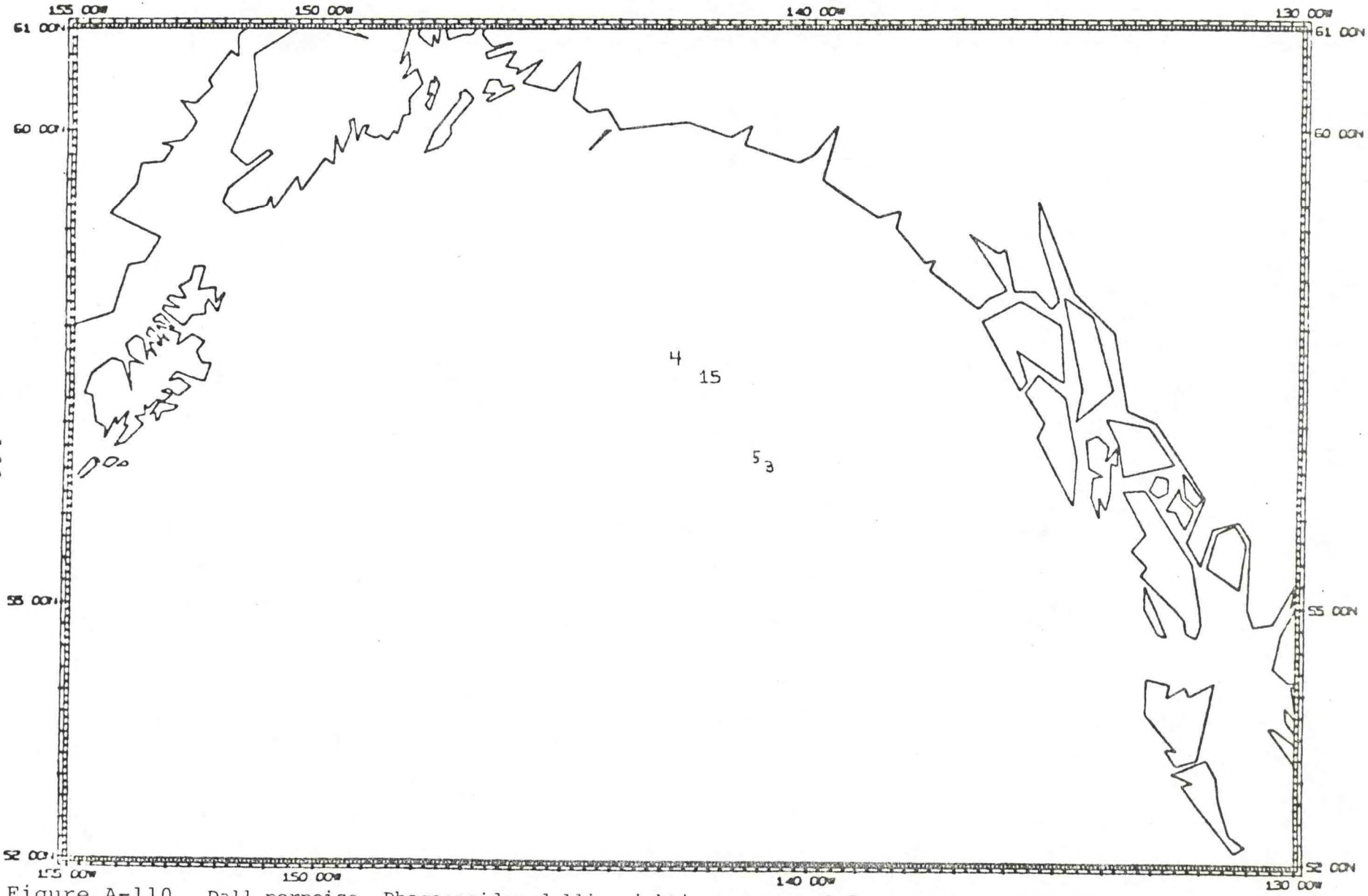

Figure A-110. Dall porpoise, Phocoenoides dalli, sightings reported for December, 1958-1976.

Figure A-111. Beluga, Delphinapterus leucas, sightings reported for May, 1958-1976.

Figure A-112. Beluga, Delphinapterus leucas, sightings reported for June, 1958-1976.

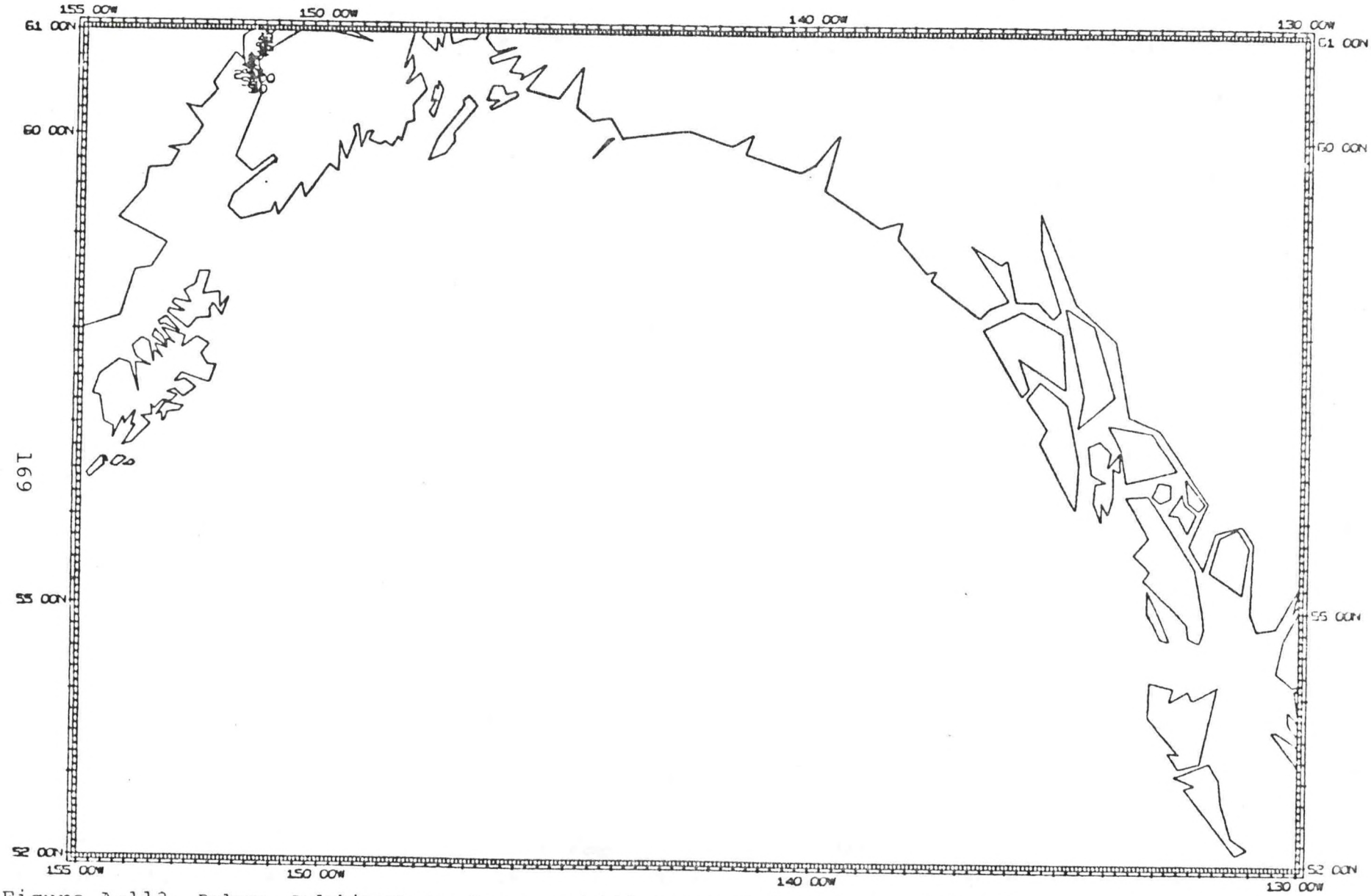

Figure A-113. Beluga, Delphinapterus leucas, sightings reported for July, 1958-1976.

Figure A-114. Beluga, Delphinapterus leucas, sightings reported for August, 1958-1976.

Figure A-115. Beluga, Delphinapterus leucas, sightings reported for September, 1958-1976.

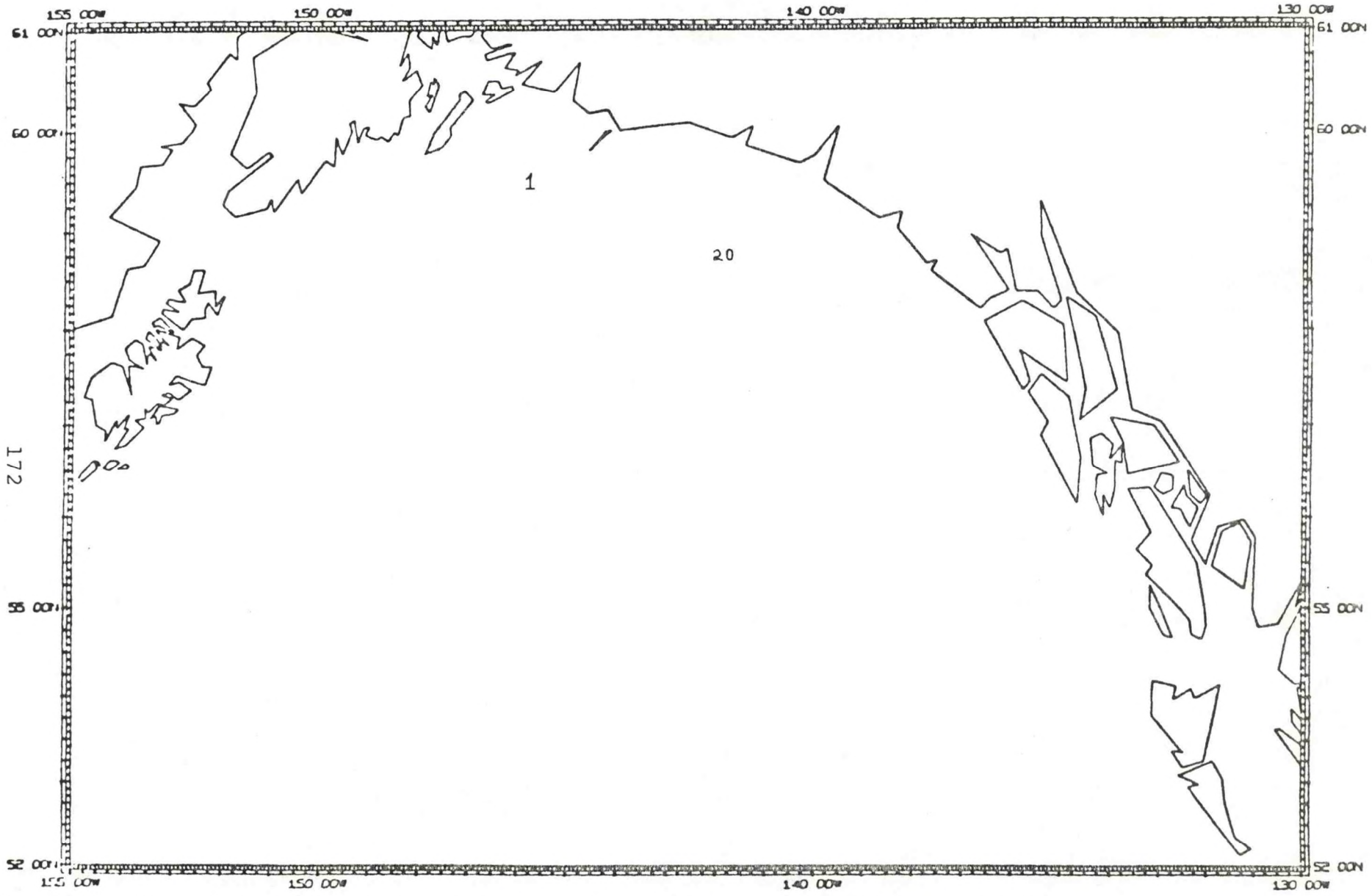

Figure A-116. Sperm whale, Physeter macrocephalus, sightings reported for May, 1958-1976.

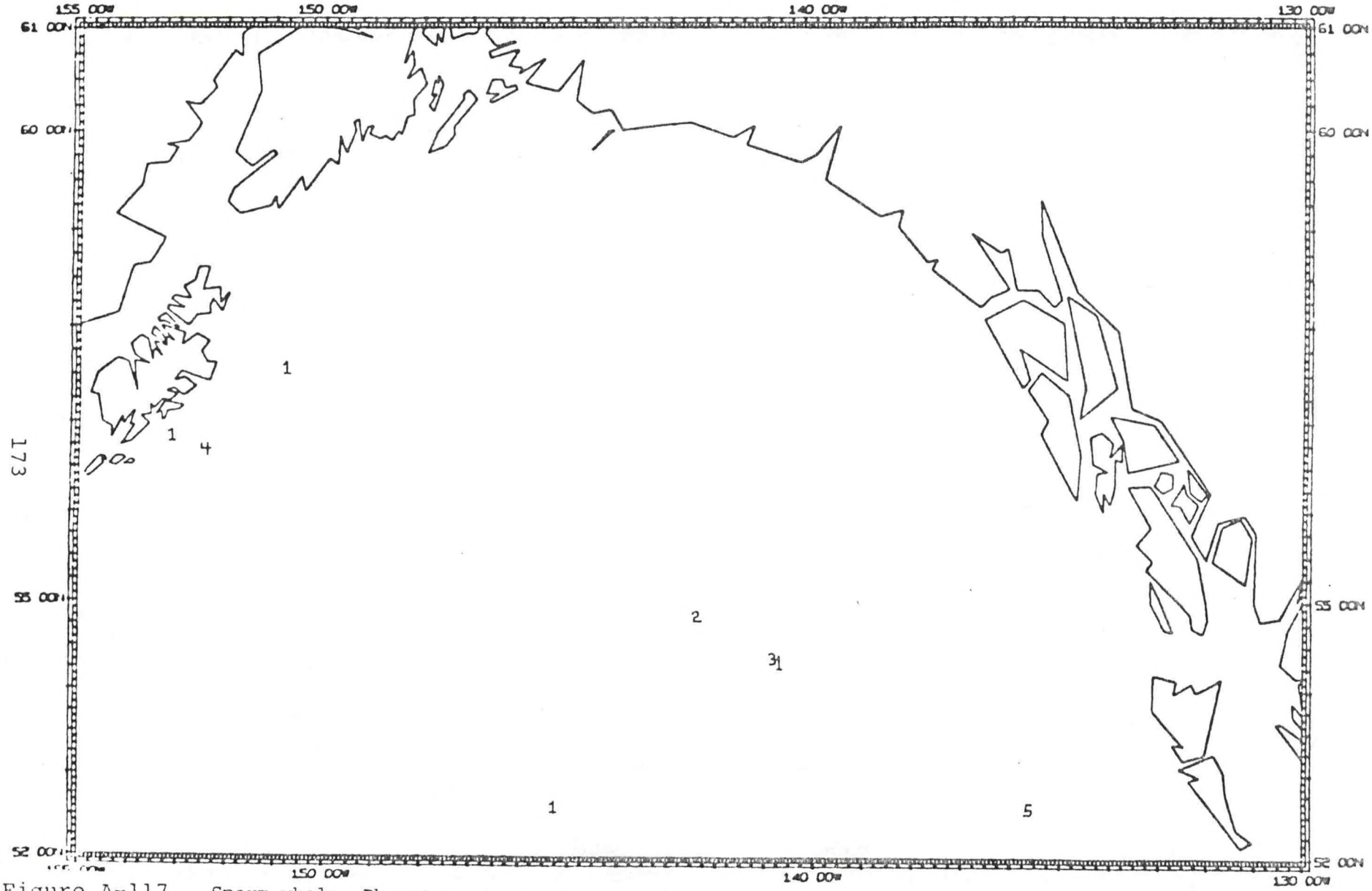

Figure A-117. Sperm whale, Physeter macrocephalus, sightings reported for June, 1958-1976.

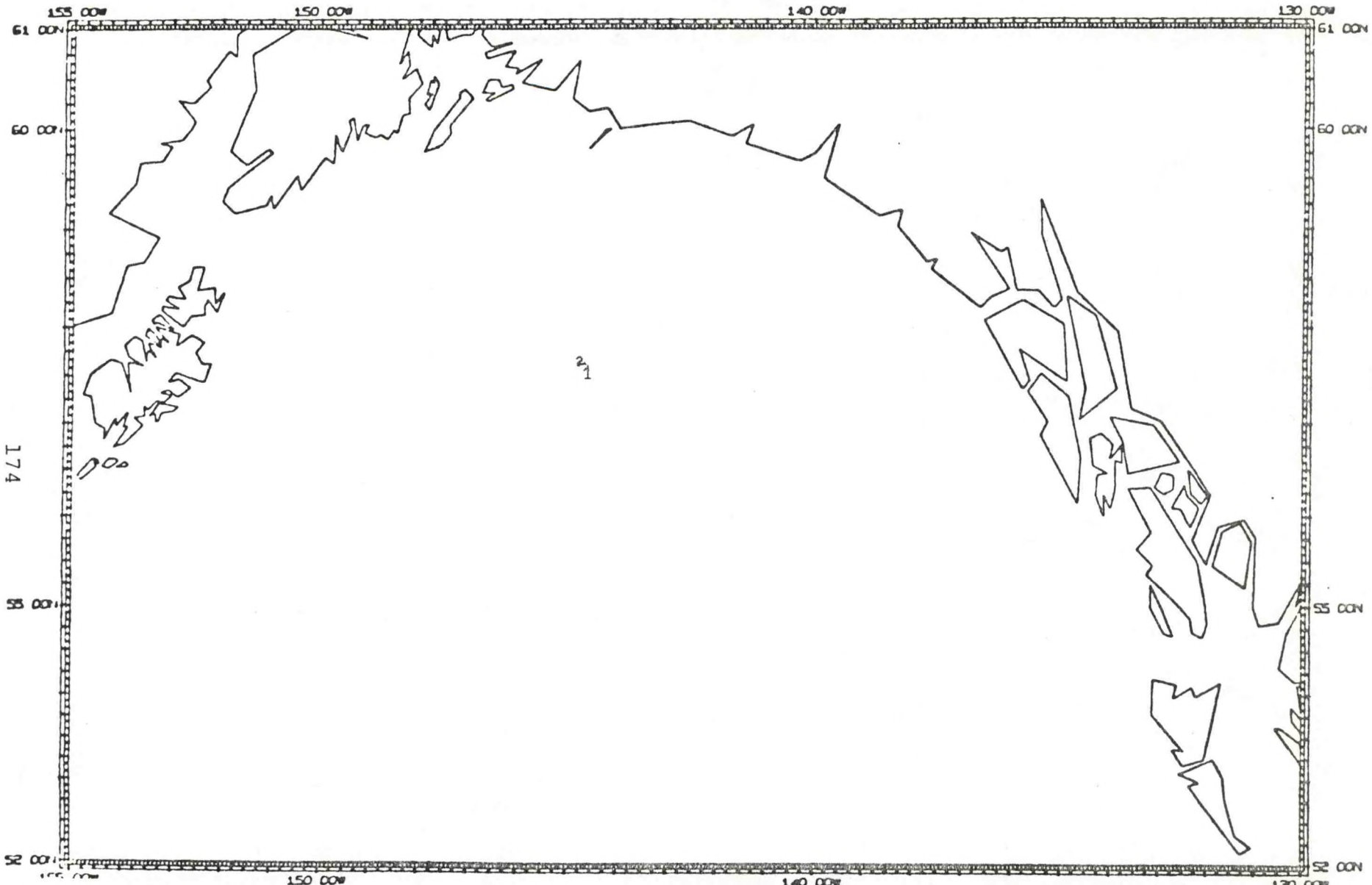

Figure A-118. Sperm whale, Physeter macrocephalus, sightings reported for August, 1958-1976.

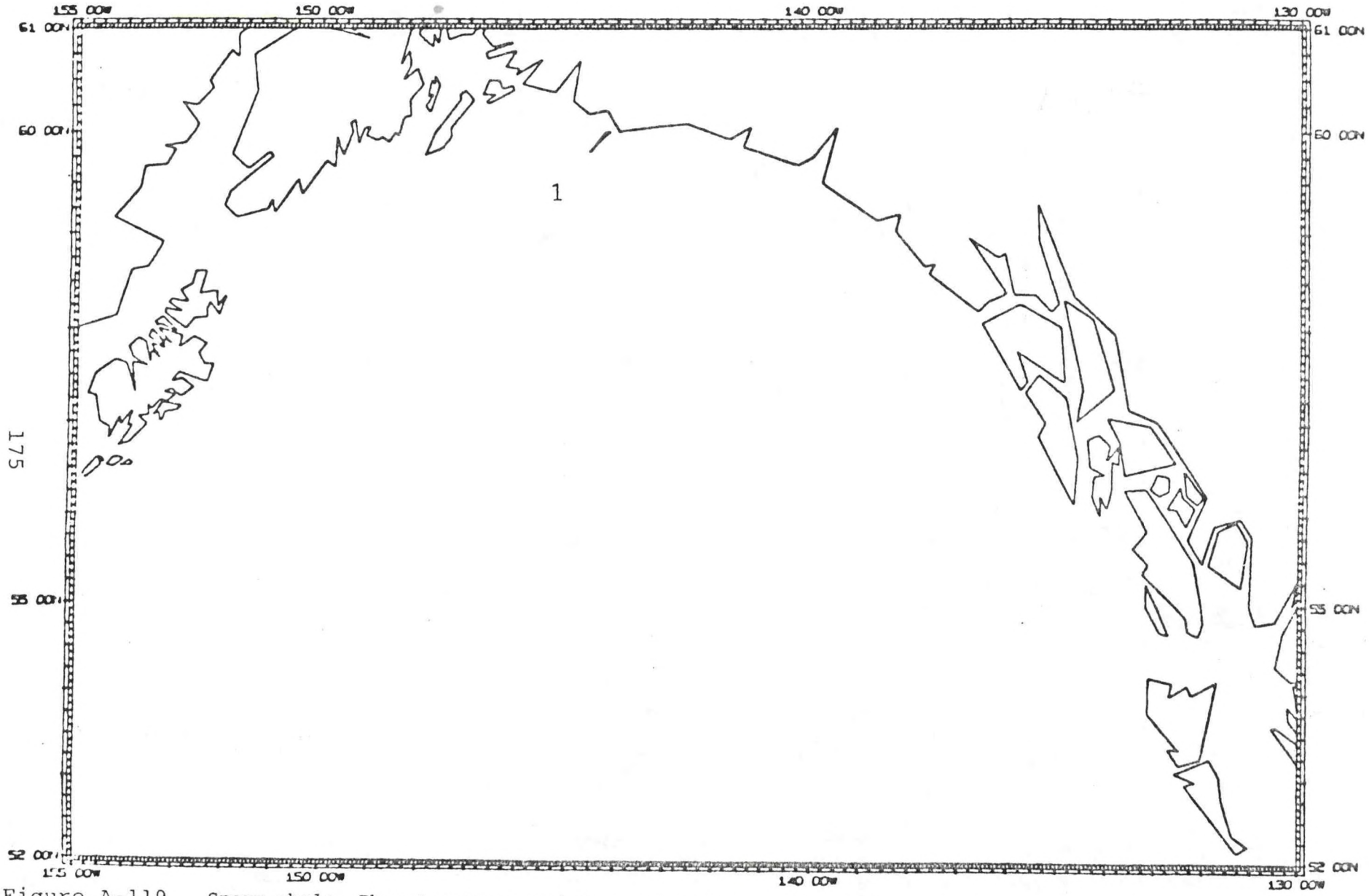

Figure A-119. Sperm whale, Physeter macrocephalus, sightings reported for November, 1958-1976.

TABLE A- 1 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
NORTHERN SEA LION (EUMETOPIAS JUBATUS)

DATE	NUMBER SEEN	LATITUDE		LONGITUDE	
23/ 2/58	3	57-00-	N	135-30-	W
24/ 2/58	1	57-00-	N	135-30-	W
9/ 3/58	2	57-00-	N	135-30-	W
1/ 4/58	1	57-32-	N	137-05-	W
8/ 4/58	3	54-55-	N	134-05-	W
8/ 4/58	1	55-20-	N	134-25-	W
8/ 4/58	1	55-37-	N	135-10-	W
8/ 4/58	2	55-37-	N	135-10-	W
17/ 4/58	1	57-06-	N	136-19-	W
20/ 4/58	1	58-40-	N	139-36-	W
21/ 4/58	1	58-58-	N	140-48-	W
21/ 4/58	1	59-20-	N	140-50-	W
21/ 4/58	2	59-18-	N	140-55-	W
21/ 4/58	2	59-22-	N	140-47-	W
22/ 4/58	1	58-31-	N	139-53-	W
27/ 4/58	7	56-58-	N	136-16-	W
2/ 5/58	1	58-19-	N	149-48-	W
2/ 5/58	1	58-20-	N	149-20-	W
2/ 5/58	1	58-15-	N	149-55-	W
3/ 5/58	1	57-51-	N	150-26-	W
3/ 5/58	6	58-08-	N	150-30-	W
3/ 5/58	3	57-56-	N	150-28-	W
3/ 5/58	1	58-10-	N	150-32-	W
3/ 5/58	1	57-51-	N	150-26-	W
3/ 5/58	1	57-45-	N	150-24-	W
4/ 5/58	1	58-06-	N	151-06-	W
7/ 5/58	1	58-20-	N	150-52-	W
7/ 5/58	1	58-20-	N	150-42-	W
7/ 5/58	2	58-20-	N	150-44-	W
7/ 5/58	8	58-20-	N	150-49-	W
7/ 5/58	1	58-20-	N	150-46-	W
11/ 5/58	1	58-30-	N	139-03-	W
13/ 5/58	1	59-24-	N	146-07-	W
14/ 5/58	1	59-26-	N	146-21-	W
14/ 5/58	1	59-26-	N	146-21-	W
16/ 5/58	1	59-52-	N	146-13-	W
16/ 5/58	2	59-46-	N	147-57-	W
17/ 5/58	35	59-46-	N	147-57-	W
17/ 5/58	50	59-46-	N	147-57-	W
19/ 5/58	1	59-10-	N	147-51-	W
22/ 5/58	50	59-51-	N	147-20-	W
22/ 5/58	1	60-06-	N	146-28-	W
23/ 5/58	1	59-37-	N	144-56-	W
25/ 5/58	1	59-37-	N	144-52-	W

TABLE A- 1 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
NORTHERN SEA LION (EUMETOPIAS JUBATUS)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
26/ 5/58	3	59-08- N	148-49- W
27/ 5/58	1	59-13- N	147-04- W
28/ 5/58	1	58-07- N	149-04- W
29/ 5/58	1	58-02- N	149-55- W
29/ 5/58	2	58-01- N	149-14- W
31/ 5/58	3	56-57- N	151-35- W
1/ 6/58	1	57-14- N	151-49- W
2/ 6/58	1	57-40- N	151-35- W
5/ 6/58	1	57-14- N	152-15- W
5/ 6/58	1	55-55- N	154-52- W
7/ 6/58	1	55-51- N	155-49- W
7/ 6/58	1	56-43- N	153-03- W
8/ 6/58	1	56-46- N	151-35- W
9/ 6/58	1	57-02- N	152-00- W
11/ 6/58	1	56-46- N	152-20- W
4/ 3/60	2	57-00- N	135-30- W
6/ 3/60	2	57-00- N	135-30- W
6/ 3/60	3	57-00- N	135-30- W
6/ 3/60	14	57-00- N	135-30- W
7/ 3/60	2	56-50- N	135-30- W
7/ 3/60	6	56-50- N	135-30- W
7/ 3/60	4	57-00- N	135-30- W
8/ 3/60	1	57-00- N	135-30- W
8/ 3/60	1	57-01- N	135-21- W
8/ 3/60	1	57-01- N	135-21- W
8/ 3/60	8	57-01- N	135-21- W
8/ 3/60	5	57-01- N	135-21- W
8/ 3/60	2	57-01- N	135-21- W
9/ 3/60	7	57-00- N	135-30- W
9/ 3/60	4	56-50- N	135-30- W
9/ 3/60	1	57-00- N	135-30- W
9/ 3/60	6	57-00- N	135-30- W
9/ 3/60	1	57-00- N	135-30- W
10/ 3/60	3	57-00- N	135-30- W
10/ 3/60	5	56-50- N	135-30- W
10/ 3/60	1	56-50- N	135-30- W
10/ 3/60	3	56-50- N	135-30- W
11/ 3/60	3	56-50- N	135-30- W
11/ 3/60	6	56-50- N	135-30- W
11/ 3/60	2	57-00- N	135-30- W
12/ 3/60	1	57-01- N	135-21- W
12/ 3/60	3	57-01- N	135-21- W
12/ 3/60	10	57-01- N	135-21- W
13/ 3/60	5	57-01- N	135-21- W

TABLE A- 1 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
NORTHERN SEA LION (EUMETOPIAS JUBATUS)

DATE	NUMBER SEEN	LATITUDE		LONGITUDE	
13/ 3/60	7	57-01-	N	135-21-	W
14/ 3/60	5	57-00-	N	135-30-	W
15/ 3/60	7	57-00-	N	135-30-	W
15/ 3/60	2	56-50-	N	135-30-	W
15/ 3/60	1	57-00-	N	135-30-	W
15/ 3/60	1	56-50-	N	135-30-	W
17/ 3/60	2	57-00-	N	135-30-	W
17/ 3/60	3	57-00-	N	135-30-	W
17/ 3/60	1	57-00-	N	135-30-	W
17/ 3/60	10	57-00-	N	135-30-	W
18/ 3/60	2	56-50-	N	135-30-	W
18/ 3/60	1	56-50-	N	135-30-	W
18/ 3/60	1	56-50-	N	135-30-	W
18/ 3/60	4	56-50-	N	135-30-	W
19/ 3/60	6	57-00-	N	135-30-	W
19/ 3/60	5	57-00-	N	135-30-	W
19/ 3/60	1	56-50-	N	135-30-	W
22/ 3/60	1	57-02-	N	135-12-	W
22/ 3/60	1	57-02-	N	135-12-	W
22/ 3/60	1	57-02-	N	135-12-	W
22/ 3/60	2	57-02-	N	135-12-	W
22/ 3/60	6	56-50-	N	135-30-	W
23/ 3/60	2	57-02-	N	135-12-	W
23/ 3/60	2	57-02-	N	135-12-	W
23/ 3/60	10	57-02-	N	135-12-	W
24/ 3/60	1	56-50-	N	135-30-	W
26/ 3/60	1	56-50-	N	135-30-	W
26/ 3/60	3	56-50-	N	135-30-	W
26/ 3/60	8	56-50-	N	135-30-	W
26/ 3/60	3	56-50-	N	135-30-	W
28/ 3/60	1	56-50-	N	135-30-	W
28/ 3/60	1	56-50-	N	135-30-	W
29/ 3/60	1	57-01-	N	135-21-	W
30/ 3/60	1	56-50-	N	135-30-	W
30/ 3/60	1	56-50-	N	135-30-	W
31/ 3/60	12	57-13-	N	136-25-	W
31/ 3/60	1	57-20-	N	136-40-	W
2/ 4/60	1	57-43-	N	136-40-	W
2/ 4/60	1	57-47-	N	136-28-	W
2/ 4/60	1	57-50-	N	136-50-	W
3/ 4/60	2	58-08-	N	136-22-	W
4/ 4/60	1	58-36-	N	139-29-	W
5/ 4/60	1	59-35-	N	144-00-	W
5/ 4/60	1	59-35-	N	142-37-	W

TABLE A- 1 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
NORTHERN SEA LION (EUMETOPIAS JUBATUS)

DATE	NUMBER SEEN	LATITUDE		LONGITUDE	
5/ 4/60	1	59-35-	N	142-37-	W
5/ 4/60	1	59-35-	N	142-37-	W
9/ 4/60	1	59-52-	N	147-47-	W
9/ 4/60	1	58-55-	N	148-38-	W
9/ 4/60	1	59-52-	N	147-47-	W
10/ 4/60	7	58-28-	N	149-19-	W
10/ 4/60	1	58-16-	N	149-34-	W
10/ 4/60	1	58-16-	N	149-34-	W
10/ 4/60	1	58-28-	N	149-19-	W
10/ 4/60	1	58-12-	N	149-42-	W
10/ 4/60	1	58-18-	N	149-29-	W
10/ 4/60	1	58-12-	N	149-42-	W
13/ 4/60	1	57-26-	N	152-09-	W
13/ 4/60	1	57-19-	N	152-18-	W
13/ 4/60	1	57-19-	N	152-18-	W
13/ 4/60	4	57-19-	N	152-18-	W
14/ 4/60	1	57-09-	N	151-10-	W
14/ 4/60	1	57-21-	N	150-48-	W
14/ 4/60	1	57-41-	N	150-10-	W
14/ 4/60	1	57-35-	N	150-21-	W
15/ 4/60	1	58-10-	N	150-18-	W
15/ 4/60	1	58-10-	N	150-18-	W
15/ 4/60	1	58-09-	N	149-58-	W
15/ 4/60	1	57-46-	N	149-53-	W
15/ 4/60	1	58-09-	N	149-58-	W
15/ 4/60	1	57-57-	N	150-13-	W
15/ 4/60	2	57-57-	N	150-13-	W
15/ 4/60	1	57-46-	N	149-53-	W
15/ 4/60	1	57-46-	N	149-53-	W
16/ 4/60	1	57-50-	N	150-25-	W
16/ 4/60	1	57-47-	N	150-43-	W
18/ 4/60	1	57-30-	N	152-00-	W
18/ 4/60	4	56-50-	N	151-39-	W
18/ 4/60	2	56-31-	N	152-18-	W
19/ 4/60	1	56-34-	N	152-24-	W
19/ 4/60	1	56-46-	N	152-31-	W
23/ 4/60	1	56-18-	N	135-29-	W
24/ 4/60	6	57-12-	N	152-53-	W
24/ 4/60	1	57-06-	N	152-48-	W
24/ 4/60	1	56-51-	N	152-33-	W
24/ 4/60	2	56-54-	N	152-35-	W
25/ 4/60	1	56-59-	N	152-39-	W
25/ 4/60	1	56-54-	N	152-39-	W
25/ 4/60	4	56-41-	N	152-36-	W

TABLE A- 1 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
NORTHERN SEA LION (EUMETOPIAS JUBATUS)

DATE	NUMBER SEEN	LATITUDE		LONGITUDE	
25/ 4/60	6	56-43-	N	152-37-	W
26/ 4/60	3	56-44-	N	152-32-	W
27/ 4/60	40	56-45-	N	152-33-	W
28/ 4/60	1	56-59-	N	152-15-	W
28/ 4/60	1	58-50-	N	140-24-	W
28/ 4/60	1	58-57-	N	141-07-	W
29/ 4/60	1	59-37-	N	144-25-	W
1/ 5/60	1	59-28-	N	146-29-	W
1/ 5/60	2	59-26-	N	146-25-	W
3/ 5/60	4	57-03-	N	151-28-	W
3/ 5/60	2	59-18-	N	147-08-	W
4/ 5/60	1	58-16-	N	150-44-	W
4/ 5/60	1	58-23-	N	150-20-	W
4/ 5/60	1	58-06-	N	151-25-	W
4/ 5/60	1	58-03-	N	151-38-	W
4/ 5/60	1	58-03-	N	151-35-	W
4/ 5/60	200	57-02-	N	152-40-	W
4/ 5/60	1	58-47-	N	148-53-	W
4/ 5/60	1	58-27-	N	150-53-	W
5/ 5/60	9	56-37-	N	152-22-	W
8/ 5/60	1	58-02-	N	150-55-	W
8/ 5/60	1	58-15-	N	150-58-	W
8/ 5/60	1	58-13-	N	151-20-	W
8/ 5/60	1	58-12-	N	151-24-	W
8/ 5/60	1	58-14-	N	150-55-	W
8/ 5/60	3	58-03-	N	151-34-	W
8/ 5/60	1	58-14-	N	151-05-	W
8/ 5/60	1	58-13-	N	150-53-	W
8/ 5/60	1	57-37-	N	150-34-	W
8/ 5/60	2	58-09-	N	151-26-	W
8/ 5/60	2	58-03-	N	151-36-	W
8/ 5/60	3	58-14-	N	151-05-	W
9/ 5/60	1	58-09-	N	150-32-	W
9/ 5/60	4	57-43-	N	151-38-	W
9/ 5/60	2	57-20-	N	150-24-	W
9/ 5/60	2	57-31-	N	151-27-	W
9/ 5/60	1	57-20-	N	150-24-	W
10/ 5/60	2	56-55-	N	151-42-	W
10/ 5/60	4	56-55-	N	151-42-	W
10/ 5/60	2	56-55-	N	151-42-	W
10/ 5/60	2	56-55-	N	151-42-	W
10/ 5/60	2	56-55-	N	151-42-	W
10/ 5/60	1	56-55-	N	151-42-	W
11/ 5/60	1	58-35-	N	151-10-	W

TABLE A- 1 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
NORTHERN SEA LION (EUMETOPIAS JUBATUS)

DATE	NUMBER SEEN	LATITUDE		LONGITUDE	
11/ 5/60	1	56-59-	N	151-39-	W
11/ 5/60	7	56-58-	N	151-40-	W
11/ 5/60	1	58-30-	N	151-24-	W
12/ 5/60	200	56-22-	N	153-03-	W
12/ 5/60	1	56-44-	N	152-34-	W
12/ 5/60	1	58-17-	N	150-10-	W
12/ 5/60	1	56-48-	N	152-28-	W
13/ 5/60	3	56-31-	N	153-07-	W
13/ 5/60	1	58-13-	N	150-23-	W
13/ 5/60	1	56-31-	N	153-07-	W
13/ 5/60	1	56-55-	N	153-17-	W
17/ 5/60	1	56-52-	N	151-50-	W
18/ 5/60	1	57-27-	N	152-17-	W
18/ 5/60	6	57-37-	N	152-05-	W
21/ 5/60	20	58-10-	N	152-15-	W
21/ 5/60	1	58-34-	N	151-02-	W
21/ 5/60	175	58-22-	N	151-47-	W
23/ 5/60	1	58-00-	N	151-23-	W
23/ 5/60	40	58-23-	N	151-47-	W
23/ 5/60	1	58-01-	N	151-27-	W
24/ 5/60	1	58-07-	N	150-32-	W
25/ 5/60	1	58-12-	N	150-37-	W
25/ 5/60	1	58-11-	N	150-36-	W
25/ 5/60	1	58-07-	N	150-49-	W
25/ 5/60	1	58-04-	N	150-45-	W
25/ 5/60	1	58-11-	N	150-40-	W
25/ 5/60	1	58-11-	N	150-40-	W
25/ 5/60	1	58-10-	N	150-37-	W
25/ 5/60	1	58-10-	N	150-37-	W
26/ 5/60	1	58-15-	N	151-15-	W
26/ 5/60	50	58-21-	N	151-44-	W
27/ 5/60	1	58-15-	N	151-35-	W
28/ 5/60	1	58-13-	N	151-15-	W
28/ 5/60	1	58-17-	N	151-38-	W
28/ 5/60	1	58-09-	N	151-16-	W
28/ 5/60	1	58-14-	N	151-13-	W
28/ 5/60	1	58-14-	N	151-10-	W
28/ 5/60	1	58-09-	N	151-16-	W
28/ 5/60	1	58-09-	N	151-16-	W
28/ 5/60	1	58-10-	N	151-22-	W
29/ 5/60	2	58-13-	N	151-38-	W
29/ 5/60	1	58-14-	N	151-39-	W
29/ 5/60	2	58-14-	N	151-39-	W
29/ 5/60	1	57-53-	N	151-53-	W

TABLE A- 1 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
NORTHERN SEA LION (EUMETOPIAS JUBATUS)

DATE	NUMBER SEEN	LATITUDE		LONGITUDE	
31/ 5/60	5	57-37-	N	152-05-	W
31/ 5/60	1	57-32-	N	151-54-	W
1/ 6/60	1	57-41-	N	152-10-	W
2/ 6/60	1	56-21-	N	153-50-	W
2/ 6/60	1	56-33-	N	153-27-	W
31/ 1/61	2	53-57-	N	130-58-	W
1/ 3/61	1	53-56-	N	130-30-	W
5/ 3/61	1	55-13-	N	133-05-	W
12/ 3/61	75	52-47-	N	131-18-	W
13/ 3/61	1	52-04-	N	130-53-	W
5/ 5/62	1	56-04-	N	134-34-	W
12/ 5/62	1	56-09-	N	154-15-	W
12/ 5/62	1	55-46-	N	155-26-	W
12/ 5/62	1	55-47-	N	155-24-	W
12/ 5/62	1	56-30-	N	153-43-	W
12/ 5/62	2	56-24-	N	153-45-	W
12/ 5/62	1	56-23-	N	153-45-	W
12/ 5/62	2	56-16-	N	153-47-	W
11/ 9/63	1	57-55-	N	150-47-	W
19/ 5/68	1	55-58-	N	135-12-	W
19/ 5/68	1	56-11-	N	135-31-	W
19/ 5/68	1	55-28-	N	134-12-	W
19/ 5/68	2	56-20-	N	135-32-	W
19/ 5/68	1	55-30-	N	134-20-	W
19/ 5/68	1	56-17-	N	135-32-	W
19/ 5/68	2	56-36-	N	135-33-	W
19/ 5/68	1	56-41-	N	135-34-	W
20/ 5/68	1	57-00-	N	135-50-	W
20/ 5/68	1	57-07-	N	137-01-	W
23/ 5/68	1	57-54-	N	149-30-	W
25/ 5/68	1	57-31-	N	151-53-	W
27/ 5/68	1	56-19-	N	152-48-	W
28/ 5/68	1	56-32-	N	152-05-	W
28/ 5/68	1	56-32-	N	152-03-	W
29/ 5/68	1	57-07-	N	151-22-	W
31/ 5/68	1	56-54-	N	152-36-	W
31/ 5/68	50	57-30-	N	152-14-	W
31/ 5/68	150	57-32-	N	152-12-	W
1/ 6/68	1	55-59-	N	153-37-	W
1/ 6/68	1	56-48-	N	152-44-	W
1/ 6/68	9	56-03-	N	153-30-	W
1/ 6/68	1	56-02-	N	153-34-	W
1/ 6/68	1	56-26-	N	153-02-	W
1/ 6/68	1	56-47-	N	152-46-	W

TABLE A- 1 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
NORTHERN SEA LION (EUMETOPIAS JUBATUS)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
1/ 6/68	1	56-48- N	152-45- W
2/ 6/68	1	55-29- N	155-49- W
2/ 6/68	1	55-35- N	155-26- W
2/ 6/68	1	55-28- N	155-45- W
2/ 6/68	2	55-29- N	155-41- W
19/ 8/68	1	56-04- N	155-13- W
19/ 8/68	1	56-05- N	155-04- W
20/ 8/68	1	57-13- N	152-14- W
20/ 8/68	1	56-49- N	152-13- W
20/ 8/68	2	56-47- N	152-15- W
20/ 8/68	1	56-53- N	152-13- W
20/ 8/68	1	56-54- N	152-13- W
20/ 8/68	1	56-43- N	152-18- W
20/ 8/68	1	56-47- N	152-16- W
20/ 8/68	1	57-05- N	152-12- W
22/ 8/68	1	57-48- N	151-14- W
2/ 2/75	1	59-34- N	142-13- W
3/ 2/75	3	58-59- N	142-13- W
4/ 2/75	1	59-46- N	141-59- W
5/ 2/75	1	59-46- N	141-59- W
5/ 2/75	1 T	59-45- N	142-04- W
7/ 2/75	1	60-18- N	146-48- W
8/ 2/75	1	59-40- N	149-21- W
12/ 2/75	1	59-33- N	144-55- W
12/ 2/75	2	59-31- N	144-32- W
21/ 2/75	1	60-02- N	144-48- W
25/ 2/75	1	60-36- N	146-40- W
26/ 2/75	3	60-28- N	146-54- W
27/ 2/75	7	59-37- N	144-04- W
27/ 2/75	2	59-37- N	143-59- W
28/ 2/75	6	59-38- N	142-10- W
28/ 2/75	2 T	59-56- N	142-39- W
10/ 4/75	12	59-27- N	146-00- W
22/ 4/75	1	58-20- N	151-17- W
27/ 4/75	2	59-35-30 N	143-38-00 W
28/ 4/75	1	59-37- N	143-40- W
29/ 4/75	1 T	59-25- N	143-56- W
2/ 5/75	5	60-13- N	146-45- W
2/ 5/75	2	60-29- N	146-56- W
2/ 5/75	1	58-09- N	151-53- W
2/ 5/75	3	58-13- N	151-39- W
3/ 5/75	1	58-05-36 N	151-26-30 W
3/ 5/75	1	59-07- N	143-04- W
4/ 5/75	1	59-40- N	142-50- W

TABLE A- 1 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
NORTHERN SEA LION (EUMETOPIAS JUBATUS)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
4/ 5/75	1	58-00- N	150-45- W
5/ 5/75	1	57-49- N	151-23- W
6/ 5/75	1	59-01- N	151-36- W
6/ 5/75	2	58-25- N	148-10- W
6/ 5/75	2	58-25- N	148-10- W
7/ 5/75	1	59-51- N	149-31- W
7/ 5/75	1	59-51- N	149-31- W
7/ 5/75	1	59-51- N	149-31- W
7/ 5/75	6	58-25- N	148-08- W
8/ 5/75	1	60-10- N	147-38- W
9/ 5/75	1	59-11- N	146-30- W
10/ 5/75	1	59-46-36N	141-57-10W
10/ 5/75	1	59-45-48N	141-58- W
10/ 5/75	1	60-35- N	146-12- W
10/ 5/75	2	60-35- N	146-18- W
10/ 5/75	2	60-35- N	146-20- W
10/ 5/75	1	60-31- N	146-40- W
12/ 5/75	2	60-35- N	146-16- W
12/ 5/75	1	59-44- N	141-33- W
12/ 5/75	2	59-58- N	149-23- W
12/ 5/75	1	57-50- N	144-01- W
13/ 5/75	3	60-06-36N	147-29-30W
13/ 5/75	5	60-09-12N	147-27-00W
13/ 5/75	1	58-24-54N	151-18- W
15/ 5/75	2	58-20- N	151-44- W
15/ 5/75	1	58-31- N	151-30-30W
15/ 5/75	1	58-25-42N	151-33-12W
15/ 5/75	1	58-31-48N	151-14-12W
15/ 5/75	1	59-34- N	149-31- W
15/ 5/75	-0	60-20- N	146-50- W
16/ 5/75	1 T	60-32- N	146-34-30W
16/ 5/75	3	55-24- N	155-24- W
16/ 5/75	20	60-07- N	147-35- W
16/ 5/75	2	60-08- N	147-30- W
16/ 5/75	1	58-17- N	151-34-24W
18/ 5/75	1	58-39-12N	151-14- W
18/ 5/75	4	60-50- N	147-10- W
18/ 5/75	4	60-02-42N	147-08-30W
19/ 5/75	3	58-38-42N	151-07- W
19/ 5/75	2	58-33- N	151-20-48W
19/ 5/75	1	58-33- N	151-22- W
20/ 5/75	1	58-36-30N	150-51-48W
20/ 5/75	1	58-34- N	151-22- W
28/ 5/75	1	60-05- N	147-38- W

TABLE A- 1 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
NORTHERN SEA LION (EUMETOPIAS JUBATUS)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
28/ 5/75	1	60-04-00N	146-51-30W
28/ 5/75	1	59-58-30N	147-10- W
29/ 5/75	6	56-45- N	155-56- W
29/ 5/75	2	56-01- N	155-56- W
1/ 6/75	2	60-04-12N	147-38-00W
10/ 6/75	2	60-18-54N	150-47-30W
13/ 7/75	6	56-04- N	155-40- W
14/ 7/75	25	55-56- N	155-14- W
14/ 7/75	2	55-48- N	155-14- W
14/ 7/75	20	55-51- N	155-16- W
14/ 7/75	2	56-55- N	155-59- W
16/ 7/75	1	56-49- N	152-22- W
19/ 7/75	1	58-09- N	151-15- W
10/ 8/75	1	59-06- N	149-45- W
10/ 8/75	1	59-23- N	149-37- W
10/ 8/75	2	59-34- N	149-30- W
11/ 8/75	4	58-06- N	150-08- W
18/ 8/75	1	59-36- N	151-24- W
2/ 9/75	2	57-41- N	152-07- W
3/ 9/75	4	56-46- N	152-10- W
3/ 9/75	3	57-37- N	152-01- W
3/ 9/75	2	57-41- N	152-06- W
4/ 9/75	1	60-07- N	147-52- W
2/10/75	2	56-13- N	152-25-30W
15/10/75	1	58-17- N	151-24- W
24/10/75	1	59-12- N	147-39- W
25/10/75	1	59-11- N	147-36- W
25/10/75	1	59-11- N	147-36- W
2/11/75	6	59-43- N	144-36-18W
3/11/75	1	59-45- N	144-38- W
6/11/75	1	59-34- N	142-11- W
6/11/75	1	59-34- N	142-12- W
27/11/75	3	59-36- N	142-40- W
28/11/75	1	59-30- N	146-54- W
29/11/75	1	60-15- N	146-50- W
1/12/75	2	58-59- N	148-39- W
2/12/75	4	59-55- N	149-15- W
2/12/75	45	59-55- N	149-15- W
13/ 4/76	4	59-57-42N	147-49-48W
15/ 4/76	1	59-44-48N	149-25-12W
6/ 6/76	1	56-41-00N	153-28-48W
6/ 6/76	4	56-41-42N	153-27-30W
6/ 6/76	1	56-01-42N	155-05-00W
6/ 6/76	3	56-01-48N	155-04-00W

TABLE A- 1 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
NORTHERN SEA LION (EUMETOPIAS JUBATUS)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
6/ 6/76	1	56-01-54N	155-03-48W
6/ 6/76	1	56-02-00N	155-03-42W
6/ 6/76	1	56-01-12N	155-03-24W
6/ 6/76	3	56-01-12N	155-03-00W
6/ 6/76	1	56-03-18N	154-54-48W
6/ 6/76	3	56-03-24N	154-57-30W
6/ 6/76	1	56-04-24N	154-41-42W
6/ 6/76	1	57-38-24N	152-03-06W
19/ 6/76	2	56-01-00N	154-59-00W
20/ 6/76	4	56-55-12N	153-02-00W

TABLE A- 2 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
NORTHERN FUR SEAL (CALLORHINUS URSINUS)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
30/ 1/75	1 T	52-49- N	136-08- W
30/ 1/75	1	52-49- N	136-08- W
7/ 2/75	3 T	60-21- N	146-53- W
10/ 2/75	1	58-15- N	143-23- W
10/ 2/75	1	58-16- N	143-29- W
12/ 2/75	1	59-33- N	144-38- W
19/ 2/75	2 T	59-50- N	143-52- W
26/ 2/75	65 T	60-39- N	146-40- W
3/ 3/75	1	54-53- N	140-47- W
24/ 4/75	1	54-03- N	134-20- W
24/ 4/75	1	54-00- N	134-10- W
25/ 4/75	3	58-12- N	136-12- W
1/ 5/75	1	54-25- N	132-30- W
1/ 5/75	1 T	54-20- N	132-00- W
2/ 5/75	1	58-38- N	140-05- W
2/ 5/75	2	58-46- N	142-11- W
2/ 5/75	1	58-39- N	140-20- W
3/ 5/75	1 T	59-37-36N	148-07-42W
4/ 5/75	1	59-09- N	141-37-30W
4/ 5/75	3	59-00- N	142-14- W
5/ 5/75	2	59-09- N	145-36- W
5/ 5/75	2	59-11-30N	145-45- W
6/ 5/75	1 T	59-30- N	149-15- W
10/ 5/75	2 T	53-45- N	135-30- W
11/ 5/75	1	56-38- N	141-48- W
12/ 5/75	1	57-34- N	143-46- W
13/ 5/75	1	59-07- N	142-15- W
13/ 5/75	1	59-32- N	142-05- W
14/ 5/75	1	58-22- N	147-05- W
15/ 5/75	1	58-31- N	151-20-06W
15/ 5/75	1	58-31- N	151-30-30W
16/ 5/75	1	55-58- N	152-38- W
18/ 5/75	1	57-50- N	152-18- W
18/ 5/75	2	58-39-12N	151-14- W
19/ 5/75	1	58-33- N	151-20-48W
30/ 5/75	1	59-27- N	146-00- W
10/ 6/75	1 T	57-00- N	149-42- W
19/ 6/75	1 T	56-27- N	151-49- W
19/ 6/75	1 T	56-20- N	152-00- W
19/ 6/75	1 T	56-15- N	152-09- W
19/ 6/75	1 T	58-03- N	150-03- W
19/ 6/75	2	58-00- N	150-07- W
19/ 6/75	1 T	56-30- N	151-44- W
20/ 6/75	1	57-41- N	144-34- W

TABLE A- 2 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
NORTHERN FUR SEAL (CALLORHINUS URSINUS)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
20/ 6/75	2	59-01- N	147-34- W
20/ 6/75	1	59-05- N	147-35- W
22/ 6/75	1	52-18- N	133-56- W
22/ 6/75	1	52-44- N	134-44- W
13/ 7/75	2	56-03- N	155-40- W
13/ 7/75	1	56-13- N	155-30- W
21/ 7/75	1	57-51- N	151-30- W
8/ 8/75	1	54-22- N	138-07- W
11/ 8/75	1 T	57-58- N	150-11- W
24/ 8/75	1	55-10- N	137-00- W
22/10/75	3	59-50- N	149-31- W
3/12/75	1	57-33- N	142-24- W
4/12/75	1	56-40- N	141-05- W
9/ 4/76	1	59-27-30N	152-05-24W
20/ 4/76	2	58-54-12N	145-17-42W
20/ 4/76	2	59-02-12N	145-19-48W
20/ 4/76	2	59-04-42N	145-19-48W
20/ 4/76	2	59-09-24N	145-19-48W
20/ 4/76	2	59-10-18N	145-19-48W
21/ 4/76	2	59-11-30N	144-44-54W
21/ 4/76	1	59-09-18N	144-46-48W
21/ 4/76	1	59-05-24N	144-50-54W
21/ 4/76	1	58-53-12N	145-00-36W
19/ 6/76	1	54-01-48N	154-19-00W

TABLE A- 3 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
HARBOR SEAL (PHOCA VITULINA)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
14/ 2/58	1	55-30- N	135-10- W
22/ 2/58	1	57-00- N	135-30- W
23/ 2/58	1	57-00- N	135-30- W
3/ 4/58	1	58-48- N	140-00- W
3/ 4/58	1	58-50- N	140-05- W
7/ 5/58	1	57-55- N	152-04- W
7/ 5/58	1	58-25- N	150-24- W
19/ 5/58	1	59-28- N	146-59- W
20/ 5/58	1	60-19- N	146-50- W
24/ 5/58	12	59-56- N	148-14- W
4/ 6/58	1	57-17- N	151-00- W
7/ 6/58	1	56-53- N	153-00- W
9/ 3/60	1	57-00- N	135-30- W
9/ 3/60	1	57-00- N	135-30- W
9/ 3/60	1	57-00- N	135-30- W
11/ 3/60	1	56-50- N	135-30- W
12/ 3/60	1	57-01- N	135-21- W
14/ 3/60	2	57-00- N	135-30- W
15/ 3/60	1	57-00- N	135-30- W
22/ 3/60	1	56-50- N	135-30- W
22/ 3/60	1	56-50- N	135-30- W
26/ 3/60	1	57-01- N	135-21- W
30/ 3/60	1	56-50- N	135-30- W
30/ 3/60	1	56-50- N	135-30- W
31/ 3/60	1	57-20- N	136-40- W
3/ 4/60	1	58-08- N	136-22- W
13/ 4/60	1	57-26- N	152-09- W
15/ 4/60	1	58-09- N	149-58- W
15/ 4/60	1	57-57- N	150-13- W
16/ 4/60	1	57-40- N	151-02- W
16/ 4/60	1	57-40- N	151-02- W
16/ 4/60	1	57-38- N	151-41- W
18/ 4/60	1	57-38- N	152-10- W
24/ 4/60	1	57-06- N	152-48- W
24/ 4/60	1	57-06- N	152-48- W
25/ 4/60	1	56-59- N	152-39- W
26/ 4/60	1	56-38- N	152-31- W
3/ 5/60	1	57-36- N	151-58- W
3/ 5/60	1	57-38- N	152-05- W
3/ 5/60	1	57-01- N	152-21- W
4/ 5/60	1	57-02- N	152-40- W
5/ 5/60	1	57-08- N	152-48- W
8/ 5/60	1	57-30- N	152-15- W
8/ 5/60	1	57-44- N	152-05- W

TABLE A- 3 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
HARBOR SEAL (PHOCA VITULINA)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
8/ 5/60	1	57-30- N	152-15- W
8/ 5/60	1	58-00- N	151-05- W
12/ 5/60	1	56-22- N	153-03- W
13/ 5/60	1	56-55- N	153-17- W
13/ 5/60	1	56-55- N	153-17- W
13/ 5/60	1	56-20- N	153-04- W
17/ 5/60	2	57-13- N	153-02- W
17/ 5/60	2	57-03- N	153-18- W
17/ 5/60	2	57-03- N	153-18- W
17/ 5/60	1	56-55- N	153-21- W
17/ 5/60	1	56-55- N	153-21- W
17/ 5/60	1	56-53- N	153-10- W
17/ 5/60	1	56-55- N	153-21- W
21/ 5/60	2	58-10- N	152-15- W
24/ 5/60	1	58-45- N	150-49- W
26/ 5/60	1	58-15- N	151-28- W
27/ 5/60	1	58-14- N	151-16- W
28/ 5/60	1	58-10- N	151-22- W
29/ 5/60	1	58-06- N	151-12- W
11/ 2/61	1	53-52- N	130-53- W
5/ 3/61	1	55-13- N	133-05- W
12/ 5/62	1	56-28- N	153-43- W
12/ 5/62	1	56-30- N	153-43- W
10/ 9/63	1	56-55- N	155-56- W
19/ 5/68	1	56-56- N	135-32- W
25/ 5/68	1	57-25- N	152-08- W
25/ 5/68	1	57-21- N	152-11- W
25/ 5/68	1	57-23- N	152-09- W
31/ 5/68	1	57-23- N	152-20- W
31/ 5/68	3	57-19- N	152-26- W
31/ 5/68	1	57-17- N	152-29- W
31/ 5/68	1	57-18- N	152-28- W
31/ 5/68	1	57-17- N	152-30- W
31/ 5/68	1	57-05- N	152-34- W
31/ 5/68	1	57-16- N	152-30- W
31/ 5/68	1	57-15- N	152-31- W
31/ 5/68	1	57-09- N	152-34- W
13/ 5/75	35	60-15-42N	147-20-48W
19/ 5/75	6	58-20- N	152-10- W
7/ 8/75	1	60-24- N	152-10- W
23/ 8/75	1	59-35- N	151-25- W
8/ 9/75	1	58-15- N	137-10- W
2/10/75	1 T	56-13- N	152-25- W
14/10/75	1	58-54- N	152-53- W

TABLE A- 3 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
HARBOR SEAL (PHOCA VITULINA)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
30/10/75	1	60-03- N	144-47- W
9/ 4/76	1	59-34-00N	151-34-00W
9/ 4/76	1	59-36-30N	151-19-00W

TABLE A- 4 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
NORTHERN ELEPHANT SEAL (MIROUNGA ANGUSTIROSTRIS)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
5/ 5/62	1	56-04- N	134-31- W
29/ 5/75	1	59-21-00N	145-51-24W

TABLE A- 5 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
GRAY WHALE (ESCHRICHTIUS ROBUSTUS)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
21/ 4/58	2	59-34- N	140-03- W
21/ 4/58	3	59-33- N	140-10- W
3/ 5/58	1	58-20- N	150-34- W
21/ 5/74	1 T	59-24- N	153-21- W
1/ 5/75	3 T	58-07- N	152-07- W
1/ 5/75	1 T	57-51- N	152-20- W
7/ 4/76	2	57-45-54N	152-10-00W
7/ 4/76	2	57-45-30N	152-03-00W

TABLE A- 6 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
MINKE WHALE (BALAENOPTERA ACUTOROSTRATA)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
6/ 3/60	2	57-00- N	135-00- W
21/ 3/60	1	56-50- N	135-30- W
22/ 3/60	1	57-02- N	135-30- W
23/ 3/60	1	57-02- N	135-12- W
23/ 3/60	1	57-02- N	135-12- W
20/ 5/60	1	58-00- N	150-17- W
21/ 5/60	1	58-15- N	151-57- W
21/ 5/60	1	58-13- N	151-57- W
25/ 5/60	1	58-08- N	150-40- W
1/ 6/60	1	57-44- N	152-23- W
1/ 6/60	1	57-43- N	152-21- W
20/ 9/62	1	56-40- N	154-32- W
20/ 9/62	1	56-40- N	154-31- W
18/ 5/68	1	54-34- N	132-51- W
19/ 5/68	1	56-33- N	135-33- W
19/ 5/68	1	56-46- N	135-34- W
21/ 5/68	1	57-32- N	139-52- W
21/ 5/68	1	57-36- N	140-12- W
21/ 5/68	1	57-34- N	140-48- W
23/ 5/68	1	58-03- N	149-11- W
25/ 5/68	1	57-33- N	151-58- W
26/ 5/68	3	56-54- N	151-47- W
26/ 5/68	1	56-36- N	152-12- W
27/ 5/68	1	56-23- N	152-48- W
31/ 5/68	1	57-13- N	152-33- W
31/ 5/68	1	57-40- N	152-08- W
31/ 5/68	1	56-53- N	152-36- W
31/ 5/68	1	57-10- N	152-34- W
1/ 6/68	1	56-20- N	153-04- W
1/ 6/68	1	55-54- N	154-13- W
1/ 6/68	1	55-58- N	153-38- W
1/ 6/68	1	56-16- N	153-04- W
22/ 8/68	1	57-52- N	151-55- W
2/ 2/75	1	59-44- N	142-04- W
19/ 4/75	1 T	58-10-12N	151-05-48W
13/ 5/75	1	60-16- N	147-17- W
13/ 5/75	3 T	60-11-42N	147-23-42W
13/ 5/75	1	60-08-48N	147-27-30W
13/ 5/75	1	60-06-36N	147-29-30W
18/ 5/75	1	60-08- N	147-24- W
23/ 5/75	4	60-22-18N	147-13-48W
27/ 5/75	1	60-34-06N	146-37-36W
2/ 6/75	1	60-08-30N	147-25-06W
10/ 6/75	1	59-36-48N	152-14-00W

TABLE A- 6 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
MINKE WHALE (BALAENOPTERA ACUTOROSTRATA)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
20/ 6/75	1	59-40- N	149-25- W
31/ 7/75	1 T	60-35- N	151-38- W
8/ 8/75	1	53-56- N	137-14- W
11/ 8/75	1	58-02- N	150-08- W
18/ 8/75	1	59-36- N	151-24- W
20/ 8/75	2 T	59-39- N	151-47- W
22/ 8/75	2	59-36- N	151-24- W
22/ 8/75	2	59-40- N	151-57- W
23/ 8/75	1	59-37- N	151-58- W
23/ 8/75	1 T	59-35- N	151-45- W
23/ 8/75	1	59-30-42N	151-48-36W
30/ 9/75	2	56-29- N	133-55-30W
27/11/75	7	59-27-12N	145-11-24W
17/ 4/76	1	60-21-54N	146-52-54W
22/ 4/76	1	59-14-36N	143-59-06W
29/ 4/76	1	58-22-30N	138-22-30W

TABLE A- 7 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
SEI WHALE (BALAENOPTERA BOREALIS)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
4/ 4/58	2	57-30- N	137-55- W
17/ 4/58	1	56-58- N	135-44- W
5/ 6/58	2	55-57- N	154-37- W
5/ 6/58	4	56-02- N	154-08- W
18/ 4/60	1	57-15- N	151-50- W
23/ 5/60	1	57-44- N	152-14- W
6/ 5/62	2	56-10- N	140-38- W
7/ 5/62	4	56-13- N	145-32- W
12/ 5/62	1	55-45- N	155-29- W
26/ 5/68	6	56-29- N	151-59- W
15/ 5/75	2 T	60-25- N	146-55- W

TABLE A- 8 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
FIN WHALE (BALAENOPTERA PHYSALUS)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
9/ 3/58	1	57-00- N	135-30- W
4/ 4/58	1	58-15- N	138-40- W
5/ 4/58	3	57-30- N	137-55- W
6/ 4/58	1	55-42- N	135-55- W
7/ 4/58	2	55-05- N	135-10- W
19/ 4/58	2	58-26- N	139-00- W
19/ 4/58	1	58-10- N	139-15- W
1/ 5/58	2	58-26- N	145-11- W
1/ 5/58	1	58-29- N	147-05- W
18/ 5/58	2	58-55- N	149-52- W
18/ 5/58	1	58-55- N	149-52- W
18/ 5/58	1	58-55- N	149-45- W
8/ 6/58	3	56-42- N	152-16- W
8/ 5/60	2	57-30- N	152-15- W
8/ 5/60	1	56-55- N	151-42- W
10/ 5/60	1	56-55- N	151-42- W
11/ 5/60	3	58-15- N	151-58- W
12/ 5/60	1	58-09- N	150-27- W
19/ 5/60	1	58-06- N	150-47- W
21/ 5/60	2	58-33- N	151-05- W
21/ 5/60	1	58-37- N	151-13- W
24/ 5/60	3	58-08- N	150-31- W
25/ 5/60	2	58-06- N	150-44- W
25/ 5/60	3	58-10- N	150-37- W
25/ 5/60	4	58-10- N	150-37- W
25/ 5/60	1	58-08- N	150-40- W
25/ 5/60	1	58-12- N	150-37- W
26/ 5/60	2	58-15- N	151-38- W
27/ 5/60	1	58-15- N	151-35- W
27/ 5/60	1	58-14- N	151-16- W
29/ 5/60	2	58-06- N	151-12- W
29/ 5/60	1	57-31- N	151-40- W
1/ 6/60	1	57-39- N	151-56- W
7/ 5/62	1	56-13- N	145-35- W
7/ 5/62	1	56-13- N	145-12- W
11/10/62	1	56-28- N	148-39- W
18/ 5/68	2	54-33- N	132-49- W
25/ 5/68	1	57-26- N	150-22- W
11/ 5/74	2	57-31- N	147-00- W
11/ 5/74	4	57-28- N	146-36- W
11/ 5/74	3	57-42- N	147-30- W
14/ 5/75	3 T	59-58- N	145-55- W
15/ 5/75	2 T	60-25- N	146-55- W
14/ 7/75	1 T	60-06- N	152-03- W

TABLE A- 8 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
FIN WHALE (BALAENOPTERA PHYSALUS)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
14/ 7/75	1 T	59-45- N	152-00- W
14/ 7/75	1 T	59-43- N	152-01- W
14/ 7/75	1 T	59-34-36N	151-30-42W

TABLE A- 9 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
BLUE WHALE (BALAENOPTERA MUSCULUS)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
25/ 5/60	2	58-10- N	150-37- W
1/ 6/60	5	55-50- N	145-58- W

TABLE A-10 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
HUMPBACK WHALE (MEGAPTERA NOVAENGLIAE)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
14/ 5/58	5	59-26- N	146-21- W
17/ 5/58	2	59-46- N	147-57- W
18/ 5/58	1	59-17- N	147-45- W
19/ 3/60	1	57-00- N	135-30- W
18/ 4/60	2	56-31- N	152-18- W
19/ 4/60	1	56-36- N	152-30- W
19/ 4/60	1	56-38- N	152-35- W
19/ 4/60	3	56-47- N	152-31- W
25/ 4/60	1	56-43- N	152-37- W
25/ 4/60	3	56-40- N	152-36- W
25/ 4/60	1	56-43- N	152-37- W
26/ 4/60	2	56-46- N	152-34- W
26/ 4/60	1	56-47- N	152-34- W
26/ 4/60	1	56-46- N	152-34- W
26/ 4/60	1	56-45- N	152-33- W
27/ 4/60	12	56-45- N	152-33- W
5/ 5/60	2	57-00- N	152-41- W
5/ 5/60	2	56-31- N	152-18- W
5/ 5/60	1	56-40- N	152-30- W
6/ 5/60	1	57-08- N	151-24- W
10/ 5/60	1	56-55- N	151-42- W
10/ 5/60	4	56-55- N	151-42- W
10/ 5/60	3	56-55- N	151-42- W
10/ 5/60	2	56-55- N	151-42- W
11/ 5/60	3	56-56- N	151-49- W
13/ 5/60	1	56-20- N	153-04- W
17/ 5/60	1	56-52- N	153-00- W
17/ 5/60	2	56-47- N	152-23- W
17/ 5/60	2	56-52- N	153-00- W
17/ 5/60	4	56-52- N	153-00- W
17/ 5/60	1	56-52- N	151-50- W
17/ 5/60	2	56-42- N	151-55- W
17/ 5/60	2	56-35- N	153-10- W
18/ 5/60	3	57-11- N	152-19- W
18/ 5/60	1	57-48- N	150-33- W
18/ 5/60	3	57-30- N	152-10- W
21/ 5/60	2	58-34- N	151-05- W
23/ 5/60	2	58-07- N	151-17- W
23/ 5/60	1	58-22- N	151-55- W
24/ 5/60	1	58-24- N	151-41- W
25/ 5/60	2	58-10- N	150-37- W
25/ 5/60	1	58-10- N	150-37- W
26/ 5/60	5	58-15- N	151-38- W
27/ 5/60	2	58-15- N	151-35- W

TABLE A-10 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
HUMPBACK WHALE (MEGAPTERA NOVAENGLIAE)

DATE	NUMBER SEEN		LATITUDE	LONGITUDE
28/ 5/60	1		58-14- N	151-18- W
29/ 5/60	1		57-31- N	151-46- W
29/ 5/60	1		58-13- N	151-27- W
29/ 5/60	3		57-28- N	151-38- W
29/ 5/60	1		57-31- N	151-40- W
31/ 5/60	1		57-14- N	150-47- W
31/ 5/60	1		57-16- N	150-55- W
31/ 5/60	2		57-37- N	152-05- W
1/ 6/60	1		57-15- N	151-40- W
1/ 6/60	2		57-38- N	151-52- W
2/ 6/60	2		56-22- N	153-47- W
2/ 6/60	2		56-51- N	152-29- W
2/ 6/60	2		56-15- N	154-10- W
7/ 5/62	1		56-13- N	145-39- W
7/ 5/62	1		56-13- N	145-32- W
19/ 5/68	2		56-51- N	135-35- W
20/ 5/68	2		56-57- N	135-43- W
3/ 5/75	5		59-10- N	144-10- W
8/ 5/75	2		60-10- N	147-38- W
12/ 5/75	1	T	59-46-48N	141-33- W
13/ 5/75	4		60-22- N	147-14- W
14/ 5/75	1		59-55- N	143-00- W
15/ 5/75	2		60-25- N	146-55- W
15/ 5/75	10		60-25- N	146-55- W
15/ 5/75	3		60-25- N	146-55- W
15/ 5/75	1		60-25- N	146-55- W
16/ 5/75	1		60-28- N	146-46- W
21/ 5/75	1		60-08- N	147-30- W
28/ 5/75	2		60-22-48N	147-12-00W
31/ 5/75	1		60-07- N	147-31-43W
2/ 6/75	2		60-09-30N	147-42-00W
9/ 7/75	2		56-45- N	154-14- W
11/ 8/75	3	T	58-02- N	150-08- W
11/ 8/75	1	T	57-46- N	150-17- W
24/ 8/75	12		57-42- N	144-56- W
2/10/75	2		56-28-54N	132-56-06W
3/10/75	1		56-30- N	133-56-30W
6/10/75	1		56-29-24N	132-53- W
9/10/75	4		56-15- N	132-40- W
21/ 4/76	11		59-14-36N	143-59-06W
22/ 4/76	1		59-16-00N	143-58-00W

TABLE A-11 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
NORTH PACIFIC WHITESIDE DOLPHIN (LAGENORHYNCHUS OBLIQUIDENS)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
6/ 4/58	18	55-42- N	135-55- W
8/ 4/58	2	55-30- N	134-35- W
9/ 2/61	6	54-16- N	130-28- W
21/ 5/68	2000	57-34- N	140-33- W
27/11/75	17	59-36- N	142-40- W
30/11/75	12	58-09- N	149-57- W

TABLE A-12 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
FALSE KILLER WHALE (PSEUDORCA CRASSIDENS)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
22/ 2/58	1	57-00- N	135-30- W
4/ 5/60	1	57-20- N	152-55- W
12/ 3/61	1	53-23- N	130-58- W

TABLE A-13 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
KILLER WHALE (ORCINUS ORCA)

DATE	NUMBER SEEN		LATITUDE	LONGITUDE
9/ 3/58	5		57-00- N	135-30- W
13/ 3/58	3		57-00- N	135-30- W
9/ 4/58	5		56-30- N	135-50- W
10/ 5/58	1		58-15- N	137-15- W
14/ 5/58	1		59-26- N	146-21- W
18/ 5/58	10		58-58- N	149-26- W
20/ 5/58	1		59-52- N	147-11- W
9/ 3/60	3		57-00- N	135-30- W
11/ 4/60	8		57-21- N	150-41- W
9/ 5/60	4		57-55- N	151-45- W
18/ 5/60	3		57-17- N	152-37- W
29/ 1/61	2		53-47- N	130-34- W
4/ 3/61	1		54-41- N	132-36- W
24/ 5/68	5		58-04- N	150-18- W
20/ 8/68	2		57-45- N	152-10- W
3/ 3/75	12		53-22- N	135-14- W
2/ 5/75	1		58-09- N	151-53- W
2/ 5/75	6		60-14- N	146-48- W
4/ 5/75	6		55-30- N	132-01- W
7/ 5/75	2		59-51- N	149-31- W
8/ 5/75	5		60-15- N	146-56- W
12/ 5/75	5		59-42- N	141-12- W
14/ 5/75	2		60-08- N	146-30- W
14/ 5/75	4		60-07- N	146-25- W
14/ 5/75	2		60-01- N	146-03- W
14/ 5/75	3		60-01- N	146-03- W
14/ 5/75	1	T	60-01- N	146-03- W
15/ 5/75	2		60-06- N	149-27- W
15/ 5/75	1		60-06- N	149-27- W
28/ 5/75	6		60-05-00N	147-38-00W
29/ 5/75	20		59-30- N	146-15- W
1/ 6/75	5		60-04-12N	147-38-00W
7/ 6/75	7		60-00- N	147-55- W
20/ 6/75	1	T	59-12- N	147-55- W
20/ 6/75	1	T	59-40- N	149-05- W
27/ 6/75	20		56-25- N	154-19- W
4/ 8/75	1	T	59-34- N	151-22- W
8/ 8/75	1		53-58- N	137-22- W
10/ 8/75	2		59-28- N	149-35- W
24/ 8/75	6		56-39- N	139-24- W
5/ 9/75	10		60-17- N	147-03- W
8/10/75	2		57-40- N	152-05- W
12/ 4/76	12		60-41-12N	147-39-24W
12/ 4/76	1		60-26-00N	147-30-18W

TABLE A-13 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
KILLER WHALE (ORCINUS ORCA)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
16/ 4/76	5	59-50-48N	148-05-36W
17/ 4/76	12	60-21-54N	146-52-54W
22/ 4/76	1	59-14-36N	143-59-06W
29/ 4/76	4	58-22-30N	138-22-30W
29/ 4/76	2	58-22-30N	138-21-06W
19/ 6/76	2	56-01-18N	154-55-12W

TABLE A-14 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
HARBOR PORPOISE (PHOCOENA PHOCOENA)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
16/ 2/58	35	57-00- N	135-30- W
14/ 3/60	4	57-00- N	135-30- W
29/ 3/60	2	57-01- N	135-21- W
30/ 3/60	2	57-00- N	135-30- W
3/ 4/60	1	57-59- N	136-18- W
3/ 4/60	1	58-08- N	136-22- W
3/ 4/60	1	58-08- N	136-22- W
6/ 4/60	4	59-37- N	146-25- W
24/ 4/60	1	56-55- N	135-30- W
20/ 5/60	7	58-00- N	150-17- W
21/ 5/60	2	58-10- N	152-15- W
23/ 5/60	25	58-02- N	151-19- W
23/ 5/60	2	58-02- N	151-12- W
28/ 5/60	2	58-09- N	151-16- W
12/ 3/61	2	53-04- N	131-17- W
10/ 9/63	1	57-10- N	155-31- W
25/ 5/68	1	57-23- N	152-09- W
26/ 5/68	12	56-42- N	152-21- W
29/ 5/68	100	57-40- N	152-07- W
31/ 5/68	1	57-16- N	152-31- W
31/ 5/68	2	57-09- N	152-34- W
31/ 5/68	3	57-18- N	152-27- W
1/ 6/68	3	56-34- N	152-56- W
1/ 6/68	4	56-34- N	152-56- W
1/ 6/68	4	56-28- N	153-00- W
1/ 6/68	2	56-28- N	152-58- W
1/ 6/68	2	56-30- N	152-57- W
7/ 2/75	6 T	60-18- N	146-48- W
28/ 2/75	3 T	59-32- N	143-12- W
28/ 2/75	2 T	59-43- N	141-39- W
17/ 5/75	5	60-53- N	146-59- W
4/ 8/75	2	59-36- N	151-24- W
9/ 8/75	1 T	60-33- N	151-31- W
9/ 8/75	4	59-53- N	149-26- W
10/ 8/75	3 T	60-00- N	149-25- W
12/ 8/75	1	60-31- N	151-26- W
17/ 8/75	1	59-36- N	151-24- W
18/ 8/75	1	59-36- N	151-24- W
22/ 8/75	2	59-40- N	151-57- W
22/ 8/75	2	59-36- N	151-24- W
22/ 8/75	6	59-36- N	151-24- W
23/ 8/75	1	59-33- N	151-42- W
23/ 8/75	2	59-33- N	151-36- W
23/ 8/75	2	59-35- N	151-25- W

TABLE A-14 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
HARBOR PORPOISE (PHOCOENA PHOCOENA)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
25/ 8/75	1	59-30- N	151-53- W
3/ 9/75	4 T	59-52- N	148-19- W
29/ 9/75	2	55-26- N	131-49-24W
9/10/75	1	56-28- N	132-40- W
29/11/75	2	59-57- N	147-08- W

TABLE A-15 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
DALL PORPOISE (PHOCOENOIDES DALLI)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
2/ 4/58	5	58-10- N	139-30- W
3/ 4/58	4	58-45- N	140-05- W
3/ 4/58	3 T	58-50- N	140-05- W
4/ 4/58	45	57-30- N	137-55- W
5/ 4/58	1	57-30- N	137-45- W
6/ 4/58	4	56-10- N	136-25- W
6/ 4/58	5	56-20- N	136-45- W
7/ 4/58	2	55-02- N	135-10- W
9/ 4/58	1	57-00- N	135-30- W
17/ 4/58	1	57-17- N	137-05- W
17/ 4/58	4	57-05- N	136-09- W
19/ 4/58	5	58-14- N	139-10- W
20/ 4/58	3	58-38- N	139-18- W
21/ 4/58	5	59-29- N	140-35- W
21/ 4/58	7	59-25- N	140-42- W
22/ 4/58	2	59-25- N	139-56- W
24/ 4/58	3	57-21- N	139-40- W
24/ 4/58	2	57-01- N	139-10- W
24/ 4/58	3	56-58- N	138-52- W
24/ 4/58	10	56-57- N	138-32- W
25/ 4/58	2	56-58- N	136-54- W
25/ 4/58	1	56-58- N	136-15- W
25/ 4/58	1	56-58- N	136-47- W
25/ 4/58	2	56-57- N	137-00- W
25/ 4/58	9	56-57- N	137-20- W
25/ 4/58	5	56-58- N	136-09- W
27/ 4/58	3	56-58- N	136-16- W
27/ 4/58	4	56-58- N	136-16- W
28/ 4/58	1	56-57- N	137-50- W
28/ 4/58	1	56-51- N	136-57- W
28/ 4/58	2	56-49- N	136-44- W
28/ 4/58	1	56-46- N	136-31- W
29/ 4/58	2	57-40- N	139-55- W
30/ 4/58	3	58-15- N	142-41- W
1/ 5/58	3	58-28- N	146-54- W
1/ 5/58	2	58-26- N	145-58- W
1/ 5/58	3	58-29- N	147-15- W
1/ 5/58	3	58-28- N	146-59- W
2/ 5/58	3	58-14- N	150-01- W
2/ 5/58	1	58-23- N	149-04- W
2/ 5/58	7	58-25- N	148-48- W
2/ 5/58	1	58-25- N	148-48- W
3/ 5/58	3	58-04- N	150-10- W
3/ 5/58	1	58-14- N	150-10- W

TABLE A-15 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
DALL PORPOISE (PHOCOENOIDES DALLI)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
3/ 5/58	4	58-20- N	150-34- W
4/ 5/58	1	57-52- N	151-58- W
7/ 5/58	4	58-01- N	151-47- W
8/ 5/58	2	58-35- N	149-16- W
8/ 5/58	4	58-35- N	149-16- W
8/ 5/58	35	58-35- N	149-16- W
8/ 5/58	1	58-35- N	149-16- W
10/ 5/58	2	58-27- N	149-07- W
10/ 5/58	75	58-27- N	149-07- W
12/ 5/58	4	58-47- N	141-00- W
13/ 5/58	2	59-24- N	145-52- W
14/ 5/58	4	59-26- N	146-21- W
15/ 5/58	2	59-32- N	145-29- W
16/ 5/58	4	59-49- N	145-40- W
16/ 5/58	3	59-49- N	145-33- W
16/ 5/58	4	59-07- N	150-08- W
16/ 5/58	2	58-54- N	150-13- W
16/ 5/58	3	58-38- N	150-57- W
18/ 5/58	4	58-55- N	149-52- W
18/ 5/58	12	59-17- N	147-45- W
18/ 5/58	2	59-06- N	148-11- W
18/ 5/58	10	58-55- N	149-40- W
18/ 5/58	2	58-55- N	149-45- W
19/ 5/58	4	59-15- N	147-36- W
20/ 5/58	2	60-25- N	146-47- W
20/ 5/58	32	60-10- N	147-00- W
20/ 5/58	5	60-05- N	147-10- W
22/ 5/58	8	60-00- N	146-07- W
22/ 5/58	4	59-52- N	145-45- W
22/ 5/58	5	59-58- N	146-04- W
23/ 5/58	4	59-43- N	145-11- W
23/ 5/58	6	59-35- N	148-32- W
23/ 5/58	2	59-39- N	145-02- W
27/ 5/58	4	59-11- N	147-24- W
27/ 5/58	5	59-04- N	148-02- W
28/ 5/58	4	58-33- N	148-41- W
28/ 5/58	4	58-33- N	148-41- W
29/ 5/58	3	58-01- N	149-06- W
1/ 6/58	3	57-01- N	151-49- W
1/ 6/58	3	57-41- N	151-49- W
3/ 3/60	4	55-20- N	131-38- W
3/ 3/60	6	55-37- N	132-16- W
5/ 4/60	2	59-35- N	142-37- W
5/ 4/60	1	59-35- N	143-05- W

TABLE A-15 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
DALL PORPOISE (PHOCOENOIDES DALLI)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
9/ 4/60	2	59-22- N	148-18- W
9/ 4/60	4	59-36- N	148-11- W
9/ 4/60	2	59-36- N	148-11- W
9/ 4/60	2	59-20- N	148-20- W
21/ 4/60	2	54-28- N	131-51- W
22/ 4/60	3	54-40- N	131-58- W
23/ 4/60	6	55-44- N	135-30- W
24/ 4/60	2	57-01- N	152-43- W
24/ 4/60	1	56-50- N	152-35- W
25/ 4/60	2	56-59- N	152-39- W
26/ 4/60	2	57-07- N	137-05- W
27/ 4/60	1	58-05- N	138-34- W
27/ 4/60	3	57-46- N	138-03- W
27/ 4/60	8	57-35- N	137-44- W
29/ 4/60	6	59-11- N	142-10- W
1/ 5/60	3	59-52- N	144-54- W
1/ 5/60	1	59-52- N	144-56- W
3/ 5/60	6	59-05- N	147-38- W
3/ 5/60	2	57-01- N	152-21- W
10/ 5/60	2	58-03- N	151-27- W
11/ 5/60	3	58-29- N	151-28- W
11/ 5/60	6	58-29- N	150-50- W
12/ 5/60	3	58-09- N	150-16- W
12/ 5/60	5	58-10- N	150-27- W
13/ 5/60	6	58-09- N	150-59- W
13/ 5/60	1	58-11- N	150-25- W
17/ 5/60	4	56-53- N	153-10- W
18/ 5/60	2	57-30- N	152-10- W
18/ 5/60	1	57-48- N	150-54- W
18/ 5/60	4	57-49- N	151-40- W
18/ 5/60	2	57-45- N	150-05- W
19/ 5/60	50	58-07- N	150-42- W
19/ 5/60	12	58-08- N	150-40- W
20/ 5/60	3	58-00- N	150-17- W
21/ 5/60	1	58-22- N	151-47- W
21/ 5/60	22	58-33- N	151-01- W
21/ 5/60	6	58-34- N	151-05- W
21/ 5/60	2	58-35- N	151-36- W
24/ 5/60	12	58-40- N	150-42- W
25/ 5/60	3	58-10- N	150-37- W
25/ 5/60	2	58-10- N	150-37- W
25/ 5/60	4	58-10- N	150-37- W
25/ 5/60	2	58-07- N	150-45- W
25/ 5/60	5	58-10- N	150-37- W

TABLE A-15 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
DALL PORPOISE (PHOCOENOIDES DALLI)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
25/ 5/60	2	58-10- N	150-37- W
25/ 5/60	10	58-11- N	150-40- W
25/ 5/60	6	58-09- N	150-43- W
26/ 5/60	55	58-15- N	151-33- W
28/ 5/60	5	58-09- N	151-16- W
28/ 5/60	3	58-09- N	151-16- W
28/ 5/60	1	58-01- N	151-23- W
28/ 5/60	2	58-01- N	151-23- W
28/ 5/60	2	58-09- N	151-16- W
29/ 5/60	1	57-31- N	151-46- W
31/ 5/60	1	57-11- N	150-40- W
2/ 6/60	6	57-04- N	152-35- W
2/ 6/60	5	56-08- N	154-29- W
2/ 6/60	4	54-44- N	141-53- W
2/ 6/60	2	54-15- N	140-23- W
6/ 2/61	6	53-38- N	130-44- W
6/ 2/61	2	55-06- N	131-12- W
6/ 2/61	2	55-01- N	131-07- W
6/ 2/61	3	54-55- N	131-02- W
9/ 2/61	8	54-31- N	130-36- W
9/ 2/61	2	54-18- N	130-45- W
3/ 3/61	5	54-42- N	132-30- W
4/ 3/61	3	54-40- N	132-38- W
5/ 3/61	3	55-22- N	133-27- W
5/ 3/61	10	55-09- N	132-02- W
5/ 3/61	2	55-06- N	132-57- W
5/ 3/61	5	55-00- N	132-50- W
6/ 5/62	5	56-10- N	139-25- W
6/ 5/62	4	56-10- N	139-18- W
6/ 5/62	4	56-10- N	139-50- W
7/ 5/62	1	56-13- N	145-09- W
7/ 5/62	3	56-13- N	145-00- W
7/ 5/62	2	56-13- N	144-58- W
7/ 5/62	4	56-12- N	144-30- W
7/ 5/62	3	56-12- N	144-26- W
12/ 5/62	2	56-21- N	153-45- W
20/ 9/62	1	56-37- N	153-36- W
11/10/62	1	56-30- N	150-17- W
11/10/62	3	56-30- N	149-23- W
11/10/62	3	56-30- N	150-15- W
24/ 6/63	3	52-00- N	143-30- W
25/ 6/63	4	52-34- N	146-28- W
25/ 6/63	1	52-39- N	147-20- W
26/ 6/63	2	53-00- N	150-30- W

TABLE A-15 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
DALL PORPOISE (PHOCOENOIDES DALLI)

DATE	NUMBER SEEN	LATITUDE		LONGITUDE	
26/ 6/63	1	53-13-	N	152-30-	W
27/ 6/63	1	53-30-	N	155-13-	W
10/ 9/63	3	56-55-	N	155-57-	W
10/ 9/63	1	57-10-	N	155-31-	W
11/ 9/63	6	57-52-	N	150-15-	W
11/ 9/63	3	57-52-	N	150-14-	W
11/ 9/63	2	57-52-	N	150-15-	W
11/ 9/63	3	55-51-	N	149-59-	W
11/ 9/63	3	55-51-	N	150-04-	W
11/ 9/63	2	55-51-	N	150-05-	W
26/ 6/64	4	56-22-	N	137-37-	W
26/ 6/64	4	56-15-	N	136-32-	W
26/ 6/64	2	56-14-	N	136-25-	W
26/ 6/64	1	56-22-	N	137-40-	W
26/ 6/64	2	56-22-	N	137-40-	W
26/ 6/64	1	56-24-	N	138-05-	W
27/ 6/64	2	56-46-	N	141-30-	W
27/ 6/64	2	56-49-	N	141-57-	W
18/ 5/68	1	54-37-	N	133-10-	W
18/ 5/68	6	54-30-	N	132-11-	W
18/ 5/68	2	54-30-	N	132-42-	W
18/ 5/68	4	54-30-	N	132-40-	W
18/ 5/68	4	54-30-	N	132-30-	W
18/ 5/68	7	54-30-	N	132-20-	W
18/ 5/68	2	54-28-	N	131-45-	W
18/ 5/68	2	54-22-	N	131-03-	W
18/ 5/68	3	54-26-	N	131-30-	W
19/ 5/68	1	56-31-	N	135-32-	W
19/ 5/68	1	56-28-	N	135-32-	W
19/ 5/68	2	56-20-	N	135-32-	W
19/ 5/68	1	55-35-	N	134-42-	W
19/ 5/68	4	55-34-	N	134-36-	W
19/ 5/68	3	56-02-	N	135-19-	W
19/ 5/68	1	56-01-	N	135-16-	W
19/ 5/68	3	56-08-	N	135-28-	W
19/ 5/68	2	56-03-	N	135-21-	W
19/ 5/68	1	56-39-	N	135-34-	W
19/ 5/68	2	56-56-	N	135-31-	W
19/ 5/68	2	56-47-	N	135-34-	W
19/ 5/68	2	56-38-	N	135-33-	W
19/ 5/68	1	56-34-	N	135-33-	W
20/ 5/68	12	57-02-	N	136-17-	W
20/ 5/68	3	57-04-	N	136-31-	W
20/ 5/68	1	57-04-	N	136-28-	W

TABLE A-15 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
DALL PORPOISE (PHOCOENOIDES DALLI)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
20/ 5/68	2	57-03- N	136-19- W
20/ 5/68	3	57-05- N	136-47- W
20/ 5/68	2	57-05- N	136-47- W
21/ 5/68	4	57-33- N	141-43- W
21/ 5/68	3	57-35- N	140-23- W
21/ 5/68	2	57-34- N	140-50- W
21/ 5/68	5	57-33- N	139-58- W
21/ 5/68	2	57-35- N	140-15- W
21/ 5/68	2	57-33- N	141-24- W
22/ 5/68	1	58-09- N	148-06- W
22/ 5/68	2	58-10- N	148-19- W
22/ 5/68	2	58-13- N	148-45- W
22/ 5/68	1	58-12- N	148-39- W
22/ 5/68	3	58-14- N	148-50- W
23/ 5/68	3	58-05- N	149-05- W
23/ 5/68	2	58-03- N	149-12- W
23/ 5/68	500	57-51- N	149-48- W
23/ 5/68	2	58-03- N	149-13- W
23/ 5/68	8	57-52- N	149-55- W
23/ 5/68	2	57-52- N	149-34- W
23/ 5/68	3	57-51- N	149-48- W
24/ 5/68	6	57-55- N	150-04- W
24/ 5/68	12	57-58- N	150-10- W
24/ 5/68	2	57-41- N	150-26- W
24/ 5/68	5	58-00- N	150-28- W
24/ 5/68	2	57-47- N	150-26- W
24/ 5/68	20	57-55- N	150-03- W
24/ 5/68	50	57-52- N	150-02- W
24/ 5/68	1	58-08- N	150-29- W
25/ 5/68	5	57-24- N	152-08- W
25/ 5/68	12	57-23- N	152-10- W
25/ 5/68	2	57-23- N	150-55- W
25/ 5/68	1	57-23- N	150-57- W
25/ 5/68	4	57-11- N	152-02- W
25/ 5/68	2	57-22- N	150-39- W
25/ 5/68	1	57-23- N	150-59- W
25/ 5/68	1	57-22- N	150-40- W
25/ 5/68	2	57-09- N	151-59- W
25/ 5/68	4	57-08- N	151-57- W
25/ 5/68	20	57-03- N	151-53- W
25/ 5/68	1	57-27- N	152-07- W
25/ 5/68	2	57-32- N	151-56- W
25/ 5/68	2	57-35- N	152-02- W
25/ 5/68	1	57-33- N	151-58- W

TABLE A-15 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
DALL PORPOISE (PHOCOENOIDES DALLI)

DATE	NUMBER SEEN	LATITUDE		LONGITUDE	
25/ 5/68	3	57-28-	N	152-05-	W
25/ 5/68	3	57-27-	N	152-07-	W
25/ 5/68	1	57-27-	N	152-06-	W
26/ 5/68	16	56-30-	N	152-35-	W
26/ 5/68	2	56-55-	N	151-48-	W
26/ 5/68	6	56-36-	N	152-34-	W
26/ 5/68	1	56-50-	N	151-45-	W
26/ 5/68	5	56-33-	N	151-44-	W
26/ 5/68	2	56-35-	N	151-44-	W
26/ 5/68	2	56-36-	N	151-45-	W
26/ 5/68	14	56-38-	N	152-15-	W
26/ 5/68	20	56-44-	N	152-23-	W
26/ 5/68	50	56-42-	N	152-21-	W
26/ 5/68	1	56-40-	N	152-34-	W
26/ 5/68	3	56-46-	N	152-28-	W
26/ 5/68	5	56-36-	N	152-34-	W
27/ 5/68	4	56-25-	N	152-25-	W
27/ 5/68	2	56-17-	N	152-33-	W
27/ 5/68	1	56-17-	N	152-47-	W
27/ 5/68	4	56-12-	N	152-46-	W
27/ 5/68	3	56-10-	N	152-52-	W
27/ 5/68	5	56-07-	N	152-45-	W
27/ 5/68	2	56-12-	N	152-46-	W
27/ 5/68	3	56-11-	N	152-48-	W
27/ 5/68	5	56-10-	N	152-50-	W
27/ 5/68	3	56-10-	N	152-50-	W
28/ 5/68	6	57-08-	N	151-15-	W
28/ 5/68	2	56-58-	N	151-27-	W
28/ 5/68	1	56-31-	N	152-10-	W
29/ 5/68	2	57-01-	N	151-11-	W
29/ 5/68	50	57-40-	N	152-07-	W
1/ 6/68	3	56-54-	N	152-39-	W
1/ 6/68	4	55-56-	N	153-46-	W
1/ 6/68	2	55-58-	N	153-38-	W
1/ 6/68	3	56-47-	N	152-46-	W
1/ 6/68	2	56-45-	N	152-48-	W
2/ 6/68	8	55-29-	N	155-41-	W
2/ 6/68	4	55-32-	N	155-35-	W
2/ 6/68	3	55-24-	N	155-59-	W
19/ 8/68	1	56-05-	N	155-04-	W
20/ 8/68	3	56-56-	N	152-14-	W
20/ 8/68	4	56-44-	N	152-18-	W
20/ 8/68	2	56-56-	N	152-14-	W
20/ 8/68	5	56-58-	N	152-13-	W

TABLE A-15 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
DALL PORPOISE (PHOCOENOIDES DALLI)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
20/ 8/68	1	57-12- N	152-13- W
22/ 8/68	2	57-52- N	152-05- W
22/ 8/68	2	57-52- N	152-01- W
22/ 8/68	6	57-52- N	152-00- W
22/ 8/68	2	57-52- N	152-00- W
22/ 8/68	3	57-45- N	150-23- W
22/ 8/68	3	57-52- N	151-59- W
22/ 8/68	2	57-44- N	150-19- W
22/ 8/68	1	57-42- N	150-02- W
22/ 8/68	1	57-44- N	150-15- W
22/ 8/68	1	57-40- N	149-57- W
22/ 8/68	4	57-39- N	149-54- W
23/ 8/68	1	57-24- N	144-05- W
23/ 8/68	3	57-23- N	144-30- W
23/ 8/68	2	57-27- N	146-10- W
23/ 8/68	3	57-26- N	145-52- W
23/ 8/68	1	57-22- N	144-50- W
24/ 8/68	2	57-13- N	138-54- W
24/ 8/68	2	57-16- N	140-50- W
24/ 8/68	3	57-16- N	140-45- W
24/ 8/68	2	57-13- N	138-44- W
24/ 8/68	2	57-13- N	138-57- W
24/ 8/68	7	57-16- N	140-31- W
24/ 8/68	3	57-16- N	140-41- W
24/ 8/68	4	57-13- N	138-36- W
13/ 6/70	3	53-03- N	154-38- W
14/ 6/70	3	53-02- N	150-45- W
14/ 6/70	2	52-58- N	149-55- W
15/ 6/70	5	52-25- N	144-23- W
15/ 6/70	2	52-25- N	144-23- W
15/ 6/70	8	52-25- N	144-23- W
3/ 2/75	3	59-04- N	142-17- W
3/ 2/75	8	59-08- N	142-25- W
3/ 2/75	12 T	59-05- N	142-20- W
4/ 2/75	10	59-05- N	142-26- W
4/ 2/75	12	59-04- N	142-45- W
5/ 2/75	9	59-00- N	142-17- W
5/ 2/75	5	59-02- N	142-10- W
5/ 2/75	5	59-03- N	142-35- W
5/ 2/75	11	59-01- N	142-27- W
7/ 2/75	6	60-22- N	146-54- W
7/ 2/75	7	60-12- N	146-25- W
7/ 2/75	1	60-20- N	146-52- W
7/ 2/75	1	60-15- N	146-49- W

TABLE A-15 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
DALL PORPOISE (PHOCOENOIDES DALLI)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
8/ 2/75	1	59-47- N	149-28- W
8/ 2/75	2	59-51- N	149-51- W
9/ 2/75	9	58-21- N	147-30- W
9/ 2/75	11	58-21- N	147-08- W
25/ 2/75	6	60-39- N	146-39- W
25/ 2/75	2	60-36- N	146-40- W
1/ 3/75	6	59-45- N	149-21- W
6/ 4/75	12	57-13- N	133-36- W
7/ 4/75	10	58-05- N	134-07- W
21/ 4/75	8	58-21- N	151-30- W
23/ 4/75	7	53-21- N	133-40- W
23/ 4/75	5	53-04-48N	133-24-24W
24/ 4/75	7	57-47- N	137-18- W
24/ 4/75	13 T	57-24- N	136-54- W
2/ 5/75	2	60-09- N	146-09-48W
2/ 5/75	6	60-13- N	146-44- W
2/ 5/75	9	58-47- N	143-00- W
4/ 5/75	1	57-59- N	150-46- W
4/ 5/75	8	58-12- N	135-10- W
5/ 5/75	1	58-18- N	139-56- W
5/ 5/75	3	58-20- N	136-00- W
5/ 5/75	7	58-31-30N	148-12- W
6/ 5/75	10	59-51- N	149-31- W
6/ 5/75	8	59-01- N	151-36- W
6/ 5/75	8	59-45- N	149-30- W
7/ 5/75	25	59-51- N	149-31- W
7/ 5/75	3	59-59-06N	149-21-30W
9/ 5/75	3	60-07- N	149-25- W
10/ 5/75	5	59-40- N	144-08- W
10/ 5/75	2	59-43- N	143-19- W
10/ 5/75	3 T	53-07- N	134-30- W
10/ 5/75	4	58-38- N	141-30- W
10/ 5/75	6	58-25- N	141-36- W
10/ 5/75	3	52-35- N	133-20- W
10/ 5/75	10	60-31- N	146-40- W
10/ 5/75	10	60-10- N	146-34- W
12/ 5/75	7	59-58- N	149-23- W
13/ 5/75	13	60-20- N	147-17- W
15/ 5/75	2 T	60-00- N	149-22- W
15/ 5/75	4	60-02- N	149-23- W
15/ 5/75	8 T	59-58- N	149-23- W
15/ 5/75	2 T	60-25- N	146-55- W
16/ 5/75	3	60-05- N	147-33- W
16/ 5/75	6	60-06- N	147-31- W

TABLE A-15 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
DALL PORPOISE (PHOCOENOIDES DALLI)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
16/ 5/75	3	58-48- N	149-35- W
17/ 5/75	11	60-53- N	146-59- W
18/ 5/75	1	60-28- N	146-52- W
19/ 5/75	1	58-33- N	151-22- W
19/ 5/75	25	58-20- N	151-53- W
20/ 5/75	1	58-35- N	151-00- W
21/ 5/75	3	60-10- N	147-37- W
23/ 5/75	12	60-09- N	147-20- W
27/ 5/75	13	60-03- N	149-23- W
28/ 5/75	12	60-05- N	147-38- W
29/ 5/75	10	60-02- N	147-35- W
29/ 5/75	6 T	59-22-30N	145-59- W
30/ 5/75	15	60-08- N	146-38- W
30/ 5/75	10	59-27- N	146-00- W
5/ 6/75	5 T	59-32-48N	142-33-30W
10/ 6/75	6	59-02-00N	151-23-00W
19/ 6/75	2	58-03- N	150-03- W
20/ 6/75	2	59-40- N	149-25- W
21/ 6/75	6 T	54-35- N	138-16- W
30/ 7/75	1	60-30- N	151-43- W
9/ 8/75	2	59-57- N	149-24- W
10/ 8/75	9	59-40- N	149-28- W
10/ 8/75	24	59-34- N	149-30- W
10/ 8/75	10	59-17- N	149-40- W
10/ 8/75	50	58-38- N	149-50- W
11/ 8/75	7	58-02- N	150-08- W
11/ 8/75	16	57-47- N	150-19- W
11/ 8/75	11	57-50- N	150-15- W
11/ 8/75	15	57-54- N	150-14- W
11/ 8/75	9	57-10- N	150-33- W
11/ 8/75	5	57-13- N	150-27- W
11/ 8/75	9	57-32- N	150-24- W
11/ 8/75	5	57-37- N	150-22- W
23/ 8/75	5	58-18- N	147-53- W
23/ 8/75	1	58-45- N	149-49-30W
23/ 8/75	1	59-33-30N	151-53-30W
23/ 8/75	4	57-54- N	146-00- W
23/ 8/75	7	58-12- N	147-08- W
23/ 8/75	4	58-13- N	147-13- W
23/ 8/75	12	58-15- N	147-43- W
24/ 8/75	4	57-47- N	145-27- W
24/ 8/75	2	56-38- N	139-21- W
24/ 8/75	2	57-37- N	144-30- W
24/ 8/75	4	55-34- N	137-55- W

TABLE A-15 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
DALL PORPOISE (PHOCOENOIDES DALLI)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
25/ 8/75	6	52-17- N	132-29- W
25/ 8/75	2	52-42- N	133-07- W
25/ 8/75	6	59-32- N	151-33- W
28/ 8/75	6	57-38- N	152-01- W
28/ 8/75	3	57-34- N	152-02- W
3/ 9/75	6	57-41- N	152-06- W
3/ 9/75	3	57-38- N	152-01- W
3/ 9/75	5	56-33- N	152-14- W
3/ 9/75	5	59-16- N	150-27- W
3/ 9/75	4	59-12- N	150-41- W
4/ 9/75	2	60-23- N	145-13- W
4/ 9/75	2	60-19- N	147-28- W
7/ 9/75	2	58-25- N	137-56- W
14/10/75	12	57-07- N	134-00- W
14/10/75	4	57-07- N	133-57- W
14/10/75	2	56-30- N	132-55- W
23/10/75	8	59-22-42N	149-06-12W
23/10/75	8	59-25- N	149-06- W
23/10/75	4	59-25- N	149-05- W
23/10/75	1	59-43-42N	149-18- W
25/10/75	2	59-11- N	147-36- W
25/10/75	5	59-11- N	147-36- W
28/10/75	5	60-10- N	146-43- W
28/10/75	5	60-26- N	146-48- W
28/10/75	6	60-30- N	146-45- W
28/10/75	8	60-20- N	146-48- W
29/10/75	8	60-03- N	144-47- W
30/10/75	2	60-03- N	144-47- W
30/10/75	8	60-03- N	144-47- W
30/10/75	3	60-03- N	144-47- W
2/11/75	6	59-15- N	144-40- W
2/11/75	11	59-15- N	144-40- W
3/11/75	3	59-15- N	143-58- W
3/11/75	5	59-59- N	144-48- W
4/11/75	3	59-43- N	142-46- W
7/11/75	5	59-35-30N	141-37- W
8/11/75	4	58-13- N	142-05- W
8/11/75	2	58-13- N	142-05- W
8/11/75	6	58-13- N	142-05- W
8/11/75	3	58-13- N	142-05- W
8/11/75	12	58-13- N	142-05- W
9/11/75	25	58-13- N	142-05- W
20/11/75	2	59-34- N	140-36- W
26/11/75	6	59-34- N	141-54- W

TABLE A-15 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
DALL PORPOISE (PHOCOENOIDES DALLI)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
29/11/75	3	60-00- N	147-06- W
3/12/75	4	57-42- N	142-43- W
3/12/75	3	56-32- N	140-50- W
3/12/75	15	57-27- N	142-10- W
3/12/75	5	56-40- N	141-05- W
13/ 4/76	6	59-57-42N	147-49-48W
13/ 4/76	9	60-15-30N	147-32-12W
13/ 4/76	8	60-09-36N	147-41-12W
13/ 4/76	5	60-11-54N	147-39-36W
20/ 4/76	4	59-00-36N	145-19-48W
20/ 4/76	4	58-38-12N	145-13-00W
21/ 4/76	3	59-28-00N	143-57-12W
21/ 4/76	3	59-28-00N	143-57-12W
28/ 4/76	4	58-37-24N	140-44-06W
29/ 4/76	3	58-12-42N	140-02-36W
20/ 6/76	1	56-55-12N	153-02-00W
20/ 6/76	2	56-49-30N	153-03-30W
20/ 6/76	3	56-53-42N	153-04-42W
20/ 6/76	4	56-57-12N	152-57-26W
20/ 6/76	5	56-53-00N	153-06-00W
20/ 6/76	2	56-52-30N	153-07-00W
20/ 6/76	2	56-51-18N	153-54-30W
20/ 6/76	3	56-49-30N	153-12-30W
20/ 6/76	3	53-36-42N	144-20-00W
20/ 6/76	10	53-47-30N	146-09-00W

TABLE A-16 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
BELUGA (DELPHINAPTERUS LEUCAS)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
20/ 5/74	1	59-24- N	153-21- W
28/ 5/74	2	61-13- N	149-54- W
1/ 8/74	2	60-18- N	152-08- W
8/ 8/74	2	60-22- N	152-04- W
8/ 8/74	1	60-22- N	152-04- W
20/ 8/74	1	60-21- N	151-50- W
21/ 8/74	3	60-25- N	151-40- W
22/ 8/74	5	60-24- N	152-10- W
8/ 5/75	3	60-50-12N	151-20-00W
28/ 5/75	6	61-09-30N	150-17- W
30/ 5/75	30	61-12- N	150-32- W
3/ 6/75	3	61-02- N	151-13- W
10/ 6/75	11	61-12- N	150-30- W
11/ 6/75	1	60-35- N	151-47-18W
13/ 6/75	2	60-31- N	151-51- W
14/ 6/75	3	60-31- N	151-51- W
19/ 6/75	1	60-37- N	151-40- W
20/ 6/75	6	61-05- N	150-40- W
20/ 6/75	8	61-03-12N	150-54-30W
24/ 6/75	3	61-11- N	150-00- W
1/ 7/75	2	61-12- N	150-30- W
1/ 7/75	50	61-00- N	151-20- W
3/ 7/75	1	60-40- N	151-30- W
8/ 7/75	5	60-38- N	151-37- W
8/ 7/75	6	61-10- N	150-23-48W
9/ 7/75	1	61-06-12N	150-27-12W
9/ 7/75	1	61-08-12N	150-20-00W
9/ 7/75	40	60-55- N	151-23- W
11/ 7/75	1	60-53- N	151-15- W
12/ 7/75	11	60-36- N	151-32- W
12/ 7/75	10	60-45- N	151-33- W
12/ 7/75	15	60-50- N	151-22- W
13/ 7/75	17	60-34-30N	151-34-00W
15/ 7/75	50	60-30-30N	151-41- W
16/ 7/75	2	60-53-24N	151-14-24W
23/ 7/75	40	60-26- N	151-29- W
23/ 7/75	5	60-26- N	151-32- W
25/ 7/75	1	60-43-12N	151-34-06W
25/ 7/75	2	60-43-18N	151-34-12W
25/ 7/75	3	60-43-18N	151-34-12W
25/ 7/75	12	60-42-24N	151-42-30W
25/ 7/75	1	60-43-00N	151-34-06W
26/ 7/75	1	60-48-24N	151-16-54W
28/ 7/75	5	60-50-30N	151-24- W

TABLE A-16 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
BELUGA (DELPHINAPTERUS LEUCAS)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
29/ 7/75	10	61-08-36N	150-38-30W
29/ 7/75	2	61-08-36N	150-38-30W
29/ 7/75	2	61-08-36N	150-36-30W
29/ 7/75	2	60-47-42N	151-19-30W
29/ 7/75	3	60-35- N	151-24- W
29/ 7/75	100	60-32- N	151-30- W
30/ 7/75	1	60-38- N	151-33- W
31/ 7/75	2	60-34- N	151-50- W
31/ 7/75	25	60-37- N	151-40- W
6/ 8/75	2	60-32- N	151-52- W
7/ 8/75	50	60-24- N	152-10- W
7/ 8/75	2	60-41- N	151-26- W
7/ 8/75	1	60-34- N	151-40- W
8/ 8/75	1	61-14-30N	149-53-06W
9/ 8/75	1	60-32- N	151-31- W
9/ 8/75	5	60-31- N	151-32- W
9/ 8/75	1	60-33- N	151-52- W
9/ 8/75	10	60-32- N	151-30- W
9/ 8/75	2	60-35- N	151-29- W
10/ 8/75	5	60-34- N	151-34- W
10/ 8/75	7	60-34- N	151-35- W
11/ 8/75	3	60-32- N	151-30- W
13/ 8/75	6	60-34- N	151-35- W
3/ 9/75	1	60-26- N	151-41- W
3/ 9/75	1	60-41- N	151-35- W

TABLE A-17 OBSERVATIONS OF MARINE MAMMALS IN THE GULF OF ALASKA
SPERM WHALE (PHYSETER MACROCEPHALUS)

DATE	NUMBER SEEN	LATITUDE	LONGITUDE
26/ 5/58	1	59-32- N	145-42- W
3/ 6/58	1	57-31- N	150-40- W
7/ 6/58	1	56-52- N	153-02- W
8/ 6/58	4	56-42- N	152-19- W
2/ 6/60	1	54-20- N	140-43- W
2/ 6/60	3	54-22- N	140-46- W
2/ 6/60	2	54-53- N	142-17- W
3/ 6/60	5	52-33- N	135-45- W
25/ 6/63	1	52-22- N	145-20- W
2/ 5/75	20	58-46- N	141-57- W
8/ 8/75	1	57-33- N	144-31- W
24/ 8/75	2	57-40- N	144-40- W
28/11/75	1 T	59-27- N	145-11- W

APPENDIX B

Annotated Bibliography

BERZIN, A.A. 1964. Opredelenic vozrastnogo sostava stada kashalotov Beringova morya i prilezhashchikh chastei Tikhogo okeana (Determination of age composition of the sperm whale stock of the Bering Sea and adjacent parts of the Pacific). Trv. Vses. Nauchno-issled. Inst. Morsk. Rybn. Khoz. Okeanogr. 52:267-270. (Transl. by Israel Program Sci. Transl. 1968. p. 263-266 in P.A. Moiseev (ed.), Soviet fisheries investigations in the northeast Pacific, Pt. 3, avail. Natl. Tech. Inf. Serv. Springfield, VA. as TT 67-51205.)

Pacific sperm whales are composed of two independent stocks: Asiatic and American. American stock said to migrate from California to Aleutian Islands and into the Bering Sea. Catch imformation in 1950-61 indicated that American stock was becoming younger because intensive whaling since 1954 removed older animals. 1. fig.

BERZIN, A.A. AND A.A. ROVNIN. 1966. Raspredelenie i, migratsii kitov v severo-vostochnoi chasti Tikhoga okeana, v Beringovom i Chukotskom moryakh (Distribution and migration of whales in the northeastern part of the Pacific Ocean, Bering and Chukchi Seas). Izv. Tikhookean. Nauchno-issled. Inst. Morsk. Rybn. Khoz. Okeanogr. 58: 179-207.

Information on sperm, humpback, finback, blue, gray, and Pacific right whales has been gathered by Russian research vessels and whaling fleets, and is presented here. Distribution charts for each species are included. Migration patterns are shown to be complex and therefore the traditional concept of "American" and "Asiatic" stocks of whales should be abandoned. Three oceanographic factors are discussed as they relate to whale distribution: (1) salinity of water, (2) cyclonic current systems, and (3) distribution of preferred food species. 8 fig.

BROOKS, J.W. 1957. Marine Mammals in relation to commercial fisheries in Alaska. Paper presented at the Eigth Alaskan Science Conf., Anchorage, Alaska, Sept. 10-13. 6 pp.

Of the 7 pinnipeds and more than 12 cetaceans common to Alaska, only the fur seal and the walrus are of major present commercial value; however, Eskimos utilize ringed seal, bearded seal, harbor seal, and ribbon seal, beluga, bowhead and gray whale on a smaller scale. Beluga whales, harbor seals, and northern sea lions are discussed as predators on commercial fish. Beluga whale research in estuaries of Bristol Bay was begun in 1954. Harbor seal control program by Alaska Dept. of Fish and Game is discussed.

Calkins, Donald G., Kenneth Pitcher, and Karl Schneider. 1975. Distribution and abundance of marine mammals in the Gulf of Alaska. Alaska Dept. of Fish and Game, Div. of Game, Anchorage, Alaska. 39 pp. 4 tab., 31 charts.

Report prepared under an OCSEAP contract to NOAA. Sea otters, northern sea lions, and harbor seals are discussed at length, as were the northern fur seal, black right whale, gray whale, minke whale, sei whale, fin whale, blue whale, humpback whale, north Pacific white-sided dolphin, killer whale, harbor porpoise, Dall porpoise, sperm whale, Bering Sea beaked whale, goose-beaked whale, northern right whale dolphin, short-finned pilot whale, belukha, and giant bottlenosed whale. Charts show sea lion and sea otter distribution; others show harbor seal density.

Clarke, Robert. 1957. Migration of marine mammals. Norsk Hvalfanget-tid. 46(1):609-630.

General review of migrations of the large whales and of a small number of small cetaceans, fur seals, phocid seals, and walruses. Paper notes lack of understanding of mechanisms of migration. 11 fig., 76 refs.

Cowan, Ian McTaggart. 1939. The sharp-headed finned whale of the eastern Pacific. J. Mammal. 20 (2):215-225.

Physical description of two specimens of Balaenoptera acutorostrata from waters off Vancouver Island, British Columbia, as well as museum specimens examined by the author. Morphometric comparison of Atlantic and Pacific forms is offered. Differences between forms do not justify taxonomic separation of species. 3 pl., 3 fig., 3 tab.

Fiscus, Clifford H., Dale W. Rice, and Ancel M. Johnson. 1969. New records of Mesoplodon stejnegeri and Ziphius cavirostris from Alaska. J. Mammal. 50 (1):127.

Floating carcass of Mesoplodon stejnegeri found 43 km west of Cape Edgecombe, Gulf of Alaska, at Lat. 57° 04' N., Long. 146° 32' W. Skull of Z. cavirostris found at Trident Bay, Akun Island, at Lat. 54° 09' N., Long. 165° 33'W.

Gilmore, Raymond, M. 1956. Rare right whale visits California. Pacific Discovery 9 (4):20-25.

Description of whale sighted along Southern California coast. Discussion of the history of the species. Data from California whalers shows only a handful of right whales taken. Map shows "original" distribution in North Pacific and Bering. Mentions Kodiak Gyre and Kodiak Ground. 3 photos + drawings.

Johnson, Murray L. and Gordon D. Alcorn. 1962. The return of the sea otter. Outdoor Calif. 23 (2):4-5.

Recounts history of exploitation since 1741. Present population is estimated as high as 40,000. Distribution includes Amchitka Island, Delarof, Andreanof and Fox Islands, Alaska Peninsula, Kodiak archipelago, and Kenai Peninsula to Cape St. Elias in Alaska, and the California coast.

Kasuya, Toshio. 1971. Consideration of distribution and migration of toothed whales off the Pacific coast of Japan based upon aerial sighting record. Sci. Rep. Whale Res. Inst. 23:37-60.

Reports odontocete sightings recorded during oceanographic aerial surveys 1959-1970, comprising 171,809 nautical miles flown. Describes conditions of observations. Mentions Physeter, Berardius, Orcinus, Globicephala, Pseudorca, Grampus, Ziphius, Stenella attenuata, Stenella caeruleoalba, Tursiops, Lagenorhynchus, Phocoenoides, and Lissodelphis.

Kellogg, Remington. 1931. Whaling statistics for the Pacific coast of North America. J. Mammal. 12 (1):73-77.

Catch data by species and location from 1919-1929. Species are blue, finback, humpback, sei, gray, and sperm whales, plus "miscellaneous" whales including beluga, bowhead, right, bottlenose, sharp-headed finback (minke), Bryde's whales. Locations described include: Alaska, British Columbia, Washington and California. Discussion mentions migration, numbers of whales, biology (lengths and maturity) and conservation.

Kenyon, Karl W. 1952. Diving depths of the Steller sea lion and Alaska fur seal. J. Mammal. 33 (2):245-246.

Sea lions and fur seals described at the mouth of Sitka Sound, off Crawfish Inlet, and off Kruzof Island, all within 40 miles of Sitka, Alaska. Based on a fisherman's observations, sea lions do not dive below 100 fathoms, and fur seals below 30 fathoms to feed.

Kenyon, Karl W. 1961. Cuvier beaked whales stranded in the Aleutian Islands. J. Mammal. 42 (1):71-76.

Two carcasses of Ziphius cavirostris found on Amchitka Island, apparently shot by rifle. Complete measurements given. 3 pl.

Kenyon, Karl W. and Ford Wilke. 1953. Migration of the northern fur seal, Callorhinus ursinus. J. Mammal. 34 (1):86-98.

Summary of existing knowledge. Three major breeding grounds are the Pribilof Islands and Commander Islands, and Robben Island. Fur seals migrate southward in winter as far as 34° N. Lat. off Japan. Monthly summary of known occurrences of the northern fur seal at sea is given. Effects of water temperature, food, and weather on distribution are evaluated. Arrival and departure schedule of the various age classes on Pribilof breeding grounds is summarized. Recoveries of tagged seals are summarized.

Klinkhart, Edward. 1966. The beluga whale in Alaska. Vol. VII, Project Report, Fed. Aid in Wildlife Restoration, Projects W-6-R and W-14-R. Alaska Dept. Fish. Game. 11 pp.

A general article which discusses knowledge of biology of beluga whales. Concentrations of belugas occur in shallow bays or estuaries of large rivers north of Lat. 40°N. (have been seen up to 60 miles upstream from the mouth of the Yukon River). Population in Bristol Bay is estimated at 1,000-1,500. Population in Cook Inlet is estimated at 300-400. Populations which winter in the Bering Sea may be those which summer in the western Canadian arctic and eastern Siberian arctic. Contains sections on abundance, range and movements, population dynamics, food habits, future research and management, and other topics.

Klinkhart, Edward G. 1967. Birth of a harbor seal pup. J. Mammal. 48(4):677.

On June 15, 1967, a female harbor seal gave birth at Tugidak Island, Alaska (Lat. 56° 33' N., Long. 155°20' W.). One half-hour of observation, from 12 minutes before the birth until 18 minutes afterward, is reported.

Klinkhart, Edward. 1969. The harbor seal in Alaska. Alaska Dept. of Fish and Game, Wildlife Notebook Series. 2 pp.

Both ice-and non-ice-inhabiting harbor seals are described. Natural history is given. Annual harvest in northern Alaska is given as 4,000; 30,000 in southern Alaska. A bounty was in effect from 1927 to 1967.

Klumov, S. K. 1962. Gladkiye (Yaponskiye) kity Tikhogo Okeana (The right whales in the Pacific Ocean). Trudy Inst. Okeanol., 58:202-297. English summary.

(Abstracted from English summary)
Whaling and research vessels conducted observations from 1952 to 1957 on the distribution of right whales in the northwest Pacific. The results of this work describe two stocks. The Pacific stock is larger than the Okhotsk stock and growth of the Pacific stock is faster. It is possible that puberty of females and males comes when they are 14-15 m long. Mating in right whales takes place in December and January; gestation is 11-12 months. Calves at birth are 5-6 m long. Weaning takes place after 6-7 months. All data are preliminary. The weight of adult whales is more than 100 tons at a length of 16-17 m. Analysis of food showed that right whales are stenophags. The main food of right whales in the Northern Hemisphere is Calanoida.

Lensinsk, Calvin J. 1960. Status and distribution of sea otters in Alaska. J. Mammal. 41(2):172-182.

A detailed report and review of census efforts from Cook Inlet to Amchitka Island from 1936 to 1957. "The present status of the otter is such that we can expect a rapid expansion in numbers from the Andreanof Islands eastward. West of the Andreanof Islands the habitat is limited and the population may already be near the carrying capacity. Here, sea otters are perhaps as abundant as they were before exploitation by the Russians. On Amchitka Island the evidence indicates that a high population has resulted in increased mortality and a lowered reproductive rate". - from author's summary. Estimates present Alaska population at 40,000. Includes distribution map.

Marine Mammal Biological Laboratory. Birds and mammals observed at sea, 1958-present. National Marine Fisheries Serv., Seattle, WA. (unpublished data listing).

An on-going compilation of marine mammal sightings from pelagic fur seal cruises, comprising 25 species. Sightings of each species are arranged by geographical area (e.g. Gulf of

Alaska, Bering Sea, British Columbia). Lat./Long., date,number and groups observed.

Mathisen, Ole A. 1959. Studies on Steller sea lion (Eumetopias jubata) in Alaska. Trans. 24th North American Wildl. Conf., March 2,3, and 4, 1959. p.346-356.

From 1953 to 1955, author explored use of aerial surveys.From March to December, 1956-58, surveys were made in the Gulf of Alaska, Aleutian Islands, and Bristol Bay. Counts given: Aleutian Islands - 73,090; Gulf of Alaska - 76,027; Bristol Bay - 147, including information from other sources. In 1958 the Chernabura Island (Shumagin Islands) rookeries were studied. Mating took place from 31 May - 10 June; births from 25 May - 27 June. Notes reluctance of animals to leave rookery during breeding season. 2 photos.

Mathisen, Ole A., Robert T. Baade and Ronald J. Lopp. 1962. Breeding habits, growth and stomach contents of the Steller sea lion in Alaska. J. Mammal. 43(4):469-477.

Rookery on Chernabura Island (Shumagin Islands) was observed from May 18 to July 25, 1958. Author's abstract: "Steller sea lions (Eumetopias jubata) were observed from May to July. Harem boundaries were indistinct, and the size of a harem varied from day to day as did the number of unattached males near a harem. Copulation was observed from 31 May to 10 July, parturition from 24 May to 27 June. A cow nursed only her own pup or yearling. Harem groups slowly disbanded as pups learned to swim. Lengths of pups, yearlings, cows and bulls are summarized. Only non-commercial fishes, with the exception of one pink salmon, were found in 114 stomachs. Invertebrates were more frequent than fishes".

Mathisen, Ole A. and Ron J. Lopp. 1963. Photographic census of the Steller sea lion herds in Alaska, 1956-58. (Contr. No. 83, College of Fisheries, U. Wash.) U. S. Fish Wildl. Serv. Spec. Sci. Rep.--Fisheries No. 424.

Author's abstract: "An aerial photographic technique for censusing herds of Steller sea lions (Eumetopias jubata) in Alaska is described. The minimum number of sea lions from Cape St. Elias to the Islands of the Four Mountains was estimated to be about 110,000 based on photographic censuses of rookeries and hauling grounds in 1957. The heaviest population density was recorded in an area between the entrance of Cook Inlet and Unimak Pass. Pronounced seasonal variations were

observed, with a partial peak population on the rookeries from July to September. A partial aerial photo census of the harbor seals (Phoca vitulina) in Alaska is discussed in the appendix". Surveys in the Kodiak Island District include three in 1956, five in 1957 and one in 1958.

Nasu, Keiji. 1963. Oceanography and whaling ground in the subarctic region of the Pacific Ocean. Sci. Rep. Whales Res. Inst. 17:105-155.

Data was obtained by whaling factory and whale marking boats in the North Pacific Ocean and Bering and Chukchi Seas. Extensive oceanographic data collected. Usual whaling grounds for blue, fin, humpback, sei, and sperm whales are discussed. Areas north and south of Unalaska are particularly productive for all species except perhaps blue. 51 fig.

Nasu, Keiji. 1966. Fishery oceanographic study on the baleen whaling grounds. Sci. Rep. Whales Res. Inst. 20:157-210.

Discusses the Bering Sea, northern North Pacific, and Gulf of Alaska "pelagic" grounds. In the subarctic Pacific, distribution of whaling grounds for blue, fin, sei, and humpback whales is roughly mapped. In the Gulf of Alaska, Japanese catch of baleen whales is tabulated for 1961-64, fin whale catch is mapped in detail. Section on whale movements includes fin whales in subarctic Pacific. 56 refs.

Nemoto, T. 1959. Food of baleen whales with reference to whale movements. Sci. Rep. Whales Res. Inst. 14:149-290.

Mentions blue, sei, Bryde's fin, right, Greenland, gray, humpback, and little piked whales. Data come from whales caught in three areas: northern North Pacific, waters adjacent to Japan, and Antarctica. In addition to food items found in stomachs of each species, author discusses: "feeding apparatus" in relation to food preference; hours of feeding; natural history of Euphausia superba; yearly fluctuations in abundance and location of foods in North Pacific; quantity of stomach contents; previous publications on feeding; "swallowing" and "skimming" types of feeding; congregation, diurnal migration and depth of food species; weights of stomach contents of fin and sei whales; distribution of whales in North Pacific (especially migrations of fin, sei, and Bryde's whales); results of marking research; "dispersive movements" of fin whales, and parasites found as related to whale migration. Appendix gives data on whale marks recovered from fin, sei,

and Bryde's whales in the North Pacific. One plate, picturing 17 food species. 43 tab., approximate 40 charts, 149 refs.

Nemoto, Takahisa. 1963. Some aspects of the distribution of Calanus cristatus and C. plumchrus in the Bering and its neighboring waters, with reference to the feeding of baleen whales. Sci. Rep. Whales Ref. Inst. 17:157-170.

Calanus cristatus spring and summer concentration coincides with fin whales' feeding grounds, and C. plumchrus concentrations with sei whales. Distribution of the two Calanus species was studied using whale stomach contents from 1952-1961, and plankton net studies. Total catches of fin and sei whales 1952-1961 are mapped. (Includes Gulf of Alaska).

Nemoto, Takahisa and Toshio Kasuya. 1965. Foods of baleen whales in the Gulf of Alaska of the North Pacific. Sci. Rep. Whales Res. Inst. 19:45-51.

Stomach contents were examined of blue, fin and sei whales caught in the Gulf of Alaska from 1961-1963. Catch distribution of 1963 are mapped. Right whales are mentioned in coastal waters of Kodiak Island.

Nikolaev, A. M. 1961. (The distribution, quantity and biology of the sea otter). Trudy Soveshchaniy Ikhtiologicheskoy Komissii, Vol. 12, p. 214-217. Translated by Division of Foreign Fisheries, National Marine Fisheries Service, NOAA. Trans. 520, 1970.

Tabulates population estimates for years 1912 to 1939 from Kuriles, Kamchatka, Aleutians and Alaska, and California. Otter habitat analyzed. Suggests possibility that sea otters give birth only once every two years.

Nishiwaki, Masahuru. 1966. Distribution and migration of marine mammals in the North Pacific area. Proc. Eleventh Pac. Sci. Congress, August 24, 1966.

Maps and short discussions on present knowledge of distribution of each species of marine mammal (excluding polar bear) found in the North Pacific, Bering Sea and waters north of Bering Strait. Thirteen pinnipeds, fifty-three cetaceans discussed.

Nishiwaki, Masahuru. 1966. Distribution and migration of the larger cetaceans in the North Pacific as shown by Japanese whaling results. Pages 171-191, in K. S. Norris, ed. Whales, dolphins and porpoises. Univ. Calif. Press, Berkeley and Los Angeles.

Whaling catches reported for 1945-1962 for blue, fin, humpback, sei, Bryde's and sperm whales. Table and map for each species. Area includes North Pacific, Gulf of Alaska and Bering Sea. Catches are analyzed by 10^{o} squares of area. Months of whaling activity are noted. Population estimates offered.

Ohsumi, Seiji. 1975. Incidental catch of cetaceans with salmon gillnet. J. Fish. Res. Board Can. 32(7):1229-1235.

Reports data from salmon research vessels, 1962-71. Species caught were Dall porpoise, True's porpoise, harbor porpoise, pilot whale and Baird's beaked whale. Many animals were not identified to species. The area fished included northern North Pacific, Bering Sea, Sea of Okhotsk and Sea of Japan. 6 fig.

Okutani, Takashi and Takahisa Nemoto. 1964. Squids as the food of sperm whales in the Bering Sea and Alaskan Gulf. Sci. Rep. Whales Res. Inst., 18:111-122.

Seven genera of squid were found in stomachs of sperm whales from Aleutian Island waters, Bering Sea and Gulf of Alaska. Distribution of whales caught is mapped, according to whether they contained fish or squid, and what kind of squid they contained. Squids predominated over fish in the western part of the Aleutian chain, while fish predominated in the Gulf of Alaska. 5 pl., 5 fig.

Omura, Hideo. 1955. Whales in the northern part of the North Pacific. Norsk Hvalfangst-tid. 44(6):323-345; and 44(7): 395-405.

Described history of whaling in the North Pacific and compiles catch statistics since beginning of commerical whaling. Recent Japanese catches on each of 3 whaling grounds, (a) south of Commander Islands, (b) north of Akutan Is., and (c) south of Akutan, are analyzed for each species by sex, length, and sexual maturity. Pecularities of results are discussed. Also reports on 2 marking cruises. 17 tab., 18 fig.

Omura, Hideo. 1958. North Pacific Right Whale. Sci. Rep. Whale Res. Inst. 13:1-52.

Black right whales appear in the Bering Sea in June and stay all summer. Sightings from 1941-57 are mapped by months; April, May, June, and July-September. Numerous sightings occurred between Pribilof Islands and Aleutian Islands in July. In June and July a few were seen as far east as the Shumagin Island region. Whales sighted near the Aleutian Islands are thought perhaps to belong to a "Kodiak Ground" stock. Of all sightings, 68% were of single individuals. Largest group seen was four. 8 pls., 27 fig. including 25 photos.

Omura, Hideo and Seiji Ohsumi. 1964. A review of Japanese whale marking in the North Pacific to the end of 1962, with some information on marking in the Antarctic. Norsk Hval-fangst-tid. 53(4):90-112.

Reports on marking of blue, fin, humpback, sei (and Bryde's), and sperm whales from 1949 to 1962. Of 3,343 whales marked, 282 were recaptured, 80% of which were fin and sperm. Area included waters east of Japan to Long. 160°E., waters south of the Aleutian chain, the Gulf of Alaska and the Bering Sea. Maps show movements of recaptured whales summarized by species. Appendix gives sex, length, date and locations of marking and recapture of each whale. 12 tab., 5 maps.

Omura, Hideo, Seiji Ohsumi, Takahisa Nemoto, Keiji Nasu, and Toshio Kasuya. 1969. Black right whales in the North Pacific. Sci. Rep. Whales Res. Inst. 21:1-78.

Gives detailed anatomical descriptions of 13 black right whales, including two previously reported by Omura in 1958. Distribution is shown in maps, by month from April to September. Extensive comments made on movements in the Aleutian Islands area, Gulf of Alaska, and the Bering Sea. 27 fig., 18 pls.

Pike, Gordon C. 1962. Migration and feeding of the gray whale (Eschrichtius gibbosus). J. Fish. Res. Board Can. 19(5): 815-838.

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Nishiwaki, Masahuru. 1966. Distribution and migration of the larger cetaceans in the North Pacific as shown by Japanese whaling results. Pages 171-191, in K. S. Norris, ed. Whales, dolphins and porpoises. Univ. Calif. Press, Berkeley and Los Angeles.

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Observations of gray whales from the coasts of British Columbia, Washington and Alaska are combined with published accounts in an effort to define the timing and route of the

migration, and feeding areas in the Bering and Chukchi Seas. Uncertainty remains as to the route between British Columbia and the Bering Sea. Feeding observations, particularly around St. Lawrence Island, are given. 4 fig., 2 are maps.

Pike, G. C., and B. E. Maxwell. 1958. The abundance and distribution of Northern Sea Lions (Eumetopias jubata) on the coast of British Columbia. J. Fish. Board Can. 15(1):5-17.

Abundance and distribution of the northern sea lion in British Columbia waters are described based on aerial surveys in 1956-57. Compared to similar surveys in 1913, 1916, 1938, and 1955, the number of sea lions had not changed significantly. Estimated population in 1913 was 12,000-13,000. The 1956 estimate was 11,000-12,000. The major changes over this period were in distribution, and usage of different rookeries.

Pike, G. C., and I. B. MacAskie. 1969. Marine mammals of British Columbia. Bull. Fish. Res. Board Can., No. 171. 54 pp.

Records of cetaceans and pinnipeds in British Columbia and into the Gulf of Alaska up to 1967 were compiled from published and unpublished records. An account is given for each species with information on distribution, measurements, and incidental observations of interesting phenomena. A photograph or drawing is also given for each species. No abundance information is included except the occasional comment that a species is rare.

Pitcher, Kenneth W. 1975. Distribution and abundance of sea otters, Steller sea lions, and harbor seals in Prince William Sound, Alaska. Appendix A. in Donald G. Calkins, Kenneth W. Pitcher, and Karl Schneider, Distribution and abundance of marine mammals in the Gulf of Alaska. Alaska Dept. of Fish and Game report. 31 pp., 19 charts.

Report on two helicopter surveys, June 1973 and March 1974, and supplemental small plane and boat surveys. Sea otter: counts tabulated; history of occurrence discussed; census techniques evaluated; sexual segregation and shifts in distribution discussed; total population estimated at 5,000. Steller sea lion: habits, habitat, shifts in distribution, and decrease in population estimated at 6,500-7,500. Harbor seal: preferred types of hauling grounds and rookeries discussed; surveys are lacking; summer concentration sites are mentioned. Sightings of Dall porpoise, minke whale, humpback whale, killer whale and northern fur seal are reported. Charts show harbor

seal and sea otter distribution.

Prasil, R. G. 1972. Distribution of sea mammals and associated land mammals found along the Katmai coast, Katmai National Monument. Science in Alaska, Proc. 22d. Sci. Conf. 8 pp.

Ten flights and 25 hours of observation from a boat were conducted by Park Service personnel from July, 1969 to June, 1971, along the coast of the Katmai Peninsula, surveying for marine mammals in the area. General seasonal distribution and maximum numbers observed are given for sea otter, sea lions, and hair seals. A brief description of the different habitat types available to each species is given by coastal zones.

Rice, D.W., and A. A. Wolman. 1971. Life history and ecology of the gray whale, Eschrichtius robustus. Amer. Soc. Mammal. Spec. Publ. No. 3. 142 pp.

Mongraphic account of existing knowledge, incorporating results of author's research, 1959-1970, which involved collection of 316 gray whales mostly from California. Offers good descriptions of methods currently used in biological research on large whales, with the exception of marking. Contents: Introduction; nomenclature; field and laboratory procedures, seasonal migratory cycle; food and feeding; age and growth; female reproductive cycle; male reproductive cycle; predators; parasites and epizoites; population; exploitation; summary. 48 tab., 38 fig., 172 refs.

Sandegren Finn. 1975. Sexual-agonistic signalling and territoriality in the Steller sea lion (Eumetopias jubatus).Pages 195-204, in K. Ronald and A.W. Mansfield, eds. Biology of the seal. Vol. 169.
About 3,000 hours of observation were carried out on Lewis Island, Gulf of Alaska, in summers of 1967- 69. Author describes reproductive "display" of the female, analyzing components of the display. Male response to display discussed. Functions of various components of display are considered; compared with other species of pinnipeds. Author hypothesizes that display serves to synchronize breeding cycles of male and female. 11 photos, 2 graphs.

Scammon, C. M. 1874. The Marine Mammals of the Northwestern coast of North America. John H. Carmany and Co., San Francisco and G. P. Putnam's Sons, New York. 319 pp.

The first major account of marine mammals in Alaska coupled with detailed descriptions of each species encountered. The book is written in three sections: I. Cetacea, II. Pinnipedia, and III. The American Whale-Fishery.

Scattergood, Leslie W. 1949. Notes on the little piked whale. Murrelet 30(1):3-16.

Summarizes knowledge of distribution, size, reproduction, food and taxonomy of Balaenoptera acutorostrata around the world, citing 62 authors. Discusses utilization in Norway, Siberia, Iceland, and Japan.

Scheffer, Victor B. 1949. The Dall porpoise, Phocoenoides dalli, in Alaska. J. Mammal. 30(2):116-121.

Reports on observations during two cruises in 1947 and 1948. Describes range in southern Bering Sea, Aleutian Island waters, Gulf of Alaska and southeast Alaska. No seasonality was observed. Anatomical measurements given for 5 specimens. 2 pls.

Scheffer, Victor B. 1973. Marine mammals in the Gulf of Alaska. Pages 175-207 in, Donald H. Rosenburg, ed. A review of the oceanography and renewable resources of the northern Gulf of Alaska. Institute of Marine Science, Univ. of Alaska, Fairbanks. 690 pp.

Discusses history of regulations and uses of marine mammals and threats to particular species. Population estimates in northwestern Gulf of Alaska (centered at Lat. 59°N. and Long. 150°W.) are tabulated. Large whale estimates are rough, the procedure used to arrive at them is explained. Smaller cetacean estimates come mainly from miscellaneous records. 66 refs.

Schiller, Everett L. and Robert Rausch. 1956. Mammals of the Katmai National Monument, Alaska. Arctic 9(3):191-201.

Occurrence and distribution of mammals obtained in the summer of 1953 at Katmai National Monument. Harbor seals were found to be common along the Shelikof Strait, especially in Kukak, Katmai, and Portage Bays. Includes map of Katmai area with collection localities marked.

Shurunov, N.A. 1970. Nekotorye gidrologicheskie kharakteristiki raionov kontsentratsii kitov v severo-vostochnoi chasti Tikhogo okeana, Beringovom i Chukotskom moryakh (Some hydrological characteristics of whale grounds in the northeastern Pacific and the Bering and Chukchi Seas.) Tr. Vses. Nauchno-issled.

Inst. Morsk. Rybn. Khoz. Okeanogr. 70 (Izv. Tikhookean. Nauchno-issled. Inst. Rybn. Khoz. Okeanogr. 72: 89-92. Transl. by Israel Program Sci. Transl., 1972, p. 83-86 in P.A. Moiseev (ed.), Soviet fisheries investigations in the northeastern Pacific, Pt. 5, avail. Natl. Tech. Inf. Serv. Springfield, VA. as TT 71-50127.)

Surveys conducted on two vessels in 1972 along the Pacific coast of the Aleutian Islands east of 170° W. and the western part of the Gulf of Alaska to the Kenai Peninsula; the southeastern Bering Sea; the northern Bering Sea and the southern Chukchi Sea. It appears that whales form feeding concentrations in regions of contact between bodies of water of different characteristics. Hydrological information on the southeastern Bering Sea is from July; that on northern Bering and southern Chukchi is from July-August; In mid-March, 1961, finbacks and sperm whales arrived in the western Gulf of Alaska and eastern Aleutian Islands waters. In about June, Sei whales arrived. Concentrations of gray whales were noted in northern Bering Sea and southern Chukchi Sea.

Skaptason, Patricia Ann. 1971. The sea otter (Enhydra lutris). U. S. Dept. Int., Office of Library Services, Washington,D.C.

Bibliography of 194 references. Includes English language materials and translations from the Russian from 1950-1970, plus one 1897 publication. Index by subject and geographic area.

Taylor, F. H. C., M. Fujinaga and Ford Wilke. 1955. Distribution and food habits of the fur seals of the North Pacific ocean. Report of cooperative investigations by the governments of Canada, Japan, and the United States of America, February - July 1952. U. S. Dept. of the Int., Fish and Wildl. Serv. 86 pp.

Six vessels operated off the coast of northeastern Japan 19 February to 17 June, and off southern Hokkaido 6-17 June (2,329 seals were collected). One vessel operated off California, Oregon and Washington 8 February to 30 April. One vessel operated off Alaska 4 June to 13 July: 686 seals were collected off N. America; most work was done within 30 miles of shore. Location of winter concentrations of seals is noted; distribution by sex and age is discussed. Stomach contents are discussed area by area noting proportions comprised by commercial species. 50 fig., 30 tab., 9 appendices.

Thorsteinson, Fredrik V. and Calvin J. Lensink. 1962. Biological observations of Steller sea lions taken during an

experimental harvest. J. Wildl. Manag. 26(4):353-359.

Between 27 May and 15 July 1959, 464 sea lions, almost all breeding bulls, were harvested from five rookeries: Marmot Is., Chowiet Is., Atkins Is., Jude Is., and Ugamak Is. Sea lion harvest behavior, reproduction, growth, sex age composition of local populations, natural mortality of pups and food habits are discussed. 382 stomachs examined.

Vania, John and Edward Klinkhart. 1967. Marine mammal report. Vol. VIII, Annual Project Segment Report, Federal Aid in Wildlife Restoration. Alaska Dept. Fish and game, Juneau, Alaska. 24 pp.

Reproductive tracts of 11 adult female Steller sea lions collected in October 1966 were examined. Delayed implantation appears to last about 3 months. Molting at Lat. 58° - 59° N. Lat. lasts from the last week in July until beyond Oct. 25. Gulf of Alaska population discussed.

Thirty sea otters were transplanted from Prince William Sound to Klag Bay (Southeast Alaska) and Yakutat Bay.

Reports on studies of harbor seals at Tugidak Island and the Port Heiden - Port Moller area, primarily oriented towards commercial harvesting for pelts. Three hundred pups were tagged on Tugidak Island in 1966; 45 were recovered. Aerial surveys were carried out of Tugidak Island, Port Heiden-Port Moller, Sitkinak Is., Seal Is., and Cinder River.

Killer whale sounds in the 20-22,000cps frequency range were transmitted underwater in the Naknek River (Bristol Bay) and beluga whales moved away from the sound source. Four belugas were collected in the Kvichak River and measurements and stomach contents are given.

Vania, John, Edward Klinkhart and Karl Schneider. 1968. Marine Mammal Report. Vol. IX, Annual Project Segment Report, Federal Aid in Wildlife Restoration. Alaska Dept. of Fish and Game, Juneau, Alaska. 46 pp.

Harvesting activities on sea lions were monitored on Sugerloaf Island and Marmot Island where hunters took 4,855 sea lion pup pelts. Hunting activity caused a shift of several thousand sea lions from one area of the rookery to another.

Sightings of transplanted otters near Klag Bay are reported.

Examination of harbor seal pelage collected at 2-week intervals during 1966-67 indicated that molting begins in late August and is completed by late October. Eleven hundred and six pups were tagged at Tugidak Island (June 2-21), and 180 at Port Heiden (June 14-28). Pupping area on Tugidak Island, Port Heiden and Port Moller were surveyed by air during June, July and August. Results are tabulated for 1965-1967.

Belukha whales respond to killer whale sound playbacks at a distance of one mile.

Wilke, F. and K. W. Kenyon. 1954. Migration and food of the northern fur seal. Trans. 19th No. Amer. Wildl. Conf., pages 430-440.

Reviews history of pelagic studies of the northern fur seal. Summarizes U. S. pelagic research 1947-1952; animals were collected from south of the Pribilof Islands on both sides of the Aleutian Islands. Includes some findings of the joint research project carried out in the spring of 1952 by Canada, U. S. and Japan. Upon leaving the Pribilofs, those seals bound for the North American coast fan out southward and eastward into the eastern North Pacific and Gulf of Alaska. Migration differs in the winter distribution of various age classes; notes sites of winter concentrations.

Wilke, Ford, and Clifford H. Fiscus. 1961. Gray whale observations. J. Mammal. 42(1):108-109.

Reports observations off Washington, Gulf of Alaska, Kodiak Is., and in the Bering and Chukchi Seas. Includes thoughts on route of migration and feeding.