

Geographic Patterns of Seal Hunting in Southeast Alaska, 1992-94

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by
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ABSTRACT

Tlingit and Haida hunters take harbor seals throughout the waterways and along the coastlines of Southeast Alaska. During 1992-1994, Alaska Native hunters from 16 communities in Southeast Alaska provided information on seal harvests, seal kill locations, and month of kill as part of a harvest assessment program. When the seal harvest locations of hunters are mapped by hunter residence, spatial parameters of a community's harvest become apparent. For most communities, hunters use the waters and coastlines adjacent to their home to harvest seals. The sizes of community use areas ranged from 24.5 sq mi to 1,124 sq mi, with a mean of 375.8 sq mi for the 16 communities. By community, mean travel distances to kill sites ranged from 5.0 miles to 32.6 miles, with a mean distance of 16.2 miles. Productivity of seal hunting areas ranged from 0.10 seals to 3.03 seals per sq mi of use area. While there was overlap in some cases, most communities had discrete core use areas for hunting seals which were unique to the community. The geographic patterns of seal hunting in Southeast Alaska provide an information base from which further research exploring the interaction between humans and harbor seals can be conducted.

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INTRODUCTION

This report presents maps and spatial data that describe the geographic areas used by Tlingit and Haida hunters of harbor seal during 1992-94. This information was collected during the first three years of a subsistence harvest assessment program conducted from 1992-98 by the Alaska Department of Fish and Game in cooperation with Alaska Native hunters in 16 communities of Southeast Alaska. The project received support from the tribal governments of southeast Alaska communities, as well as the Southeast Alaska Native Subsistence Commission of the Central Council of Tlingit and Haida Indian Tribes of Alaska. Formal technical oversight for the project was provided by Indigenous People's Council for Marine Mammals (1992-95) and the Alaska Native Harbor Seal Commission (1996-98). Funding for the project derived from the National Oceanic and Atmospheric Administration and the National Marine Fisheries Service (Subsistence Study and Monitor System No. 50ABNF400080 and Subsistence Seal and Sea Lion Research NA66FX0476).

During 1992-94, hunters in Southeast Alaska reported locations of harbor seal kill sites, the month of the kill, and the number of harvested seals per kill site. The maps, charts, and tables in this report illustrate some aspects of the spatial information provided by hunters. As will be shown below, geographic patterns exist for harbor seal hunting at the community and regional level. The maps that follow depict the harvest areas of communities, as well as seasonal harvest patterns for selected communities. The analysis describes the size and productivity of harvest areas of communities.

In general, the spatial parameters of a community's subsistence activities can be viewed as an expression of a number of inter-related factors influencing a local subsistence system. In the case of harbor seal hunting, these factors probably include seal population dynamics, individual seal behaviors, seal habitat variability, as well as community hunting traditions, proximity of the hunter's residence to seal habitats, and local economic factors, among others. While an in-depth inquiry into relationships between these factors would be of value, it is not the aim of this particular report. This report presents geographic information provided by hunters and describes some of the patterns created by the activities of seal hunters across the landscape. Future researchers may seek correlations between these data and other factors in order to better understand the relationships between harbor seals and the humans who interact with them as part of dynamic ecological and cultural systems.

METHODOLOGY

The information presented in this report was gathered as part of a statewide harvest assessment program for harbor seal and sea lion in Alaskan communities (see Robert J. Wolfe and Craig Mishler, *Subsistence Harvest of Harbor Seal and Sea Lion by Alaska Natives*, 1992, Technical Paper No. 229, Division of Subsistence, Alaska Department of Fish and Game, Juneau, 1993). In southeast Alaska, seal hunters were identified through within-community referral, household census, and random household selection, depending upon the community. Attempts were made to identify and survey all known hunters in every community where seal hunting occurred. In the southeast region, there were 475 households surveyed in 1992, 716 households surveyed in 1993, and 704 households surveyed in 1994. Hunters were asked for specific information regarding the location of each seal killed during the previous survey period. That information was entered on a supplemental survey form and filed with the standard survey form used for all households statewide.

Information linked to each kill site was entered into an Excel spreadsheet program, then imported into a data structure integrated with ESRI's ArcView 3.1, a geographic information system (GIS). The database contained information on each seal reported, including the exact latitude and longitude at which it was killed, the month and year of the kill, the community of hunter's residence, and a code number for the hunter's household within that community. ArcView was used to represent the information as points which were then layered onto a base map of the Southeast Alaska archipelago.

Problems arose when the latitude and longitude coordinates recorded on the original survey form generated points on the map which seemed unlikely places for a seal hunt. Correction of errors on the survey form was needed for "mountain seals" whose latitude and longitude coordinates placed them in the middle of a land mass, as well as for seals whose location seemed unrealistic. Fortunately, the survey form asked for the place name for the seal kill location as well as numeric latitude and longitude location information. In places where the coordinate information seemed incorrect, the place name or description usually allowed for the correction to the numeric information which was required for accurate representation and analysis within the GIS.

It was clear that some of the mistakes resulted from confusion in reading the nautical charts while locating seal kill locations and recording the coordinate data

accurately. For example, a point with a position of 135.50 decimal degrees longitude (equal to 135 degrees, 30 minutes longitude) might have been accidentally recorded as 135.30 decimal degrees longitude when the surveyor failed to convert the number of minutes (30) into a fraction of the whole degree (.50), which is composed of 60 minutes.

Once all the seal harvest locations were satisfactorily recorded in the GIS, organizing and representing the data in map form was possible. Maps of seal harvests by kill site for each community were made by sorting the database according to community of the hunter's residence. The harbor seal use area maps, as well as all the charts describing spatial characteristics of the seal harvest locations, were created by considering all the seal points of one community as a group. The Division of Subsistence, in soliciting this spatial data from seal hunters, had as its main interest the geographic patterns of a community's subsistence seal hunting, and the data was organized according to that principle.

Upon inspection of the community level maps, it became apparent that there was a use area specific for most communities. To further depict and analyze the use areas, a delimited, bounded area was generated for each community, defined as a line which contained the closest 90-95 percent of that community's harvests. The 5 percent of kill sites farthest from the community (up to 10 percent when the total harvest was around 10 seals) fell outside the boundary. Bounded areas were constructed and measured using the ArcView software. The line circumscribing kill sites was constructed to conform to adjacent coastlines. Localized areas of seal kill locations removed by ten miles or more from other concentrations were circumscribed separately, but their metric area was combined with that of other areas used by hunters from that community. Within each community hunting area, several quantitative measurements were calculated to describe the geographic pattern of the seal harvest across the landscape, including the square mileage of each use area, the average number of seals harvested per square mile of use area, and the average distance traveled for harvesting a seal for each community.

To describe the seasonality of a community's seal hunting pattern, a set of maps was created showing the locations and frequencies of seal harvest locations by community for each of four seasons. In consulting Alaska Department of Fish and Game's Division of Wildlife Conservation harbor seal biologists, the groups of months were selected according to physiological and behavioral cycles of harbor seal in Southeast Alaska, and the data was sorted accordingly. If a finer-grain seasonal study

had been desired, the data analysis and presentation in the maps could have been effected by sorting each seal record by month, rather than by the three-month periods as was done here.

GEOGRAPHIC PATTERNS OF SEAL HUNTING

Map 1 shows the locations of seal harvests color coded by a hunter's community of residence. This map contains all seal harvests and kill sites recorded for all communities. Map 1 depicts the areas used by hunters from surveyed communities as represented by the complete data set. Maps 2 and 3 depict the boundaries of community use areas which contain 90-95 percent of the seal harvest locations closest to a community, as described above. Maps 4-20 present the hunting areas of each community individually. Maps 21-24 depict hunting areas by season. The following section describes several features of the geographic patterns shown in these maps.

Community Use Areas

In Maps 1, 2, and 3, it is apparent that for each community, hunters use the waters and coastlines adjacent to their home to harvest harbor seals, with areas of various dimensions being exploited. Coastlines include those on which the village is located, as well as nearby shores. For example, Angoon hunters travel north along the west coast of Admiralty Island, as well as due west across Chatham Strait to the shores of Chichagof and Baranof Islands. In some communities, hunters harvest seals primarily near shore (such as Angoon), while in others hunters report taking seals at locations off shore or on near-shore islands (such as Kake, Hoonah, and Saxman). Hunters from communities near the outer coast appear to hunt primarily on the backside of outer coast islands (such as Sitka, Craig, Hydaburg, and Pelican).

The concentration of seal harvests about a community can be approximated by looking at the points of a similar color in Map 1, as well as on the individual maps for each community (Maps 4-20). Most communities appear to have a nuclear area of exploitation centered at the village location. Less frequently, communities have use areas composed of a number of dispersed satellite areas (Petersburg and Wrangell).

Maps 1, 2, and 3 also depict the degree to which communities use the same waters to hunt harbor seals. For instance, neighbor communities Ketchikan and Saxman exploit almost all the same waters for hunting seals. Hoonah and Juneau

hunters share the waters of Icy Strait and Glacier Bay, but also hunt other waters that do not overlap. There is considerable overlap of hunting areas of Klawock and Hydaburg by Craig hunters, however, there is no overlap between Klawock and Hydaburg hunters. Areas of some communities like Sitka, Angoon, and Kake have few overlaps with other community use areas.

As stated above, Map 1 displays all harvest locations, although not all points are clearly visible due to their close proximity and the size of the map scale does not allow for fine resolution. In Map 1, the outliers of some communities' harvests are visible. For example, Hoonah, Angoon, and Kake hunters all report taking seals from near the mouth of Tenakee Inlet on the east side of Chichagof Island. The southern end of Kuiu Island has hunters from Sitka, Kake, Saxman and Petersburg taking the resource on its shores. Though less common, a few hunters travel far afield to the middle of a use area primarily used by another community. For example, a Petersburg hunter reported taking seals in Sitka Sound, an Angoon resident hunted amidst the Yakutat hunters in Monti Bay (not visible on Map 1, but present), and a Sitka hunter traveled to hunt in the Gulf of Esquibel near Klawock. It is believed that some of these hunters reside in one community, but have family or personal connections to another place and travel to hunt there.

The Size of Community Use Areas

The size of harbor seal harvest areas are shown in Fig. 1 and Table 1. Pelican hunters used the smallest area at 24.5 square miles and Hoonah the greatest at 1,123.9 square miles. The average area used by a community was 375.8 square miles. The total area used by the Southeast Alaska communities surveyed was 6,012.7 square miles.

Productivity of Seal Harvest Areas

Fig. 2 and Table 2 show the productivity of a community's seal harvest area, calculated as the average number of seals harvested per square mile of hunted area (the number of seals harvested within the use area divided by the square mileage of that area). Yakutat harvested approximately 3.03 seals per square mile of use area. The scale on the chart for Yakutat (on the bottom of the chart in Figure 2) was adjusted because of its greater productivity compared to other communities (scale on the top of the chart) -- about 4.5 times as great as the next highest community. Ketchikan was

next with 0.65 seals harvested per square mile of hunted area. The average per community was 0.47 seals harvested per square mile (without Yakutat, the average was 0.30 seals per square mile).

These relative measurements can be considered alongside the absolute size of a community use area. Ketchikan has a high seal productivity within its use area, but this results in part from a relatively small use area. Saxman's use area was almost the same size as Ketchikan's (as well as overlapping it significantly) but with fewer harvested seals it registers a much lower production of seals per square mile. Hoonah, despite having the largest use area among communities, harvested seals in numbers so great as to maintain a high ratio of seal harvests per square mile. Yakutat's medium-sized use area, divided by an extremely high number of seals harvested, resulted in its exceptionally high productivity of seals per area hunted.

Distances Traveled by Hunters

Distances traveled to harvest seals are shown in Fig. 3 and Table 3. The distances from a community to each seal harvest location (the closest 90-95 percent) were averaged. These measures are presented in Table 3. In addition, the distances are shown for the farthest kill sites (including the farthest 5 percent of seal harvest locations) and nearest kill sites. Figure 3 depicts the average distance for each community in a bar chart.

Pelican hunters traveled the least distance on average for their seals (5 miles). Juneau hunters traveled an average of 32.6 miles away from their home community to hunt seals, the farthest of any community. The average distance traveled for a seal for all communities in Southeast Alaska was 16.2 miles. There may be some correlation between these relative measurements and the size of seal use areas (Table 1). For example, Pelican has both the smallest use area and the smallest average distance to its seal kill sites, and Juneau has both a large use area and a high average distance to its seal hunting locations. Further inquiries into these distance measures, as with the geographic description of the community use areas, might explore connections between a person's mobility, such as that which accompanies commercial fishing activity, and seal harvest locations. Another line of inquiry might explore connections between average distances traveled to hunt seal to a community's proximity to ecological features such as significant harbor seal haul out areas, tidewater glaciers, or salmon streams.

COMMUNITY MAP DESCRIPTIONS

The remainder of the report provides brief descriptions of community maps presented in the appendix. Maps 4 – 19 depict community use areas. Maps 20 – 24 depict seasonal harvest patterns for five selected communities.

Map 4. Angoon

Angoon's hunting pattern is focused on the bays of the west coast of Admiralty Island, primarily Mitchell Bay, Hood Bay, Chaik Bay, and Whitewater Bay. The coastlines of Admiralty, Chichagof, Baranof, and Catherine Islands are also used intensively as places for seal hunting. Hood and Chaik Bays appear to be the sites of the most productive harbor seal hunting, indicated by the number of orange, magenta, and red dots in those waters. Mitchell Bay also has several very productive spots on its northern shore. Only six seals of 199, or 3 percent of Angoon's total seal harvest between 1992-1994, were located outside the local waters Chatham Strait between Point Gardner to the south and Square Cove to the north.

Map 5. Craig

Hunters in Craig used the coastlines of and passages between San Fernando, Lulu, and Baker Islands most intensively. Shinaku Inlet, north of the village of Klawock, and Trocadero Bay south of Craig, were also heavily used. Stretching north to Sea Otter Sound and south to Cordova Bay the harvest by Craig hunters thinned out significantly.

Map 6. Haines

Hunters in Haines found harbor seals in the nearby waters of Lutak Inlet to the north and Chilkat Inlet (outside the mouth of the Chilkat River) to the west, as well as in the headwaters of Lynn Canal. Several seals were taken south in the waters of Icy Strait near Port Frederick and Whitestone Harbor.

Map 7. Hoonah

Harbor seal hunters living in Hoonah found many seals close to home in the inside waters of Port Frederick, the coastlines on the south side of Icy Strait, and in

Excursion Inlet on the north side of Icy Strait. Hunting locations were highly concentrated on these shores, dispersing quickly in areas like Glacier Bay to the north, Cross Sound to the west, and the east coast of Chichagof Island to the south.

Map 8. Hydaburg

Hunters in Hydaburg tended to stay south of Trocadero Bay, taking seals most intensively around Goat Island and in Tlevak Strait near Sukkwan Island. These locations lie within the use area of Craig, which extends fully southward through Tlevak to Cordova Bay near Long Island. One Hydaburg hunter reported getting three seals at a point south of Cordova Bay and the Barrier Islands.

Map 9. Juneau

Juneau harbor seal hunters used the waters and coastlines of Stephens Passage near Young Bay, Auke Bay, and southern Lynn Canal near Shelter Island. Points north to Berner's Bay and St. James Bay also were hunted. Much of Juneau's seal harvest came from waters in Excursion Inlet and Icy Strait far to the west, and the western edge of the range extended to Lemusurier Island and Glacier Bay. The large degree of overlap between the Juneau and Hoonah use areas actually appears to be a continuum between the two communities, where hunters traveled back and forth between the two communities taking seals along the way. In addition, some hunters originally from the village of Hoonah who lived in Juneau at the time of the survey continued to hunt in waters close to their tribal home in Icy Strait.

Map 10. Kake

Harbor seal hunters from Kake took a large portion of their seals from the Keku Islands in Keku Strait separating the northern ends of Kuiu and Kupreanof Islands. Port Camden, south of Keku Strait, was also a principal area of exploitation within the larger Kake use area, as well as the interior waters near Entrance Island. Several hunters reported taking seals offshore in Frederick Sound, and many more hunted seals along the southern edge of Admiralty Island in Herring Bay, Eliza Harbor, and Little Pybus Bay. The north western edge of the Kake seal harvest range coincides exactly with the southern terminus of the Angoon range, that being the southernmost tip of Admiralty Island near Point Gardner. The two communities appear to observe a boundary between their two harbor seal use areas. The inside waters of Pybus Bay is another

interesting geographic boundary between two communities' seal hunting grounds. Kake hunters reported using only the outside waters and Petersburg hunters took seals from the inner waters of the large bay.

Map 11. Ketchikan

Hunters in Ketchikan reported taking seals around the community's location on Revillagigedo Island and around the smaller islands close by. The area used by Ketchikan hunters extended north to the northern mouth of Behm Canal near Betton Island, and south to Revillagigedo Channel east of Duke Island.

Map 12. Klawock

Hunters in Klawock took most of their seals in waters near the village in San Alberto Bay and Shinaku Inlet. Some seals were reported taken at locations removed from the village in Affleck Canal on Kuiu Island, and on the east, inner coast of Coronation Island.

Map 13. Klukwan

Like their neighbors in Haines, Klukwan seal hunters took seals in Lutak and Chilkat Inlets, as well as in waters far to the south in Icy Strait. Because of the village's location on the upstream banks of the Chilkat River at some distance from the ocean, Klukwan hunters traveled the farthest of any community to reach its nearest seal, 15.5 miles (in Table 1.)

Map 14. Pelican

The village of Pelican is situated inside Lisianski Inlet, with access to Lisianski Strait and its spur Stag Bay. The waters of Stag Bay, and the headwaters of Lisianski Inlet, provided Pelican with the majority of its seal harvest. No seals were taken outside of these narrow waterways.

Map 15. Petersburg

Harbor seal hunters living in Petersburg, like their neighbors in Wrangell, appeared to have no one nucleus to their hunting area. In the bays along the south and eastern end of Frederick Sound, as well as in Pybus Bay on Admiralty Island and Tebenkof Bay on Kuiu Island, Petersburg's hunters reported taking seals in a pattern

that is widely dispersed. Petersburg's hunting area contains an estimated 0.10 seals per square mile, which along with Pelican is the least concentrated seal harvest of communities surveyed.

Map 16. Saxman

The community of Saxman is located very close to Ketchikan, and the hunters residing in Saxman used approximately the same waters as those in Ketchikan. Nichols Passage near Gravina Island, and the inside waters of George and Carroll Inlets and Thorne Arm were the locations where most of Saxman's seals were harvested. Saxman hunters did not go as far north as the north end of Behm Canal to harvest seals, as did Ketchikan hunters. They also did not venture as far south as Ketchikan hunters.

Map 17. Sitka

Sitka hunters used the waters and coastlines of Sitka Sound intensively, and this use area continued almost uninterruptedly northward through Salisbury Sound into the western arm of Peril Strait and the Sergius Narrows. Within Sitka Sound, the harbor seals of the island group of Crow, Gagarin, and Middle Island were harvested intensively. Immediately south of the community, Cape Burunof and the Vasilief Bank were also well hunted.

Map 18. Wrangell

Wrangell hunters use the waters in and around Zarembo and Wrangell Islands, as well as in the mouth of the Stikine River, as harbor seal hunting grounds. Only a few seals were reported for each year of the survey, and these were widely distributed around these waterways. Wrangell was estimated to take only 0.15 seal per square mile of hunting area, the fourth lowest concentration of all communities surveyed.

Map 19. Yakutat

Hunters in Yakutat took the most harbor seals of any Southeast Alaska community, as well as any community in all of Alaska, during the years of 1992-1994. Within Yakutat Bay and north to the waters of Disenchantment Bay, where the tidewater glaciers Hubbard and Turner churn out ice bergs on which seals haul out. The islands near the community on the east shores of Yakutat Bay, Khantaak and Doggie Islands were used thoroughly, but the greatest concentration of seals by far came from the feet

of the two glaciers in Disenchantment Bay and the mouth of the Situk River. Eighteen percent of the seal harvest was clustered close to the feet of the two glaciers in the north end of Disenchantment Bay, and 16 percent was taken from the small area at the mouth of the Situk on the outer coast south of Yakutat. One seal was reported taken from the headwaters of Russell Fiord, and 11 from the waters near Point Manby on the western shore of Yakutat Bay.

Map 20. Angoon Seasons

The seasonal movements of hunters from Angoon were most dramatic for their lack of activity during May-July, and the immediate pick-up through August-January. In May-July, only points deep in Mitchell Bay and across Chatham Strait on Baranof Island near Kasnyku Bay were hunted for harbor seal. But in August-October, seals were being taken throughout the greater use area, from Marble Bluffs in the north, to Wilson Cove near the south of Admiralty Island, as well as points west on Baranof and Catherine Islands. During this period, Florence Bay, near Point Hayes on the southeastern tip of Chichagof Island, was used heavily by hunters from Angoon who traveled due west from the village across Chatham Strait. Mitchell and Hood Bays were also productive during May-July.

In November-January, the most productive season for Angoon seal hunters, harvests were concentrated in Hood and Chaik Bays, starting a shift away from the Baranof and Catherine Island coastlines which was complete by February-April. In November-January, hunters were also making successful kills on the west coast of Admiralty Island north of Angoon, near Marble and Cube Coves, as well as south toward Point Gardner at Wilson Cove.

By the February-April season, hunting was declining. No seals were taken at all on the west side of Chatham Strait, and most were taken near Angoon in Mitchell, Hood, and Chaik Bays. Approximately three seals were taken at a distance of greater than 15 miles from the village of Angoon.

Map 21. Hoonah Seasons

Hoonah harbor seal hunters use their seal use area thoroughly throughout the year, with seasonal variation in the reaches into Glacier Bay to the north and intensification of hunting in the inside waters of Port Frederick. During May-July, seal hunting is in low gear, but harvests are being made at locations through Port Frederick

and along the southern shores of Icy Strait west to Idaho Inlet and east to Point Couverden, as well as in Chatham Strait near Iyokeen Point. In August-October, the south shores of Icy Strait between Point Adolphus and Eagle Point, and Idaho Inlet were being hunted heavily, with only slight increase in the Port Frederick harvest area. In November-January, Excursion Inlet was more productive in Icy Strait than the Point Adolphus area, and more kills were being made in the inside waters of Port Frederick. Also during November-January, the shores of Lemesurier Island were being harvested heavier than in other seasons, and kill sites began to show up inside Glacier Bay to the north. The period of February-April saw a resumption of the harvest along southern Icy Strait east of Point Adolphus, fewer kills made around Lemesurier and Horseshoe Island to the west.

Map 22. Juneau Seasons

Very few seals were taken during May-July, and these were all in areas near Icy Strait. During August-October, the south shores of Icy Strait east of Point Adolphus, Lemesurier Island were more intensively used, the outside of Excursion Inlet, as well as the northern and southern ends of Stephens Passage. November-January was a continuation of the late summer pattern in Icy Strait and Stephens Passage, with more concentration in the northern end of Stephens Passage near Young Bay. The period February-April saw Juneau hunters moving out of Icy Strait almost entirely (except for Excursion Inlet) and hunting almost exclusively in southern Lynn Canal near Shelter Island and St. James Bay.

Map 23. Kake Seasons

The Kake harbor seal use area spans Frederick Sound, using the southern coast of Admiralty and the northern end embayments and offshore islets of Kuiu and Kupreanof Islands. However, during the period of May-July, no Kake hunters were making successful seal harvests on the north side of Frederick Sound. Seals were taken almost exclusively from the Keku Islands in that season, with some reports of kills in Port Camden to the south. In August-October, hunters were taking seals from the Admiralty Island coast south of Pybus Bay, as well as a much more intensive harvest in the Keku Islands, Port Camden, and waters near Entrance Island. Also more productive during this period were the outer shores of Kupreanof Island near Cape Bendel. November-January saw the hunting of the inside waters of Keku Strait decrease

significantly, and a proportional decrease in hunting near Admiralty Island and Pybus Bay. In February-April, hunting near the Keku Islands had picked up again, while the points on Admiralty Island coastline were diminishing.

Map 24. Sitka Seasons

Seasonal variation in the seal hunting areas used by Sitka hunters was minimal. Points in Sitka Sound, from Nakwasina Sound southward to the Vasilief Banks, were hunted during all seasons of the year, as were points north in Peril Strait. Only Salisbury Sound, near the outer coast between Kruzof and Chichagof Island, experienced an absence of kill sites during the period February-April. Nakwasina Passage and Sound were more heavily used in August-October, while this period was the least productive for Crow, Gagarin, and Middle Islands. Cape Burunof and the Vasilief Bank were most productive during the period February-April, and least productive in August-October.

Table 1. Harbor Seal Use Areas

Community	Harbor Seal Use Area Square Miles
Hoonah	1,123.9
Juneau	991.0
Kake	833.7
Craig	656.8
Angoon	570.2
Sitka	373.2
Petersburg	274.0
Yakutat	250.1
Ketchikan	187.8
Saxman	187.7
Haines	163.9
Hydaburg	136.1
Klukwan	113.3
Wrangell	74.6
Klawock	51.9
Pelican	24.5

Table 2. Seal Concentration Within Use Area

Community	Number of Seals Per Square Mile Use Area
Yakutat	3.0311
Ketchikan	0.6489
Sitka	0.5574
Hoonah	0.5303
Pelican	0.4076
Angoon	0.3490
Haines	0.3294
Kake	0.3179
Klawock	0.2889
Hydaburg	0.2572
Craig	0.2040
Saxman	0.1545
Wrangell	0.1474
Juneau	0.1332
Petersburg	0.1022
Klukwan	0.0971

Table 3. Seal Harvest Location Distances

Community	Average Mileage Per Seal (95% of Harvest)	Distance of Farthest Seal (mi)	Distance of Nearest Seal (mi)
Juneau	32.6	166.4	8.3
Petersburg	31.4	91.7	5.3
Klukwan	24.3	85.0	15.5
Saxman	18.4	110.5	4.0
Wrangell	16.3	118.6	3.1
Ketchikan	16.0	60.1	7.5
Sitka	14.2	137.5	0.7
Hoonah	14.2	59.9	2.0
Craig	14.2	163.0	1.3
Yakutat	13.8	124.2	1.8
Haines	13.7	83.2	1.2
Angoon	12.7	235.6	2.2
Kake	12.0	61.5	1.2
Hydaburg	11.9	40.9	3.0
Klawock	9.3	52.5	3.6
Pelican	5.0	10.0	4.2

Figure 1. Size of Harbor Seal Harvest Use Areas (95% of Total Harvest), by Community

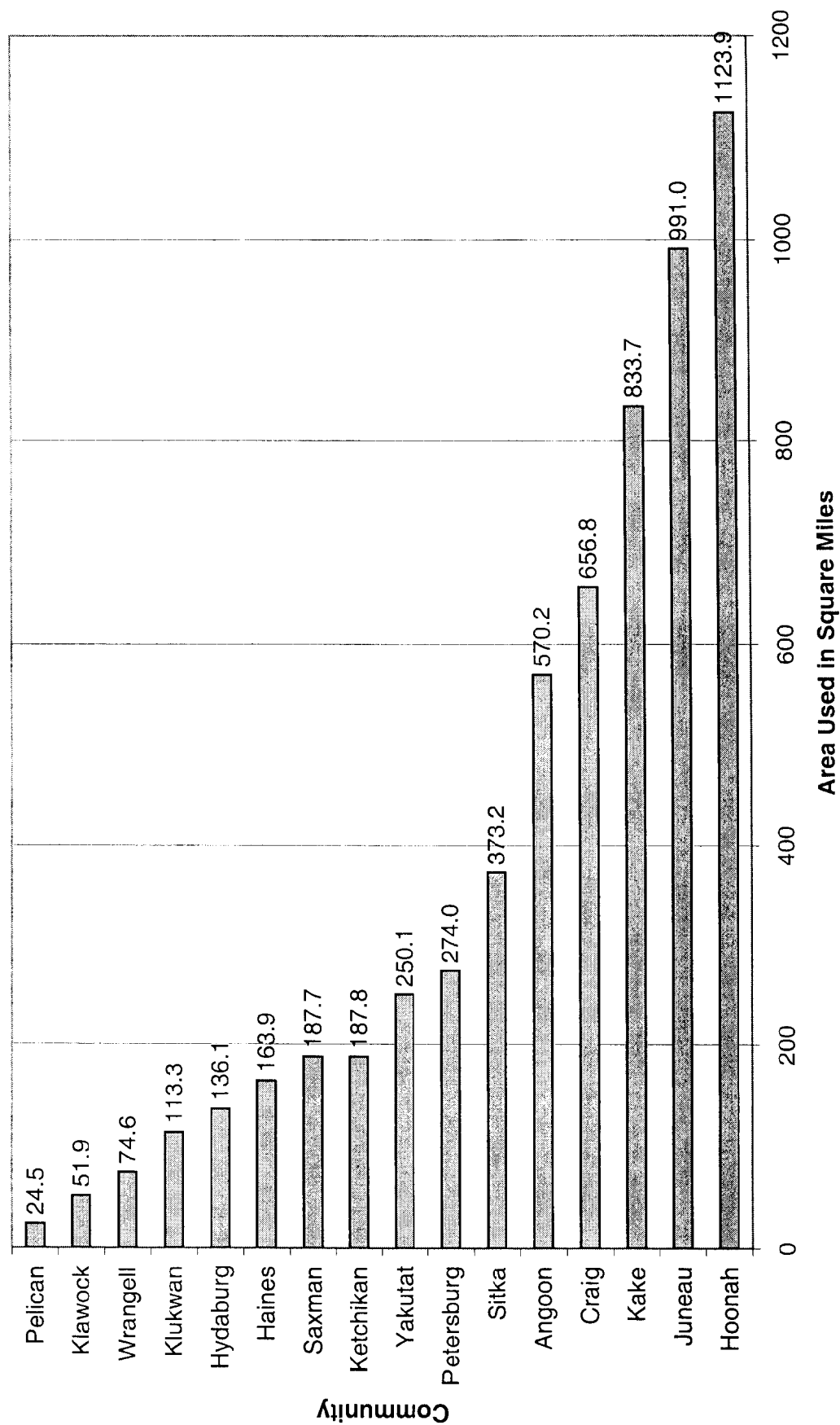


Figure 2. Average Number of Seals Harvested Per Square Mile of Hunted Area

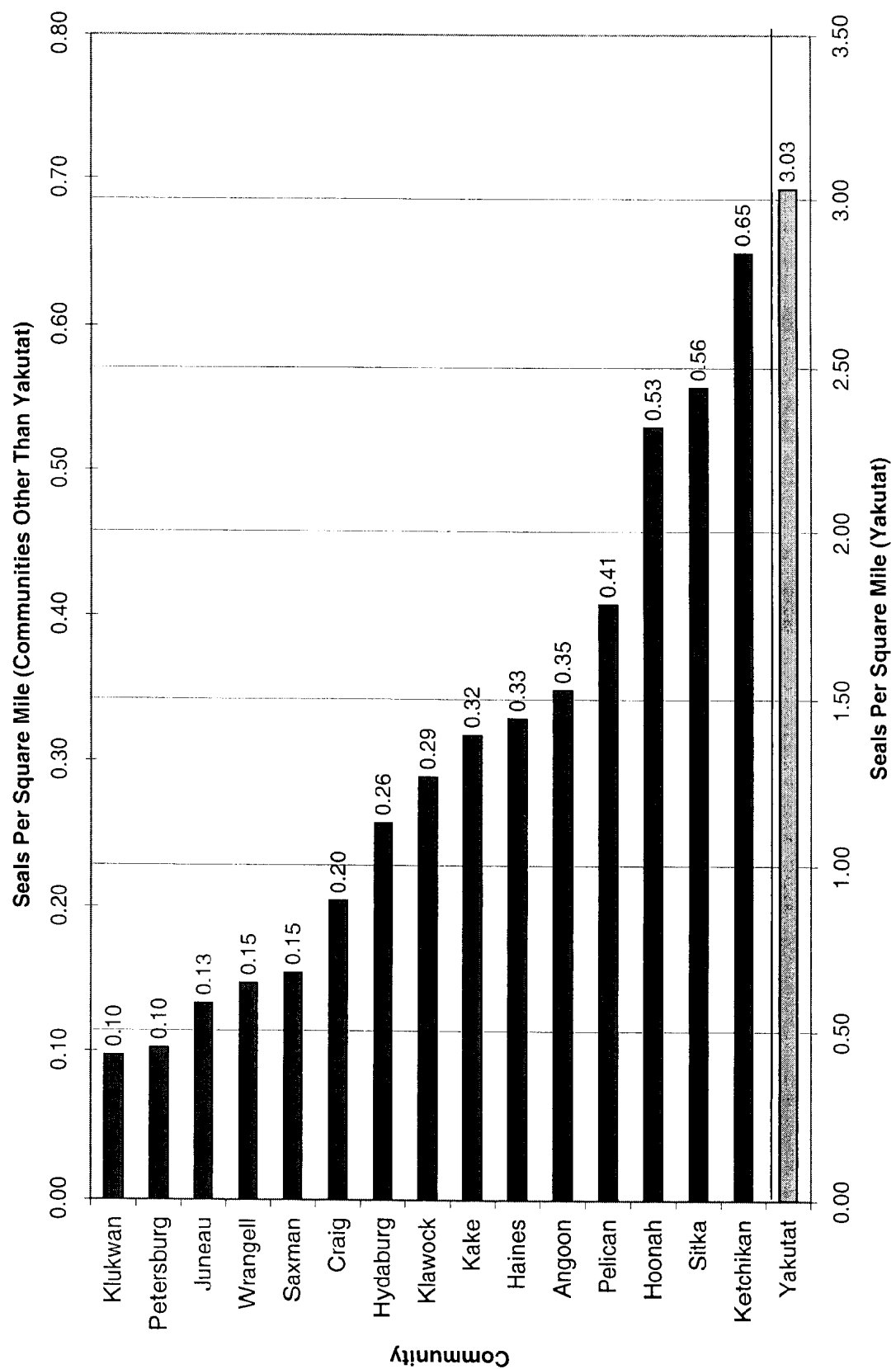
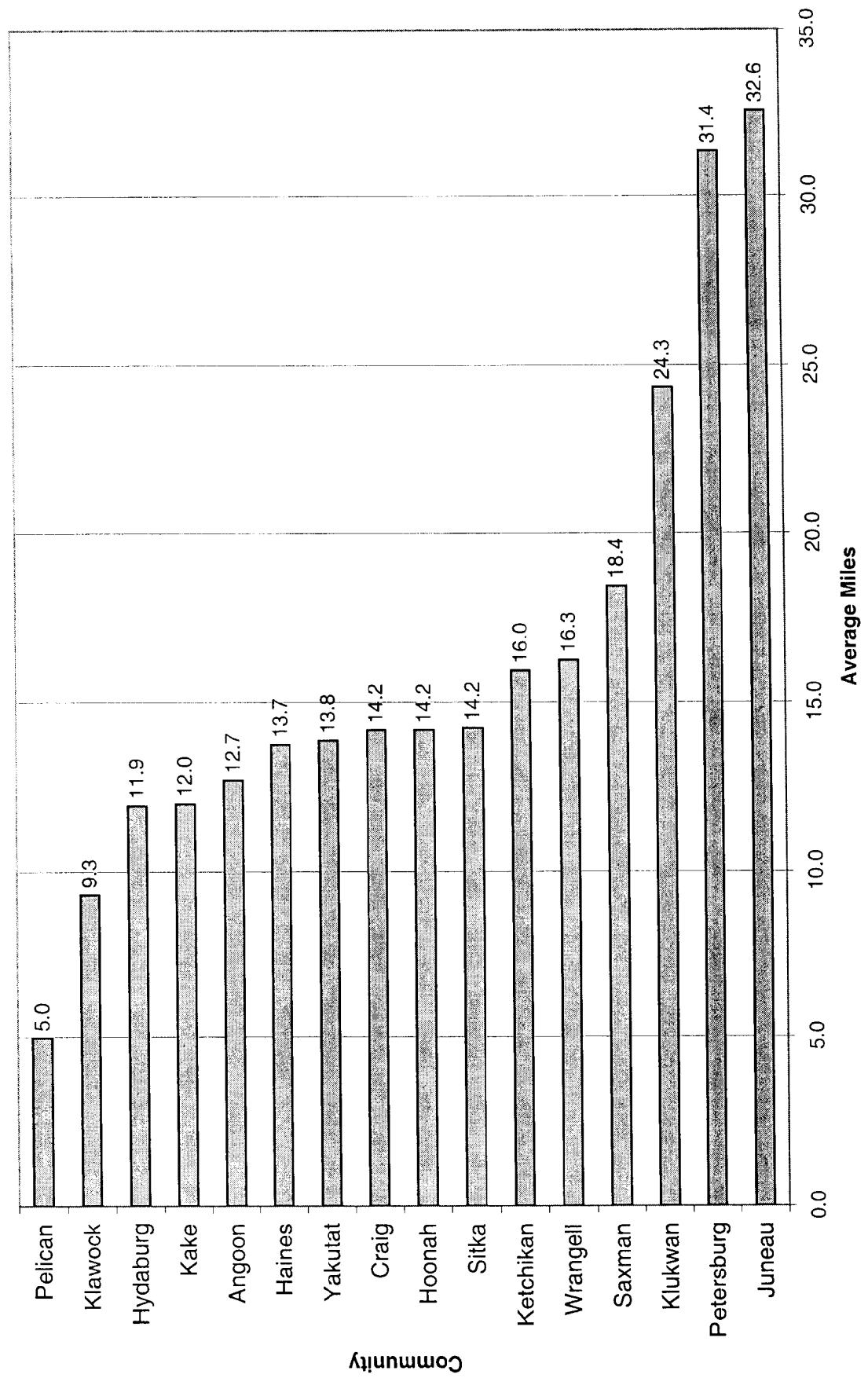


Figure 3. Average Miles Traveled Per Harvested Seal, By Community



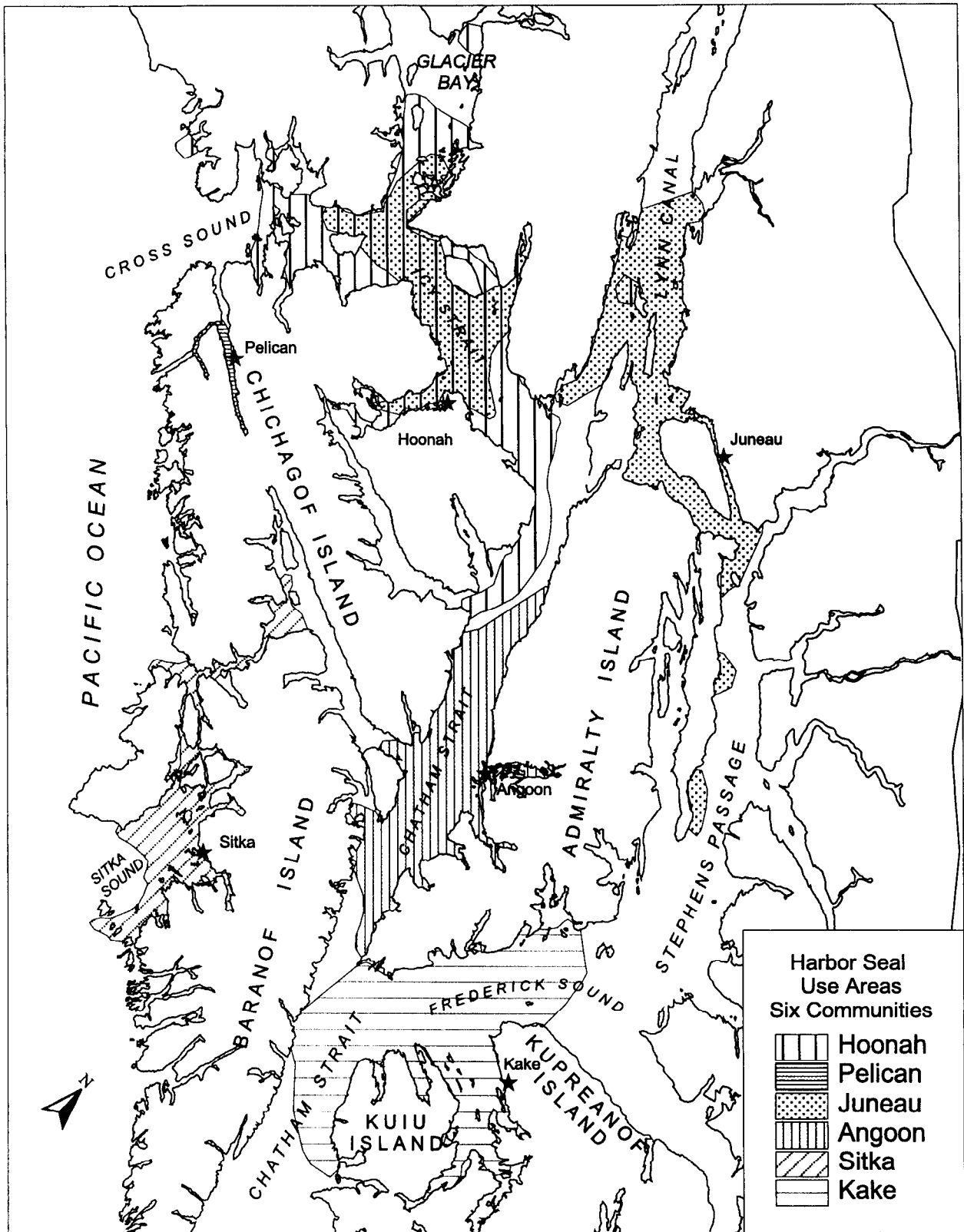
APPENDIX OF MAPS

Harvest Locations by Hunter's Residence

- Angoon
- Craig
- Haines
- Hoonah
- Hydaburg
- Juneau
- Kake
- Ketchikan
- Klawock
- Klukwan
- Pelican
- Petersburg
- Saxman
- Sitka
- Wrangell
- Yakutat

Alaska Department of Fish and Game, Division of Subsistence. Geographic Patterns of Seal Hunting in Southeast Alaska, 1992-1994

Map 2. Community Harbor Seal Use Areas, North

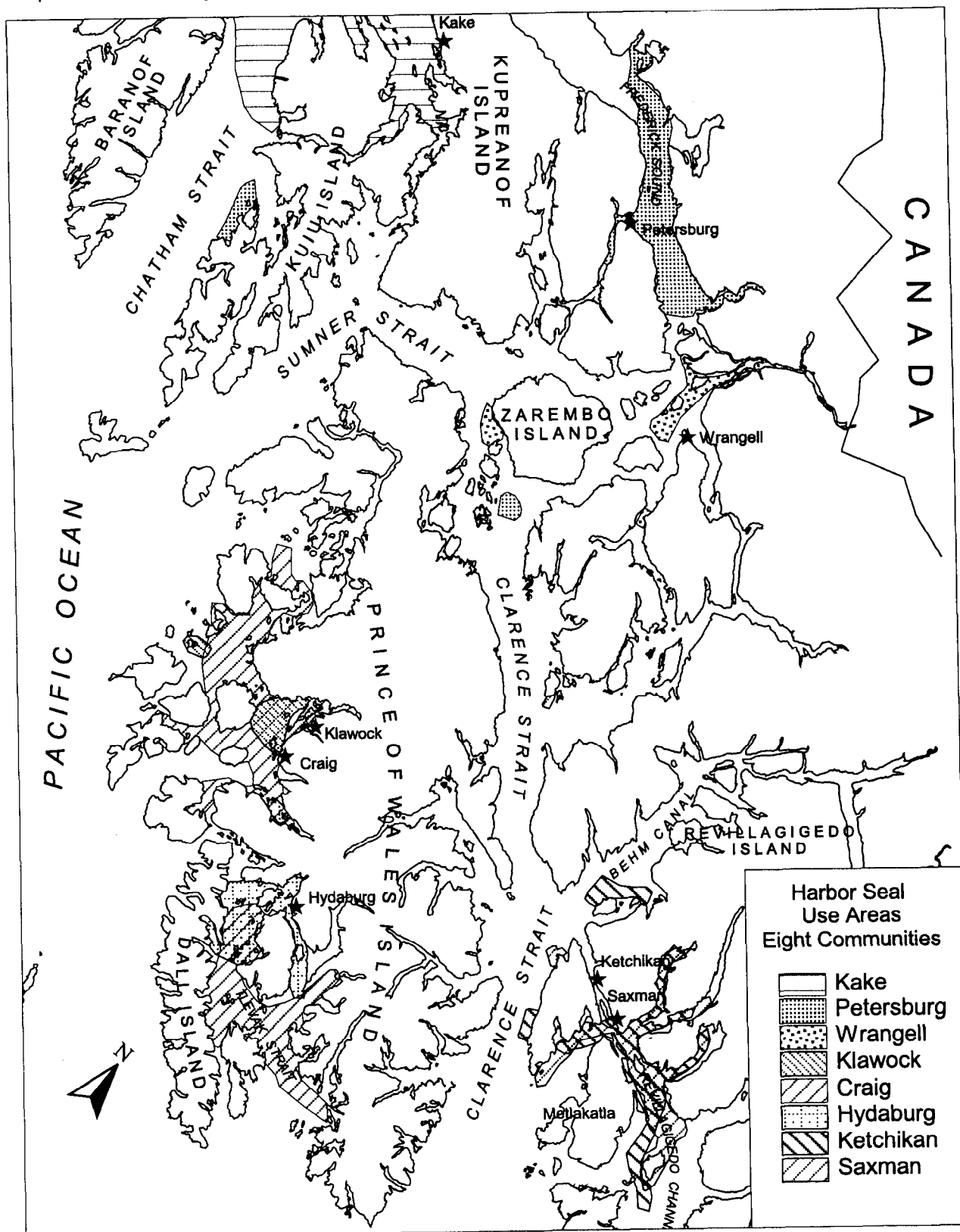


Harbor Seal Harvest Areas Of Six Southeast Alaska Communities, 1992-1994

Areas Contain 95% of Community's Harvest

Alaska Department of Fish and Game, Division of Subsistence. Harbor Seal Harvest Survey, 1992-1994

Map 3. Community Harbor Seal Use Areas, South

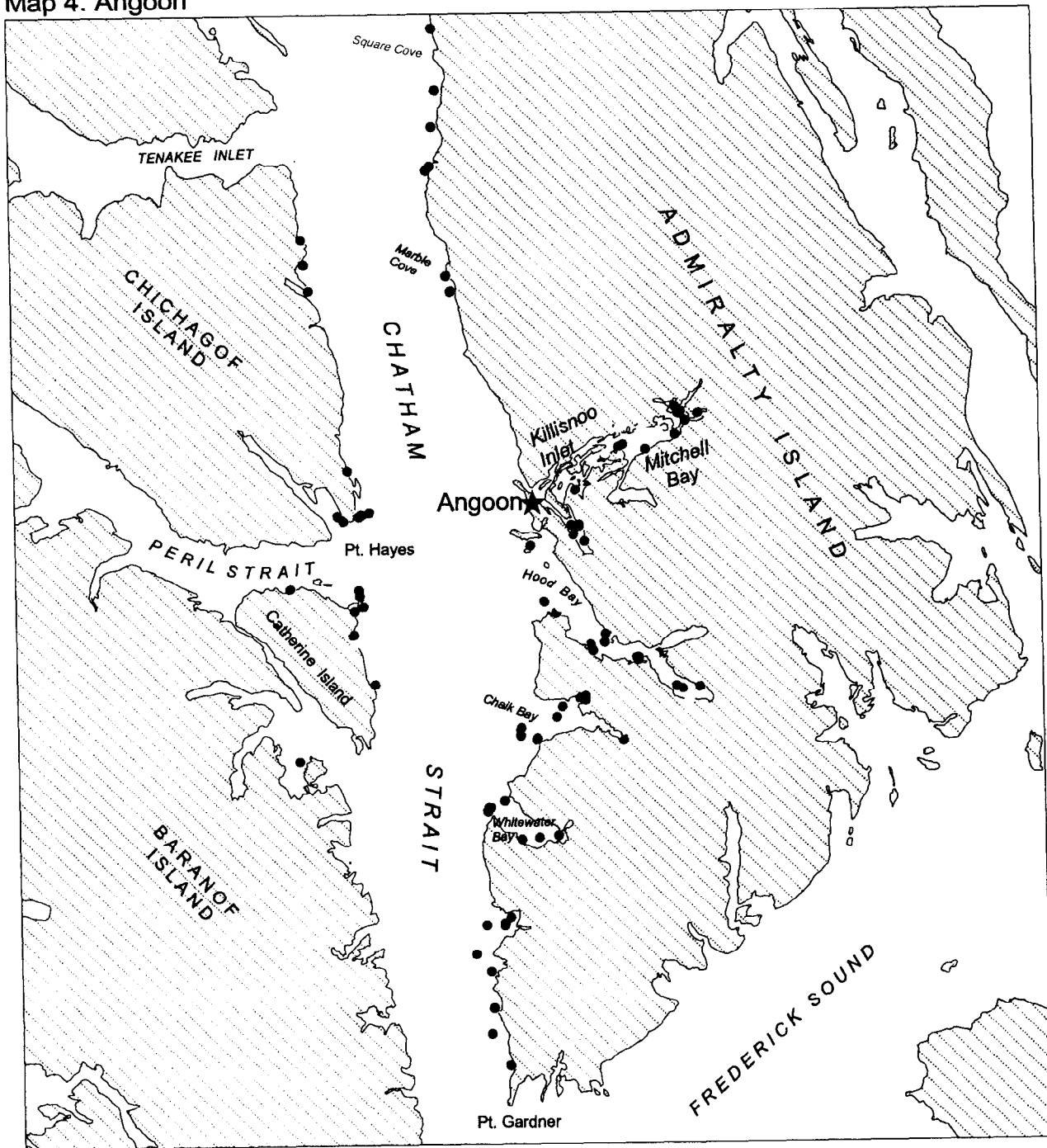


Harbor Seal Harvest Areas Of Eight Southeast Alaska Communities, 1992-1994

Areas Contain 95% of Community's Harvest

Alaska Department of Fish and Game, Division of Subsistence. Harbor Seal Harvest Survey, 1992-1994

Map 4. Angoon



Number of Seals Per Location

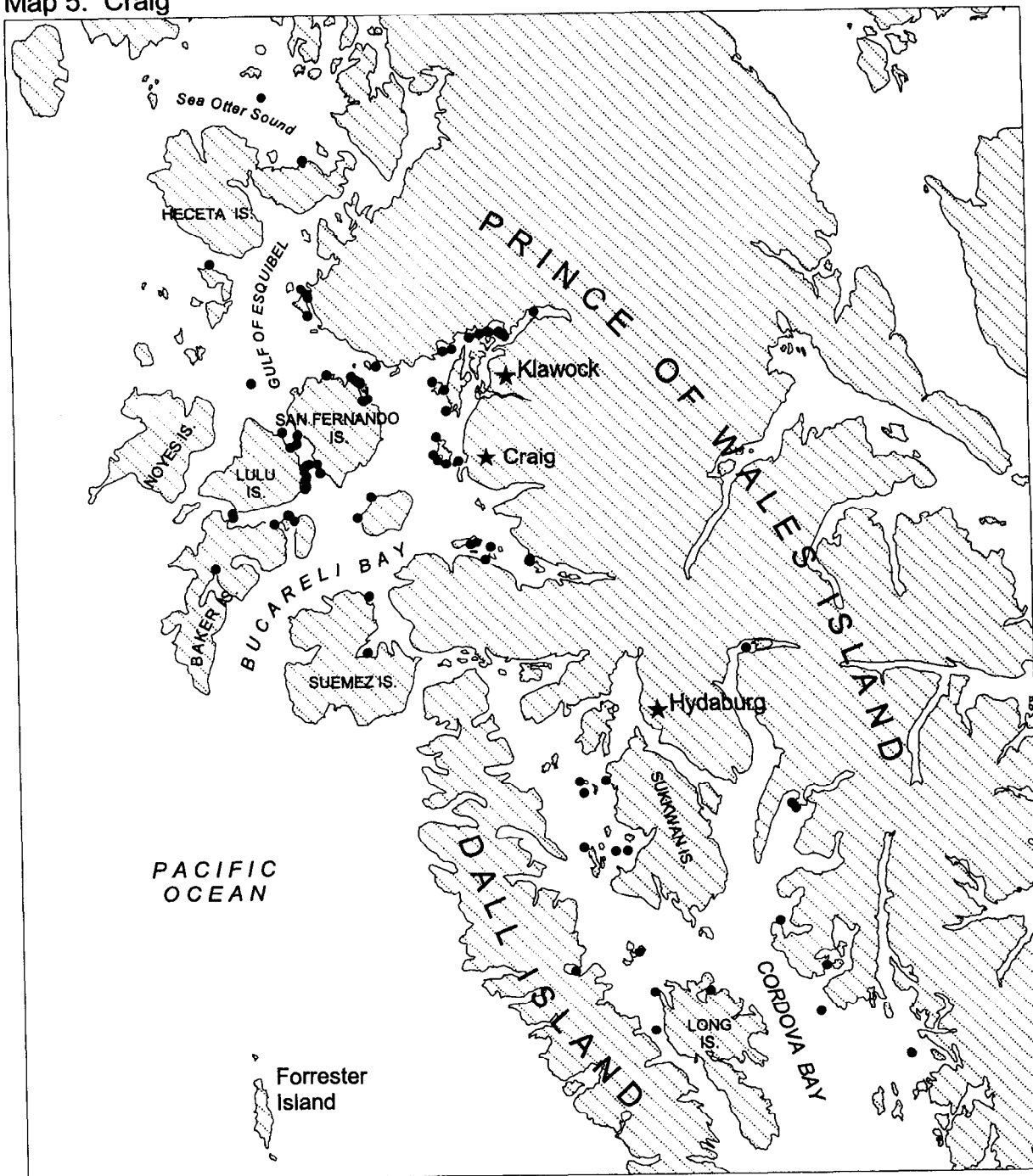
- 1
- 2
- 3-5
- 6-8
- 9-11



Harbor Seal Harvest Locations by Angoon Hunters, 1992-1994

Alaska Department of Fish and Game, Division of Subsistence. Geographic Patterns of Seal Hunting in Southeast Alaska, 1992-1994

Map 5. Craig



Number of Seals Per Location

- 1
- 2
- 3
- 4
- 5 - 7

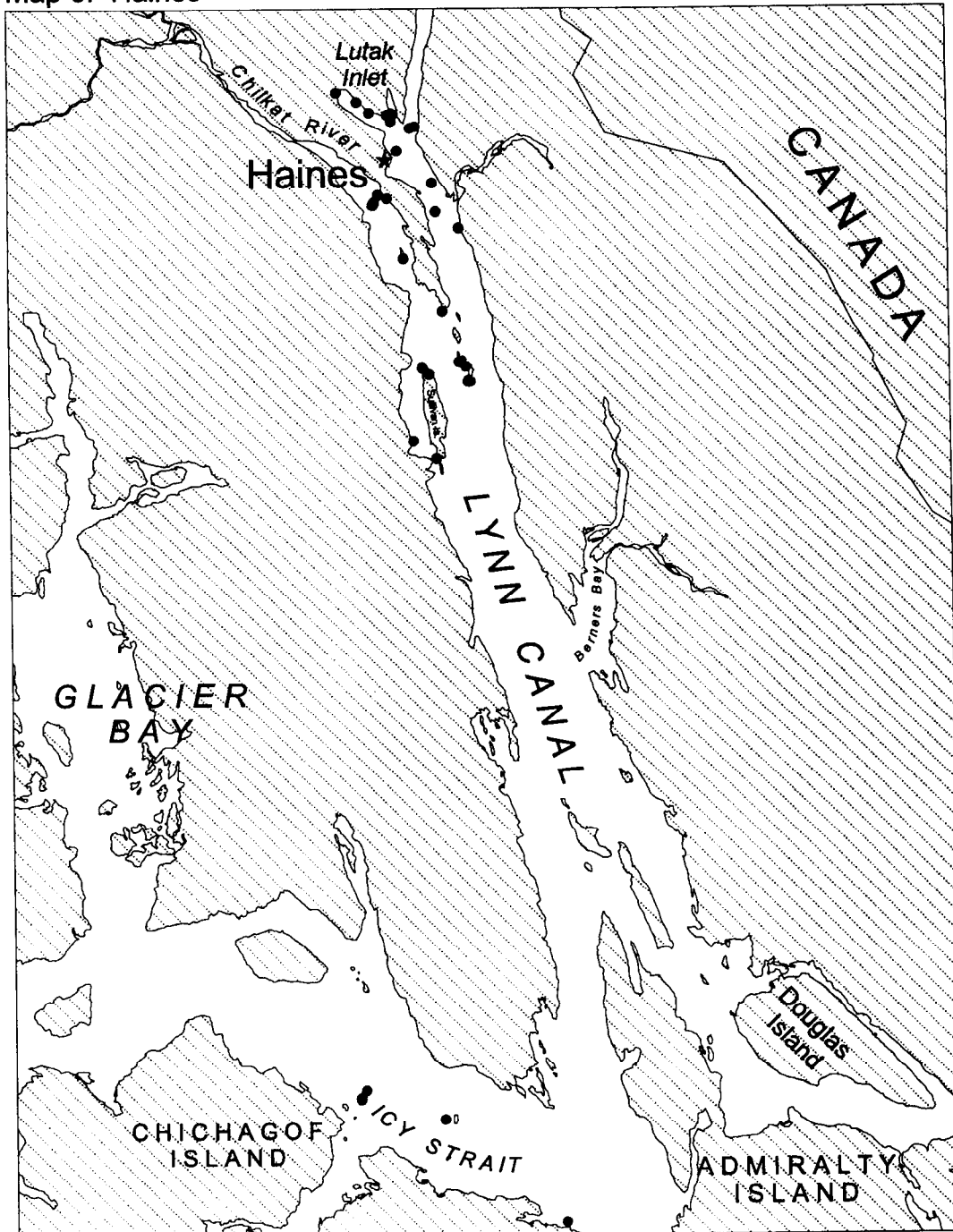


5 0 5 10 15 Miles

Harbor Seal Harvest Locations by Craig Hunters, 1992-1994

Alaska Department of Fish and Game, Division of Subsistence. Geographic Patterns of Seal Hunting in Southeast Alaska, 1992-1994

Map 6. Haines



Number of Seals Per Location

- 1
- 2
- 3
- 4 - 5
- 6 - 7

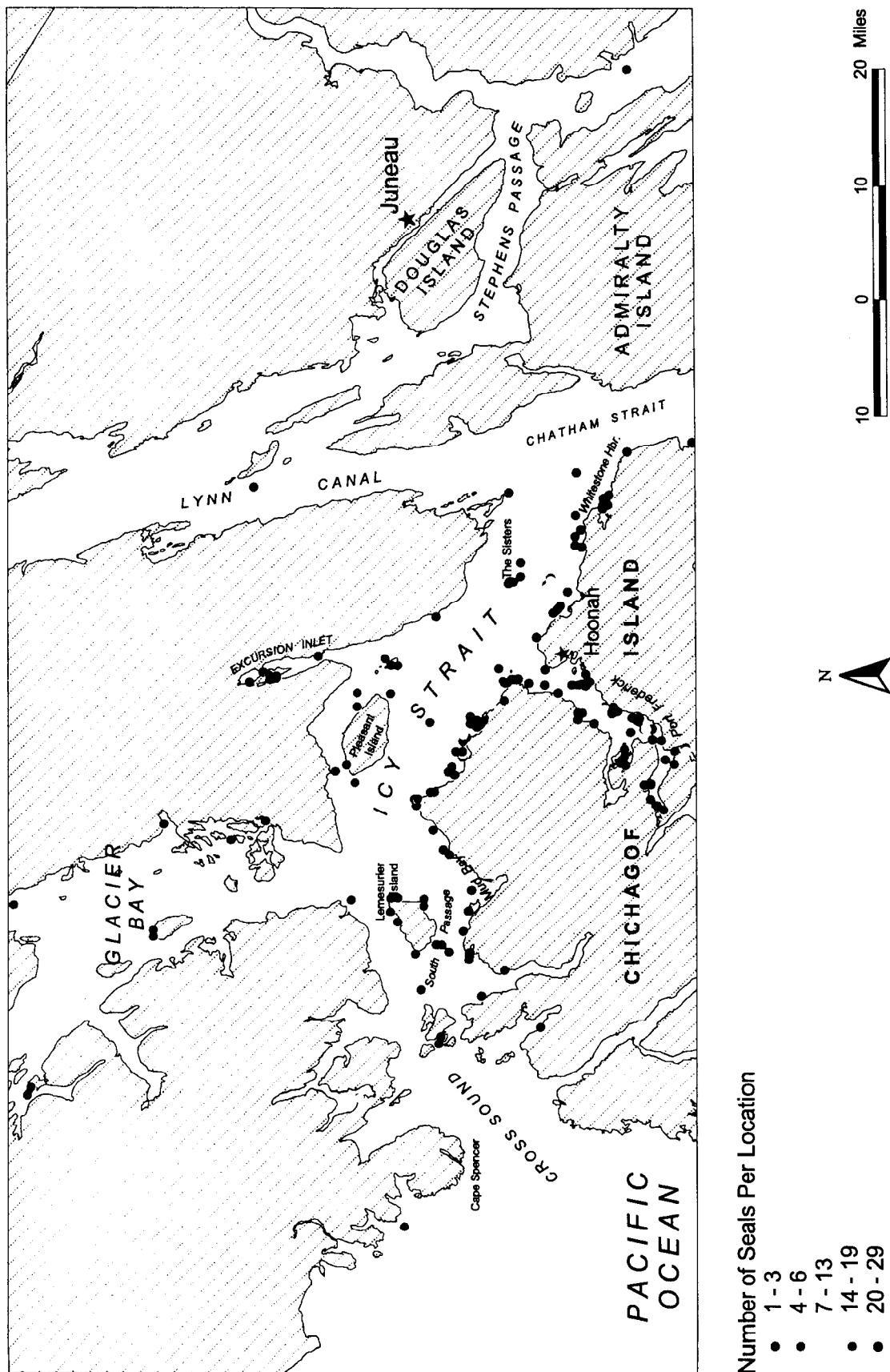


5 0 5 10 15 20 Miles

Harbor Seal Harvest Locations by Haines Hunters, 1992-1994

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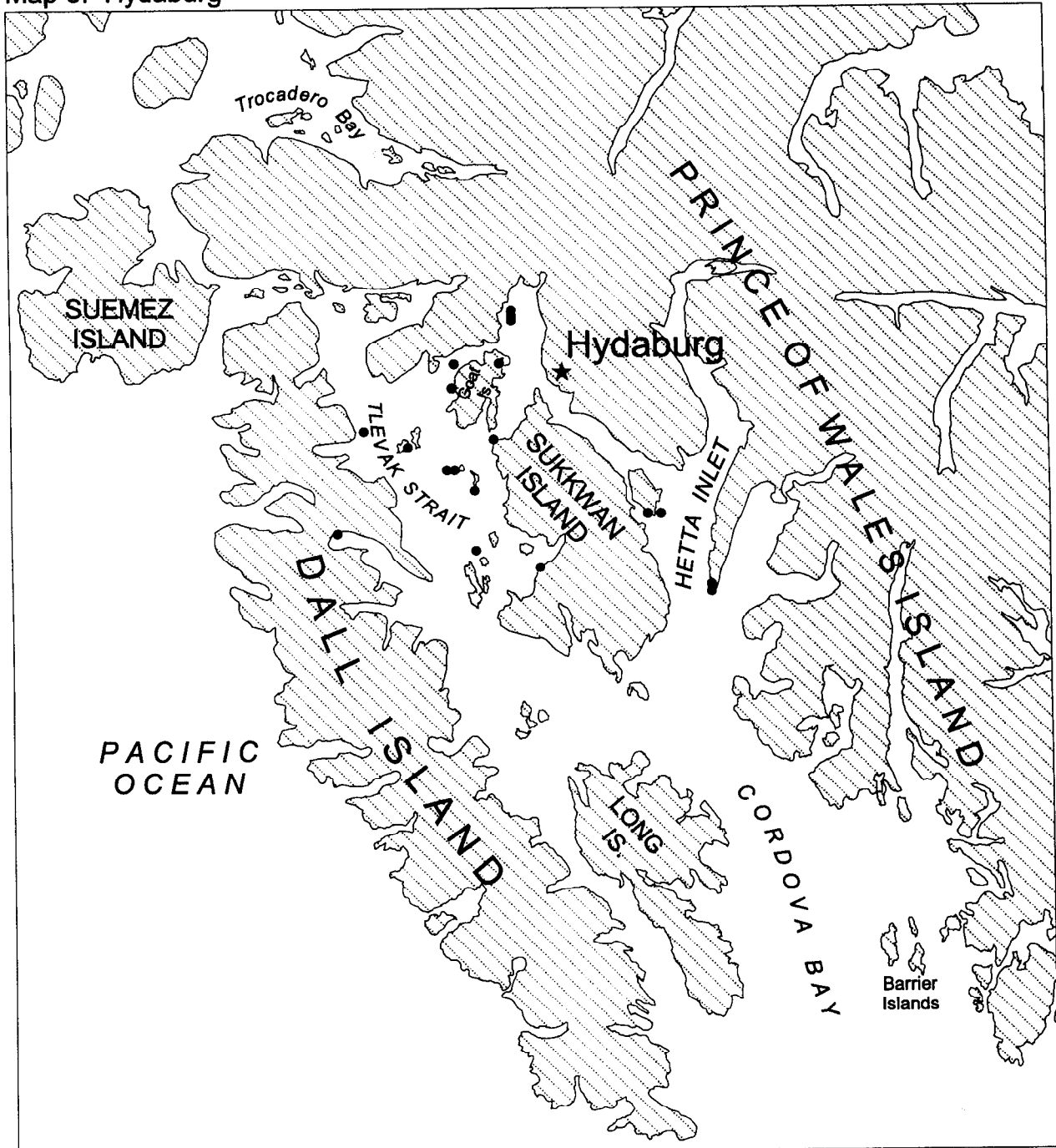
Map 7. Hoonah



Harbor Seal Harvest Locations by Hoonah Hunters, 1992-1994

Alaska Department of Fish and Game, Division of Subsistence. Geographic Patterns of Seal Hunting in Southeast Alaska, 1992-1994

Map 8. Hydaburg



Number of Seals Per Location

- 1
- 2
- 3
- 4
- 5

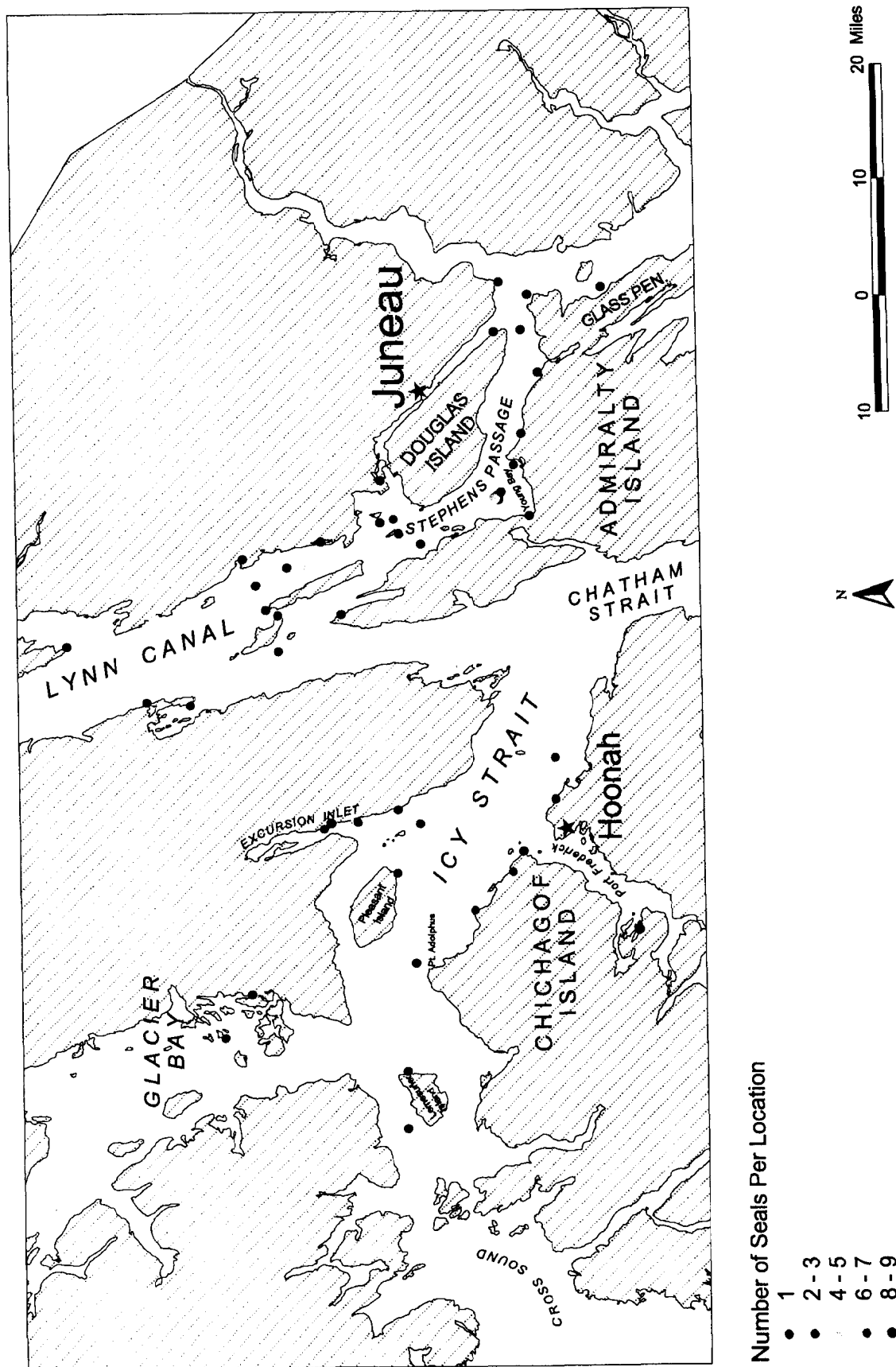


5 0 5 10 15 Miles

Harbor Seal Harvest Locations by Hydaburg Hunters, 1992-1994

Alaska Department of Fish and Game, Division of Subsistence. Geographic Patterns of Seal Hunting in Southeast Alaska, 1992-1994

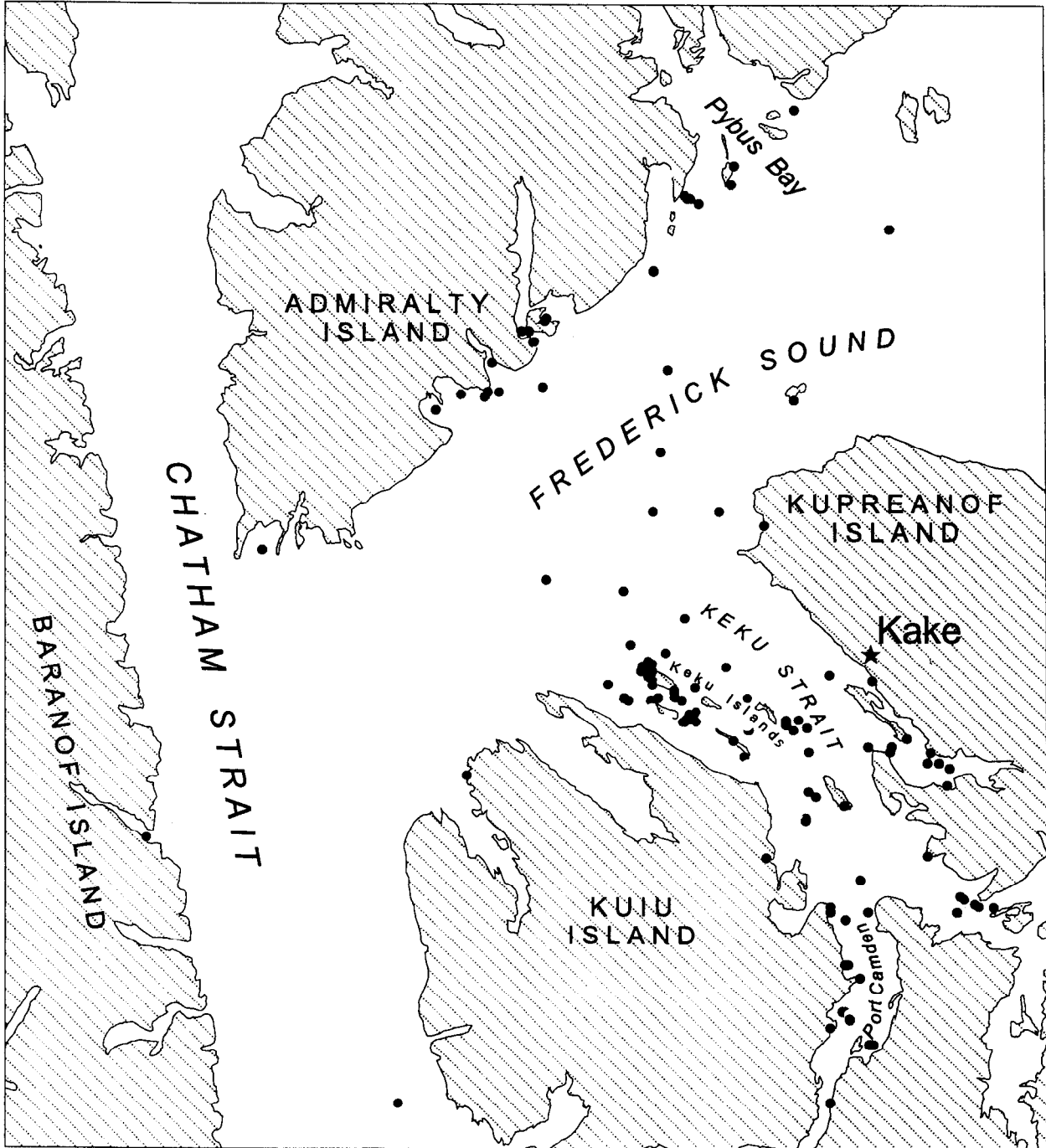
Map 9. Juneau



Harbor Seal Harvest Locations by Juneau Hunters, 1992-1994

Alaska Department of Fish and Game, Division of Subsistence. Geographic Patterns of Seal Hunting in Southeast Alaska, 1992-1994

Map 10. Kake



Number of Seals Per Location

- 1
- 2 - 3
- 4 - 5
- 6 - 7
- 8 - 10

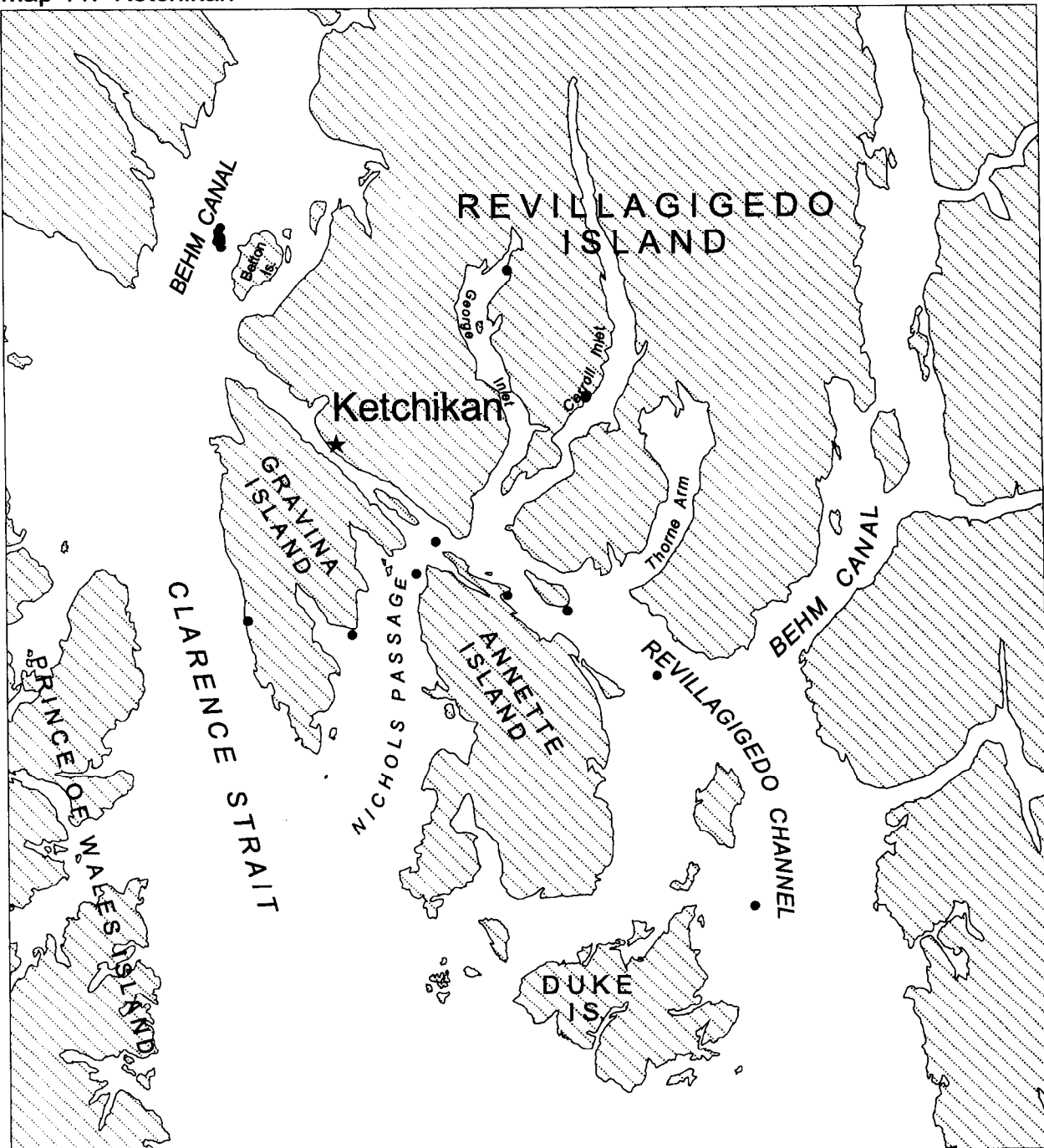


5 0 5 10 Miles

Harbor Seal Harvest by Kake Hunters, 1992-1994

Alaska Department of Fish and Game, Division of Subsistence. Geographic Patterns of Seal Hunting in Southeast Alaska, 1992-1994

Map 11. Ketchikan



Number of Seals Per Location

- 1 - 2
- 3 - 4
- 5 - 7
- 8 - 11
- 12 - 15

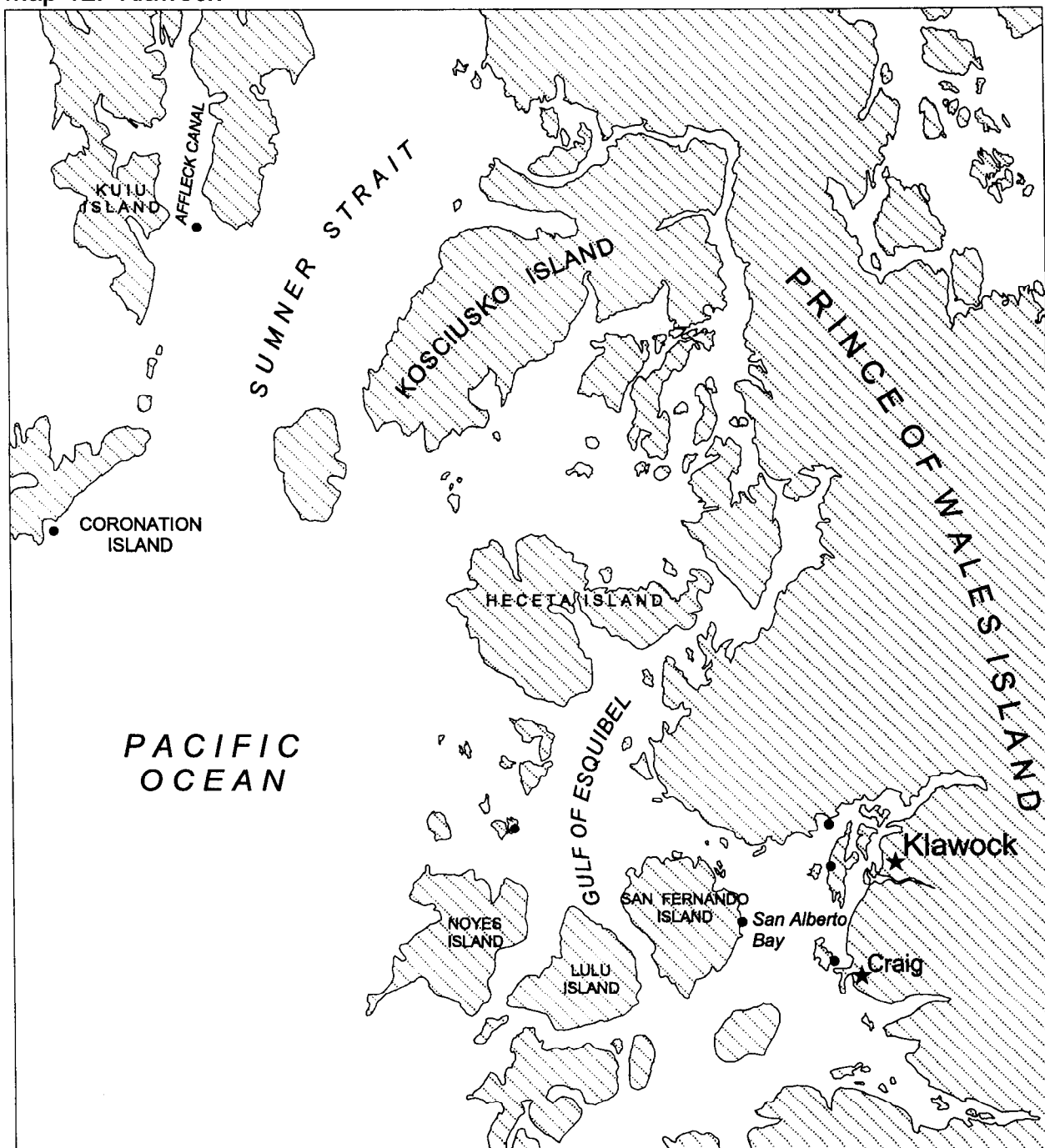


5 0 5 10 15 Miles

Harbor Seal Harvest Locations by Ketchikan Hunters

Alaska Department of Fish and Game, Division of Subsistence. Geographic Patterns of Seal Hunting in Southeast Alaska, 1992-1994

Map 12. Klawock



Number of Seals Per Location

- 1
- 2
- 3
- 4
- 5 - 8

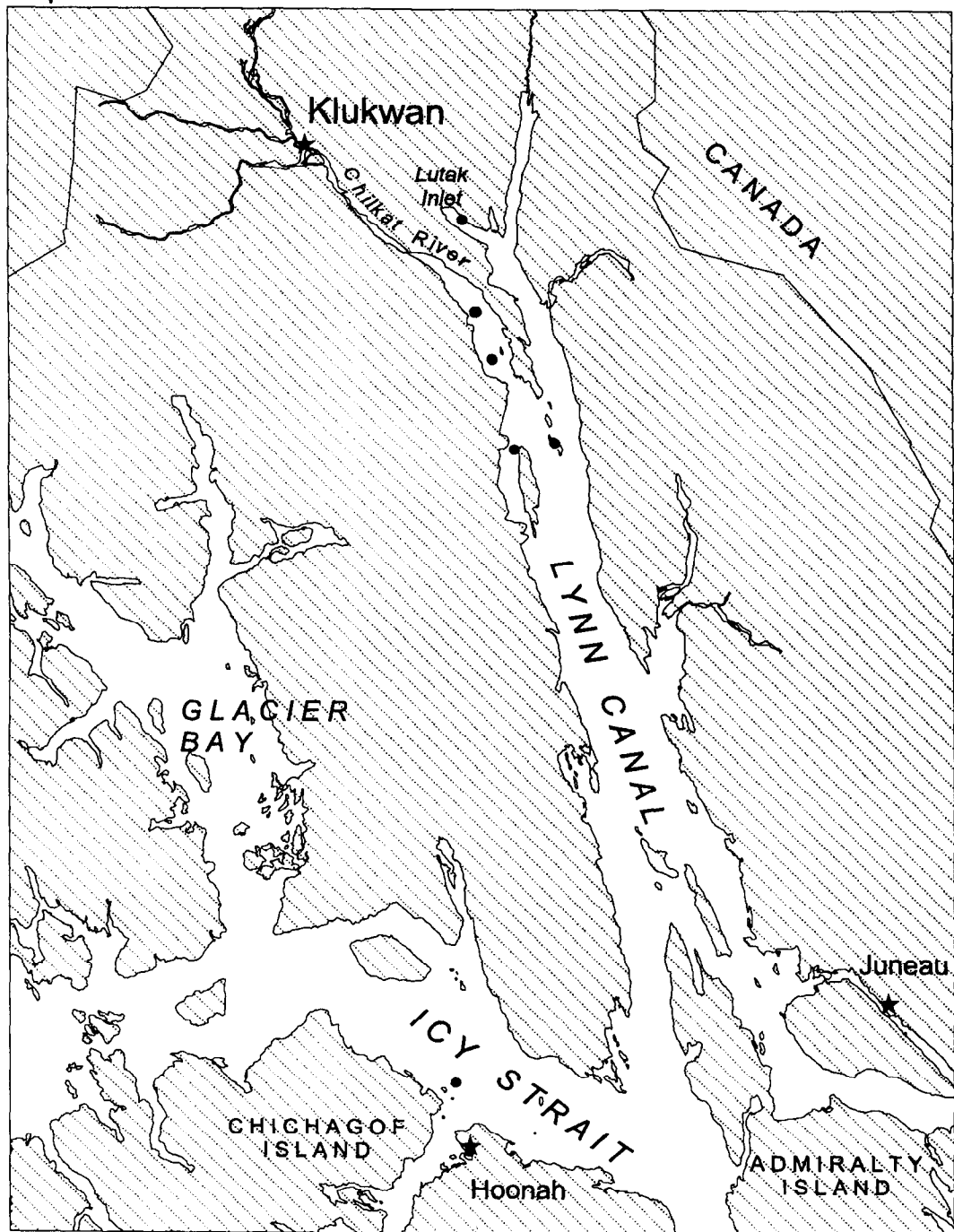


5 0 5 10 15 Miles

Harbor Seal Harvest Locations by Klawock Hunters, 1992-1994

Alaska Department of Fish and Game, Division of Subsistence. Geographic Patterns of Seal Hunting in Southeast Alaska, 1992-1994

Map 13. Klukwan



Number of Seals Per Location

- 1
- 2
- 3
- 4
- 5



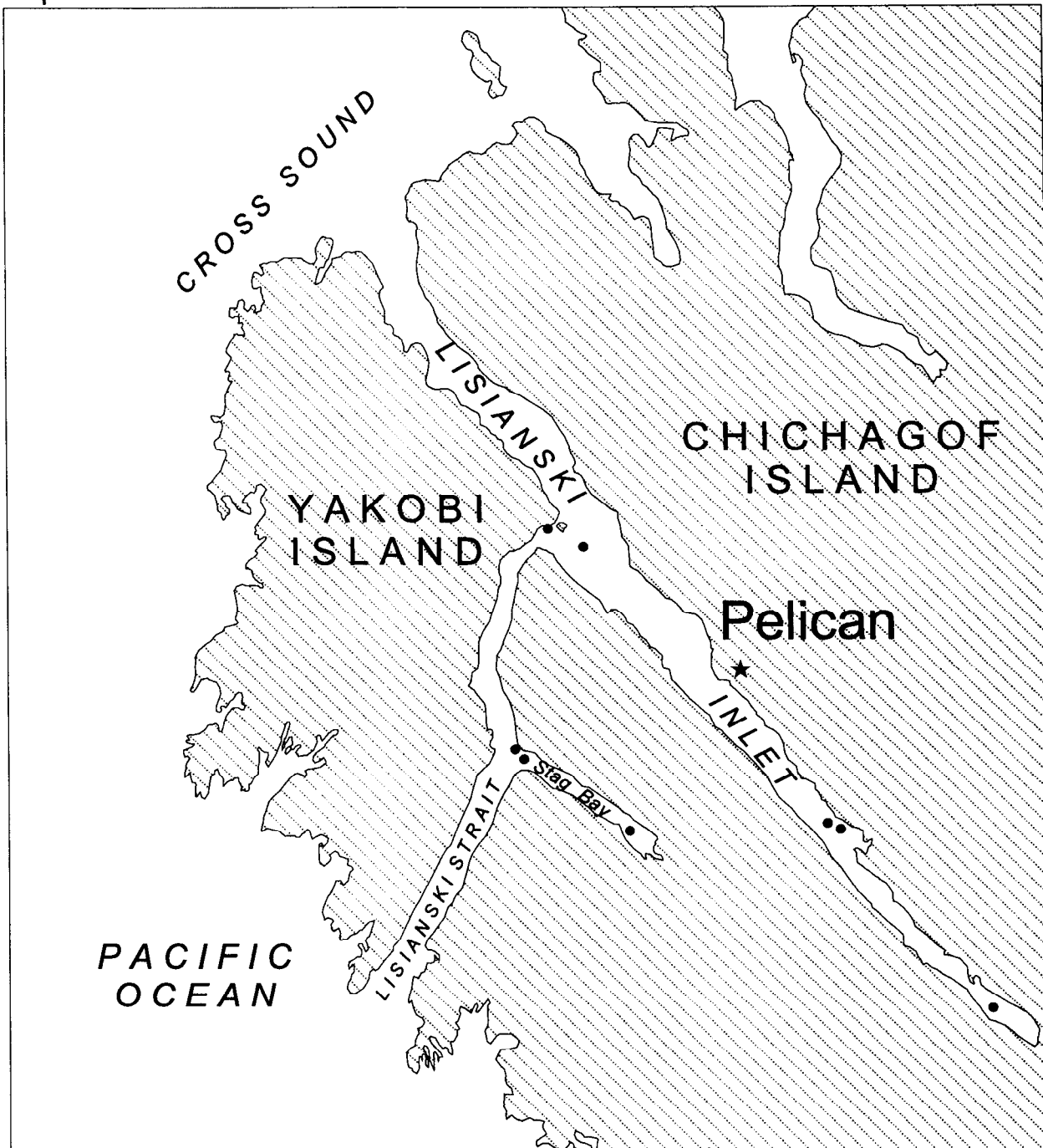
5 0 5 10 15 20 Miles

A scale bar with markings at 5, 0, 5, 10, 15, and 20 miles.

Harbor Seal Harvest Locations by Klukwan Hunters, 1992-1994

Alaska Department of Fish and Game, Division of Subsistence. Geographic Patterns of Seal Hunting in Southeast Alaska, 1992-1994

Map 14. Pelican



Number of Seals Per Location

- 1
- 2
- 3
- 4
- 5

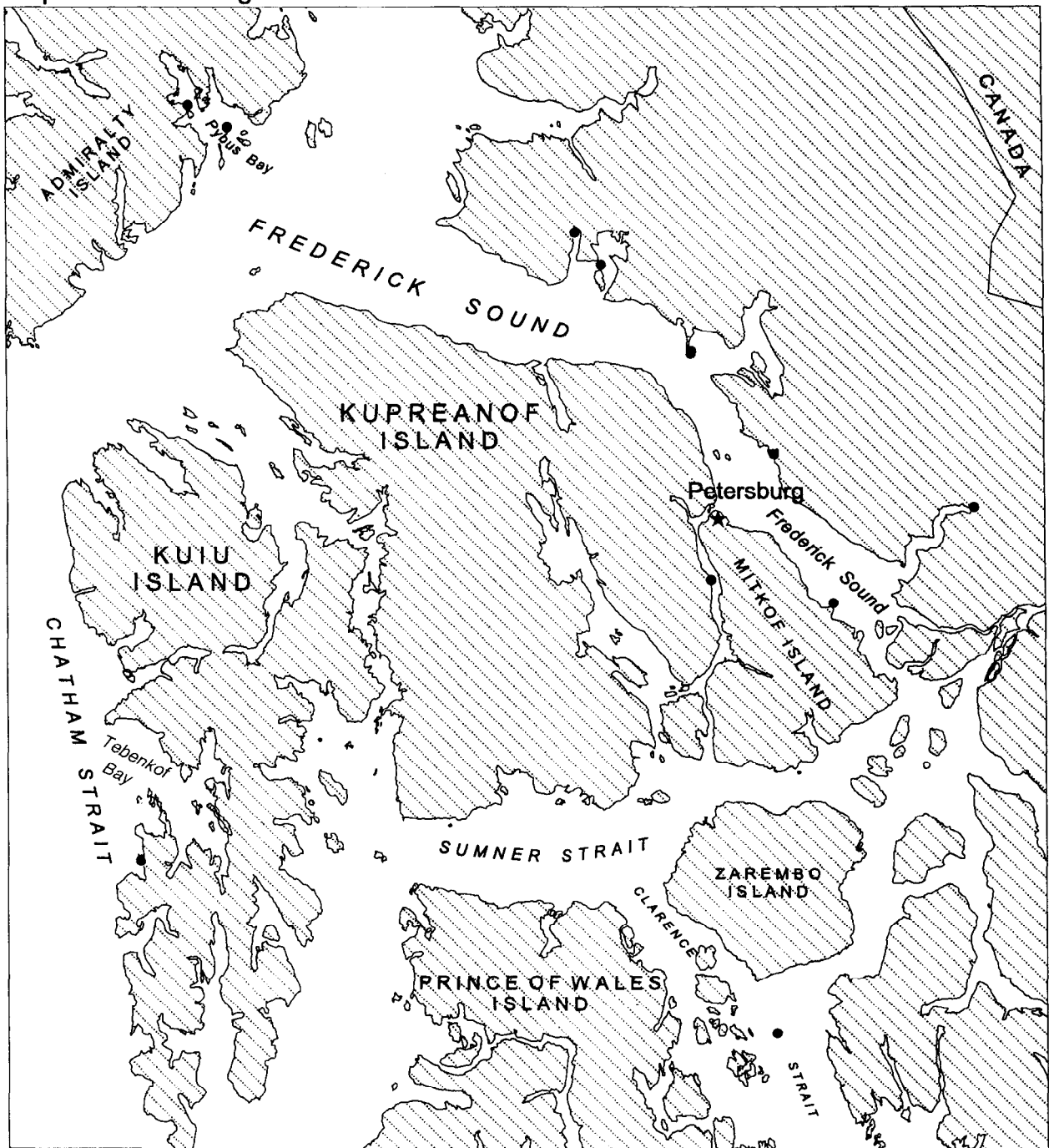


2 0 2 4 6 Miles

Harbor Seal Harvest Locations by Pelican Hunters, 1992-1994

Alaska Department of Fish and Game, Division of Subsistence. Geographic Patterns of Seal Hunting in Southeast Alaska, 1992-1994

Map 15. Petersburg



Number of Seals Per Location

- 1
- 2
- 3
- 4
- 5

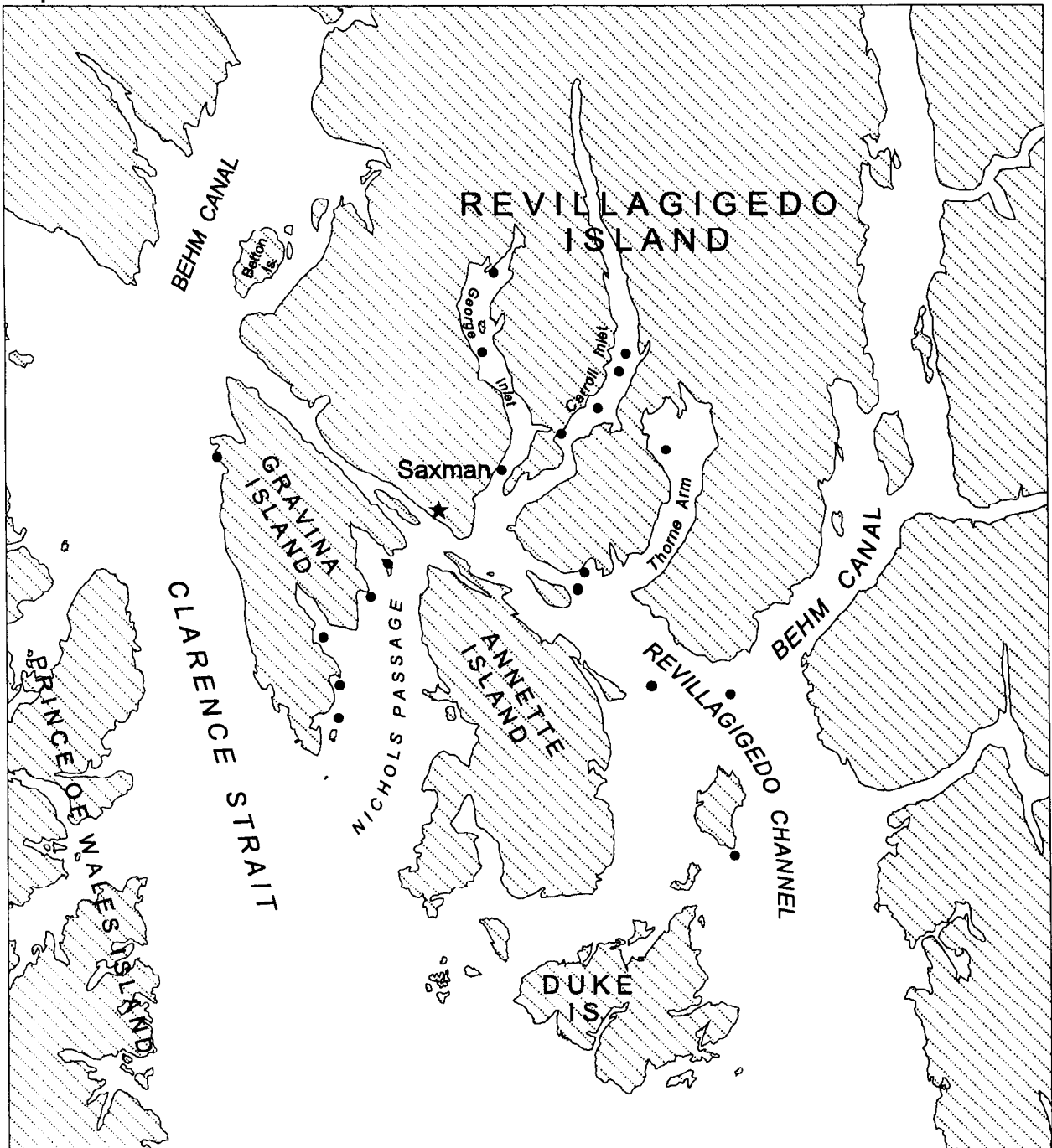


5 0 5 10 15 20 Miles

Harbor Seal Harvest Locations by Petersburg Hunters, 1992-1994

Alaska Department of Fish and Game, Division of Subsistence. Geographic Patterns of Seal Hunting in Southeast Alaska, 1992-1994

Map 16. Saxman



Number of Seals Per Location

- 1
- 2
- 3
- 4
- 5 - 6

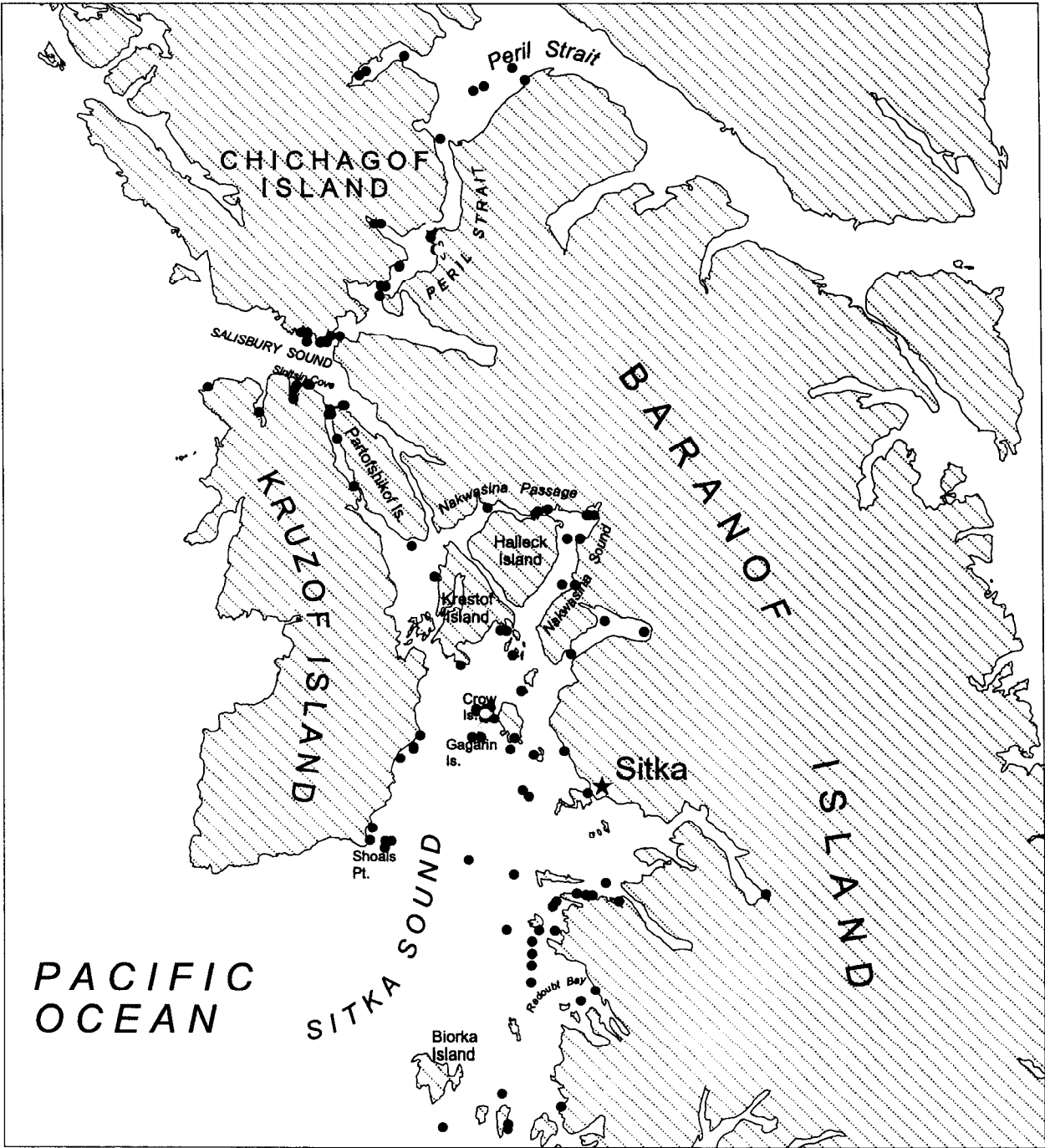


5 0 5 10 15 Miles

Harbor Seal Harvest Locations by Saxman Hunters, 1992-1994

Alaska Department of Fish and Game, Division of Subsistence. Geographic Patterns of Seal Hunting in Southeast Alaska, 1992-1994

Map 17. Sitka



Number of Seals Per Location

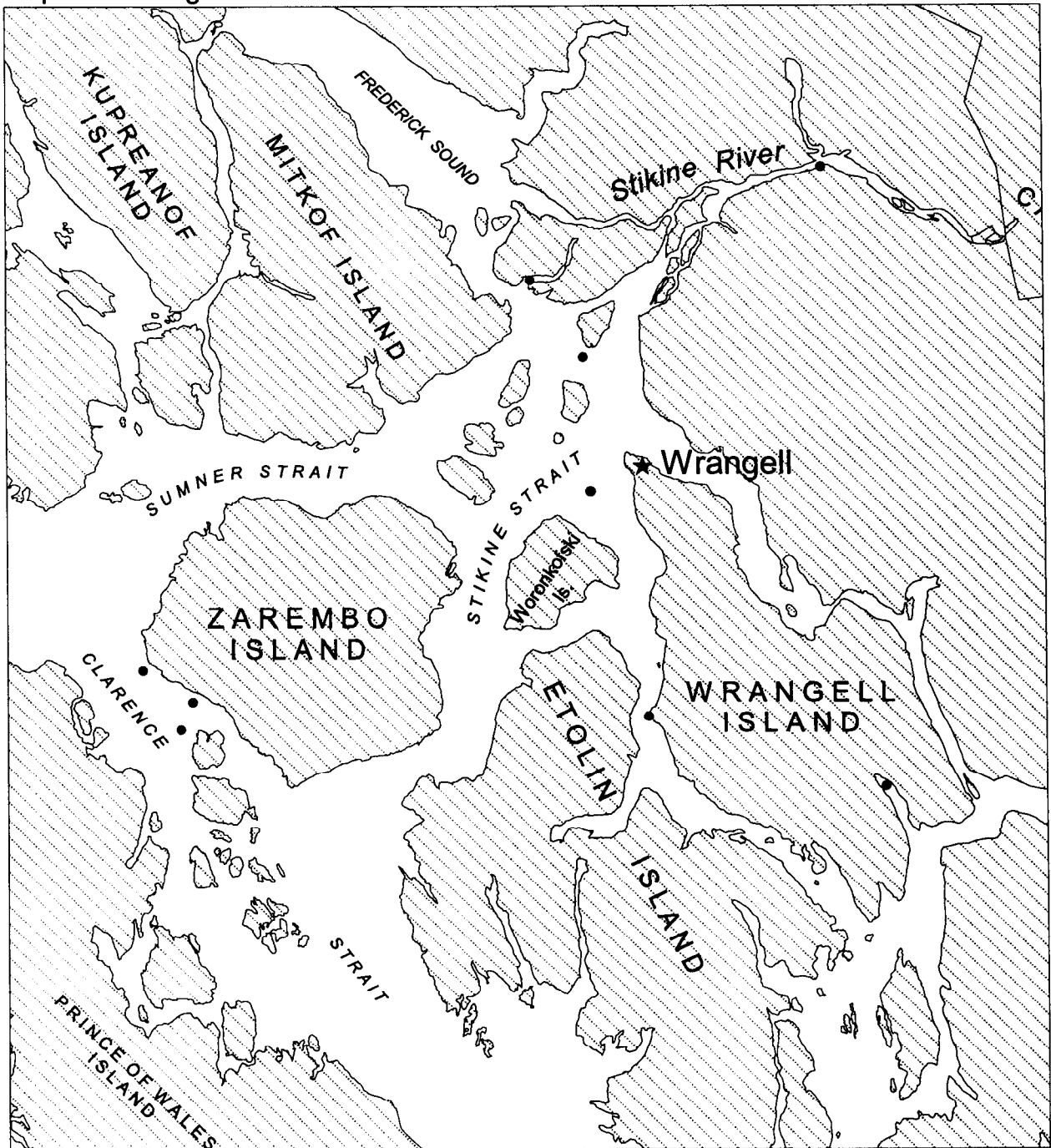
- 1
- 2
- 3
- 4
- 5



Harbor Seal Harvest Locations by Sitka Hunters, 1992-1994

Alaska Department of Fish and Game, Division of Subsistence. Geographic Patterns of Seal Hunting in Southeast Alaska, 1992-1994

Map 18. Wrangell



Number of Seals Per Location

- 1
- 2
- 3
- 4
- 5

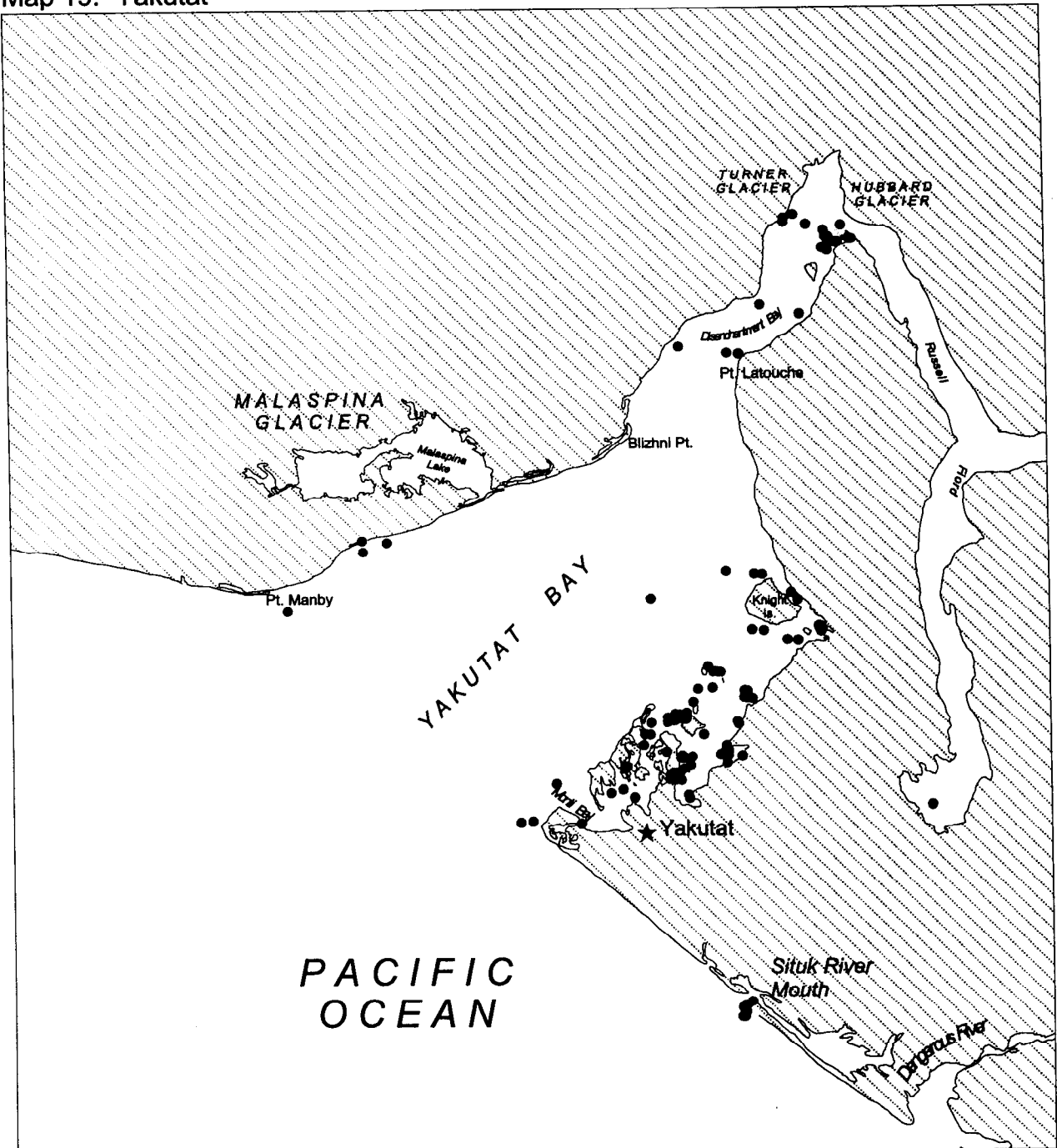


5 0 5 10 15 Miles

Harbor Seal Harvest Locations by Wrangell Hunters, 1992-1994

Alaska Department of Fish and Game, Division of Subsistence. Geographic Patterns of Seal Hunting in Southeast Alaska, 1992-1994

Map 19. Yakutat



Number of Seals Per Location

- 1 - 6
- 7 - 13
- 14 - 22
- 23 - 32
- 33 - 73

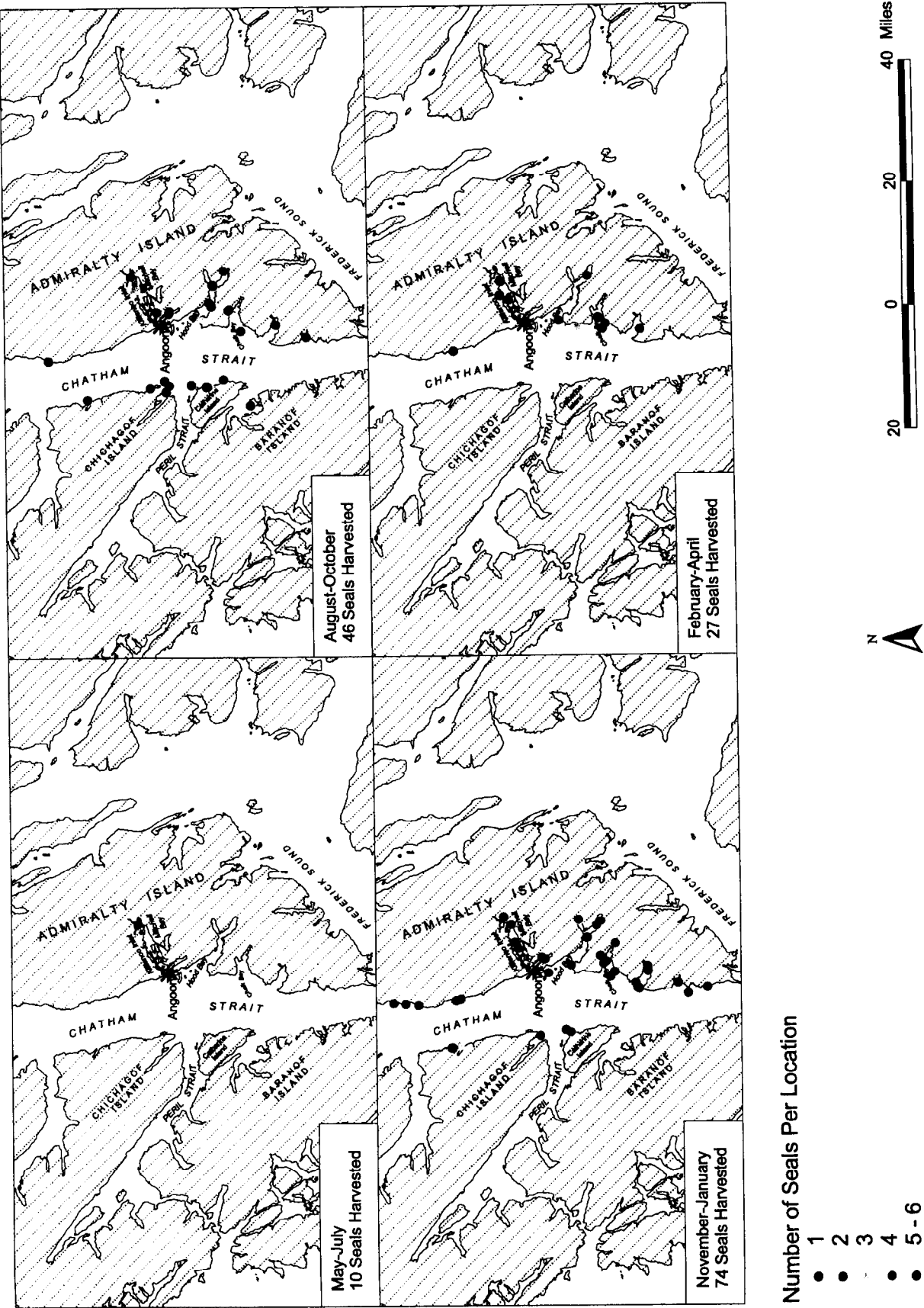


5 0 5 10 Miles

Harbor Seal Harvest Locations by Yakutat Hunters, 1992-1994

Alaska Department of Fish and Game, Division of Subsistence. Geographic Patterns of Seal Hunting in Southeast Alaska, 1992-1994

Map 20. Angoon Seasons



Harbor Seal Harvest Locations by Season, Angoon Hunters, 1992-1993

Alaska Department of Fish and Game, Division of Subsistence. Geographic Patterns of Seal Hunting in Southeast Alaska, 1992-1994

The figure consists of four maps of the Chichagof Island area, arranged in a 2x2 grid. Each map shows the coastline of Chichagof Island, including features like Glacier Bay, Lynn Canal, Chatham Strait, and the Pacific Ocean. The maps are labeled with the harvest period and the number of seals harvested:

- Top Left:** August-October 1955 Seals Harvested (195 seals). The harvest locations are marked with black dots, showing a high density of seals along the western coast of Chichagof Island, particularly in the area of Glacier Bay and Lynn Canal.
- Top Right:** February-April 101 Seals Harvested. The harvest locations are marked with black dots, showing a high density of seals along the western coast of Chichagof Island, particularly in the area of Glacier Bay and Lynn Canal.
- Bottom Left:** May-July 36 Seals Harvested. The harvest locations are marked with black dots, showing a lower density of seals along the western coast of Chichagof Island, particularly in the area of Glacier Bay and Lynn Canal.
- Bottom Right:** November-January 180 Seals Harvested. The harvest locations are marked with black dots, showing a high density of seals along the western coast of Chichagof Island, particularly in the area of Glacier Bay and Lynn Canal.

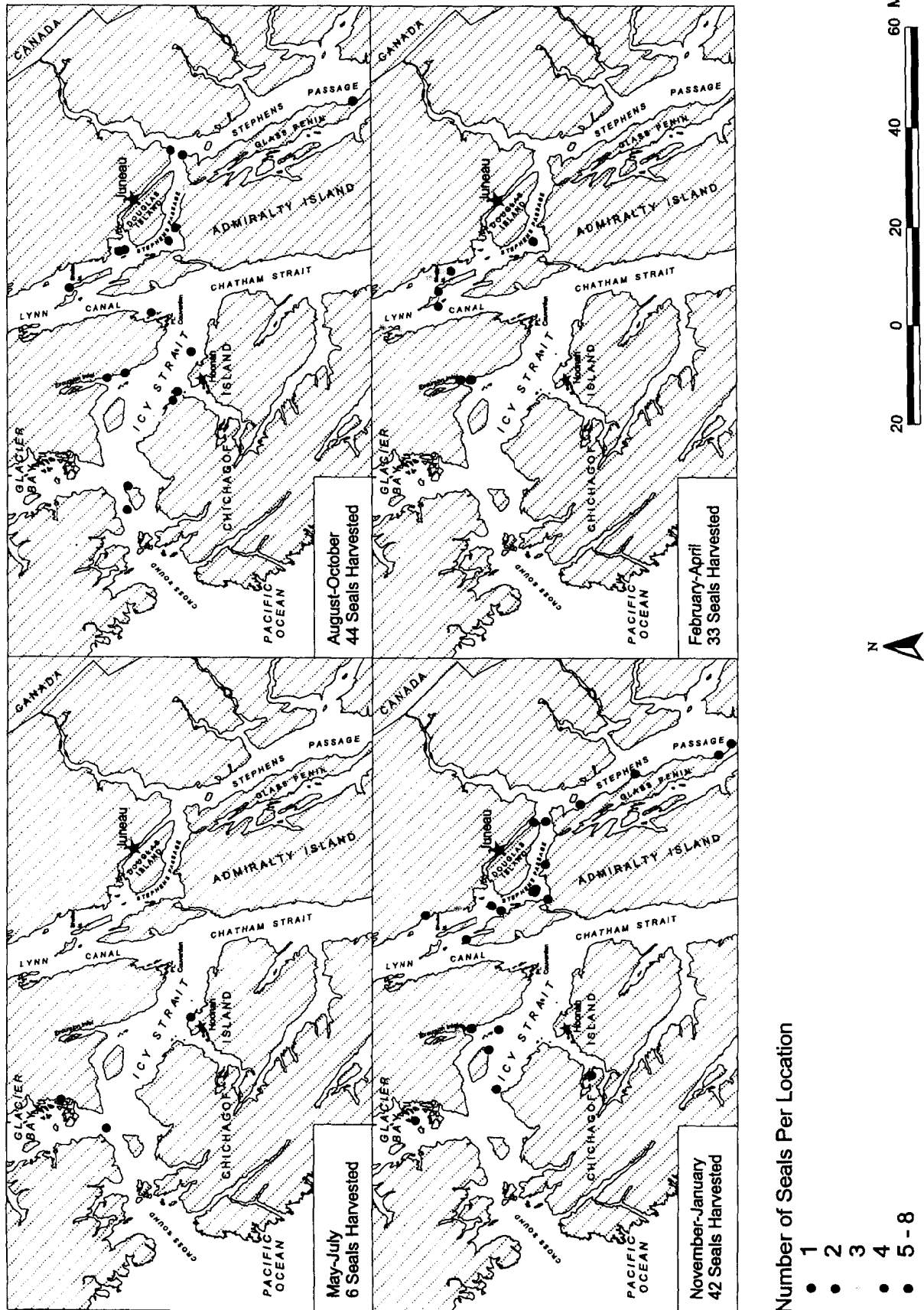
- 1-2
- 3-4
- 5-7
- 8-10
- 11-18



Harbor Seal Harvest Locations by Season, Hoonah Hunters, 1992-1993

Alaska Department of Fish and Game, Division of Subsistence. Geographic Patterns of Seal Hunting in Southeast Alaska, 1992-1994

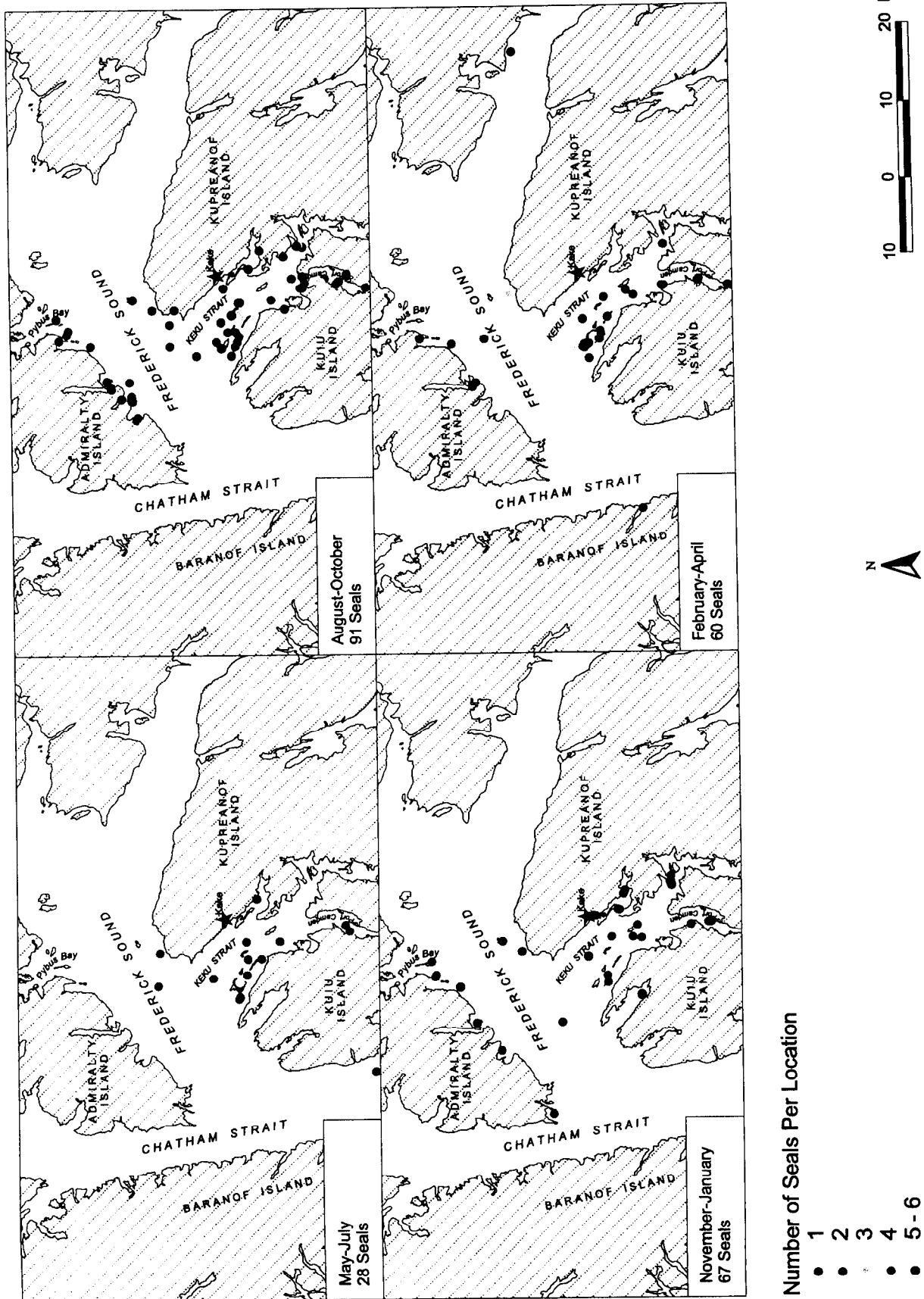
Map 22. Juneau Seasons



Harbor Seal Harvest Locations by Season, Juneau Hunters, 1992-1993

Alaska Department of Fish and Game, Division of Subsistence. Harbor Seal Harvest Survey, 1992-1994

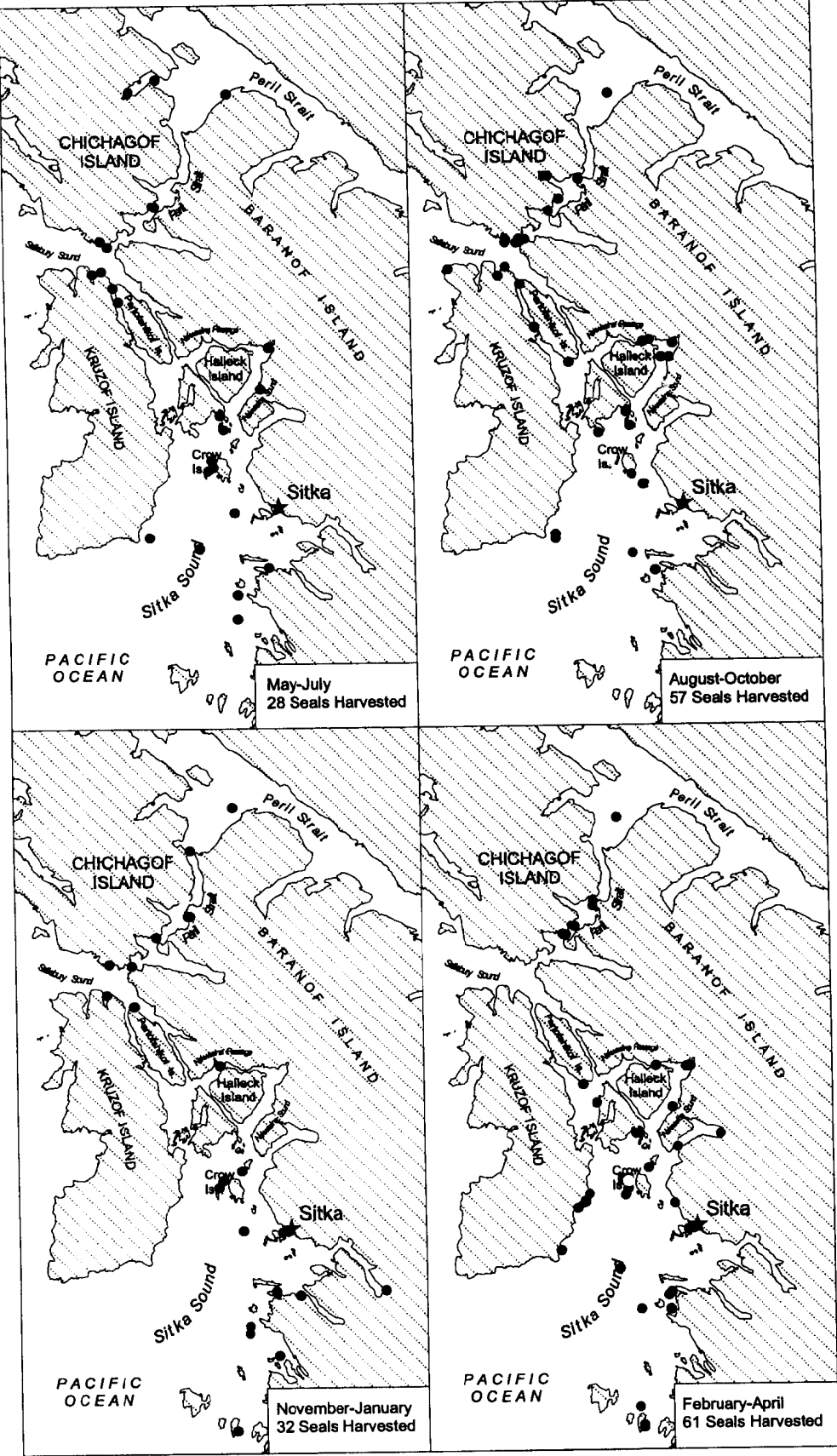
Map 23. Kake Seasons



Harbor Seal Harvest Locations by Season, Kake Hunters, 1992-1993

Alaska Department of Fish and Game, Division of Subsistence. Geographic Patterns of Seal Hunting in Southeast Alaska, 1992-1994

Map 24. Sitka Seasons



Harbor Seal Harvest Locations by Season, Sitka Hunters, 1992-1993

Alaska Department of Fish and Game, Division of Subsistence. Harbor Seal Harvest Survey, 1992-1994