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AVAILABILITY OF POLLOCK IN RELATION TO POSSIBLE SURIMI PRODUCTION CENTERS

A Report Prepared For:

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APPENDIX III

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Introduction

In this report we examine the availability of the pollock resource within 60, 100, 150 and 200 miles of nine potential production centers for surimi. The locations are St. Paul (Pribilof Islands), Akutan, Sand Point, Chignik, Kodiak, Homer, Seward, Sitka and Petersburg. Results of the analysis for Akutan are also generally applicable to Dutch Harbor.

We have studied the availability of pollock by analyzing records of the following:

1. The history of harvests as shown by the annual foreign and joint venture catches according to blocks of $\frac{1}{2}^{o}$ latitude by 1^{o} longtitude, the smallest reporting units available;

2. The potential harvests as represented by the calculated fraction of the 1984 optimum yield (OY) that is within 60, 100, 150 and 200 miles of each location;

3. The seasonal availability as indicated by the quarterly distribution of foreign catches within 100 miles and 200 miles of each location;

4. The harvest rates as shown by the tons of pollock caught per hour of trawling by large Japanese stern trawlers within 60, 60-100, 100-150 and 150-200 miles of each location and by U.S. joint venture trawlers; and

5. The size availability as given by the length composition of pollock caught by the foreign and joint venture fisheries.

The results of surveys by the National Marine Fisheries Service have also been included in our analysis.

Because seasonal and area restrictions have changed the nature of the foreign fisheries with time, we have analyzed data for three separate years over a period which encompasses full development of the Japanese surimi fishery. The period includes the peak pollock production year of 1972, which occurred before many restrictions had been placed on the foreign trawl fisheries, next, 1977 when the Magnuson Fishery Conservation and Management Act (MFCMA) was implemented; and lastly, 1983, the most recently completed fishing year.

While the availability of the pollock resource is of critical importance to the success or failure of a surimi production operation, there are many other important factors which need to be considered in relation to each of the possible locations. From a harvesting standpoint they include: availability of suitable vessels and crews and their logistic support; fishery regulations; weather conditions and the proximity of shelter; and nature of the fishing grounds, including the potential for damage to trawl gear. Some of the important factors concerned with plant operations are: facilities for unloading and holding catches as they affect vessel turnaround time, availability and cost of labor, quantity and quality of freshwater supply, waste disposal requirements and costs, cost of power, etc. Such considerations were outside the scope of this study.

Data Sources and Limitations

Our primary source of information has been the Northwest and Alaska Fisheries Center, National Marine Fisheries Service (NMFS), which provided NRC with requested computer runs of data on pollock catches and fishing effort by the foreign fisheries. This was supplemented by information available from NRC data files and from a review that was made of NMFS resource survey reports on the abundance of pollock.

Comparatively little is known about the abundance of pollock within 12 miles of the Alaska coast or within the inside waters of Southeast Alaska and Prince William Sound. Foreign fishing has been prohibited within 12 miles of shore in most areas and, except for Shelikof Strait, there has been little domestic fishing effort directed toward pollock in coastal or inside waters. For such areas it has been mostly necessary to rely on the results of limited surveys by NMFS vessels. Bottom trawls were used for most of the surveys and they underestimate the abundance of pollock.

Until recently, little was known about the abundance of pollock in Shelikof Strait where foreign fishing has been prohibited. The development of joint venture fisheries in Shelikof Strait has demonstrated the presence of a large and concentrated population of spawning pollock. We can not rule out the possibility that other large local concentrations of pollock will eventually be discovered and brought into production as the domestic and joint venture fisheries further develop.

Resource Availability

The total area of consideration in our analysis has been the 200-mile Fishery Conservation Zone (FCZ) off Alaska (Figure 1) which encompasses almost all of the Bering Sea and Gulf of Alaska pollock grounds. The portion of the FCZ included within 60, 100, 150 and 200 mile radiuses of each potential surimi location is shown in Figures 2-5. At a distance of 100 miles there is considerable overlap between Sand Point and Chignik and between Kodiak, Homer and Seward. At distances of 150 and 200 miles there is extensive overlap between all adjacent locations except for Sitka (and Petersburg) for which there is no overlap with the other locations.

The straight-line distances shown in Figures 2-5 are not always the same as the sailing distances, particularly for Homer and Kodiak. In determining the catches and harvest rates within stated distances we have made rough allowances for the actual sailing distances to the grounds.

Because of the especially high availability of spawning pollock in Shelikof Strait during January-April, access to the Shelikof grounds was separately examined on the basis of sailing distances from the various locations. As shown in Table 1, the best access to the Shelikof grounds (from the selected study sites) appears to be out of Kodiak, followed in order by

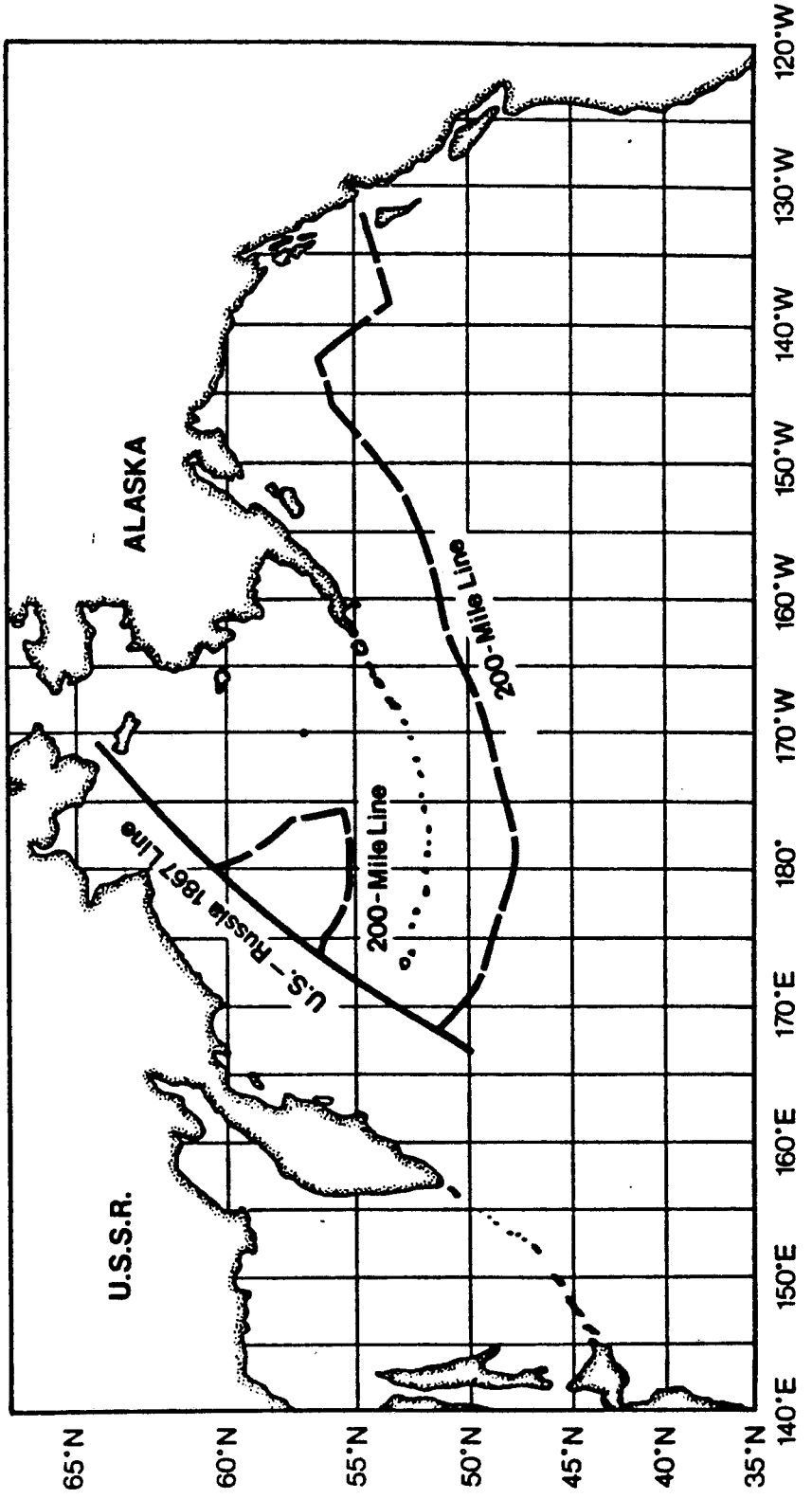

Figure 1. Approximate location of U.S. 200-mile line and U.S.-Russia 1867 line.

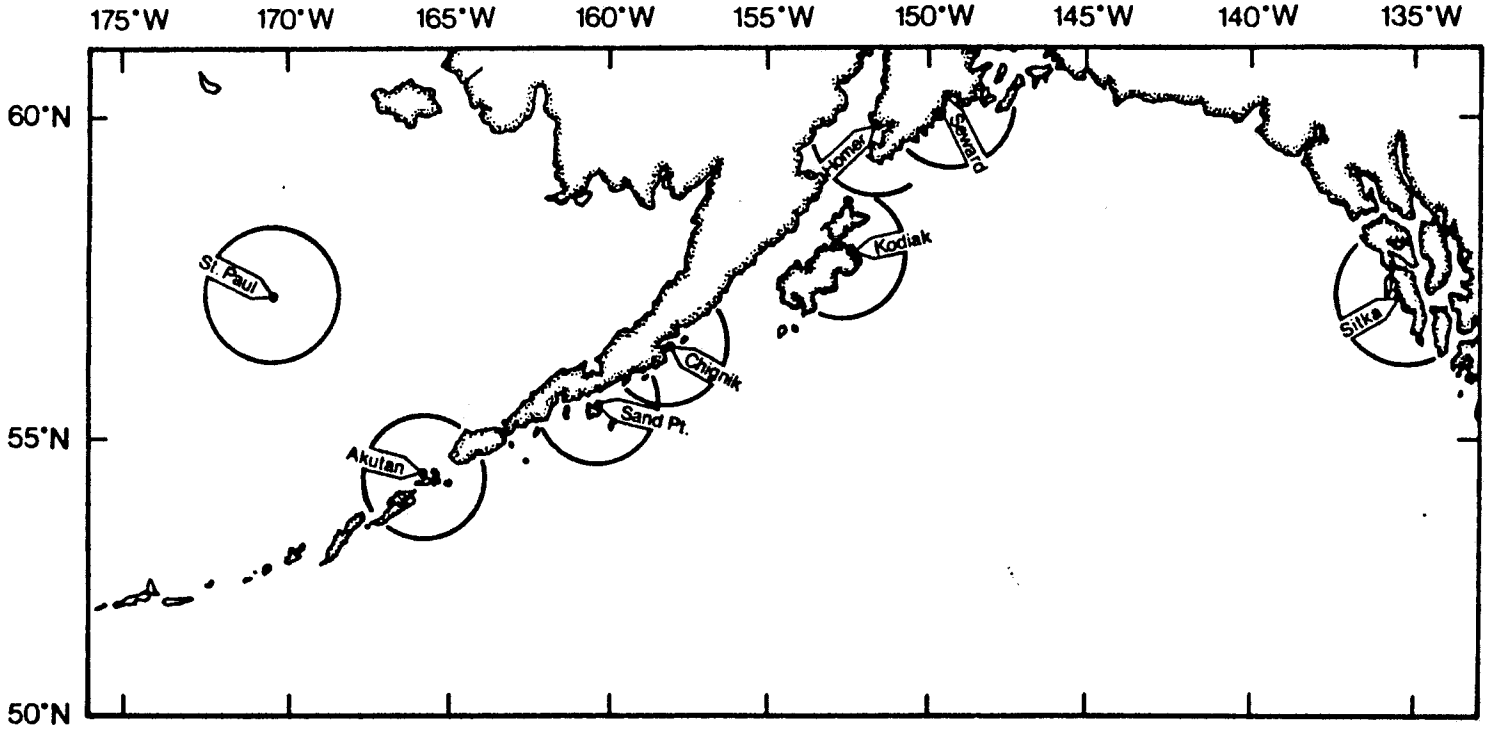

Figure 2. Areas within approximately 60 miles of the indicated locations.

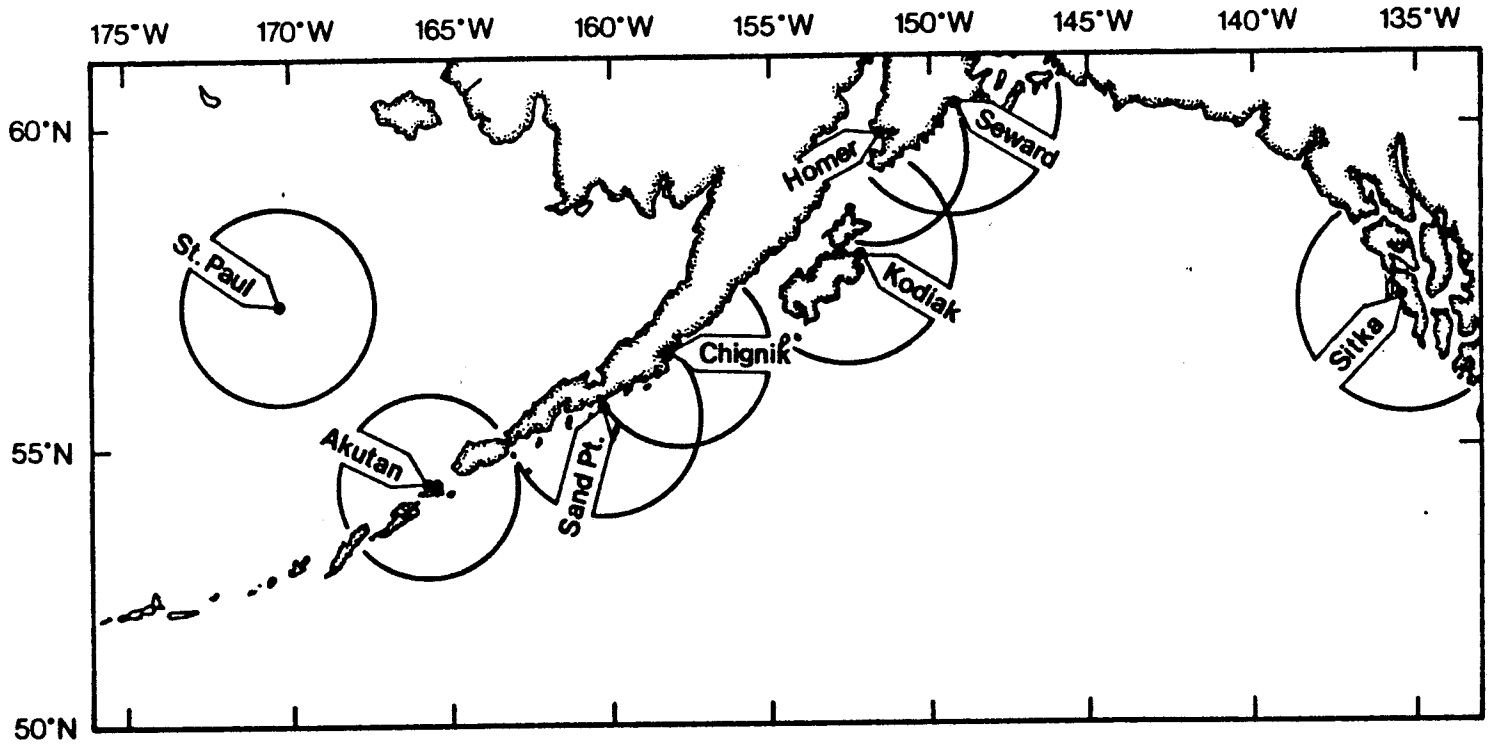

Figure 3. Areas within approximately 100 miles of the indicated locations.

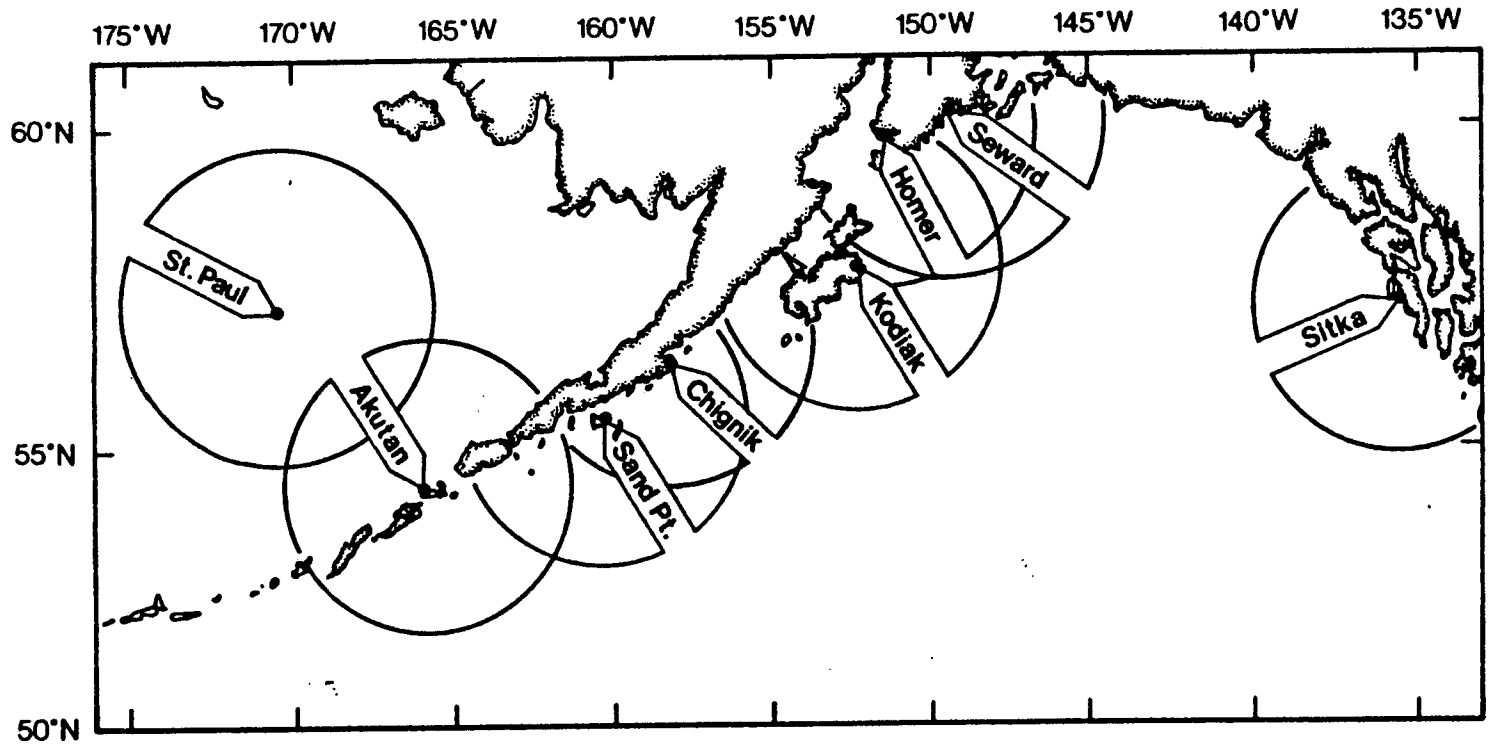

Figure 4. Areas within approximately 150 miles of the indicated locations.

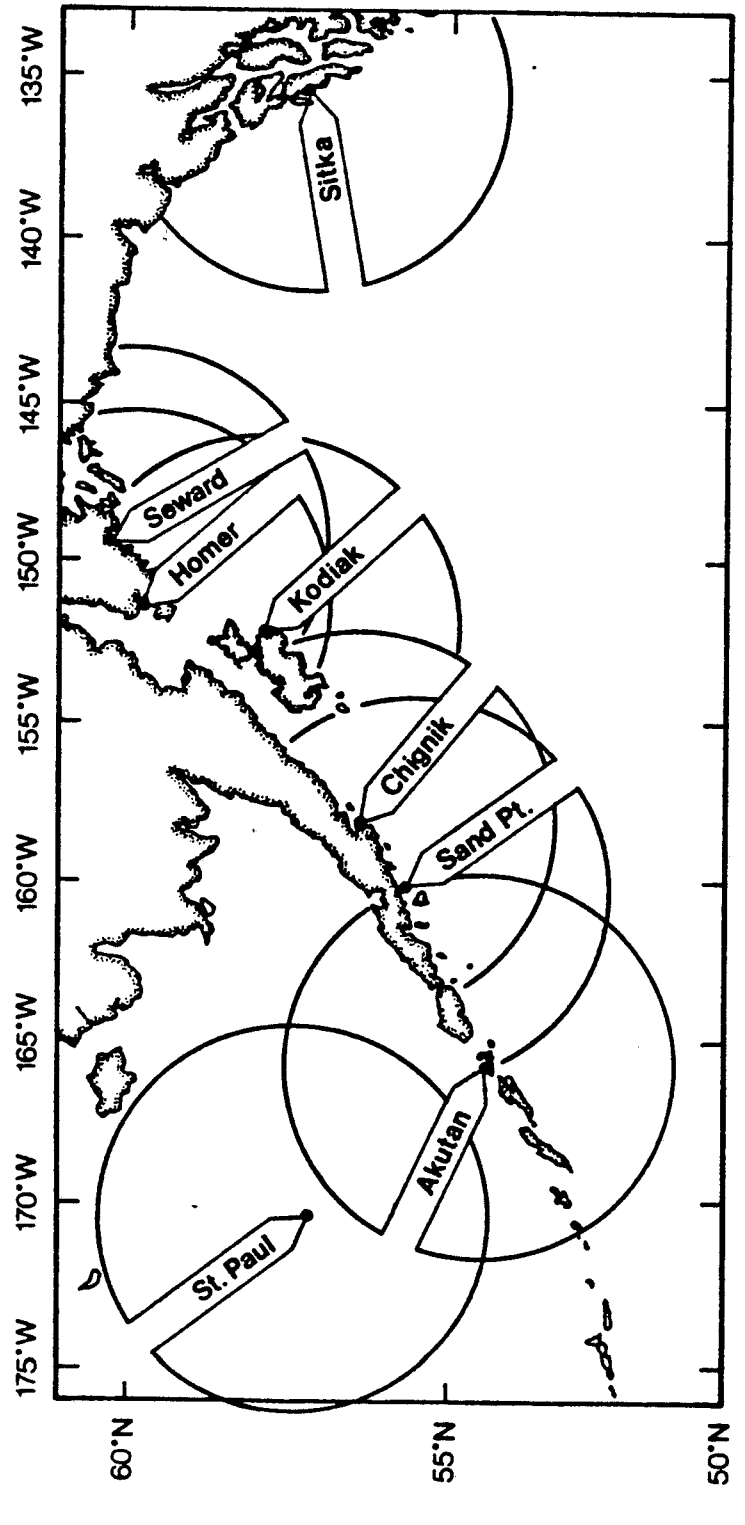

Figure 5. Areas within approximately 200 miles of the indicated locations.

Table 1. Access from specified locations to the pollock spawning grounds in Shelikof Strait as shown by the percent of the grounds within 60, 100, 150 and 200-mile sailing distances. The approximate location of the 1983 joint venture catches was used as an indicator of the spawning grounds.

	APPROXIMATE SAILING DISTANCE IN MILES			
	60	100	150	200
	PERCENT OF TOTAL GROUNDS WITHIN REACH			
Sand Point	0	0	10-25	25-50
Chignik	0-25	25-50	50-75	75-100
Kodiak	25	50	75	100
Homer	0	0-25	25-50	50-75
Seward	0	0	0	0-25

Chignik, Homer, Sand Point and Seward. Vessels operating out of Kodiak would seem to enjoy the additional advantage of having comparatively protected waters for transiting to and from the Shelikof grounds.

Catch Location

The areas of origin of foreign catches of pollock are compared in Figures 6 and 7 for the years 1977 and 1983. The absence of any 1983 catches from grounds east of 140° W. longitude is the result of their closure to foreign fishing. This illustrates why a careful choice of years is necessary for the interpretation of pollock availability.

The largest foreign catches were from grounds near Akutan where one small area (½° by 1° block number 165543) contributed pollock catches of 70,000 tons in 1977 and 72,000 tons in 1983. At the peak of the foreign pollock fishery in 1972 the same small block contributed a catch of 221,000 tons of pollock. Collectively, all grounds within a 60-mile radius of Akutan contributed foreign pollock catches of approximately 370,000 tons in 1972, 114,000 tons in 1977 and 120,000 tons in 1983. In 1983 an additional harvest of around 40,000 tons of pollock appears to have been taken by the joint venture fishery from grounds within approximately 60 miles of Akutan.

Grounds in the Gulf of Alaska have always contributed much smaller catches of pollock to the foreign fishery than grounds in the Bering Sea. However, the comparative importance of the

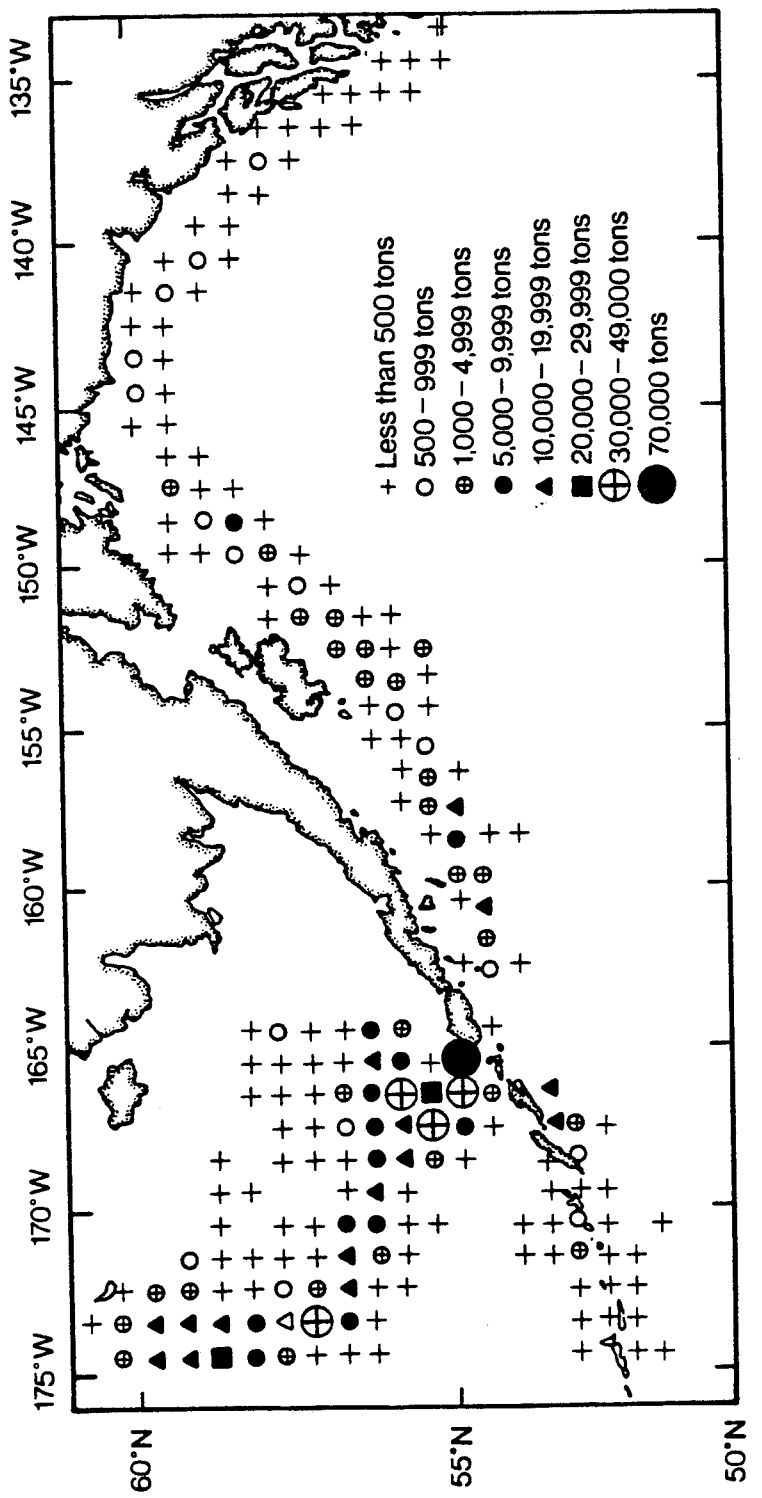

Figure 6. Foreign pollock catches in 1977 by blocks of ½° latitude by 1° longtitude, east of 175°W. longtitude.

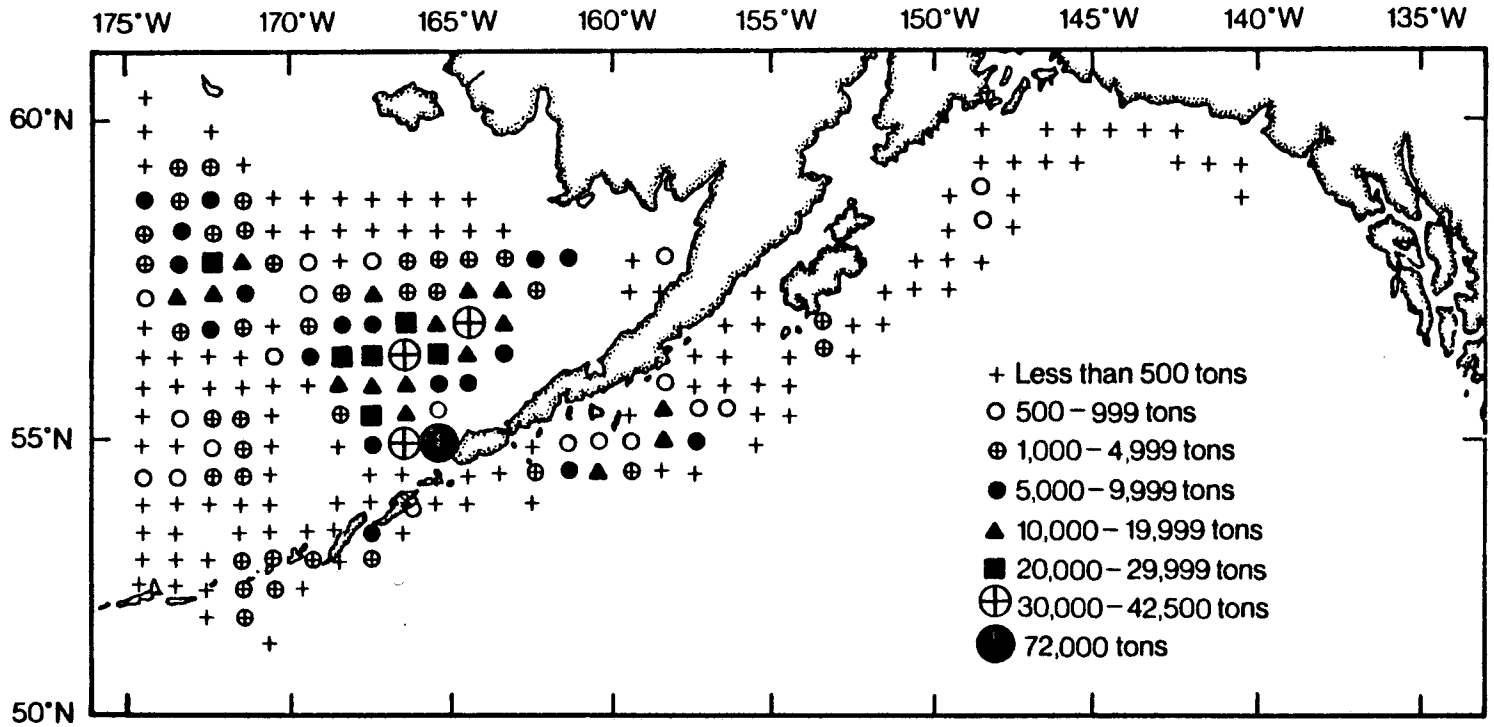

Figure 7. Foreign pollock catches in 1983 by blocks of $\frac{1}{2}^{o}$ latitude by 1^{o} longtitude, east of 175^{o}W. longtitude.

Gulf of Alaska grounds has increased in recent years with catches being the largest in the vicinity of Sand Point and Chignik. In 1983, the grounds within 60 miles of Sand Point and Chignik contributed foreign catches of approximately 12,000 and 4,000 tons, respectively. Somewhat smaller foreign catches have generally come from grounds around Kodiak, and much smaller catches have been taken from the vicinity of the other locations in the Gulf of Alaska.

As shown in Figure 8, the southeastern Bering Sea grounds near Akutan and the Shelikof Strait grounds in the Gulf of Alaska were the primary contributors to joint venture catches of pollock in 1983. The 1983 joint venture production of pollock was an estimated 146,000 tons from the southeastern Bering Sea and 134,000 tons from Shelikof Strait. The joint venture catch from Shelikof Strait showed a further increase to around 210,000 tons during the January-April 1984 fishery.

Not only is Shelikof Strait the origin of a large joint venture production of pollock but, as will be discussed later, it also provides very high catch rates during a limited period of the year. In assessing the availability of pollock, the proximity of the various locations to the Shelikof Strait grounds is thus an important consideration along with their access to productive offshore grounds.

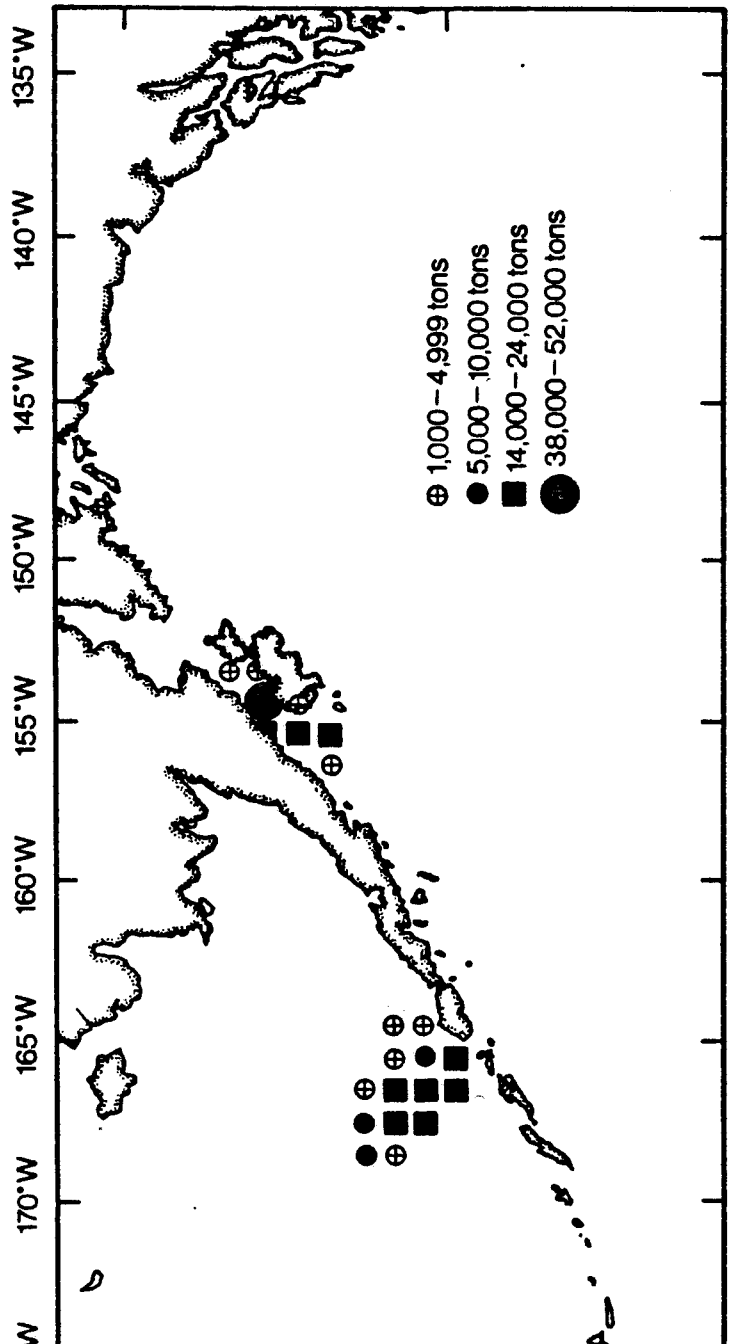

Figure 8. Approximate location and size of 1983 pollock catches by U.S. joint venture trawlers in Shelikof Strait and in the Southeastern Bering Sea.

Potential Production as Indicated by Optimum Yields (OY)

Although the scheduled pilot-plant production of surimi will not place a large demand on the pollock resource it may be appropriate to consider how each location compares in relation to the size of harvests that might be expected with full exploitation of the pollock resource. This would be particularly relevant to the suitability of the different locations if large-scale production of surimi is expected to follow at the site selected for the pilot production.

A rough approximation of the potential yields can be obtained by prorating the OY's to areas within prescribed distances of each location according to the distribution of past catches. We have used foreign catches in 1977 to indicate the distribution of catches and 1984 OY's to indicate the current expectations of yields. The year 1977 was chosen to represent catches because it occurred after the foreign fishery for pollock had developed in the Gulf of Alaska but before some regulations were established that have changed the operational characteristics of the foreign fishery (for example, no fishing east of 140°W. longtitude).

The reader is cautioned, however, that these particular calculations are subject to considerable uncertainties. This is especially true for the indicated differences in OY between locations in the Gulf of Alaska where the relationship of the

Shelikof Strait spawning population of pollock to stocks elsewhere in the Gulf is poorly known. Importance should therefore only be attached to major differences resulting from this analysis.

As shown in Table 2, the locations with substantially larger OY's available to them than to the other locations are: Akutan at a distance within 60 miles; Akutan, St. Paul and Sand Point within 100 miles; Akutan, St. Paul, Sand Point and Chignik within 150 miles; and St. Paul, Akutan, Chignik, Sand Point and Kodiak within 200 miles. The OY's pertain to ocean stocks of pollock and do not necessarily account for additional yields that could be obtained from Prince William Sound and the inside waters of Southeast Alaska. Although potential yields from the inside waters are unknown they are probably small compared to those from the ocean grounds. Nevertheless, if enough had been known to include them in the calculations they would have raised somewhat the standings of Seward, Sitka and Petersburg.

Foreign, joint venture and domestic catches of pollock in 1983 are compared in Table 3 with the OY's that have been established for 1984. Catches and OY's for the Eastern Management Area in the Gulf of Alaska (east of 147°W. longtitude) are very small compared to those for the other management areas. A 200-mile operational distance from Sitka and Petersburg is entirely within this area of indicated low potential for pollock. As

Table 2. Indicated optimum yield (OY) within specified distances, as prorated according to the distribution of 1977 all-nation catches and 1984 OY's. Solid lines enclose major breaks in OY at increasing distances from the locations.

	60 MILES	100 MILES	150 MILES	200 MILES
	METRIC TONS			
St. Paul, Pribilofs	32,000	170,000	392,000	738,000
Akutan	167,000	330,000	553,000	648,000
Sand Point	53,000	129,000	175,000	180,000
Chignik	1,500	52,000	158,000	211,000
Kodiak	14,000	53,000	96,000	110,000
Homer	100	1,000	36,000	52,000
Seward	300	8,700	37,000	49,000
Sitka	900	4,300	6,000	8,000
Petersburg	0	0	3,500	5,800

Table 3. Catch of pollock in 1983 as compared to 1984 optimum yield (OY) in metric tons.

	MANAGEMENT AREA					
			GULF OF ALASKA			
	BERING SEA	ALEUTIANS	WESTERN	CENTRAL	EASTERN	ALL AREAS
1983 Catch:						
Foreign	834,983	56,475	39,319	41,998	41	972,816
Joint Venture	146,467	2,547	497	133,634	0	283,145
Domestic	878	0	1	112	0	991
Total	982,328	59,022	39,817	175,744	41	1,256,952
1984 OY	1,200,000	100,000	400,000		16,600	1,716,600

noted above, however, the inside waters of Southeast Alaska would add an unknown, but probably comparatively small amount, to the potential. Some evidence suggests that winter concentrations of spawning pollock have occurred near Petersburg in the Frederick Sound and lower Chatham Strait regions. There is, however, no evidence to suggest that such concentrations occur on a year-round basis and hence the true annual potential of this region should be viewed with caution.

Harvest Rates

We have used the catch per hour of trawling for large Japanese stern trawlers (over 1,500 gross registered tons) and for U.S. joint venture trawlers to examine changes in the relative abundance of pollock between areas. The results of this analysis also provide some indication of the catch rates to expect by U.S. trawlers that would be supplying a surimi plant at the different locations.

As shown in Figures 9 and 10, the highest catch rates in 1977 and 1983 were attained in Shelikof Strait, near Sand Point and Chignik, and within close operating range of Akutan and St. Paul. Catch rates for large Japanese stern trawlers were substantially lower in waters offshore from Kodiak than they were to the westward and lowest of all from off the Kenai Peninsula to Southeast Alaska.

The highest catch rate for any area was the 30-40 tons per hour of trawling by U.S. joint venture trawlers in the January-

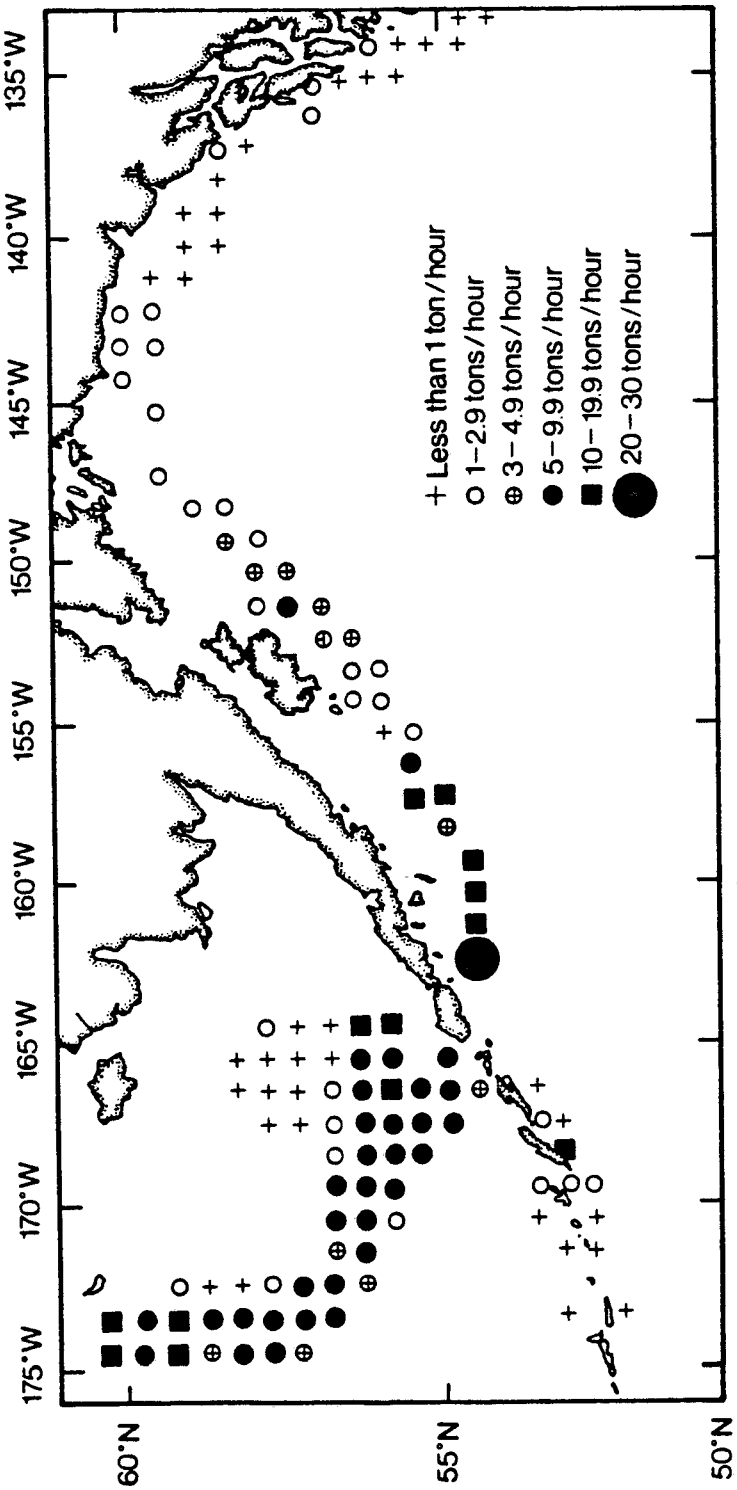

Figure 9. Tons of pollock caught per hour trawled in 1977 by large Japanese trawlers (over 1,500 G.R.T.).

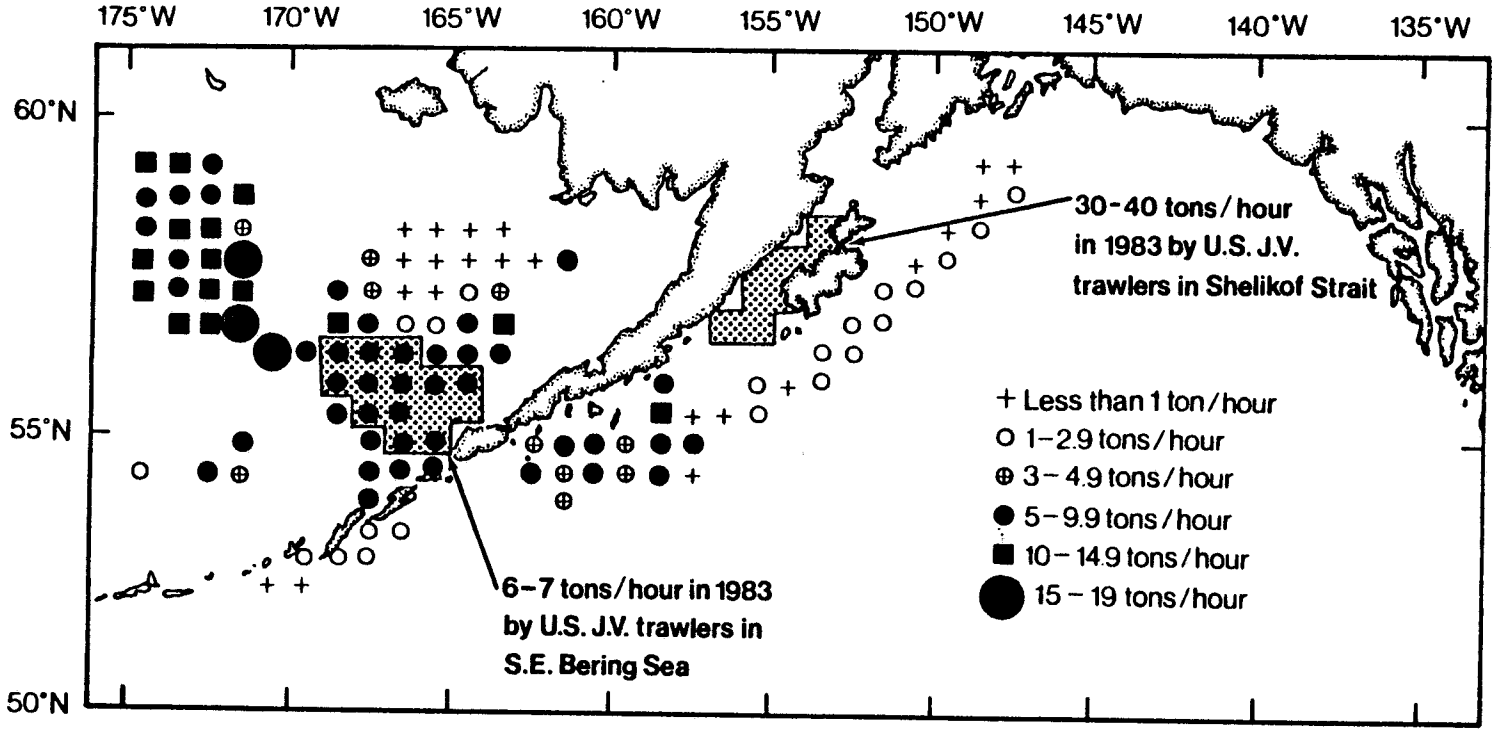

Figure 10. Tons of pollock caught per hour trawled in 1983 by large Japanese trawlers (over 1,500 G.R.T.) and by U.S. joint venture trawlers.

April 1983 fishery in Shelikof Strait. It was substantially higher than the catch rate of around 6 to 7 tons per hour realized by U.S. joint venture trawlers during a June-September 1983 fishery in the Southeastern Bering Sea. The catch rates for large Japanese trawlers and U.S. joint venture trawlers were similar in 1983 for the same operational areas in the Southeastern Bering Sea (5 to 10 tons per hour for large Japanese trawlers and 6 to 7 tons per hour for joint venture trawlers).

Catch rates attained by large Japanese trawlers in 1977 and 1983 at increasing distances from each shoreside location are shown in Figure 11. Although the highest catch rates are indicated for waters around Chignik and Sand Point, this is somewhat weakened by their considerable variation between years and their rather steep decline at increasing distances from these locations. Catch rates for the Akutan operational area were remarkably consistent between 1977 and 1983 and in both years did not decline out to distances within 150 miles of Akutan. The indicated catch rates for Kodiak, Homer and Seward were considerably lower than for locations westward, and for Sitka were lowest of all locations.

Another perspective on the relative abundance of pollock is given in Figure 12 which shows the apparent density of pollock as suggested by NMFS surveys. The results are not directly comparable to the data discussed above for the commercial fisheries because the surveys used only bottom trawls, included more

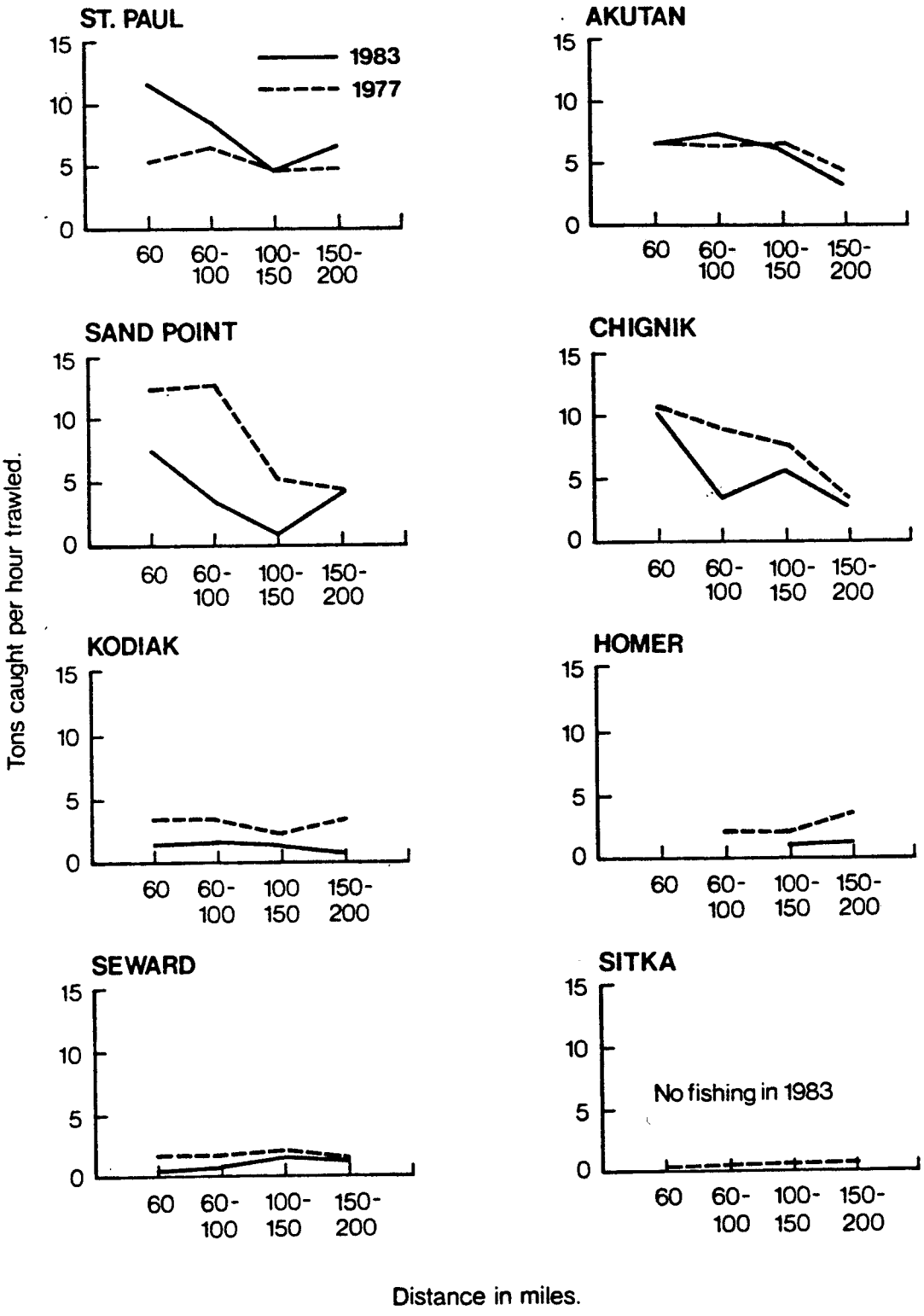

Figure 11. Tons of pollock caught per hour trawled in 1977 and 1983 by large Japanese trawlers (over 1,500 G.R.T.) within 60, 60-100, 100-150 and 150-200 miles of the indicated locations.

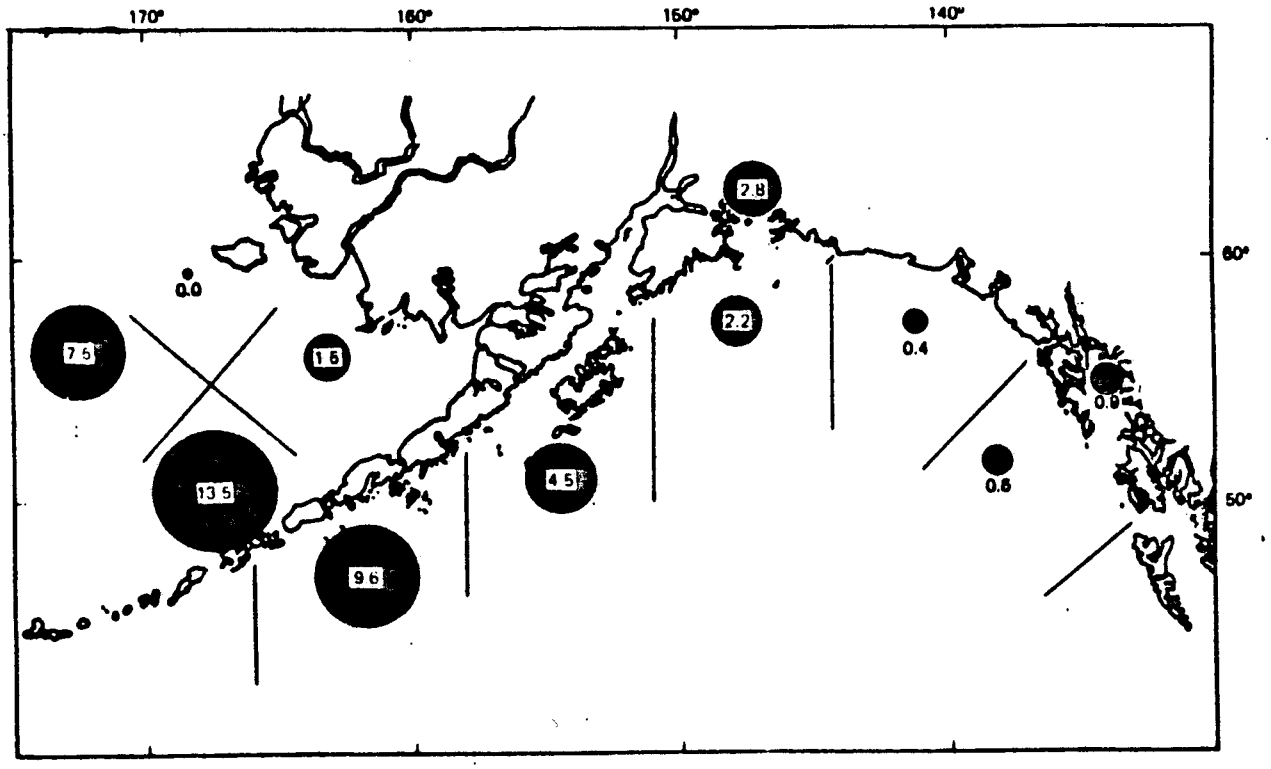

Figure 12. Apparent density (tons/km^2) of pollock in various regions of the Gulf of Alaska and eastern Bering Sea as suggested from NMFS bottom trawl surveys (1973-78) at depths of 400 meters and less. Source: Alton, Miles S. 1981. Gulf of Alaska Bottomfish and Shellfish Resources. U.S. Dept. of Commerce, NOAA. Nat'l. Marine Fisheries Service, NOAA Technical Memorandum NMFS F/NWC - 10:51pp.

small pollock in the catches, and did not cover the important Shelikof Strait grounds. However, the survey finding of a trend of increasing abundance of pollock proceeding from Southeastern Alaska westward through the Gulf of Alaska and into the Southeastern Bering Sea is in general agreement with our analyses of the commercial fishing records. Although Shelikof Strait was not included in the NMFS surveys, the pollock that spawn there in January-April of each year are available at lower densities elsewhere in the western-central Gulf at other times of the year. The surveys may thus adequately represent the year-round situation in the Gulf.

Seasonal Availability

In examining seasonal availability we have analyzed the quarterly distribution of foreign catches for the years 1972 and 1977 within 100 miles and within 200 miles of each location. It was desirable to include a year prior to 1974 in the analysis, because beginning in 1974, foreign vessels were restricted from fishing during much or all of December-May in a large part of the Southeastern Bering Sea east of 170°W. longtitude. This is reflected in Figures 13 and 14 by the absence of any catches for the Akutan operational area during January-March 1977.

For the St. Paul operational area in both 1972 and 1977, by far the largest part of the catch was taken during April-September. However, this may be more the consequence of adverse

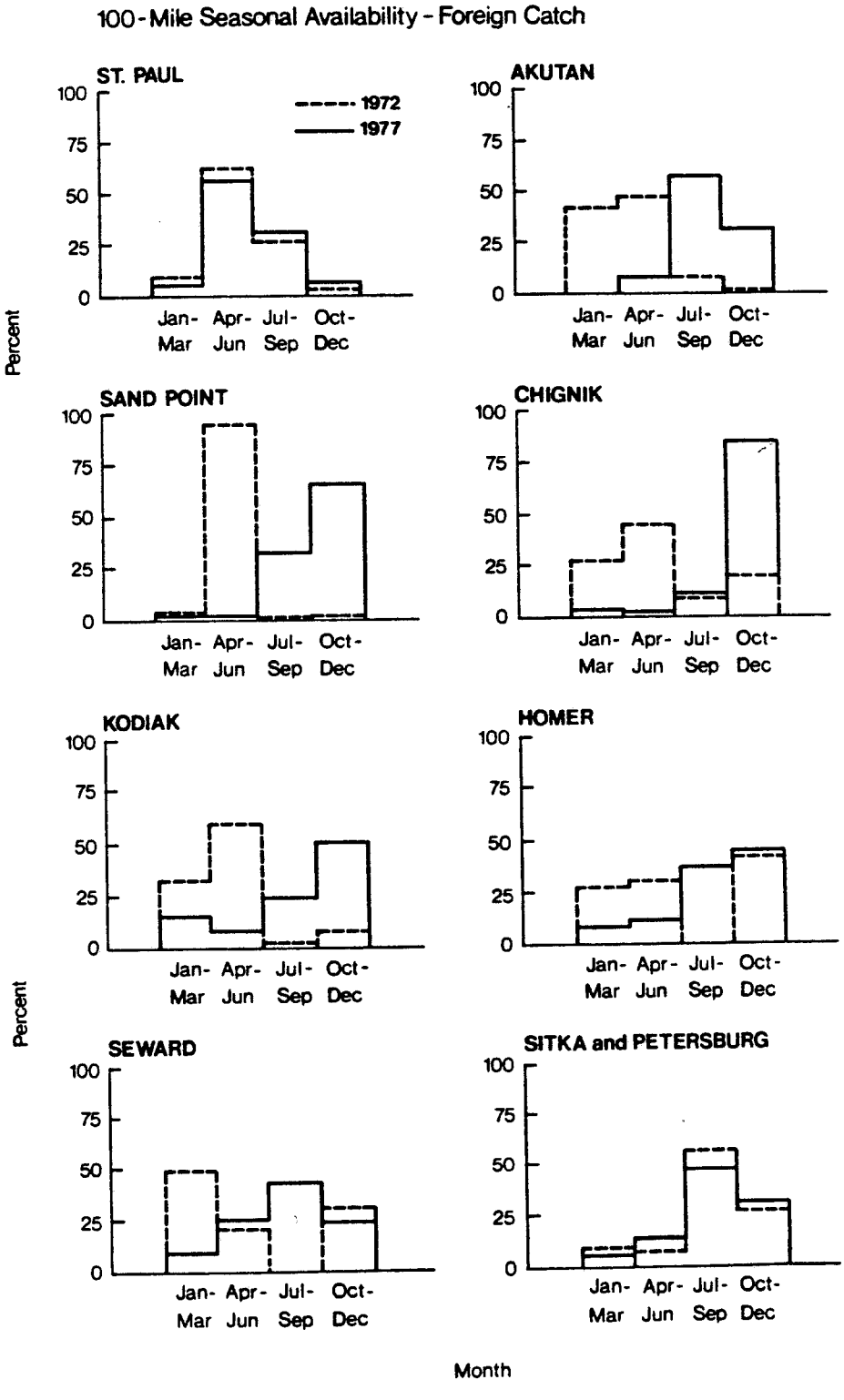

Figure 13. Quarterly distribution of the 1972 and 1977 foreign catch of pollock within 100 miles of the indicated locations.

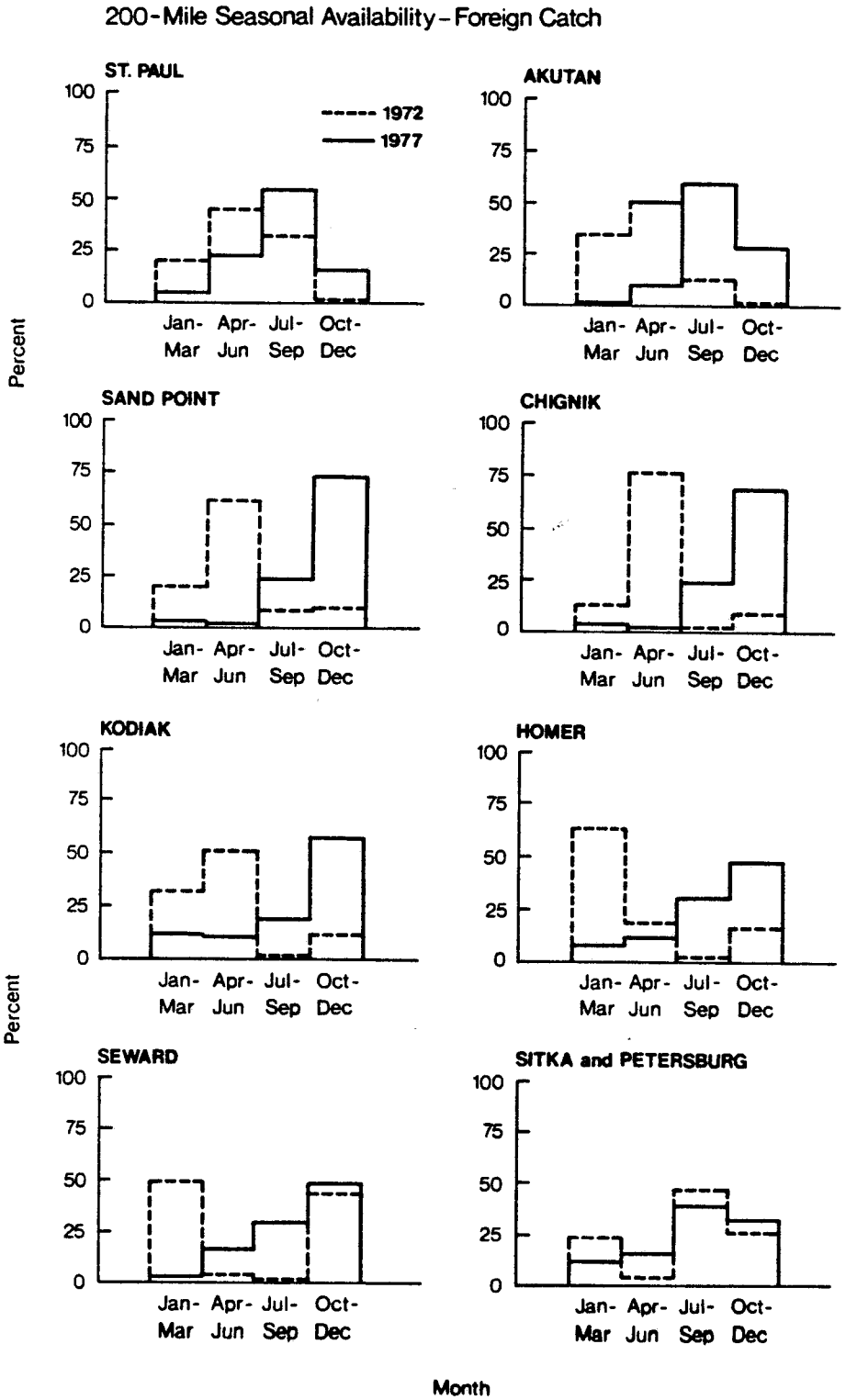

Figure 14. Quarterly distribution of the 1972 and 1977 foreign catch of pollock within 200 miles of the indicated locations.

weather and ice conditions at other times of the year than of changes in the availability of pollock.

A pronounced shift in the distribution of catches from being highest during January-June in 1972 to highest in July-December in 1977 was seen for the Akutan, Sand Point, Chignik, Kodiak and Homer areas. As noted above for Akutan, this has been mostly the consequence of fishing restrictions which have changed the operational features of the foreign fishery. A consideration of all factors leads us to conclude there probably are not large seasonal changes in pollock availability within operating range of Sand Point, Chignik, Kodiak and Homer except in January-April when availability on the offshore grounds could be expected to be lower as a result of the migration of a considerable part of the western-central Gulf population into Shelikof Strait to spawn.

When both 1972 and 1977 are considered, all quarters of the year have contributed a substantial part of the catches within operating range of Seward. For Sitka and Petersburg, however, the July-December period in both 1972 and 1977 accounted for a substantially larger part of the catch than the January-June period.

Size Composition

As shown in Figure 15, the pollock caught by the foreign fisheries in the Bering Sea and in the central-western Gulf of Alaska were somewhat larger in 1982-1983 than those caught by

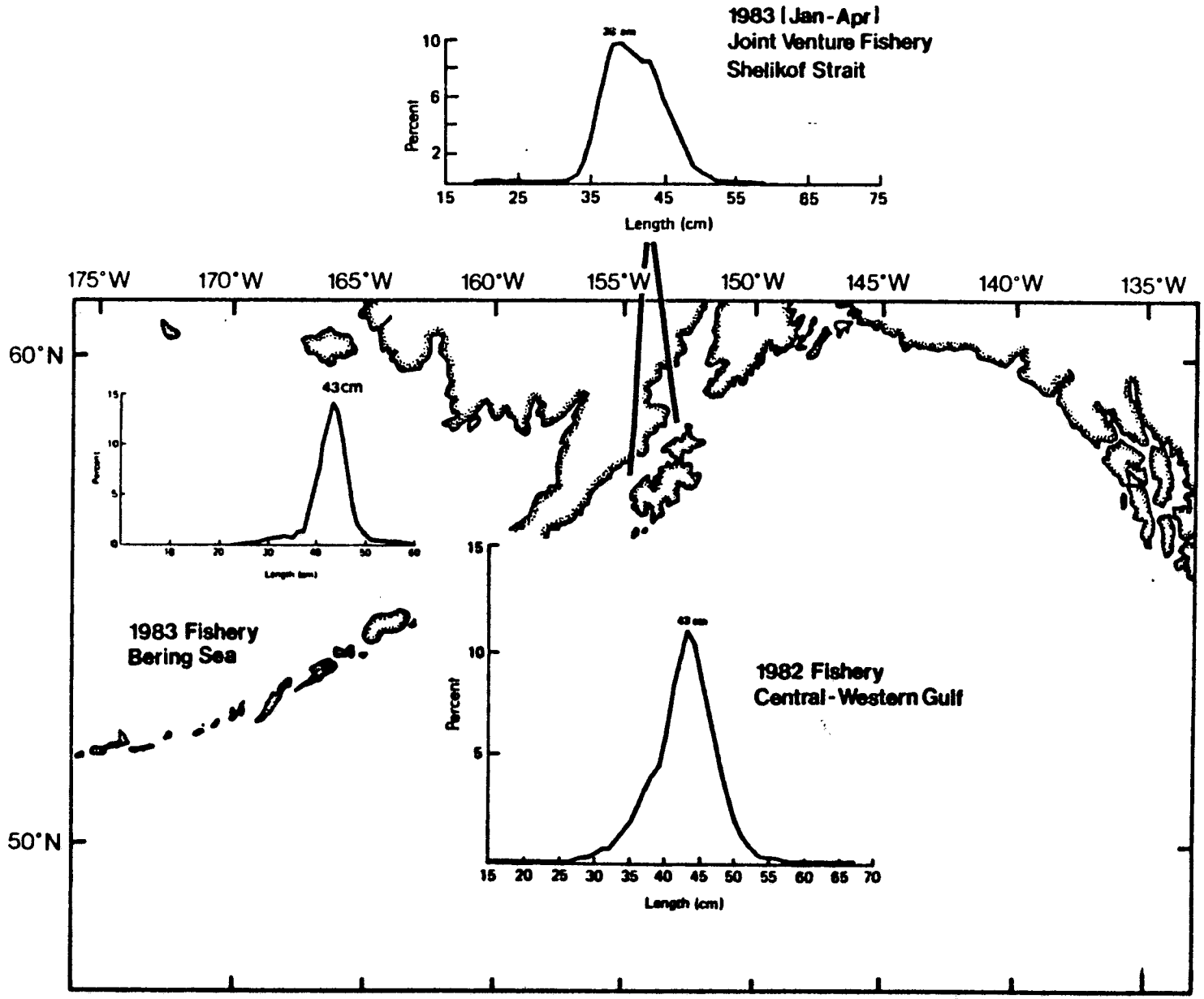

Figure 15. Length composition of pollock caught by the foreign trawl fisheries in the Bering Sea (1983) and in the central-western Gulf of Alaska (1982) and by U.S. joint venture trawlers in Shelikof Strait (1983).

the joint venture fishery in Shelikof Strait. For all these fisheries, however, most of the fish were larger than 35 cm. (13.8 inches) in length and practically all exceeded 30 cm. (11.8 inches) in length.

The sampling of catches taken by a substantial part of the 1983 fleet of U.S. joint venture trawlers showed peak sizes of 37-41 cm. (14.6-16.1 inches) during the January-April fishery in Shelikof Strait compared to peak sizes of 40-42 cm. (15.7-16.5 inches) in June and 44-45 cm. (17.3-17.7 inches) in July-September for the Southeastern Bering Sea fishery. Well over 99.9 percent of the joint venture pollock catches in the Southeastern Bering Sea consisted of fish which exceeded the prescribed miminum surimi food grade size of 30 cm.

A variable but often large part of the catches during NMFS trawl surveys of Prince William Sound and the inside waters of Southeast Alaska has consisted of below marketable sizes of pollock. However, the use of small mesh liners in the cod ends of the nets used for the surveys has strongly influenced these results. The results of the limited commercial fishing that has occurred in the inside waters of Southeast Alaska have been somewhat different than those of the surveys. Test fishing of Seymour Canal in 1976 by the midwater trawler Ocean Leader produced an average catch rate of almost 13,000 pounds of pollock per hour trawled and the fish averaged 43 cm. (17 inches) in length.

Location Summaries

The following summaries are concerned only with the comparative advantages and disadvantages of each location in relation to what is known about the availability of the pollock resource. Many other factors such as the availability of suitable vessels, weather conditions and the proximity of shelter for vessels, and the features of the proposed surimi centers will need to be evaluated in chosing a location.

Resource availability (seasonal and annual) is expressed by the past and potential capacity of the resource to contribute commercial yields together with the expected harvest rates and sizes of fish to be caught. In judging each location we have given greater credit to those with proven records of large volume production and high catch rates than to those with just high catch rates. While a location with good catch rates but poor potential for volume production might be acceptable for the pilot production of surimi it could be inadequate for any later large scale production.

When all factors are considered, our analysis of fishing records show that the availability of pollock increases from a low off Southeast Alaska to a high in the Southeastern Bering Sea. Results of NMFS surveys support this view. An important exception to this general rule is in Shelikof Strait where for a

limited period of the year (January-April) a large concentration of spawning pollock contributes high volume production and the highest catch rates of record. The possibility exists that local concentrations of pollock will be found elsewhere as the fisheries further develop. The size of pollock that is available does not appear to be a limiting factor for any location, except possibly Seward in relation to Prince William Sound and Sitka and Petersburg in relation to the inside waters of Southeast Alaska. A substantial part of the catches from Prince William Sound and Southeast Alaska has at times consisted of pollock below marketable size.

St. Paul

A location at St. Paul would share with Akutan in having the advantages of the largest past and potential yields and among the highest catch rates. A disadvantage could be an apparent winter drop in the availability of pollock, but which in fact may result from adverse weather and ice conditions that interfere with fishing and in many years would interfere with attempts to deliver to a shore plant.

Akutan

Southeastern Bering Sea grounds near Akutan have contributed larger foreign catches of pollock than grounds near any of the other locations. They also have the largest potential harvest according to the calculated optimum yields (OY).

In 1983 the grounds within a 60-mile radius of Akutan contributed around 160,000 tons of pollock which was comprised of a 120,000-ton foreign catch and a 40,000-ton joint venture catch. The production and catch rate in the Southeastern Bering Sea remains at a high level out to a distance of at least 150 miles from Akutan.

The 1983 catch rate by large Japanese trawlers was 5 to 10 tons of pollock per hour of trawling out to distances of 150 miles from Akutan. The comparative figure for the U.S. joint venture trawlers operating in the vicinity of Akutan was 6 to 7 tons per hour.

Pollock appears to be available in good quantities throughout the year near Akutan.

Sand Point and Chignik

Out to a distance of 60 miles, the 1983 catch rate by large Japanese trawlers was generally about the same near Sand Point and Chignik as near Akutan. Beyond 60 miles, however, the Sand Point and Chignik catch rates tended to be lower than the Akutan catch rate.

The past and potential yeilds are larger for Sand Point than for Chignik, but for both are substantially lower than for Akutan. On the other hand, access to the Shelikof Strait spawning grounds is better out of Chignik than out of Sand Point. This could be important early in the year when the availability

of pollock may drop somewhat off both Sand Point and Chignik as a consequence of fish having journeyed to the Shelikof spawning grounds.

Kodiak

Although the indicated availability of pollock on grounds offshore from Kodiak is lower than near Sand Point and Chignik and much lower than near Akutan, Kodiak has the best access of any location to the Shelikof Strait spawning grounds and the most protected waters for transit to and from those grounds.

A Kodiak-based operation would clearly have an advantage over other locations in January-April by utilizing the Shelikof grounds where large volume production and the highest catch rates (30 to 40 tons per hour) on record has been demonstrated. At other times of the year, however, Kodiak-based vessels would appear to be at a disadvantage compared to those operating from Akutan, Sand Point and Chignik.

Homer

The past and potential yields of pollock in the vicinity of Homer are smaller than near Kodiak. Access to the Shelikof spawning grounds is poorer than out of Kodiak and Chignik but better than out of Sand Point. Sailing distances to productive offshore grounds are farther out of Homer than out of Kodiak.

Seward

Although Seward is closer than Homer to the offshore grounds it is farther away from the Shelikof grounds. Past and

potential yields of pollock are roughly comparable for Seward and Homer, but considerably lower than for Kodiak.

An advantage enjoyed by Seward over Homer is its proximity to Prince William Sound. How large an advantage this may be, however, is uncertain because of the limited commercial fishing and surveys that have taken place there. Up to 2,400 pounds of pollock per hour of trawling have been taken in NMFS surveys with bottom trawls but most of the catches were under 1,000 pounds per hour. About one half of the NMFS catch was judged to be below marketable size due to the use of small mesh liners in the cod ends.

Sitka and Petersburg

Access to the offshore grounds is better out of Sitka than out of Petersburg, but better for Petersburg as regards the inside grounds of Southeastern Alaska.

At distances of 60, 100, 150 and 200 miles the yields and harvest rates of pollock from offshore grounds are much lower for Sitka and Petersburg than for any of the other locations. The comparatively low availability on the offshore grounds is further shown by the 1984 OY of only 16,600 metric tons that has been established for the Eastern Management Area which more than encompasses a 200-mile distance from Sitka and Petersburg. The other Gulf of Alaska locations (Sand Point, Chignik, Kodiak, Homer and Seward) have access to the 400,000 ton OY which has been established for the Western-Central Management Area.

The situation as regards the inside waters of Southeastern Alaska is less certain than for the outside waters within range of Sitka and Petersburg. Concentrations of pollock have been noted on some of the inside grounds as a result of surveys, limited commercial fishing efforts and observations by fishermen. Locations with reported fair to good concentrations at certain times of the year have included Chatham Strait, Frederick Sound, Lynn Canal, Icy Strait, Stephens Passage, Revillagigedo Channel and the Gulf of Esquibel. However, in the absence of any sustained production from the inside waters they can not at this time be viewed as offering Sitka and Petersburg a potential anywhere near as large as that available to the other locations.