

4K88-12

SHUMAGIN ISLAND SECTION JULY-SEPTEMBER SOCKEYE HARVEST

A Report to the Alaska Board of Fisheries
Anchorage, Alaska

By:

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I. Introduction

The Alaska Department of Fish and Game (ADF&G) has documented an increased sockeye salmon harvest in the post-June Shumagin Island Section fishery during 1986 and 1987. The increased catches noted in 1986 and 1987 may be the result of several factors: increased fishing effort, increased gear efficiency, greater fish availability, and changes in fishing areas. This report will focus on the harvest of sockeye salmon after June when the South Unimak and Shumagin Islands June Salmon Management Plan (ADF&G 1986) is no longer in effect. The Board has already heard the results of the 1987 sockeye and chum tagging study conducted in the Shumagin Island Section during June from Doug Eggers (1987). This report will focus on the South Peninsula and in particular the Shumagin Island Section commercial fishery after June.

II. Area Description:

The Shumagin Island Section of the Alaska Peninsula Management Area is centrally located in North Pacific waters (Figure 1). The South Peninsula portion of the Alaska Peninsula Management Area extends westward from Kupreanof Point, and the North Peninsula portion extends westward from Cape Menshikof. Bordering the Alaska Peninsula Management Area is Bristol Bay Management Area to the northeast and Chignik Management Area to the east. In proximity to the Shumagin Island Section are the Kodiak and Cook Inlet Management Areas.

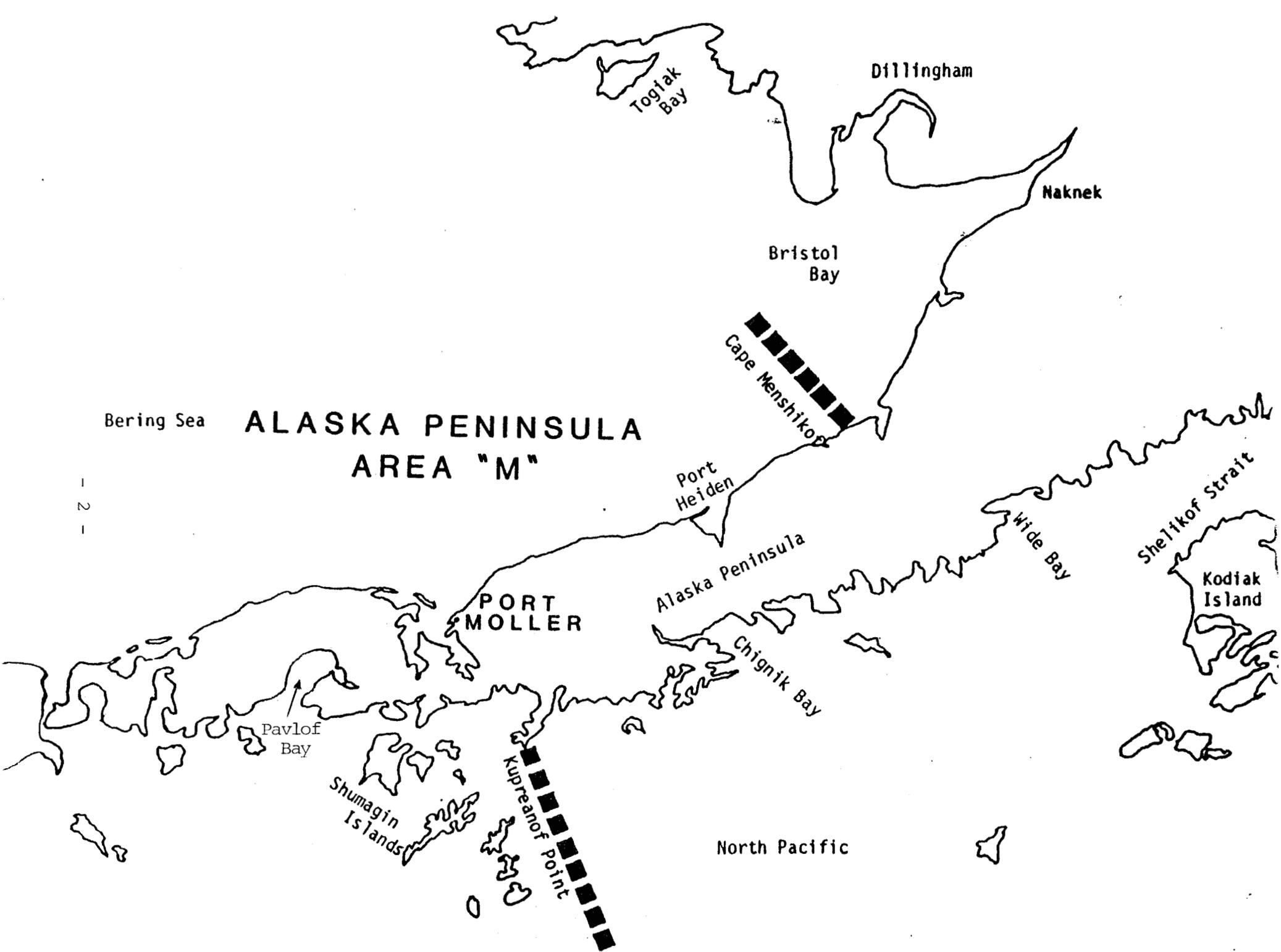


Figure 1. Map of the Alaska Peninsula Management Area.

In the Shumagin Island Section, the majority of fishing effort occurs near Korovin, Popof, and Unga Islands (Figure 2). Occasionally fishing effort also occurs near Nagai Island.

III. Background

Stock separation analysis methods, including scale digitizing and tagging, to date have been limited to June migratory salmon stocks. Only limited salmon tagging has occurred in the Shumagin Island Section in late June and early July; these studies occurred as early as 1922 (Gilbert 1923, Gilbert and Rich 1925, Thorsteinson and Merrell 1964, Van Ray 1971), and the latest occurred in 1987 (Eggers, Rowell, and Barrett 1987). Tags from these studies have been recovered in terminal fisheries in the North and South Peninsula, Chignik, Kodiak, Bristol Bay, and Cook Inlet Management Areas. The 1987 tagging study indicated that during June the majority of the sockeye salmon catch in the Shumagin Island Section was supported by Bristol Bay at 61%, followed by Chignik (18.5%), Kodiak (9.5%), South Peninsula (5.4%), North Peninsula (5.2%), and other areas (0.8%). Present information indicates that the stocks contributing to the fishery after June in the Shumagin Islands may be substantially different than the stock composition during the June fishery. To date no stock composition results have been determined for the sockeye harvested after June.

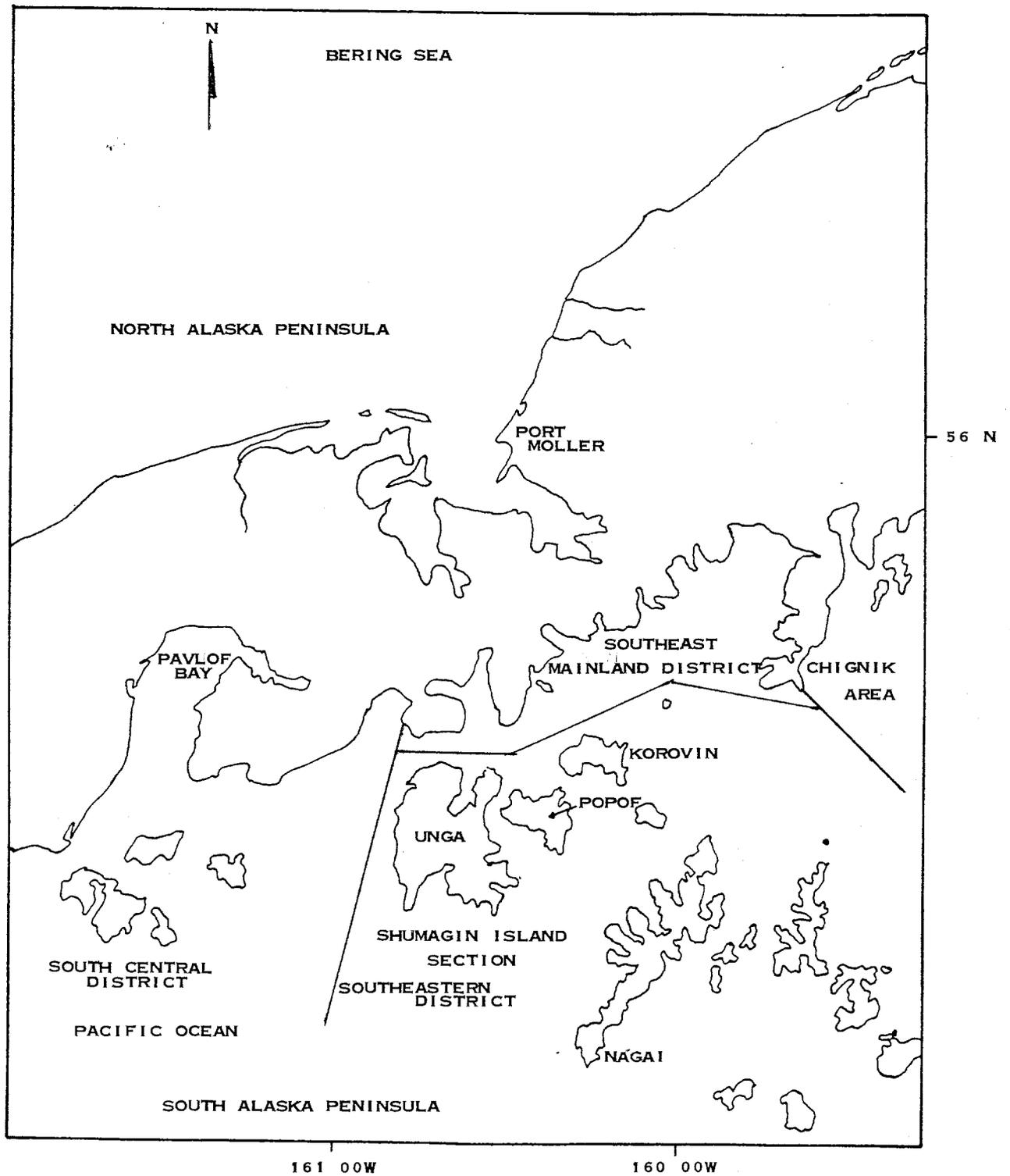


Figure 2. Map of the Shumagin Island Section, Southeast Mainland District, and the Pavlof Bay Area.

The Alaska Department of Fish and Game has collected harvest numbers since statehood from South Peninsula commercial fisheries (Shaul et al. 1987). However, a large-scale sampling effort occurred only in 1985 and 1987 (McCullough 1987). The age compositions of the harvests have been determined for those years, but there has been no digitizing of the samples. This is in part due to the lack of escapement samples from South Peninsula streams and a lack of funds.

IV. Commercial Harvest

The Shumagin Island Section during July through September has historically been managed for local pink and chum salmon runs (Figure 3). Since 1976, the harvest of pink salmon after June has ranged from zero in 1977 to 2,076,670 in 1979. The 1976-85 average harvest of pink salmon was 1,245,145 fish. Since 1976, the harvest of chum salmon after June has ranged from 38 in 1977 to 557,332 in 1986. The 1976-85 average harvest of chum salmon was 180,491 fish. Since 1976, the harvest of sockeye salmon after June has ranged from three in 1976 to 341,811 in 1986. The 1976-85 average harvest of sockeye salmon was 81,861 fish. The harvest of all species in 1976 and 1977 was low because of severe restrictions on fishing time, due to depleted South Peninsula pink and chum stocks. The 1976-85 average post-June harvest of all species was 1,642,913 fish.

The catch of sockeye salmon after June in the Shumagin Island Section increased substantially during 1986 and 1987 as compared to previous years

SHUMAGIN SOCKEYE, PINK, AND CHUM SALMON CATCH AFTER JUNE

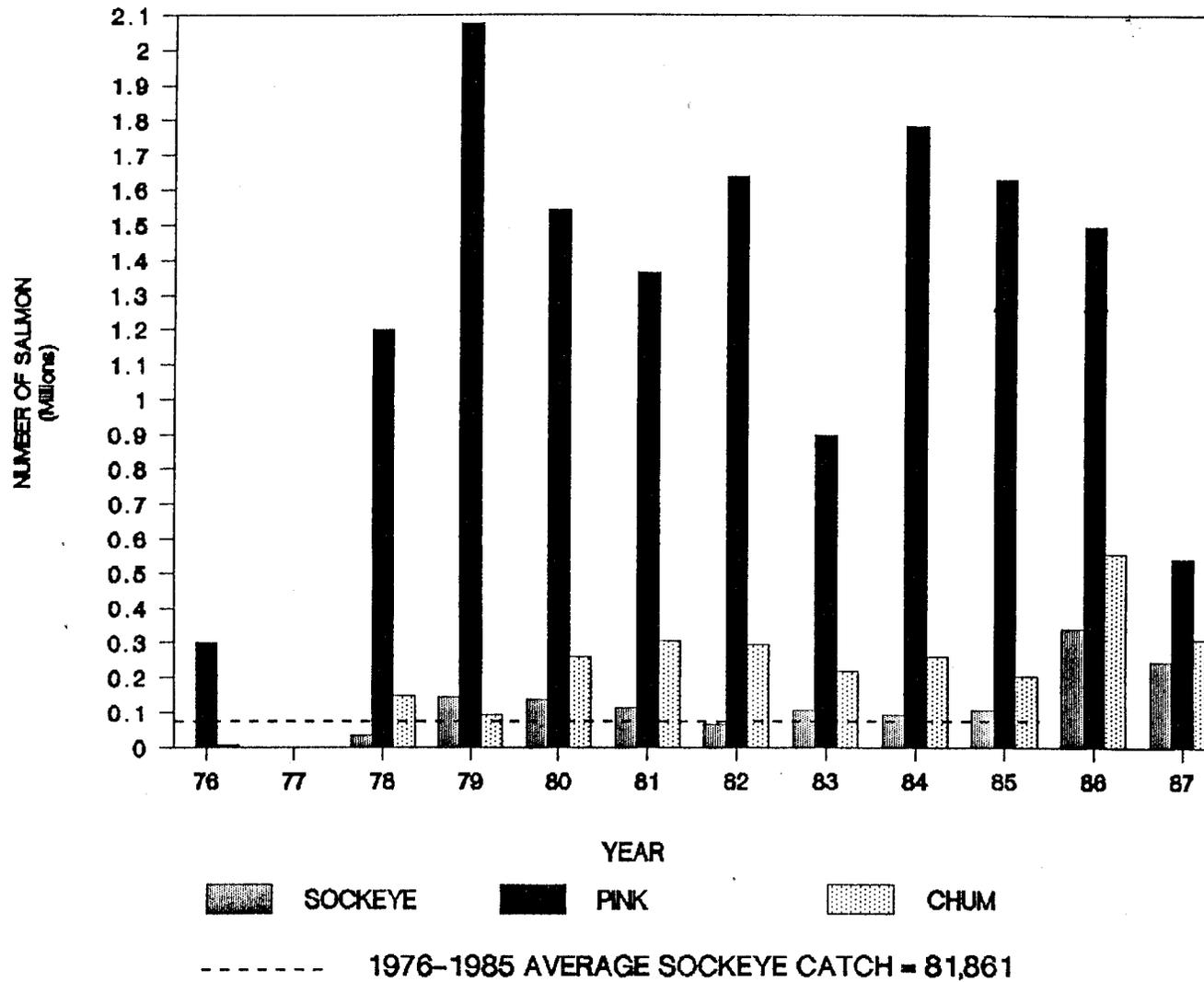


Figure 3. Shumagin Island Section harvest of pink, chum, and sockeye salmon after June.

(Figure 4). The 1976-85 average post June harvest of sockeye salmon was approximately 82,000 fish. In 1986, the catch of sockeye salmon was more than four times above the 1976-85 average, and in 1987 the catch was more than three times above the average. The increased catches in 1986 and 1987 may be the result of several factors: increased fishing effort, increased gear efficiency, greater fish availability through changes in migration patterns, greater fish availability through increased salmon abundance, and changes in fishing areas.

Since 1976, all sockeye runs in the vicinity of the South Peninsula Management Area have shown a trend of increased abundance and catch levels (Figure 5). As the salmon runs in Kodiak, Chignik, Bristol Bay, and Cook Inlet have increased a trend toward increased catches in the Shumagin Island Section has also occurred.

In addition to greater fish availability from larger salmon runs another possible factor leading to increased catches of sockeye salmon are increases in effort.

An increase in the amount of set gill net effort began in the South Peninsula approximately ten years ago. When permits were issued to South Peninsula fishermen by the Limited Entry Commission up to three different salmon fishing permits were given to an individual. As South Peninsula fisheries became more competitive an individual fisherman retained the

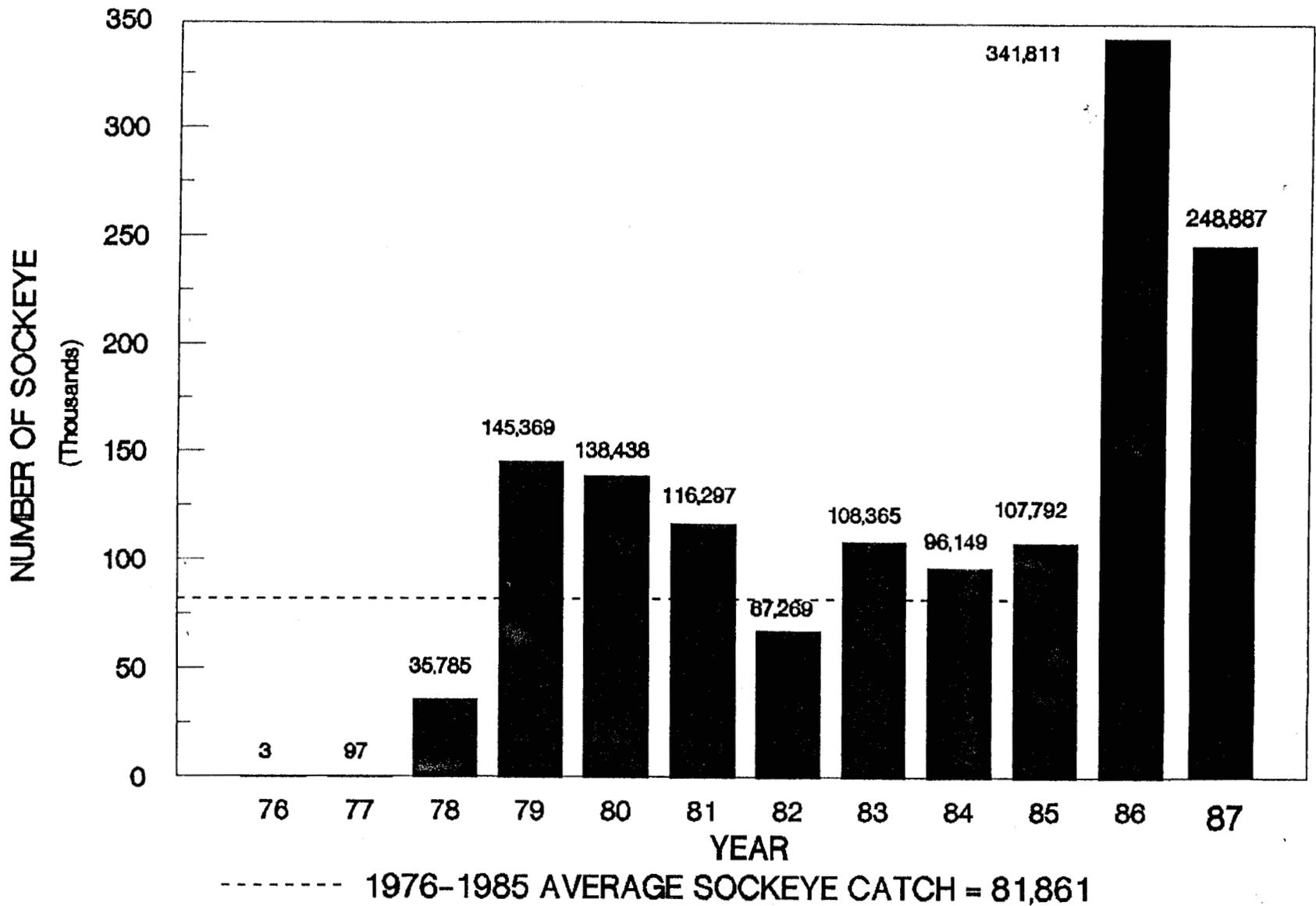


Figure 4. Shumagin Island Section commercial harvest of sockeye salmon after June, 1976-87. Commercial fishing time during 1976 and 1977 was restricted to rebuild depleted South Peninsula pink and chum salmon stocks. The 1976-85 average sockeye harvest was 81,861 fish.

CHANGE IN MAGNITUDE OF RED CATCHES (COMPARED TO THE 10 YEAR AVERAGE)

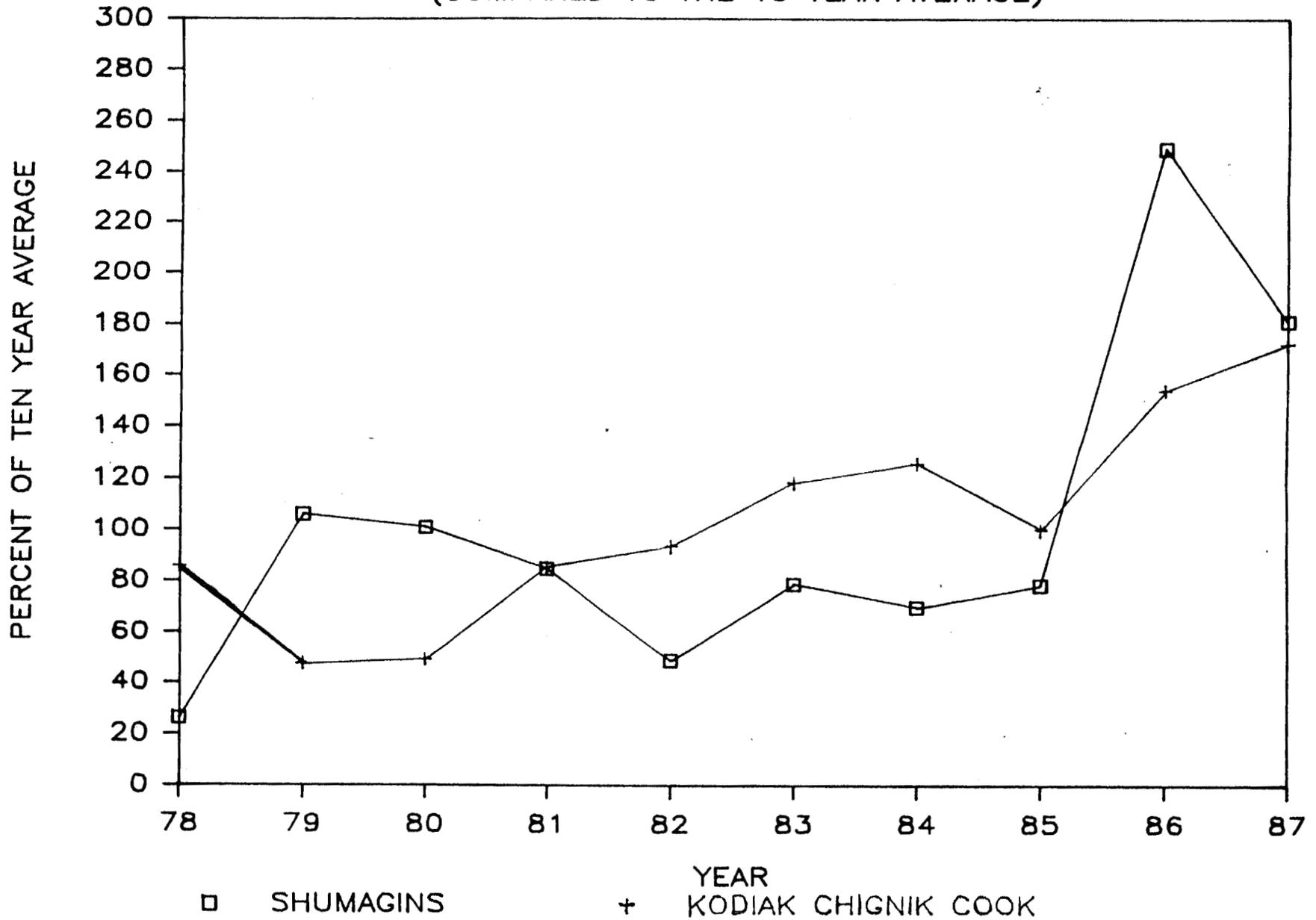


Figure 5. Change in magnitude of sockeye catches.

permit they desired, usually a drift gill net or purse seine permit, and sold any remaining permits, usually a set gill net permit. This has resulted in a large increase in the amount of set gill net gear in use full time. The set gill net gear level will probably continue to increase until approximately 21 additional set gill net permits are in use full time. In 1976 after June, a total of 16 set gill net operators fished the Shumagin Island Section. By 1987 the number of set gill net operators fishing the Shumagin Island Section after June increased to approximately 53. In just a single year, from 1986 to 1987 the number of set gill net fishermen increased by approximately nine in the Shumagin Island Section post-June fishery.

Associated with the increase in set gill net gear was a decrease in the amount of fishing time available in other lucrative fisheries, such as the Southeast Mainland Area. The Southeast Mainland Area fishery, in accordance with the Southeastern District Salmon Management Plan, had a general opening of only five days from June 1 through July 26, 1987. In July, the majority of set gill net fishermen moved to the Shumagin Island Section because it was usually open five days per week for the harvest of local pink and chum salmon stocks.

In addition to greater fish availability and increased effort other possible factors leading to increased catches of sockeye salmon are changes in fishing areas.

From 1976 to 1985 there was an average of one purse seine landing from the Nagai Island area (Figure 6). After June in 1986, two purse seine operators made landings from the Nagai Island area. The level of effort increased in 1987 to ten purse seine and one set gill net operators. The west side of Unga Island previous to 1986 was fished only occasionally by purse seine operators for local chum and pink runs located near Dry Lagoon, Bay Point, and Pinnacle Point. After June in 1986, fishing effort increased to 13 purse seine and two set gill net operators and increased further in 1987 to 25 purse seine and 11 set gill net individuals making landings.

Fish ticket information for 1987 also indicated that the species composition of the Nagai Island area and the west side of Unga Island was substantially different than the remaining portion of the Shumagin Island Section (Figure 7). In the Nagai Island area and the west side of Unga Island the majority of the catch was supported by sockeye at 44.1%, pink at 20.5%, and chum salmon at 34.9%. The remainder of the Shumagin Island Section's catch was supported by sockeye at 16.6%, pink at 42.4%, and chum salmon at 24.3%. The 1987 post-June sockeye catch from the Nagai Island and west side of Unga Island was 90,004 fish.

If the harvest of sockeye salmon after June in the Shumagin Island Section during 1985 is assumed to be typical of conditions prior to 1985, the

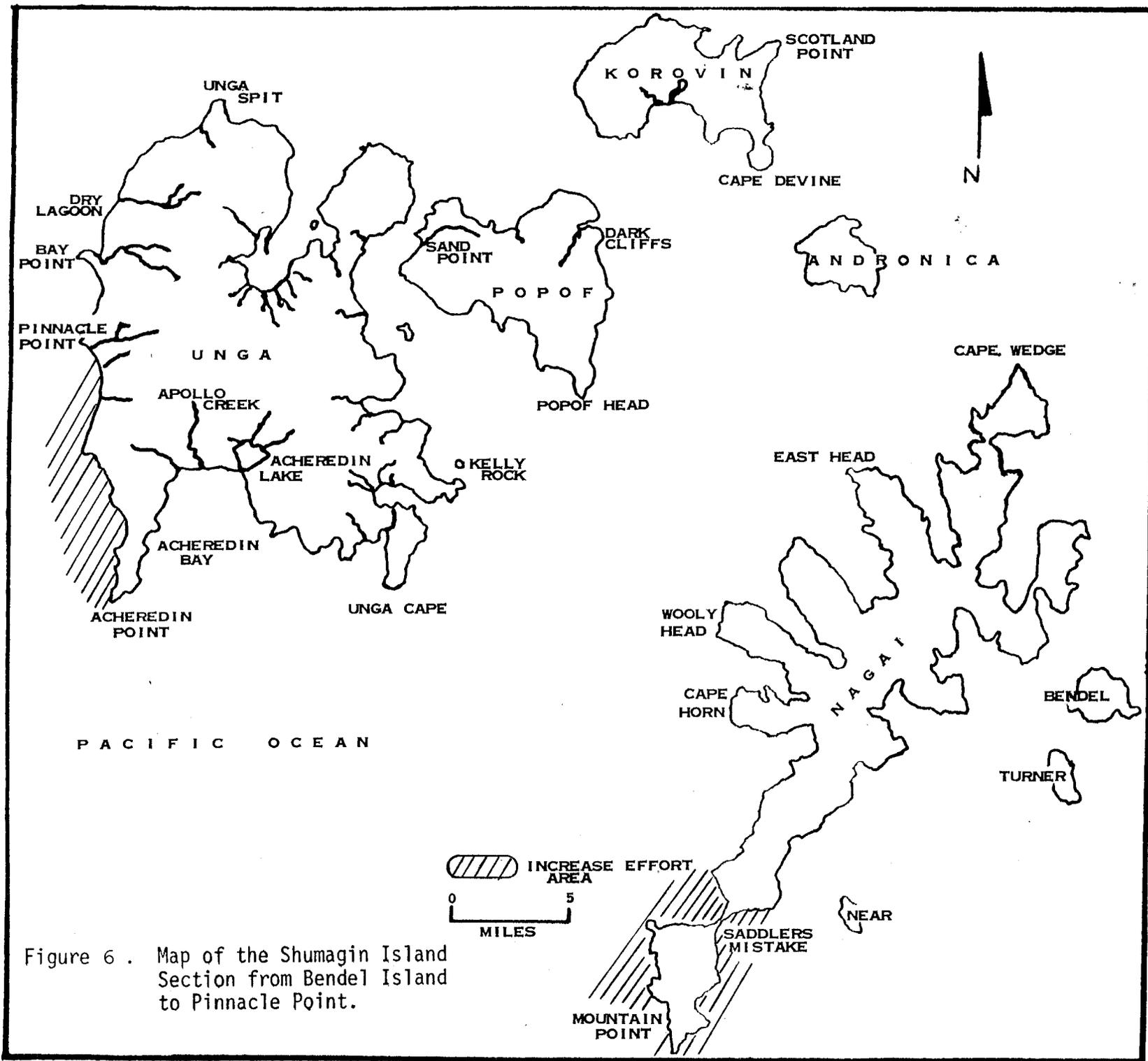


Figure 6. Map of the Shumagin Island Section from Bendel Island to Pinnacle Point.

**SPECIES COMPOSITION OF SELECTED FISHING AREAS
IN THE SHUMAGIN ISLAND SECTION, 1987**

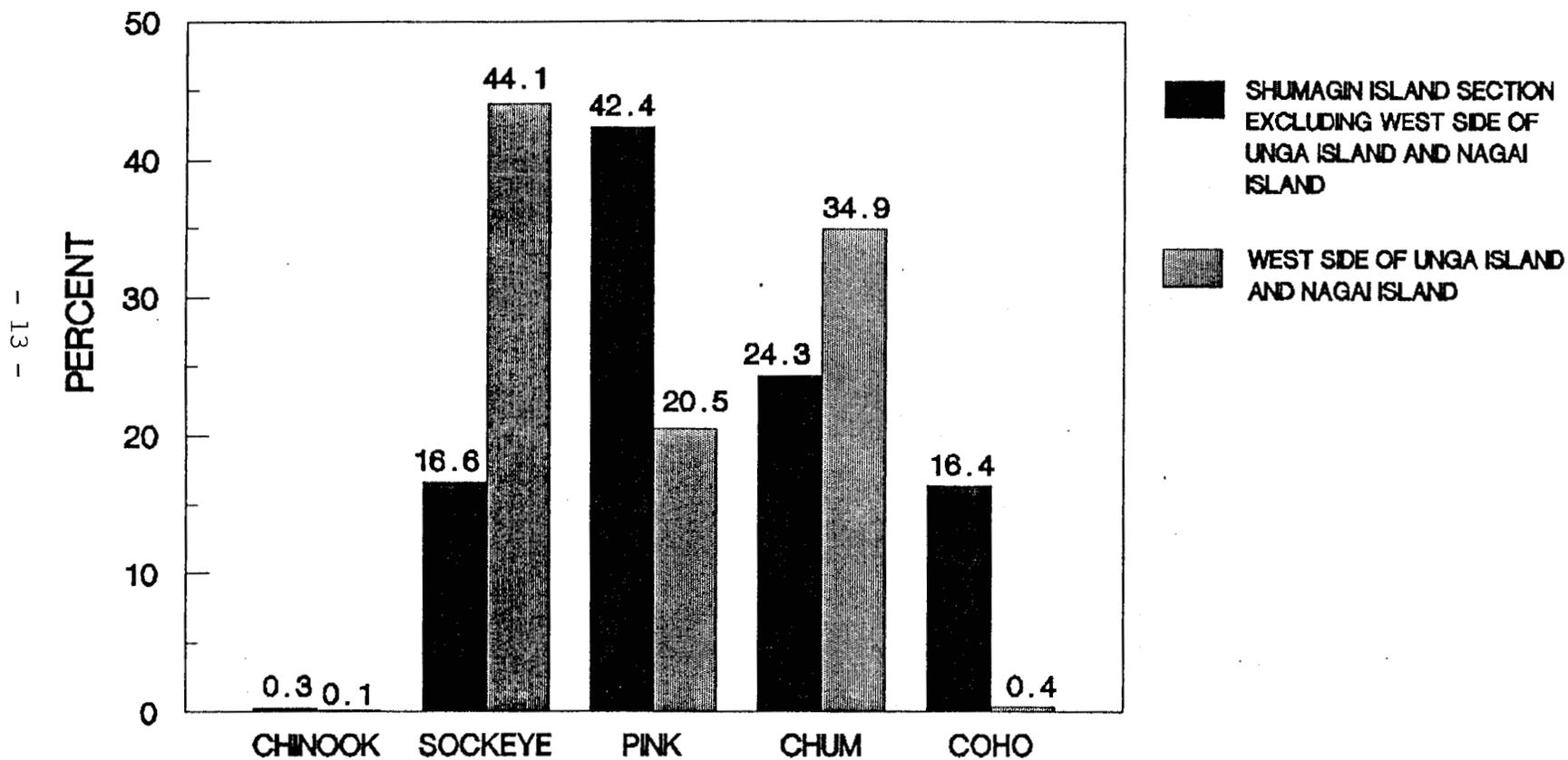


Figure 7. Species composition of the post-June Shumagin Island Section fishery.

catch by week when compared to 1986 and 1987 indicates some differences (Figure 8). In 1985, only 23% of the sockeye harvest occurred in the Shumagin Island Section after June. The majority of the post-June harvest was evenly distributed over statistical weeks 27 through 32, (six weeks) with a slight peak during week 30. In 1986, 68% and in 1987, 64% of the sockeye harvest occurred after June. The majority of the post-June harvest occurred during weeks 28-30, (three weeks) with a peak harvest during week 29. During the period of time when the majority of sockeye salmon are harvested, the majority of the pink and chum salmon harvest also occurs.

To summarize the available fish ticket information, increased catches of sockeye salmon have occurred during 1986 and 1987 in the post-June Shumagin Island Section. The increased catch of sockeye salmon appears to be the result of increased fish availability, increased effort, and changes in fishing areas.

V. Age Composition

The Alaska Department of Fish and Game has collected commercially harvested sockeye salmon scale samples from all areas that are assumed to be contributing to the Shumagin Island fishery. Presently the best method of comparing the sockeye salmon harvest occurring in the Shumagin Island

PERCENT CATCH OF SOCKEYE AFTER JUNE 1985-1987

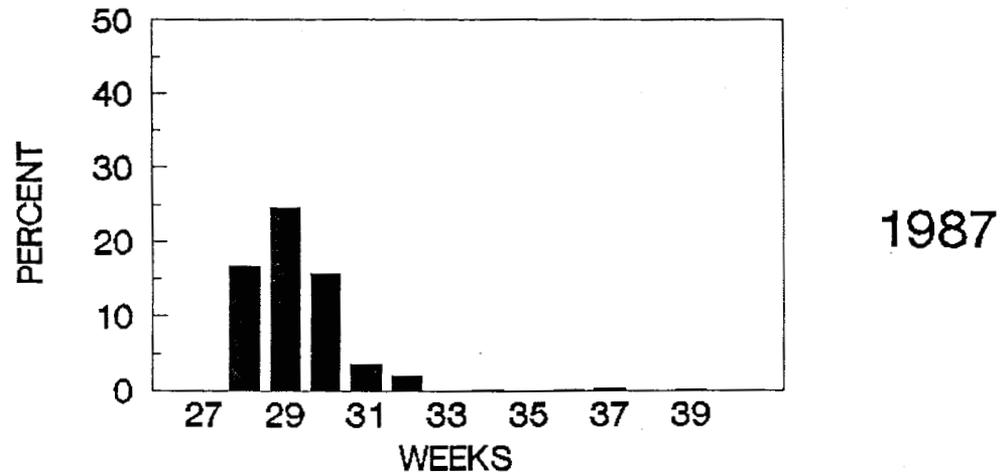
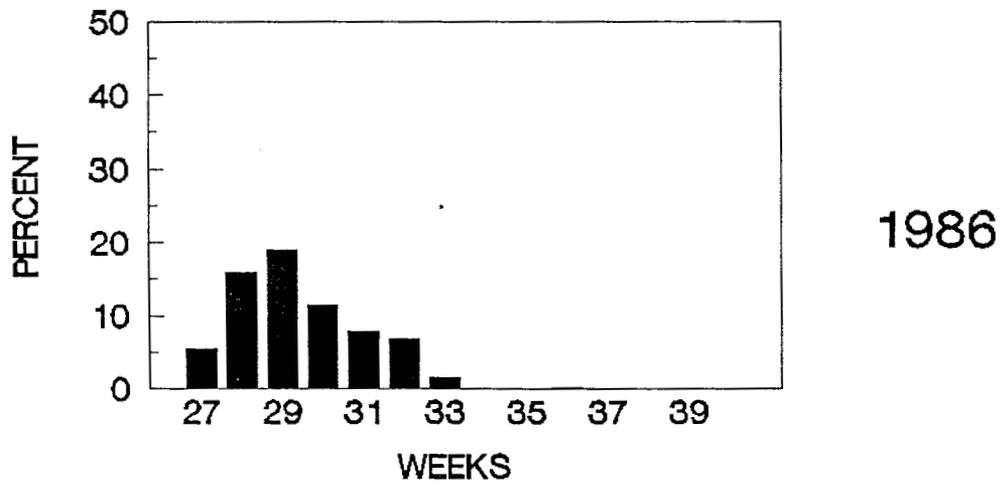
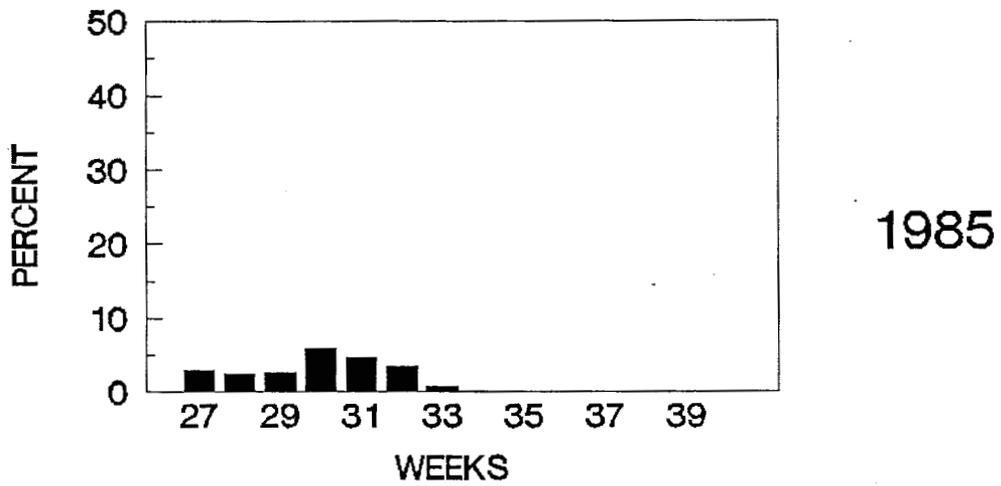


Figure 8. The percent harvest of sockeye in the Shumagin Island Section after June.

Section with other areas is to analyze the age composition of the commercial catches and escapements.

In the next three graphs only age three-ocean sockeye, (0.3, 1.3, and 2.3) were considered in the analysis. In 1987, the age composition of the sockeye harvest was approximately 85% age three-ocean fish in the post-June Shumagin Island Section fishery. The percentages of age three-ocean sockeye were expanded to 100% to compensate for gear selectivity between fisheries.

In 1987, Pavlof Bay, Southeast Mainland, and Shumagin Island Section fisheries in the South Peninsula Management Area, and other areas possibly contributing stocks to the post-June South Peninsula fisheries were sampled. The age compositions of the harvests in these fisheries were determined. The age composition of the post-June sockeye harvest for the Shumagin Island Section was approximately 59% age-1.3, and 30% age-2.3 fish. The late run age composition for the Chignik Area was 22% age-1.3 and 55% age-2.3 sockeye salmon. The dissimilarity of the age composition between the Shumagin Island Section and the Chignik Management Area is substantial. The late run composition of age-1.3 sockeye for Bristol Bay was 12%, North Peninsula 18%, South Peninsula 75%, Kodiak 20%, and Cook Inlet 37%.

In 1987, age-0.3 sockeye, those having spent no winters in fresh water and three winters in salt water, were present in the Chignik Area only during

June and early July, statistical weeks 24-27 (Figure 9). Samples from South Peninsula fisheries indicate a significant presence of age-0.3 sockeye in all samples collected, especially in the Pavlof Bay fishery during week 31. This indicates that the majority of the sockeye harvested in Pavlof Bay and Shumagin Island Section are probably not Chignik fish.

In 1987, age-1.3 sockeye, those having spent one winter in fresh water and three winters in salt water, were generally the dominate age class for the early run into the Chignik Area. In Chignik a gradual decrease in the percent composition of age-1.3 sockeye occurred (Figure 10). By week 30 age-1.3 fish were a minor component of the harvest. In South Peninsula fisheries age-1.3 sockeye were always a major component of the harvest. In the Shumagin Island Section age-1.3 sockeye always contributed over 45% of the harvest, while the Pavlof Bay fishery age-1.3 sockeye always contributed over 70%, and the Southeast Mainland Area over 55%.

In 1987, age-2.3 sockeye, those spending two winters in fresh water and three winters in salt water, were generally the dominate age class for the late run into the Chignik Area. In the Chignik Area age-2.3 sockeye increased in abundance throughout the season (Figure 11). In the South Peninsula fisheries age-2.3 sockeye decreased in abundance in the Pavlof Bay fishery after week 29 and increased in abundance in the Shumagin Island Section and the Southeast Mainland Area. The increased abundance of sockeye age-2.3 noted in the Shumagin Island Section and the Southeast

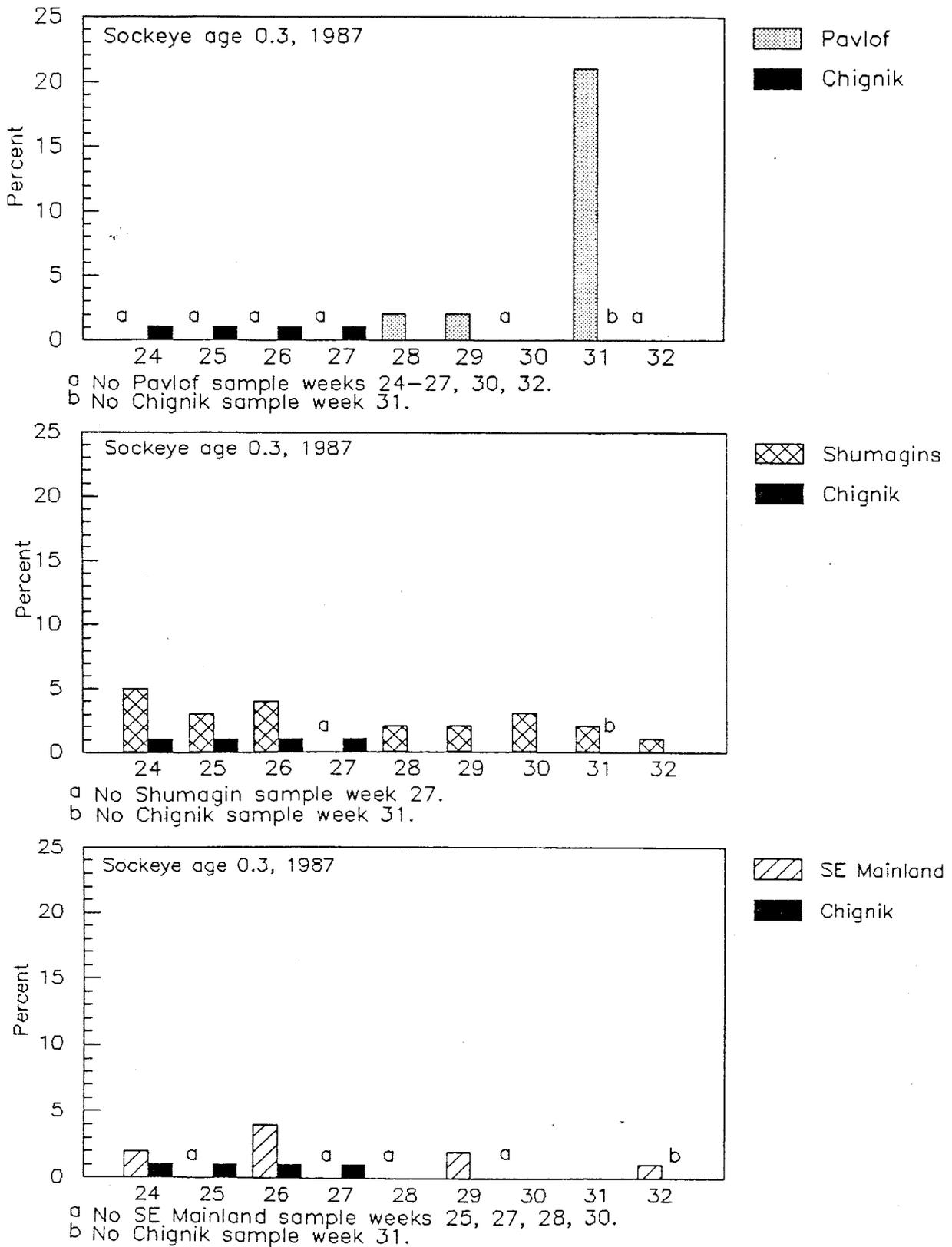


Figure 9. Percent composition of age 0.3 sockeye salmon in the 3-ocean-age component, (0.3, 1.3, and 2.3) of the harvest in the Shumagin Island Section, Pavlof Bay, and Southeast Mainland Area as compared to Chignik. Statistical weeks reflect a 1-week built in travel time delay for Chignik.

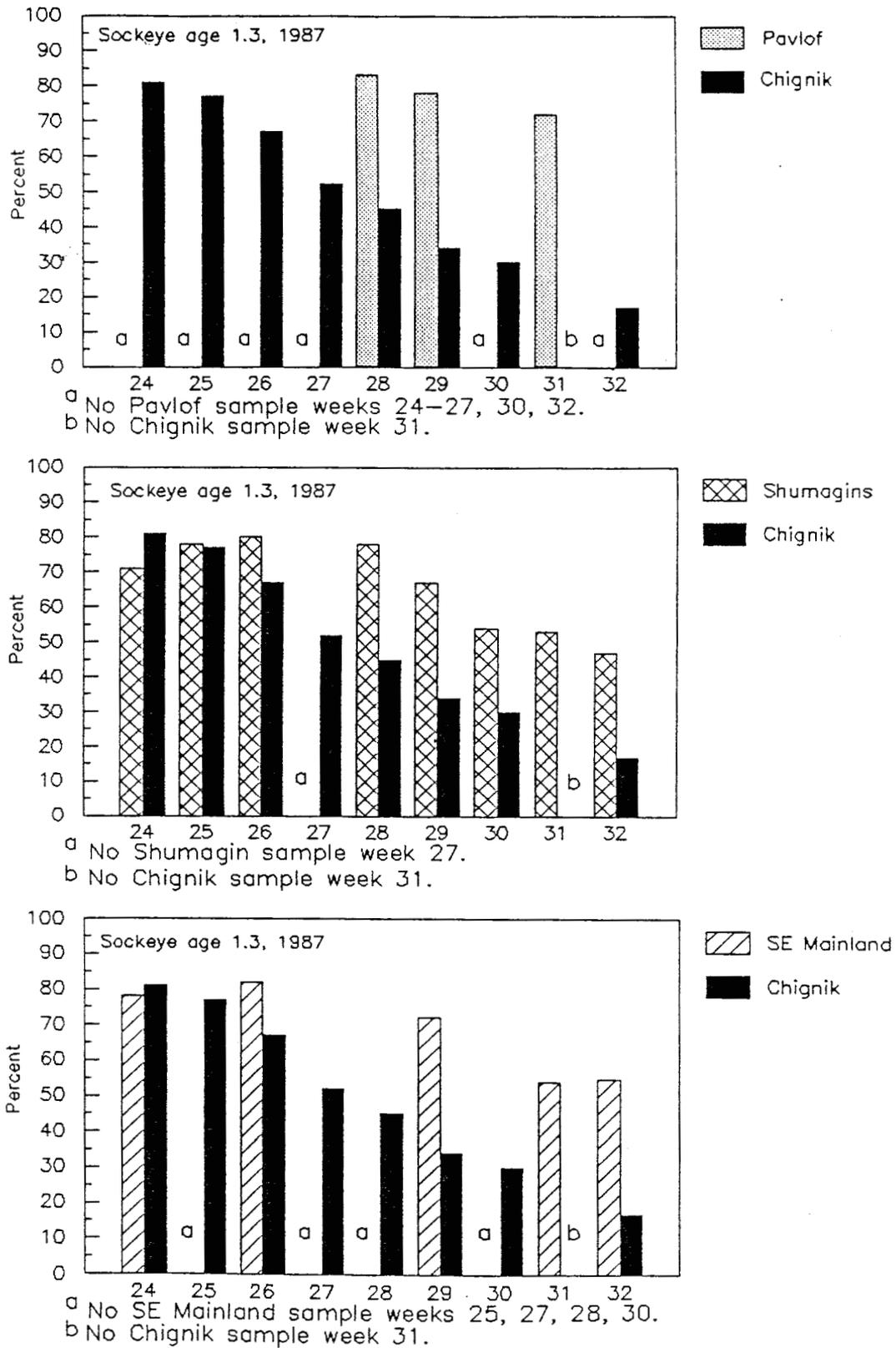


Figure 10. Percent composition of age 1.3 sockeye salmon in the 3-ocean-age component, (0.3, 1.3, and 2.3) of the harvest in the Shumagin Island Section, Pavlof Bay, and Southeast Mainland Area as compared to Chignik. Statistical weeks reflect a 1-week built in travel time delay for Chignik.

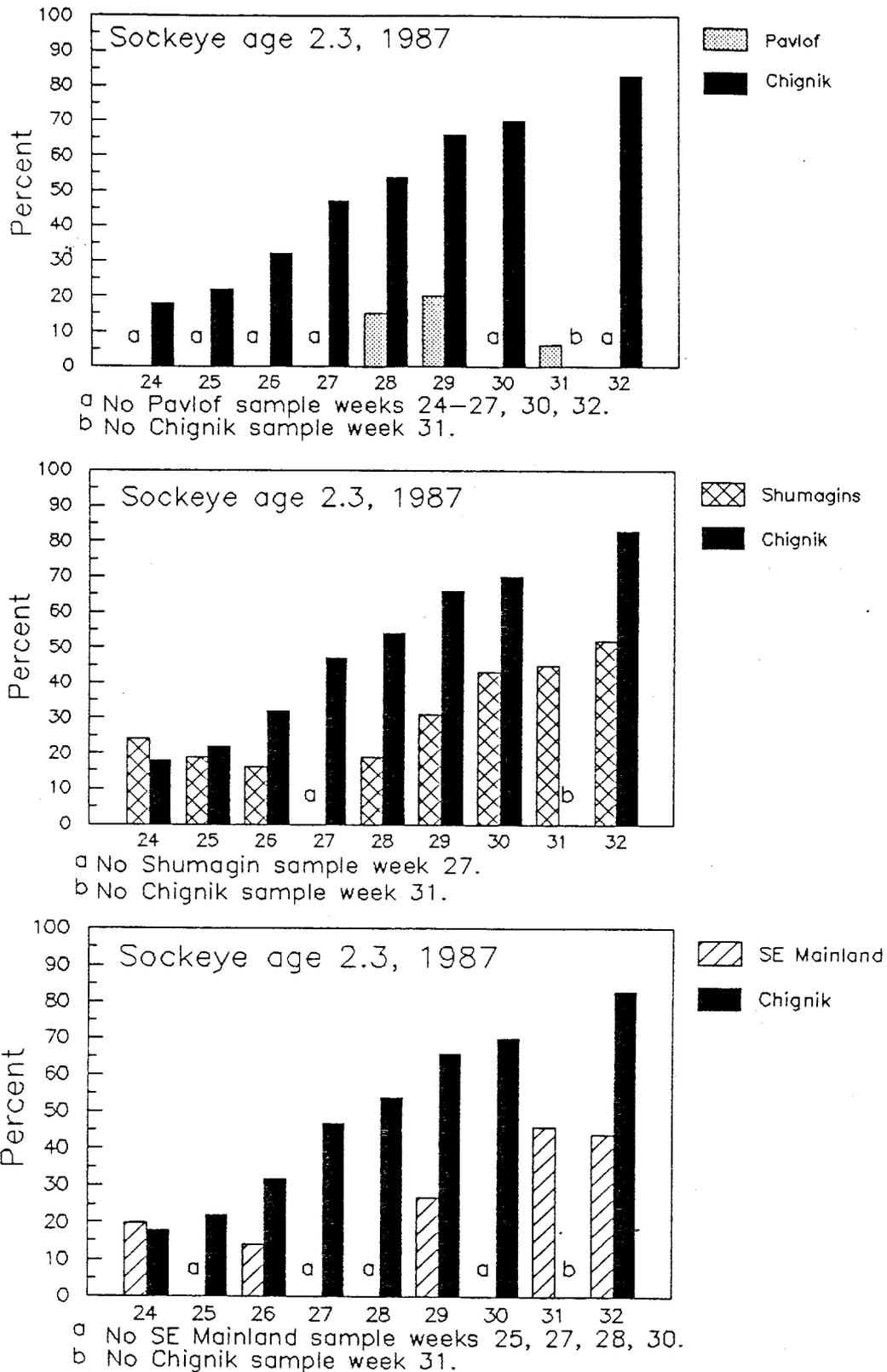


Figure 11. Percent composition of age 2.3 sockeye salmon in the 3-ocean-age component, (0.3, 1.3, and 2.3) of the harvest in the Shumagin Island Section, Pavlof Bay, and Southeast Mainland Area as compared to Chignik. Statistical weeks reflect a 1-week built in travel time delay for Chignik.

Mainland Area was always approximately 1/3 less than that observed at Chignik.

If Chignik was the dominate stock contributing to the South Peninsula fisheries located in the Shumagin Island Section and the Pavlof Bay Area the age composition should be more similar between the areas. Since substantial differences occur in age composition after June between the South Peninsula fisheries and the Chignik fisheries, stocks other than Chignik must be contributing to the South Peninsula fisheries.

VI. Summary

- 1) Local South Peninsula pink and chum salmon are the targeted species for the post-June Shumagin Island Section fishery.
- 2) Significant differences in age composition of the sockeye harvest are apparent between the South Peninsula fisheries and the Chignik Management Area.
- 3) The age composition differences indicate the presence of stocks other than Chignik in the Shumagin Island, Pavlof Bay, and Southeast Mainland fisheries.

- 4) Based on previous tagging studies Bristol Bay, Alaska Peninsula, Chignik, Kodiak, and Cook Inlet stocks contribute to the Shumagin Island Section fishery.

- 5) Age-1.3 sockeye are an important component of the South Peninsula post-June fisheries . The age-1.3 composition of late run sockeye salmon from the areas contributing to the Shumagin Island Section fishery were approximately 37% in Cook Inlet, 20% in Kodiak, 22% in Chignik, 12% in Bristol Bay, 18% in the North Peninsula, and 75% in South Peninsula terminal harvest areas.

- 6) The increased catch of sockeye salmon in the Shumagin Island Section appears to be related to increased abundance of stocks contributing to the fishery, increased effort, and changes in fishing areas.

Currently there is inadequate information to quantify the contribution level of the various stocks in the post-June sockeye harvest in the Shumagin Island Section, Southeast Mainland Area, and the Pavlof Bay Area. The information necessary to define how the contribution of individual stocks might change from year to year is unknown. We know that potential contributing stocks in early July are from the Bristol Bay, Alaska Peninsula, Chignik, Kodiak, and Cook Inlet Management Areas. How many sockeye salmon each area may be contributing to the fishery and whether their contribution changes from year to year is unknown. To determine

each stock's contribution it would be necessary to collect South Peninsula escapement data, and scale samples from all possible contributing stocks. Budget restrictions to date have not allowed adequate sampling of the South Peninsula escapement and especially of the Shumagin Island Section harvest to accurately determine stock contribution levels.

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