

ALASKA DEPARTMENT OF FISH AND GAME
DOMESTIC FISHERIES REPORT

Troll Salmon

The 1984 troll salmon fishery harvested approximately 240,000 chinook salmon; 33,000 in the winter fishery and 207,00 in the summer fishery. Additionally, 31,000 chinook were taken incidental to net fishery targeting on other species of salmon. The 1984 catch of chinook was 20,000 fewer than the 1983 catch. The summer troll chinook season was 25% shorter than the 60 day 1983 fishery.

The 1984 Southeast Alaska coho salmon continued a pattern of strong returns experienced during the last several years. The 1984 commercial harvest is expected to reach 1.8 million fish, the third largest harvest since statehood.

The troll coho harvest accounted for about 60% or 1.1 million. This harvest is down somewhat from the 1983 troll harvest of 1.3 million coho.

Bering Sea/Aleutian Island Herring

A total of 25,989 mt of herring was harvested in the eastern Bering Sea sac roe commercial fishery and Aleutian Islands food and bait fishery during 1984. Wastage of herring, due mostly to gear loss, was estimated at less than 300 mt for all fishing districts. Spawn on kelp fishermen harvested 202 mt. Value of the fishery to the fishermen was estimated at \$8.9 million, with 45 buyers participating. The number of fishermen increased from 1983 levels in Togiak, Goodnews Bay, and Cape Romanzoff districts but decreased in Security Coves and Norton Sound.

Biomass estimates for spawning herring from Togiak to Norton Sound was estimated at 139,000 mt. The commercial exploitation rate was 16.4%. Approximately 70% of the run was ages 6 and 7 fish. Recruitment was poor.

The 1984 Aleutian Islands herring fishery was prosecuted by 9 seines. The harvests of 3,246 mt was taken in state waters near Dutch Harbor and Akutan. Price paid to fishermen varied from \$200-300 per ton for this food and bait fishery.

Tanner Crab

All 1983/84 Tanner crab fisheries are closed except for the Bering Sea opilio fishery north of 58° N. latitude. Preliminary catch statistics (in million of pounds) follow:

| | <u>1983/84</u> | <u>1982/83</u> |
|-------------------|----------------|----------------|
| Southeast/Yakutat | 1.6 | 1.2 |
| P.W.S. | Closed | 1.5 |
| Cook Inlet | 2.8 | 3.0 |
| Kodiak | 14.4 | 18.9 |

| | | |
|-----------------|-------------|-------------|
| Chignik | .7 | 3.5 |
| South Peninsula | 1.8 | 2.9 |
| Dutch Harbor | .2 | .5 |
| Adak | .3 | .5 |
| Bering Sea | | |
| C. bairdi | 1.2 | 5.2 |
| C. opilio | 22.9 | 29.5 |
| Total | <u>46.0</u> | <u>66.7</u> |

Sablefish

The only remaining Gulf of Alaska sablefish fishery open is the Western District. Preliminary harvests (in metric tons) to date are:

| | <u>Harvest</u> |
|--------------------------------|----------------|
| Southeast inside | 994 |
| Southeast outside/east Yakutat | 2,654 |
| West Yakutat | 1,600 |
| Central | 2,830 |
| Western | <u>156</u> |
| Total | <u>8,234</u> |

PRELIMINARY INSEASON REPORT ON 1984 SOUTHEAST ALASKA
COMMERCIAL CHINOOK AND COHO SALMON FISHERIES

September 17, 1984

Southeast Region Staff
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Alaska Department of Fish and Game
Juneau, Alaska

IMPORTANT NOTE

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SALMON CATCH DATA REPORTED IN THIS DOCUMENT SHOULD BE CONSIDERED VERY PRELIMINARY AS IT IS BASED ON INITIAL INSEASON TABULATION OF FISH TICKETS AND INCLUDES SOME PROJECTIONS FOR MOST RECENT PERIODS WHEN FISH TICKETS WERE NOT AVAILABLE. REVISIONS WILL OCCUR AS LATE ARRIVING TICKETS ARE COMPILED AND THE DATA IS EDITED FOR ACCURACY AND COMPLETENESS. HOWEVER, CATCH DATA REPORTED IS BELIEVED TO BE SUFFICIENTLY ACCURATE TO INDICATE GENERAL FISHERY PERFORMANCE TO DATE.

PRELIMINARY SUMMARY OF 1984 SOUTHEAST ALASKA
COMMERCIAL CHINOOK AND COHO SALMON FISHERIES

CHINOOK FISHERIES

1) Based on preliminary catch reports, Southeast Alaska commercial fisheries harvested an estimated 271,000 chinook salmon during the 1984 season. Approximately 240,000 fish or nearly 90% of the harvest was taken in the troll fishery while 31,000 or about 10% of the total was caught incidentally in net fisheries targeting on other species of salmon (Table 1). An increase in catch rates during the last week of the troll chinook fishery combined with an above average incidental net catch resulted in the 1984 catch reaching the upper end of the 243,000 - 272,000 management range.

The 1984 catch of 271,000 was about 7% or 20,000 fish below the catch of 291,000 taken in both 1983 and 1982 but slightly above the 1981 catch of 268,000. Compared to the 1971-80 average catch of 325,000 chinook, the 1984 catch was reduced by about 17% or 54,000 fish (Table 2).

2) The 1984 Southeast Alaska summer troll chinook season consisted of 45 fishing days and was 15 days or 25% shorter

than the 60-day season in 1983 (Figure 1). This represents nearly a 75% reduction in fishing time since 1979 - and prior years - when 169 days were fished from April 15 through September 30. These reductions, begun in 1980, are part of a 15-year rebuilding program for depressed Southeast Alaska natural chinook salmon stocks as well as part of a coordinated coastwide effort to rebuild severely depressed natural chinook stocks originating from areas south of Alaska which contribute to Southeast Alaska fisheries.

During the 1984 summer troll season, an estimated 207,000 chinook were taken during two fishing periods, a 26-day period June 5-30 (130,000) and a 19-day period July 11-29 (77,000) (Table 3). Combined with a catch of 33,000 fish taken during the winter season (Oct. 1 - April 14), this yielded a total troll catch of 240,000 chinook. This was about 11% or 31,000 fish less than the 1983 catch of 271,000 but nearly the same as the 241,000 catch in 1982. Compared to the 1971-80 average troll catch of 300,000, the 1984 catch was reduced by about 20% or 60,000 fish. Since 1960, catches were smaller in only three years (1961, 1962, 1976).

3) The 1984 net fisheries catch of 31,000 chinook was nearly all taken incidental to the harvest of over 23 million salmon of other species. This was about 35% or 8,000 fish above the 1975-83 average of 23,000 fish (Table 1). (Almost all

chinook directed gillnet fisheries have been closed since 1975.) Approximately two thirds (20,000) of the total net chinook catch was taken by seine gear with most of this catch occurring in the Noyes Island area in southern Southeast Alaska.

4) Data on 1984 chinook salmon escapements to Southeast Alaska systems and the transboundary rivers is still being compiled, however preliminary information indicates generally strong escapements in most systems. Data provided by the Canadian Dept. of Fisheries and Oceans shows that escapements approximately doubled in the Taku and Stikine rivers which had experienced exceptionally poor escapements in 1983. Escapements to the Situk River near Yakutat and the Behm Canal systems near Ketchikan were especially strong. Overall, goals for the first cycle of the 15-year stock rebuilding plan generally continue to be met or exceeded.

COHO SALMON

1) The 1984 Southeast Alaska coho salmon return continued the pattern of strong returns experienced during the last several years. The 1984 commercial harvest which is expected to reach approximately 1.8 million would be the third largest harvest since statehood, being exceeded only by catches of

2.0 million in 1983 and 2.1 million in 1982. The 1984 harvest represents a 65 percent increase over the 1971-80 average catch of 1.1 million.

2) The projected 1984 troll coho harvest of approximately 1.1 million, which represents about 60% of the total commercial harvest, would rank 1984 as the third or fourth best coho year for the troll fishery since statehood. Catches of approximately 1.3 million were taken in both 1982 and 1983. The 1984 catch was nearly double the 1971-80 average of 654,000.

The 1984 troll coho season began on June 15 and ran through September 20 except for two 10-day closures. A regionwide 10-day closure was implemented July 1-10 for chinook management purposes but applied to all species. The impact of this closure on the troll coho harvest was probably minimal, as it occurred early in the coho run and catch patterns after the closure suggested that most coho remained in outer coastal and offshore areas where they were available to most of the troll fleet. A second 10-day regionwide closure was implemented August 15-24 for coho management. After the closure of the troll fishery to chinook on July 30, trollers targeted almost exclusively on coho salmon harvesting an estimated 500,000 to 600,000 additional coho.

3) Final 1984 season data is expected to show that net fisheries harvested approximately 700,000 fish or about 40% of the total commercial coho harvest. The total net harvest was split approximately 60:40 between seine and gillnet gear.

4) Information on the extent of 1984 coho escapements is not available at this date as peak migration into spawning streams does not occur until mid-October for many coho stocks.

TABLE 1. PRELIMINARY 1984 SOUTHEAST ALASKA COMMERCIAL CHINOOK AND COHO SALMON CATCHES BY FISHERY. (ADF&G 9/17/84)

| Fishery | Numbers of Fish in Thousands | | | |
|-----------------|------------------------------|---------|-----------------------|---------|
| | ---- Chinook ---- | | -----Coho----- | |
| | Number | Percent | Number | Percent |
| ----- | | | | |
| Troll | | | | |
| Winter | 33 | | | |
| Summer | 207 | | (1,073) ^{1/} | |
| Troll Subtotals | 240 | 89% | 1,073 | 61% |
| ----- | | | | |
| Net | | | | |
| Seine | 20 | | (400) | |
| Gillnet | 11 ^{2/} | | (280) | |
| Net Subtotals | 31 | 11% | 680 | 39% |
| ----- | | | | |
| Trap | + | + | 6 | + |
| ===== | | | | |
| Totals | 271 | | (1,759) | |

1/ Troll coho fishery in progress until Sept. 20; catch shown includes projection through that date.

2/ Fall gillnet fisheries still in progress; total season coho catch expected to reach 250-300,000.

TABLE 2. ANNUAL SOUTHEAST ALASKA COMMERCIAL AND RECREATIONAL CHINOOK SALMON CATCHES, 1965 - 84. (ADF&G 9/17/84)

Numbers of Fish in Thousands

| Year | -- Commercial Fisheries -- | | | Recreational Fisheries 2/ | Total |
|--------------|----------------------------|-----|----------|---------------------------|-------|
| | Troll 1/ | Net | Subtotal | | |
| 1965 | 259 | 28 | 287 | (13) | (300) |
| 1966 | 282 | 26 | 308 | (13) | (321) |
| 1967 | 275 | 26 | 301 | (13) | (314) |
| 1968 | 304 | 28 | 332 | (14) | (346) |
| 1969 | 290 | 24 | 314 | (14) | (328) |
| ----- | | | | | |
| 1965-69 Ave. | 282 | 26 | 308 | 13 | 322 |
| 1970 | 305 | 18 | 323 | (14) | (337) |
| 1971 | 334 | 22 | 356 | (15) | (371) |
| 1972 | 242 | 45 | 287 | (15) | (302) |
| 1973 | 308 | 36 | 344 | (16) | (360) |
| 1974 | 322 | 25 | 347 | (17) | (364) |
| ----- | | | | | |
| 1971-74 Ave. | 302 | 29 | 331 | 15 | 347 |
| 1975 | 287 | 14 | 301 | (17) | (318) |
| 1976 | 231 | 11 | 242 | (17) | (259) |
| 1977 | 272 | 13 | 285 | 17 | 302 |
| 1978 | 376 | 25 | 401 | 17 | 418 |
| 1979 | 338 | 29 | 367 | 17 | 384 |
| ----- | | | | | |
| 1975-79 Ave. | 301 | 18 | 319 | 17 | 336 |
| 1980 | 300 | 22 | 322 | 20 | 342 |
| 1981 | 248 | 20 | 268 | 21 | 289 |
| 1982 | 242 | 49 | 291 | 26 | 317 |
| 1983 | 271 | 20 | 291 | 22 | 313 |
| ----- | | | | | |
| 1980-83 Ave. | 265 | 28 | 293 | 22 | 315 |
| Prelim. 1984 | 240 | 31 | 271 | (22) ^{3/} | (293) |

1/ Troll catches prior to 1980 based on calendar year. Catches beginning in 1980 based on Oct. 1 - Sept. 30 counting year.

2/ Estimates of recreational catches after 1976 based on mail surveys. Estimates for 1965-76 based on 1977-80 average catch per capita data.

3/ 1980-83 Average catch; 1984 data not available.

TABLE 3. PRELIMINARY 1984 SOUTHEAST ALASKA TROLL FISHERY CHINOOK AND COHO SALMON CATCHES. (REVISED ADF&G 9/17/84)

| Period (No. of days) | Catches in Thousands of Fish | |
|--|------------------------------|---------------------|
| | -- Chinook -- | ---- Coho ---- |
| Winter Season (Oct. 1, 1983 - April 14, 1984) | 33 | |
| Summer Season (April 15 - Sept. 20, 1984) | | |
| Apr 15 - Jun 4 (20) | - Closed - | |
| Jun 5 - 30 (26) | 130 | 35 ^{1/} |
| Jul 1 - 10 (10) | - Closed - | |
| Jul 11 - 29 (19) | 77 | 423 |
| Jul 30 - Aug 14 (16) | -Closed- | 392 |
| Aug 15 - 24 (10) | - Closed - | |
| Aug 25 - Sep 20 (27) | -Closed- | (223) ^{2/} |
| Summer Season Subtotals | <u>207</u> | <u>1,073</u> |
| 1984 Season Totals | 240 | 1,073 |

1/ Coho catch after June 15 coho season opening date.

2/ Includes projected catch through Sept. 20.

Note: Estimated troll catches of other species include the following:
9,000 sockeye, 290,000 pink, 22,000 chum.

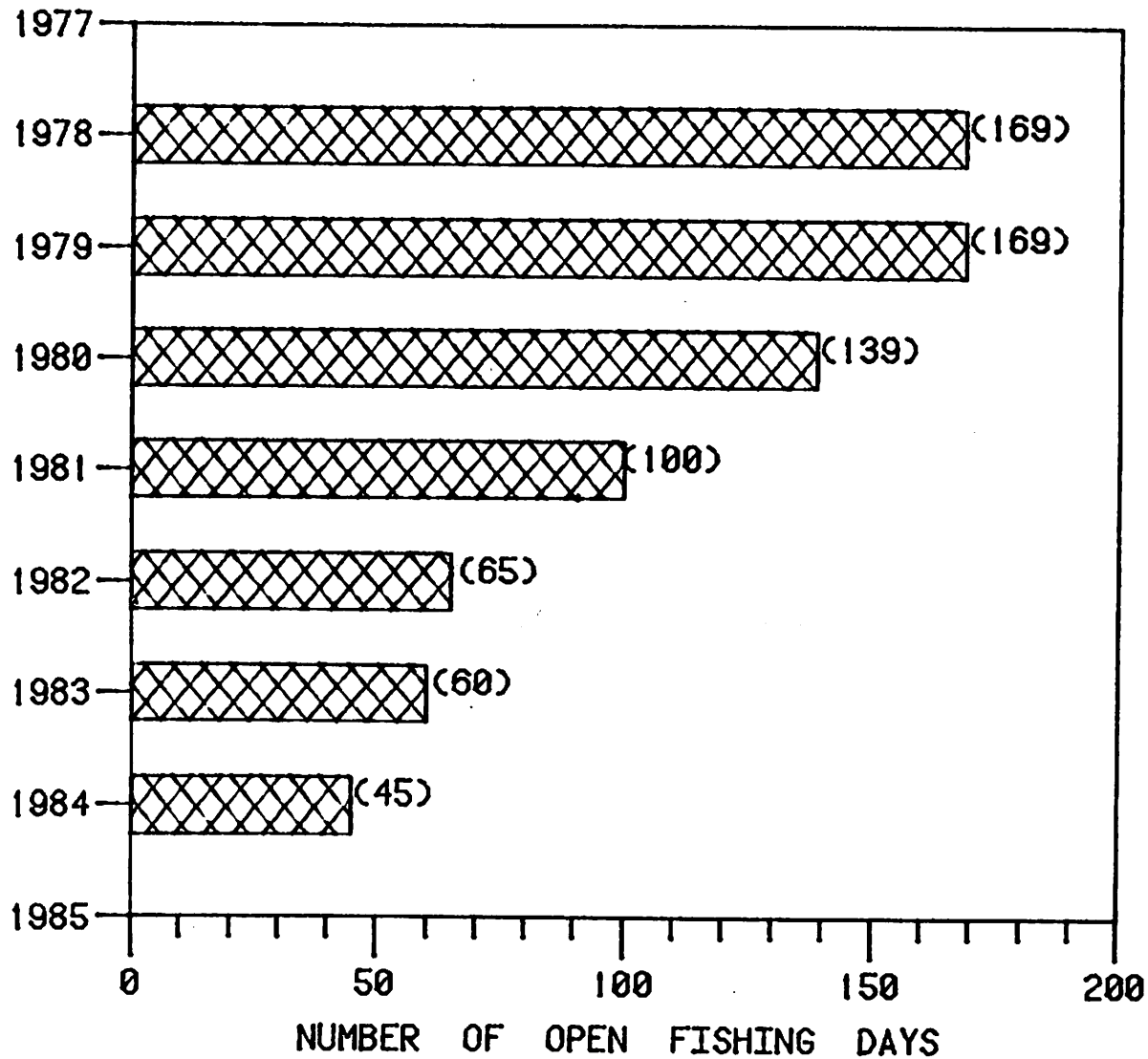


FIGURE 1 . NUMBER OF DAYS SOUTHEAST ALASKA TROLL FISHERY OPEN TO CHINOOK SALMON FISHING DURING THE SUMMER SEASON APRIL 15 THROUGH SEPTEMBER 30, 1978-84. (ADF&G 7/31/84)

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PACIFIC HERRING STOCKS AND FISHERIES
IN THE EASTERN BERING SEA,
ALASKA, 1984

A Report to the North Pacific Fisheries Management Council

September 1984

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INTRODUCTION

This report summarizes current 1984 information on eastern Bering Sea Pacific herring stocks and fisheries conducted within Alaskan waters. A more detailed account of this information is presented in Lebida et. al. (in press).

COMMERCIAL FISHERIES

A total of 25,989 mt of Pacific herring was harvested in the eastern Bering Sea herring sac roe commercial fishing districts and Aleutian Islands food and bait fishery during 1984 (Figures 1 and 2, Table 1). This was the third largest total harvest recorded in the history of these fisheries. Exploitation of estimated spawning biomass in the commercial fishing districts was 16.4% (Table 2). Wastage of herring, mostly due to abandoned gear and loss of gear to sea ice movement, was estimated to be less than 300 mt for all districts combined. Spawn on rockweed kelp harvests in Togiak and Norton Sound Districts totaled 202 mt (Table 3). Value of total herring and spawn on kelp harvests to fishermen was estimated to be \$8.9 million (Tables 2 and 3). A total of 45 buyers participated in the herring sac roe fishery in all districts in 1984 compared to 44 during 1983 (Table 4). Number of fishermen increased in Togiak, Goodnews Bay and Cape Romanzof Districts, but decreased from 1983 levels in the other districts.

SUBSISTENCE FISHERIES

A minimum estimated total of 10 mt of Pacific herring were harvested by 46 families from 3 villages in the Yukon delta area (Table 5). Subsistence surveys were not conducted during 1984 in the Nelson Island and Kuskokwim delta areas.

STOCK ASSESSMENT

Methods

Aerial surveys were conducted within all districts to estimate relative abundance, distribution and biomass of herring schools. Methods of data collection have previously been described (Barton and Steinhoff 1980; Fried 1983). A total of 172 hours was spent in aerial assessment surveys: 83 hours for Togiak, 20 hours for Security Cove/Goodnews Bay, 8 hours for Nelson-Nunivak Islands, 2 hours for Cape Romanzof and 59 hours for Norton Sound. During the season, standard conversion factors of 1.2 (water depth 5 m or less), 2.5 (water depth greater than 5 m) and 3.0 (school very dense and dark in appearance) mt per 50 m² school surface area were used in analyses of aerial survey data. Assessment of Pacific herring within Cape Romanzof District continues to be a problem, since aerial surveys cannot be conducted due to consistently turbid water. Studies are being conducted to determine whether spawning herring population size estimates can be made from egg deposition surveys. Taking into consideration harvest size, fishing effort and spawn deposition extent and intensity, the Cape Romanzof Pacific herring spawning biomass was estimated at about 5,500 mt (Table 6).

Test fishing with variable mesh gillnets and sampling of commercial landings were conducted in all districts to determine age, size and sexual maturity of Pacific herring. Volunteer purse seine and gillnet vessels were also used to

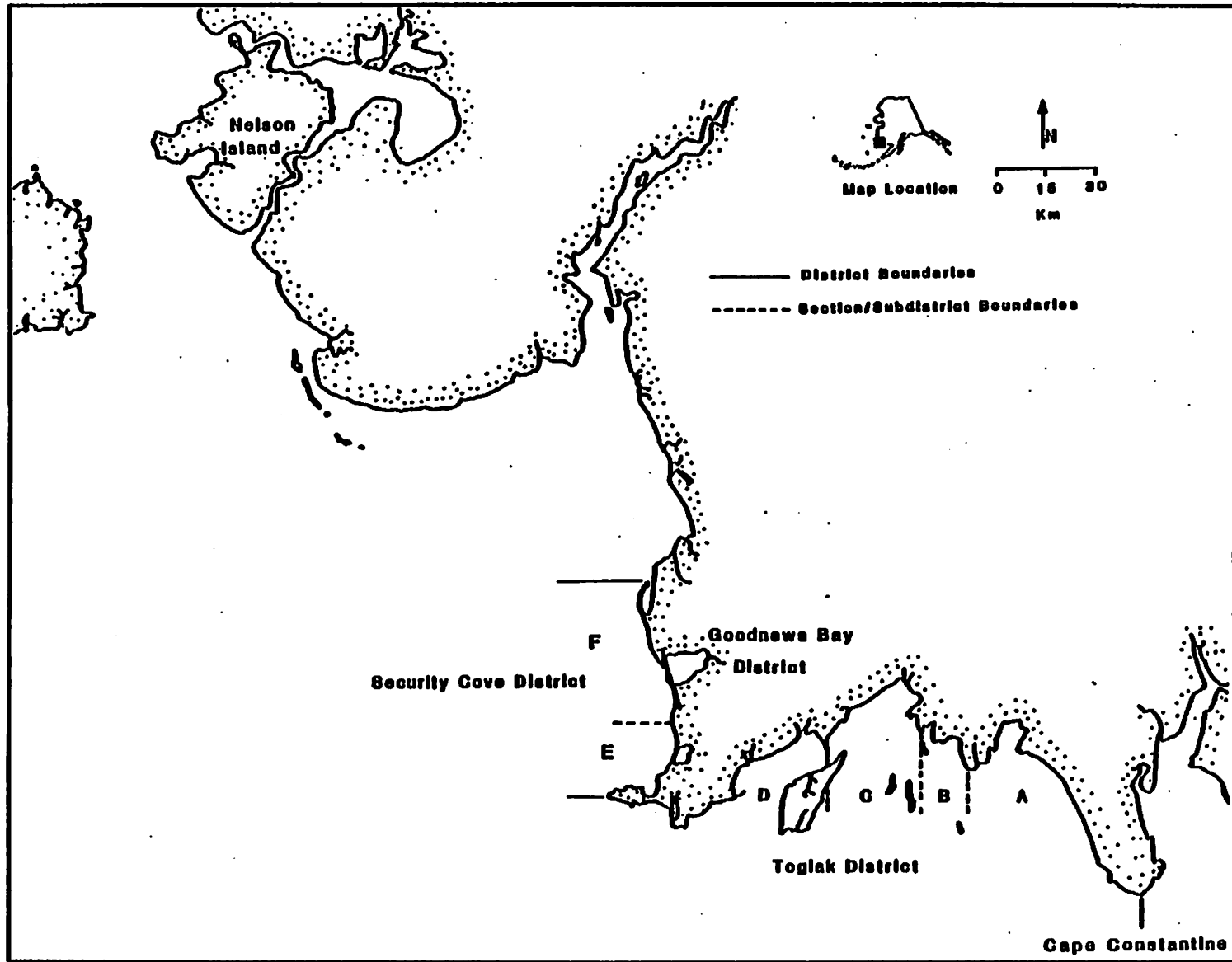


Figure 1. Togiak (A = Kulukak, B = Nunavachak, C = Togiak, D = Hagemeister Sections), Security Cove (E = Security Cove, F = Red Mt. Subdistricts) and Goodnews Bay Pacific herring commercial fishing districts in the eastern Bering Sea, Alaska.

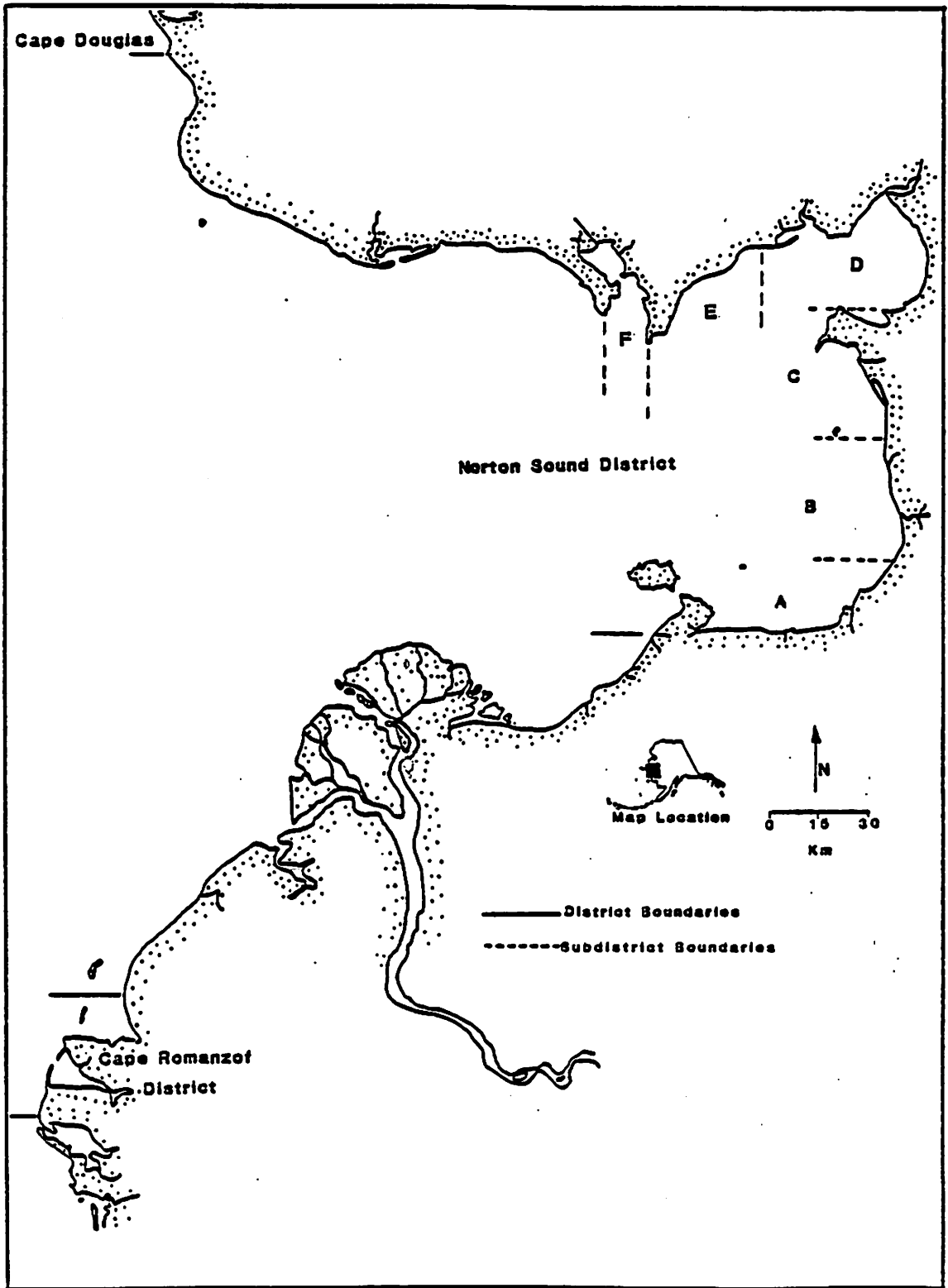


Figure 2. Cape Romanzof and Norton Sound (A = St. Michael, B = Unalakleet, C = Cape Denbigh, D = Norton Bay, E = Elim, F = Golovin Bay Subdistricts) Pacific herring commercial fishing districts in the eastern Bering Sea, Alaska.

Table 1. Pacific herring and herring spawn on kelp harvests by domestic commercial fishermen in the eastern Bering Sea, Alaska, 1909-1984.

| Year | Herring (mt) 1/ | | | | | | Herring Spawn on Kelp (mt) | | |
|-----------|------------------|-------------|-----------------------------|--------------|--------------|--------|----------------------------|--------------|-------|
| | Aleutian Islands | Bristol Bay | Security Cove/ Goodnews Bay | Cape Romanof | Norton Sound | Total | Bristol Bay | Norton Sound | Total |
| 1909-1916 | - | - | - | - | - | - | - | - | - |
| 1916-1928 | - | - | - | - | 2/ | - | - | - | - |
| 1929 | 1,142 | - | - | - | 1,706 | 1,706 | - | - | - |
| 1930 | 1,738 | - | - | - | 151 | 1,293 | - | - | - |
| 1931 | 958 | - | - | - | 400 | 2,138 | - | - | - |
| 1932 | 2,727 | - | - | - | 78 | 1,036 | - | - | - |
| 1933 | 1,438 | - | - | - | 480 | 3,207 | - | - | - |
| 1934 | 1,391 | - | - | - | 28 | 1,466 | - | - | - |
| 1935 | 2,188 | - | - | - | 4 | 1,395 | - | - | - |
| 1936 | 1,251 | - | - | - | 14 | 2,202 | - | - | - |
| 1937 | 525 | - | - | - | - | 1,251 | - | - | - |
| 1938 | 466 | - | - | - | 5 | 530 | - | - | - |
| 1939 | - | - | - | - | 9 | 475 | - | - | - |
| 1940 | - | - | - | - | 5 | 5 | - | - | - |
| 1941 | - | - | - | - | 13 | 13 | - | - | - |
| 1942-1944 | - | - | - | - | 3 | 3 | - | - | - |
| 1945 | 68 | - | - | - | - | 68 | - | - | - |
| 1946 | - | - | - | - | - | - | - | - | - |
| 1947-1963 | - | - | - | - | - | - | - | - | - |
| 1964 | * | * | * | * | 18 | 18 | * | * | * |
| 1965 | * | * | * | * | 18 | 18 | * | * | * |
| 1966 | - | - | - | - | 11 | 11 | - | - | - |
| 1967 | - | 122 | - | - | - | 122 | - | - | - |
| 1968 | - | 82 | - | - | - | 82 | - | - | - |
| 1969 | - | 43 | - | - | 2 | 45 | 25 | 5 | 25 |
| 1970 | - | 25 | - | - | 7 | 32 | 18 | 5 | 18 |
| 1971 | - | - | - | - | 18 | 18 | 24 | 24 | 24 |
| 1972 | - | 74 | - | - | 15 | 89 | 29 | 5 | 29 |
| 1973 | - | 46 | - | - | 32 | 78 | 5 | 5 | 5 |
| 1974 | - | 112 | - | - | 2 | 114 | 57 | - | 57 |
| 1975 | - | 50 | - | - | - | 50 | 50 | - | 50 |
| 1976 | - | - | - | - | 8 | 8 | 134 | - | 134 |
| 1977 | - | 2,535 | - | - | 10 | 2,545 | 125 | - | 125 |
| 1978 | - | 7,030 | - | - | 14 | 7,303 | 150 | Trace | 125 |
| 1979 | - | 10,115 | - | - | 14 | 11,754 | 188 | 3 | 153 |
| 1980 | - | 17,774 a | - | - | 1,173 | 21,582 | 86 | 12 | 200 |
| 1981 | 639 | 11,374 | 1,039 | 554 | 2,215 | 18,290 | 172 | 22 | 108 |
| 1982 | 3,234 | 19,556 | 1,660 | 653 | 3,964 | 28,131 | 106 | 37 b | 209 |
| 1983 | 3,238 | 24,486 c | 1,178 | 596 | 3,567 | 33,988 | 123 | 35 | 141 |
| 1984 | 3,246 | 17,529 e | 899 f | 740 | 4,156 | 25,989 | 184 | 25 d | 148 |
| | | | | 1,075 | 3,240 g | | | 18 3/ | 202 |

1/ Pre 1964 harvest primarily in summer and fall for food; post 1964 harvest primarily in spring for sac roe.

2/ Fishery occurred some years but harvest data unavailable.

3/ Additional 3 mt harvested from imported kelp (*Macrocystus* sp.).

* No commercial operations reported.

Wastage not included (mt): a= 5,200; b=5; c=544; d=1-5; e=140; f=52; g=80.

Table 2. Estimated biomass and commercial harvest of Pacific herring in eastern Bering Sea fishing districts, Alaska, 1978-1984.

| District | Biomass (m. t.) | Harvest (m. t.) | Roe % | Estimated Value (\$) | % Biomass Harvested |
|---------------|--------------------|--------------------|------------|----------------------------|------------------------|
| 1984 | | | | | |
| Togiak | 104,200 | 17,529 f | 9.8 | 7,178,400 | 16.8 |
| Security Cove | 4,600 | 294 e | 11.8 | 110,000 | 6.4 |
| Goodnews Bay | 3,700 | 605 d | 10.1 | 150,000 | 16.4 |
| Cape Romanzof | 5,500 | 1,075 | 8.6 | 355,000 | 19.5 |
| Norton Sound | 21,000 | 3,240 c | 10.3 | 876,000 | 15.4 |
| Total | 139,000 | 22,743 | 9.8 | 8,669,400 | 16.4 |
| 1983 | | | | | |
| Togiak | 128,600 | 24,486 b | 8.8 | 10,517,300 | 19.1 |
| Security Cove | 5,800 | 973 | 9.4 | 422,300 | 16.8 |
| Goodnews Bay | 2,900 | 395 | 9.4 | 184,800 | 13.6 |
| Cape Romanzof | 5,000 | 740 | 9.0 | 367,100 | 14.8 |
| Norton Sound | 25,500 | 4,156 | 8.6 | 1,519,200 | 16.3 |
| Total | 167,800 | 30,750 | 8.8 | 13,010,700 | 18.3 |
| 1982 | | | | | |
| Togiak | 88,800 | 19,556 | 8.8 | 6,174,300 | 22.0 |
| Security Cove | 4,600 | 737 | 9.3 | 271,000 | 16.0 |
| Goodnews Bay | 2,400 | 441 | 9.5 | 187,900 | 18.4 |
| Cape Romanzof | 4,400 | 596 | 9.3 | 221,700 | 13.6 |
| Norton Sound | 15,800 | 3,567 | 8.8 | 1,046,200 | 22.6 |
| Total | 116,000 | 24,897 | 8.9 | 7,630,100 | 21.5 |
| 1981 | | | | | |
| Togiak | 143,900 | 11,374 | 9.1 | 3,988,000 | 7.9 |
| Security Cove | 7,500 | 1,064 | 8.1 | 347,070 | 14.2 |
| Goodnews Bay | 3,900 | 596 | 7.7 | 196,170 | 15.3 |
| Cape Romanzof | 4,400 | 653 | 8.0 | 211,260 | 15.0 |
| Norton Sound | 22,800 | 3,965 | 8.8 | 1,500,000 | 17.3 |
| Total | 182,500 | 17,652 | 8.9 | 6,242,500 | 9.7 |
| 1980 | | | | | |
| Togiak | 62,300 | 17,774 a | 9.2 | 3,205,000 | 28.5 |
| Security Cove | 1,100 | 632 | 8.2 | 151,000 | 57.4 |
| Goodnews Bay | 1,100 | 406 | 9.5 | 97,000 | 36.9 |
| Cape Romanzof | 2,700 | 554 | 9.8 | 132,000 | 20.5 |
| Norton Sound | 7,600 | 2,224 | 8.1 | 500,500 | 29.3 |
| Total | 74,800 | 21,590 | 8.8 | 4,085,500 | 28.9 |
| 1979 | | | | | |
| Togiak | 216,800 | 10,115 | 8.6 | 6,700,000 | 4.7 |
| Security Cove | 19,500 | 385 | 8.5 | 327,000 | 2.0 |
| Goodnews Bay | 6,700 | 82 | 4.7 | 38,500 | 1.2 |
| Cape Romanzof | 2,700 | 0 | - | - | 0.0 |
| Norton Sound | 7,000 | 1,172 | 7.0 | 628,200 | 16.7 |
| Total | 252,700 | 12,406 | 8.0 | 7,694,000 | 4.9 |
| 1978 | | | | | |
| Togiak | 172,600 | 7,033 | 8.2 | 2,300,000 | 4.1 |
| Security Cove | 1,200 | 259 | - | - | 21.6 |
| Goodnews Bay | 400 | 0 | - | - | 0.0 |
| Cape Romanzof | 2,700 | 0 | - | - | 0.0 |
| Norton Sound | 4,800 | 13 | - | - | 0.3 |
| Totals | 181,700 | 7,305 | 8.2 | 2,300,000 | 4.0 |

Wastage not included (mt): a=5,200; b=544; c=80; d=42; e=10; f=140.

Table 3. Commercial harvest of Pacific herring spawn on rockweed kelp in eastern Bering Sea fishing districts, Alaska, 1978-1984.

| District | Harvest (m.t.) | Number of Buyers | Number of Pickers | Estimated Value (\$) |
|--------------|-------------------|---------------------|----------------------|----------------------------|
| 1984 | | | | |
| Togiak | 184.4 | 6 | 330 | 203,300 |
| Norton Sound | 17.5 1/ | 3 | 32 | 21,500 |
| Total | 201.9 | | | 224,800 |
| 1983 | | | | |
| Togiak | 122.8 | 4 | 125 | 284,400 |
| Norton Sound | 25.0 b | 1 | 35 | 38,500 |
| Total | 147.8 | | | 233,778 |
| 1982 | | | | |
| Togiak | 106.5 | 8 | 214 | 176,193 |
| Norton Sound | 34.9 | 1 | 74 | 57,585 |
| Total | 141.4 | | | 233,778 |
| 1981 | | | | |
| Togiak | 171.9 | 7 | 108 | 250,000 |
| Norton Sound | 37.2 a | 4 | 22 | 45,000 2/ |
| Total | 209.1 | | | 295,000 |
| 1980 | | | | |
| Togiak | 86.0 | 21 | 78 | 94,600 |
| Norton Sound | 22.2 | 1 | 20 | 73,000 |
| Total | 108.2 | | | 167,600 |
| 1979 | | | | |
| Togiak | 188.0 | 16 | 100 | 248,160 |
| Norton Sound | 11.8 | 1 | 19 | 15,576 |
| Total | 199.8 | | | 263,736 |
| 1978 | | | | |
| Togiak | 149.6 | 11 | 160 | 119,800 |
| Norton Sound | 3.4 | 1 | 0 | 2,723 |
| Total | 153.0 | | | 122,523 |

1/ Additional 3.0 mt harvested from 2,000 lbs. imported kelp (*Macrocystus* sp) at estimated value of \$20,000.

Wastage not included (mt): a=5; b=1.5.

Table 4. Number of buyers and fishermen participating in eastern Bering Sea Pacific herring fisheries, Alaska, 1978-1984.

| District | Number of Buyers | Number of fishermen 1/ Seine | | |
|------------------|------------------|---------------------------------|-------|-------|
| | | Gillnet | Purse | Beach |
| <u>1984</u> | | | | |
| Togiak | 25 | 300 | 196 | * |
| Security Cove | 4 | 38 | * | * |
| Goodnews Bay | 4 | 130 | * | * |
| Cape Romanzof | 3 | 66 | * | * |
| Norton Sound | 8 | 189 | * | 10 |
| <u>1983</u> | | | | |
| Togiak | 23 | 250 | 150 | * |
| Security Cove | 6 | 94 | * | * |
| Goodnews Bay | 4 | 84 | * | * |
| Cape Romanzof | 3 | 63 | * | * |
| Norton Sound | 9 | 271 | * | 1 |
| <u>1982</u> | | | | |
| Togiak | 33 | 200 | 135 | * |
| Security Cove | 3 | 107 | * | * |
| Goodnews Bay | 3 | 84 | * | * |
| Cape Romanzof | 2 | 75 | * | * |
| Norton Sound | 7 | 237 | * | - |
| <u>1981</u> | | | | |
| Togiak | 28 | 106 | 83 | * |
| Security Cove | 7 | 113 | * | * |
| Goodnews Bay | 5 | 175 | * | * |
| Cape Romanzof | 4 | 111 | * | * |
| Norton Sound | 13 | 332 | * | - |
| <u>1980</u> | | | | |
| Togiak | 27 | 363 | 140 | * |
| Security Cove | 8 | 175 | * | * |
| Goodnews Bay | 4 | 165 | * | * |
| Cape Romanzof | 2 | 69 | * | * |
| Norton Sound | 8 | 294 | * | - |
| <u>1979</u> | | | | |
| Togiak | 33 | 350 | 175 | * |
| Security Cove | 2 | 61 | * | * |
| Goodnews Bay | 1 | 41 | * | * |
| Cape Romanzof 2/ | - | - | - | * |
| Norton Sound | 7 | 50 | 17 | - |
| <u>1978</u> | | | | |
| Togiak | 16 | 40 | 25 | * |
| Security Cove | 3 | | - | * |
| Norton Sound | 1 | 11 | - | - |

* Gear prohibited.

1/ Refers to number of vessels in Togiak District only.

2/ Fishery not conducted.

Table 5. Pacific herring subsistence harvest (mt) and effort data from selected eastern Bering Sea areas, Alaska, 1975-1984. 1/

| Village | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |
|---------------------------------|------|------|------|------|-------|-------|------|------|------|------|
| <u>Nelson Island</u> | | | | | | | | | | |
| Tununak | 19.8 | 13.9 | 51.9 | 34.6 | 31.0 | 59.2 | 36.0 | 43.8 | 85.0 | - |
| Unkumiut | 30.0 | 8.5 | 2.8 | 10.4 | 7.5 | 3.1 | 9.0 | 0 | - | - |
| Toksook Bay | 31.0 | 31.8 | 19.3 | 33.5 | 46.5 | 26.6 | 13.0 | 31.6 | - | - |
| Total | 80.8 | 61.2 | 74.0 | 78.5 | 85.0 | 88.9 | 58.0 | 75.4 | 85.0 | - |
| Number of Fishing Families | 109 | 42 | 90 | 83 | 54 | 70 | 93 | 65 | 43 | - |
| <u>Yukon-Kuskokwim Delta</u> | | | | | | | | | | |
| Scamnon Bay | - | 0.6 | - | 0.6 | 5.4 | 2.8 | 6.9 | 3.5 | 2.3 | 3.9 |
| Chevak | - | 0.6 | 0.1 | - | 2.1 | 3.2 | 1.7 | 1.8 | 1.3 | 2.3 |
| Hooper Bay | 2.5 | 2.7 | 2.1 | 3.5 | 2.8 | 3.3 | 3.6 | 4.2 | 4.7 | 3.7 |
| Kwigillingok | - | 9.6 | 0.9 | - | 7.2 | 12.0 | - | 12.0 | 2/ | - |
| Total | 2.5 | 13.5 | 3.1 | 4.1 | 17.5 | 21.3 | 12.2 | 21.5 | 8.3 | 9.9 |
| Number of Fishing Families | 34 | 49 | 39 | 29 | 106 | 80 | 45 | 64 | 37 | 46 |
| <u>Areas Combined</u> | | | | | | | | | | |
| Total Catch | 83.3 | 74.7 | 77.1 | 82.6 | 102.5 | 110.2 | 70.2 | 96.9 | 93.3 | 6.9 |
| & Number of Fishing Families | 143 | 91 | 129 | 112 | 160 | 150 | 138 | 129 | 80 | 46 |

1/ Other areas with small catches have been surveyed irregularly (1975-1978; estimated total coastal yearly subsistence catch averaged 100 m.t.).

2/ Estimate based on post season observations.

- Not surveyed.

Table 6. Relative abundance index (RAI) and estimated biomass of Pacific herring in the eastern Bering Sea, Alaska, 1978-1984.

| District | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |
|-----------------------------------|---------|----------|----------|----------|----------|---------|----------|
| Relative Abundance Index (RAI) 1/ | | | | | | | |
| Togiak | 43,050 | 137,630 | 15,249 | 79,352 | 49,998 | 88,806 | 58,807 |
| Security Cove | 246 | 2,912 | 435 | 2,228 | 486 3/ | 1,602 | 3,219 |
| Goodnews Bay | 241 | 3,729 | - 3/ | 1,593 | - 3/ | 815 | 2,579 |
| Nelson Island | 1,079 | - 3/ | - 3/ | 1,072 | - 3/ | 2,515 | 8,300 |
| Nunivak Island | 215 | - | - | 5 | - | 2,300 | 5,062 |
| Cape Romanzof | 539 | - 3/ | - 3/ | - 4/ | - 4/ | - 5/ | 3,060 6/ |
| Norton Sound | 1,277 | 1,860 | 2,242 | 6,516 | 4,548 | 6,796 | 13,798 |
| Total | 46,647 | 146,131+ | 17,926+ | 90,766+ | 55,032+ | 102,534 | 94,825 |
| Estimated Biomass in m.t. 2/ | | | | | | | |
| Togiak | 172,600 | 216,800 | 62,300 | 143,900 | 88,800 | 128,600 | 104,200 |
| Security Cove | 1,200 | 19,500 | 1,100 | 7,500 | 4,600 3/ | 5,800 | 4,600 |
| Goodnews Bay | 400 | 6,700 3/ | 1,100 3/ | 3,900 | 2,400 3/ | 2,900 | 3,700 |
| Nelson Island | 5,400 | 5,400 3/ | 5,400 3/ | 3,600 | 3,600 3/ | 6,600 | 10,000 |
| Nunivak Island | 731 | - | - | 17 | - | 6,900 | 6,074 |
| Cape Romanzof | 2,700 | 2,700 3/ | 2,700 3/ | 4,400 4/ | 4,400 4/ | 5,000 | 5,500 |
| Norton Sound | 4,800 | 7,000 | 7,600 | 20,800 | 15,800 | 25,500 | 21,000 |
| Total | 187,831 | 258,100 | 80,200 | 186,117 | 119,600 | 181,300 | 155,074 |
| % Fluction 7/ | - | 40 | <69> | 132 | <36> | 52 | <14> |

1/ Number of fish schools equivalent to 50 m surface area, unadjusted for presence of non-herring pelagic species.

2/ Adjusted for presence of non-herring pelagic species. Estimates for 1978 and 1979 represent low end of estimate ranges from Barton and Steinhoff (1980), 1980 estimates from Kingsbury (1980).

3/ Incomplete data due to inclement weather and/or turbid waters, biomass estimates are questionable and are based on 1978, 1979 or 1981 data.

4/ No aerial surveys made, 1981 and 1983 estimates based upon assumption that commercial harvest represented 15 percent of total biomass; 1981 estimate used for 1982.

5/ No satisfactory aerial survey made, 1983 estimate based on assumption of slight increase in biomass over previous year.

6/ No satisfactory aerial survey made, 1984 estimate based on assumption of slight increase in biomass over previous year.

7/ Based on prior year biomass estimate.

collect Pacific herring samples within Togiak District. A total of 11,731 Pacific herring was sampled during 1984 from all districts and the Nelson Island area.

RESULTS

An overall total of 155,100 mt of Pacific herring was estimated to have been present during the 1984 spawning season (Table 6). This estimate was 14% lower than the spawning population observed in 1983 and is the smallest recorded fluctuation in population size for consecutive years since 1978. Total spawn sightings for all districts in 1984 was a record 207 linear km of milt: 99 km for Togiak, 24 km for Security Cove/Goodnews Bay, 2 km for Cape Romanzof and 69 km for Norton Sound. An additional 13 km of milt was observed during surveys of the Nelson-Nunivak Island area. Most spawning occurred 18-19 May in Togiak, 19-25 May in Security Cove, 30 May - 7 June in Cape Romanzof and 10-18 June in Norton Sound. In general, spawn deposition was extensive and egg density was moderate (i.e. usually not more than four layers thick) in all districts.

Age composition analyses indicated that 6 and 7 year old Pacific herring (1978 and 1977 year classes, respectively) comprised about 70% of the total spawning population in all districts (Figures 3 and 4). Five year old herring (1979 year class) accounted for 13% of the population with 4 year old herring (1980 year class) comprising about 2% of the Togiak and Security Cove/Goodnews Bay population, and about 4% of the Cape Romanzof and Norton Sound populations.

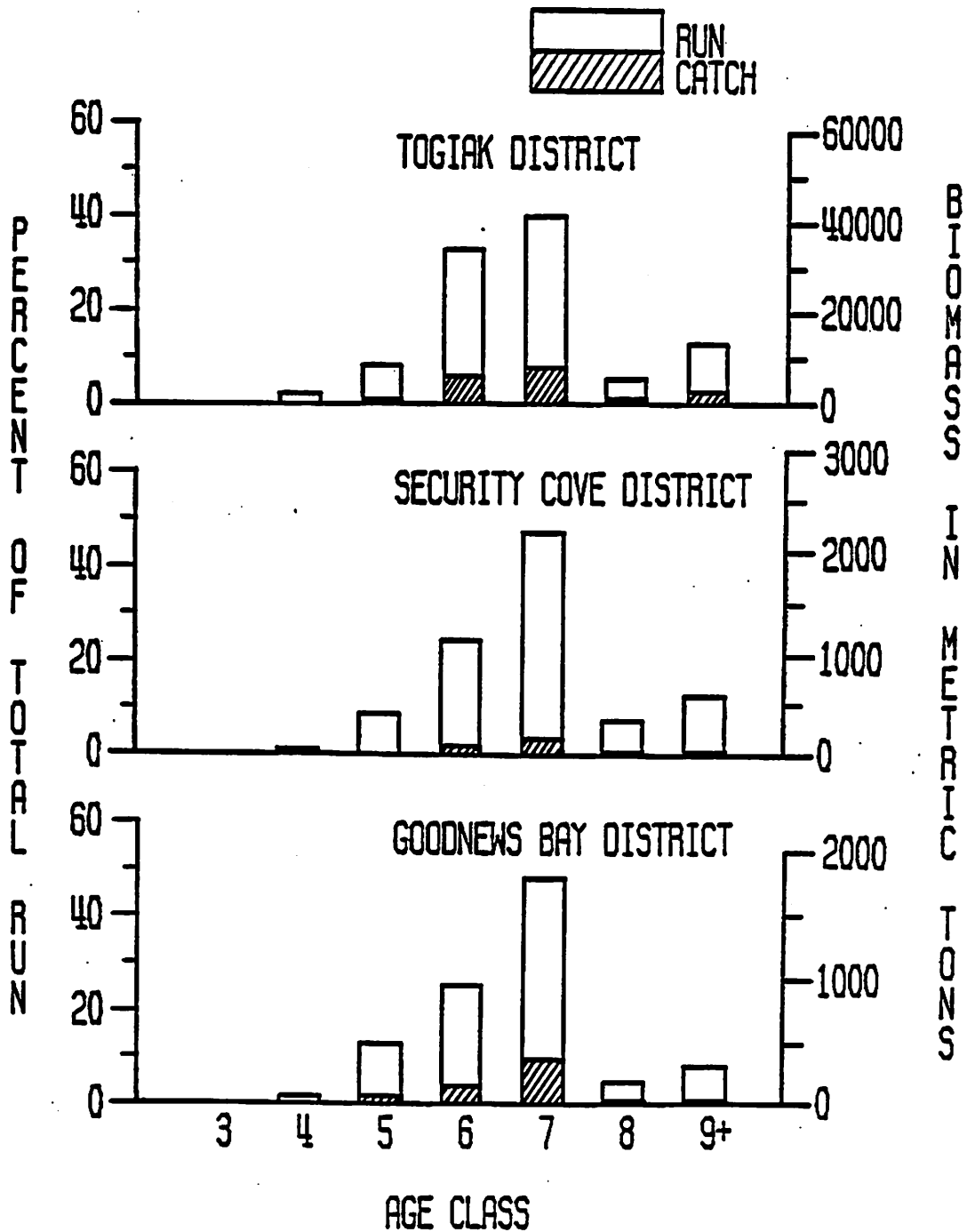


Figure 3. Age composition of Pacific herring in spawning populations and commercial catches in Togiak, Security Cove and Goodnews Bay commercial herring fishing districts, eastern Bering Sea, Alaska, 1984.

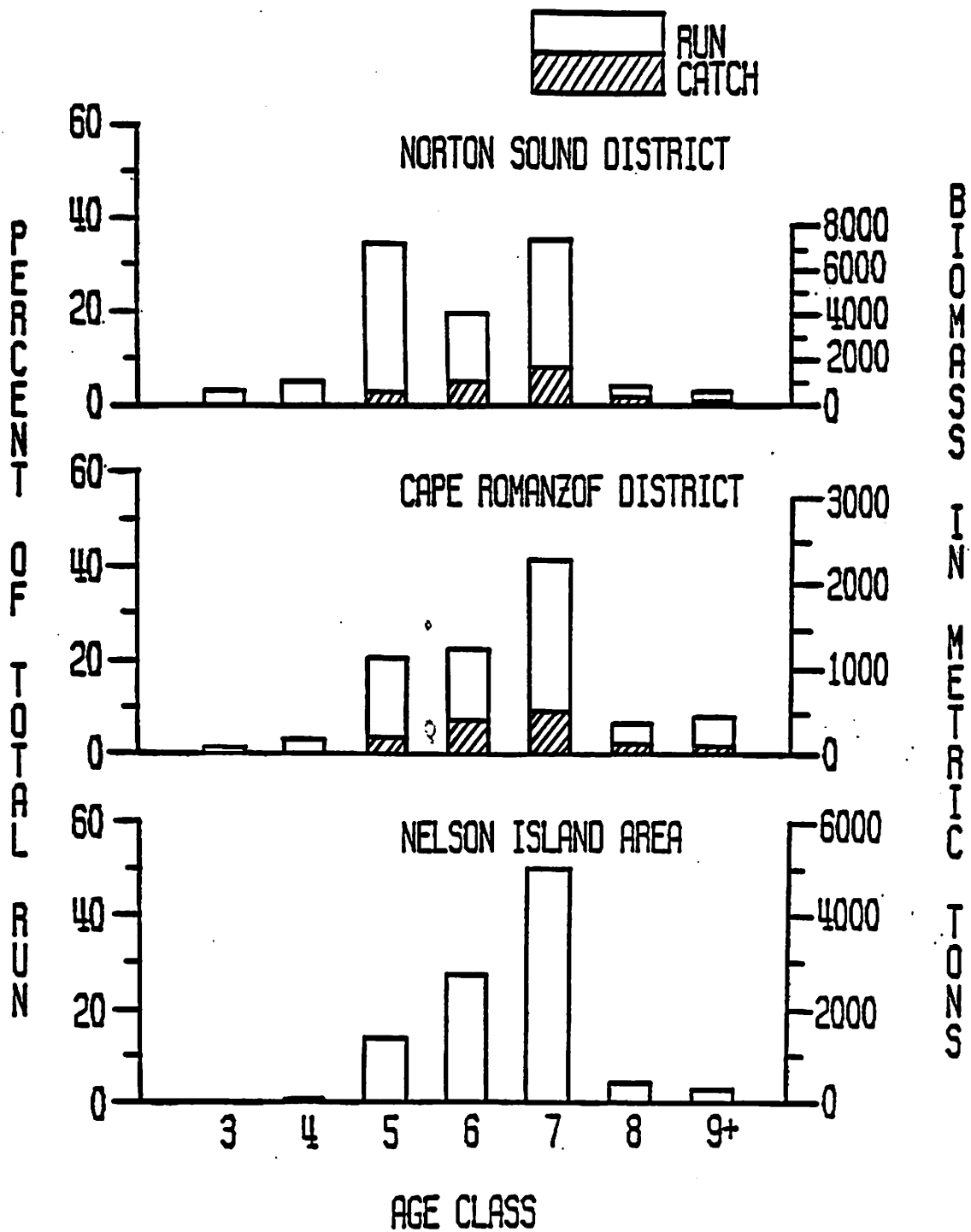


Figure 4. Age composition of Pacific herring in spawning populations and commercial catches in Norton Sound and Cape Romanzof commercial herring fishing districts and the Nelson-Nunivak Island area, eastern Bering Sea, Alaska, 1984.

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NPFMC SOURCE REPORT: COMMERCIAL GROUND FISH LANDED CATCH (METRIC TONS) FOR 1984 FOR ALL AREAS

| SPECIES | ADFG | WDF | DAP | JVP | DAH W. GERMANY | JAPAN | KOREA | POLAND | |
|----------------------|---------|--------|---------|----------|----------------|---------|----------|----------|----------------|
| ARROWTOOTH FLOUNDER | 0.4 | - | 0.4 | - | 0.4 | - | - | - | - |
| ENGLISH SOLE | - | 0.1 | 0.1 | - | 0.1 | - | - | - | - |
| PETRALE SOLE | TR | - | TR | - | TR | - | - | - | - |
| STARRY FLOUNDER | 63.3 | 26.6 | 89.9 | - | 89.9 | - | - | - | - |
| YELLOWFIN SOLE | - | - | - | 25639.6 | 25639.6 | 32925.7 | 15469.3 | - | 48395.1 |
| OTHER FLATFISH | TR | - | TR | - | TR | - | - | - | - |
| UNSP. FLATFISH | 239.8 | - | 239.8 | 13056.0 | 13295.8 | 1.2 | 28488.5 | 3615.7 | 0.2 32105.6 |
| ___ALL FLATFISH | 303.5 | 26.8 | 330.2 | 38695.6 | 39025.9 | 1.2 | 61414.2 | 19085.0 | 0.2 80500.7 |
| BLACK ROCKFISH | 13.0 | - | 13.0 | - | 13.0 | - | - | - | - |
| CANARY ROCKFISH | 3.9 | - | 3.9 | - | 3.9 | - | - | - | - |
| SILVERGREY ROCKFISH | TR | - | TR | - | TR | - | - | - | - |
| YELLOW EYE ROCKFISH | 102.4 | - | 102.4 | - | 102.4 | - | - | - | - |
| YELLOWTAIL ROCKFISH | 1.5 | - | 1.5 | - | 1.5 | - | - | - | - |
| OTHER ROCKFISH | 51.7 | - | 51.7 | - | 51.7 | - | - | - | - |
| ___SEBASTES COMPLEX | 172.6 | - | 172.6 | - | 172.6 | - | - | - | - |
| PACIFIC OCEAN PERCH | 37.8 | - | 37.8 | - | 37.8 | - | - | - | - |
| THORNYHEADS | 10.3 | - | 10.3 | - | 10.3 | - | - | - | - |
| UNSP. ROCKFISH | 350.4 | 0.5 | 350.9 | 2234.5 | 2585.4 | 1.7 | 3302.1 | 46.2 | 3350.0 |
| ___ALL ROCKFISH | 571.1 | 0.5 | 571.6 | 2234.5 | 2806.1 | 1.7 | 3302.1 | 46.2 | 3350.0 |
| ATKA MACKEREL | - | - | - | 36910.0 | 36910.0 | 0.3 | 265.7 | 6.2 | 272.2 |
| LINGCOD | 56.6 | 0.2 | 56.8 | - | 56.8 | - | - | - | - |
| PACIFIC COD | 18393.3 | 8808.7 | 27202.0 | 32958.1 | 60160.1 | 72.3 | 29559.3 | 3652.7 | 0.4 37 |
| HALLEYE POLLOCK | 402.4 | 135.1 | 537.5 | 396330.2 | 396867.7 | 14365.4 | 368415.2 | 112513.4 | 256.9 495 |
| SABLEFISH | 3506.5 | 103.3 | 3609.8 | 583.8 | 4193.6 | 1.4 | 968.5 | 40.6 | 1010.5 |
| OTHER ROUND FISH | 1.7 | - | 1.7 | - | 1.7 | - | - | - | - |
| ___ALL ROUND FISH | 22360.5 | 9047.4 | 31407.9 | 466782.1 | 498190.0 | 14439.4 | 399208.7 | 116213.0 | 257.3 530118.4 |
| SPINY DOGFISH | TR | - | TR | - | TR | - | - | - | - |
| UNSP. GROUND FISH | 21.4 | - | 21.4 | 3430.5 | 3451.9 | 11.6 | 3765.9 | 407.5 | 4185.0 |
| ___MISC. GROUND FISH | 21.4 | - | 21.4 | 3430.5 | 3451.9 | 11.6 | 3765.9 | 407.5 | 4185.0 |
| ALL GROUND FISH | 23256.5 | 9074.6 | 32331.1 | 511142.8 | 543473.9 | 14453.9 | 467691.0 | 135751.7 | 257.5 618154.0 |
| PACIFIC HALIBUT | - | 794.7 | 794.7 | - | 794.7 | - | - | - | - |

THIS REPORT INCLUDES ONLY DATA FOR NORTH PACIFIC COUNCIL INPFC AREAS

TR => LANDED CATCH LESS THAN 0.05 METRIC TONS, OR METRIC TONS PER DELIVERY LESS THAN 0.005

NPFMC SOURCE REPORT: COMMERCIAL GROUND FISH LANDED CATCH (METRIC TONS) FOR 1984 FOR ALL AREAS

| SPECIES | TOTAL |
|----------------------|-----------|
| ARROWTOOTH FLOUNDER | 0.4 |
| ENGLISH SOLE | 0.1 |
| PETRALE SOLE | TR |
| STARRY FLOUNDER | 89.9 |
| YELLOWFIN SOLE | 74034.7 |
| OTHER FLATFISH | TR |
| UNSP. FLATFISH | 45401.4 |
| ___ALL FLATFISH | 119526.5 |
| BLACK ROCKFISH | 13.0 |
| CANARY ROCKFISH | 3.9 |
| SILVERGREY ROCKFISH | TR |
| YELLOW EYE ROCKFISH | 102.4 |
| YELLOWTAIL ROCKFISH | 1.5 |
| OTHER ROCKFISH | 51.7 |
| ___SEBASTES COMPLEX | 172.6 |
| PACIFIC OCEAN PERCH | 37.8 |
| THORNYHEADS | 10.3 |
| UNSP. ROCKFISH | 5935.4 |
| ___ALL ROCKFISH | 6156.1 |
| ATKA MACKEREL | 37182.2 |
| LINGCOD | 56.8 |
| PACIFIC COD | 93444.8 |
| WALLEYE POLLOCK | 892418.7 |
| SABLEFISH | 5204.1 |
| OTHER ROUND FISH | 1.7 |
| ___ALL ROUND FISH | 1028308.3 |
| SPINY DOGFISH | TR |
| UNSP. GROUND FISH | 7636.9 |
| ___MISC. GROUND FISH | 7636.9 |
| ALL GROUND FISH | 1161627.9 |
| PACIFIC HALIBUT | 794.7 |

THIS REPORT INCLUDES ONLY DATA FOR NORTH PACIFIC COUNCIL INPFC AREAS

TR => LANDED CATCH LESS THAN 0.05 METRIC TONS, OR METRIC TONS PER DELIVERY LESS THAN 0.005

NPFMC SOURCE REPORT: COMMERCIAL GROUND FISH LANDED CATCH (METRIC TONS) FOR 1984 FOR ALEUTIAN AREA

| SPECIES | ADFG | WDF | DAP | JVP | DAH W. | GERMANY | JAPAN | KOREA | POLAND | U.S. |
|----------------------|-------|--------|--------|---------|---------|---------|---------|---------|--------|---------|
| YELLOWFIN SOLE | - | - | - | 7.3 | 7.3 | - | TR | - | - | TR |
| UNSP. FLATFISH | - | - | - | 377.7 | 377.7 | 0.2 | 1290.2 | - | - | 1290.4 |
| ___ALL FLATFISH | - | - | - | 385.0 | 385.0 | 0.2 | 1290.2 | - | - | 1290.5 |
| PACIFIC OCEAN PERCH | 2.3 | - | 2.3 | - | 2.3 | - | - | - | - | - |
| UNSP. ROCKFISH | - | - | - | 463.3 | 463.3 | 0.8 | 466.1 | - | - | 466.9 |
| ___ALL ROCKFISH | 2.3 | - | 2.3 | 463.3 | 465.6 | 0.8 | 466.1 | - | - | 466.9 |
| ATKA MACKEREL | - | - | - | 36535.7 | 36535.7 | 0.3 | 11.3 | - | - | 11.6 |
| PACIFIC COD | 260.4 | 8808.5 | 9068.9 | 6334.7 | 15403.6 | 18.1 | 528.1 | 0.3 | - | 546.5 |
| WALLEYE POLLOCK | 9.5 | 135.1 | 144.5 | 6509.5 | 6654.0 | 8698.6 | 34525.0 | 11358.5 | - | 54582.0 |
| SABLEFISH | - | 4.7 | 4.7 | 279.3 | 284.0 | 0.7 | 260.4 | - | - | 261.1 |
| ___ALL ROUND FISH | 269.8 | 8948.3 | 9218.1 | 49659.2 | 58877.3 | 8717.6 | 35324.9 | 11358.8 | - | 55401.3 |
| UNSP. GROUND FISH | - | - | - | 1488.8 | 1488.8 | 7.4 | 111.4 | 0.1 | - | 118.9 |
| ___MISC. GROUND FISH | - | - | - | 1488.8 | 1488.8 | 7.4 | 111.4 | 0.1 | - | 118.9 |
| ALL GROUND FISH | 272.1 | 8948.3 | 9220.4 | 51996.3 | 61216.7 | 8726.1 | 37192.6 | 11358.9 | - | 57277.6 |
| PACIFIC HALIBUT | - | 19.8 | 19.8 | - | 19.8 | - | - | - | - | - |

THIS REPORT INCLUDES ONLY DATA FOR NORTH PACIFIC COUNCIL INPFC AREAS
 TR => LANDED CATCH LESS THAN 0.05 METRIC TONS, OR METRIC TONS PER DELIVERY LESS THAN 0.005

NPFMC SOURCE REPORT: COMMERCIAL GROUND FISH LANDED CATCH (METRIC TONS) FOR 1984 FOR ALEUTIAN AREA

| SPECIES | TOTAL |
|----------------------|----------|
| YELLOWFIN SOLE | 7.4 |
| UNSP. FLATFISH | 1668.1 |
| ___ALL FLATFISH | 1675.5 |
| PACIFIC OCEAN PERCH | 2.3 |
| UNSP. ROCKFISH | 930.2 |
| ___ALL ROCKFISH | 932.5 |
| ATKA MACKEREL | 36547.4 |
| PACIFIC COD | 15950.1 |
| WALLEYE POLLOCK | 61236.0 |
| SABLEFISH | 545.1 |
| ___ALL ROUND FISH | 114278.6 |
| UNSP. GROUND FISH | 1607.7 |
| ___MISC. GROUND FISH | 1607.7 |
| ALL GROUND FISH | 118494.3 |
| PACIFIC HALIBUT | 19.8 |

THIS REPORT INCLUDES ONLY DATA FOR NORTH PACIFIC COUNCIL INPFC AREAS
TR => LANDED CATCH LESS THAN 0.05 METRIC TONS, OR METRIC TONS PER DELIVERY LESS THAN 0.005

NPFMC SOURCE REPORT: COMMERCIAL GROUND FISH LANDED CATCH (METRIC TONS) FOR 1984 FOR BERING SEA AREA

| SPECIES | ADFG | WDF | DAP | JVP | DAH W. GERMANY | JAPAN | KOREA | POLAND | | |
|----------------------|---------|-----|---------|----------|----------------|--------|----------|----------|-------|----------|
| YELLOWFIN SOLE | - | - | - | 25632.3 | 25632.3 | - | 32925.7 | 15469.3 | - | 48395.0 |
| UNSP. FLATFISH | - | - | - | 10986.5 | 10986.5 | 1.0 | 25751.5 | 3518.5 | 0.2 | 29271.2 |
| ___ALL FLATFISH | - | - | - | 36618.8 | 36618.8 | 1.0 | 58677.2 | 18987.8 | 0.2 | 77666.2 |
| PACIFIC OCEAN PERCH | 6.7 | - | 6.7 | - | 6.7 | - | - | - | - | - |
| UNSP. ROCKFISH | 8.8 | - | 8.8 | 135.1 | 144.0 | 0.9 | 149.3 | 7.9 | - | 158.0 |
| ___ALL ROCKFISH | 15.5 | - | 15.5 | 135.1 | 150.7 | 0.9 | 149.3 | 7.9 | - | 158.0 |
| ATKA MACKEREL | - | - | - | 15.9 | 15.9 | - | 3.2 | 2.6 | - | 5.8 |
| PACIFIC COD | 16047.9 | - | 16047.9 | 23606.9 | 39654.8 | 54.2 | 16734.6 | 3546.1 | 0.4 | 20335.3 |
| WALLEYE POLLOCK | 64.0 | - | 64.0 | 210232.3 | 210296.4 | 5666.8 | 315584.3 | 91006.9 | 256.9 | 412514.9 |
| SABLEFISH | 38.8 | - | 38.8 | 56.2 | 94.9 | 0.7 | 396.0 | 15.8 | - | 412.5 |
| ___ALL ROUND FISH | 16150.7 | - | 16150.7 | 233911.4 | 250062.1 | 5721.7 | 332718.0 | 94571.4 | 257.3 | 433268.5 |
| UNSP. GROUND FISH | - | - | - | 808.2 | 808.2 | 4.2 | 3324.7 | 385.9 | - | 3714.8 |
| ___MISC. GROUND FISH | - | - | - | 808.2 | 808.2 | 4.2 | 3324.7 | 385.9 | - | 3714.8 |
| ALL GROUND FISH | 16166.2 | - | 16166.2 | 271473.6 | 287639.8 | 5727.8 | 394869.1 | 113953.1 | 257.5 | 514807.5 |

THIS REPORT INCLUDES ONLY DATA FOR NORTH PACIFIC COUNCIL INPFC AREAS

TR => LANDED CATCH LESS THAN 0.05 METRIC TONS, OR METRIC TONS PER DELIVERY LESS THAN 0.005

NPFMC SOURCE REPORT: COMMERCIAL GROUND FISH LANDED CATCH (METRIC TONS) FOR 1984 FOR BERING SEA AREA

| SPECIES | TOTAL |
|----------------------|----------|
| YELLOWFIN SOLE | 74027.4 |
| UNSP. FLATFISH | 40257.7 |
| ___ALL FLATFISH | 114285.0 |
| PACIFIC OCEAN PERCH | 6.7 |
| UNSP. ROCKFISH | 302.0 |
| ___ALL ROCKFISH | 308.7 |
| ATKA MACKEREL | 21.7 |
| PACIFIC COD | 59990.2 |
| WALLEYE POLLOCK | 622811.2 |
| SABLEFISH | 507.4 |
| ___ALL ROUND FISH | 683330.5 |
| UNSP. GROUND FISH | 4523.0 |
| ___MISC. GROUND FISH | 4523.0 |
| ALL GROUND FISH | 802447.3 |

THIS REPORT INCLUDES ONLY DATA FOR NORTH PACIFIC COUNCIL INPFC AREAS
TR => LANDED CATCH LESS THAN 0.05 METRIC TONS, OR METRIC TONS PER DELIVERY LESS THAN 0.005

NPFMC SOURCE REPORT: COMMERCIAL GROUND FISH LANDED CATCH (METRIC TONS) FOR 1984 FOR WESTERN AREA

| SPECIES | ADFG | WDF | DAP | JVP | DAH W. GERMANY | JAPAN | KOREA | POLAND | | |
|----------------------|------|-------|-------|--------|----------------|-------|---------|---------|---|---------|
| UNSP. FLATFISH | - | - | - | 134.7 | 134.7 | - | 114.0 | 97.2 | - | 211.2 |
| ___ALL FLATFISH | - | - | - | 134.7 | 134.7 | - | 114.0 | 97.2 | - | 211.2 |
| PACIFIC OCEAN PERCH | 25.6 | - | 25.6 | - | 25.6 | - | - | - | - | - |
| UNSP. ROCKFISH | - | - | - | 1396.9 | 1396.9 | - | 140.0 | 38.3 | - | 178.3 |
| ___ALL ROCKFISH | 25.6 | - | 25.6 | 1396.9 | 1422.5 | - | 140.0 | 38.3 | - | 178.3 |
| ATKA MACKEREL | - | - | - | 351.2 | 351.2 | - | 193.0 | 3.5 | - | 196.5 |
| PACIFIC COD | 16.4 | - | 16.4 | 138.7 | 155.1 | - | 9727.6 | 106.3 | - | 9834.0 |
| WALLEYE POLLOCK | - | - | - | 271.4 | 271.4 | - | 614.6 | 10148.1 | - | 10762.6 |
| SABLEFISH | 15.4 | - | 15.4 | 120.9 | 136.3 | - | 263.9 | 24.8 | - | 288.7 |
| ___ALL ROUND FISH | 31.9 | - | 31.9 | 832.1 | 914.0 | - | 10799.1 | 10282.8 | - | 21081.8 |
| UNSP. GROUND FISH | - | - | - | 28.3 | 28.3 | - | 178.0 | 21.5 | - | 199.4 |
| ___MISC. GROUND FISH | - | - | - | 28.3 | 28.3 | - | 178.0 | 21.5 | - | 199.4 |
| ALL GROUND FISH | 57.5 | - | 57.5 | 2442.0 | 2499.5 | - | 11231.1 | 10439.7 | - | 21670.8 |
| PACIFIC HALIBUT | - | 185.9 | 185.9 | - | 185.9 | - | - | - | - | - |

THIS REPORT INCLUDES ONLY DATA FOR NORTH PACIFIC COUNCIL INPFC AREAS

TR => LANDED CATCH LESS THAN 0.05 METRIC TONS, OR METRIC TONS PER DELIVERY LESS THAN 0.005

NPFMC SOURCE REPORT: COMMERCIAL GROUND FISH LANDED CATCH (METRIC TONS) FOR 1984 FOR WESTERN AREA

| SPECIES | TOTAL |
|----------------------|---------|
| UNSP. FLATFISH | 345.9 |
| ___ALL FLATFISH | 345.9 |
| PACIFIC OCEAN PERCH | 25.6 |
| UNSP. ROCKFISH | 1575.2 |
| ___ALL ROCKFISH | 1600.8 |
| ATKA MACKEREL | 547.7 |
| PACIFIC COD | 9989.1 |
| WALLEYE POLLOCK | 11034.0 |
| SABLEFISH | 425.1 |
| ___ALL ROUND FISH | 21995.8 |
| UNSP. GROUND FISH | 227.8 |
| ___MISC. GROUND FISH | 227.8 |
| ALL GROUND FISH | 24170.3 |
| PACIFIC HALIBUT | 185.9 |

THIS REPORT INCLUDES ONLY DATA FOR NORTH PACIFIC COUNCIL INPFC AREAS
TR => LANDED CATCH LESS THAN 0.05 METRIC TONS, OR METRIC TONS PER DELIVERY LESS THAN 0.005

NPFMC SOURCE REPORT: COMMERCIAL GROUND FISH LANDED CATCH (METRIC TONS) FOR 1984 FOR CENTRAL AREA

| SPECIES | ADFG | WDF | DAP | JVP | DAH W. GERMANY | JAPAN | KOREA | POLAND | F |
|----------------------|--------|-------|--------|----------|----------------|---------|-------|--------|---------|
| ARROWTOOTH FLOUNDER | 0.4 | - | 0.4 | - | 0.4 | - | - | - | - |
| OTHER FLATFISH | TR | - | TR | - | TR | - | - | - | - |
| UNSP. FLATFISH | 239.4 | - | 239.4 | 1557.1 | 1796.5 | 1332.8 | - | - | 1332.8 |
| ___ALL FLATFISH | 239.8 | - | 239.8 | 1557.1 | 1796.9 | 1332.8 | - | - | 1332.8 |
| BLACK ROCKFISH | 5.1 | - | 5.1 | - | 5.1 | - | - | - | - |
| ___SEBASTES COMPLEX | 5.1 | - | 5.1 | - | 5.1 | - | - | - | - |
| UNSP. ROCKFISH | 16.8 | - | 16.8 | 239.1 | 256.0 | 2546.7 | - | - | 2546.7 |
| ___ALL ROCKFISH | 21.9 | - | 21.9 | 239.1 | 261.1 | 2546.7 | - | - | 2546.7 |
| ATKA MACKEREL | - | - | - | 7.1 | 7.1 | 58.2 | - | - | 58.2 |
| LINGCOD | 0.1 | - | 0.1 | - | 0.1 | - | - | - | - |
| PACIFIC COD | 2049.1 | - | 2049.1 | 2877.8 | 4926.9 | 2568.9 | - | - | 2568.9 |
| WALLEYE POLLOCK | 329.0 | - | 329.0 | 179317.1 | 179646.0 | 17691.4 | - | - | 17691.4 |
| SABLEFISH | 875.7 | 7.5 | 883.2 | 127.4 | 1010.6 | 48.2 | - | - | 48.2 |
| ___ALL ROUND FISH | 3253.9 | 7.5 | 3261.4 | 182329.4 | 185590.8 | 20366.7 | - | - | 20366.7 |
| UNSP. GROUND FISH | 0.1 | - | 0.1 | 1105.2 | 1105.3 | 151.8 | - | - | 151.8 |
| ___MISC. GROUND FISH | 0.1 | - | 0.1 | 1105.2 | 1105.3 | 151.8 | - | - | 151.8 |
| ALL GROUND FISH | 3515.7 | 7.5 | 3523.2 | 185230.8 | 188754.0 | 24398.1 | - | - | 24398.1 |
| PACIFIC HALIBUT | - | 491.5 | 491.5 | - | 491.5 | - | - | - | - |

THIS REPORT INCLUDES ONLY DATA FOR NORTH PACIFIC COUNCIL INPFC AREAS

TR => LANDED CATCH LESS THAN 0.05 METRIC TONS, OR METRIC TONS PER DELIVERY LESS THAN 0.005

NPFMC SOURCE REPORT: COMMERCIAL GROUND FISH LANDED CATCH (METRIC TONS) FOR 1984 FOR CENTRAL AREA

| SPECIES | TOTAL |
|----------------------|----------|
| ARROWTOOTH FLOUNDER | 0.4 |
| OTHER FLATFISH | TR |
| UNSP. FLATFISH | 3129.3 |
| ___ALL FLATFISH | 3129.7 |
| BLACK ROCKFISH | 5.1 |
| ___SEBASTES COMPLEX | 5.1 |
| UNSP. ROCKFISH | 2802.7 |
| ___ALL ROCKFISH | 2807.8 |
| ATKA MACKEREL | 65.4 |
| LINGCOD | 0.1 |
| PACIFIC COD | 7495.8 |
| WALLEYE POLLOCK | 197337.4 |
| SABLEFISH | 1058.8 |
| ___ALL ROUND FISH | 205957.5 |
| UNSP. GROUND FISH | 1257.1 |
| ___MISC. GROUND FISH | 1257.1 |
| ALL GROUND FISH | 213152.1 |
| PACIFIC HALIBUT | 491.5 |

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 TR => LANDED CATCH LESS THAN 0.05 METRIC TONS, OR METRIC TONS PER DELIVERY LESS THAN 0.005

NPFMC SOURCE REPORT: COMMERCIAL GROUND FISH LANDED CATCH (METRIC TONS) FOR 1984 FOR EASTERN AREA

| SPECIES | ADFG | WDF | DAP | JVP | DAH W. GERMANY | JAPAN | KOREA | POLAND | F |
|----------------------|--------|-------|--------|-----|----------------|-------|-------|--------|---|
| ENGLISH SOLE | - | 0.1 | 0.1 | - | 0.1 | - | - | - | - |
| PETRALE SOLE | TR | - | TR | - | TR | - | - | - | - |
| STARRY FLOUNDER | 63.3 | 26.6 | 89.9 | - | 89.9 | - | - | - | - |
| UNSP. FLATFISH | 0.4 | - | 0.4 | - | 0.4 | - | - | - | - |
| ___ALL FLATFISH | 63.7 | 26.8 | 90.5 | - | 90.5 | - | - | - | - |
| BLACK ROCKFISH | 7.9 | - | 7.9 | - | 7.9 | - | - | - | - |
| CANARY ROCKFISH | 3.9 | - | 3.9 | - | 3.9 | - | - | - | - |
| SILVERGREY ROCKFISH | TR | - | TR | - | TR | - | - | - | - |
| YELLOW EYE ROCKFISH | 102.4 | - | 102.4 | - | 102.4 | - | - | - | - |
| YELLOWTAIL ROCKFISH | 1.5 | - | 1.5 | - | 1.5 | - | - | - | - |
| OTHER ROCKFISH | 51.7 | - | 51.7 | - | 51.7 | - | - | - | - |
| ___SEBASTES COMPLEX | 167.5 | - | 167.5 | - | 167.5 | - | - | - | - |
| PACIFIC OCEAN PERCH | 3.2 | - | 3.2 | - | 3.2 | - | - | - | - |
| THORNYHEADS | 10.3 | - | 10.3 | - | 10.3 | - | - | - | - |
| UNSP. ROCKFISH | 324.8 | 0.5 | 325.2 | - | 325.2 | - | - | - | - |
| ___ALL ROCKFISH | 505.8 | 0.5 | 506.3 | - | 506.3 | - | - | - | - |
| LINGCOD | 56.5 | 0.2 | 56.7 | - | 56.7 | - | - | - | - |
| PACIFIC COD | 19.5 | 0.2 | 19.7 | - | 19.7 | - | - | - | - |
| SABLEFISH | 2576.6 | 91.2 | 2667.7 | - | 2667.7 | - | - | - | - |
| OTHER ROUND FISH | 1.7 | - | 1.7 | - | 1.7 | - | - | - | - |
| ___ALL ROUND FISH | 2654.2 | 91.6 | 2745.8 | - | 2745.8 | - | - | - | - |
| SPINY DOGFISH | TR | - | TR | - | TR | - | - | - | - |
| UNSP. GROUND FISH | 21.3 | - | 21.3 | - | 21.3 | - | - | - | - |
| ___MISC. GROUND FISH | 21.3 | - | 21.3 | - | 21.3 | - | - | - | - |
| ALL GROUND FISH | 3245.1 | 118.9 | 3363.9 | - | 3363.9 | - | - | - | - |
| PACIFIC HALIBUT | - | 97.5 | 97.5 | - | 97.5 | - | - | - | - |

THIS REPORT INCLUDES ONLY DATA FOR NORTH PACIFIC COUNCIL INPFC AREAS

TR => LANDED CATCH LESS THAN 0.05 METRIC TONS, OR METRIC TONS PER DELIVERY LESS THAN 0.005

NPFMC SOURCE REPORT: COMMERCIAL GROUND FISH LANDED CATCH (METRIC TONS) FOR 1984 FOR EASTERN AREA

| SPECIES | TOTAL |
|----------------------|--------|
| ENGLISH SOLE | 0.1 |
| PETRALE SOLE | TR |
| STARRY FLOUNDER | 89.9 |
| UNSP. FLATFISH | 0.4 |
| ___ALL FLATFISH | 90.5 |
| BLACK ROCKFISH | 7.9 |
| CANARY ROCKFISH | 3.9 |
| SILVERGREY ROCKFISH | TR |
| YELLOW EYE ROCKFISH | 102.4 |
| YELLOWTAIL ROCKFISH | 1.5 |
| OTHER ROCKFISH | 51.7 |
| ___SEBASTES COMPLEX | 167.5 |
| PACIFIC OCEAN PERCH | 3.2 |
| THORNYHEADS | 10.3 |
| UNSP. ROCKFISH | 325.2 |
| ___ALL ROCKFISH | 506.3 |
| LINGCOD | 56.7 |
| PACIFIC COD | 19.7 |
| SABLEFISH | 2667.7 |
| OTHER ROUND FISH | 1.7 |
| ___ALL ROUND FISH | 2745.8 |
| SPINY DOGFISH | TR |
| UNSP. GROUND FISH | 21.3 |
| ___MISC. GROUND FISH | 21.3 |
| ALL GROUND FISH | 3363.9 |
| PACIFIC HALIBUT | 97.5 |

THIS REPORT INCLUDES ONLY DATA FOR NORTH PACIFIC COUNCIL INPFC AREAS
 TR => LANDED CATCH LESS THAN 0.05 METRIC TONS, OR METRIC TONS PER DELIVERY LESS THAN 0.005

B 20

PRELIMINARY 1984 ALASKA DAP GROUND FISH HARVEST SUMMARY

(Round Weight in Metric Tons)

| | Eastern Gulf | Central Gulf | Western Gulf | Bering Sea | Aleutians | Total |
|------------------|-----------------|-----------------|-----------------|---------------|-----------|---------|
| Pollock | 0 | 330 | 0 | 149.7 | 12.3 | 492 |
| Sablefish | 5008 | 2870.4 | 155.6 | 38.7 | 0 | 8072.7 |
| Pacific Cod | 19.5 | 2072.7 | 16.4 | 20438.4 | 345.5 | 22892.5 |
| Flounder | 63.7 | 239.8 | 0 | 0 | 0 | 303.5 |
| Pacific O. Perch | 3.2 | 0 | 25.6 | 6.7 | 2.3 | 37.8 |
| Rockfish | 502.5 | 22 | 0 | 8.8 | 0 | 533.3 |
| Atka Mackerel | 0 | 0 | 0 | 0 | 0 | 0 |
| Other | 79.5 | 0.2 | 0 | 0 | 0 | 79.7 |
| Total | 5676.4 | 5535.1 | 197.6 | 20642.3 | 360.1 | 32411.5 |

Alaska Dept. of Fish and Game 22-Sep-84

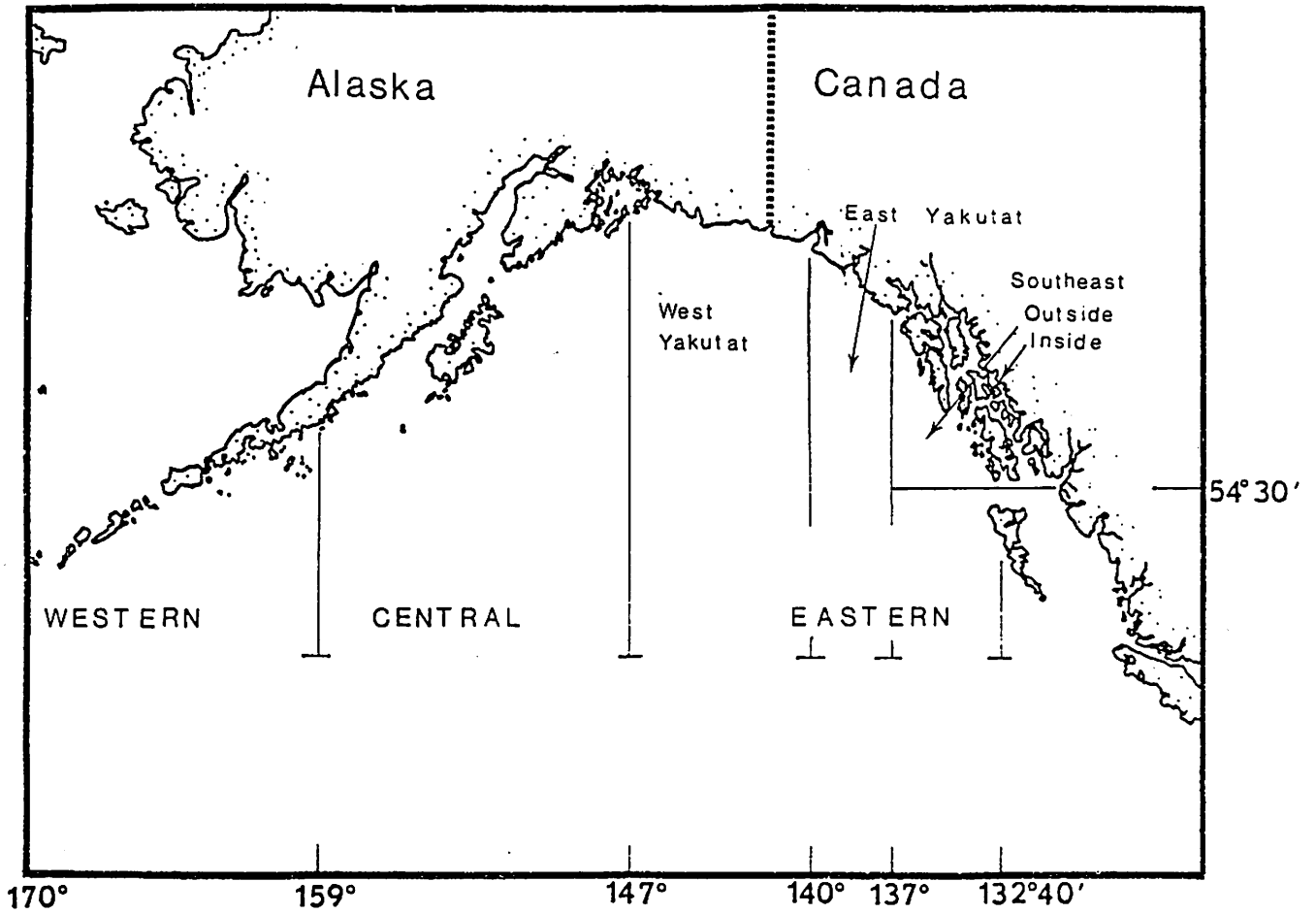


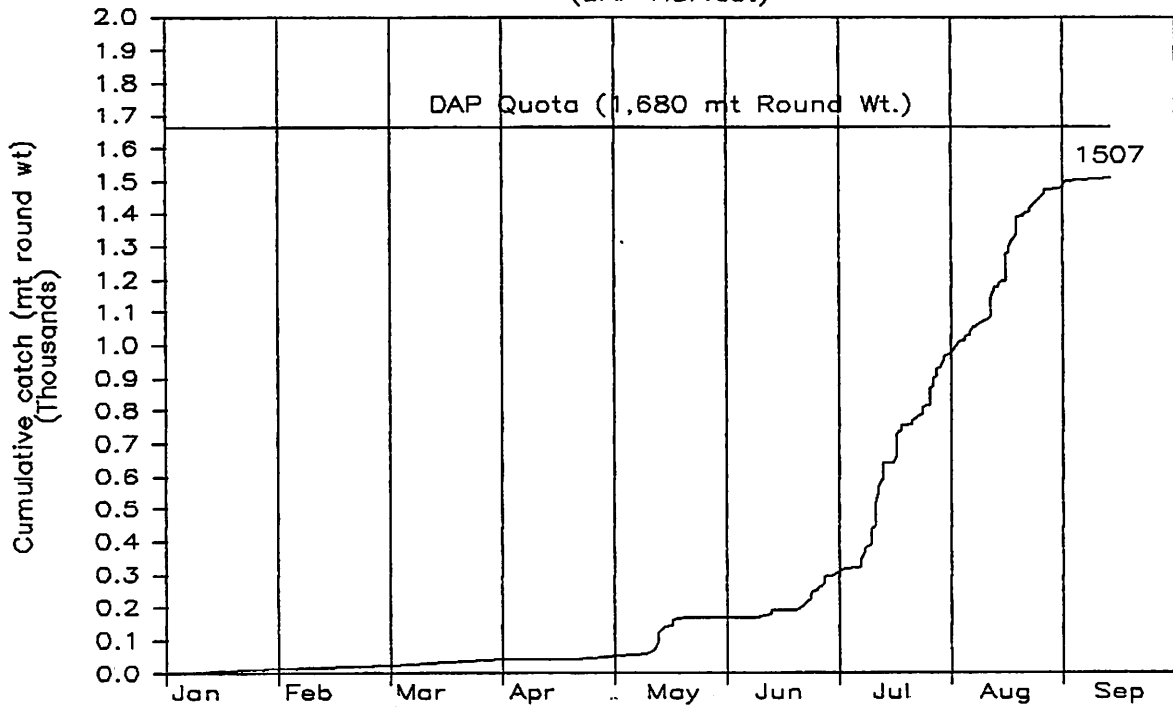
Figure 1 -- Regulatory Areas of the Gulf of Alaska (FMP)

PRELIMINARY 1984 GULF OF ALASKA SABLEFISH DAP HARVEST (22-Sep-84)

(Round Weight in Metric Tons)

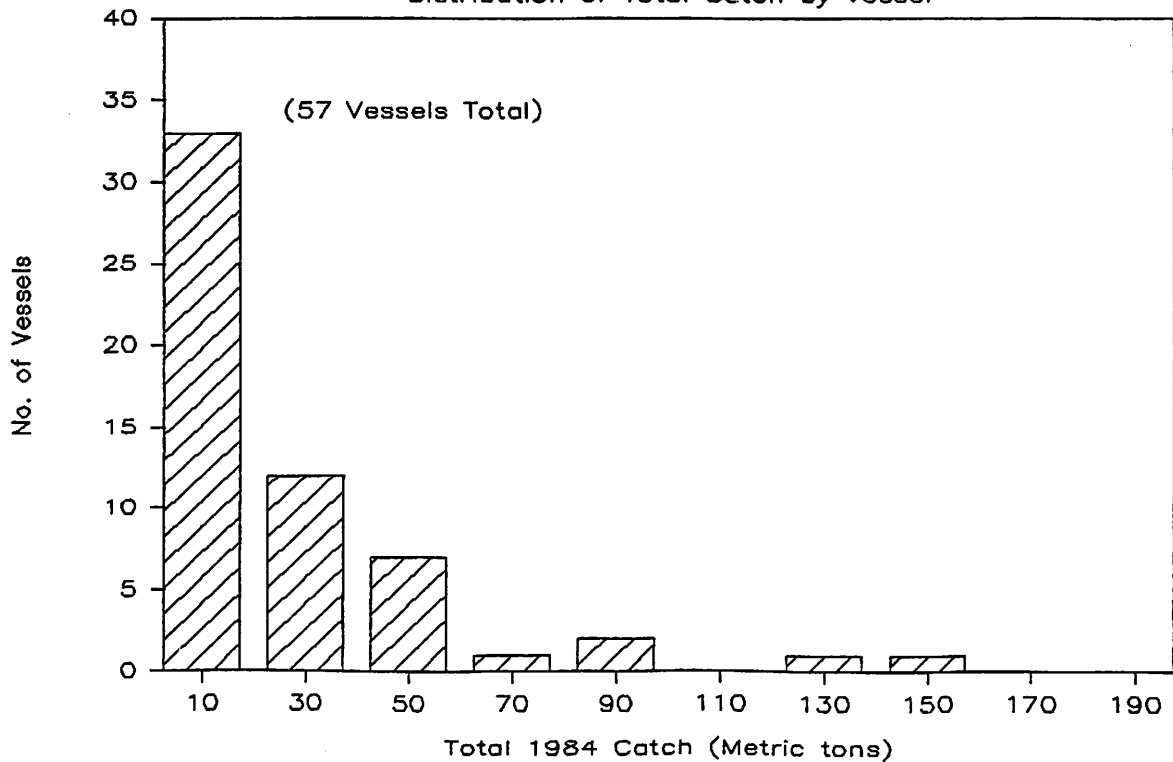
| | |
|-----------------------------------|--------|
| Clarence Strait/Dixon Entrance: | 148.0 |
| Chatham Strait: | 846.0 |
| Southeast Outside & East Yakutat: | 2654.0 |
| West Yakutat: | 1507.9 |
| Central Gulf: | 2870.4 |
| Western Gulf: | 155.6 |

1984 Western Yakutat Sablefish Fishery (DAP Harvest)

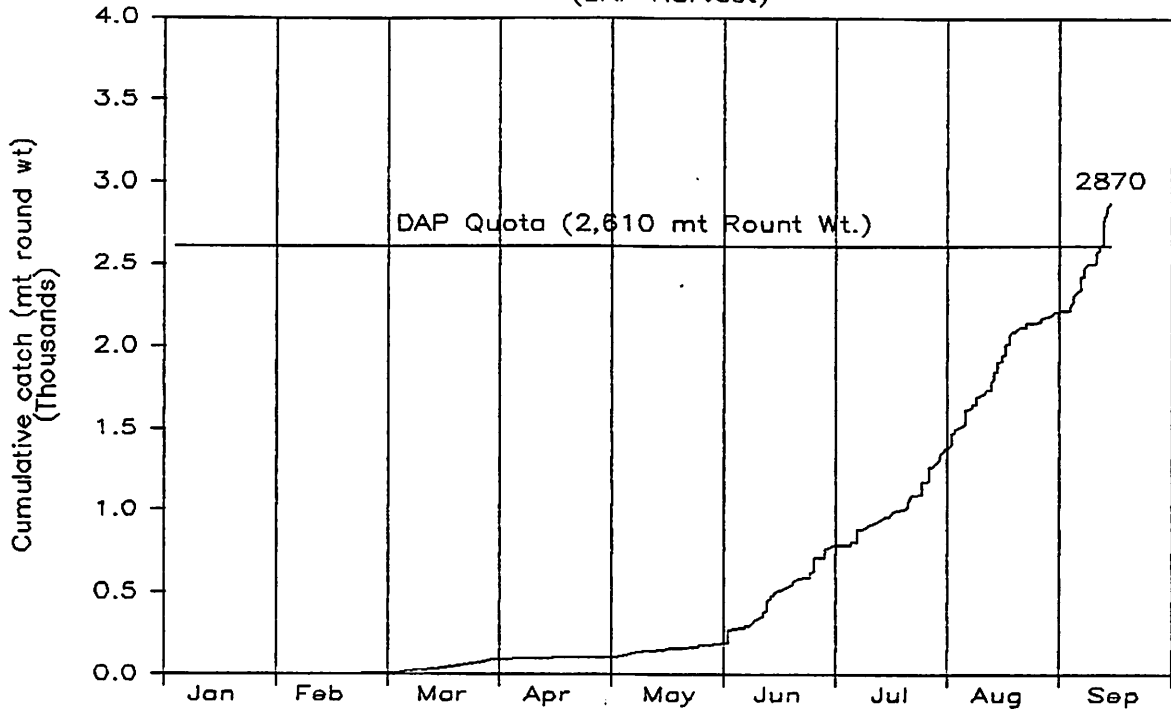


1984 WESTERN YAKUTAT SABLEFISH

Distribution of Total Catch by Vessel

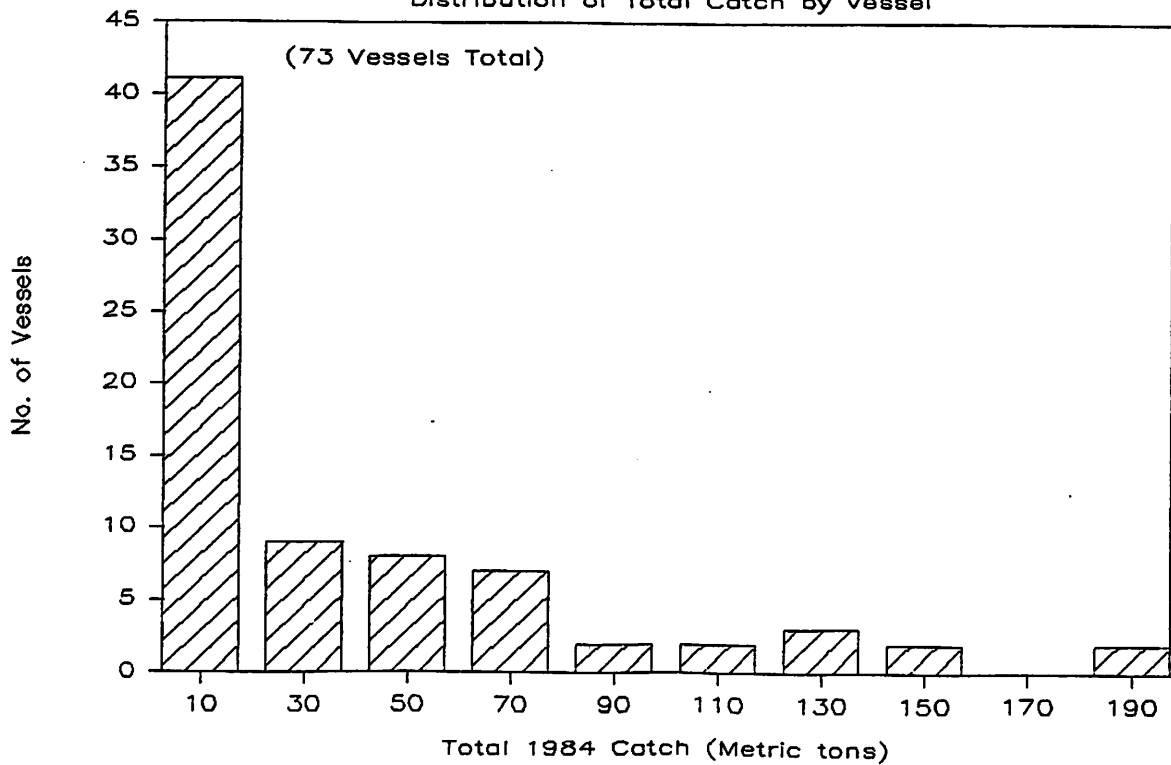


1984 Central Gulf Sablefish Fishery (DAP Harvest)



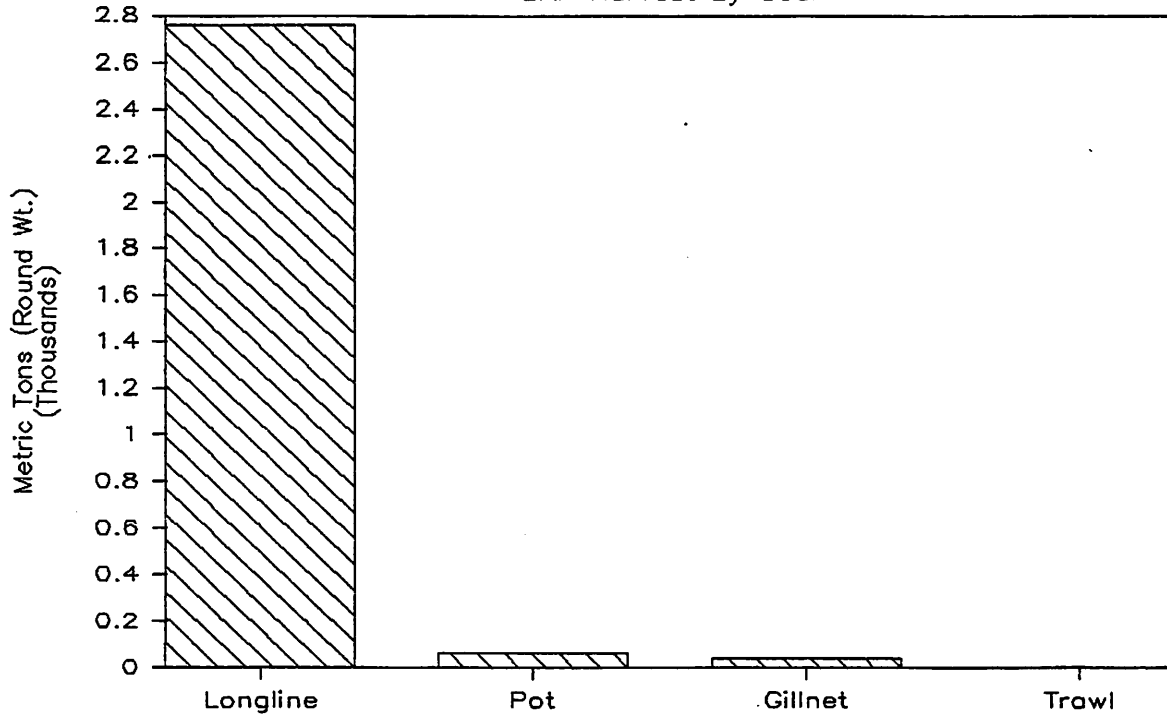
1984 CENTRAL GULF SABLEFISH

Distribution of Total Catch by Vessel



Central Gulf Sablefish

DAP Harvest By Gear



Preliminary 1984 Sablefish Harvest (Round Weight in Metric Tons)

| | Central Gulf | West Yakutat | SE & E. Yakutat | Chatham | Clarence/Dixon |
|----------|--------------|--------------|-----------------|---------|----------------|
| Longline | 2757.0 | 1507.1 | 2654.0 | 846.0 | |
| Pot | 62.5 | 0.0 | | | |
| Gillnet | 41.9 | 0.9 | | | |
| Trawl | 9.0 | 0.0 | | | |
| Total: | 2870.4 | 1507.9 | 2654.0 | 846.0 | 148.0 |

PACIFIC HERRING STOCKS AND FISHERIES
IN THE EASTERN BERING SEA,
ALASKA, 1984

A Report to the North Pacific Fisheries Management Council

September 1984

Prepared by:

Robert C. Lebida,
Craig Whitmore,
and
Gene J. Sandone

Alaska Department of Fish and Game
Division of Commercial Fisheries
333 Raspberry Road
Anchorage, Alaska 99502

INTRODUCTION

This report summarizes current 1984 information on eastern Bering Sea Pacific herring stocks and fisheries conducted within Alaskan waters. A more detailed account of this information is presented in Lebida et. al. (in press).

COMMERCIAL FISHERIES

A total of 25,989 mt of Pacific herring was harvested in the eastern Bering Sea herring sac roe commercial fishing districts and Aleutian Islands food and bait fishery during 1984 (Figures 1 and 2, Table 1). This was the third largest total harvest recorded in the history of these fisheries. Exploitation of estimated spawning biomass in the commercial fishing districts was 16.4% (Table 2). Wastage of herring, mostly due to abandoned gear and loss of gear to sea ice movement, was estimated to be less than 300 mt for all districts combined. Spawn on rockweed kelp harvests in Togiak and Norton Sound Districts totaled 202 mt (Table 3). Value of total herring and spawn on kelp harvests to fishermen was estimated to be \$8.9 million (Tables 2 and 3). A total of 45 buyers participated in the herring sac roe fishery in all districts in 1984 compared to 44 during 1983 (Table 4). Number of fishermen increased in Togiak, Goodnews Bay and Cape Romanzof Districts, but decreased from 1983 levels in the other districts.

SUBSISTENCE FISHERIES

A minimum estimated total of 10 mt of Pacific herring were harvested by 46 families from 3 villages in the Yukon delta area (Table 5). Subsistence surveys were not conducted during 1984 in the Nelson Island and Kuskokwim delta areas.

STOCK ASSESSMENT

Methods

Aerial surveys were conducted within all districts to estimate relative abundance, distribution and biomass of herring schools. Methods of data collection have previously been described (Barton and Steinhoff 1980; Fried 1983). A total of 172 hours was spent in aerial assessment surveys: 83 hours for Togiak, 20 hours for Security Cove/Goodnews Bay, 8 hours for Nelson-Nunivak Islands, 2 hours for Cape Romanzof and 59 hours for Norton Sound. During the season, standard conversion factors of 1.2 (water depth 5 m or less), 2.5 (water depth greater than 5 m) and 3.0 (school very dense and dark in appearance) mt per 50 m² school surface area were used in analyses of aerial survey data. Assessment of Pacific herring within Cape Romanzof District continues to be a problem, since aerial surveys cannot be conducted due to consistently turbid water. Studies are being conducted to determine whether spawning herring population size estimates can be made from egg deposition surveys. Taking into consideration harvest size, fishing effort and spawn deposition extent and intensity, the Cape Romanzof Pacific herring spawning biomass was estimated at about 5,500 mt (Table 6).

Test fishing with variable mesh gillnets and sampling of commercial landings were conducted in all districts to determine age, size and sexual maturity of Pacific herring. Volunteer purse seine and gillnet vessels were also used to

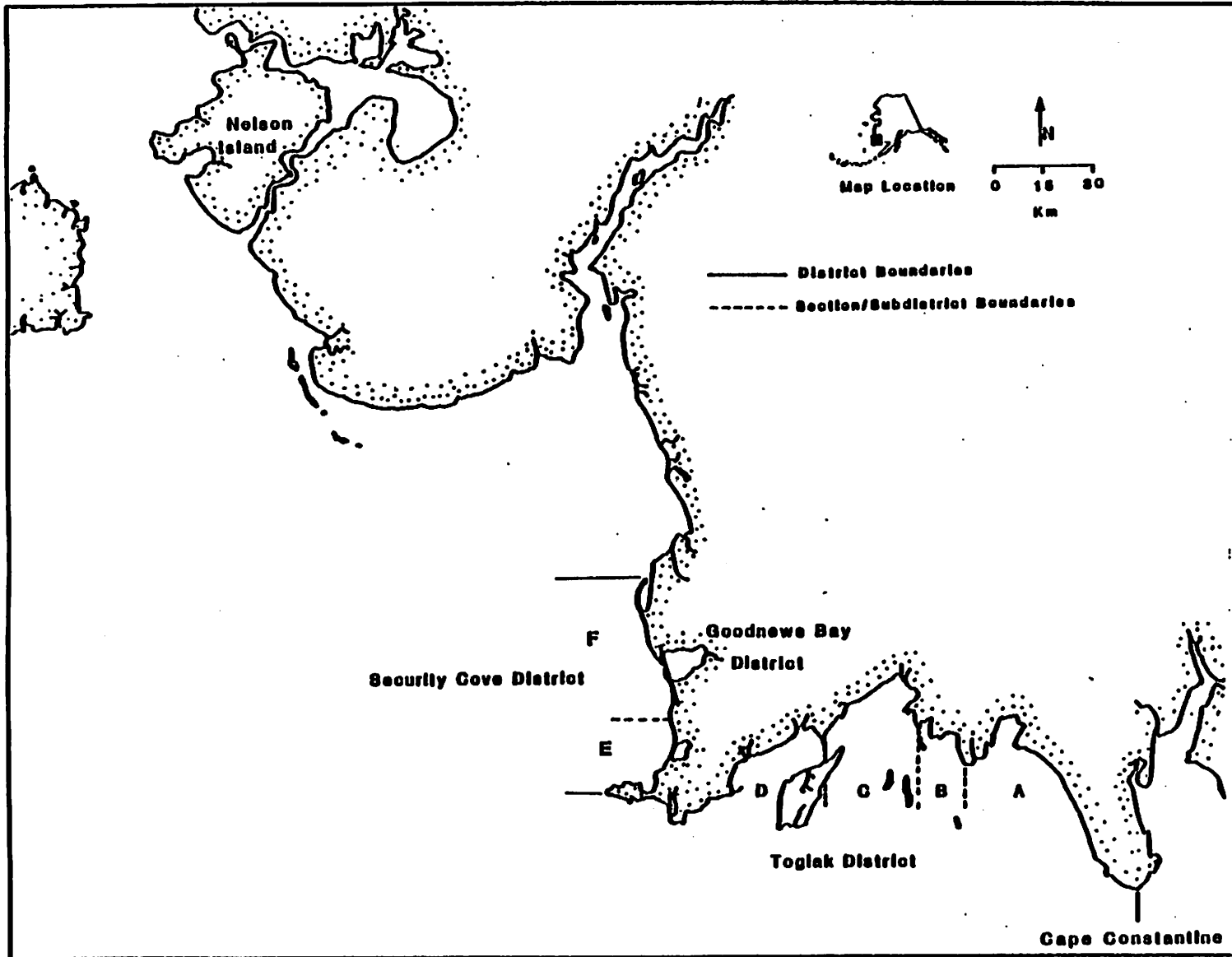


Figure 1. Togiak (A = Kulukak, B = Nunavachak, C = Togiak, D = Hagemeister Sections), Security Cove (E = Security Cove, F = Red Mt. Subdistricts) and Goodnews Bay Pacific herring commercial fishing districts in the eastern Bering Sea, Alaska.

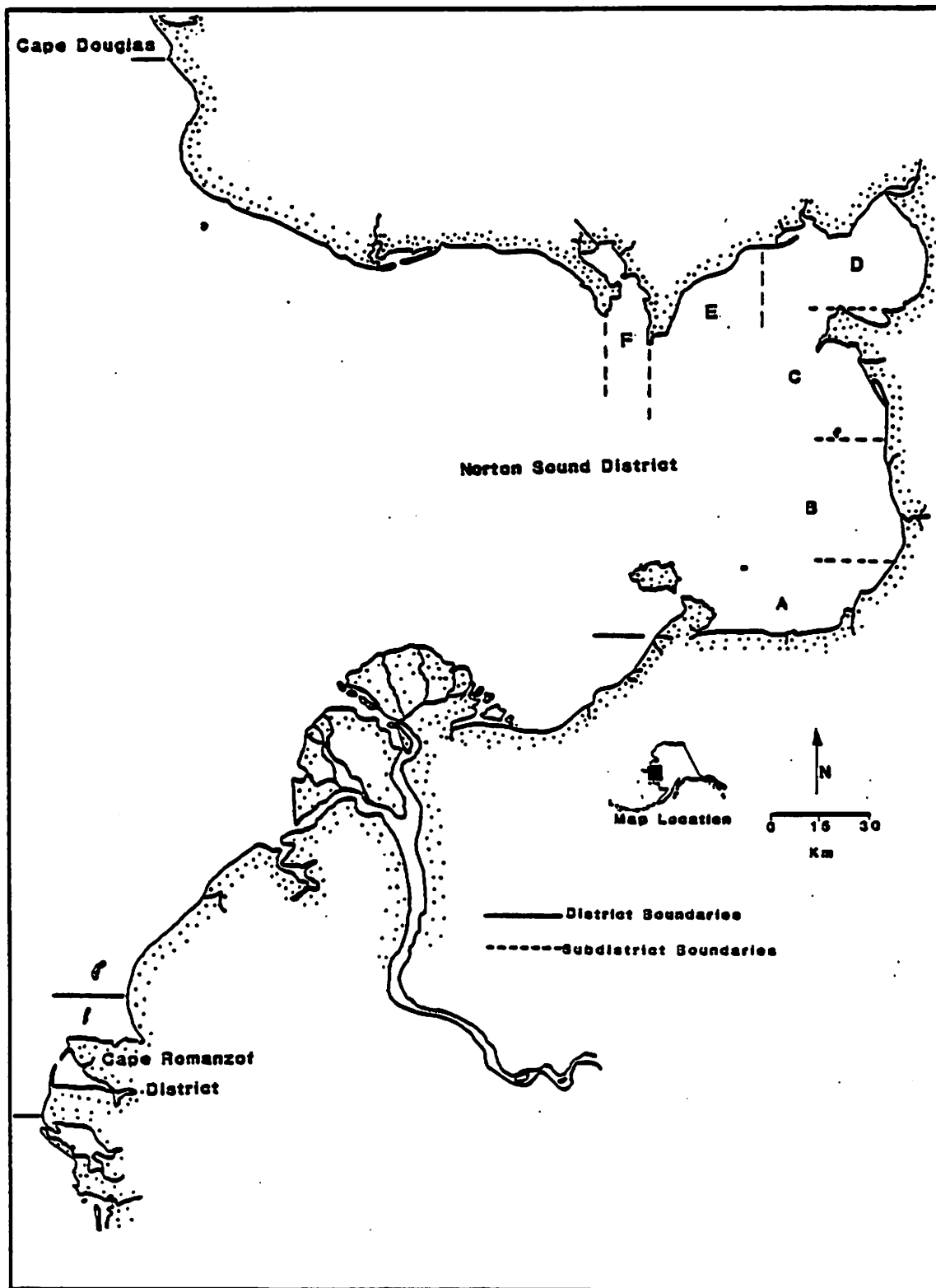


Figure 2. Cape Romanzof and Norton Sound (A = St. Michael, B = Unalakleet, C = Cape Denbigh, D = Norton Bay, E = Elim, F = Golovin Bay Subdistricts) Pacific herring commercial fishing districts in the eastern Bering Sea, Alaska.

Table 1. Pacific herring and herring spawn on kelp harvests by domestic commercial fishermen in the eastern Bering Sea, Alaska, 1909-1984.

| Year | Herring (mt) 1/ | | | | | | Herring Spawn on Kelp (mt) | | |
|-----------|------------------|-------------|-----------------------------|--------------|--------------|--------|----------------------------|--------------|-------|
| | Aleutian Islands | Bristol Bay | Security Cove/ Goodnews Bay | Cape Romanof | Norton Sound | Total | Bristol Bay | Norton Sound | Total |
| 1909-1916 | - | - | - | - | - | - | - | - | - |
| 1916-1928 | - | - | - | - | 2/ | - | - | - | - |
| 1929 | 1,142 | - | - | - | 1,706 | 1,706 | - | - | - |
| 1930 | 1,738 | - | - | - | 151 | 1,293 | - | - | - |
| 1931 | 958 | - | - | - | 400 | 2,138 | - | - | - |
| 1932 | 2,727 | - | - | - | 78 | 1,036 | - | - | - |
| 1933 | 1,438 | - | - | - | 480 | 3,207 | - | - | - |
| 1934 | 1,391 | - | - | - | 28 | 1,466 | - | - | - |
| 1935 | 2,188 | - | - | - | 4 | 1,395 | - | - | - |
| 1936 | 1,251 | - | - | - | 14 | 2,202 | - | - | - |
| 1937 | 525 | - | - | - | - | 1,251 | - | - | - |
| 1938 | 466 | - | - | - | 5 | 530 | - | - | - |
| 1939 | - | - | - | - | 9 | 475 | - | - | - |
| 1940 | - | - | - | - | 5 | 5 | - | - | - |
| 1941 | - | - | - | - | 13 | 13 | - | - | - |
| 1942-1944 | - | - | - | - | 3 | 3 | - | - | - |
| 1945 | 68 | - | - | - | - | 68 | - | - | - |
| 1946 | - | - | - | - | - | - | - | - | - |
| 1947-1963 | * | * | * | * | * | * | * | * | * |
| 1964 | - | - | - | - | 18 | 18 | - | - | - |
| 1965 | * | * | * | * | * | * | * | * | * |
| 1966 | - | - | - | - | 11 | 11 | - | - | - |
| 1967 | - | 122 | - | - | - | 122 | - | - | - |
| 1968 | - | 82 | - | - | 2 | 82 | 25 | - | 25 |
| 1969 | - | 43 | - | - | 2 | 45 | 5 | - | 5 |
| 1970 | - | 25 | - | - | 7 | 32 | 18 | - | 18 |
| 1971 | - | 74 | - | - | 2 | 78 | 24 | - | 24 |
| 1972 | - | 46 | - | - | 15 | 89 | 29 | - | 29 |
| 1973 | - | 112 | - | - | 32 | 114 | 5 | - | 5 |
| 1974 | - | 50 | - | - | 2 | 50 | 57 | - | 57 |
| 1975 | - | - | - | - | 8 | 8 | 50 | - | 50 |
| 1976 | - | 2,535 | - | - | 10 | 2,545 | 134 | - | 134 |
| 1977 | - | 7,030 | - | - | 14 | 7,303 | 125 | - | 125 |
| 1978 | - | 10,115 | - | - | 1,173 | 11,754 | 150 | Trace | 153 |
| 1979 | - | 17,774 | a | - | 2,215 | 21,582 | 188 | 3 | 200 |
| 1980 | - | 1,039 | - | - | 3,964 | 18,290 | 86 | 22 | 108 |
| 1981 | 639 | 11,374 | - | - | 3,567 | 28,131 | 172 | 37 b | 209 |
| 1982 | 3,234 | 19,556 | - | - | 4,156 | 33,988 | 106 | 35 | 141 |
| 1983 | 3,238 | 24,486 | c | - | 3,240 | 25,989 | 123 | 25 d | 148 |
| 1984 | 3,246 | 17,529 | e | - | 3,240 | 25,989 | 184 | 18 3/ | 202 |

1/ Pre 1964 harvest primarily in summer and fall for food; post 1964 harvest primarily in spring for sea ice.

2/ Fishery occurred some years but harvest data unavailable.

3/ Additional 3 mt harvested from imported kelp (Macrocystus sp.).

* No commercial operations reported.

Wastage not included (mt): a= 5,200; b=5; c=544; d=1-5; e=140; f=52; g=80.

Table 2. Estimated biomass and commercial harvest of Pacific herring in eastern Bering Sea fishing districts, Alaska, 1978-1984.

| District | Biomass (m. t.) | Harvest (m. t.) | Roe % | Estimated Value (\$) | % Biomass Harvested |
|---------------|--------------------|--------------------|------------|----------------------------|------------------------|
| 1984 | | | | | |
| Togiak | 104,200 | 17,529 f | 9.8 | 7,178,400 | 16.8 |
| Security Cove | 4,600 | 294 e | 11.8 | 110,000 | 6.4 |
| Goodnews Bay | 3,700 | 605 d | 10.1 | 150,000 | 16.4 |
| Cape Romanzof | 5,500 | 1,075 | 8.6 | 355,000 | 19.5 |
| Norton Sound | 21,000 | 3,240 c | 10.3 | 876,000 | 15.4 |
| Total | 139,000 | 22,743 | 9.8 | 8,669,400 | 16.4 |
| 1983 | | | | | |
| Togiak | 128,600 | 24,486 b | 8.8 | 10,517,300 | 19.1 |
| Security Cove | 5,800 | 973 | 9.4 | 422,300 | 16.8 |
| Goodnews Bay | 2,900 | 395 | 9.4 | 184,800 | 13.6 |
| Cape Romanzof | 5,000 | 740 | 9.0 | 367,100 | 14.8 |
| Norton Sound | 25,500 | 4,156 | 8.6 | 1,519,200 | 16.3 |
| Total | 167,800 | 30,750 | 8.8 | 13,010,700 | 18.3 |
| 1982 | | | | | |
| Togiak | 88,800 | 19,556 | 8.8 | 6,174,300 | 22.0 |
| Security Cove | 4,600 | 737 | 9.3 | 271,000 | 16.0 |
| Goodnews Bay | 2,400 | 441 | 9.5 | 187,900 | 18.4 |
| Cape Romanzof | 4,400 | 596 | 9.3 | 221,700 | 13.6 |
| Norton Sound | 15,800 | 3,567 | 8.8 | 1,046,200 | 22.6 |
| Total | 116,000 | 24,897 | 8.9 | 7,630,100 | 21.5 |
| 1981 | | | | | |
| Togiak | 143,900 | 11,374 | 9.1 | 3,988,000 | 7.9 |
| Security Cove | 7,500 | 1,064 | 8.1 | 347,070 | 14.2 |
| Goodnews Bay | 3,900 | 596 | 7.7 | 196,170 | 15.3 |
| Cape Romanzof | 4,400 | 653 | 8.0 | 211,260 | 15.0 |
| Norton Sound | 22,800 | 3,965 | 8.8 | 1,500,000 | 17.3 |
| Total | 182,500 | 17,652 | 8.9 | 6,242,500 | 9.7 |
| 1980 | | | | | |
| Togiak | 62,300 | 17,774 a | 9.2 | 3,205,000 | 28.5 |
| Security Cove | 1,100 | 632 | 8.2 | 151,000 | 57.4 |
| Goodnews Bay | 1,100 | 406 | 9.5 | 97,000 | 36.9 |
| Cape Romanzof | 2,700 | 554 | 9.8 | 132,000 | 20.5 |
| Norton Sound | 7,600 | 2,224 | 8.1 | 500,500 | 29.3 |
| Total | 74,800 | 21,590 | 8.8 | 4,085,500 | 28.9 |
| 1979 | | | | | |
| Togiak | 216,800 | 10,115 | 8.6 | 6,700,000 | 4.7 |
| Security Cove | 19,500 | 385 | 8.5 | 327,000 | 2.0 |
| Goodnews Bay | 6,700 | 82 | 4.7 | 38,500 | 1.2 |
| Cape Romanzof | 2,700 | 0 | - | - | 0.0 |
| Norton Sound | 7,000 | 1,172 | 7.0 | 628,200 | 16.7 |
| Total | 252,700 | 12,406 | 8.0 | 7,694,000 | 4.9 |
| 1978 | | | | | |
| Togiak | 172,600 | 7,033 | 8.2 | 2,300,000 | 4.1 |
| Security Cove | 1,200 | 259 | - | - | 21.6 |
| Goodnews Bay | 400 | 0 | - | - | 0.0 |
| Cape Romanzof | 2,700 | 0 | - | - | 0.0 |
| Norton Sound | 4,800 | 13 | - | - | 0.3 |
| Totals | 181,700 | 7,305 | 8.2 | 2,300,000 | 4.0 |

Wastage not included (mt): a=5,200; b=544; c=80; d=42; e=10; f=140.

Table 3. Commercial harvest of Pacific herring spawn on rockweek kelp in eastern Bering Sea fishing districts, Alaska, 1978-1984.

| District | Harvest (m.t.) | Number of Buyers | Number of Pickers | Estimated Value (\$) |
|--------------|----------------|------------------|-------------------|----------------------|
| 1984 | | | | |
| Togiak | 184.4 | 6 | 330 | 203,300 |
| Norton Sound | 17.5 1/ | 3 | 32 | 21,500 |
| Total | 201.9 | | | 224,800 |
| 1983 | | | | |
| Togiak | 122.8 | 4 | 125 | 284,400 |
| Norton Sound | 25.0 b | 1 | 35 | 38,500 |
| Total | 147.8 | | | 233,778 |
| 1982 | | | | |
| Togiak | 106.5 | 8 | 214 | 176,193 |
| Norton Sound | 34.9 | 1 | 74 | 57,585 |
| Total | 141.4 | | | 233,778 |
| 1981 | | | | |
| Togiak | 171.9 | 7 | 108 | 250,000 |
| Norton Sound | 37.2 a | 4 | 22 | 45,000 2/ |
| Total | 209.1 | | | 295,000 |
| 1980 | | | | |
| Togiak | 86.0 | 21 | 78 | 94,600 |
| Norton Sound | 22.2 | 1 | 20 | 73,000 |
| Total | 108.2 | | | 167,600 |
| 1979 | | | | |
| Togiak | 188.0 | 16 | 100 | 248,160 |
| Norton Sound | 11.8 | 1 | 19 | 15,576 |
| Total | 199.8 | | | 263,736 |
| 1978 | | | | |
| Togiak | 149.6 | 11 | 160 | 119,800 |
| Norton Sound | 3.4 | 1 | 0 | 2,723 |
| Total | 153.0 | | | 122,523 |

1/ Additional 3.0 mt harvested from 2,000 lbs. imported kelp (*Macrocystus* sp) at estimated value of \$20,000.

Wastage not included (mt): a=5; b=1.5.

Table 4. Number of buyers and fishermen participating in eastern Bering Sea Pacific herring fisheries, Alaska, 1978-1984.

| District | Number of Buyers | Number of fishermen 1/ | | |
|------------------|------------------|------------------------|-------|-------|
| | | Gillnet | Purse | Beach |
| <u>1984</u> | | | | |
| Togiak | 25 | 300 | 196 | * |
| Security Cove | 4 | 38 | * | * |
| Goodnews Bay | 4 | 130 | * | * |
| Cape Romanzof | 3 | 66 | * | * |
| Norton Sound | 8 | 189 | * | 10 |
| <u>1983</u> | | | | |
| Togiak | 23 | 250 | 150 | * |
| Security Cove | 6 | 94 | * | * |
| Goodnews Bay | 4 | 84 | * | * |
| Cape Romanzof | 3 | 63 | * | * |
| Norton Sound | 9 | 271 | * | 1 |
| <u>1982</u> | | | | |
| Togiak | 33 | 200 | 135 | * |
| Security Cove | 3 | 107 | * | * |
| Goodnews Bay | 3 | 84 | * | * |
| Cape Romanzof | 2 | 75 | * | * |
| Norton Sound | 7 | 237 | * | - |
| <u>1981</u> | | | | |
| Togiak | 28 | 106 | 83 | * |
| Security Cove | 7 | 113 | * | * |
| Goodnews Bay | 5 | 175 | * | * |
| Cape Romanzof | 4 | 111 | * | * |
| Norton Sound | 13 | 332 | * | - |
| <u>1980</u> | | | | |
| Togiak | 27 | 363 | 140 | * |
| Security Cove | 8 | 175 | * | * |
| Goodnews Bay | 4 | 165 | * | * |
| Cape Romanzof | 2 | 69 | * | * |
| Norton Sound | 8 | 294 | * | - |
| <u>1979</u> | | | | |
| Togiak | 33 | 350 | 175 | * |
| Security Cove | 2 | 61 | * | * |
| Goodnews Bay | 1 | 41 | * | * |
| Cape Romanzof 2/ | - | - | - | * |
| Norton Sound | 7 | 50 | 17 | - |
| <u>1978</u> | | | | |
| Togiak | 16 | 40 | 25 | * |
| Security Cove | 3 | | - | * |
| Norton Sound | 1 | 11 | - | - |

* Gear prohibited.

1/ Refers to number of vessels in Togiak District only.

2/ Fishery not conducted.

Table 5. Pacific herring subsistence harvest (mt) and effort data from selected eastern Bering Sea areas, Alaska, 1975-1984. 1/

| Village | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |
|---------------------------------|------|------|------|------|-------|-------|------|---------|------|------|
| Nelson Island | | | | | | | | | | |
| Tunmak | 19.8 | 13.9 | 51.9 | 34.6 | 31.0 | 59.2 | 36.0 | 43.8 | 85.0 | - |
| Unkumlut | 30.0 | 8.5 | 2.8 | 10.4 | 7.5 | 3.1 | 9.0 | 0 | - | - |
| Toksook Bay | 31.0 | 31.8 | 19.3 | 33.5 | 46.5 | 26.6 | 13.0 | 31.6 | - | - |
| Total | 80.8 | 61.2 | 74.0 | 78.5 | 85.0 | 88.9 | 58.0 | 75.4 | 85.0 | - |
| Number of Fish- ing Families | 109 | 42 | 90 | 83 | 54 | 70 | 93 | 65 | 43 | - |
| Yukon-Kuskokwim Delta | | | | | | | | | | |
| Scammon Bay | - | 0.6 | - | 0.6 | 5.4 | 2.8 | 6.9 | 3.5 | 2.3 | 3.9 |
| Chevak | - | 0.6 | 0.1 | - | 2.1 | 3.2 | 1.7 | 1.8 | 1.3 | 2.3 |
| Hooper Bay | 2.5 | 2.7 | 2.1 | 3.5 | 2.8 | 3.3 | 3.6 | 4.2 | 4.7 | 3.7 |
| Kwigillingok | - | 9.6 | 0.9 | - | 7.2 | 12.0 | - | 12.0 2/ | - | - |
| Total | 2.5 | 13.5 | 3.1 | 4.1 | 17.5 | 21.3 | 12.2 | 21.5 | 8.3 | 9.9 |
| Number of Fish- ing Families | 34 | 49 | 39 | 29 | 106 | 80 | 45 | 64 | 37 | 46 |
| Areas Combined | | | | | | | | | | |
| Total Catch | 83.3 | 74.7 | 77.1 | 82.6 | 102.5 | 110.2 | 70.2 | 96.9 | 93.3 | 6.9 |
| Number of Fish- ing Families | 143 | 91 | 129 | 112 | 160 | 150 | 138 | 129 | 80 | 46 |

1/ Other areas with small catches have been surveyed irregularly (1975-1978; estimated total coastal yearly subsistence catch averaged 100 m.t.).
 2/ Estimate based on post season observations.
 - Not surveyed.

Table 6. Relative abundance index (RAI) and estimated biomass of Pacific herring in the eastern Bering Sea, Alaska, 1978-1984.

| District | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |
|-----------------------------------|----------------|-----------------|----------------|----------------|----------------|----------------|----------------|
| Relative Abundance Index (RAI) 1/ | | | | | | | |
| Togiak | 43,050 | 137,630 | 15,249 | 79,352 | 49,998 | 88,806 | 58,807 |
| Security Cove | 246 | 2,912 | 435 | 2,228 | 486 3/ | 1,602 | 3,219 |
| Goodnews Bay | 241 | 3,729 | - 3/ | 1,593 | - 3/ | 815 | 2,579 |
| Nelson Island | 1,079 | - 3/ | - 3/ | 1,072 | - 3/ | 2,515 | 8,300 |
| Nunivak Island | 215 | - | - | 5 | - | 2,300 | 5,062 |
| Cape Romanzof | 539 | - 3/ | - 3/ | - 4/ | - 4/ | - 5/ | 3,060 6/ |
| Norton Sound | 1,277 | 1,860 | 2,242 | 6,516 | 4,548 | 6,796 | 13,798 |
| Total | 46,647 | 146,131+ | 17,926+ | 90,766+ | 55,032+ | 102,534 | 94,825 |
| Estimated Biomass in m.t. 2/ | | | | | | | |
| Togiak | 172,600 | 216,800 | 62,300 | 143,900 | 88,800 | 128,600 | 104,200 |
| Security Cove | 1,200 | 19,500 | 1,100 | 7,500 | 4,600 3/ | 5,800 | 4,600 |
| Goodnews Bay | 400 | 6,700 3/ | 1,100 3/ | 3,900 | 2,400 3/ | 2,900 | 3,700 |
| Nelson Island | 5,400 | 5,400 3/ | 5,400 3/ | 3,600 | 3,600 3/ | 6,600 | 10,000 |
| Nunivak Island | 731 | - | - | 17 | - | 6,900 | 6,074 |
| Cape Romanzof | 2,700 | 2,700 3/ | 2,700 3/ | 4,400 4/ | 4,400 4/ | 5,000 | 5,500 |
| Norton Sound | 4,800 | 7,000 | 7,600 | 20,800 | 15,800 | 25,500 | 21,000 |
| Total | 187,831 | 258,100 | 80,200 | 186,117 | 119,600 | 181,300 | 155,074 |
| % Fluction 7/ | - | 40 | <69> | 132 | <36> | 52 | <14> |

1/ Number of fish schools equivalent to 50 m surface area, unadjusted for presence of non-herring pelagic species.

2/ Adjusted for presence of non-herring pelagic species. Estimates for 1978 and 1979 represent low end of estimate ranges from Barton and Steinhoff (1980), 1980 estimates from Kingsbury (1980).

3/ Incomplete data due to inclement weather and/or turbid waters, biomass estimates are questionable and are based on 1978, 1979 or 1981 data.

4/ No aerial surveys made, 1981 and 1983 estimates based upon assumption that commercial harvest represented 15 percent of total biomass; 1981 estimate used for 1982.

5/ No satisfactory aerial survey made, 1983 estimate based on assumption of slight increase in biomass over previous year.

6/ No satisfactory aerial survey made, 1984 estimate based on assumption of slight increase in biomass over previous year.

7/ Based on prior year biomass estimate.

collect Pacific herring samples within Togiak District. A total of 11,731 Pacific herring was sampled during 1984 from all districts and the Nelson Island area.

RESULTS

An overall total of 155,100 mt of Pacific herring was estimated to have been present during the 1984 spawning season (Table 6). This estimate was 14% lower than the spawning population observed in 1983 and is the smallest recorded fluctuation in population size for consecutive years since 1978. Total spawn sightings for all districts in 1984 was a record 207 linear km of milt: 99 km for Togiak, 24 km for Security Cove/Goodnews Bay, 2 km for Cape Romanzof and 69 km for Norton Sound. An additional 13 km of milt was observed during surveys of the Nelson-Nunivak Island area. Most spawning occurred 18-19 May in Togiak, 19-25 May in Security Cove, 30 May - 7 June in Cape Romanzof and 10-18 June in Norton Sound. In general, spawn deposition was extensive and egg density was moderate (i.e. usually not more than four layers thick) in all districts.

Age composition analyses indicated that 6 and 7 year old Pacific herring (1978 and 1977 year classes, respectively) comprised about 70% of the total spawning population in all districts (Figures 3 and 4). Five year old herring (1979 year class) accounted for 13% of the population with 4 year old herring (1980 year class) comprising about 2% of the Togiak and Security Cove/Goodnews Bay population, and about 4% of the Cape Romanzof and Norton Sound populations.

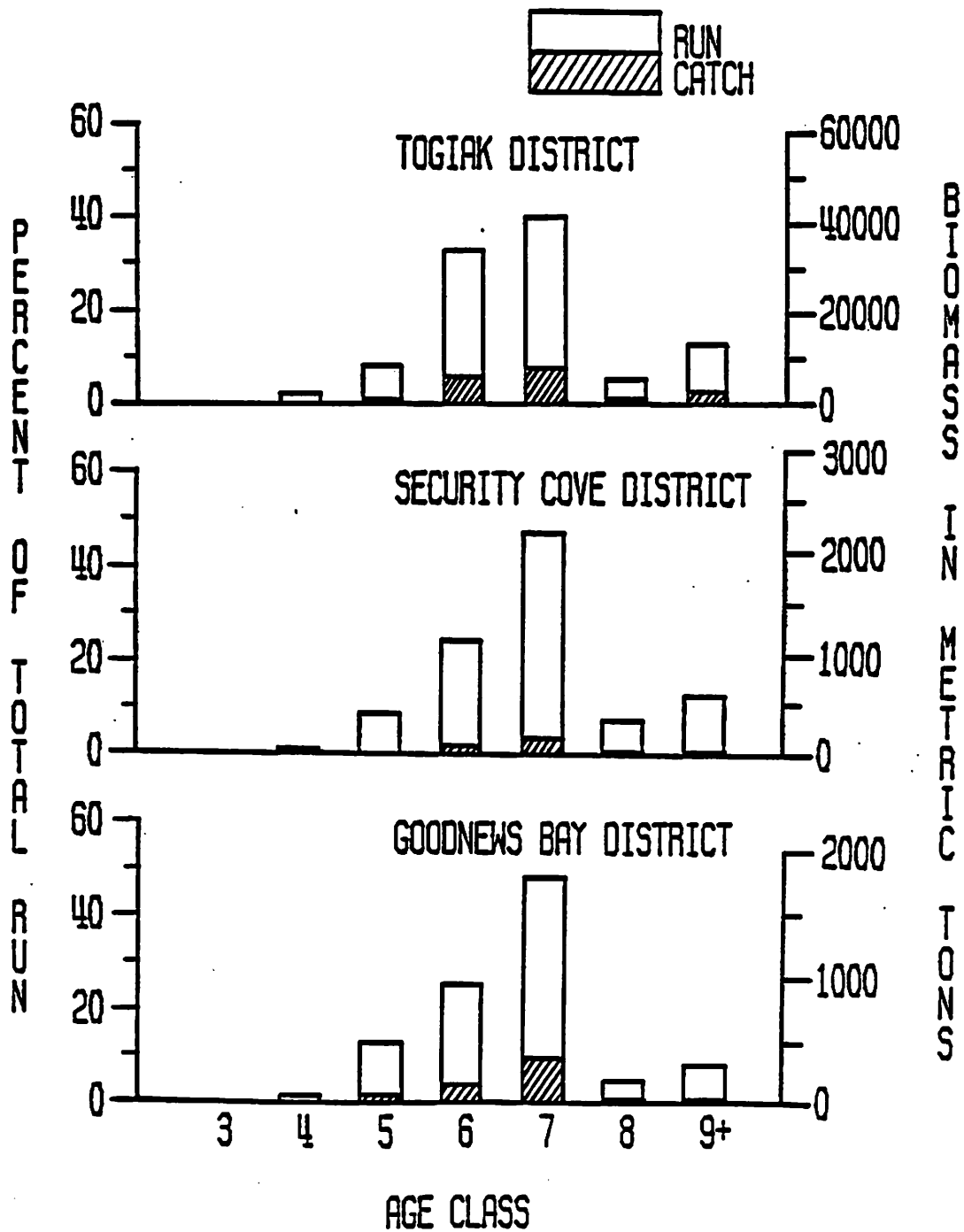


Figure 3. Age composition of Pacific herring in spawning populations and commercial catches in Togiak, Security Cove and Goodnews Bay commercial herring fishing districts, eastern Bering Sea, Alaska, 1984.

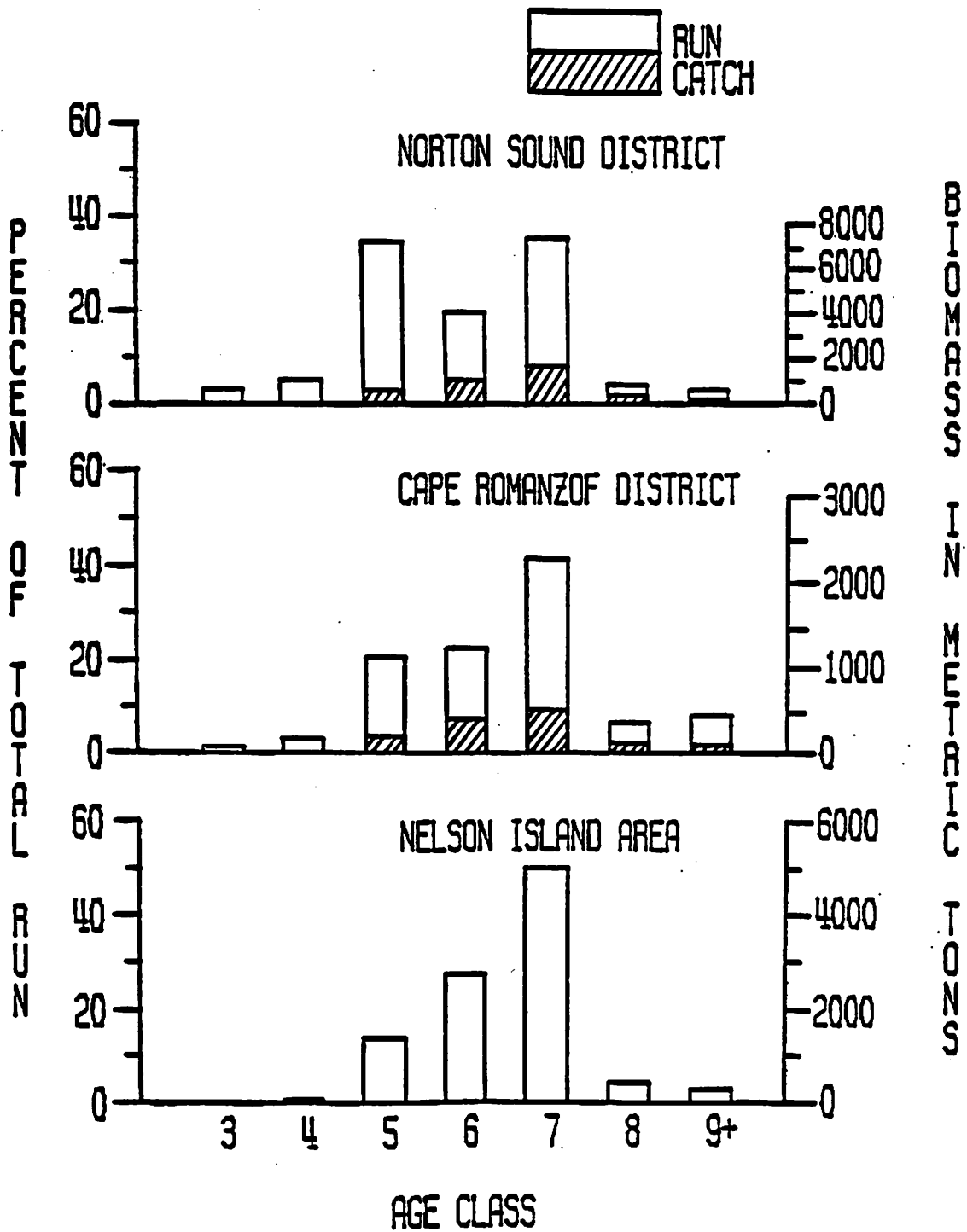


Figure 4. Age composition of Pacific herring in spawning populations and commercial catches in Norton Sound and Cape Romanzof commercial herring fishing districts and the Nelson-Nunivak Island area, eastern Bering Sea, Alaska, 1984.

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