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GROUNDFISH



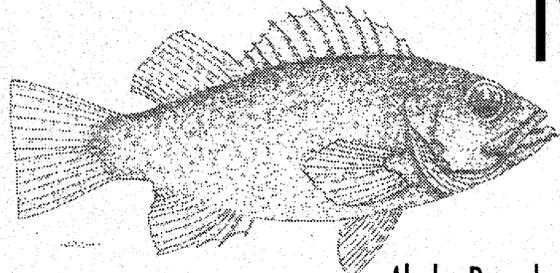
FISHERIES



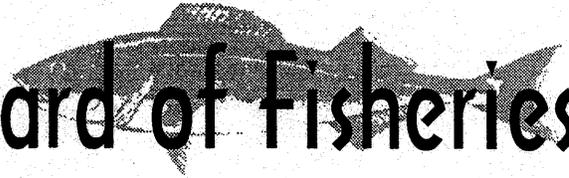
Southeast Alaska-Yakutat Region
1995



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Report to the Board of Fisheries



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ABSTRACT

This report includes summaries of catch and effort, management actions, and an outlook to the 1996 season for the groundfish fisheries managed by the Alaska Department of Fish and Game (ADF&G) in the Eastern Gulf of Alaska during 1995. Harvest figures from 1995 indicate a total of 5,415,000 lb, landed weight, of groundfish worth an estimated exvessel value of \$10,821,000 (Table 1). The high value of groundfish landings in 1995 is due primarily to increases in the price for sablefish and demersal shelf rockfishes.

All species are managed on a calendar year basis, except flatfish, for which the season is October 1 through September 30. Inseason management action was required in the sablefish, DSR (DSR), and lingcod fisheries during the year.

The Northern Southeast Inside (NSEI) sablefish fishery in 1996 was in the last year of a three-year management plan based on an equal allocation between permit holders. In 1995, the second year of the plan, the harvest objective was set at three-million dressed pounds and the individual share was 24,500 dressed pounds for each of the 122 permanent or interim permit holders. The Southern Southeast Inside (SSEI) sablefish fishery was open for 48 hours in 1995, during which 440,331 lb of the guideline harvest limit of 500,000 lb was taken. Because of changes in regulation under the federal sablefish Individual Fishing Quota (IFQ) fishery, the state waters portion of the Southeast Outside (SEO) Subdistrict was closed to sablefish fishing by emergency order.

Management of DSR has changed with the implementation of the halibut IFQ fishery. The winter season is now January 1 through March 15 and the fall season is November 16 through December 31. No directed fishing was allowed in NSEO waters and the winter season ran less than one month in the other three outside management sections. Fishing activity in NSEI and SSEI remains at low levels.

No inseason management action was necessary during the 1995 flatfish trawl season and harvest in all areas was well below preseason harvest objectives.

Lingcod harvests continued to increase in 1995, primarily because of an increase in the directed landing by dinglebar gear in the East Yakutat (EYKT) area. Some areas of the Central Southeast Outside (CSEO) and NSEO, previously subjected to intense directed fishing pressure, were closed for conservation purposes in both 1994 and 1995.

The reported Pacific cod harvest is at the lowest level in 5 years, possibly due to the weak food fish market. Regulations requiring the reporting of bait harvests have not been effective and a significant portion of Pacific cod taken as bait for other fisheries is not being reported.

INTRODUCTION

The Eastern Gulf of Alaska regulatory area for groundfish management encompasses all waters surrounding the Alexander Archipelago from Dixon Entrance (54°30' N latitude) northwestward along the outer coast to 147° W longitude (Figure 1).

The Alaska Department of Fish and Game has management jurisdiction over all groundfish resources within state water in the Eastern Gulf of Alaska area. State waters include all internal waters of Southeast Alaska and Yakutat Bay, and waters within three miles of shore along the outer coast. In addition, a provision in the Gulf of Alaska Groundfish Fisheries Management Plan (FMP) authorizes the state to execute inseason management of DSR in both state and federal waters in the SEO Subdistrict (outer coastal waters east of 140°W. longitude). Lingcod is under state jurisdiction in both state and federal waters east of 147°W longitude because lingcod is not defined as a groundfish under the FMP.

Seven groundfish management areas have been established in Southeast Alaska (Figure 1). The West Yakutat District (WYKT) includes all waters between 140° W longitude and 147° W longitude, excluding Prince William Sound. Four of the areas, EYKT section, NSEO section, CSEO section, and Southern Southeast Outside section (SSEO), are along the outer coast and make up the SEO subdistrict. The remaining two areas, NSEI subdistrict and SSEI subdistrict, are in internal waters.

In addition to having direct management responsibility for certain groundfish species, the Region I Groundfish Project provides harvest information and other resource data from the adjacent Exclusive Economic Zone (EEZ) to the National Marine Fisheries Service (NMFS) and North Pacific Fishery Management Council (NPFMC) under the terms of a cooperative agreement with NMFS. Under this agreement, ADF&G staff has the responsibility of collecting, editing, and entering all fish tickets from the domestic harvest of groundfish in Alaska waters. The state is also involved in management of groundfish in the EEZ through the Groundfish Project Leader's participation on the Gulf of Alaska Groundfish Plan Team.

This report provides detailed harvest, effort, and management information for the state-managed groundfish fisheries in the Eastern Gulf of Alaska during 1995. This includes all groundfish species in internal waters, DSR in all waters of the Southeast District, and lingcod regionwide.

The primary state-managed fisheries within the region include sablefish, rockfish, lingcod, Pacific cod, and starry flounder. By regulation, sablefish can be fished only with longline and pot gear, and state-managed rockfish and lingcod fisheries are restricted to hook and line gear in the Southeast District. Fisheries targeting on sablefish and DSR almost exclusively use longline gear and directed lingcod fisheries use primarily dinglebar troll gear. Flatfish are harvested with trawl gear.

Preliminary 1995 groundfish landings from state-managed fisheries total 5,414,812 lb landed weight. Exvessel value of the 1995 harvest was significant at \$10,821,415 (Table 1).

LINGCOD

Lingcod are the largest member of the greenling family, attaining a maximum length of 5 feet. This cold water species occurs from the intertidal to depths of 270 fm from northern Baja, California to the Bering Sea. Adults tend to be resident, although they exhibit some seasonal movement related to spawning and individual fish may occasionally move large distances. Females attain a greater size and age than males. Lingcod live to a maximum age of 20 years and have an unusual reproductive strategy. Males move into nearshore rocky areas in the fall and set up territories. Females move into this area just prior to spawning and leave the area post-spawning. The females lay large egg masses and the males, after fertilizing the eggs, guard the egg mass from predation until hatching, generally 7 to 11 weeks.

Lingcod have traditionally been an important bycatch species in the rockfish longline fishery and in the salmon troll fishery, as well as bycatch in the halibut fishery and the target species in subsistence and recreational fisheries. The directed commercial fishery for lingcod developed in 1987 off the outer coast of Kruzof Island in CSEO and has increased in importance and presence since that time.

Fisheries and History

Lingcod are harvested by mechanical jigging machines, longline gear, and by troll gear. The majority of longline landings are incidental to the DSR fishery where, in some areas and seasons, the bycatch rate of lingcod can exceed 40%. Most of the catch attributed to mechanical jigging machines is actually taken using dinglebar gear. Dinglebar gear is rigged to operate off the hydraulic gurdies on power-troll gear and differs from power trolling only in the configuration of the terminal tackle and the proximity of the gear to the bottom when fished.

The directed lingcod fishery has developed steadily since its inception in 1987 when a small fleet using dinglebar gear harvested 159,000 lb of lingcod from the northern CSEO and NSEO areas. In 1991 the directed fishery catch of 498,292 lb accounted for almost half of the total catch (Table 2). The directed fishery occurs primarily out of Sitka with major fishing grounds off the outer coasts of Baranof, Chichagof, and Kruzof Islands. In 1995 there was a major expansion of the directed fishery to the EYKT subdistrict, primarily the Fairweather Ground. In that year, well over two thirds of the total lingcod catch was harvested by the directed fishery (Table 3). Due to imposition of management measures affecting both lingcod and DSR fisheries, the amount of lingcod landed by the DSR longline fishery has declined sharply in the last few years. The harvest, value, and effort history from 1987 through September 1996 is shown in table 4

Regulation Development

The Board of Fisheries (BOF) first addressed Southeast Alaska lingcod management at their 1989 meeting when they implemented a size limit of 27" for lingcod in an attempt to prevent harvest of sexually immature females. In 1991 a guideline harvest limit of 300,000 to 500,000 lb was established for the Southeast District (east of 137° W. longitude) based on catch histories in the CSEO fishery. Also a winter closure inside the surfline was implemented from January 1 through May 31 in an attempt to protect nest-guarding males.

In 1991, the department met with industry representatives, including directed fishers, longliners, and trollers, and developed a lingcod management plan to present to the BOF. The BOF adopted some of proposed regulations. The closed season was changed to December 1 through April 30 and the closure line was extended out to three-miles offshore. In the absence of stock abundance information, management area harvest guidelines were set based on a total harvest not to exceed $0.25 \text{ mt/nm}^2 - 0.50 \text{ mt/nm}^2$. A mandatory logbook program was established and legal gear types defined as hook and line only. Additionally the BOF adopted allocations between longline, troller, and directed fishery groups in the CSEO and NSEO management areas and set split-season harvest objectives for the directed fishery in those areas.

Stock Assessment and Management

The rapid increase in lingcod harvests over the past two years is a cause for increased attention to the management of this species. Not enough is known about biomass, sustainable harvest levels, or basic biology of lingcod in Southeast Alaska. The staff examines catch trends and distribution of harvest through the use of the mandatory logbook program. Inseason closures in specific areas of high fishing pressure are implemented in an attempt to distribute fishing effort and prevent localized depletion.

Surveys to obtain catch per unit effort (CPUE), age, and growth data have occurred seasonally since 1993. Because the movement of local stocks of lingcod in Southeast Alaska is not well understood, a tagging study was launched in the spring of 1996. To date over 500 lingcod have been tagged and released in the CSEO and NSEO area and 200 lingcod have been tagged and released in the EYKT area. A tag return incentive program has been instituted and to date 11 tags have been returned.

1995 Season Summary

Regional lingcod harvests totaled 942,613 lb round weight in 1995. This included both directed and bycatch harvests from all Southeast Alaska and Yakutat Districts, a 5% increase from the 1994 annual harvest of 904,119 lb (Table 2). The increase was due primarily to increased harvests in the directed fishery (dinglebar) which continues to take the majority of the catch. The

1995 harvest by the directed fishery totaled over 658,000 lb, a 63% increase from the 1994 harvest of 419,113 lbs.

Landings from the EYKT management area dominated the Southeast District harvest in 1995 with 353,200 lb (41%) of the total regional harvest reported from that section alone (Table 3). Landings from the CSEO and NSEO sections were also significant, with 202,500 lb (24%) and 97,100 lb (11%) of the total harvest, respectively. To a certain extent, conservation closures in CSEO and NSEO forced effort into the EYKT area.

1996 Outlook

Catch figures for 1996 (January through September) show the lingcod total harvest in Southeast Alaska is comparable to 1995. As anticipated, there is a marked increase in the harvest from the SSEO section. This is due primarily to inseason closures of sections of NSEO and CSEO, providing impetus for the fleet to go further south and fish areas that are productive but farther from the traditional port of Sitka.

Trollers can participate in the dinglebar fishery with minimal investment in gear. This makes it an attractive alternative fishery during the off season. As long as troll seasons remain short, markets for lingcod remain stable throughout the year, and lingcod stocks are healthy, it is likely that effort will continue to increase. The increase in effort will have to take place in areas other than NSEO and EYKT because those areas are currently harvested at or near their guideline harvest level (GHL).

ROCKFISH

More than 30 species of rockfishes from two genera (*Sebastolobus* and *Sebastes*) are landed in Region I groundfish fisheries. Thornyhead rockfish (*Sebastolobus spp*) inhabit the continental slope in waters as deep as 6,000 feet. These fishes are landed primarily as bycatch in the sablefish longline fishery. The *Sebastes* rockfishes are divided into three assemblages for management purposes because a group of species co-inhabiting an area are generally caught together. The assemblages are based on habitat preference and behavior:

- The DSR assemblage is comprised of seven species of nearshore, bottom-dwelling species and includes yelloweye rockfish (*S. ruberrimus*).
- The Pelagic Shelf Rockfish (PSR) assemblage is comprised of five nearshore schooling species including black rockfish (*S. melanops*) and dusky rockfish (*S. ciliatus*).
- The Slope rockfish assemblage is found along the edge of the continental shelf and on the continental slope in depths as great as 400 fm. This group contains all remaining species of rockfish. Roughey rockfish (*S. aleutianus*), shorttraker

rockfish (*S. borealis*), and Pacific Ocean perch (*S. alutus*) are predominant commercial species in this group.

DEMERSAL SHELF ROCKFISH

The assemblage definition for DSR has changed three times since its inception as a result of new information. The current DSR assemblage comprises seven species including yelloweye rockfish, quillback rockfish, tiger rockfish, china rockfish, canary rockfish, copper rockfish, and rosethorn rockfish.

Yelloweye rockfish, the dominant species in the DSR assemblage, occur in nearshore waters to 200 fm (although commonly to 100 fm) from northern Baja California to the Aleutian Islands. These fish are habitat specific, occurring on rocky reefs, ridges, and pinnacles. They attain a maximum length of 36 inches and can live to over 115 years of age. They are slow growing, late maturing, and ovoviviparous (extruding larvae rather than laying eggs).

Fishery Development and History

DSR have been the target of a directed shore-based longline fishery in Southeast Alaska since the late 1970s. The fishery began in the Sitka Sound area as a small family-run, fresh-fish business, catching primarily black rockfish using skiffs and automatic jigging machines. By 1982 longline gear had replaced jigging machines and with the change in gear type the dominant species caught became yelloweye and quillback rockfish. Harvest increased six fold in five years with total catch exceeding one-million pounds in 1986. Prior to 1984 well over half of the total Southeast Alaska rockfish landings were reported from the CSEO area. Management action was limited to the CSEO area and as effort and harvest continued to increase much of the effort shifted into the SSEI management area followed by a shift in the late 1980s to the SSEO area. A directed DSR fishery developed in the EYKT subdistrict in 1991, primarily targeting yelloweye on the Fairweather Ground. The CSEO area has seen a renewed level of effort and harvest since the early 1990s and catch rates in this area have stabilized (Figure 2). A large portion of these fisheries are conducted in federal waters. The remaining portions of Southeast Alaska are now fished to a lesser extent. The State has not opened the directed fishery in the NSEO section since 1994 when the stock assessment survey in that area indicated a low abundance of fish. Table 5 lists harvest, value, and effort for the DSR fishery from 1987 through September 1996.

Prior to the implementation of management for this fishery, there was a general trend toward high effort close to port followed by a period of fishing further and further from port. This is significant for several reasons. DSR are habitat specific, and tend to be resident, preferring rocky reefs, ridges, and pinnacles and consequently are susceptible to localized depletion. The market for DSR is primarily a high quality, round fish, fresh market. This means that fish may not be delivered to the plant more than four days after capture, limiting the feasible travel distance to fishing grounds. The increase in travel distance was almost certainly due to localized

pressure causing declines in abundance. Imposition of regulations and inseason management action combined seems to have provided some stabilization.

Regulation Development

The DSR fishery has been intensively managed since 1989. Prior to 1989 the fishery occurred primarily in the CSEO area where a 1.3 million pound harvest cap was placed in 1984. Limited management measures were in place for this area only, beginning in 1987 a draft management plan was written and quotas were set for five management areas. A portion of Sitka Sound was closed by emergency order to directed commercial fishing after public testimony underscored the concern regarding localized stock depletion.

The department, concerned about the rapid increase in catch and effort, co-sponsored an industry workshop with the Commercial Fisheries Entry Commission (CFEC) and the Pacific States Marine Fisheries Commission (PSMFC), exploring management options for this fishery. The workshop was funded through PSMFC. Several recommendations for management actions came from this working group and were implemented at the 1989 BOF meeting.

In the 1980s the fishery was managed with an October 1 start date. In 1989 regulations were passed to retain the small boat, fresh-product nature of the fishery. These regulations included providing for a three period, split season to facilitate marketing of fresh product over an extended portion of the year and imposing a trip limit of 7,500 lb per five-day period. Legal gear for DSR was defined as hook and line only. Annual guideline harvest limits were reduced substantially in all areas and closures to directed commercial fishing were implemented for areas surrounding the ports of Sitka, Craig, and Ketchikan. In addition, logbooks were required to be maintained by fishers directed fishing for DSR. A DSR directed fishery CFEC permit card for Southeast Alaska was introduced in 1990. Fishers making directed landings from EYKT did not use this card until 1991 when EYKT was included in the SEO Subdistrict.

The directed fishery season was curtailed in the summer of 1990 and again in the summer and fall of 1991 when the prohibited species cap for halibut (halibut mortality cap in non-halibut fisheries) was met. In 1991 the NPFMC set aside a separate allocation of halibut mortality for the DSR fishery that prevents the directed DSR fishery from being impacted by excessive halibut bycatch in other Gulf of Alaska fisheries.

Bycatch and wastage of DSR in other fisheries is a concern because these species often die when brought to the surface, making release ineffective. Consequently, a regulation was passed that allowed for unlimited retention of all DSR landed incidental during the halibut fisheries. This was to minimize wastage of bycatch that occurred during the historic 24-hour halibut fisheries. Additionally, fishers may no longer target DSR while fishing for bait, and no more than 10% by weight of bait catch may be DSR.

In 1991 the NPFMC extended the SEO District, and the State's management authority for DSR from 137° W longitude to 140° W longitude. Further regulation changes were made at the 1993 meeting, largely drafted by the Sitka Rockfish Working Group to reflect changes in the nature of the fishery. Reapportionment of DSR by season was made to allow for more product to be taken in the winter season when the price was best. New, lower guideline harvest limits were adopted

for DSR and a directed fishery harvest limit for DSR in the East Yakutat District was implemented. Trip limits were set at 12,000 lb for East Yakutat and reduced from 7,500 to 6,000 lb in the other management areas.

Allowable biological catch levels (ABC) and total allowable catch levels (TAC) are now set annually for the SEO subdistrict as part of the NPFMC Fishery Evaluation and Stock Assessment process. These levels do not specify directed fishing levels. With the implementation of IFQ management for halibut, several major changes have occurred in management of rockfish. First, because the season for halibut is now open for eight months, the regulation that had allowed for unlimited retention of DSR during halibut fishing could easily result in exceeding the TAC for DSR, particularly when the price for DSR is high and there is an incentive to increase bycatch of these species. Therefore the directed season for DSR is limited to the non-IFQ months (January 1 - March 15 and November 16 - December 31) and bycatch during the halibut fishery is limited to 10%, by weight, of all halibut on board. Second, seasonal apportionment of DSR is now based on these two open periods with most of the production occurring in winter. Third, bycatch needs for other fisheries are estimated first (including an estimate of unreported mortality) and taken off the TAC prior to setting directed fishing levels in the SEO District.

Stock Assessment and Management

In 1989 a provision in the Gulf of Alaska (GOA) FMP transferred direct management authority to the state for the DSR assemblage in both state and EEZ waters east of 137° W longitude. In 1991 that authority was extended to all water east of 140° W longitude. The State is currently involved in a multi-year stock assessment survey for DSR in the SEO district. Biomass is estimated as the product of density/km² collected during line transect surveys, the area of rocky habitat within the 600 ft contour, and the average weight by management area. The NPFMC system requires that ABC and overfishing levels be set based on a six-tier system. DSR falls under the fourth tier, where a reliable point estimate of B (biomass), $F_{30\%}$ (fishing mortality rate, F , equal to 30% of the biomass per recruit), and $F_{40\%}$ (F equal to 40% of the biomass per recruit) are available. Allowable biological catch for the SEO Subdistrict is set by multiplying the lower 90% confidence interval of biomass for yelloweye rockfish by the natural mortality rate (0.02) and adjusting for the 10% of other species landed in the assemblage. This is more conservative than using the $F_{40\%}$ rate of 0.023. The overfishing level is set using a rate of $F_{30\%}$ (0.037). There is no stock assessment information available for NSEI and SSEI and these harvest levels are set at low levels based on historic CPUE and catch data.

In 1996 the state conducted a sidescan sonar mapping project for the commercial fishing grounds off Kruzof Island in CSEO. In 1997 the department proposes to conduct additional line transect surveys and habitat mapping to improve the stock assessment for this group.

1995 Season Synopsis

The 1995 season was divided into two harvest periods, winter (January 1 - March 15) and fall (November 16- December 31). The directed fishery had 68 vessels and landed 430,000 lb (round wt.) with an exvessel value of \$616,000. An additional 274,000 lb worth an exvessel value of \$166,000 was landed as bycatch in other fisheries. It is estimated that 287,000 lb were taken as unreported mortality (caught and released).

In 1995 the TAC limit for the Southeast District was 1.28 million lbs.. Given the new IFQ halibut fishery, and the consequent, but unknown changes in DSR bycatch, a limited amount of quota was released to the directed fishery during the winter season. The East Yakutat Subdistrict was allocated 110,250 lb and 220,500 lb was allocated for the CSEO and SSEO areas. NSEO was not open due to low abundance estimates in the area. The NSEI and SSEI were both allocated 55,125 lbs. Season length varied by area: a portion of CSEO closed on January 7 to prevent the total harvest from being taken off of Cape Edgecumbe and Kruzof Island with the remaining area closing on January 15; SSEO was open for 28 days, closing on January 28; EYKT was open for 31 days, closing on January 31; NSEI and SSEI had extremely low levels of effort and remained open for the entire period, closing on March 14. The short season in CSEO reflects an extremely high price per pound, exceeding \$1.50 on some deliveries.

With the exception of CSEO and NSEO, where there was no fall allocation, the directed fishery during the fall period was open for the entire 46 days. The CSEO area did not open for a fall allocation because the combined winter harvest and bycatch exceeded the area TAC of 330,000 lbs.. Catch and effort is usually lower in the fall than in the winter because the weather tends to be worse in the fall, the price per pound is not as high, and it is the end of the calendar year when financial pressures for some participants are lower. The lower number of participants in 1995 compared to 1994 is actually a reflection of the change in regulations regarding halibut and not a decrease in the size of the directed fishery. Prior to 1995 many fishers landed their DSR bycatch from halibut on their directed fishery card which greatly increased the number of permits with DSR landings. In 1995 DSR bycatch during halibut was limited to 10% and had to be landed on a halibut permit card.

1996 Season Outlook

The TAC for DSR in the SEO Subdistrict increased to 1.4 million lb in 1996. The increase is due to changes in stock assessment methods and does not reflect an increase in stock size; 661,500 lb were set aside for anticipated bycatch needs. Winter allocations for the directed fishery were 441,000 lb for EYKT, 242,550 lb for CSEO, and 132,300 lb for SSEO. The NSEI and SSEI releases were both 55,125 lbs. Season length was very short in CSEO, closing on January 10, but much longer in the other areas. SSEO was open until March 8, EYKT, NSEI, and SSEI were open until March 14. The length of the season in SSEO reflects the lack of winter markets in the SSEO area. EYKT was open longer because of the larger quota and the limited opportunities to fish due to weather.

The fall period will reopen the directed fishery in all areas but NSEO on November 16 with harvest allocations of 220,500 lb for EYKT, 132,300 lb for CSEO, 88,200 lb for SSEO, and 55,125 lb each for both NSEI and SSEI. Landed bycatch as of October is 138,915 lb and estimated unreported mortality is 769,545 lbs.

PELAGIC SHELF AND SLOPE ROCKFISH

Pelagic shelf rockfish are generally taken as bycatch in longline and troll fisheries in the NSEI and SSEI areas. The total landings of pelagic shelf rockfish taken in internal waters have averaged 15,000 lb per year for the past five years (Table 6), with roughly one quarter of those landings taken on mechanical jigging machines. There is a very small developing fishery in the CSEO area that targets black rockfish. At this time, the fishery falls under federal management and PSR catches from the SEO district are not included in this report. There has been discussion by NPFMC to explore alternative management of the PSR assemblage. One option under discussion is the removal of black and blue rockfish from the PSR assemblage and from the GOA FMP which would give management authority of these species to the State of Alaska in both state and EEZ waters.

Slope rockfishes are taken as bycatch in longline fisheries for sablefish, halibut, and DSR with the majority of the catch associated with the SSEI and NSEI sablefish fisheries. In addition to the bycatch landings, there are a few longline fishers who target slope rockfish in the NSEI area. There has been a steady and significant increase in the landings of slope rockfish. In 1995 408,507 lb were landed, almost five times the 1990 landings of 88,705 (Table 7). The increase in landings can be attributed to two factors: the development of a market for slope rockfish, primarily thornyheads, shortraker, and roughey rockfishes, and the change in management strategy for NSEI sablefish. The longer season and slower pace of the fishery for sablefish encourages the retention of bycatch.

SABLEFISH

Sablefish (*Anoplopoma fimbria*) occur only in the North Pacific Ocean, the Bering Sea, and adjacent waters from Hokkaido, Japan to Baja, California with the greatest abundance in the Gulf of Alaska. Adult sablefish inhabit the deeper water areas of the continental shelf, the slope, and the deep-water coastal fjords. Most adults live in depths of 200 to 500 fm although they have been found at less than 100 fm and to over 1,000 fm. In the NSEI fishery, the average age from survey samples of this long-lived species is estimated at 14 years, with a range of 1 to 70 years of age.

The market value of sablefish continues to increase each year, making sablefish the most valuable fin fish currently sold in Southeast and Gulf of Alaska waters. Average price per pound

has increased from 42-cents per pound in 1980 to over three dollars per pound in 1995, resulting in an exvessel value of over nine million dollars (Table 8).

Fishery Development and History

Sablefish have been harvested in the internal waters of Southeast Alaska since the early 1900s. The fishery is split into two areas: The NSEI area, where fishing occurs mostly in Chatham Strait, and the SSEI area, including Clarence Strait and adjacent waters of Dixon entrance.

Prior to the 1940s, sablefish were primarily landed as incidental catch in the halibut fishery. Halibut longline gear was modified in the late 1940s to specifically target sablefish. Pot gear was first introduced in 1970 in the SSEI and Dixon Entrance, accounting for 33% of the harvest in the early 1970s. By 1979, pot gear was responsible for less than 5% of the catch. Harvest levels fluctuated widely until the 1970s due to price and more opportunities in other fisheries.

Season limitations were first imposed in 1945 for the NSEI fishery, and in 1982 for the SSEI fishery. Seasons were shortened as effort escalated in the 1970s and 1980s. Guideline harvest ranges were established for both areas in 1980 based on historical catches. Fleet effort and efficiency continued to increase dramatically and by 1984 the season was reduced to five days (Table 8). In 1985, a limited entry program was implemented for the fishing fleets in both areas. However, the overall operating efficiency of the NSEI longline fleet increased seven fold after the limited entry program was in place. For example, the average number of hooks set per vessel per day increased from 4,791 in 1984 to 28,514 in 1993. In order to stay within harvest objectives, the department continued to reduce the number of fishing days in both areas. In the NSEI fishery, the number of fishing days went from 76 in 1980 to one in 1987. A one-day opening continued until 1993. In that year, the fleet harvested 3,640,000 lb, 2,140,000 lb over the upper bounds of the 1,500,000 lb GHL in 24 hours. The number of days fished in the SSEI fishery has been reduced from 200 days in 1980 to two days since (Table 8).

In an effort to improve management, the Board of Fish adopted a shared quota system for the NSEI fishery beginning in 1994 as recommended by a working group of industry representatives and state fisheries managers.

Regulations

Current management regulations, including guideline harvest ranges (GHR), management plans, fishing seasons, and gear specifications, are defined separately for the NSEI and SSEI areas. The current GHR for NSEI is 1.0 to 3.0 million dressed pounds. The NSEI shared quota system directs the department to divide the annual harvest objective equally among the CFEC permits and interim use permits issued for the fishery. The annual harvest objective was set at a maximum of three million pounds for the first year of the three-year share quota system. The GHR for the SSEI area is between 250,000 to 500,000 dressed pounds. This fishery continues to be regulated by fishing season only. There is no sablefish fishery in the state-managed 0-3 mile

zone in outside coastal waters of Southeast Alaska because this zone is mostly too shallow to harbor adult sablefish, which are generally found at depths exceeding 200 fm. There are no size limits placed on the sablefish fisheries.

Current Fishing Seasons and Periods

When the Board of Fish adopted the shared quota system in 1994, the fishing season was extended to 30 days. Regulations call for the NSEI fishery to be open between September 1 and November 15 and the SSEI fishery between June 1 and July 15 each year.

The department decides fishing dates within these regulatory time frames based on maximizing the number of favorable tides and minimizing conflicts with other fisheries. Current regulations specify that sablefish fisheries must not conflict with halibut openings in the International Pacific Halibut Commission Area 2-C. However, in 1995, the federal halibut fishery switched to an Individual Fishing Quota (IFQ) system, eliminating potential seasonal conflicts between these two longline fisheries.

Gear Restrictions

Only longline gear can be used to catch sablefish in the NSEI fishery. Both longline and pot gear are legal in the SSEI fishery.

Stock Assessment and Management

In 1988, the department began annual longline research surveys in the NSEI and SSEI areas to assess the relative abundance of sablefish over time. Previous research indicates substantial movement of sablefish into and out of both Chatham and Clarence areas, but neither the extent of movement nor the consequence of movement on the abundance of sablefish in those areas is known. Therefore, department surveys are conducted a few weeks prior to the fishery. Fixed sampling stations were randomly assigned within statistical subareas in both Chatham and Clarence Strait, where the majority of fleet fishing effort is focused. Once established, the same stations are fished in a similar manner each year to estimate change in relative abundance over time. Biological data collected during the surveys include length, weight, sex, stage of maturity and otoliths (aging structures) from a subset of fish collected. The annual harvest objective for both fisheries is set after the department completes this survey.

In addition to the annual survey, port samplers in Petersburg, Sitka and Ketchikan conduct skipper interviews and collect recovered tags in both the NSEI and SSEI fisheries. Interviews provide detailed effort data as well as information on location of fishing, numbers of fish caught,

and amount of gear lost during the fishery. The SSEI fishery is intensely monitored during the 48-hour opening. Overflight of the grounds are conducted to determine fleet distribution and to verify fish ticket data.

1994 and 1995 Season Summary

The total sablefish landings from both state-managed fisheries was 3,520,824 and 3,301,015 dressed pounds in 1994 and 1995 respectively (Table 8). The exvessel value of these fisheries was approximately \$10.8 million in 1994 and \$10.7 million in 1995.

NSEI

In the first two years of the three-year shared quota system harvest levels in the NSEI fishery stayed within harvest guidelines outlined by the BOF and below the harvest objective of three-million dressed pounds set by the department (Table 8; Figure 3). The CFEC issued 122 permanent and interim permits for the fishery. The shared quota system gave each individual fisherman 24,500 dressed pounds and 30 days to fish beginning September 22 in 1994 and September 13 in 1995. One hundred twenty-one permit holders fished in both years. In 1995, the 2,860,684 lb harvested in NSEI was 100,000 less than 1994 and a result of 50 permit holders harvesting less than 24,500 dressed pounds.

The harvest objective is based in part on survey results. The 1993 NSEI survey CPUE (fish/hook) was extremely high compared to the previous four years (Figure 4). Although the survey CPUE declined from a high of 0.22 fish/hook in 1993 to 0.17 fish/hook in 1994 and further to 0.15 fish/hook in 1995, the 1994 and 1995 CPUE values were still high compared to the survey results in 1989-1992.

Catch rates (dressed lb/hook) in the NSEI fishery showed a trend somewhat similar to the trend in survey catch rates (Figure 4). The 1993 fishery CPUE of 1.02 lb/hook was very high, followed by a substantial decline between 1993 and 1994, falling again in 1995. 1993 was the last year of the 24-hour fishery. Given the new extended season management beginning in 1994, some decline in average CPUE was expected; however, the large drop in CPUE over two years is cause for concern.

SSEI

The SSEI sablefish harvests were 554,870 dressed pounds in 1994 and 440,331 in 1995, which were within 12% of the departments harvest objective of 500,000 lb (Table 8). Thirty permit holders fished in 1994 and 29 in 1995. The fishery was open from June 15-17 in 1994 and from June 20-22 in 1995.

Results of the department survey in SSEI showed CPUE (fish/hook) increased from 0.11 in 1993 to 0.14 in 1994, then declined back to 0.11 in 1995 (Figure 4). The SSEI fishery CPUE (dressed lb/hook) showed an opposite trend in relative abundance compared to the survey (Figure 4). Because this fishery is only open for 48 hours, fishery CPUE can vary widely due to factors independent of abundance such as weather conditions, the date of the fishery, and the number of dogfish sharks in the area. The percent of the SSEI fleet interviewed for catch and effort data for 1994 and 1995 was 89% and 88% respectively.

1996 Season Outlook

NSEI

The harvest objective for NSEI in 1996 was again set at the upper limit of the GHF of 3.0 million lb for 122 permits. Although there continued to be concern over the decline in fishery CPUE, the 1996 survey results showed CPUE was slightly higher than 1994 and 1995 (Figure 4). The survey CPUE (fish/hook) showed a 12% increase in CPUE from 1995 to 1996, and the 1996 survey CPUE was higher than the previous seven-year average (Figure 4). The department extended the fishing season from 30 days to 60 to increase the number of favorable tides available to fishers, to encourage fishers to set gear in a manner that minimizes gear and fish loss, and to minimize time conflicts with other fisheries.

Preliminary fishery data from the first month of the season indicates that low fishery CPUE is again a concern and may warrant a reduction in the harvest objective for 1997.

Stock assessment models are currently being developed in an attempt to estimate absolute sablefish biomass in the Chatham Strait (NSEI) area. The department is approaching this problem using different stock assessment techniques. A trial removal study is planned for 1997. A critical assumption in this study design is that fish will not enter or leave the area during the experiment. The department placed sonic tags in 20 sablefish in Chatham Strait this year and tracked their movements for 2 weeks. Results from this tagging study will help determine if movements by sablefish would violate the assumptions of the removal study. Age-structured models, similar to the National Marine Fisheries Service stock assessment methods, are also being evaluated.

SSEI

In 1996, the survey CPUE in the SSEI fishery remained the same as in 1995 (Figure 4). The department extended the survey into Dixon Entrance in 1996 because 55% of the fleet effort is now concentrated there. Preliminary fishery CPUE results showed a 24% decline between 1995 and 1996 (Figure 4). Several factors independent of fish abundance may have contributed to this decline. The weather during the June 8-10 opening was stormy and many of the fisherman interviewed were unable to fish the more productive Dixon Entrance area. In addition, many

fisherman commented that the number of dogfish sharks landed was unusually high this year, and most likely related to the early June opening date. In past years, an inverse relationship between dogfish shark, and sablefish CPUE has been observed in the fishery.

PACIFIC COD

The reported landings of Pacific cod from NSEI and SSEI have varied widely over the past six years with a low of 273,168 lb reported in 1990 to a high of 944,198 lb in 1993. In 1991 the BOF implemented a regulation setting a guideline harvest range for Pacific cod at 750,000 to 1,250,000 lb, round weight. Since 1993 the catch has decreased, with 318,637 lb landed in 1995 (Table 9). The increase in catch in the early 1990s was due to the development of a food market for Pacific cod. This market has not been strong the last few years and landings have declined. Over 90% of the landings are taken in the NSEI area.

A large portion of the Pacific cod taken in Southeast Alaska is used for bait in other fisheries. The implementation of additional bait regulations, including the regulation requiring that a fish ticket be submitted to the department detailing bait catches, have largely been unsuccessful in increasing the reporting of bait taken for personal use.

FLATFISH

The trawl fishery for flatfish is limited to four areas: the Stikine flats (the Stikine flats area is closed due to poor stock condition), lower Duncan Canal, Port Camden, and Anita Bay. Harvest guidelines are low in all areas due to limited habitat and low stock conditions. Anita Bay is the only area that has had a directed fishery in the past few years and production has been extremely limited (Table 10). In 1993 the BOF implemented a 20,000 lb weekly trip limit that is intended to prevent overharvest of these small quotas.

The season begins October 1 for flatfish and runs into April for some areas. During the 1994/1995 season, trawl permits were issued to one vessel. During the 1995/1996 season permits were issued to three vessels. Permits require that the operator keep a detailed logbook. Areas open, gear restrictions, and reporting requirements are outlined in the individual permits. Permits are issued for 30 days and are renewable only upon return of completed logbook pages. The department may also require on-board observer coverage.

OTHER SPECIES

Landings of other groundfish species continue to be very low, with the dominant species reported in 1995 being dogfish shark (11,000 lb) and skates (27,131 lb). There has been increasing interest in developing markets for miscellaneous species particularly skate wings. There is a periodic interest in developing a hagfish fishery but to date no markets have been developed. With the exception of hagfish, these species tend to be taken as bycatch in other fisheries and have not yet been targeted as a directed fishery.

Table 1. Landed weight (pounds) and exvessel value for state managed groundfish from groundfish fish-ticket database, Region I, 1993-1995.

Species Group	Area Managed	1993	1993	1994	1994	1995	1995
		Landed Wt	Value	Landed Wt	Value	Landed Wt	Value ^a
Lingcod	Region I	729,806	\$386,497	587,910	\$341,882	617,442	\$479,209
Flatfish	NSEI/SSEI	22,841	\$840	17,875	\$3,550	15,563	\$2,917
Demersal Shelf Rockfish	SEO/NSEI/SSEI	1,556,426	\$826,673	1,540,314	\$847,316	693,029	\$767,028
Pelagic Rockfish	NSEI/SSEI	17,073	\$5,462	16,768	\$4,797	8,665	\$2,463
Slope Rockfish	NSEI/SSEI	178,247	\$81,994	295,426	\$212,707	408,587	\$371,814
Pacific Cod	NSEI/SSEI	944,198	\$384,960	389,084	\$142,108	318,637	\$109,111
Sablefish	NSEI/SSEI	4,211,493	\$6,485,699	3,520,824	\$10,141,169	3,301,015	\$9,088,873
Total		7,660,084	\$8,090,425	6,536,761	\$11,925,901	5,414,814	10,821,415

^a Exvessel values were calculated from groundfish fish ticket data. Values are preliminary and do not reflect additional adjustments to processor prices made after the fishing season.

Table 2. Harvest totals of Lingcod 1990 to 1995 in round pounds including all Southeast Alaska and Yakutat Districts.

Year	Directed Jig	Troll	Longline	Total
1990	314,609	110,992	388,846	814,447
1991	498,292	93,472	474,081	1,065,845
1992	453,260	66,864	486,504	1,006,628
1993	495,454	71,324	507,377	1,074,155
1994	419,113	94,628	390,378	904,119
1995	658,681	88,924	195,008	942,613
1996 ^a	296,599	53,518	194,850	544,967

^a 1996 data are for January 1st through September 30th only.

Table 3. Lingcod harvests (round weight in pounds x 1,000) by ADF&G groundfish management area and gear type, 1994-1995.

Management Area	Longline		Dinglebar		Troll ^a		Total	
	1994	1995	1994	1995	1994	1995	1994	1995
WYKT	6.9	13.6	0.0	3.12				
EYKT	123.6	41.6	87.5	311.6				
NSEO	55.5	26.3	107.7	97.1				
CSEO	127.5	95.1	204.6	202.5				
NSEI	9.6	6.5	15.4	12.3				
SSEO	46.3	8.6	3.2	31.8				
SSEI	11.7	1.5	5.8	2.3				
Total	381.1	193.2	424.2	660.7	94.6	88.9	900.8	942.8

^a Incidental landings on salmon troll gear are not reported by groundfish management area.

Table 4. Lingcod harvest, effort, and value for Region 1, 1987 through September 1996. Data provided does not include salmon troll bycatch as this data is not available on the groundfish fish ticket database.

Year	Directed Harvest Landed Wt. (lb)	Directed Value	Directed Permits	Total Harvest Landed Wt. (lb)	Total Value	Total Permits
1987	115,119	\$64,933	20	339,001	\$180,212	438
1988	182,737	\$115,005	50	437,060	\$244,228	584
1989	136,853	\$88,480	33	403,307	\$209,097	627
1990	226,079	\$153,580	40	507,414	\$276,873	668
1991	350,048	\$225,430	51	708,656	\$383,264	680
1992	293,466	\$160,720	55	696,355	\$314,248	723
1993	357,116	\$238,477	64	729,806	\$386,497	216
1994	296,643	\$212,640	69	587,910	\$341,882	628
1995	472,312	\$392,277	76	617,442	\$479,209	499
1996 (thru 9/30)	372,716	\$254,128	94	516,148	\$343,290	429
Unique Permits			285			2,979

Table 5. Demersal Shelf Rockfish harvest, effort, and value from groundfish fish ticket data, 1987 through September 1996 (directed fishery permit implemented in 1990).

Year	Directed Harvest Landed Wt. (lb)	Directed Value	Directed Permits	Total Harvest Landed Wt. (lb)	Total Value	Total Permits
1987				2,432,945	\$1,233,179	520
1988				1,665,931	\$953,123	531
1989				1,355,379	\$729,094	817
1990	629,210	\$375,441	136	1,069,595	\$550,012	773
1991	720,766	\$467,187	121	1,407,357	\$769,027	803
1992	1,043,252	\$611,036	142	1,517,294	\$760,337	871
1993	973,187	\$659,178	113	1,556,427	\$826,673	758
1994	958,825	\$685,214	128	1,540,314	\$847,316	778
1995	418,016	\$615,563	67	693,029	\$767,028	692
1996 (thru 9/30)	601,966	\$561,462	92	808,837	\$675,332	665
Unique Permits			445			3,665

Table 6. Pelagic Shelf Rockfish harvest, effort, and value, NSEI and SSEI, 1987 through September 1996.

Year	Directed Harvest Landed Wt. (lb) (jig and mechanical jig)	Directed Value	Directed Permits	Total Harvest Landed Wt. (lb)	Total Value	Total Permits
1987	2,347	\$809	5	85,712	\$25,305	186
1988	9,183	\$2,735	4	24,776	\$7,718	65
1989	1,083	\$385	3	9,348	\$2,794	57
1990	1,001	\$272	4	5,261	\$1,327	67
1991	29	\$7	1	9,722	\$3,157	58
1992	9,679	\$2,731	7	25,816	\$7,047	83
1993	4,772	\$1,355	7	17,073	\$5,462	56
1994	3,815	\$1,086	5	16,768	\$4,797	55
1995	2,086	\$598	4	8,665	\$2,463	48
1996 (thru 9/30)	4,280	\$1,105	13	6,672	\$2,122	44
Unique Permits			44			544

Table 7. Slope rockfish harvest, value, and effort for NSEI and SSEI, 1987 through September 1996.

Year	Directed Harvest Landed Wt. (lb) (M longlinea)	Directed Value	Directed Permits	Total Harvest Landed Wt. (lb)	Total Value	Total Permits
1987	141,128	\$64,637	185	210,128	\$94,558	365
1988	26,105	\$9,920	65	86,583	\$35,499	188
1989	21,273	\$7,446	50	93,833	\$43,186	201
1990	10,608	\$3,925	26	88,705	\$43,465	206
1991	40,907	\$18,817	34	134,131	\$77,796	247
1992	27,580	\$7,724	41	147,628	\$66,433	263
1993	53,904	\$20,484	56	178,247	\$81,994	271
1994	68,196	\$58,649	43	295,426	\$212,707	270
1995	154,776	\$120,725	88	408,587	\$371,814	382
1996 (thru 9/30)	192,842	\$185,128	100	396,458	\$372,671	398
Unique Permits			473			1,511

^a Harvest by longline gear by "M" miscellaneous finfish longline permit holders.

Table 8. Summary of NSEI Fishery Data (1980-1995) and SSEI Fishery Data (1980-1996) for sablefish.

Year	NSEI					SSEI				
	Harvest (dressed lb)	Value	No. of Permits	No. of Days	CPUE (dressed lb/hook)	Pounds (dressed lb)	Value	No. of Permits	No. of Days	CPUE (dressed lb/hook)
1980	865,119	\$363,350	50	76	0.28	39,772	\$16,704		200	
1981	667,888	\$340,623	42	40	0.49	76,000	\$38,760		154	
1982	781,470	\$554,844	38	15	0.33	289,991	\$205,894		215	
1983	1,166,470	\$653,223	61	12	0.35	70,573	\$39,521		278	
1984	1,122,843	\$718,620	67	5	0.70	237,229	\$151,827	18	48	
1985	2,005,394	\$2,005,394	112	3	0.61	322,319	\$322,319	43	7	0.53
1986	2,600,000	\$2,704,000	146	2	0.90	471,000	\$489,840		7	0.53
1987	2,468,829	\$3,332,919	162	1	0.88	312,811	\$340,964	26	5	0.43
1988	2,747,724	\$3,736,905	158	1	0.84	479,598	\$767,357	28	5	0.37
1989	2,412,089	\$2,870,386	151	1	0.73	607,732	\$729,278	32	5	0.33
1990	2,068,588	\$3,537,285	121	1	0.79	477,890	\$554,352	29	3	0.37
1991	2,509,263	\$6,900,473	127	1	0.79	428,197	\$492,427	31	2.4	0.33
1992	2,840,722	\$5,226,928	120	1	0.87	545,467	\$867,340	30	2.4	0.39
1993	3,641,897	\$5,608,521	120	1	1.02	569,596	\$877,178	30	2.4	0.33
1994	2,965,954	\$9,075,819	121	30	0.63	554,870	\$1,065,350	30	2.4	0.30
1995	2,860,684	\$7,723,847	121	30	0.57	440,331	\$1,365,026	29	2.4	0.33
1996						312,978	\$885,728	28	2	0.25

Table 9. Pacific cod harvest, value, and effort, NSEI and SSEI 1987 through September 1996.

Year	Directed Harvest Landed Wt. (lb)	Directed Value	Directed Permits	Total Harvest Landed Wt. (lb)	Total Value	Total Permits
1987	649,758	\$242,141	179	672,177	\$247,905	262
1988	466,003	\$161,108	149	494,192	\$168,302	279
1989	298,182	\$115,871	100	361,720	\$130,149	318
1990	192,234	\$77,892	71	273,168	\$97,817	338
1991	457,348	\$169,931	87	539,443	\$189,580	326
1992	753,647	\$285,970	136	855,259	\$306,280	376
1993	872,836	\$370,566	131	944,198	\$384,960	319
1994	335,721	\$132,618	74	389,084	\$142,108	220
1995	266,782	\$92,299	89	318,637	\$103,218	239
1996 (thru 9/30)	264,904	\$100,061	80	306,898	\$109,111	222
Unique Permits			661			1,695

Table 10. Flatfish harvest, value, and effort, NSEI and SSEI, 1987 through September 1996.

Year	Directed Trawl Harvest Landed Wt. (lb)	Directed Value	Directed Permits	Total Harvest Landed Wt. (lb)	Total Value	Total Permits
1987	795,314	\$192,620	9	796,627	\$193,185	18
1988	807,107	\$184,267	4	809,359	\$184,637	12
1989	208,008	\$46,489	3	258,329	\$46,646	6
1990	297,505	\$71,509	6	301,840	\$71,935	10
1991	172,516,	\$22,097	5	172,936	\$22,194	9
1992	confidential	confidential	1	8,720	\$856	8
1993	confidential	confidential	2	22,841	\$840	3
1994	confidential	confidential	2	17,875	\$3,550	4
1995	confidential	confidential	1	15,563	\$2,917	16
1996 (thru 9/30)	confidential	confidential	0	3,594	\$975	11
Unique Permits			19			76

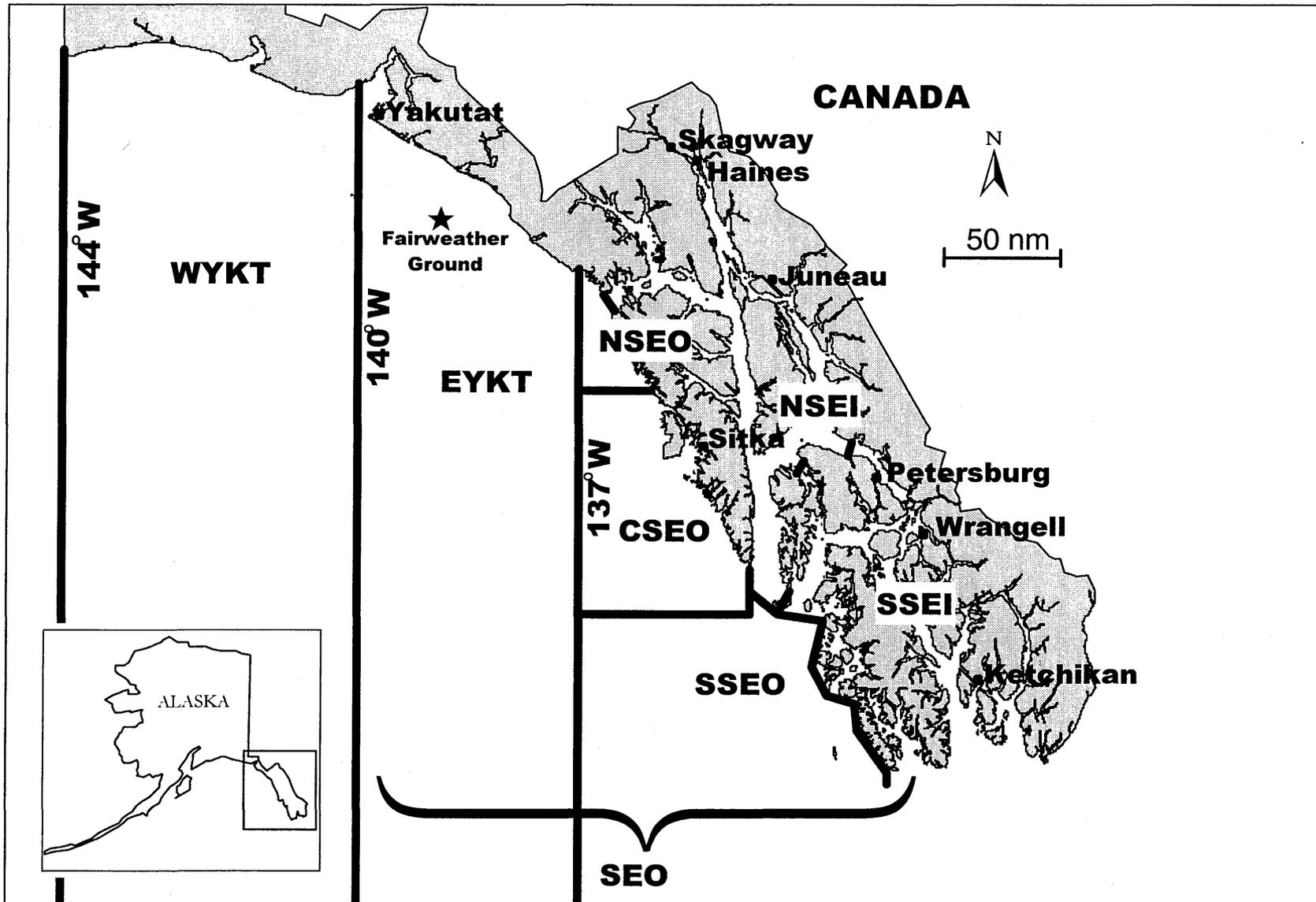


Figure 1. Southeast region groundfish management areas.

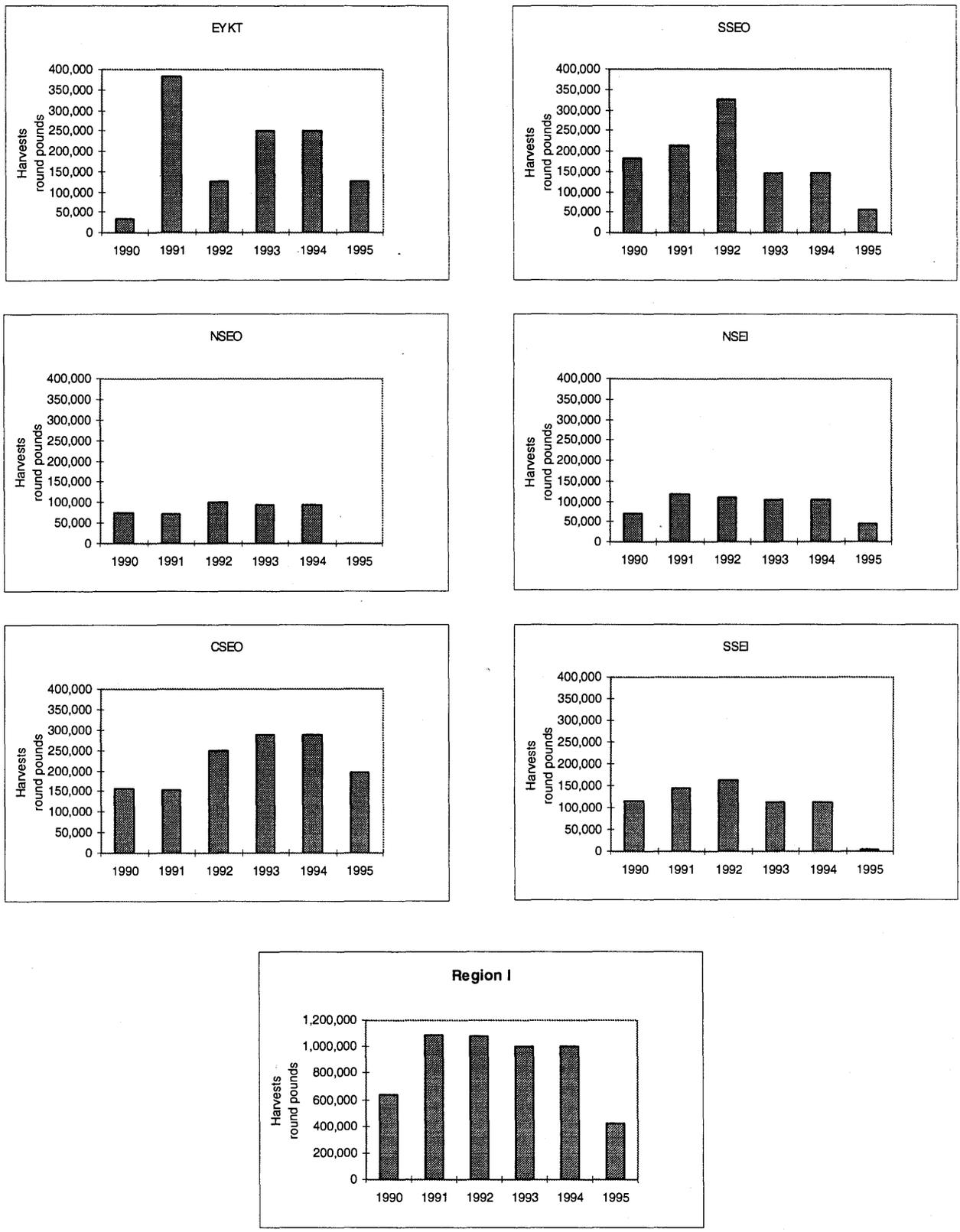


Figure 2. Directed DSR landings, round pounds, by management area by year, 1990-1995. Note that the scale is different in the graph depicting Region I harvest.

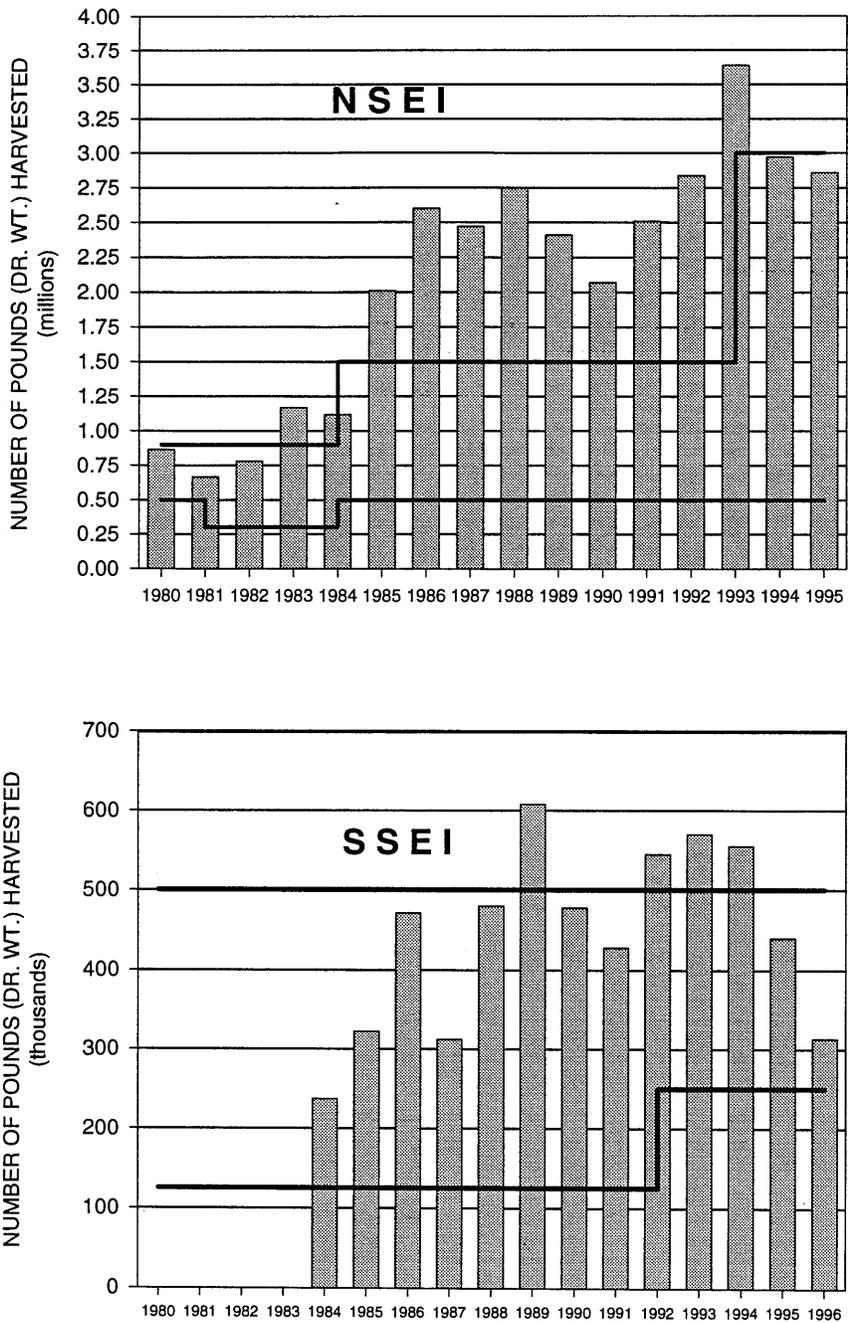


Figure 3. The total number of pounds (dressed weight) harvested in the Southeast Alaska sablefish fisheries, NSEI (top) and SSEI (bottom) from 1980s to present. The bold lines denote the lower and upper GHR. Note: The vertical scale is different for the two fisheries.

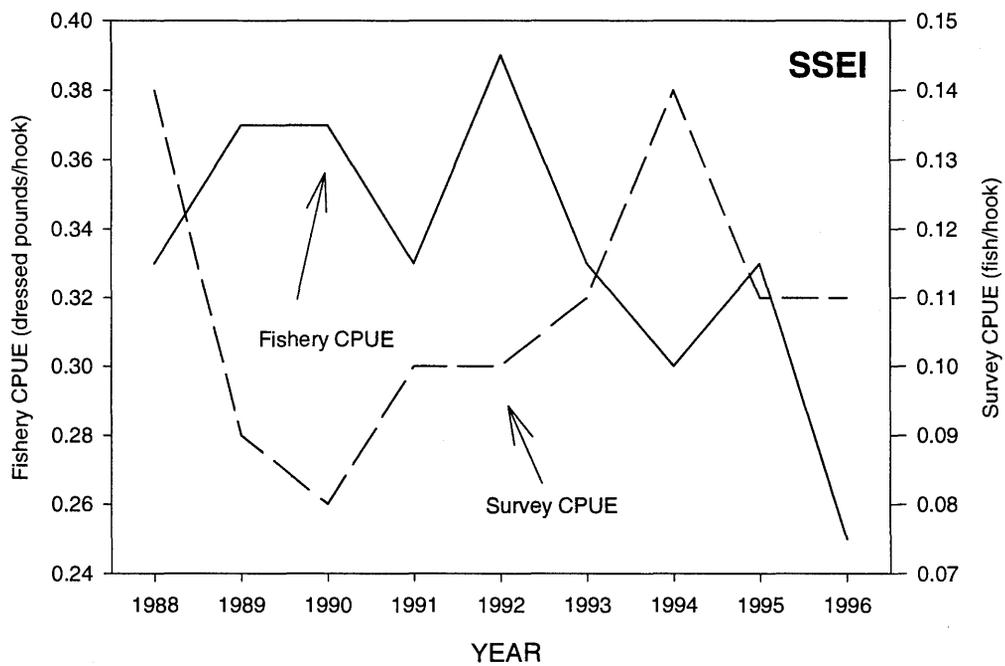
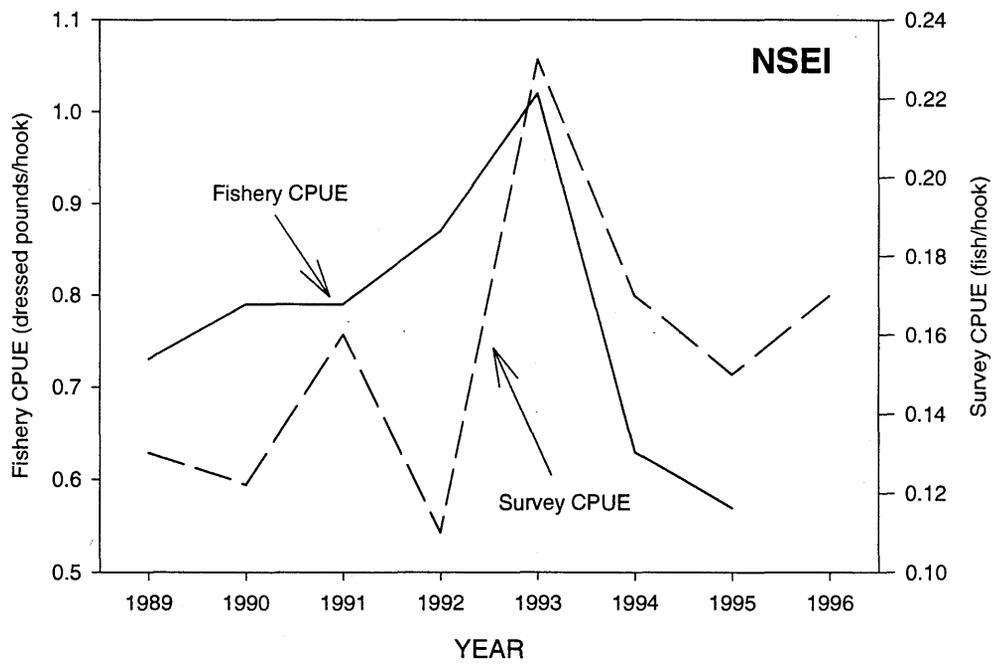


Figure 4. Survey and fishery CPUE for NSEI (top) and SSEI (bottom) for the years 1988-1996.