THE SOUTHEAST ALASKA DEMERSAL SHELF ROCKFISH FISHERY WITH 2004 SEASON OUTLOOK

by
Victoria M. O'Connell and Cleo Brylinsky

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AUTHORS

Victoria O'Connell is the Region I groundfish project leader for the Alaska Department of Fish and Game, Division of Commercial Fisheries, 304 Lake Street, Room 103, Sitka, Alaska 99835-7563.

Cleo Brylinsky is a Fishery Biologist II with the groundfish project for the Alaska Department of Fish and Game, Division of Commercial Fisheries, 304 Lake Street, Room 103, Sitka, Alaska 99835-7563.

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Cover Photo: David Shoemaker and Barry Bracken land yelloweye rockfish on the *F/V Java,* by V. O'Connell.

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ABSTRACT

The purpose of this document is to provide information on demersal shelf rockfish (DSR) and the fishery for these species. This report is to be used in conjunction with the 2003 Commercial Groundfish Fishing Regulations and active news releases and Emergency Orders as these inseason actions will supersede information provided in this document.

INTRODUCTION

Rockfishes of the genus *Sebastes* are found in temperate waters of the continental shelf off North America. At least thirty-two species of *Sebastes* occur in the Gulf of Alaska (GOA). In 1988, the North Pacific Fisheries Management Council (NPFMC) divided the rockfish complex into three components for management purposes in the eastern Gulf: Demersal shelf rockfish (DSR), pelagic shelf rockfish, and slope rockfish. These assemblages were based on species distribution and habitat as well as commercial catch composition data. The species composition within each assemblage has changed over time, as new information becomes available. The DSR assemblage is now comprised of the seven species of nearshore, bottom-dwelling rockfishes listed in Table 1. These fishes all occur on the continental shelf, reside on bottom, and are generally associated with rugged, rocky habitat. For purposes of this report, emphasis is placed on yelloweye rockfish, *Sebastes ruberrimus*, and quillback rockfish, *Sebastes maliger*, as they are the dominant species in the DSR fishery.

The DSR fishery is managed in the Eastern Gulf of Alaska based on a total of six management areas in three subdistricts (Figure 1). The Southeast Outside Subdistrict (SEO) is comprised of East Yakutat (EYKT), Northern Southeast Outside (NSEO), Central Southeast Outside (CSEO), and Southern Southeast Outside (SSEO) management areas. The federal waters in this subdistrict are managed by ADF&G under authority of the North Pacific Fishery Management Council (NPFMC). Northern Southeast Inside (NSEI) and Southern Southeast Inside (SSEI) are subdistricts as well as management areas and are managed entirely by ADF&G.

GENERAL BIOLOGY OF DEMERSAL SHELF ROCKFISHES

All DSR are considered highly K selective, exhibiting slow growth and extreme longevity (Adams 1980, Gunderson 1980, Archibald et al. 1981). Estimates of natural mortality are very low. We estimate the natural mortality of yelloweye rockfish to be approximately two percent. These types of fishes are very susceptible to over-exploitation and are slow to recover once driven below the level of sustainable yield (Leaman and Beamish 1984, Francis 1985, Leaman 1991). An acceptable exploitation rate is assumed to be very low.

Rockfishes are considered viviparous although different species have different maternal contribution (Boehlert and Yoklavich 1984, Boehlert et al. 1986, Love et al. 2002, Yoklavich and Boehlert 1995). Rockfishes have internal fertilization with several months separating copulation, fertilization, and parturition. Within this species, complex parturition occurs from February through September with the majority of species extruding larvae in late winter and spring. Yelloweye and quillback rockfish extrude larvae over an extended time period, with the peak period of parturition occurring in April and May (O'Connell 1987). Although some species

of *Sebastes* have been reported to spawn more than once per year in other areas (Love et al. 1990), no incidence of multiple brooding has been noted in Southeast Alaska (O'Connell 1987).

Rockfishes have a closed swimbladder, a balloon-like organ used to regulate buoyancy. Because they use a vascular system to regulate gas volume they cannot withstand quick changes in pressure and are susceptible to embolism mortality when brought to the surface from depth. Therefore most DSR, including discarded bycatch in other fisheries, are usually fatally injured when landed on fishing gear.

We collect information on size, weight, sex, stage of maturity, and age data from port samples. Summary information for Southeast Alaska samples of the species in the DSR assemblage is listed in Table 2. Rosethorn rockfish (*S. helvomaculatus*) are the smallest of the species in the assemblage with a maximum sampled size of 36 cm and yelloweye rockfish are the largest species in the assemblage with a maximum sampled length of 90 cm. Maximum age of fish sampled varied between species but ranged from 31 years in copper rockfish (*S. caurinus*) to 121 years in yelloweye rockfish. Our port sampling program concentrates on sampling yelloweye rockfish and quillback rockfish as these are the predominate species in the commercial catch.

Biology of Yelloweye Rockfish

Yelloweye rockfish are distributed from Umnak Island is the Aleutian Islands to Ensenada in northern Baja California (Mecklenburg et al. 2002). They are a large rockfish, attaining a maximum length of 90 cm. They are orange in color and have bright yellow eyes. The juveniles have a distinct coloration: red with 2 horizontal white stripes (Figure 2). Yelloweye are a predatory fish that usually feeds close to the bottom. Food habit studies indicate that the diet of yelloweye rockfish is dominated by fish remains, which comprised 95% by volume, of the stomachs analyzed. Herring (*Clupea harengus*), sandlance (*Ammodytes hexapterus*) and Puget Sound rockfish (*S. empheaus*) were particularly dominant. Shrimp are also an important prey item (Rosenthal et al. 1988).

Yelloweye are long-lived, with a maximum published age for yelloweye of 118 years, but one specimen from the SSEO 2000 samples was aged at 121 years (O'Connell and Funk 1987, O'Connell et al. 2002). They are slow growing and late to reach sexual maturity. Von Bertalanffy growth parameters and length weight parameters for yelloweye are listed in Table 3 and 4. These parameters were calculated using 2000 to 2002 port sample data. Males attain a larger maximum size than females and there appears to be a slight trend in the data for increasing growth with increasing latitude (Table 3). Estimated length and age at 50% maturity (the size and age at which half the fish are sexually mature) for yelloweye collected in CSEO in 1988 are 45 cm and 21 years for females and 50 cm and 23 years for males. The commercial catch has been between 42 to 50 percent males depending on year and area sampled. Average size of fish increases with depth (Rosenthal et al. 1982). Yelloweye are viviparous, giving birth to larvae, with parturition occurring between April and August with a peak in May and June (O'Connell 1987). Fecundity (the number of larvae a female will spawn each year) is estimated to be close to 3 million (Hart 1947).

An estimate of total mortality=Z=0.0174 (± 0.0053) from a 1984 "lightly-exploited" stock in SSEO is used to estimate natural mortality=M=0.02 (Table 5). There is a distinct decline in the log frequency of fish after age 95. This may be due to increased natural mortality in the older ages, perhaps senescence. The M=0.02 is based on a catch curve analysis of age data grouped into two-year intervals (to avoid zero counts) between the ages of 36 and 96. This number is similar to the estimate of Z from a small sample from CSEO in 1981 and to the 0.0196 estimated for a lightly exploited stock of yelloweye on Bowie Seamount (Lynne Yamanaka, Department of Fisheries and Oceans, personal communication). Hoenig's geometric mean method for calculating Z yields estimates of 0.033 when using his fish parameters, and 0.038 when using his combined parameters, and a maximum age of 121 year (Hoenig 1983). Wallace (2001) set natural mortality equal to 0.04 in his stock assessment of west coast yelloweye. For the Northern California and Oregon data the model performed better when M was set constant until 50% maturity then increased linearly until age 70 (Wallace 2001).

Age and Size Compositions in Commercial Fisheries

Length frequency distributions are not particularly useful in identifying individual strong year classes because individual growth levels off at about age 30 (O'Connell and Funk 1987). Sagittal otoliths are collected for aging. The break and burn technique is used for distinguishing annuli (Chilton and Beamish 1983). Radiometric age validation has been conducted for yelloweye rockfish otoliths collected in Southeast Alaska (Andrews et al. 2002). Radiometry of the disequilibrium of ^{210}Pb and ^{226}Ra was used as the validation technique. Although there is not a tight relationship between growth-zone-derived ages and radiometric ages, Andrews et al. conclude support for age that exceeds 100 years from their observation that as aged derived from growth zones approached and exceeded 100 years, the sample ratios measured approached equilibrium. Maximum published age for yelloweye is 118 years (O'Connell and Funk 1987), but one specimen from the SSEO 2000 samples was aged at 121 years.

In CSEO, the area with the longest directed fishery harvest history, a bimodal pattern has been present in the age distribution since 1992 and the oldest ages have declined in frequency over time (Figures 4a). Maximum age for fish sampled from CSEO in 2002 is 109 years and the average age is 36. There is a strong mode at 26 years and a secondary mode around 33 years. Very few fish are represented in the 60 and older ages. In 2000 and 2001 it appears that 31 year olds and 33 year olds respectively, contributed significantly, accounting for 11% of the samples in each year. The corresponding year classes do not appear strong in prior years nor do they appear particularly strong in 2002. In the SSEO samples the 2002 age data has a bimodal distribution with a strong mode at 24/25 years and smaller modes at 34 and 44 years (Figures 4b). Maximum age is 116, with very few fish older than 60. The SSEO samples had an average age of 40 years. Samples from inside waters, NSEI and SSEI, were small, making it difficult to draw conclusions about changes in the distributions. Average age was 34 in SSEI in 2002 (Figure 4c) and 38 in NSEI in 2002 (Figure 4d). No new samples were available for EYKT as there are currently no directed fisheries in this area (Figure 4e) and no age data is available for NSEO.

Catch curve analysis of recent age data was run for each management area in SEO. The port sampling data from 2000-2002 were used and a line fit to the data between the majority of the ages (approximately 20-60 years). The estimate of Z is 0.03 for SSEO, 0.04 for EYKT, and 0.056 for CSEO (Table 5). Catch curves are problematic for fish with variable recruitment however these estimates would indicate that we might be exceeding our harvest policy of 2 percent in the CSEO area.

Length data is fairly uniformly distributed in all areas (Figures 5a-5c). Average length for 2002 port samples was 55 cm in CSEO, SSEO, and SSEI and 52 cm in NSEI. Average length for the EYKT port samples was 59 cm for 2000, the last year a directed fishery occurred in that area.

Biology of Quillback Rockfish

Quillback rockfish are found from the Kenai Peninsula to the Anacapa Passage in southern California (Mecklenburg et al. 2002). They are brown with yellow and often have brown mottling on their head. The anterior portion of their dorsal fin is light yellow making them very visible underwater (Figure 6). Quillback are opportunistic feeders. Rosenthal et al. (1988) found 45 prey taxa in quillback stomachs examined for fish caught in Southeast Alaska. Sandlance (*Ammodytes hexapterus*), shrimp (*Pandalus* spp), herring (*Clupea harengus*) and mysids were all important components of their diet.

Quillback are long-lived, with a maximum age of 95 years (Love et al. 2002). They are slow growing, reaching sexual maturity at about age 5 with 50% sexual maturity at 11 years and 29 cm in British Columbia (Love et al. 2002). In Southeast Alaska, females are slightly larger than males at a given size (Figure 7). Von Bertalanffy growth parameters are listed in Table 6.

Natural mortality is assumed to be low. Hoenig's geometric mean method for calculating total mortality (Z) yields estimates of 0.04 when using his fish parameters and a maximum age of 95 years (Hoenig 1983). This estimate is a proxy for natural M. Catch curve analysis on quillback age data from southeast Alaska yielded estimates of Z = 0.066 for CSEO in 2001 ($r^2 = 0.9$) and Z = 0.05 for NSEI in 2002 (r^2=0.6).

Age and Size Compositions in Commercial Fisheries

Length frequency distributions are not very useful in identifying strong year classes as growth levels of quickly at maturity (Figure 7). Age data is based on break and burn aging of otoliths collected from port samples.

The CSEO area had a range of ages from 14 to 85 in the 2002 samples with an average age of 33 (Figure 8a). There is a strong mode at age 22 that was represented by age 20 the previous year. Some smearing of ages is mostly occurring in the age reading. Variable recruitment events are evident in the aged data from the NSEI area where modes occur approximately every 20 years (Figure 8b). In NSEI, 2002 quillback samples ranged in age from 3 to 77 years with an average age of 31. The SSEI data has less obvious modes (Figure 8c). There is some recruitment

occurring in 2002 at age 10, followed by a strong mode at 17 and 23 years. Age ranged from 7 to 89 with an average age of 32. Sample sizes taken from SSEO were too small to display as frequency distributions. In 2002, the age range in SSEO was between 15 and 74 with a mean of 42 years. Age frequency distributions from SSEO in 2000 indicate several strong age classes, with modes at 13, 17, 42 and 62 years. (Figure 8d). When combining 2002 data for all areas, the age 8 (1994 year class) looks to be quite strong, accounting for over 4% of the age distribution in that year.

Length distributions for quillback taken from 2002 port samples are similar by area with an average length of 37 in CSEO, SSEI, and NSEI (Figure 9). Smaller fish were evident in the SSEI port samples.

STOCK ASSESSMENT

Traditional abundance estimation methods (e.g., area-swept trawl surveys, mark recapture) are not considered useful for these fishes given their distribution, life history, and physiology. ADF&G uses direct observation to collect density estimates and is continuing research to develop and improve a stock assessment approach for these fishes. As part of that research, a manned submersible, *Delta*, has been used to conduct line transects to estimate rockfish density (Buckland et al. 1993, Burnham et al. 1980). This work is conducted in the SEO subdistrict. No stock assessments are conducted in the NSEI and SSEI areas. We have surveyed the Fairweather Ground in the EYKT section in 1990, 1994, 1995, 1997, 1999, and 2003; the CSEO section during 1990, 1994, 1995, 1997, and 2003; the NSEO section in 1994 and 2001; and the SSEO section in 1994 and 1999 (Figure 10). More than 500 line transects have been run since 1989, of which 102 were run in CSEO in 2003 and 20 were run in EYKT in 2003 (Figures 11 and 12). Although line transect data is collected for four of the eight DSR species (yelloweye, quillback, tiger, rosethorn), and for juvenile as well as adult yelloweye, included here are density estimates for adult yelloweye rockfish only. Density estimates are limited to adult yelloweye because it is the principal species targeted and caught in the fishery, and our allowable biological catch (ABC) recommendations for the entire assemblage are keyed to adult yelloweye abundance.

Biomass of adult yelloweye rockfish is derived as the product of estimated density, the estimate of rocky habitat within the 200 m contour, and average weight of fish for each management area. Variance estimates can be calculated for the density and weight parameters but not for area. Because this is an in-situ method for stock assessment, we have made some changes in techniques each year in an attempt to improve the survey. Estimation of both line length for the transects and total area of rocky habitat are difficult and result in some uncertainty in the biomass estimates. In 2002, ADF&G revised the protocol for classifying habitat. Commercial logbook data is now used directly in this protocol. The total exploitable biomass for the SEO subdistrict in 2004 is estimated to be 20,168 mt (based on the sum of the lower 90% confidence limits of biomass estimates from each management area). A more complete explanation of stock assessment methods for DSR is provided in ADF&G Regional Information Report IJ03-39

"Demersal Shelf Rockfish Stock Assessment and Fishery Evaluation Report for 2004" (O'Connell et al. 2003).

FISHERY

Description of Fishery

The directed fishery for DSR began in 1979 as a small, shore-based, hook and line fishery in Southeast Alaska (Bracken and O'Connell 1986, Rosenthal et al. 1982). This fishery targeted on the nearshore, bottom-dwelling component of the rockfish complex, with fishing occurring primarily inside the 110 m contour. The early directed fishery targeted the entire DSR complex. The targeted share of the total Region 1 DSR landed catch was only 31% in 1979, increasing to 59% in 1981, and 91% in 1984 (CFEC 1989). In the 1986 directed fishery yelloweye accounted for 70% of the DSR landed and 67% of the total rockfish landed while quillback accounted for 23%. The fishery has changed considerably over the past twenty years. The current fishery targets yelloweye rockfish, and fishes primarily between the 150 m and the 75 m contours. In recent years yelloweye rockfish accounted for 92% (by weight) of the total DSR catch and 85% of the total rockfish catch while quillback rockfish accounted for 5% of the landed catch. During 2002 and 2003 the percentage of yelloweye was lower, about 84% due primarily to the closure of the EYKT area to directed fishery. The directed fishery is prosecuted almost exclusively by longline gear. Although snap-on longline gear was originally used in this fishery, most vessels now use conventional longline gear. Markets for this product are domestic fresh markets and fish are generally brought in whole, bled, and iced. Processors will not accept fish delivered more than three days after landed.

The fishery began in the Sitka area and through 1985 over half of the directed landings were made in the CSEO area. However, by 1986 the total harvest from CSEO had dropped to less than 40% of the total, with the SSEI area accounting for 43% of the total. The following year distribution shifted again with 35% coming from SSEO, 22% from CSEO, and 22% from SSEI. Actual harvest in the CSEO also dropped and vessels moved further from port to maintain productive fishing and voluntary logbook data also shows a decline in catch per unit effort (CPUE). This type of shift in distribution is indicative of localized depletions.

Commercial fishery catch per unit effort (CPUE), expressed as round pounds of yelloweye rockfish per hook for vessels using conventional gear, has been fairly stable in CSEO and shows a slow decline in SSEO for the past two years after increasing in-between 1998 and 2001 (Figure 13). Overall CPUE is generally higher for snap-on gear than for conventional longline gear.

Participation in the directed fishery has increased. In 2003, 60 vessels made directed fishery landings compared to 58 in 2002 and 54 in 2001. There is still turnover in this fleet, evidenced by the fact that 109 different vessels made directed landings in the 2001-2003 fisheries. CSEO had the largest fleet with 36 vessels making landings in 2003 (down 3 from 2002), 22 vessels made landings in SSEO, 14 vessels made landings in NSEI, and 14 vessels made landing in SSEI (Table 7a-f).

MANAGEMENT ACTIONS

There have been significant changes in management of the directed fishery over time. The history of management action is listed in Table 8 with specific details by management area listed in Table 7a–f. ADF&G implemented a guideline harvest limit (GHL) of 600 mt for the directed fishery CSEO area in 1985. This GHL was based on the projected catch from 1984 and was meant to limit further growth while a management plan was developed. Table 8 lists the management actions since that time. In 1986, a GHL was set for the directed fishery in each of the management areas except for EYKT. No directed fishery occurred in EYKT until 1990. In 1989, the NPFMC implemented a TAC (for all fishery removals including directed) for the SEO district of 470 mt, based on average harvest history. The ADF&G began a biomass-based harvest rate approach in 1993, setting the TAC based on a 2% harvest rate applied to the lower 90% confidence limit of the area specific biomass estimates (O'Connell and Carlile 1993, O'Connell et al. 2001).

The 2003 fishery was fast paced largely due to a reduction of quota in SSEO and lack of directed fishery in EYKT. For the second time in two years, the directed fishery was not opened in EYKT because bycatch mortality in the halibut fishery was estimated equivalent to the area TAC. CSEO had the shortest season on record, with a 2-day season during the winter and a 2-day season in the fall (Table 7a). SSEO closed on January 11, 2003 and did not reopen in the fall as all but 2 mt of the total annual quota had been harvested at that point (Table 7b). The NSEI area fall fishery closed on 12/19, the first fall closure in many years (Table 7c).

Catch History

The history of domestic landings of DSR from SEO is shown in Table 9. The directed fishery card for DSR was introduced in 1990 for all areas east of 137^{o} W longitude and for EYKT area in 1991. Prior to this, directed landings were made on miscellaneous finfish cards. Identification of directed DSR landings was made by assuming any landing with at least 51% DSR was directed. The CSEO area has the longest history of directed fishing pressure, with directed landings beginning in 1979 (Table 10).

The directed DSR catch in Southeast increased from 65 mt in 1979 to a peak of 1,106 mt in 1987. Directed fishery landings have often been constrained by other fishery management actions, in particular the halibut prohibited species cap (PSC) implemented by NPFMC. Once the annual PSC is met, all longline fisheries that take halibut must be closed. In 1992 the directed DSR fishery was allotted a separate halibut PSC of 10 mt and is therefore no longer affected when the PSC is met for other longline fisheries in the GOA. In 1993 the fall directed fishery was cancelled due to an unanticipated increase in DSR bycatch during the fall halibut fishery.

Directed fishery landings in Southeast totaled 147 mt in 2003 and reported bycatch landings totaled 190 mt, 177 mt of which were landed in the halibut fishery. These numbers do not include discard at sea. The exvessel values of DSR landings in Southeast Alaska for 2003 are listed in Table 11. This data is based on average price per pound from fish tickets and does not

reflect post-season adjustments. Landing of DSR were worth $783,000 exvessel with $369,000 attributed to the directed fishery and $386,000 attributed to the halibut fishery.

Sport catch of yelloweye in Southeast is difficult to determine. Preliminary estimates of landed catch of yelloweye from Southeast in 2001 (the last year data is available) indicate over 26,000 fish were landed. Total catch likely exceeds landed catch, as there is a bag limit of 2 or 1 per day depending on area. In the CSEO area, landed sport catch of yelloweye in 2001 exceeded 11,000 fish[2]. Weight data is not available from the sport catch, but if the average weight is similar to that of the commercial fishery (3.12 kg), the landed sport fish catch of yelloweye in CSEO was over 35 mt in 2001. Future stock assessment will need to address sport fish removals in evaluating harvest.

Bycatch of DSR in other Fisheries

DSR have been taken as bycatch in domestic longline fisheries, particularly the halibut fishery, for over 100 years. Some bycatch was also landed by foreign longline and trawl vessels targeting on slope rockfish in the eastern Gulf from the late 1960s through the mid-1970s. DSR mortality during the halibut longline fishery continues to account for a significant portion of the total allowable catch (TAC). In 2002, reported DSR bycatch in the halibut fishery accounted for over 40% of the total reported DSR landings in the SEO subdistrict.

The allowable bycatch limit of DSR during halibut fishing is 10% of the halibut weight. Current federal regulations prevent fishermen from bringing in DSR above the bycatch limit of 10% of the target species (round pounds). In 1998, the NPFMC passed an amendment to require full retention of DSR. This amendment would require fishermen to retain all DSR caught, forfeiting without penalty, the amount above the directed fishing standard. This amendment is still under review at the Regional Office. In July of 2000, the State of Alaska enacted a regulation requiring all DSR landed in state waters of Southeast Alaska to be retained and reported on fish tickets. Proceeds from the sale of DSR in excess of legal sale limits are forfeited to the State of Alaska fishery fund. The amount of yelloweye landed has significantly increased with this management action: in 2001 49,344 pounds of yelloweye were forfeited in southeast Alaska compared to 13,767 in 2000. Of this 49,344 pounds, permit holders retained 8,944 pounds for personal use.

Landed bycatch of DSR does not reflect the true mortality of bycatch as most rockfish suffer embolism mortality when caught and do not generally survive when released. Only a portion of bycatch is landed and reported on fishtickets. There is an inherent problem in estimating a rate of bycatch for DSR. DSR are habitat specific, and although their distribution overlaps with halibut, the distributions are not correlated. International Pacific Halibut Commission (IPHC) longline survey data indicates that bycatch of DSR is highly variable both inter-annually and within year, by area. There is no linear relationship between the catch of halibut and the catch of DSR (Figure 14). Until full retention of DSR is implemented in federal waters it will be difficult to discern whether the TAC has been met or exceeded.

[2] Unpublished data, Mike Jaenicke, Alaska Department of Fish and Game, Division of Sport Fish, Douglas, AK.

The IPHC has provided us with data from recent longline surveys. Bycatch is estimated based on sampling the first 20 hooks of each skate of gear. There are obviously some problems in estimating total bycatch using this sampling approach. DSR tend to be contagiously distributed because they are habitat specific in their distribution. The 2003 IPHC survey bycatch of yelloweye, expressed as the percent of yelloweye weight to legal-sized halibut weight ranged from 0% to 83%, with area estimate means ranging from 3% in EYKT to 12% in CSEO. The overall rate ranged from 4% in EYKT and 18% in NSEO (Figure 15).

Estimated total mortality of DSR in the halibut fishery in the SEO subdistrict has ranged between 130 mt to 355 mt annually. Before the implementation of the halibut Individual Fishery Quota (IFQ) fishery, we estimated unreported mortality of DSR during the halibut fishery based on IPHC interview data. For example, the 1993 interview data indicates a total mortality of DSR of 13% of the June halibut landings (by weight) and 18% of the September halibut landings. This data has been more difficult to collect under the halibut IFQ fishery and appears to be less reliable than previous data. In recent years we have used IPHC catch statistics to determine the percent of the halibut catch taken in each of the 4 DSR management areas in the Southeast Outside district. For 2003, it was estimated that a total of 275 mt of DSR would be caught in the SEO halibut fishery; 177 mt were landed and reported.

Based on the 2002 halibut landing data, it is estimated that approximately 49% of the 2C (IPHC Regulatory Area) halibut quota and 12% of the 3A halibut quota are taken in SEO (IPHC web page). Total bycatch mortality of DSR in the halibut fishery is estimated using 10% bycatch mortality in 2C and IPHC statistical area 190 (Fairweather Ground) and a 7% bycatch mortality in the remaining portions of 3A east of 140^{o}. Based on the 2003 halibut quotas and the distribution of commercial halibut harvest in 2002, the estimated total DSR mortality for the 2004 SEO halibut fishery is anticipated to be 288 mt. If the 2004 halibut quota is different from the 2003 quota, the mortality estimate will be revised and changes made in-season to the directed DSR quota.

CURRENT MANAGEMENT

The directed fishery is managed with seasonal allocations: 67 percent of the directed fishery quota is allocated between January 1 and March 15 and 33 percent is allocated between November 16 and December 31. The directed fleet requested a winter fishery, as the exvessel price is highest at that time. The directed season is closed during the halibut IFQ season to prevent over-harvest of DSR.

The fishery continues to be open access, meaning that anyone may buy a permit card to participate in the fishery. In-season management actions and news releases as well as in-season tracking of catches is available on the Alaska Department of Fish and Game Commercial Fisheries Division Southeast Groundfish home page:

http://www.cf.adfg.state.ak.us/region1/finfish/grndfish/grndhom1.php.

2004 Directed Fishery Quotas

New density estimates for yelloweye, based on 2003 summer surveys, are available for the CSEO and EYKT areas. Biomass estimates were updated using the new density estimates as well as updated average size data (O'Connell et al. 2003). The total allowable catch (TAC) for DSR for the SEO subdistrict in 2004 is 450 mt. Directed fishery quotas are set by management area and, for the SEO management area, are based on the remaining TAC after subtracting the estimated DSR bycatch (reported and non-reported discard) in the halibut fishery (Table 12). We determine total catch of halibut in each SEO management area from IPHC landing records and then determine the percent of the 2C and 3A catch taken in each management area based on IPHC statistical areas (Figure 16). For the 2004 fishery, we used the 2002 IPHC catch data (the 2003 data was not yet available). We then apply these percentages to the 2003 halibut quotas to come up with the amount of halibut estimated to be harvested by management area. The total DSR mortality estimated for the halibut fishery is then calculated using a 10% rate in Fairweather, CSEO, NSEO and SSEO and a 7% rate for the remainder of EYKT. This year, for the first time in 2 two years, the directed DSR fishery will be opened in the EYKT area.

Directed fishery quotas for 2004 are as follows: 90 mt for EYKT, 65 mt for CSEO, 40 mt for SSEO (Table 12). Internal water quotas for 2004 are 25 mt SSEI and 25 mt NSEI. No directed fishery is allowed in the NSEO management area because the biomass of yelloweye is low and estimated bycatch exceeds the area quota.

Regulations Summary

This summary is intended as an informational guide only. The regulations, as outlined in this document, may be changed by emergency regulations or emergency orders at any time. Copies of emergency orders are available at all Southeast ADF&G area offices. All regulations pertaining to the Southeast demersal shelf rockfish fishery are listed in the 2003-2004 Groundfish Regulation Booklet. In addition, the BOF is meeting to address Southeast Groundfish issues in January of this year. Therefore it is likely that there will be additional regulations in place during 2003. The following summary was excerpted from the official codes on file with the Lieutenant Governor. There may be errors or omissions that have not been identified and changes that occurred after this publication. Please refer to the most recent copy of the Alaska Administrative Code (and its appendices) for the most current and accurate regulations.

General Permits Required to Directed Fish for DSR

- State of Alaska vessel license (16.05.490)
- State of Alaska permit card (16.05.675)
- State of Alaska logbook (5 AAC 28.175)
- If fishing in federal waters:
- Federal Groundfish Permit
- Photo identification on board the vessel while fishing and delivering fish (16.10.267 (2)).

The longline logbook form is shown in Appendix 1. Further details on federal fishing requirements may be found at the following website:

http://www.fakr.noaa.gov/ram/applications.htm#Link_8.

Vessels must be licensed to participate in the fishery. A commercial fishing vessel must display its permanent vessel license plate number in permanent symbols at least 12-inches high on both sides of the hull, cabin, or mast. Additional requirements are listed in 5 AAC 39.119. In addition, a Commercial Fishery Entry (CFEC) Permit Card is required. To fish for demersal shelf rockfish, a fisherman must have a Demersal Shelf Rockfish Southeast permit card (Fishery code=Y, area code=A), which is coded to the specific gear type used. If the vessel is directed fishing on DSR in federal waters the fisher will also need a Federal Fisheries Groundfish Permit. A vessel does not need to have a federal LLP (License Limitation Permit) as long as they remain below the maximum retainable percentages of bycatch species as published by National Marine Fisheries Service.

Logbooks (5 AAC 28.175 (1))

Logbooks are required and may be obtained from ADF&G. Logbooks must be turned in with the fish ticket documenting the landing. For longline gear, the logbook must include the date, the specific location of harvest by latitude and longitude within one-half mile of set, the amount of gear (number of hooks) used, the depth of each set, the estimated weight of all target species taken in the directed fishery in each specific location, and an estimated weight of the bycatch retained or discarded at sea. (Appendix 1).

Legal Gear (5 AAC 28.130, (d), (1))

Demersal Shelf Rockfish may be harvested by longline, dinglebar troll, hand troll gear, and mechanical jigging machines. Definition of these gear are listed in 5 AAC 39.105, page 37-39 of the 2002-2003 Groundfish Regulation Booklet. In the Southeast District, a person operating a trawl vessel shall retain, weigh, and report all demersal shelf rockfish taken. All DSR in excess of one-percent, round weight, of all target species on board the vessel must be reported but may not be sold unless all proceeds from the sale of these fishes are surrendered to the state.

Harvest Guidelines and Ranges (5 AAC 28.160 (c) (1)

The directed fishery GHLs for SSEI and NSEI are not to exceed 50 mt (110,000 lb). For the management areas of SEO, the directed rockfish fishing quotas will be released January 1 and calculated based on the federal TAC after estimated bycatch mortality is deducted.

Fishing Seasons (5 AAC 28.111)

The directed fishery is split between two seasons: January 1 – March 14, or until 67% of the annual directed harvest limit for the management area is taken (which ever is first) and November 16 – December 31, or until 33% of the annual directed harvest for the management area is taken. Opening time is 9:00 a.m. and closing time is 4:00 p.m.

Trip Limits and Full Retention (5 AAC 28.171)

In the CSEO, SSEO, SSEI, and NSEI management areas, a vessel or permit holder may not sell more than 6,000 pounds (round weight) of DSR in any five-day period. All DSR in excess of this amount must be weighed and reported on an ADF&G fish ticket. All proceeds from the sale of DSR in excess of 6,000 pounds must be forfeited to the state.

In the EYKT management areas, a vessel or permit holder may not sell more than 12,000 pounds (round weight) of DSR in any five-day period. All DSR in excess of this amount must be weighed and reported on an ADF&G fish ticket. All proceeds from the sale of DSR in excess of 12,000 pounds must be forfeited to the state.

Additionally, in the Southeast district, a CFEC permit holder fishing for species other than DSR must retain, weight, and report all DSR taken. All DSR bycatch in excess of 10 percent, round weight, of all target species on board the vessel must be weighed and reported as bycatch overage on an ADF&G fish ticket. All proceeds from the sale of excess DSR bycatch must be forfeited to the state.

FISHING AREAS

The demersal shelf rockfish fishery is confined to the waters of the Eastern Gulf of Alaska east of 140^{o} W. longitude. There are six management areas related to this fishery (Figure 1). The EYKT, CSEO, NSEO, and SSEO comprise the Southeast Outside Subdistrict. The NSEI and SSEI are separate subdistricts and may also be referred to as "internal waters" of the Southeast Region.

Closed Waters

Waters Closed To All Retention

5 AAC 28.150. Groundfish may not be taken in the waters off Cape Edgecumbe enclosed by a box defined as 56^{o}55.5' N. latitude, 56^{o}57' N. latitude, 135^{o}54' W. longitude, and 135^{o}57' W. longitude. This area is commonly referred to as "the Pinnacles" or the "Edgecumbe Pinnacles" (Figure 17).

Waters Closed To Directed Fishing

5 AAC 28.150
The waters of Sitka Sound south of 57°16' N. latitude and north and east of a line from Sitka Point on Kruzof Island to the northernmost tip of Little Biorka Island to Frosty Reef (Figure 18).

In the Ketchikan vicinity: in all waters of Behm Canal, Clarence Strait, Tongass Narrows, Nichols Passage, George Inlet, Carroll Inlet, Thorne Arm, Revillagigedo Channel, and all contiguous waters enclosed by the latitude of Busy Point Light, a line from Point Alava to the Southernmost tip of Ham Island, a line from Cedar Point to Dall head, and a line from Dall Head to a point in midstream Clarence Strait at the latitude of Dall head to Amano Point (Figure 19).

In the vicinity of Craig and Klawock: in all waters enclosed by a line from the southernmost tip of St. Philip Island to the northernmost tip of San Fernando Island, to Point Cangrejo, and all water of Ulloa Channel north of the latitude of Waterfall Cannery (Figure 20).

Bycatch Regulations

Bycatch limits for groundfish taken in the DSR fishery are set by emergency order (EO) at the beginning of the calendar year. The following is a list of what is usually allowed as bycatch in the DSR fishery. **These percentages may be changed inseason** if there is a conservation concern for a bycatch species (e.g. approached total allowable catch).

The provisions of 5 AAC 28.070 Groundfish Possession And Landing Requirements. (b) are superseded by this emergency order, to read:

5 AAC 28.070 Groundfish Possession And Landing Requirements.

(b) Consistent with 5 AAC 28.070 (b), bycatch limits are defined below for groundfish fisheries in the Southeast District. The limits are round weight of the bycatch as a percentage of the round weight of target species. Bycatch limits that are already set in regulation are indicated in parenthesis.

(1) A permit holder fishing for demersal shelf rockfish (DSR) in waters of Alaska in the Southeast Outside Subdistrict

(A) with longline gear may retain the following:

i. 35% lingcod (5 AAC 28.173 (b))
ii. 7% shortraker and rougheye rockfish in aggregate
iii. 15% all other rockfish and thornyheads in aggregate
iv. 35% spiny dogfish (5 AAC 28.174 (1))
v. 20% Pacific cod
vi. 20% other groundfish in aggregate

(B) with hand troll, dinglebar and mechanical jig gear may retain the following:
  i. 0% lingcod
  ii. 7% shortraker and rougheye rockfish in aggregate
  iii. 15% all other rockfish and thornyheads in aggregate
  iv. 20% spiny dogfish
  v. 20% Pacific cod
  vi. 20% other groundfish in aggregate

(2) A permit holder fishing for DSR in Southeast Inside Subdistrict (SSEI) or Northern Southeast Inside Subdistrict (NSEI)

(A) with longline gear may retain the following:
  i. 35% lingcod (5AAC 28.173 (b))
  ii. 7% shortraker and rougheye rockfish in aggregate
  iii. 15% all other rockfish and thornyheads in aggregate
  iv. 35% spiny dogfish (5 AAC 28.174 (1))
  v. 20% Pacific cod
  vi. 20% other groundfish in aggregate

(B) with hand troll, dinglebar and mechanical jig gear may retain the following:
  i. 0% lingcod
  ii. 7% shortraker and rougheye rockfish in aggregate
  iii. 15% all other rockfish and thornyheads in aggregate
  iv. 20% spiny dogfish
  v. 20% Pacific cod
  vi. 20% other groundfish in aggregate

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Table 1. Species included in the demersal shelf rockfish assemblage.

Common name	Scientific Name
canary rockfish	*Sebastes pinniger*
China rockfish	*S. nebulosus*
copper rockfish	*S. caurinus*
quillback rockfish	*S. maliger*
rosethorn rockfish	*S. helvomaculatus*
tiger rockfish	*S. nigrocinctus*
yelloweye rockfish	*S. ruberrimus*

Table 2. Length and age ranges for DSR species sampled from commercial landings in Southeast Alaska.

Species	Length range SE(cm)	Age range SE
canary	32-69	6-68
copper	21-55	3-31
China	26-46	26-72
quillback	20-48	6-90
rosethorn	19-36	8-87
tiger	23-66	18-116
yelloweye	50-90	4-121

Table 3. Growth parameters (cm and kg) for yelloweye rockfish in Southeast Alaska from 2000-2002 port samples.

		Wt. Vs Length		**von B**		
Sex	**Area**	**a**	**b**	$\mathbf{L_{inf}}$	**K**	$\mathbf{t_0}$
Female	EYKT	0.000008876	3.2113	71.0496	0.0327	-14.8832
	CSEO	0.000012	3.1346	65.8733	0.0342	-14.7556
	SSEO	0.000023	2.9689	67.4639	0.0236	-28.7107
	NSEI	0.000018	3.0248	68.5183	0.0314	-13.5622
	SSEI	0.000017	3.011	68.674	0.0196	-36.7438
Male	EYKT	0.000055	2.7441	72.0703	0.03	-18.9701
	CSEO	0.000037	2.8348	65.9722	0.05	-4.2473
	SSEO	0.000016	3.0397	63.112	0.0573	-4.4311
	NSEI	0.000008792	3.1884	63.3418	0.0367	-17.7907
	SSEI	0.000008189	3.1716	62.3299	0.0727	1.0032
Combined	Outside Areas Only	0.000014	3.0869	65.9619	0.0369	-13.0505

Table 4. Length and age at 50% sexual maturity for yelloweye rockfish, Southeast Alaska.

	m_8	?	?	50%
Female length	0.98142	1.0813	41.79	41.8
Female age	0.97801	0.283363	21.814	22.0
Male length	1.004079	0.55547	43.128	43.1
Male age	0.9942	0.3645	18.23	18.3

Table 5. Estimates of instantaneous mortality (Z) of yelloweye rockfish in Southeast Alaska.

AREA	YEAR	SOURCE	Z	n
SSEO	1984	Commercial Longline	.017*	1049
CSEO	1981	Research Jig	.020*	196
CSEO	1988	Research Longline	.042	600
EYKT	2000-2002	Commercial Longline ages 24-62	.04	295
CSEO	2000-2002	Commercial Longline Ages 20-60	0.056	514
SSEO	2000-2002	Commercial Longline (ages 24-67)	0.03	602
SE		Hoenigs equation max age 121 (parameters combined taxa)	0.038	
SE		Hoenig's equation max age 121 (fish parameters)	0.033	

*Z approximately equal to M as there was very little directed fishing pressure in these areas at that time (1981 for CSEO, 1984 for SSEO).

Table 6. Von Bertalanffy growth coefficients for quillback rockfish, Southeast Alaska, 1996-1998.

Statistic	Combined Sex	Male	Female
L	42.7219	41.64777	42.8975
K	0.05186	0.068501	0.05663
t_0	-17.6432	-11.3374	-13.6596

Table 7a. Quotas, seasons, effort, and harvest for directed DSR in CSEO.

Year	Directed annual quota mt	Published Season	Inseason Closure Dates	Number vessels[b]	Mt harvested[c]
1979		1/1-12/31	No closures	16	21
1980		1/1-12/31	No closures	18	20
1981		1/1-12/31	No closures	30	75
1982		1/1-12/31	No closures	34	102
1983		1/1-12/31	No closures	35	161
1984		1/1-12/31	No closures	82	507
1985	600 mt	1/1-12/31	No closures	90	317
1986	300 mt	1/1-12/31	No closures	78	336
1987	300	1/1-12/31	Closed 8/10-9/30	97	235
1988	150	1/1-12/31	Closed 8/15-8/28 and 9/8-9/30	98	165
1989	150	12/1-5/15 (42%) 7/1-9/30 (15%) 10/1-11/30 (43%)	No closures	76	143
1990	125	Same as 1989	Closed 5/29-8/14[a]	52	75
1991	115	Same as 1989	Closed 3/21 Closed 7/13-12/31[a]	28	74
1992	115	Same as 1989	Closed 7/13-12/31[a]	40	112
1993	115	Same as 1989	Closed 2/12 Closed 8/4 Closed 11/17-12/31	47	128
1994	115	Same as 1989	Closed 1/8 Closed 7/10 Closed 11/7-12/31	61	146
1995	100 (with SSEO)	Same as 1989	Closed 1/15-12/31	43	88
1996	185	1/1-3/15 (67%) 11/16-12/31 (33%)	Closed 1/24 Closed 12/18-12/31	72	180
1997	150	Same as 1996	Closed 1/22 Closed 11/21-12/31	58	148
1998	110	Same as 1996	Closed 1/8-12/31	79	120
1999	71	Same as 1996	Closed 1/8 Closed 12/11-12/31	47	105
2000	71	Same as 1996	Closed 1/19-12/31	22	63
2001	62	1/8-3/15 (67%) 11/16-12/31 (33%)	Closed 1/12 Closed 11/28 - 12/31	32	64
2002	70	1/1-3/15 (67%) 11/16-12/31 (33%)	Closed 1/4 Closed 11/17	39	76
2003	70	Same as 2002	Closed 1/3 Closed 11/17	36	64

[a] Halibut prohibited species cap met in DSR fishery so fishery was closed.
[b] No directed fishery cards issued until 1990 so number of directed vessels difficult to determine.
[c] NSEO catch and effort included in CSEO 1979-1984 (used salmon area 113).

Table 7b. Quotas, seasons, effort, and harvest for directed DSR in SSEO.

Year	Directed annual quota mt	Published Season	Closure Dates	Number vessels[b]	Mt harvested
1979		1/1-12/31	No closures	1	0
1980		1/1-12/31	No closures	1	0
1981		1/1-12/31	No closures	2	0
1982		1/1-12/31	No closures		0
1983		1/1-12/31	No closures	3	0
1984		1/1-12/31	No closures	13	36
1985		1/1-12/31	No closures	15	32
1986	250	1/1-12/31	No closures	38	95
1987	250	1/1-12/31	Closed 6/3-9/30	66	347
1988	170	1/1-12/31	Closed 5/13-9/30	65	244
1989	170	12/1-5/15 (42%) 7/1-9/30 (15%) 10/1-11/30 (43%)	Closed 3/3-7/1	36	141
1990	150	Same as 1989	Closed 5/29-8/14[a]	29	89
1991	100	Same as 1989	Closed 3/21-7/1 Closed 7/8-12/31[a]	31	97
1992	100	Same as 1989	Closed 7/28-/30	38	141
1993	100	Same as 1989	Closed 2/14 Closed 8/27 Closed 11/9	21	67
1994	75	Same as 1989	Closed 2/14 Closed 8/10	29	77
1995	100 (combined with CSEO)	Same as 1989	Closed 1/28-11/15	15	24
1996	100	1/1-3/15 (67%) 11/16-12/31 (33%)	Closed 3/8	28	66
1997	100	Same as 1996		31	56
1998	75	Same as 1996	Closed 1/21	19	56
1999	68	Same as 1996	Closed 1/21	25	62
2000	68	Same as 1996	Closed 1/29 Closed 12/14-12/31	20	63
2001	60	1/8-3/15 (67%) 11/16-12/31 (33%)	Closed 1/29	23	58
2002	60	1/1-3/15 (67%) 11/16-12/31 (33%)	Closed 1/25 Closed 11/24	23	60
2003	40	Same as 2002	Closed 1/11 No fall opening	22	38

[a] Halibut prohibited species cap met in DSR fishery so fishery was closed.
[b] No directed fishery cards issued until 1990 so number of directed vessels difficult to determine.

Table 7c. Quotas, seasons, effort, and harvest for directed DSR in NSEI.

Year	Directed annual quota mt	Published Season	Closure Dates	Number vessels[b]	Mt harvested
1979		1/1-12/31		2	3
1980		1/1-12/31		8	3
1981		1/1-12/31		10	14
1982		1/1-12/31		7	10
1983		1/1-12/31		12	30
1984		1/1-12/31		3	14
1985		1/1-12/31		15	32
1986	90	1/1-12/31		30	45
1987	90	1/1-12/31	Closed 7/6-9/30[a]	32	48
1988	90	1/1-12/31	Closed 8/15-9/30[a]	38	48
1989	45	12/1-5/15 (42%) 7/1-9/30 (15%) 10/1-11/30 (43%)	Closed 4/29-7/1	17	23
1990	45	Same as 1989		39	32
1991	45	Same as 1989	Closed 8/15	46	55
1992	45	Same as 1989	Closed 5/15 Closed 7/28	50	50
1993	45	Same as 1989	Closed 3/29 Closed 7/20 Closed 12/17	41	48
1994	45	Same as 1989	Closed 4/7 Closed 8/21	35	29
1995	45	Same as 1989	Closed 3/14	28	22
1996	25	1/1-3/15 (67%) 11/16-12/31 (33%)	No inseason closure	22	3
1997	25	Same as 1996	No inseason closure	29	19
1998	25	Same as 1996	No inseason closure	28	21
1999	25	Same as 1996	No inseason closure	26	14
2000	25	Same as 1996	No inseason closure	19	13
2001	25	1/8-3/15 (67%) 11/16-12/31 (33%)		13	21
2002	25	1/1-3/15 (67%) 11/16-12/31 (33%)	Closed 2/08	18	23
2003	25	Same as 2002	Closed 2/19 Closed 12/20	14	20

[a] Halibut prohibited species cap met in DSR fishery so fishery was closed.
[b] No directed fishery cards issued until 1990 so number of directed vessels difficult to determine.

Table 7d. Quotas, seasons, effort and harvest for directed DSR in SSEI.

Year	quota mt	Published Season	Closure Dates	# vessels	Landed mt
1979		1/1-12/31		11	21
1980		1/1-12/31		10	5
1981		1/1-12/31		21	35
1982		1/1-12/31		15	31
1983		1/1-12/31		43	78
1984		1/1-12/31		46	110
1985		1/1-12/31		78	225
1986	225	1/1-12/31		111	381
1987	225	1/1-12/31	Closed 6/3-9/30[a]	111	302
1988	112	1/1-12/31	Closed 5/13-9/30[a]	83	145
1989	112	12/1-5/15 (42%) 7/1-9/30 (15%) 10/1-11/30 (43%)	Closed 3/26	46	62
1990	100	Same as 1989	No inseason closure	35	54
1991	75	Same as 1989	Closed 4/30 Closed 8/15	55	70
1992	75	Same as 1989	Closed 5/11 Closed 8/7	56	74
1993	50	Same as 1989	Closed 3/22	36	52
1994	50	Same as 1989	Closed 8/26	35	29
1995	25	Same as 1989	Closed 3/14	5	2
1996	25	1/1-3/15 (67%) 11/16-12/31 (33%)	No inseason closure	22	7
1997	25	Same as 1996	No inseason closure	22	8
1998	25	Same as 1996	No inseason closure	23	19
1999	25	Same as 1996	Closed 2/8	17	14
2000	25	Same as 1996	No inseason closure	18	18
2001	25	1/8-3/15 (67%) 11/16-12/31 (33%)	No fall opening	11	30
2002	25	1/1-3/15 (67%) 11/16-12/31 (33%)	Closed 2/16 Closed 12/7	21	16
2003	25	Same as 2002	Closed 2/5 Closed 12/2	14	25

[a] Halibut prohibited species cap met in DSR fishery so fishery was closed.
[b] No directed fishery cards issued until 1990 so number of directed vessels difficult to determine.

Table 7e. Quotas, seasons, effort and harvest for directed DSR in NSEO.

Year	Directed annual quota mt	Published Season	Closure Dates	Number vessels[a]	Mt harvested[b]
1979		1/1-12/31	No inseason closures		
1980		1/1-12/31	No inseason closures		
1981		1/1-12/31	No inseason closures		
1982		1/1-12/31	No inseason closures		
1983		1/1-12/31	No inseason closures		
1984		1/1-12/31	No inseason closures		
1985		1/1-12/31	No inseason closures	19	37
1986	75	1/1-12/31	No inseason closures	22	17
1987	75	1/1-12/31	No inseason closures	45	103
1988	75	1/1-12/31	No inseason closures	35	52
1989	50	12/1-5/15 (42%) 7/1-9/30 (15%) 10/1-11/30 (43%)	No inseason closures	18	28
1990	50	Same as 1989	No inseason closures	42	34
1991	50	Same as 1989	No inseason closures	30	30
1992	50	Same as 1989	No inseason closures	33	44
1993	50	Same as 1989	No inseason closures	33	41
1994	50	Same as 1989	No inseason closures	28	45
1995-2003	0			0	0

[a] No directed fishery cards issued until 1990 so number of directed vessels difficult to determine.
[b] NSEO catch and effort included in CSEO 1979-1984 (used salmon area 113)

Table 7f. Quotas, seasons, effort, and harvest for directed DSR in EYKT.

Year	Directed annual quota mt	Published Season	Closure Dates	Number vessels[a]	Mt harvested
1979		1/1-12/31		3	1
1980		1/1-12/31		1	3
1981		1/1-12/31		1	0
1982		1/1-12/31		1	3
1983		1/1-12/31		4	7
1984		1/1-12/31		1	1
1985		1/1-12/31		8	7
1986		1/1-12/31		0	0
1987		1/1-12/31		12	76
1988		1/1-12/31		12	38
1989		12/1-5/15 (42%) 7/1-9/30 (15%) 10/1-11/30 (43%)	No inseason closures	11	31
1990		Same as 1989	No inseason closures	5	26
1991		Same as 1989	No inseason closures	5	186
1992	50	Same as 1989	Fairweather closed 4/2 EYKT closed 10/14	9	56
1993	100	Same as 1989	Fairweather closed 3/22 EYKT closed 5/14	15	105
1994	100	Same as 1989	Closed 2/18-10/12	11	114
1995	100	Same as 1989	Closed 1/31	17	57
1996	330	1/1-3/15 (67%) 11/16-12/31 (33%)	No inseason closures	15	103
1997	150	Same as 1996	No inseason closures	14	76
1998	100	Same as 1996	No inseason closures	14	65
1999	76	Same as 1996	Closed 3/9	15	74
2000	76	Same as 1996	No inseason closures	10	61
2001	76	1/8-3/15 (67%) 11/16-12/31 (33%)		9	50
2002	0				
2003	0				

[a] No directed fishery cards issued until 1991 so number of directed vessels difficult to determine.

Table 8. History of DSR management action, BOF, NPFMC and ADF&G.

YEAR	ACTION
1983	Marine reserves recommended to BOF by ADF&G – rejected
1984	Marine reserves recommended to BOF by ADF&G – rejected
	600 mt harvest limit for 10 species of DSR in CSEO directed fishery
	NPFMC defines 10 species assemblage as DSR
	(yelloweye, quillback, china, copper, canary, rosethorn, tiger, silvergrey, bocaccio, redstripe)
	October 1 accounting year
1986	Marine reserves recommended to BOF by ADF&G – rejected
	ADF&G restricts gear for rockfish in the Southeast Region to hook and line only
	NPFMC gives ADF&G management authority for DSR to 137^0 W long. (Southeast Outside SEO)
	Guideline harvest limit (GHL) for directed fishery reduced to 300 mt (CSEO)
	GHL for directed fishery set for SSEO (250), SSEI (225), NSEO (75), and NSEI (90)
1987	Sitka Sound closed to commercial fishing for DSR
1988	NPFMC implements 660 mt total allowable catch for all fisheries (TAC) for SEO
1989	NPFMC imposes TAC of 470 mt (catch history average)
	Industry working group discusses ITQ options with PMFC (rejected)
	IWG recommends 7,500 lb trip limits, mandatory logbooks, and seasonal allocations (10/1-11/31 43%, 12/1-5/15 42%, 7/1-9/30 15%).
	Ketchikan area closure implemented
	GHL for directed fishery reduced in all areas (CSEO 150, SSEO 170, SSEI 112, NSEO 50, NSEI 45)
1990	Directed permit card required for CSEO, SSEO, SSEI, NSEO, and NSEI
	NPFMC TAC of 470 mt
1991	NPFMC TAC of 425 mt
	Change in assemblage to 8 species (removed silvergrey, bocaccio, redstripe added redbanded)
	Craig and Klawock closures implemented
1992	East Yakutat area included in SEO (NPFMC extends ADF&G mgt authority to 140^0)
	NPFMC TAC of 550 mt
	Directed fishery permit card required in EYKT
	Line transect data used to set ABC in EYKT
1993	BOF changes seasonal allocation to calendar year: 1/1-5/15 (43%), 7/1-9/30 15%, and 10/1-12/31 (42%), DSR opened for 24 hour halibut opening 6/10 (full retention)
	NPFMC TAC of 800, yelloweye line transect data used to set TAC
	NPFMC institutes a separate halibut prohibited species cap (PSC) for DSR
1994	Trip limits reduced to 6,000 in SE and 12,000 lb trip limit implemented in EYKT
	Reduced lower end of NSEI and SSEI GHL to 0
	NPFMC TAC 960 mt line transect yelloweye plus 12% for other species
1995	NPFMC TAC 580 mt, line transect modified to include 2^{nd} camera, no directed fishery NSEO
1996	NPFMC TAC 945 mt, no directed fishery NSEO
1997	NPFMC TAC 945 mt, redbanded removed from assemblage definition, no directed fishery NSEO
1998	NPFMC TAC 560 mt, revised estimates of rock habitat in EYKT, 10% included for other species, Directed fishery season changed to prevent overlap with IFQ fishery 1/1-3/14 (67%), 11/16-12/31 (33%), no directed fishery NSEO
1999	NPFMC TAC 560 mt, no directed fishery NSEO
2000	NPFMC TAC 340 mt, revised estimates of rock habitat in SEO, no directed fishery NSEO
2001	NPFMC TAC 330 mt , Fall directed fishery season initially 24 hours in CSEO and SSEO due to small quota then re-opened 11/26 until quotas taken, no directed fishery NSEO
2002	NPFMC TAC 350 mt, no directed fishery in EYKT due to changes in estimated bycatch mortality in that area, no directed fishery in NSEO.
2003	NPFMC TAC 390 mt, no directed fishery in EYKT or NSEO, protocol for classifying habitat revised resulting in changes in TAC
2004	NPFMC TAC 460 mt, directed fishery reopened in EYKT, no directed fishery in NSEO.

Table 9. DSR landings, mt round weight, by year. Prior to 1990 directed landings identified by having at least 51% (rd weight) DSR.

YEAR	DIRECTED	BYCATCH	TOTAL
1979	65	142	207
1980	67	97	164
1981	131	88	219
1982	160	67	227
1983	291	84	375
1984	557	73	630
1985	699	101	800
1986	878	106	984
1987	1106	210	1316
1988	669	176	845
1989	409	127	536
1990	299	212	511
1991	508	339	847
1992	477	228	705
1993	441	266	707
1994	438	289	727
1995	193	158	351
1996	359	102	461
1997	307	119	426
1998	282	145	427
1999	270	161	431
2000	219	138	357
2001	208	182	390
2002	177	183	360
2003	147	190	337

Table 10. Directed DSR landings (mt round weight) by area and year. Prior to 1985 NSEO catch included in CSEO. Prior to 1990 directed fishery landings identified by having at least 51% (rd weight) DSR.

Year	EYKT	NSEO	CSEO	NSEI	SSEO	SSEI	Total
1979	1	0	30	3	1	21	65
1980	3	0	50	3	5	5	67
1981	0	0	77	14	2	35	131
1982	3	0	108	10	2	31	160
1983	7	0	164	30	5	78	291
1984	1	0	400	14	31	110	557
1985	7	37	344	32	54	225	699
1986	0	17	337	45	98	381	878
1987	76	103	233	48	344	302	1106
1988	38	52	150	48	235	145	669
1989	31	28	132	23	132	62	409
1990	26	34	71	32	82	54	299
1991	186	30	69	55	97	70	508
1992	56	44	112	50	141	74	477
1993	105	41	128	48	67	52	441
1994	114	45	146	29	77	29	438
1995	57	0	88	22	24	2	193
1996	103	0	180	3	66	7	359
1997	76	0	148	19	56	8	307
1998	65	0	120	21	56	19	282
1999	74	0	106	14	63	14	270
2000	61	0	63	13	63	18	219
2001	50	0	64	13	58	23	208
2002	0	0	76	20	60	21	177
2003	0	0	76	23	60	29	188

Table 11. Exvessel value as reported on fish tickets for DSR, Southeast Alaska, 2003.

Fishery	**Whole Pounds with price**	**Value**	**Average Price**	**Pounds with no price**	**Total Whole Pounds**	**Total Value**
Halibut IFQ	389,733	$371,289	$0.95	15,098	404,831	$385,673
IFQ Sablefish	11,045	$7,341	$0.66	376	11,421	$7,590
NSEI Sablefish	204	$243	$1.19	58	262	$312
SSEI Sablefish	750	$404	$0.54		750	$404
Lingcod	6,645	$8,385	$1.26	23	6,668	$8,414
Misc finfish	11,123	$11,342	$1.02	580	11,703	$11,934
DSR	250,602	$366,665	$1.46	1,296	251,898	$368,561
Total	670,101	$765,669		17,431	687,532	$782,888

Table 12. Information used to set 2003 DSR directed fishery quotas for CSEO, SSEO, Fairweather Ground, and remaining areas of EYKT.

Statistic	**CSEO**	**EYKT**	**NSEO**	**SSEO**
IPHC statistical areas (See Figure 16)	160 and 2/3 of 170	185, 190, and 1/3 of 200	1/3 of 170 and 181	140 and 150
2002 halibut catch distribution	23% of 2C	12% of 3A	15% of 2C	11% of 2C
Estimated DSR bycatch mortality (10% CSEO, SSEO, FW, 7% EYKT)	88	98	59	42
2004 DSR TAC	152	190	24	71
Directed DSR Fishery GHL (Rounded to nearest 5 mt)	65	90	0	40

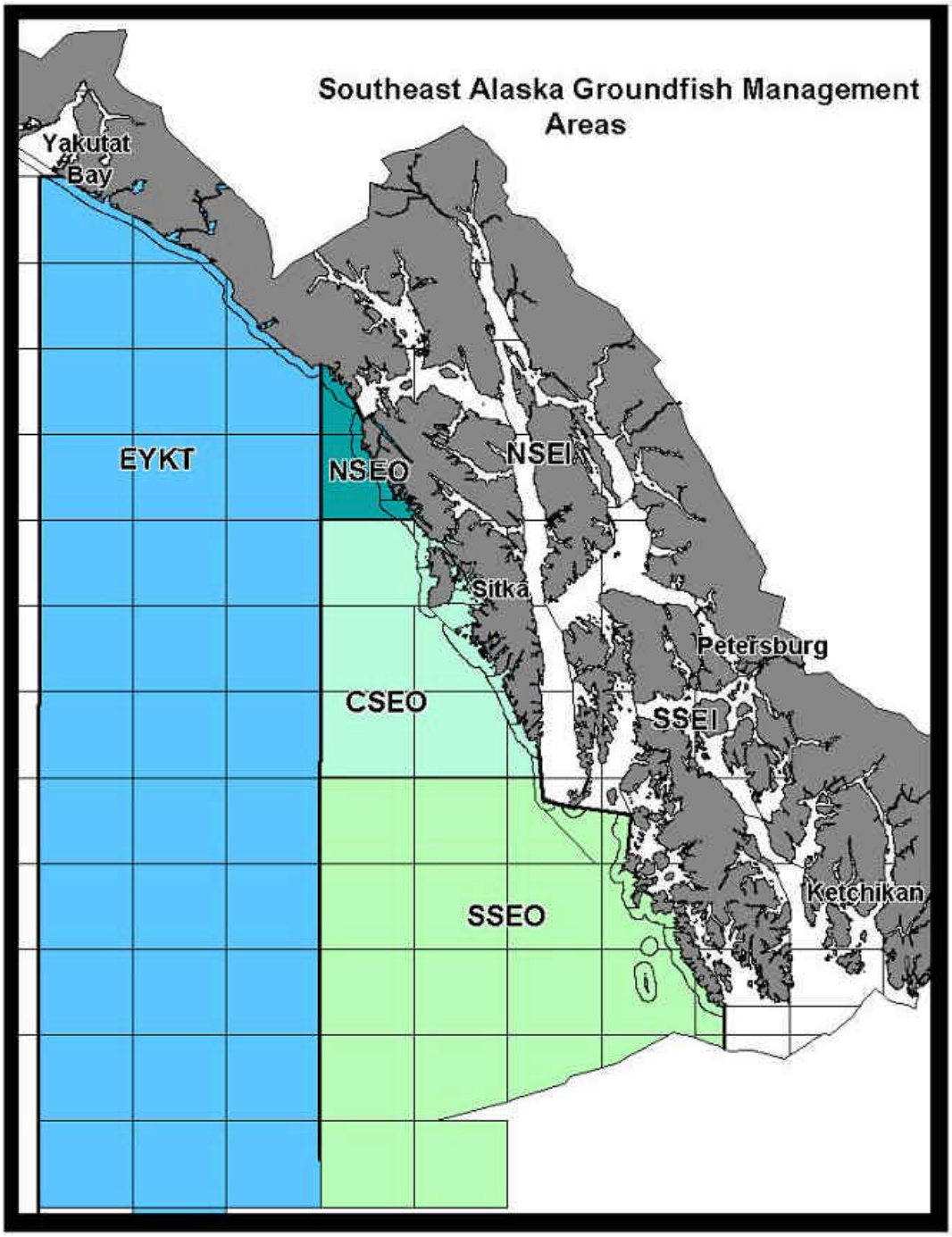


Figure 1. Demersal shelf rockfish management areas in the Southeast Region. Southeast Outside Subdistrict (SEO) is comprised of SSEO, CSEO, NSEO, and EYKT.

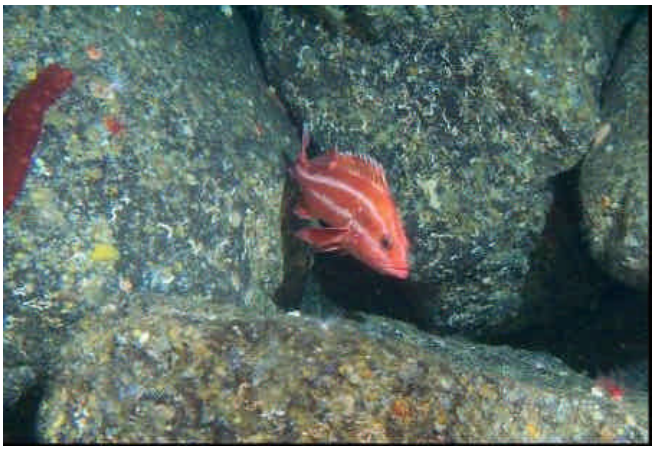


Figure 2. Yelloweye rockfish adult (left) and juvenile (right). Photos by V. O'Connell.

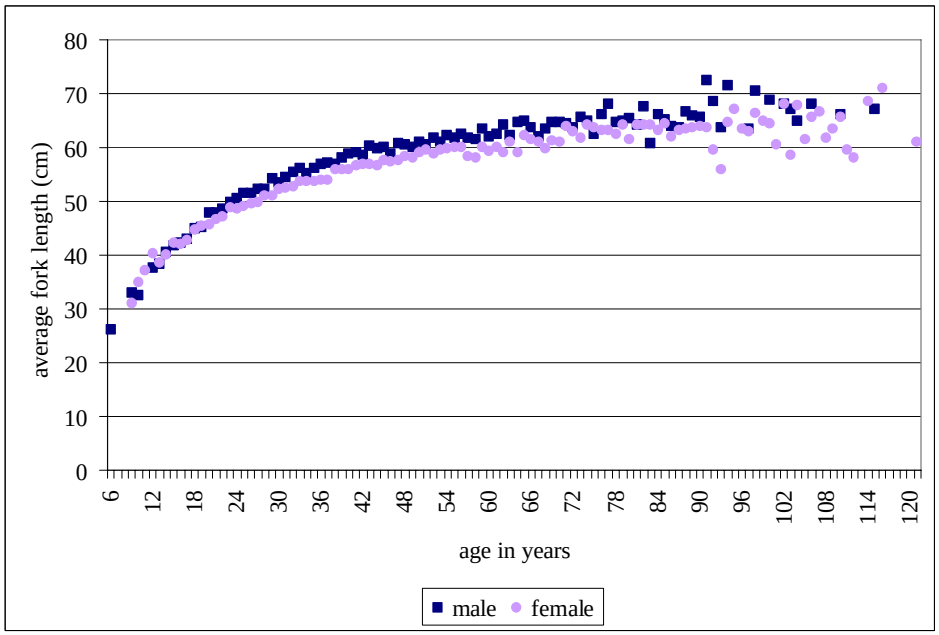


Figure 3. Average length (cm) at age (years) for yelloweye rockfish, 1998-2002.

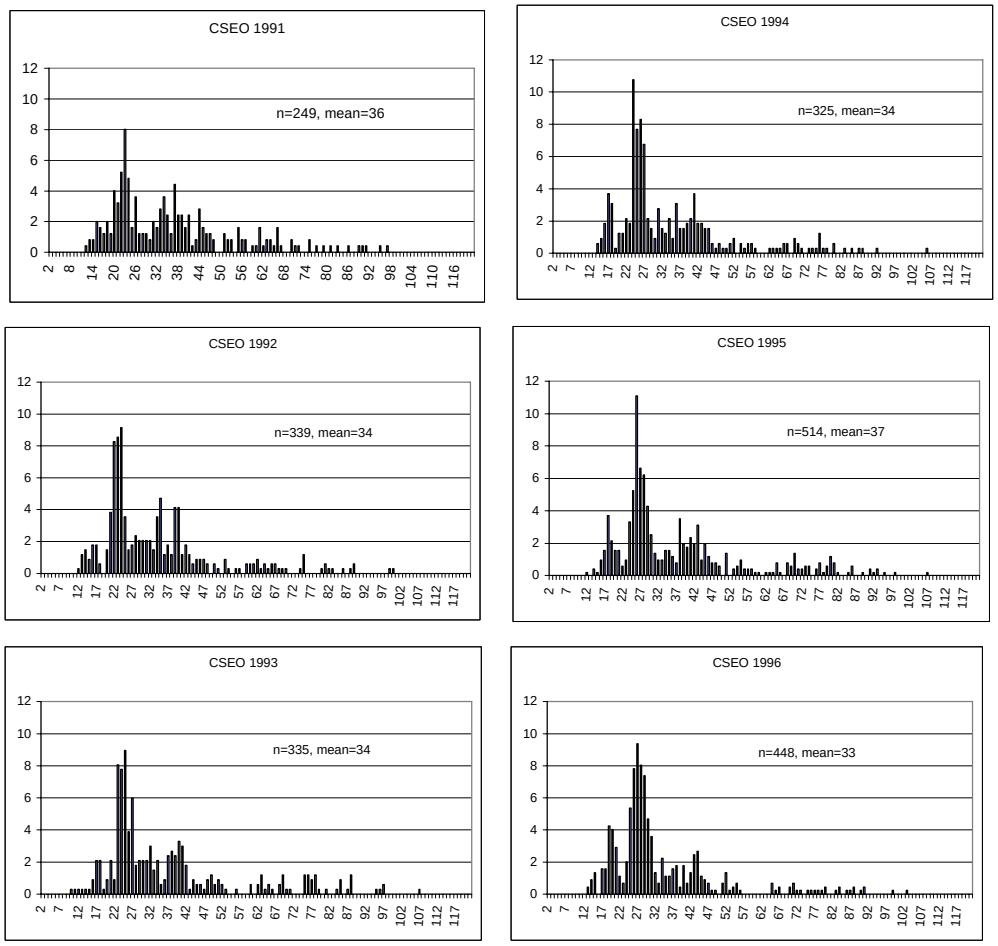


Figure 4a. Age distributions for yelloweye rockfish port samples, CSEO, by year.

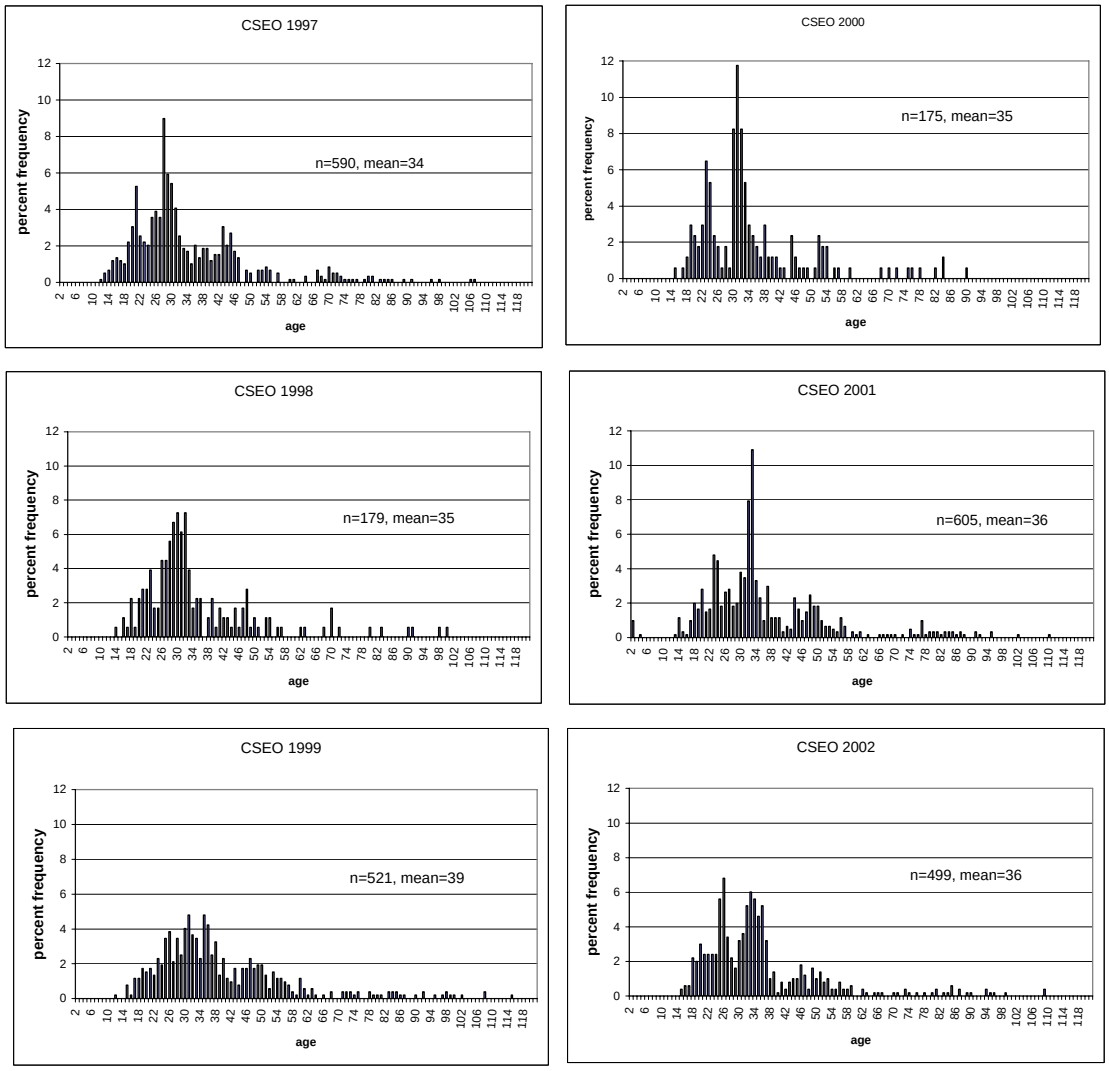


Figure 4a cont. Age distributions for yelloweye rockfish port samples, CSEO, by year.

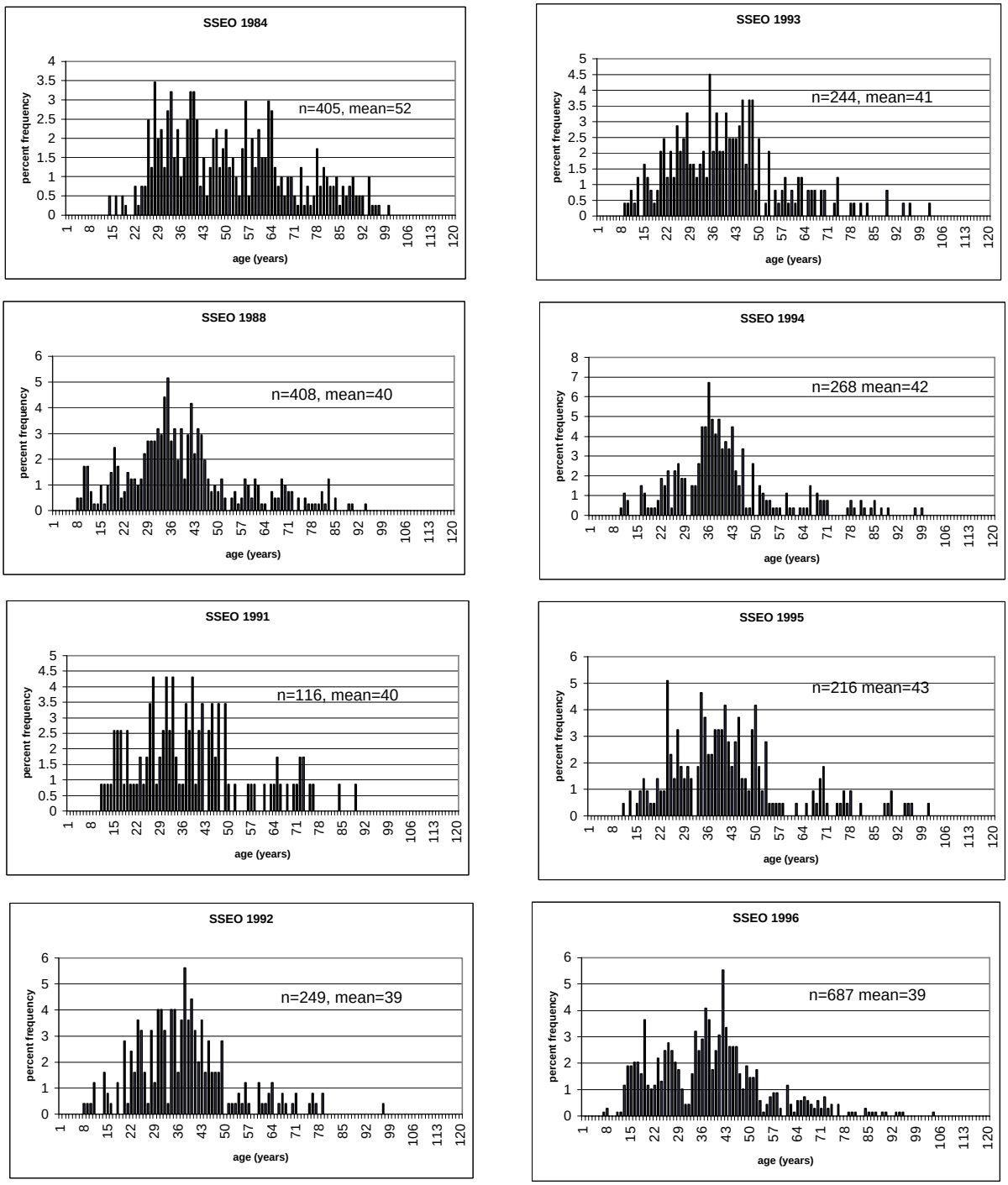


Figure 4b. Age distributions for yelloweye rockfish port samples, SSEO, by year.

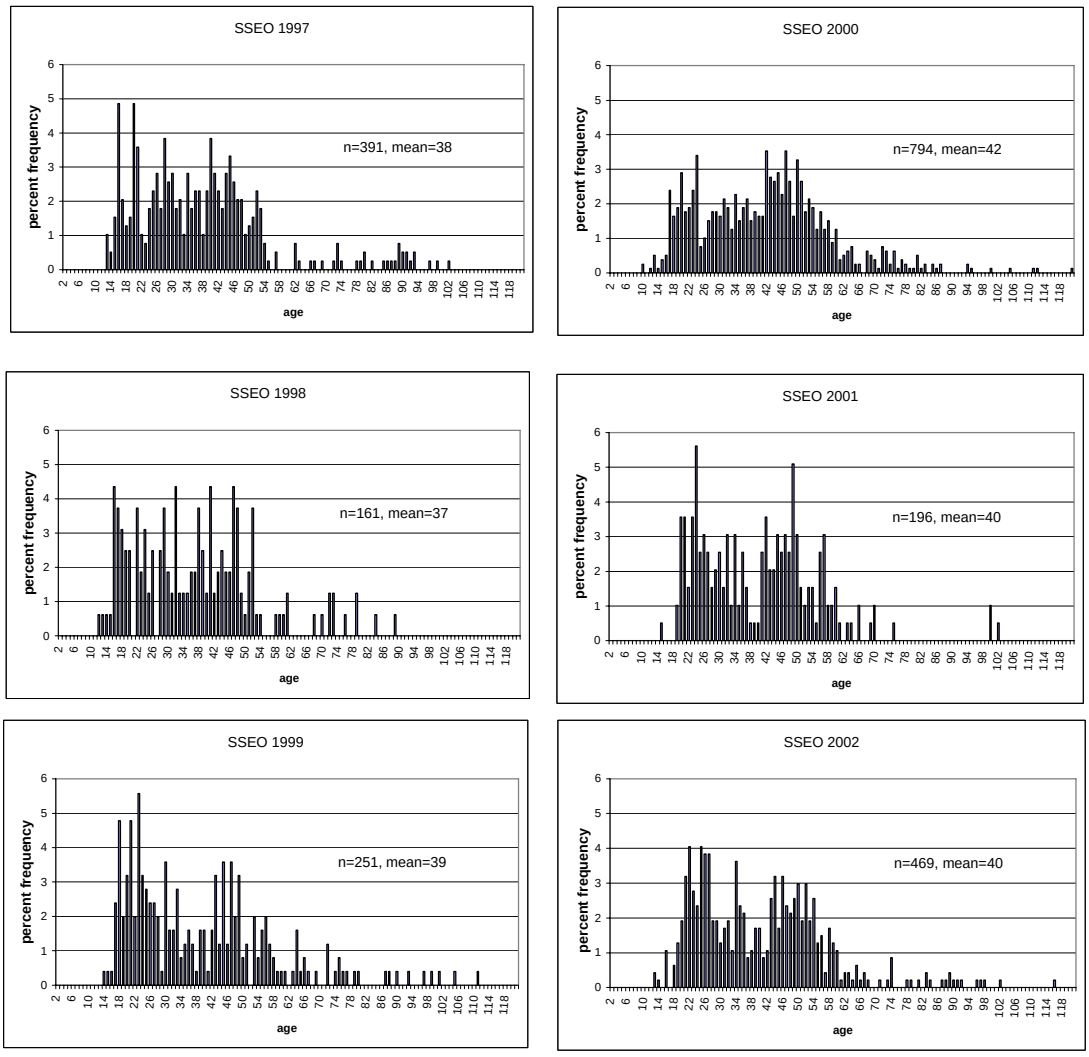


Figure 4b cont. Age distributions for yelloweye rockfish port samples, SSEO by year.

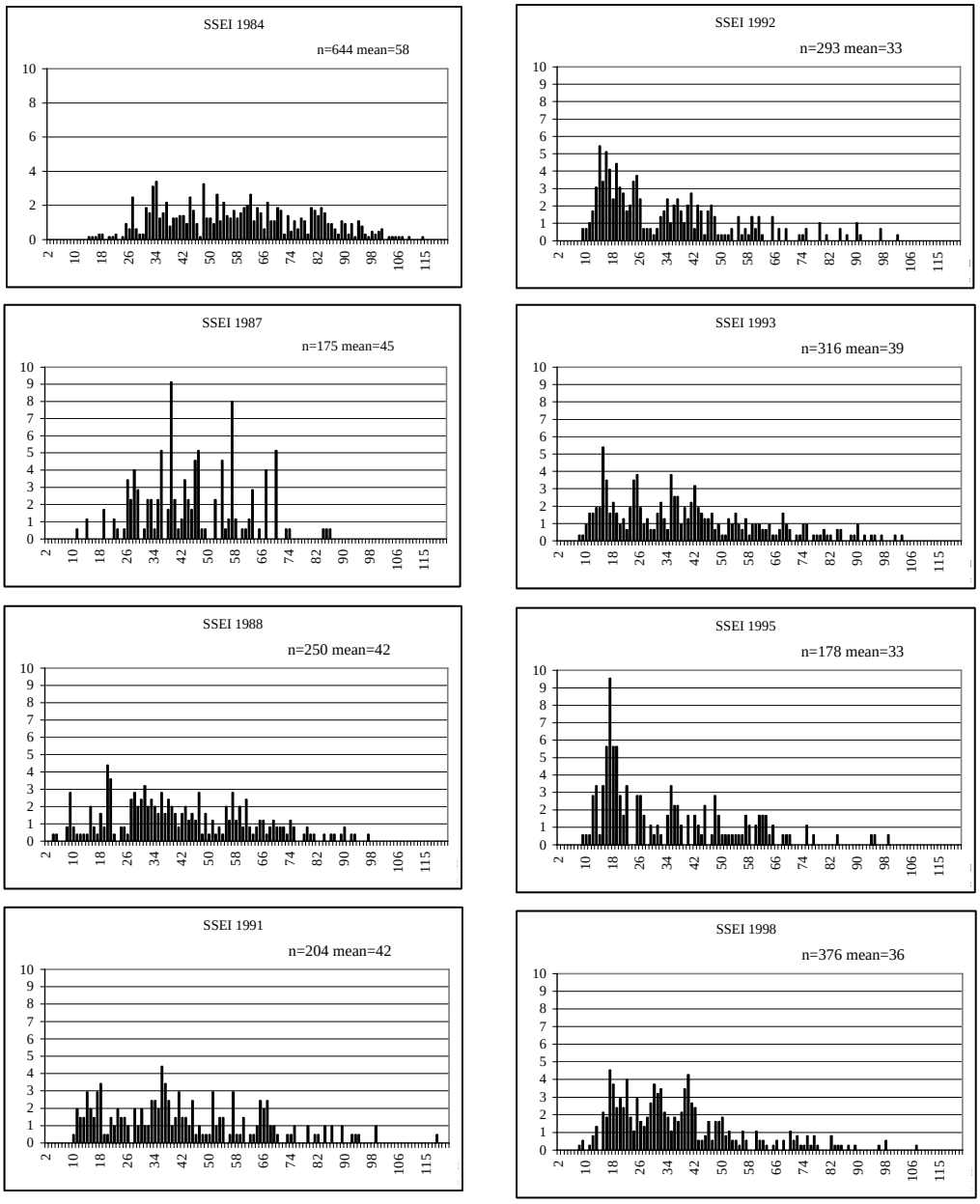


Figure 4c. Age distributions for yelloweye rockfish port samples, SSEI, by year.

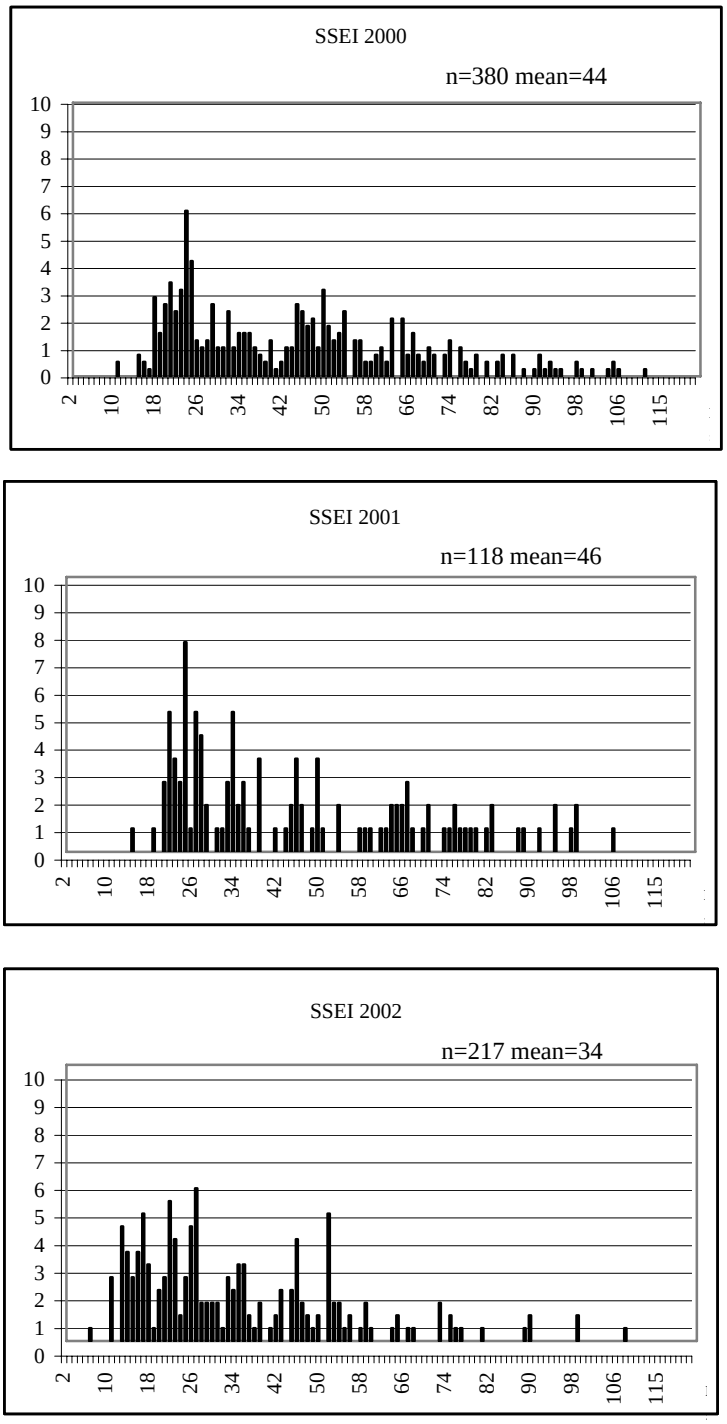


Figure 4c cont. Age distributions for yelloweye rockfish port samples, SSEI, by year.

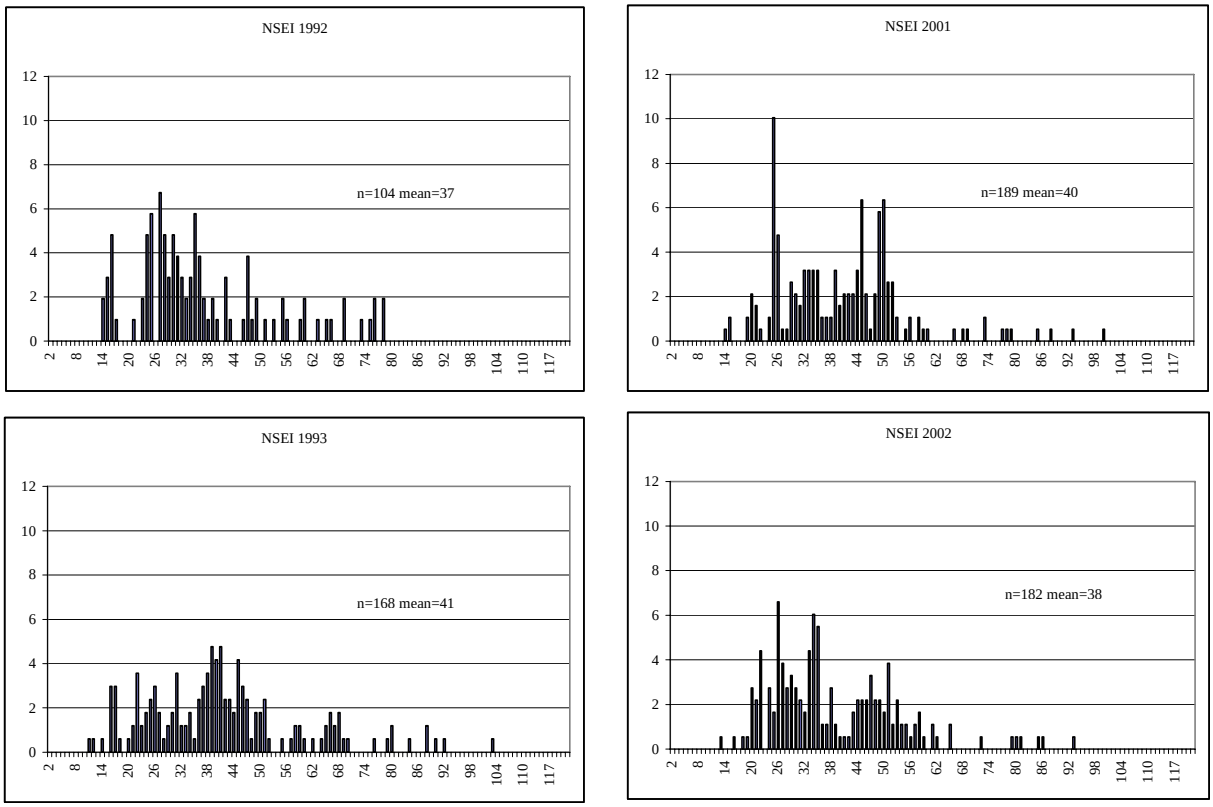


Figure 4d. Age distributions for yelloweye rockfish port samples, NSEI, by year.

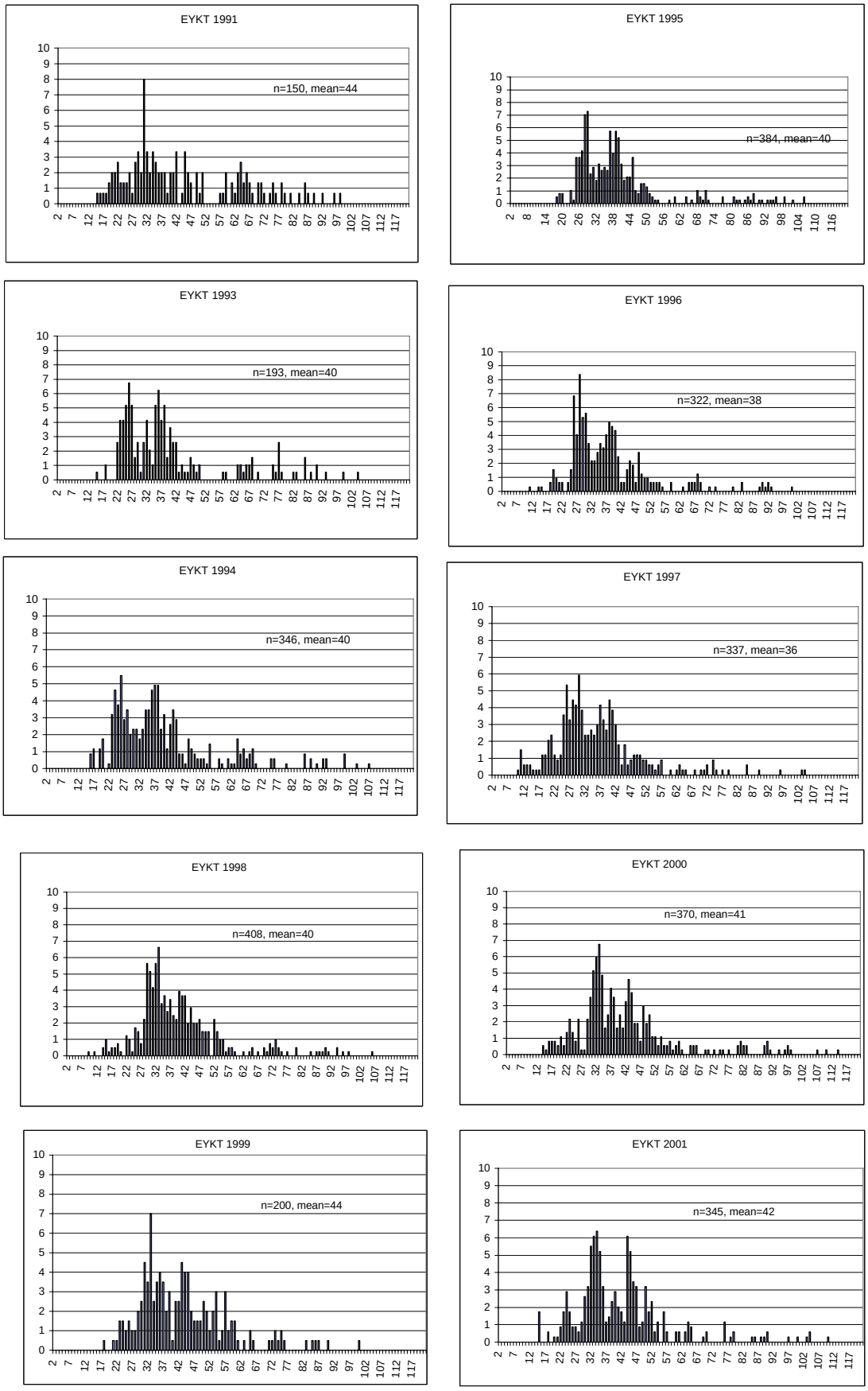


Figure 4e. Age distributions for yelloweye rockfish port samples, EYKT, by year.

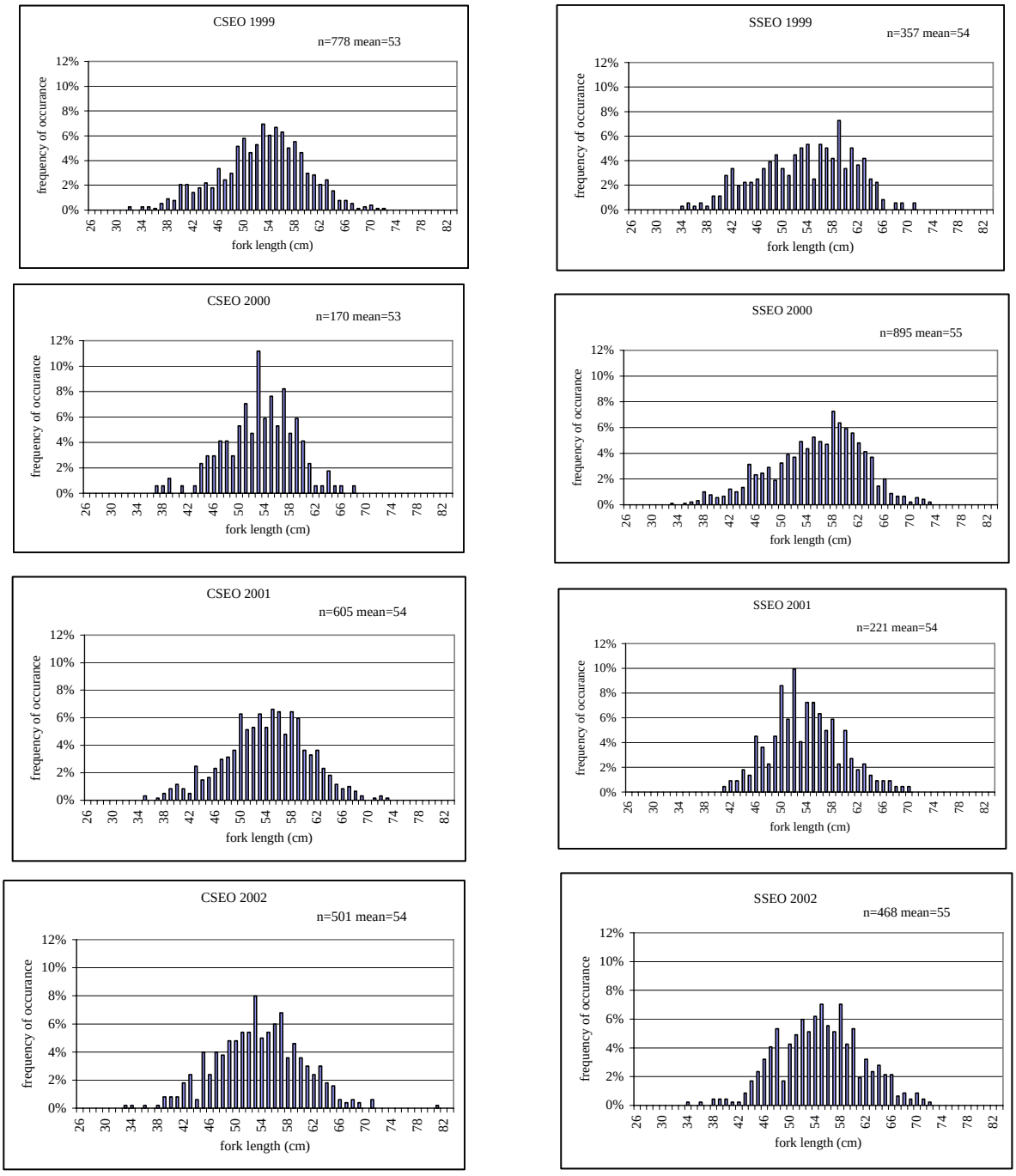


Figure 5a. Length distributions for yelloweye rockfish port samples, CSEO and SSEO, by year.

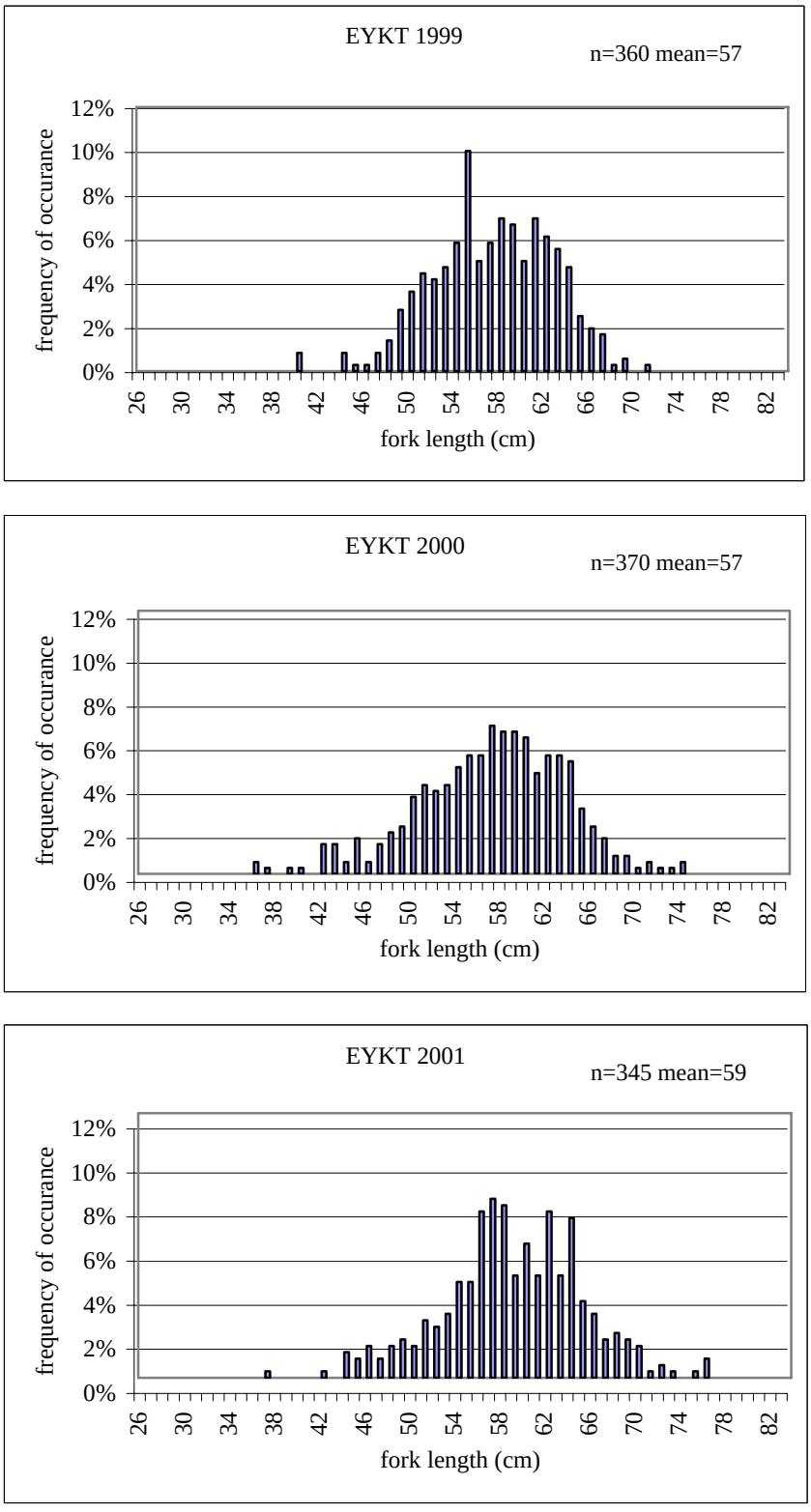


Figure 5b. Length distributions for yelloweye rockfish port samples, EYKT, by year.

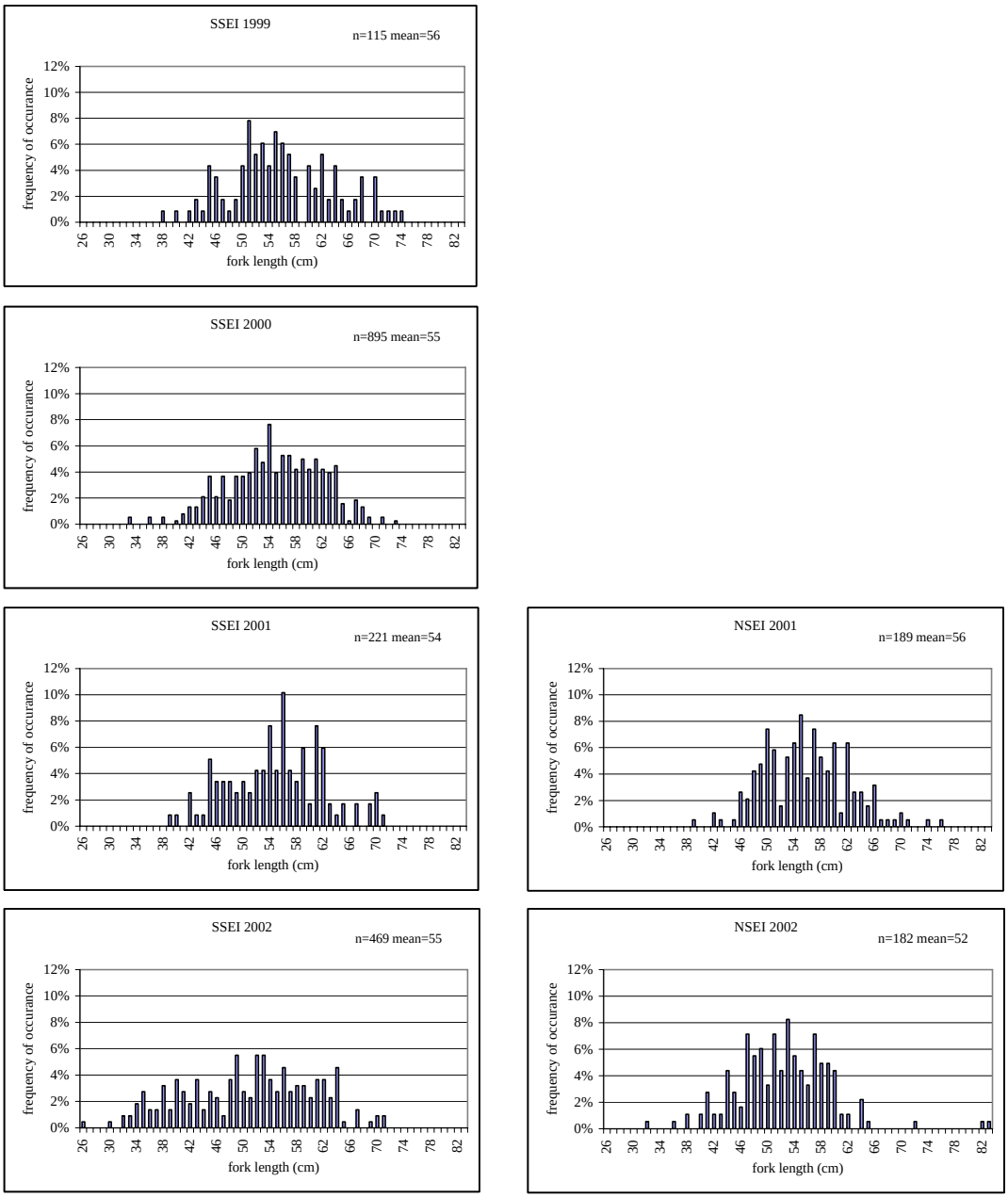


Figure 5c. Length distributions for yelloweye rockfish port samples, SSEI and NSEI, by year.

Figure 6. Quillback rockfish, southeast Alaska.

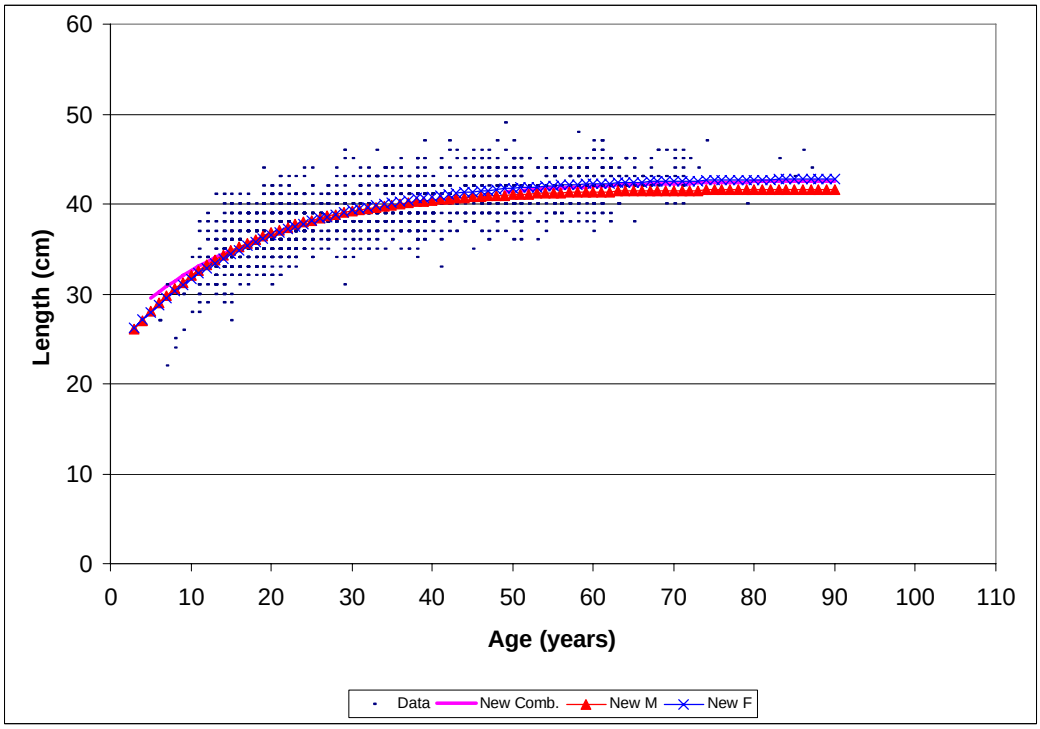


Figure 7. Von Bertalanffy growth curve for quillback rockfish by sex and combined, with raw data from 1996-1998.

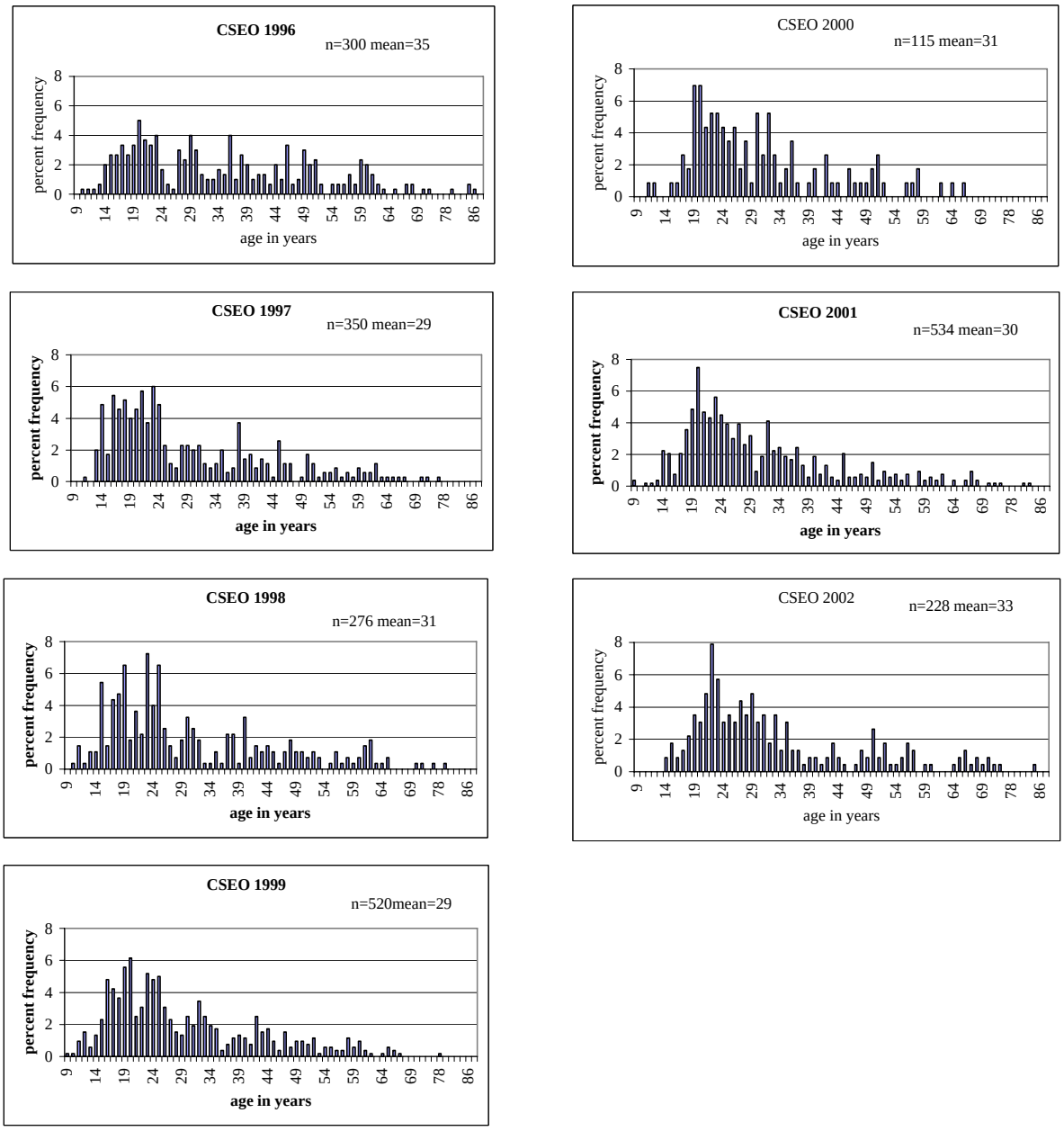
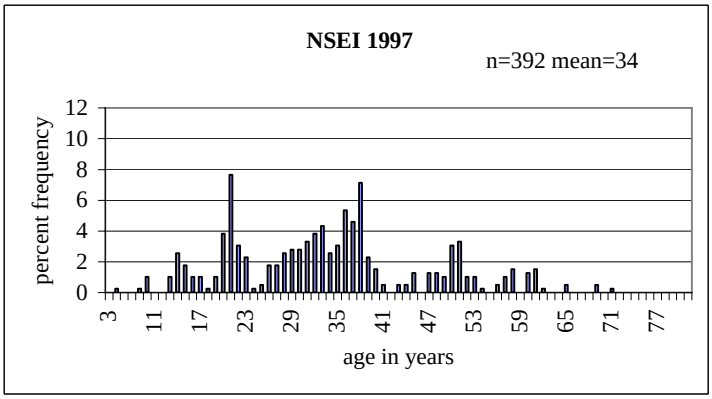
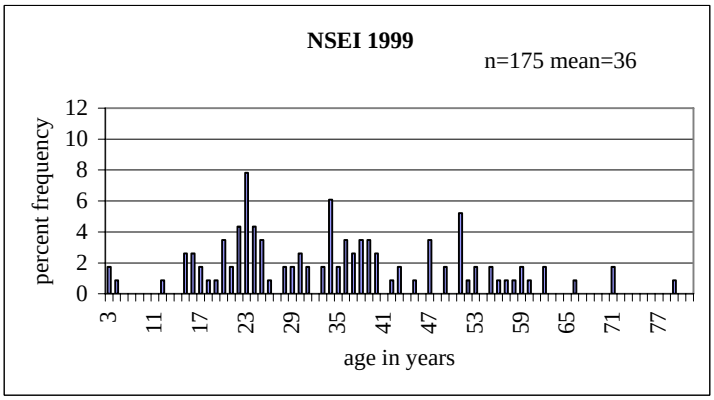
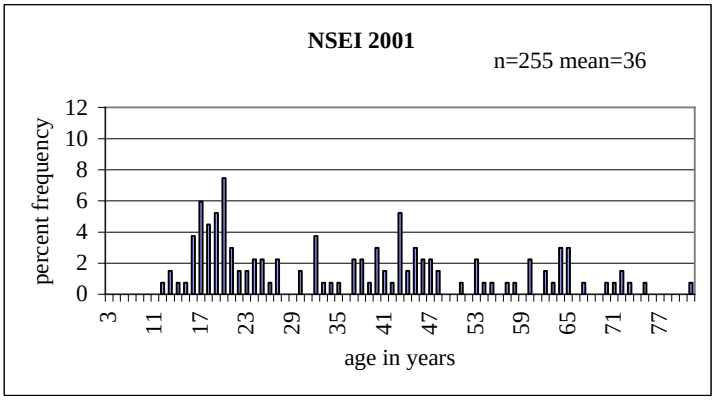


Figure 8a. Age frequency distributions of quillback rockfish, CSEO, by year.







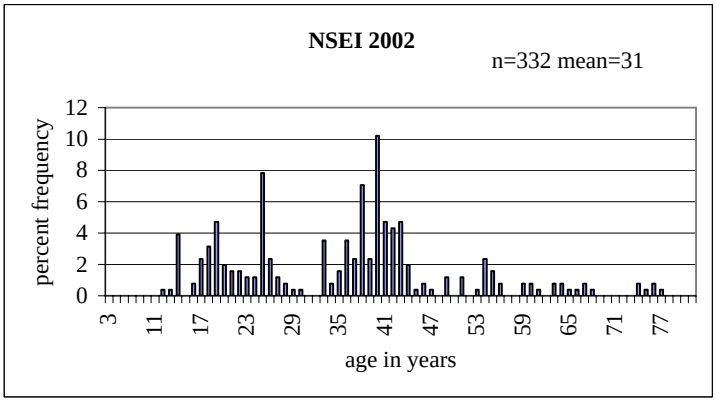


Figure 8b. Age distributions for quillback rockfish port samples, NSEI, by year.

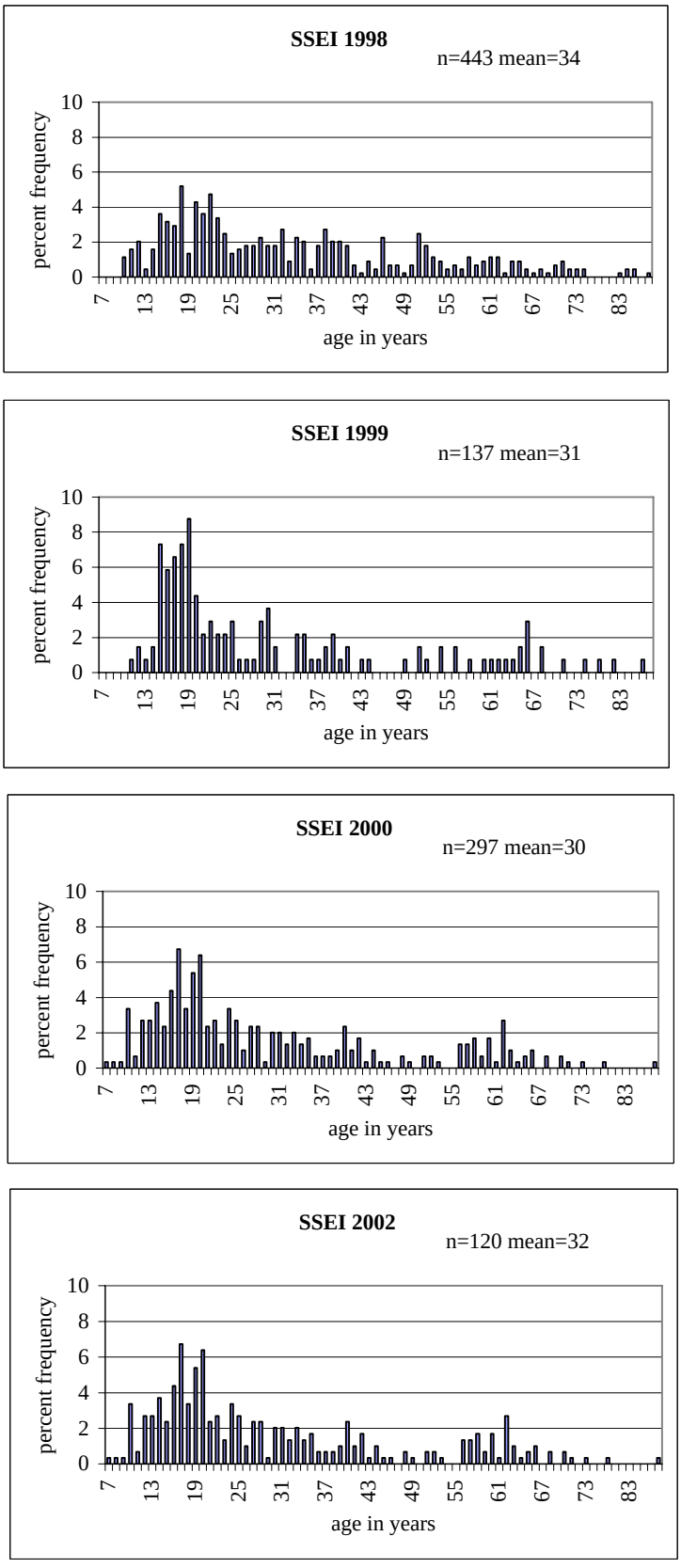


Figure 8c. Age distributions for quillback rockfish port samples, SSEI, by year.

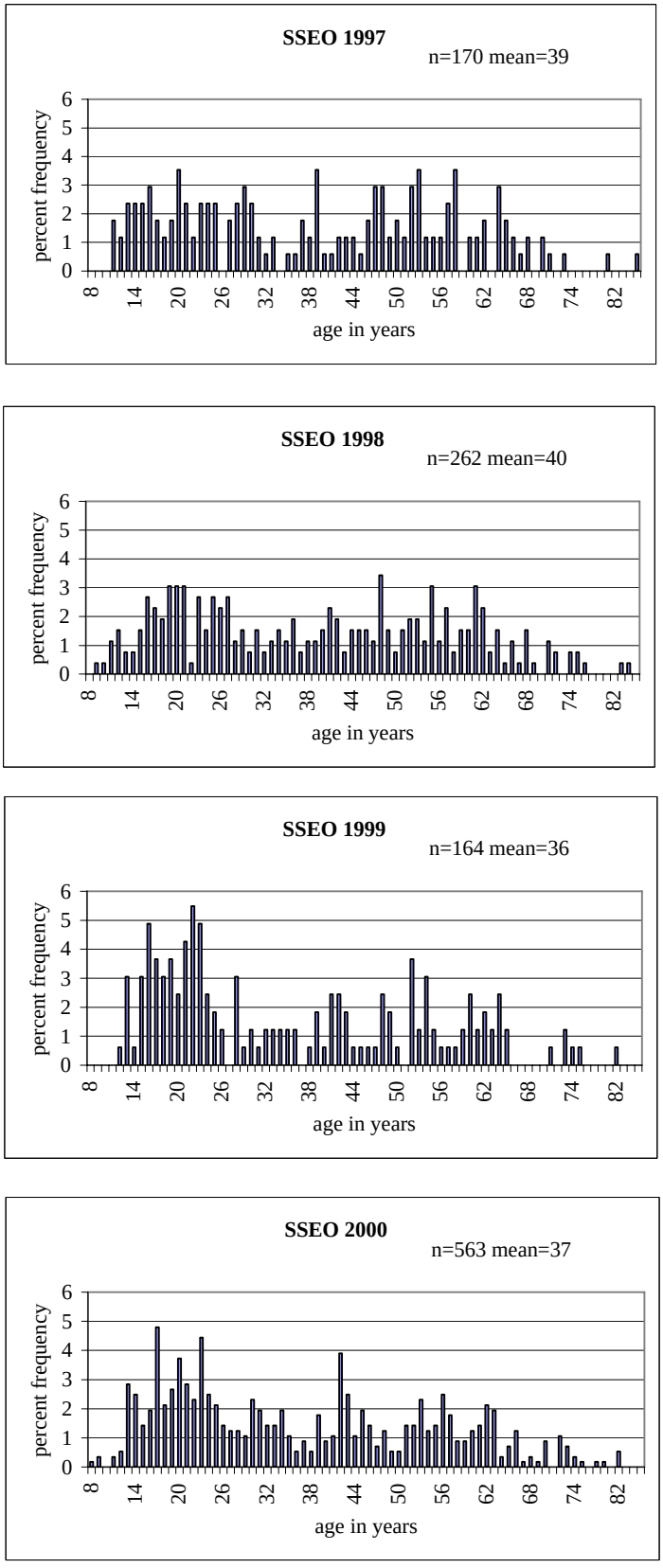
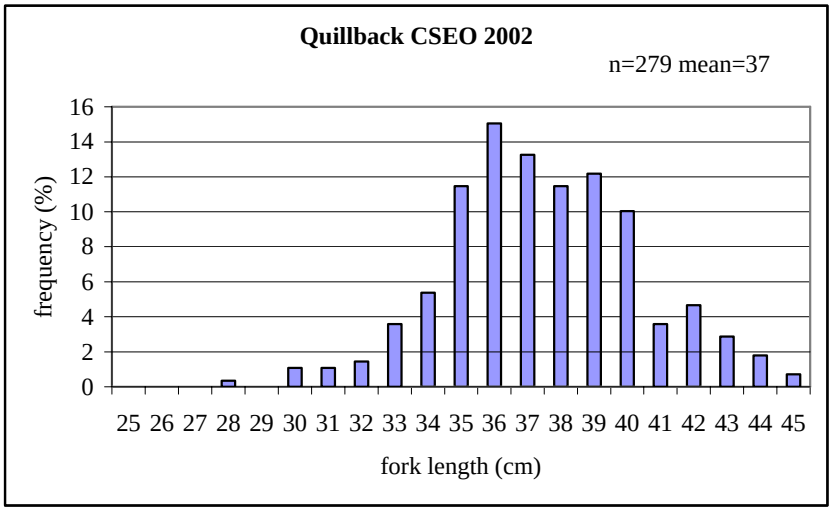
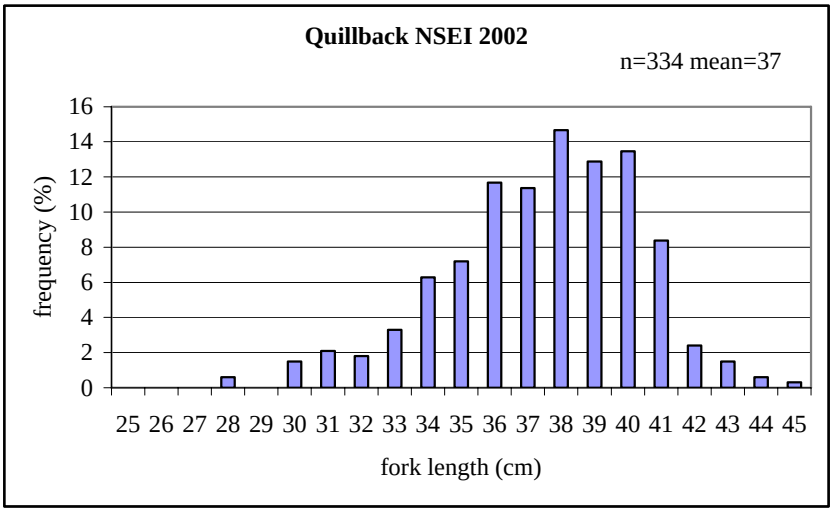


Figure 8d. Age distributions for quillback rockfish port samples, SSEO, by year.





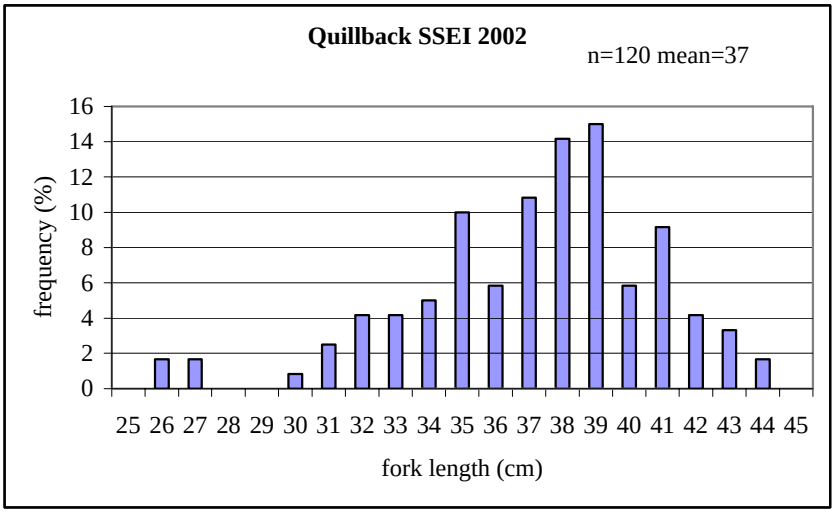


Figure 9. Length distributions for quillback rockfish port samples, by area, 2002.

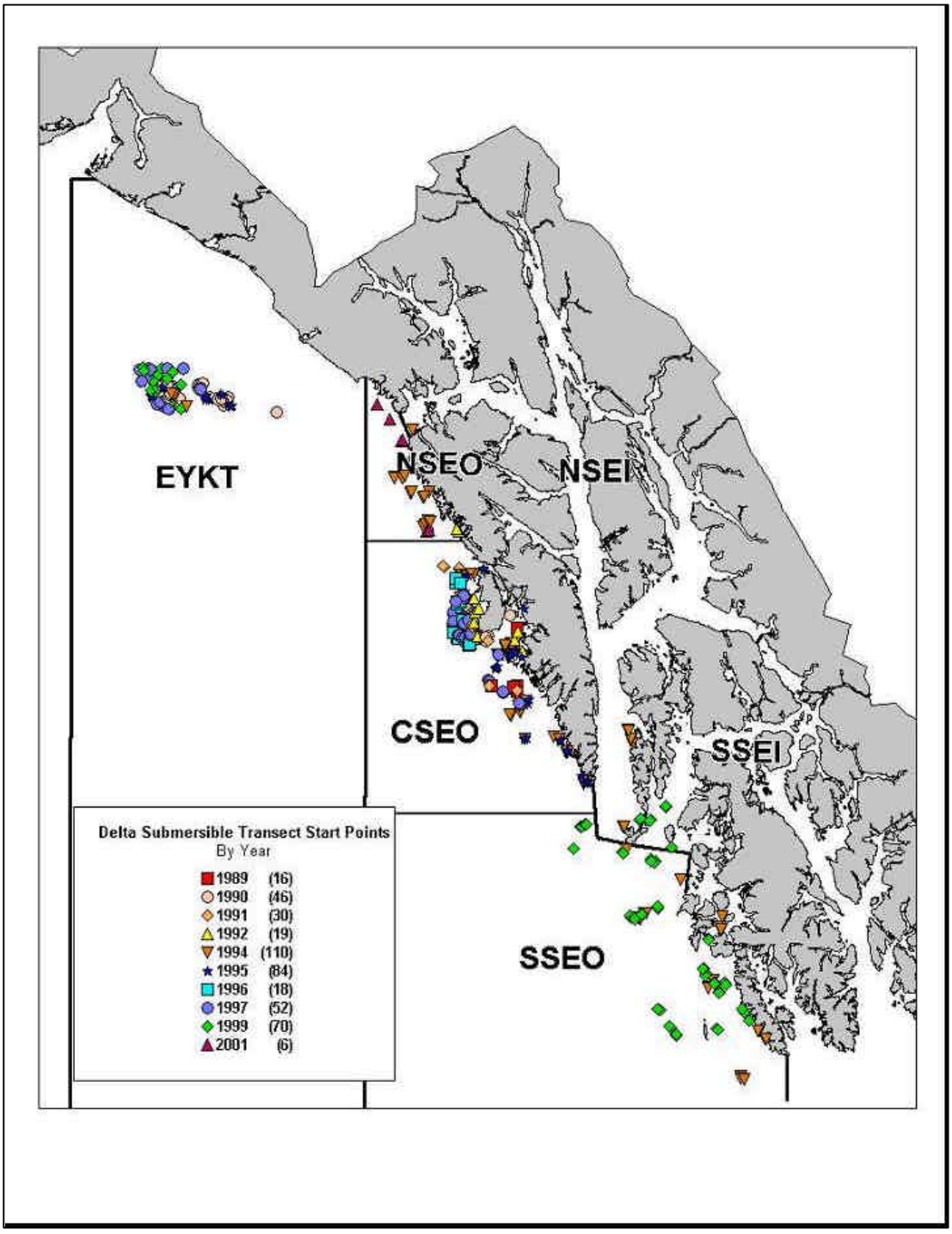


Figure 10. Starting locations of submersible dives, Southeast Alaska 1990–2001.

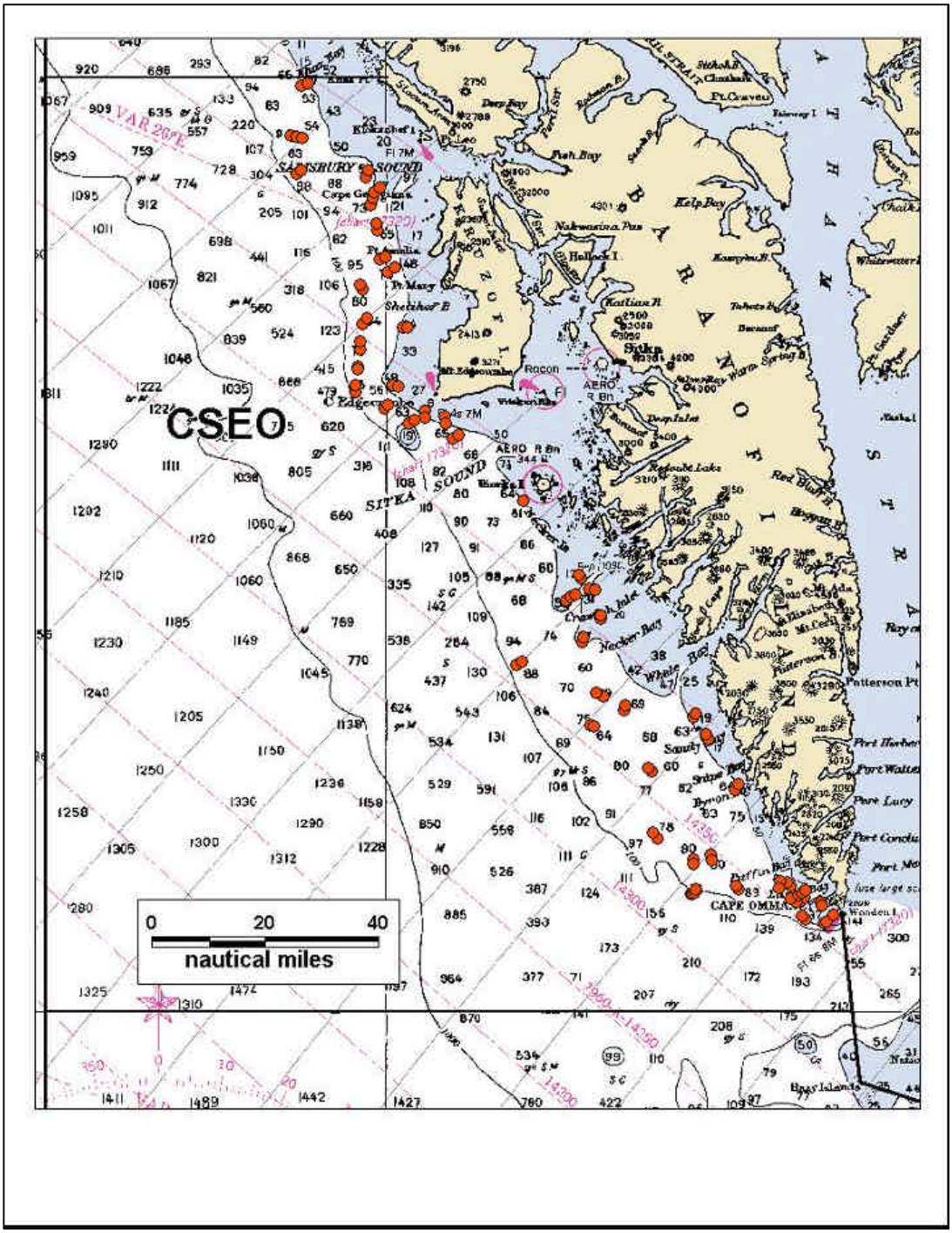


Figure 11. Location of 2003 submersible line transect dives, CSEO.

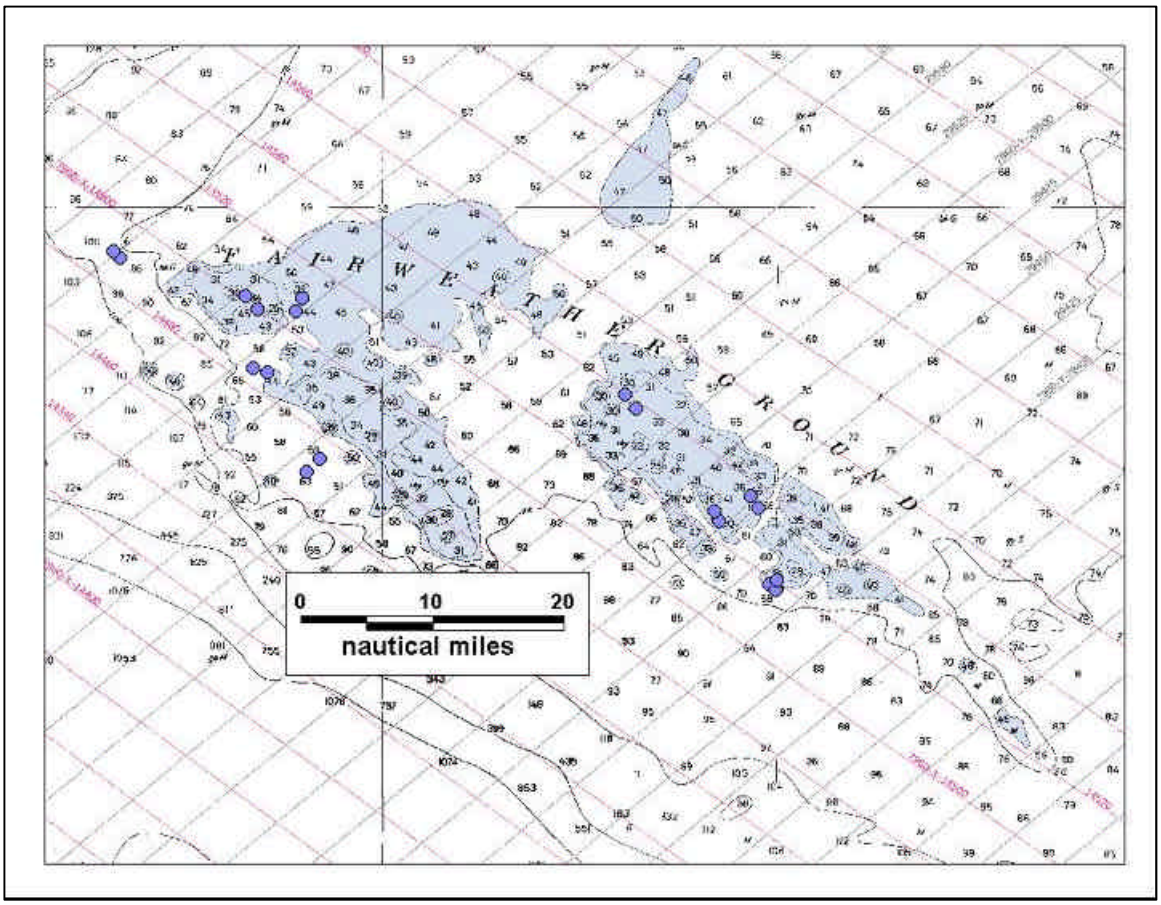
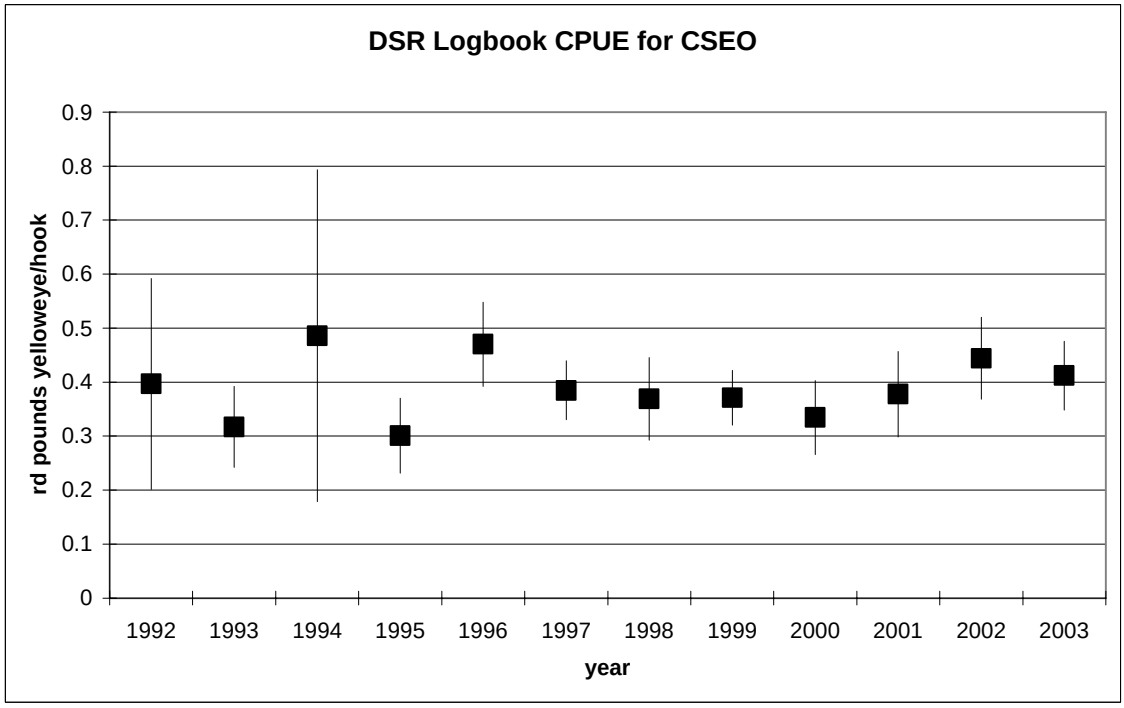


Figure 12. Location of 2003 submersible line transect dives, EYKT.



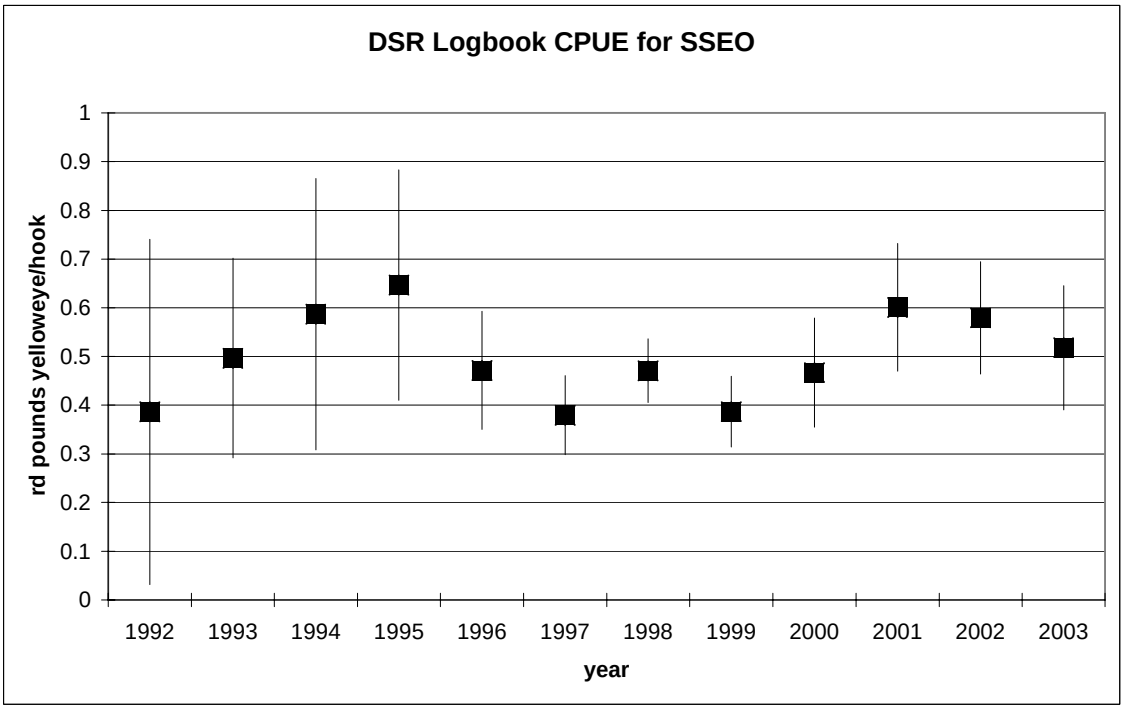


Figure 13. Directed fishery catch per unit effort (rd pounds yelloweye/hook), conventional gear, by area and year with 95% confidence limits.

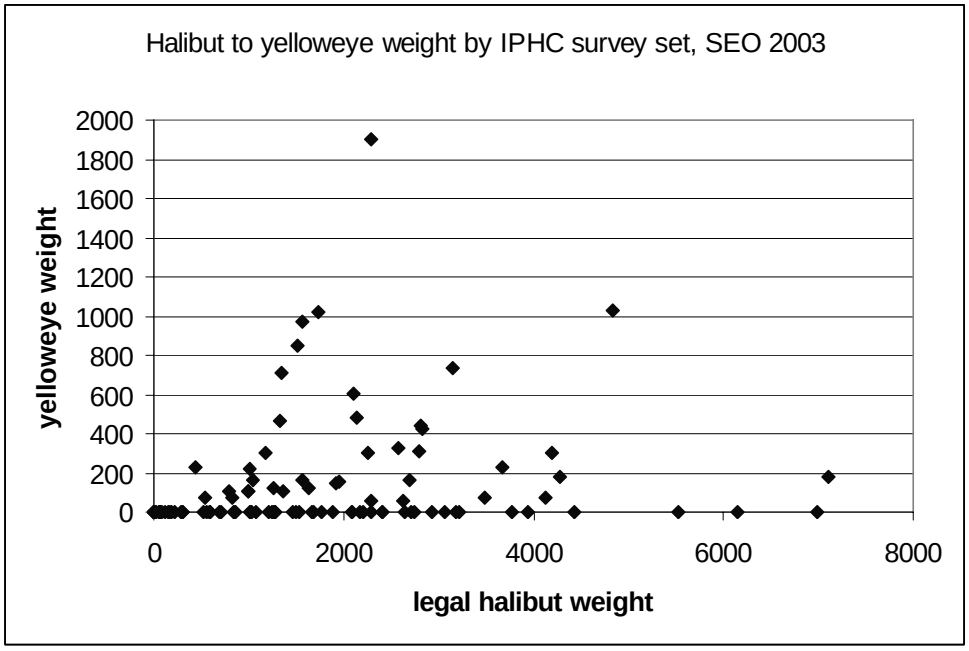


Figure 14. DSR weight versus legal sized halibut weight, IPHC longline survey 2003.

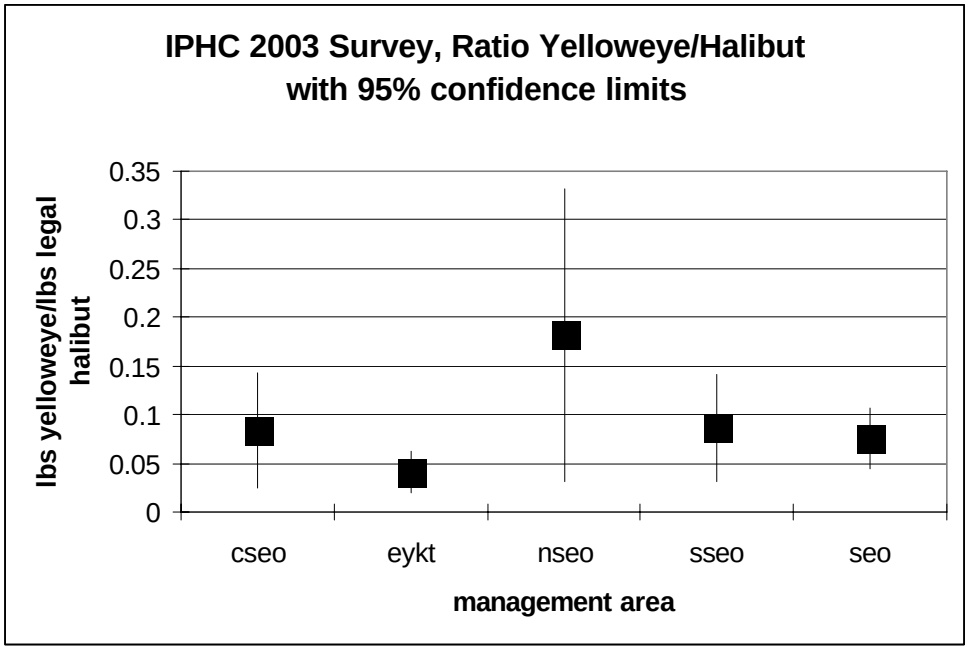


Figure 15. 2003 IPHC longline survey data, ratio of yelloweye to legal halibut.

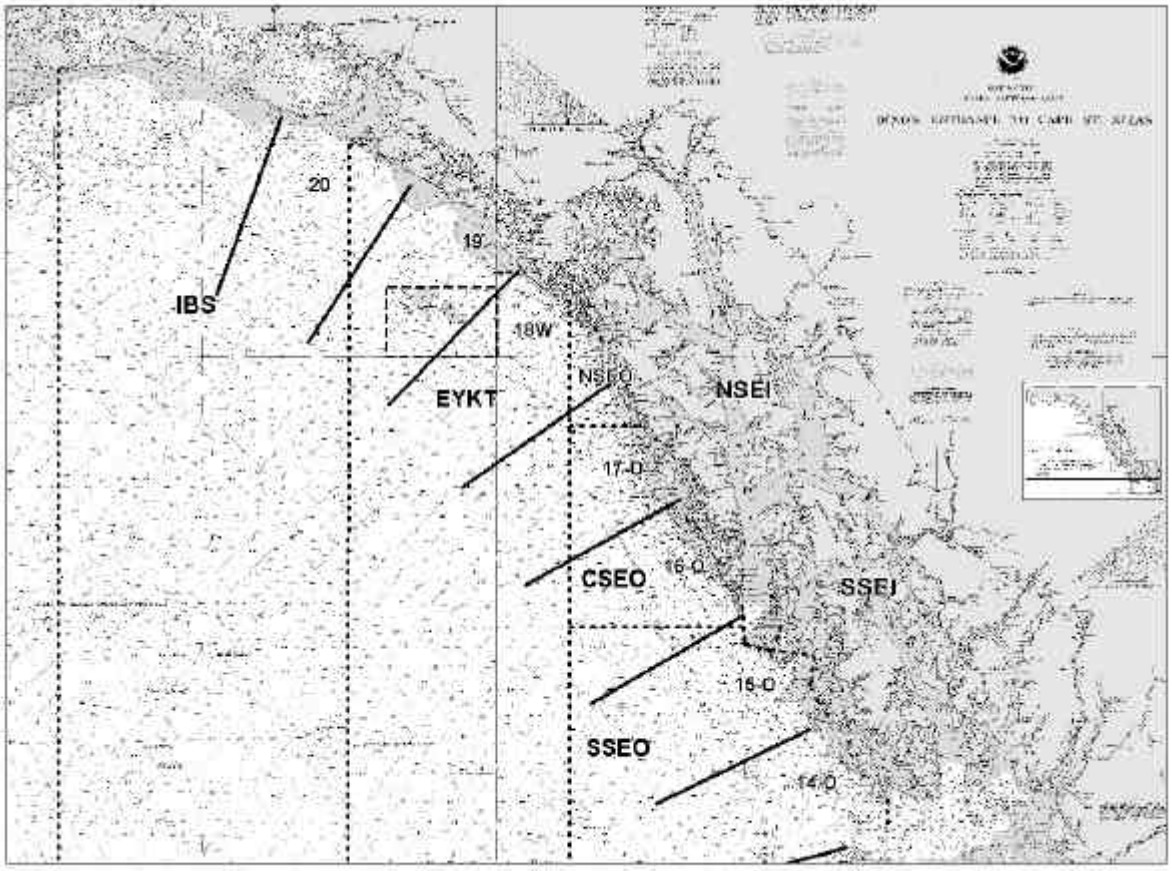


Figure 16. IPHC area (numeric) and ADF&G statistical areas.

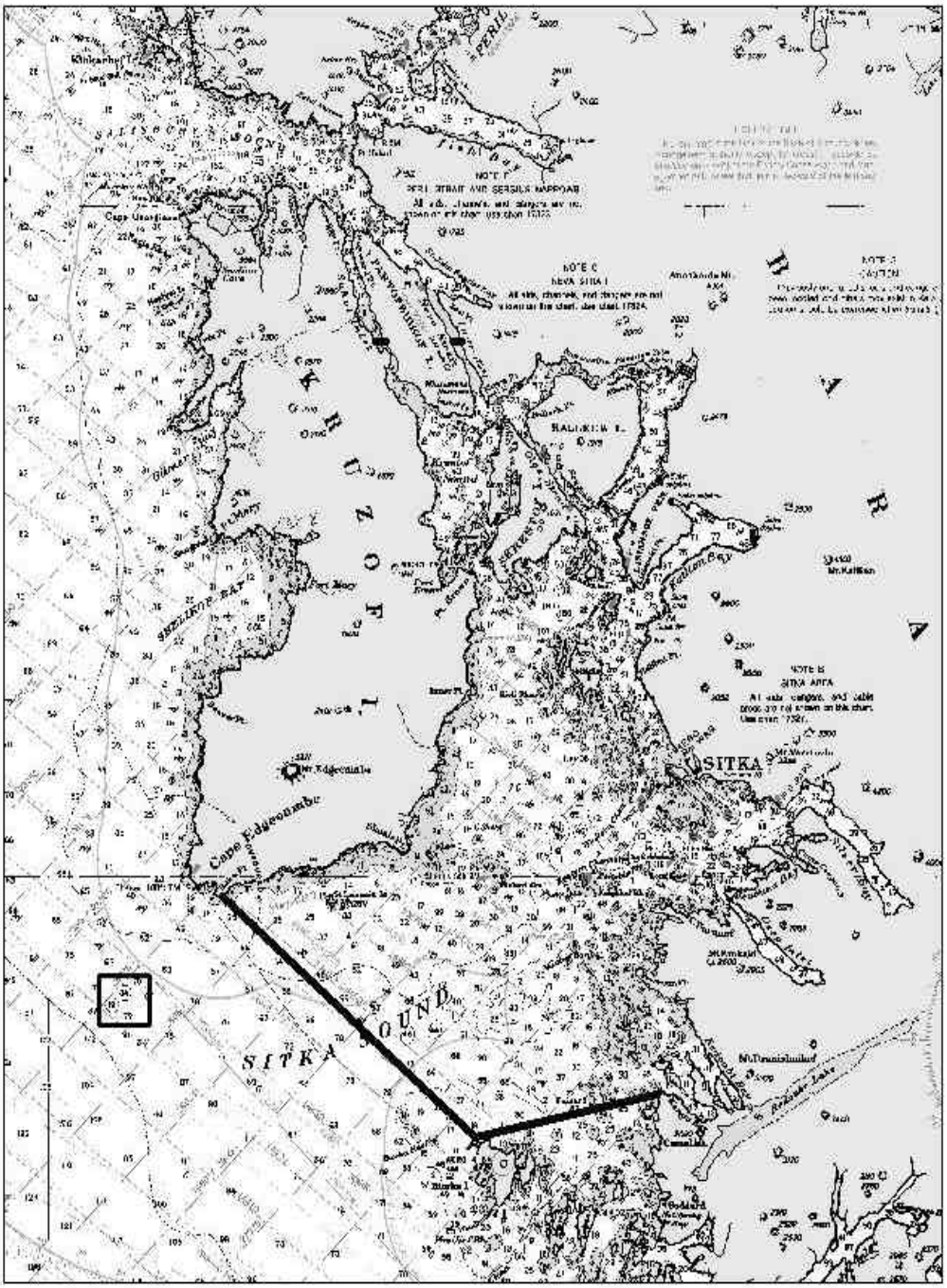


Figure 17. Location of Edgecumbe Pinnacles Marine Reserve (box) and DSR directed fishery closure area, Sitka Sound.

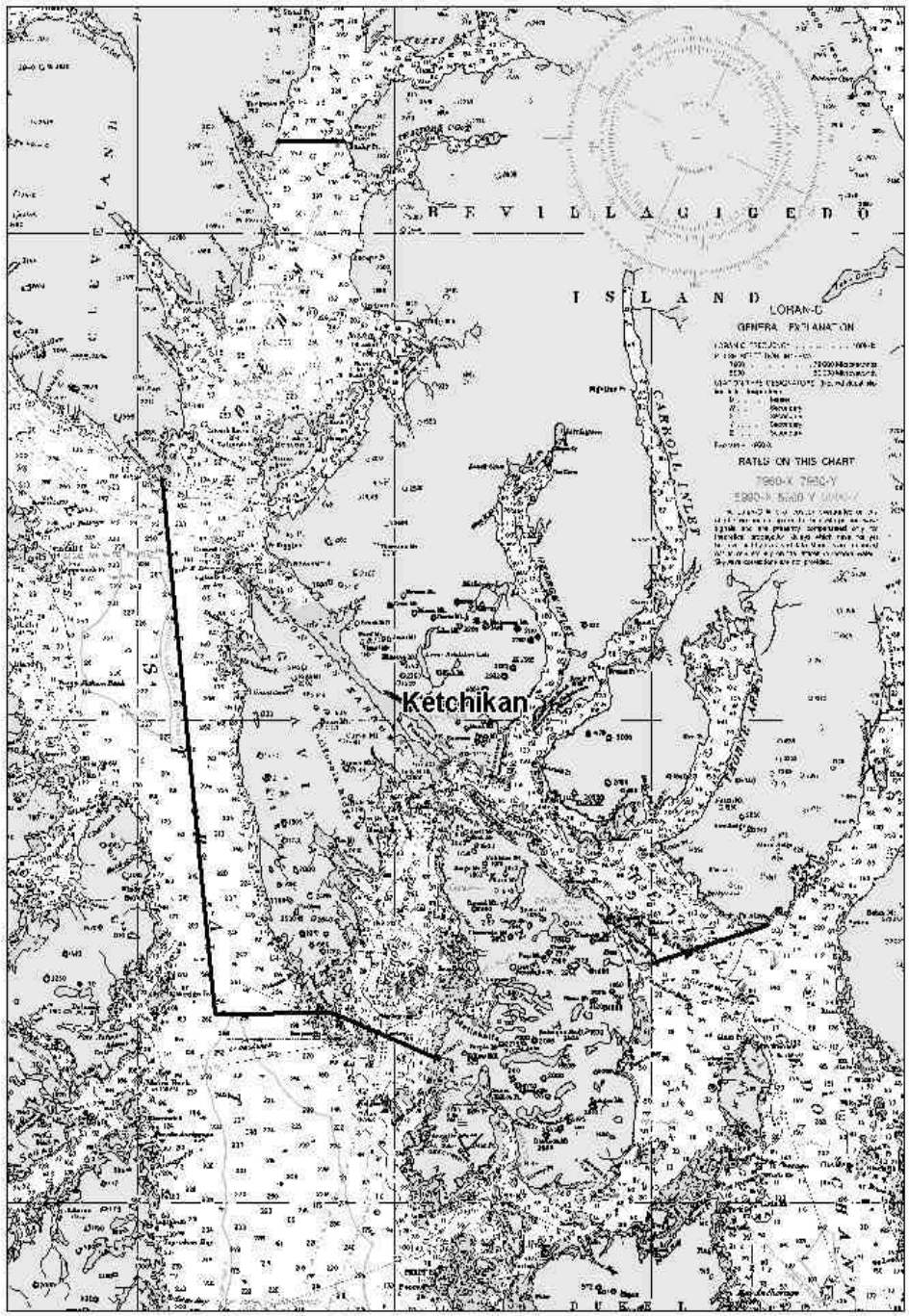


Figure 18. DSR directed fishery closure area in the vicinity of Ketchikan.

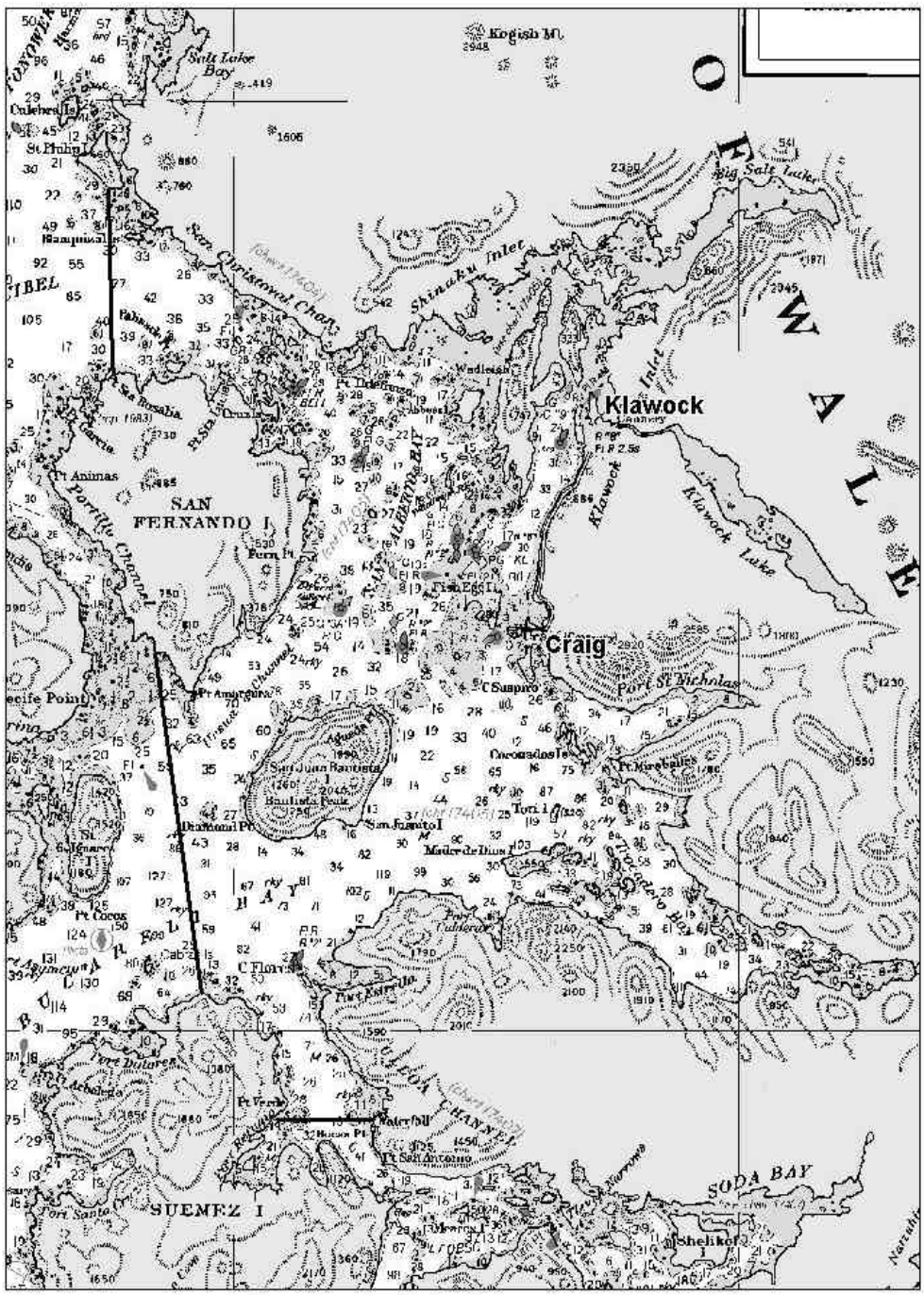


Figure 19. DSR directed fishery closure area in the vicinity of Craig.

APPENDICES

Appendix A. Listing of ADF&G Region I Commercial Fisheries Groundfish Personnel.

Kyle Hebert, Regional Research Supervisor Scott Kelley, Regional Management Supervisor Deidra Holum, Fishery Technician IV	Douglas Office 802 3rd Street Douglas, AK 99824 (907) 465-4250
Tory O'Connell, Groundfish Project Leader Cleo Brylinsky, Fishery Biologist II Eric Coonradt, Fishery Biologist II Mike Vaughn, Fishery Biologist I Kamala Carroll, Fishery Technician III	Sitka 304 Lake Street, Room 103 Sitka, AK 99835 (907) 747-6688
Beverly Richardson, Research Analyst II	Petersburg 16 Sing Lee Alley Box 667 Petersburg, AK 99833 (907) 772-3801
Sue Domenowske, Fishery Technician III	Craig 333 Cold Storage Road, Suite 302 Box 668 Craig, AK 99921 (907) 826-2563

For commercial permits and vessel license applications contact:	State of Alaska **Commercial Fisheries Entry Commission** (907) 789-6150 **National Marine Fisheries Service**, Alaska Regional Office (907) 586-7229 **Restricted Access Management** program (RAM), P.O. Box 21668, Juneau, AK 99802-1668, (907)-586-7202

ADF&G Longline - Pot Fishery Logbook form.

ADF&G LONGLINE - POT FISHERY LOGBOOK

PERMIT HOLDER ____________________ TARGET SPECIES ____________________ CREW SIZE (includes skipper) ________

VESSEL NAME ____________________ PORT OF LANDING ____________________

ADF&G NUMBER ____________________ DATE LEFT PORT ____________________

SKIPPER NAME ____________________ DATE OF LANDING ____________________

SYSTEM USED

CONV ☐ SNAP ☐

OTHER (explain) ________

LONGLINE GEAR			
HOOK SIZE/TYPE	SKATE LINE SIZE	HOOK SPACING	NUMBER OF HOOKS/SKATE

POT GEAR		
POT DIMENSIONS (ft)	GROUNDLINE WT. OR DIAMETER	POT SPACING (ft)

BAIT(S) USED	%

SET NO.	DATE SET	TIME SET	Lat X Lon Beginning	DATE HAULED	TIME HAULED	Lat X Lon End	AVERAGE DEPTH (fm)	NO. SKATES OR POTS SET	LOST GEAR Y/N - (HOW MUCH?)	COMMENTS/TAGS ATTATCH TAGS HERE FOR THIS SET

CATCH DATA please indicate if catch is in NUMBERS or POUNDS (round) use separate box for each species	TARGET	AMOUNT	SPECIES	AMOUNT	SPECIES	AMOUNT	SPECIES	AMOUNT	SPECIES	AMOUNT	SPECIES	AMOUNT

SET NO.	DATE SET	TIME SET	Lat X Lon Beginning	DATE HAULED	TIME HAULED	Lat X Lon End	AVERAGE DEPTH (fm)	NO. SKATES OR POTS SET	LOST GEAR Y/N - (HOW MUCH?)	COMMENTS/TAGS ATTATCH TAGS HERE FOR THIS SET

CATCH DATA please indicate if catch is in NUMBERS or POUNDS (round) use separate box for each species	TARGET	AMOUNT	SPECIES	AMOUNT	SPECIES	AMOUNT	SPECIES	AMOUNT	SPECIES	AMOUNT	SPECIES	AMOUNT

SET NO.	DATE SET	TIME SET	Lat X Lon Beginning	DATE HAULED	TIME HAULED	Lat X Lon End	AVERAGE DEPTH (fm)	NO. SKATES OR POTS SET	LOST GEAR Y/N - (HOW MUCH?)	COMMENTS/TAGS ATTATCH TAGS HERE FOR THIS SET

CATCH DATA please indicate if catch is in NUMBERS or POUNDS (round) use separate box for each species	TARGET	AMOUNT	SPECIES	AMOUNT	SPECIES	AMOUNT	SPECIES	AMOUNT	SPECIES	AMOUNT	SPECIES	AMOUNT

ADDITIONAL COMMENTS / Did you shake gear and/or sablefish due to reaching your limit? How much?

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If you believe you have been discriminated against in any program, activity, or facility, or if you desire further information please write to ADF&G, P.O. Box 25526, Juneau, AK 99802-5526; U.S. Fish and Wildlife Service, 4040 N. Fairfield Drive, Suite 300, Arlington, VA 22203; or O.E.O., U.S. Department of the Interior, Washington DC 20240.

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