

THE SOUTHEAST ALASKA

PACIFIC COD FISHERY



by

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FOREWORD

This report provides species information on Pacific cod and the Pacific cod fishery. This report is designed to be used in conjunction with the 2002 Commercial Groundfish Fishing Regulations, active News Releases, and Emergency Orders. Inseason actions will supercede information provided in this document.

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TABLE OF CONTENTS

	<u>Page</u>
FOREWORD	2
AUTHOR 2	2
ACKNOWLEDGEMENTS	2
LIST OF TABLES	4
LIST OF FIGURES	4
LIST OF APPENDICES	4
INTRODUCTION	5
LIFE HISTORY OF PACIFIC COD	5
COMMERCIAL FISHERY	6
Description of Fishery	6
Catch History	6
FISHERY DATA	7
Methods of Fishery Data Collection	7
Length Frequencies	8
Growth Parameters	8
Age Composition	9
Catch Per Unit Effort	9
Bycatch and Discards	9
Management	10
DISCUSSION	10
STATE REGULATIONS	11
5 AAC 28.160. HARVEST GUIDELINES AND RANGES FOR EASTERN GULF OF ALASKA AREA	11
5 AAC 28.130. LAWFUL GEAR FOR EASTERN GULF OF ALASKA AREA.	11
5 AAC 39.145 ESCAPE MECHANISM FOR SHELLFISH AND BOTTOMFISH POTS.	11
5 AAC 28.135. VESSEL IDENTIFICATION FOR EASTERN GULF OF ALASKA AREA.	12
5 AAC 28.175. LOGBOOKS FOR EASTERN GULF OF ALASKA AREA.	12
5 AAC 28.180. PROHIBITIONS FOR EASTERN GULF OF ALASKA AREA.	13
5 AAC 28.190 HARVEST OF BAIT BY COMMERCIAL PERMIT HOLDERS IN EASTERN GULF OF ALASKA AREA.	13
5 AAC 28.105. DESCRIPTION OF EASTERN GULF OF ALASKA AREA DISTRICTS, SUBDISTRICTS, SECTIONS, AND SECTORS	14
IFQ BYCATCH REGULATIONS	15
Sec.2. FIXED GEAR QUOTA SHARE AND INDEIVIDUAL FISHERY QUOTA SYSTEM	15
LITERATURE CITED	16
APPENDIX	29

LIST OF TABLES

	<u>Page</u>
Table 1. Number of vessels participating in the directed Pacific cod fishery by year and management subdistrict.....	18
Table 2. Pacific cod removals from the NSEI Subdistrict by core fleet* as a proportion of the total directed removals.....	18
Table 3. Pacific cod harvest, value, and effort, in the NSEI and SSEI Subdistricts 1985–2001.....	18
Table 4. Pacific cod catch by fishery for NSEI.....	19
Table 5. Pacific cod catch by fishery for SSEI.....	19
Table 6. Total removals of Pacific cod in round pounds and as a percent of total removals, by year.....	20

LIST OF FIGURES

	<u>Page</u>
Figure 1. Groundfish management areas of Southeast Alaska.....	21
Figure 2. Management districts of Southeast Alaska.....	22
Figure 3a. Pacific cod directed fishery catch for NSEI.....	23
Figure 3b. Pacific cod bycatch, by fishery, for NSEI.....	23
Figure 4a. Pacific cod directed fishery catch for SSEI.....	24
Figure 4b. Pacific cod bycatch, by fishery, for SSEI.....	24
Figure 5. Catch versus price in the directed Pacific cod fishery.....	25
Figure 6. Catch versus price in all fisheries for Pacific cod.....	25
Figure 7a. Length frequencies for Pacific cod in NSEI and SSEI.....	26
Figure 7b. Length frequencies for Pacific cod in NSEI and SSEI.....	27
Figure 8. Length to weight relationship for Pacific cod in the NSEI and SSEI Subdistricts (1990–2001).....	27
Figure 9. Length weight relationship (cm-kg) for Pacific cod in the inside waters of Southeast Alaska (1990–2001).....	28
Figure 10. Commercial longline CPUE by year and gear type for Pacific cod (NSEI and SSEI).....	28

LIST OF APPENDICES

	<u>Page</u>
Appendix A. Listing of ADF&G Region I Commercial Fisheries groundfish personnel.....	30
Appendix B. ADF&G longline – pot fishery logbook form.....	31

INTRODUCTION

Pacific cod (*Gadus macrocephalus*) are found from the northern Yellow Sea in China through the Bering Sea as far north as the Chukchi Sea, and south along the Gulf of Alaska and the coast of North America to Monica Bay, California (Love 1991; Westreim 1996). Pacific Cod inhabit the waters of the continental shelf and the upper continental slope waters (Bakkala et al. 1984; Hart 1973; Love 1991; Westreim 1996). Pacific cod have been an important commercial species in Alaska since 1882 (Rigby 1984).

The Pacific Cod commercial longline and pot fisheries in Southeast Alaska are managed by the Alaska Department of Fish and Game (ADF&G) in internal state waters [Northern Southeast Inside (NSEI) and Southern Southeast Inside (SSEI) Subdistricts] (Figure 1). The National Marine Fisheries Service (NMFS) manages Pacific Cod in the federal waters of the Gulf of Alaska (3–200 mi) and ADF&G parallels NMFS management in the outer coastal waters of Southeast (0–3 mi) (Figure 2). This report details the directed Pacific cod fishery, which occurs in the NSEI and SSEI Subdistricts of Southeast Alaska.

LIFE HISTORY OF PACIFIC COD

Pacific cod are a moderately fast growing, short-lived species compared to many other Alaskan groundfish. Estimates of annual natural mortality in the Gulf of Alaska range from 0.27 to 0.50 (Thompson and Zenger 1993, 1995). The NMFS currently uses an estimate for natural mortality of 0.37 in their stock assessment (Thompson et al. 2001). Pacific cod in Alaskan waters are slower growing with a greater longevity than those found further south, allowing them to attain a greater size. The maximum age for Pacific cod caught in the inside waters of Southeast Alaska, has been estimated at 21 years (ADF&G port sample data 1980–2001) using the break and burn method, however, aging of Pacific cod is problematic (Tok 1994), and all age data should be considered an estimate.

Pacific cod are oviparous and eggs are fertilized externally (Hart 1973). Females produce between 225,000 and 5 million eggs per year, and spawning generally occurs from January to April in waters from 40 m to 120 m in depth (Klovach et al. 1995). Pacific cod spawn once each year, releasing all ripe eggs within a few minutes time (Sakurai 1989). Eggs are demersal, are approximately 1 mm in size, and are weakly adhesive (Hart 1973; Palsson 1990). Hatching occurs in 8 to 28 days depending on water temperature and salinity (Alderdice and Forrester 1971; Hart 1973). Eggs and winter concentrations of adults have been found associated with coarse sand and cobble bottom type, therefore it has been inferred this is optimal spawning habitat (Palsson 1990).

Larvae are approximately 3–4 mm in length at the time of hatching and are born with a yolk sack that is absorbed within 10 days (Palsson 1990). Larvae and juveniles are pelagic, and there is some evidence that both larvae and juveniles are transported to nursery habitats by the current (Garrison and Miller 1982). The nursery habitats are associated with shallow water and intertidal areas with a sandy bottom, and kelp or eel grass vegetation (Miller et al. 1976). It has been theorized that with increasing size and age juveniles move into deeper water (Brodeur et al. 1995).

Adults and large juveniles seem to prefer soft bottom habitats associated with clay, sand, or mud (Garison and Miller 1982) and adults inhabit depths ranging from 10 m to 875 m, although most occur from 50 m to 300 m (Allen and Smith 1988; Love 1991).

Pacific cod have a closed swim bladder making them susceptible to internal injuries when brought to surface from depth. Injuries are caused when gas pressure builds up within the swim bladder causing it to expand within the gut cavity, crushing vital organs. Because of this, most Pacific cod that are caught, including those discarded as bycatch in other fisheries, are often fatally injured.

COMMERCIAL FISHERY

Description of Fishery

Longline gear is the primary gear used in the directed Pacific cod fishery, which takes place in the internal waters of Southeast Alaska, although pots and other hook and line gear such as jig and dinglebar are also legal. The directed fishery for Pacific cod has remained open year round in state waters, for all legal gear types since the adoption of the Guideline Harvest Range (GHR) in 1993.

Pacific cod are a commercially important species in the western Gulf of Alaska and Bering Sea where they are harvested for their flesh as well as for their roe, milt, stomach, liver, and a variety of other parts. These parts are marketed in the orient where they are of considerable value, relative to their flesh. However, the markets for Pacific cod caught in Southeast Alaska are limited because of their small size and because the fish are prone to protistan parasites. These parasites cause parabronchial X-cell lesions, making them less appealing in the food fish market (Westrheim 1996). There are also difficulties delivering these fish to the fresh market in a timely fashion. Therefore a high percentage of the Pacific cod caught in Southeast Alaska are used as bait for more valuable fish and shellfish fisheries.

Catch History

It is difficult to piece together the true catch history of the directed Pacific cod fishery in the inside waters of southeast Alaska, because there are limited landing records for the fishery. Much of the catch is used as bait in other fisheries and fishticket reporting compliance of bait catch has been poor. Also, the fishery that took place on the inside waters was very small in comparison to the Pacific cod fishery that took place in the western Gulf of Alaska and Bering Sea. There is an extensive amount of data available about the history of the fisheries of the Bering Sea and the western Gulf of Alaska (Rigby 1984).

There have only been a limited number of vessels participating in the directed fishery for the past 12 years, and to date, the guideline harvest level (GHL) has never been achieved. A five-year average shows 35 vessels have participate in the NSEI Subdistrict directed Pacific cod fishery per year (Table 1). Of these 35 vessels, 11 vessels take approximately 281,000 pounds per year, which accounts for 55 percent

of the total reported directed catch in the NSEI Subdistrict (Table 2). In the SSEI Subdistrict there have been an average of two vessels participating in the directed fishery.

The Pacific cod catch in state managed inside waters averaged about 700,000 pounds annually over the past five years. In 2000, approximately 600,000 pounds of Pacific cod were taken from the inside waters of Southeast Alaska, 95% of which was taken from the NSEI Subdistrict. Of the 95% caught in the NSEI Subdistrict, 50% was from the Fredrick Sound and Icy Straits areas. Several years of low Pacific cod catch appear in the directed fishery data (Figures 3a and 4a). Reduced catch is particularly evident in the SSEI Subdistrict for 1994 to 1998. These years of low harvest do not coincide with times of low price (Table 3; Figures 5–6). This decrease could be indicative of a period of low abundance, however there are several other possible explanations, which are discussed further in the bycatch section of this report.

Catch levels shown in this report should be considered an absolute minimum, because much of the Pacific cod caught and used as bait in other fisheries is not reported. Although fishermen are required to report all Pacific cod caught, including fish used as bait at sea, much of this catch remains unreported (Figures 3b and 4b; Tables 4 and 5).

Identifying Pacific cod landings in the directed fishery is problematic because multiple target species can be landed on a miscellaneous finfish card making it difficult to differentiate the target species. Also, Pacific cod bycatch in other directed fisheries can be landed on a miscellaneous finfish card. For the purpose of this report the directed fishery was identified as a fisher landing greater than 50% by weight Pacific cod to miscellaneous species (Figures 3a and 4a).

FISHERY DATA

Methods of Fishery Data Collection

Port samplers located in major ports of landing collect biological data specific to the NSEI and SSEI Subdistrict Pacific cod fishery. Data collected includes, fork length, weight, sex, maturity, and otoliths for aging. Biological samples are collected sporadically and thus it is not possible to use some of the data for size frequency distributions, or other biological indicators of population health.

Catch data from the NSEI and SSEI Subdistricts is derived from commercial logbook data and fish tickets. Commercial logbook information used for management of the fishery includes; date gear set, date gear hauled, location (in latitude and longitude) of each set, amount and type of gear set, estimate of catch for each set, and estimates of bycatch associated with each set. A copy of this logbook is required to be turned into the state with the fish tickets (Appendix 1).

Length Frequencies

Palsson (1990), in studying several decades of Canadian commercial catch data, reported that length frequencies are usually multi-modal and the fishery generally depends on one or two strong cohorts for the majority of its catch.

Length frequency distributions from Pacific cod sampled from the NSEI and SSEI Subdistrict Pacific cod fishery are shown in Figure 3a and 3b. Length frequency data from the commercial catch differs somewhat by management subdistrict; however, both subdistricts show multi-modal distributions. Several strong cohorts appear in the 1999 NSEI Subdistrict data, at 53 cm, 60 cm, and 64 cm. Mean size in the 1999 data is 60 cm. The 2000 NSEI Subdistrict data had too small a sample size and therefore does not appear in this report. In the 2001 NSEI Subdistrict data, the mean length is 59 cm and no outstanding cohorts appear in the length frequency distribution. There are, however, small modes appearing at 62 cm, 59 cm, and possibly 42 cm. This could be an indication of a low level of recruitment, however, without continuous data from 1995 to 2001 it is difficult to draw any meaningful conclusions from the 2001 data. In the 2000 SSEI Subdistrict data, mean length is 64 cm, and there are several modes at 54 cm, 59 cm, 66 cm, and 67 cm. This information may be misleading due to the marginal sample size and because the entire sample was taken from a single vessel (multiple trips). It is however, the only data available from that area for the past seven years, therefore it was included. It is hard to follow long-term trends in the NSEI/SSEI Pacific cod fishery due to several years of missing data and several years with small sample sizes.

Growth Parameters

A graph showing the length-weight relationship for Pacific cod caught in NSEI and SSEI is shown in Figure 3. This graph combines the data for all years (1990–2001) and both sexes, because the sample sizes were too small to look at individually. A length-weight regression showing the parameters $W = aL^b$ are listed in Figure 9. These parameters were calculated using 1990 through 2001 port sample data. Because there were so few samples the data was combined for both management areas and both sexes.

The growth and maturity of Pacific cod varies greatly with latitude (Karp 1982). It has been reported that in west Kamchatka males and females reach 50% sexual maturity at lengths of 69 cm and 73 cm respectively (Ketchen 1961). By comparison, in the Strait of Georgia, male and female Pacific cod are 50% sexually mature is at 48–49 cm and 55 cm respectively (Ketchen 1961). In the waters of British Columbia, 50% sexual maturity has been found in 47–56 cm length females and in 41–53 cm length males. (Ketchen 1961). Males are reported to mature at an earlier age and smaller size than females. In the Strait of Georgia, 50% sexual maturity in males occurs at age 2. In comparison, females are only 15–20% sexually mature at this age. There have been no studies, to date, investigating the growth and maturity of Pacific cod on the inside waters of Southeast Alaska.

Age Composition

Historically, several structures have been studied to determine age of Pacific cod including otoliths, fin rays, and scales. Aging of Pacific cod remains problematic regardless of structure examined (Hattori et al. 1992; Ketchen 1970; Kimura and Lyons 1990; Lai et. al. 1987; LaLanne 1975; Tok 1994). Not surprisingly, fish age as determined by scale analysis often disagrees with age determined from otoliths (Tok 1994).

ADF&G collects Pacific cod otoliths from the commercial fishery through its port sampling program. Many of these otoliths have not been aged because an accurate means of determining age from Pacific cod otoliths has not been developed. However, a recent study has tentatively validated thin sectioning of otoliths with digital measurements of annuli. This study combines new age reading criteria along with new preparation methods, producing more accurate ages (Roberson 2001). Aging of Pacific cod otoliths may be a possibility in the near future.

Catch Per Unit Effort

Catch per unit effort (CPUE) data is collected through a mandatory logbook program. Commercial CPUE expressed as round pounds of Pacific cod per hook shows a stable CPUE, for both NSEI and SSEI Subdistricts combined, for the past five years (Figure 10). Overall CPUE for both snap-on longline and conventional longline gear seems to be about the same, however it is hard to obtain any definitive information from this data because both 1997 and 2001 are incomplete data sets. The logbook program was not instituted until July 1997 and 2001 is not fully entered.

Bycatch and Discards

Pacific cod have been taken as bycatch in the domestic longline fisheries, in particular the halibut fishery, since the turn of the century. Bycatch of Pacific cod, by target fishery, is depicted in Figures 3a and 4a, and Tables 4 and 5. The allowable bycatch limit for Pacific cod taken in the Halibut fishery is 20% by round weight of the halibut aboard, however bycatch in excess of this limit may be landed on a Miscellaneous Finfish Card (M card). It is difficult to estimate actual bycatch levels of Pacific cod in these fisheries because many fishers use Pacific cod as bait and a significant amount of fish used as bait is unreported. Also, because of the fish's low value (Table 3), many fishers will discard Pacific cod bycatch at sea. A large percentage of these discarded cod are dead due to internal injuries caused by an expanded swim bladder. Therefore bycatch levels found in this report should be considered an absolute minimum.

Pacific cod caught as bait for the shellfish fisheries does not appear in Figures 3b and 4b. On average, less than three vessels per year report their bait catch for the shellfish fishery making the information confidential. The amount of fish reported caught is also very minimal. As stated earlier there is significant unreported Pacific cod catch associated with these fisheries.

In the past five years an average of 14 percent of the total reported Pacific cod removals from the NSEI and SSEI Subdistricts was landed as bycatch in other fisheries, beginning in 1997 with 11% of the total Pacific cod catch and steadily increasing to 18% in 2001. A five-year average estimates the halibut fishery accounts for 8% of the total Pacific cod bycatch from inside waters. Pacific cod bycatch in the halibut fishery accounted for 7% of the total reported removals in both the NSEI and SSEI Subdistricts in 1997. In the 2001 data, Pacific cod bycatch in the halibut fishery accounts for 10% of the total reported Pacific cod removals. A significant amount of Pacific cod bycatch is also reported in the demersal shelf rockfish fishery (Table 6).

Figures 3b and 4b show several years of low Pacific cod catch in several fisheries. These low catches are particularly evident in the SSEI Subdistrict, directed pacific cod fishery (Figure 4a), and in the NSEI Subdistrict, in all fisheries which take Pacific cod as bycatch. We do not have enough information to draw any conclusions from this information, however, currently in the Gulf of Alaska, the federal stock assessment has shown a general decline in the Pacific cod stocks (Thompson 2001).

Management

The Pacific cod fishery that occurs on the inside waters of Southeast Alaska is currently managed using a guideline harvest range based on historical catch and industry input. The Board of Fish (BOF) adapted the guideline harvest range of 750,000 to 1,250,000 pounds, per year, in November 1993 when the fishery was rapidly escalating. The Alaska Department of Fish and Game generally sets the annual GHIL at the midpoint of the range.

DISCUSSION

There has been a decrease in effort in the directed fishery for the past several years (Figure 3a, 3b, 4a, and 4b). This may have to do largely with economic factors affecting the fleet. Increased price for fuel, increased price for bait, and a decrease in price paid for Pacific cod could all affect directed fishing effort.

STATE REGULATIONS

PACIFIC COD

5 AAC 28.160. HARVEST GUIDELINES AND RANGES FOR EASTERN GULF OF ALASKA AREA.

(f) The guideline harvest range for the taking of Pacific cod in the Southern and Northern Southeast Inside Subdistricts combined is 750,000 – 1,250,000 pounds round weight.

5 AAC 28.130. LAWFUL GEAR FOR EASTERN GULF OF ALASKA AREA.

(d) In the Southeast District,

(3) Pacific cod may be taken only by longline, dinglebar troll gear, hand troll gear, mechanical jigging machines, and pots;

(f) In the Eastern Gulf of Alaska Area, pots may not be longlined. At least one buoy on each groundfish pot must be legibly marked with only the permanent department vessel license plate number of the vessel operating the gear. The number must be placed on the top one-third of the buoy in numerals at least four inches high and one-half inch wide, must be in a color contrasting to the color of the buoy, and must be visible above the water surface when the buoy is attached to the groundfish pot.

(h) In the Eastern Gulf of Alaska Area, dinglebar troll gear is gear that consists of a single line that is retrieved and set with a troll gurdy or hand troll gurdy with a terminally attached weight from which one or more leaders with one or more lures or baited hooks are pulled through the water while a vessel is making way.

(k) A person may not operate a vessel that is using dinglebar troll gear and mechanical jigging machines at the same time.

5 AAC 39.145 ESCAPE MECHANISM FOR SHELLFISH AND BOTTOMFISH POTS.

Pot gear must include an escape mechanism in accordance with the following provisions:

(1) A sidewall, which may include the tunnel, of all shellfish and bottomfish pots must contain an opening equal to or exceeding 18 inches in length, except that in shrimp pots the opening must be a minimum of six inches in length. The opening must be laced, sewn, or secured together by a single length of untreated, 100 percent cotton twine, no larger than 30 thread. The cotton twine may be knotted at each end only. The opening must be within six inches of the bottom of the pot and must be parallel with it. The cotton twine may not be tied or looped around the web bars. Dungeness crab pots may have the pot lid tie-down straps secured to the pot at one end by a single loop of untreated, 100 percent cotton twine no larger than 60 thread, as a substitute for the above requirement; the pot lid must be secured so that, when the twine degrades, the lid will no longer be securely closed.

(2) All king crab, Tanner crab, shrimp, miscellaneous shellfish and bottomfish pots may, instead of complying with (1) of this section, satisfy the following: a sidewall, which may include the tunnel, must contain an opening at least 18 inches in length, except that shrimp pots must contain an opening at least six inches in length. The opening must be laced, sewn, or secured together by a single length of treated or untreated twine, no larger 36 thread. A galvanic timed released

(GTR) device, designed to release in no more than 30 days in salt water, must be integral to the length of twine so that, when the device releases, the twine will no longer secure or obstruct the opening of the pot. The twine may be knotted only at each end and at the attachment points on the galvanic timed release device. The opening must be within six inches of the bottom of the pot and must be parallel with it. The twine may not be tied or looped around the web bars.

5 AAC 28.135. VESSEL IDENTIFICATION FOR EASTERN GULF OF ALASKA AREA.

(a) In the Eastern Gulf of Alaska Area, a vessel fishing for groundfish with dinglebar troll gear must display the letter “D” and a vessel fishing for groundfish with mechanical jigging machines must display the letter “M”

(1) on both sides of the hull, cabin, and mast:

(2) in symbols at least 12 inches high and one inch wide that contrast with the background

(3) in a manner that leaves the letter plainly visible and unobscured; and

(4) at all times when fishing with or transporting fish taken with dinglebar troll gear or mechanical jigging machines.

(b) Repealed 7/14/00

(c) A person may not operate a vessel that is displaying

(1) more than one letter required under (a) of this section at any time;

(2) any letter required under (a) of this section when the vessel is being used to fish for salmon.

5 AAC 28.175. LOGBOOKS FOR EASTERN GULF OF ALASKA AREA.

(a) An operator of a vessel fishing for groundfish in the waters of Alaska in the Eastern Gulf of Alaska Area or in a state-managed directed fishery in the waters of the exclusive economic zone adjacent to the Eastern Gulf of Alaska Area shall maintain an accurate logbook of all fishing operations for each type of gear used.

(b) A logbook described in (a) of this section

(1) for longline gear 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; for the Northern Southeast Inside Subdistrict and the Southern Southeast Inside Subdistrict sablefish fisheries, a logbook must include a record of the round weight delivered, the purchasing processor, and date of each delivery during that season if multiple landings have been made;

(2) for dinglebar, mechanical jig, or hand troll gear must include the date, the specific location of harvest by six digit statistical area and nearest headland, the number of lines and hooks per lines used, the average depth fished, the hours fished for each line, and the number of bycatch fish taken, by species; for the target species the following is required:

(A)the number retained;

(B)the number discarded; and

(C)for lingcod only, their estimated sex ratio;

(3) must be updated, within 24 hours after midnight local time on the day of operation; and

(4) must be retained, with its original pages, for a period of two years by the owner or operator of the vessel.

(c) A logbook described in (a) of this section must be kept on board the vessel while operating gear, during transits to or from a port of landing, and for five days after delivering groundfish.

(d) Repealed 6/15/97

(e) A logbook described in (a) of this section must be made available to a local representative of the department upon request.

(f) A copy of the page of the logbook described in (a) in this section pertaining to a landing must be attached to the fish ticket documenting the landing.

(g) A person may not make a false entry in the logbook described in (a) of this section.

5. AAC 28.180. PROHIBITIONS FOR EASTERN GULF OF ALASKA AREA.

(b) Unless authorized by the terms of a scientific, propagative, or educational permit issued under AS 16.05.340(b), a person may not possess groundfish in a manner that indicates an intent to keep the groundfish alive.

5. AAC 28.190 HARVEST OF BAIT BY COMMERCIAL PERMIT HOLDERS IN EASTERN GULF OF ALASKA AREA.

The holder of valid CFEC interim use or limited entry permit may take groundfish in the waters of Alaska in the Eastern Gulf of Alaska Area for use as bait in the commercial fishery for which the permit is held as follows:

(1) groundfish may be taken at any time;

(2) unless use of a gear is restricted in 5 AAC 27- 5 AAC 39, groundfish may be taken by any gear specified in 5 AAC 39.105 except trawls.

(3) no more than 10 percent, by weight, of all other species of fish on board the vessel may be demersal shelf rockfish, and no more than 10 percent, by weight, of all other species of fish on board may be lingcod.

(4) a person on board a vessel used to take bait under the provisions of this section may not participate in the sablefish fishery if restricted by 5 AAC 28.180.

(5) a person who takes groundfish under this section must report the harvest to the department on departmental fish tickets within seven days after landing a species for which the bait was intended;

(6) groundfish taken under this section may not be:

(A) purchased or sold; or

(B) transported outside of the waters of Alaska in the Eastern Gulf of Alaska Area;

(7) sablefish taken under this section must be cut in half laterally between the first and second dorsal fin immediately after capture, and may not be retained aboard a vessel after the cessation of the fishing trip during which the sablefish was used as bait.

5 AAC 28.105. DESCRIPTION OF EASTERN GULF OF ALASKA AREA DISTRICTS, SUBDISTRICTS, SECTIONS, AND SECTORS

(a) Southeast District: all waters described in 5 AAC 28.100.

(1) Southern Southeast Inside (SSEI) Subdistrict: All waters of Dixon Entrance, Clarence Strait, Ernest Sound, Behm Canal, Bradfield Canal, Sumner Strait, Cordova Bay, Tlevak Strait, Bucarelli Bay, Gulf of Esquibel, Davidson Inlet, Sea Otter Sound, Stikine Strait, Blake Channel, Zimovia Strait, Eastern Passage, and contiguous bays and inlets and that portion of Frederick Sound, bordered by a line from 54°43.50' N. lat., 130°37.62' W. long. to 54°43.40' N. lat., 130°37.65' W. long. to 54°43.25' N. lat., 130°37.73' W. long. to 54°43' N. lat., 130°37.92' W. long. to 54°42.97' N. lat., 130°37.95' W. long. to 54°42.78' N. lat., 130°38.10' W. long. to 54°42.37' N. lat., 130°38.43' W. long. to 54°41.15' N. lat., 130°38.97' W. long. to 54°39.90' N. lat., 130°38.97' W. long. to 54°39.23' N. lat., 130°39.30' W. long. to 54°39.80' N. lat., 130°41.58' W. long. to 54°40.05' N. lat., 130°42.37' W. long. to 54°40.70' N. lat., 130°44.72' W. long. to 54°40.68' N. lat., 130°44.98' W. long. to 54°40.77' N. lat., 130°45.85' W. long. to 54°41.10' N. lat., 130°48.52' W. long. to 54°41.08' N. lat., 130°49.28' W. long. to 54°41.35' N. lat., 130°53.30' W. long. to 54°41.43' N. lat., 130°53.65' W. long. to 54°42.45' N. lat., 130°56.30' W. long. to 54°42.57' N. lat., 130°57.15' W. long. to 54°43' N. lat., 130°57.68' W. long. to 54°43.77' N. lat., 130°58.92' W. long. to 54°44.20' N. lat., 130°59.73' W. long. to 54°45.65' N. lat., 131°03.10' W. long. to 54°46.27' N. lat., 131°04.72' W. long. to 54°42.18' N. lat., 131°13' W. long. to 54°40.87' N. lat., 131°13.90' W. long. to 54°39.15' N. lat., 131°16.28' W. long. to 54°36.87' N. lat., 131°19.37' W. long. to 54°29.88' N. lat., 131°33.80' W. long. to 54°30.53' N. lat., 131°38.02' W. long. to 54°28.30' N. lat., 131°45.33' W. long. to 54°26.68' N. lat., 131°49.47' W. long. to 54°21.85' N. lat., 132°02.90' W. long. to 54°24.87' N. lat., 132°23.65' W. long. to 54°24.68' N. lat., 132°24.48' W. long. to 54°24.68' N. lat., 132°24.58' W. long. to 54°24.65' N. lat., 132°26.85' W. long. to 54°25.33' N. lat., 132°41.53' W. long. to the Cape Muzon Light to the northernmost tip of Eagle Point on Dall Island and passing successively through the southernmost tip of Point Arboleda, the northernmost tip of Point San Rogue, the southernmost tip of Cape Ulitka, the northernmost tip of Cape Lynch to the southernmost tip of Helm Point, and from a point west of Gish Bay at 55°54.53' N. lat., 134°12.50' W. long. to the Cape Decision Light and from Point Camden to Salt Point Light on Keku Strait and from Beacon Point to Wood Point;

(2) Northern Southeast Inside (NSEI) Subdistrict: All waters of Frederick Sound, Stephens Passage, Lynn Canal, Icy Strait, Glacier Bay, Chatham Strait, and contiguous bays and inlets bordered by a line from Beacon Point to Wood Point, from Point Camden to Salt Point Light, the Cape Decision Light to a point west of Gish Bay at 55°54.53' N. lat., 134°12.50' W. long. to the

southernmost tip of Helm Point to the westernmost tip of Hazy Island to the Cape Ommaney Light, north of 57°30' N. lat. in Peril Straight, from the westernmost tip of Column Point to the northernmost tip of Soapstone Point and from the southernmost tip of Cape Spencer through Yakobi Rock to Yakobi Island;

(3) Icy Bay Subdistrict: All waters of the Southeast District between 140° W. long., including Yakutat Bay three miles seaward of a line from Ocean Cape at 59°30' N. lat.;

(4) Southeast Outside Subdistrict: All remaining waters of the Southeast District:

(A) Southern Southeast Outside (SSEO) Section: all waters of the Southeast Outside Subdistrict south of 56° N. lat., and east of 137° W. long.;

(B) Central Southeast Outside (CSEO) Section: all waters of the Southeast Outside Subdistrict between 56° N. lat. and 57°30' N. lat., and east of 137° W. long.;

(C) Northern Southeast Outside (NSEO) Section: all waters of the Southeast Outside Subdistrict north of 57°30' N. lat., and east of 137° W. long.;

(D) East Yakutat (EYKT) Section: all waters of the Southeast Outside Subdistrict between 137° and 140° W. long.

IFQ BYCATCH REGULATIONS

NMFS regulations regarding Pacific cod caught in the IFQ Halibut and Sablefish fisheries:

Sec.2. FIXED GEAR QUOTA SHARE AND INDEIVIDUAL FISHERY QUOTA SYSTEM

L) Fish harvested incidentally during the operation of a QS/IFQ fishery shall be termed bycatch species for the purpose of this program. Bycatch species shall be Pacific cod and rockfish, but other species may be included by NMFS by regulatory amendment if it can be shown that the species is unlikely to survive if discarded. Any species identified as a bycatch species that is taken during the operation of a QS/IFQ fishery shall be retained and landed unless designated a prohibited species.

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Table 1. Number of vessels participating in the directed Pacific cod fishery by year and management subdistrict.

Year	NSEI	SSEI	Total
1997	34	3	25
1998	45	2	45
1999	38	3	40
2000	39	4	41
2001	17	0	17

Table 2. Pacific cod removals from the NSEI Subdistrict by core fleet* as a proportion of the total directed removals.

Year	Number of Vessels	Round Pounds Landed by Vessels	Total Pounds Landed in the Directed Fishery	Percent of Total
1997	9	131,652	683,209	19%
1998	12	354,734	571,792	62%
1999	15	433,199	679,875	64%
2000	14	327,196	466,534	70%
2001	7	157,979	259,757	61%
Average	11	280,952	532,233	55%

*Core fleet is defined as a vessel delivering greater than 14,000 round pounds in the directed fishery.

Table 3. Pacific cod harvest, value, and effort, in the NSEI and SSEI Subdistricts 1985–2001.

Year	Directed Harvest Round Pounds	Directed Value	Directed Permits	Total Harvest Round Pounds	Total Value	Total Permits
1985	132,915		42	142,405	\$35,601	61
1986	318,312	\$79,578	99	338,145	\$84,536	123
1987	724,781	\$231,930	179	781,487	\$250,076	259
1988	474,359	\$166,026	156	522,964	\$177,808	278
1989	311,255	\$124,502	102	380,070	\$140,626	318
1990	218,120	\$80,704	74	309,919	\$102,273	338
1991	504,036	\$191,534	88	589,376	\$212,175	322
1992	780,265	\$335,514	141	886,243	\$354,497	377
1993	889,676	\$382,561	133	962,434	\$394,598	319
1994	346,663	\$138,665	77	402,475	\$148,916	220
1995	285,363	\$105,584	92	339,312	\$115,366	237
1996	592,090	\$313,808	129	639,343	\$326,065	281
1997	722,814	\$310,810	138	778,413	\$326,933	298
1998	585,573	\$216,662	106	647,940	\$233,258	301
1999	709,378	\$255,376	131	808,175	\$282,861	356
2000	528,147	\$219,118	107	592,568	\$235,067	305
2001	302,714	\$87,787	77	347,405	\$93,799	238

Table 4. Pacific cod catch by fishery for NSEI.

Year	Jig	Pot	DSR	Sablefish	Halibut Longline	Misc. Longline	Directed Pacific Cod	Total Removals
1990	*	0	2,171	3,096	69,989	6,384	197,157	278,797
1991	*	0	5,926	4,542	45,032	4,026	453,228	512,754
1992	4,354	*	7,065	2,593	82,146	11,774	720,719	828,650
1993	1,631	0	552	6,148	57,635	7,869	855,469	929,305
1994	*	0	2,128	1,389	44,489	4,515	329,206	381,726
1995	*	*	1,874	*	46,217	11,741	265,844	325,674
1996	3,901	0	*	1,054	39,945	15,044	568,649	628,594
1997	*	0	2,035	2,346	44,439	26,818	683,209	758,847
1998	*	*	6,938	3,721	44,225	18,627	571,792	645,302
1999	3,605	0	10,353	4,441	74,404	21,757	679,875	794,433
2000	0	0	2,761	748	54,821	36,388	466,534	561,252
2001	*	0	4,005	1,499	30,986	16,723	259,757	312,970

*Blanks appearing in the data are years in which less than three vessels participated and are therefore information is confidential.

Table 5. Pacific cod catch by fishery for SSEI.

Year	DSR	Sablefish	Halibut Longline	Misc. Longline	Directed Pacific Cod	Total Removals
1990	5,279	199	6,593	4,544	10,806	27,421
1991	6,547	181	6,818	697	44,830	59,074
1992	3,283	319	6,406	3,221	42,123	55,352
1993	1,663	530	2,723	316	25,077	30,309
1994	340	0	6,046	3,216	7,624	17,227
1995	*	*	5,297	762	3,326	9,385
1996	993	774	2,582	1,451	4,483	10,284
1997	217	533	6,132	3,100	4,132	14,113
1998	3,206	855	3,073	3,047	*	10,181
1999	4,161	623	5,271	1,630	16,172	27,858
2000	2,347	62	2,951	3,511	21,714	30,586
2001	2,047	198	2,068	950	6,337	11,600

*Blanks appearing in the data are years in which less than 3 vessels participated and are therefore confidential.

Table 6. Total removals of Pacific cod in round pounds and as a percent of total removals, by year.

Year	<u>Directed Fishery</u>		<u>Bycatch from Other Fisheries</u>		<u>Halibut Fishery</u>		<u>Total Removals</u>
	Round Pounds	Percent of Total	Round Pounds	Percent of Total	Round Pounds	Percent of Total	Round Pounds
1997	687,341	89%	34,884	4%	50,735	7%	772,960
1998	571,792	87%	36,393	6%	47,298	7%	655,483
1999	696,047	85%	46,569	6%	79,675	9%	822,291
2000	488,248	82%	45,818	8%	57,772	10%	591,838
2001	266,094	82%	25,422	8%	33,054	10%	324,570
Average	541,904	86%	37,817	6%	53,707	8%	633,428

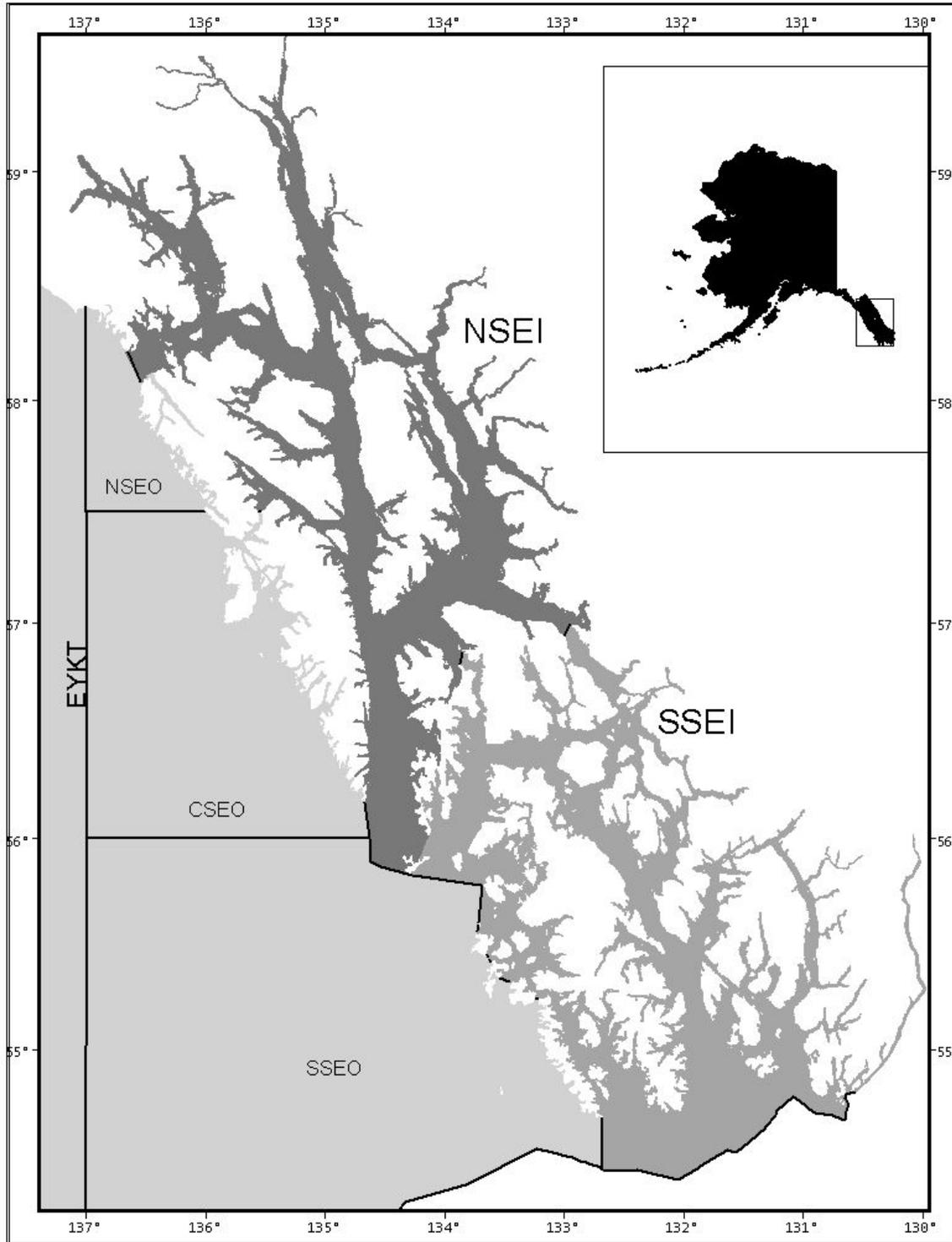


Figure 1. Groundfish management areas of Southeast Alaska.

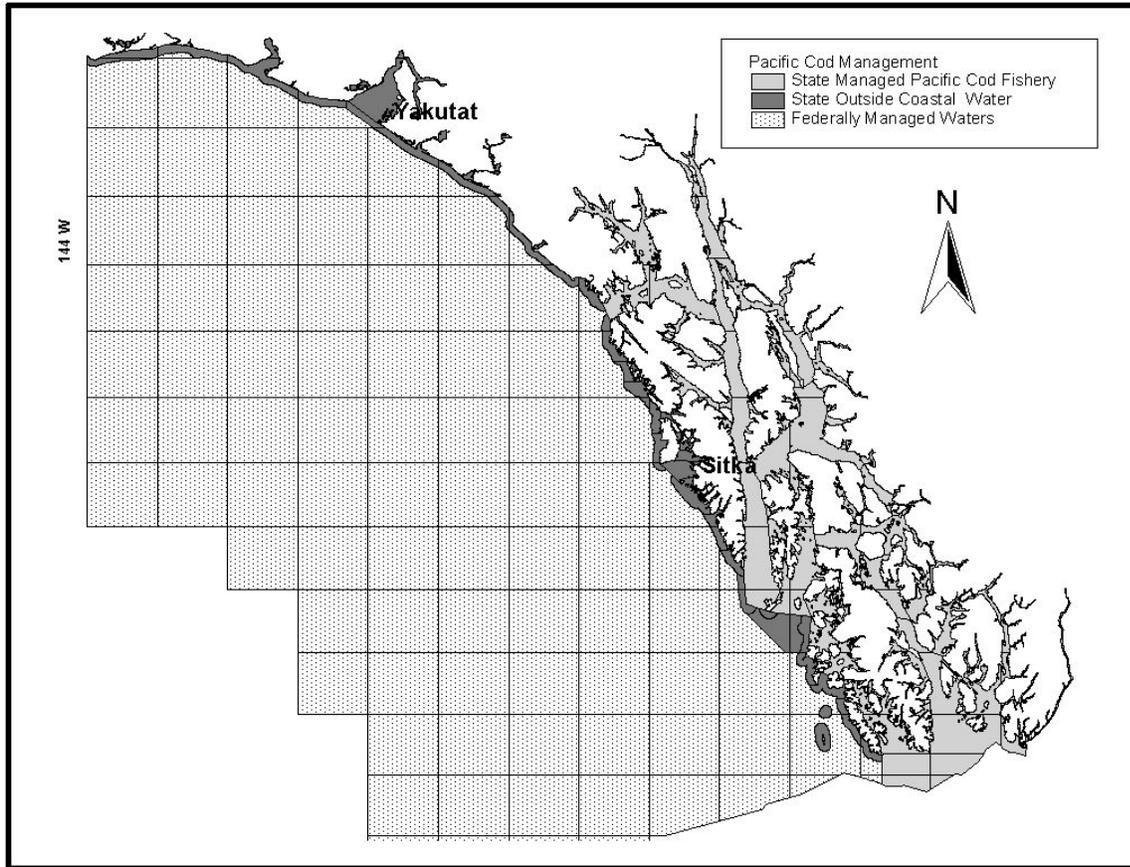
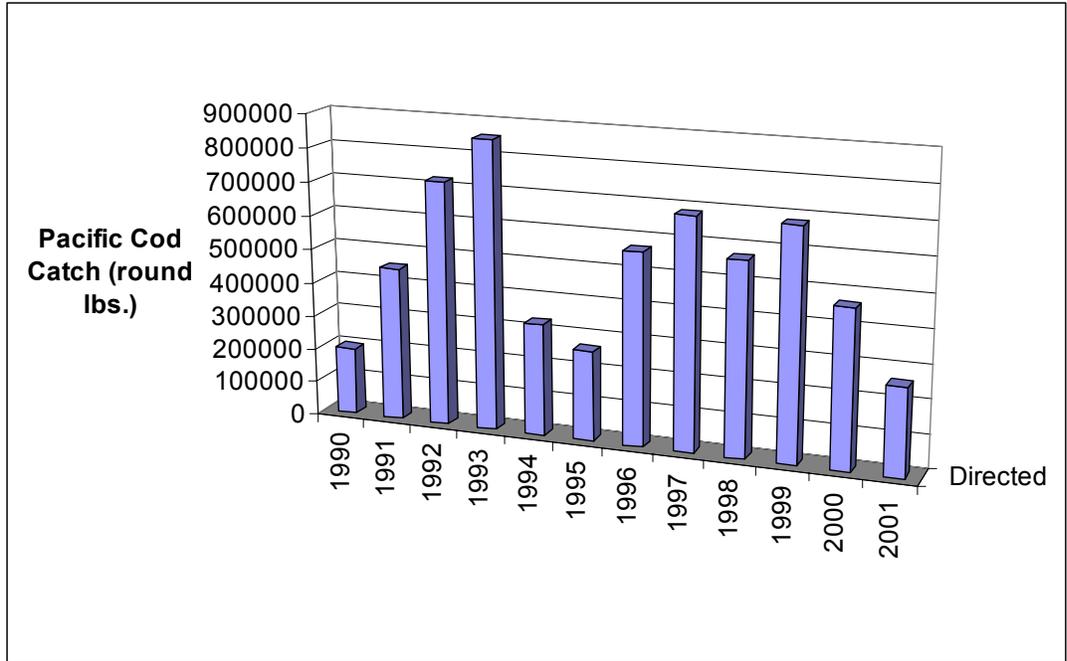


Figure 2. Management districts of Southeast Alaska.



*Figures are based on 50% or greater catch (in round pounds), Pacific cod/Misc. species.

Figure 3a. Pacific cod directed fishery catch for NSEI.

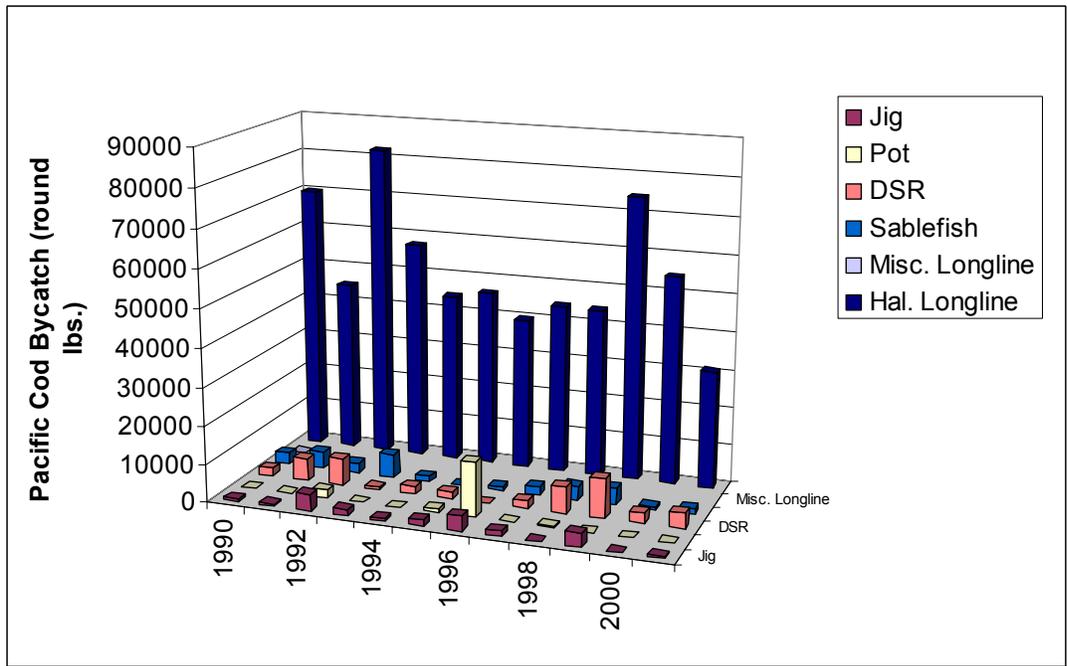
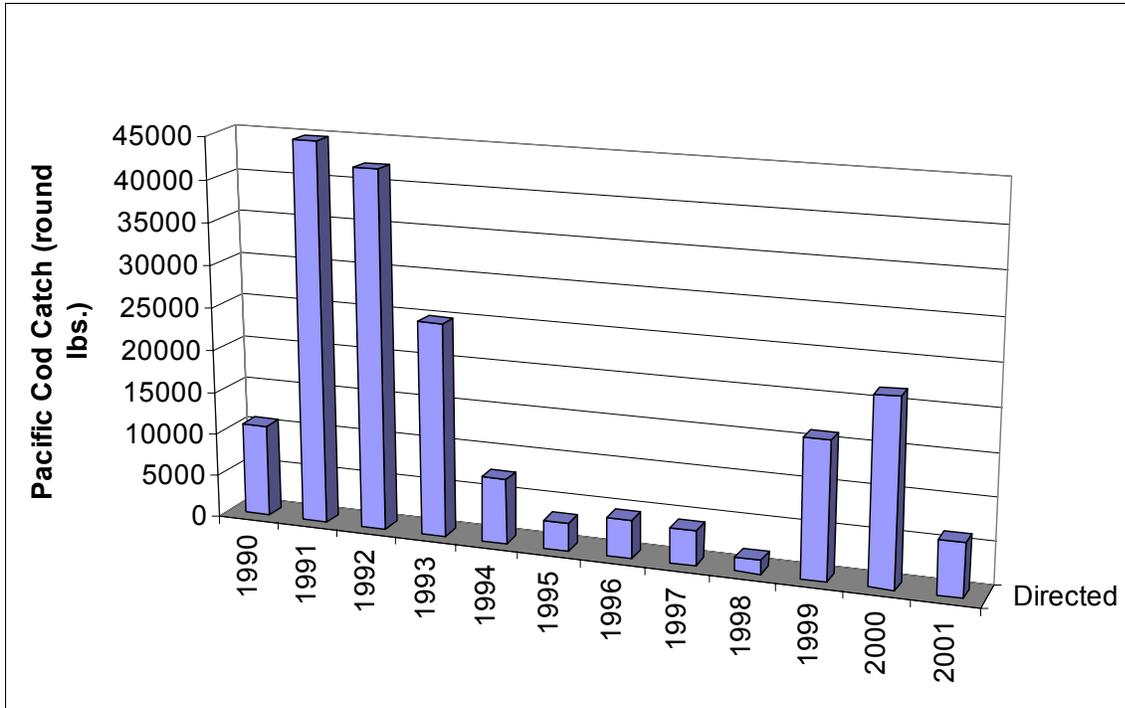


Figure 3b. Pacific cod bycatch, by fishery, for NSEI.



*Figures are based on 50% or greater catch (in round pounds), Pacific cod/Misc. species.

Figure 4a. Pacific cod directed fishery catch for SSEI.

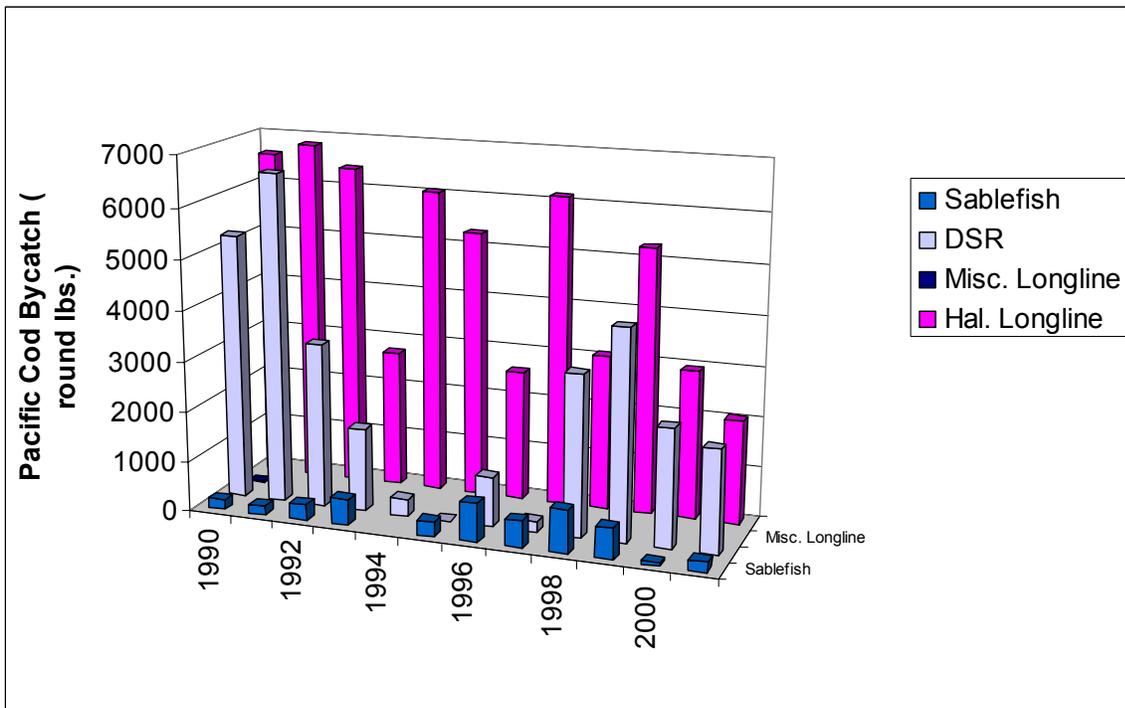


Figure 4b. Pacific cod bycatch, by fishery, for SSEI.

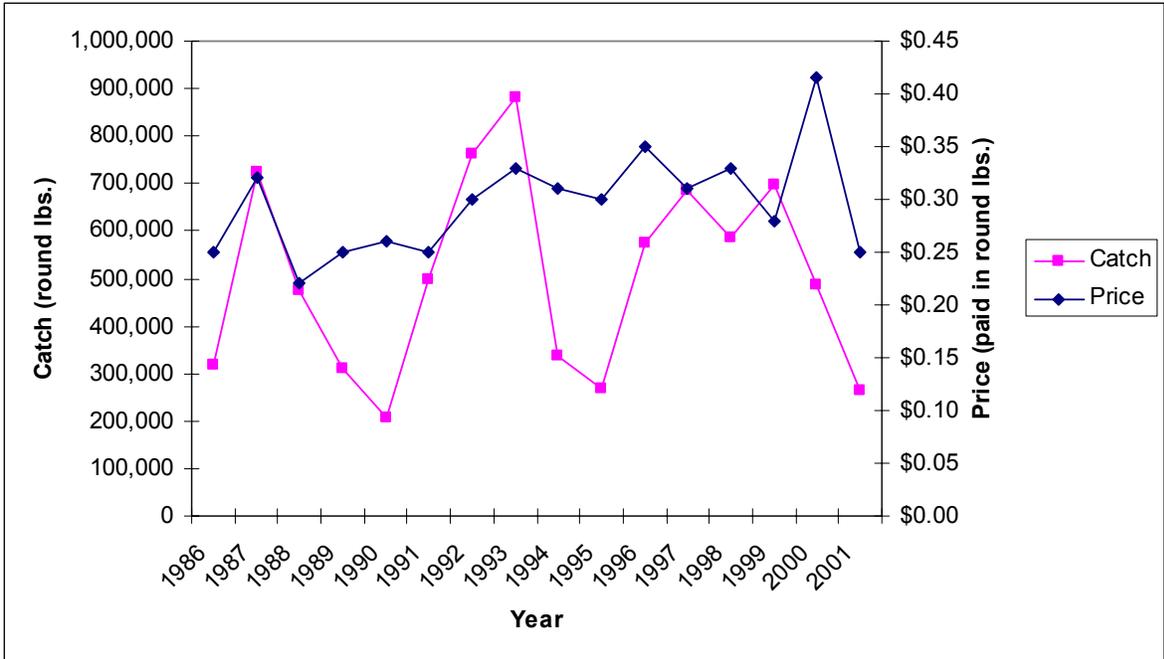


Figure 5. Catch versus price in the directed Pacific cod fishery.

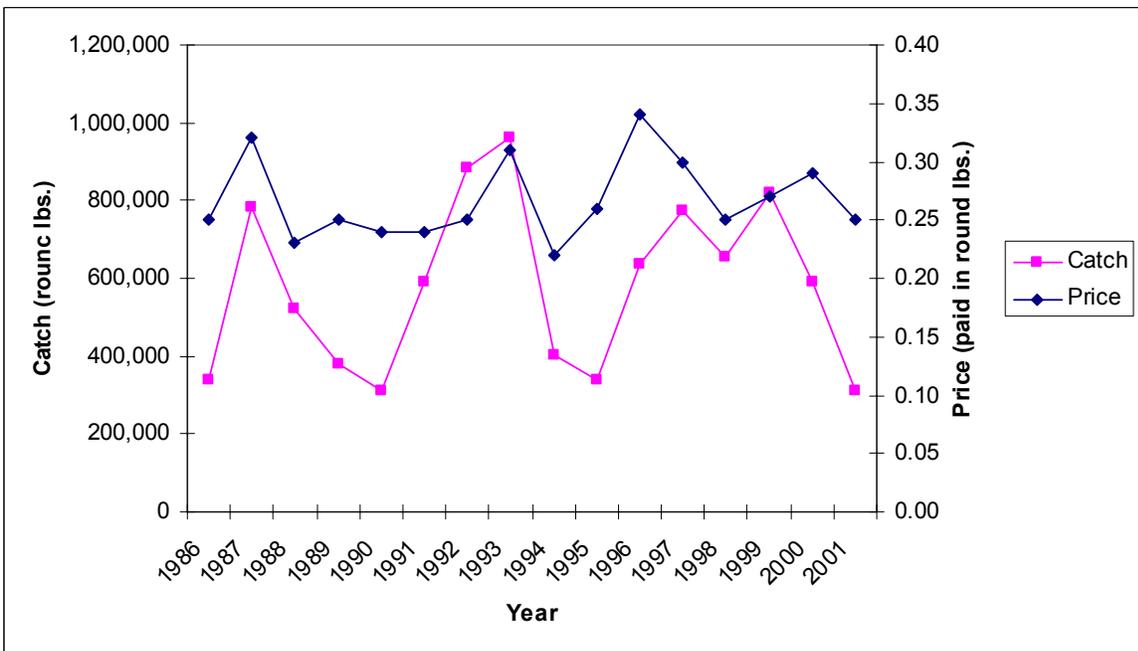
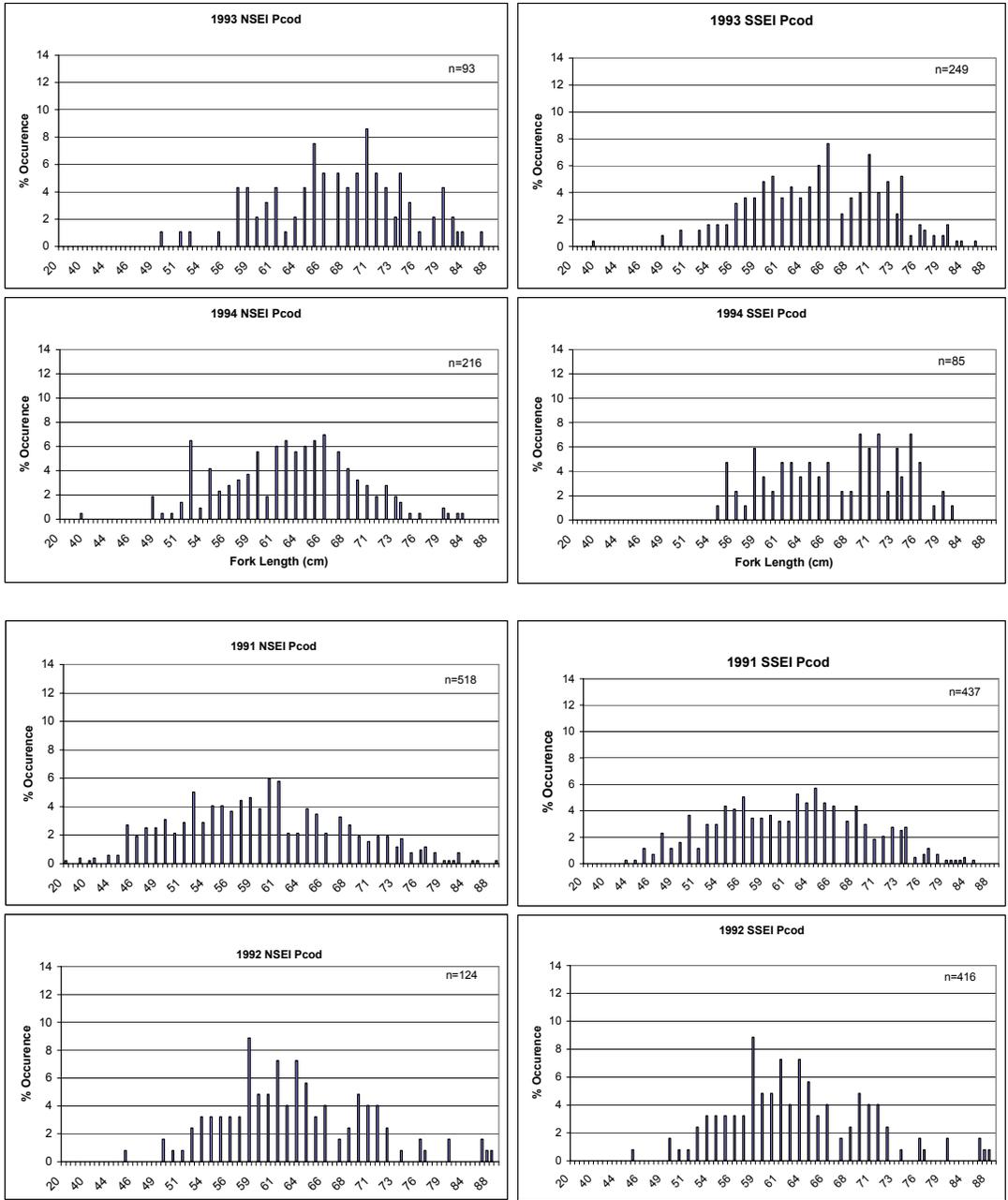


Figure 6. Catch versus price in all fisheries for Pacific cod.



* NSEI 1993 data, has a marginal sample size, it was included to see a continuous time line.
 **SSEI 1994 data, has a marginal sample size, it was included to see a continuous time line.

Figure 7a. Length frequencies for Pacific cod in NSEI and SSEI.

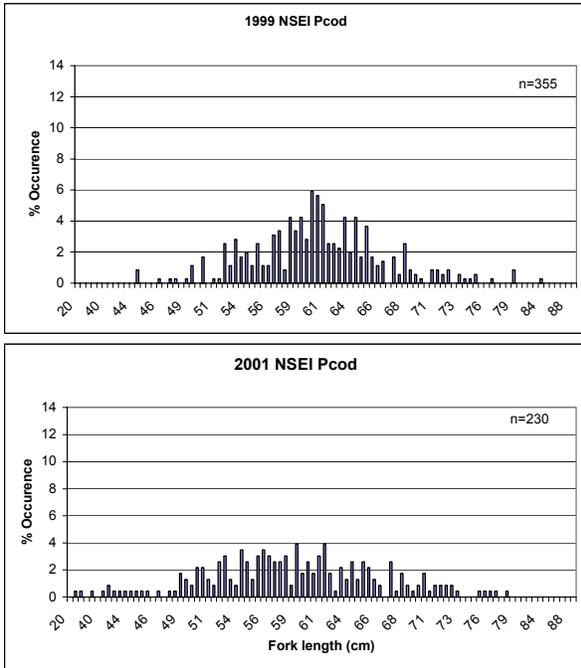


Figure 7b. Length frequencies for Pacific cod in NSEI and SSEI.

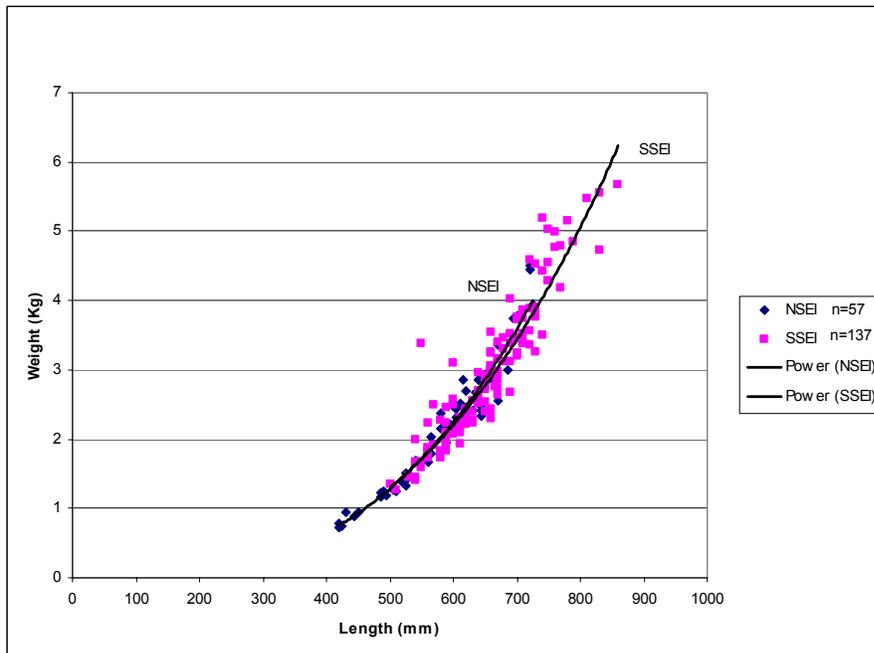


Figure 8. Length to weight relationship for Pacific cod in the NSEI and SSEI Subdistricts (1990–2001).

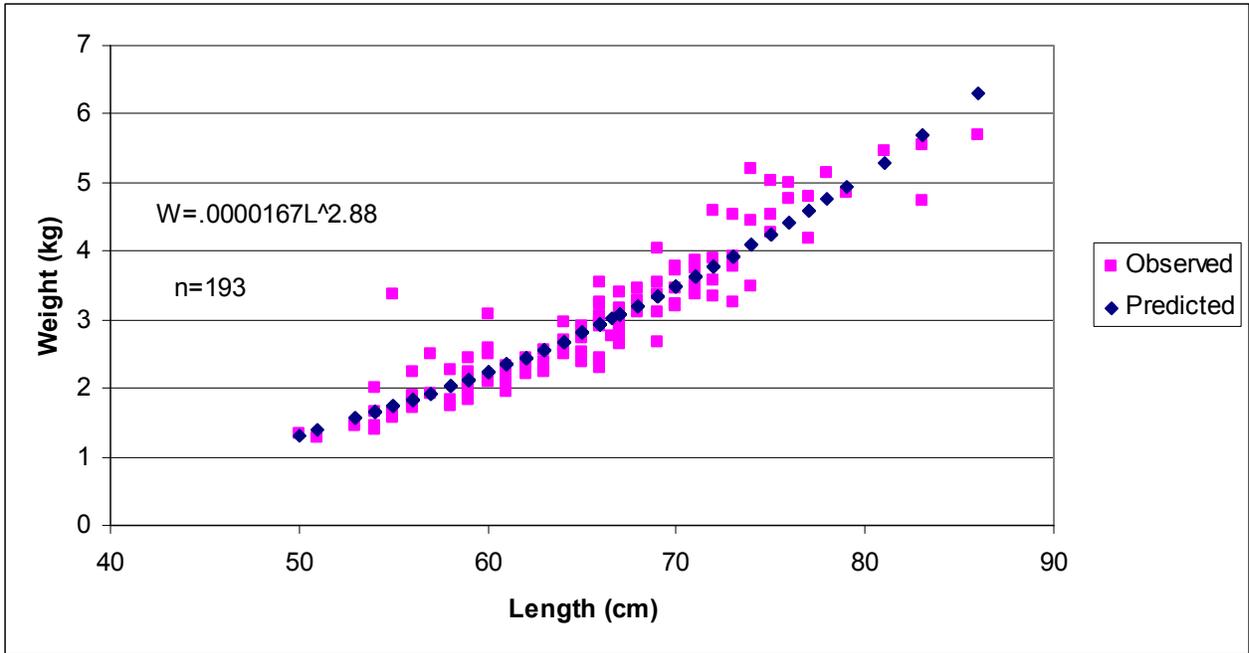


Figure 9. Length weight relationship (cm-kg) for Pacific cod in the inside waters of Southeast Alaska (1990–2001).

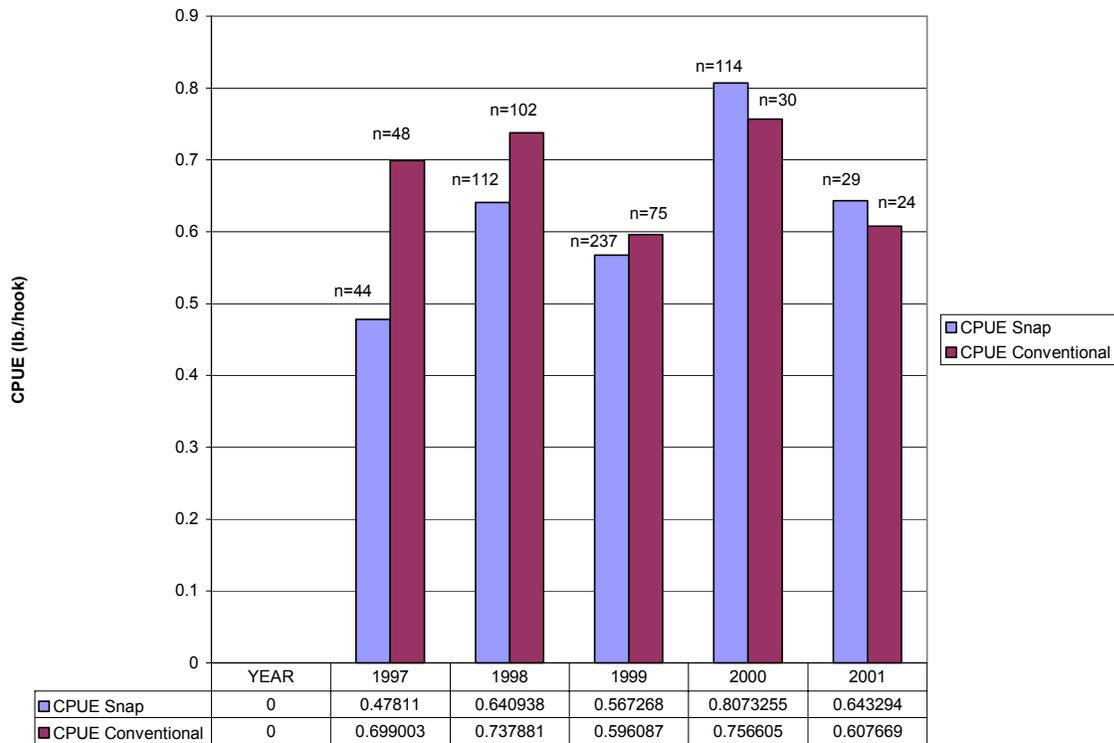


Figure 10. Commercial longline CPUE by year and gear type for Pacific cod (NSEI and SSEI).

APPENDIX

Appendix A. Listing of ADF&G Region I Commercial Fisheries groundfish personnel.

Andy McGregor, Regional Research Supervisor Scott Kelley, Regional Management Supervisor Deidra Holum, Fishery Technician IV	Douglas Office 802 3 rd 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, Fishery Technician V	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

Appendix B. ADF&G longline – pot fishery logbook form.

ADF&G LONGLINE - POT FISHERY LOGBOOK

PERMIT HOLDER _____ TARGET SPECIES _____ CREW SIZE _____ (includes skipped)
 VESSEL NAME _____ PORT OF LANDING _____
 ADF&G NUMBER _____ DATE LEFT PORT _____
 SKIPPER NAME _____ DATE OF LANDING _____

SYSTEM USED
 CONV SNAP
 OTHER (explain) _____

LONGLINE GEAR				POT GEAR				BAIT(S) USED	
HOOK SIZE/TYPE	SKATE LINE SIZE	HOOK SPACING	NUMBER OF HOOKS/SKATE	POT POT DIMENSIONS (ft)	GROUNDLINE WT. OR DIAMETER	POT SPACING (ft)		%	

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

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

SET NO.	DATE SET	TIME SET	Lat X Lon Beginning	DATE HAILED	TIME HAILED	Lat X Lon End	AVERAGE DEPTH (ft) OR POTS SET	NO. SKATES OR POTS SET	Y/N - (HOW MUCH?)	LOST GEAR	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								

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

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

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

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